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Solutia Ingenuity Productivity Performance

FEASIBILITY STUDY FOR OU-4 OF THE ANNISTON PCB SITE

Anniston, Alabama

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ACRONYMS AND ABBREVIATIONS

%	percent
°F	degrees Fahrenheit
ABS	dermal absorption factor
ADEM	Alabama Department of Environmental Management
ADWFF	Alabama Division of Wildlife and Freshwater Fisheries
AE	assessment endpoint
ALDOT	Alabama Department of Transportation
ARAR	applicable, relevant, and appropriate requirement(s)
ASTM	ASTM International
AWQC	Ambient Water Quality Criteria
AWWSB	Anniston Water Works and Sewer Board
BAF	bioaccumulation factor
BAZ	biologically active zone
BBL	Blasland, Bouck & Lee Inc.
BE-7	beryllium-7
BERA	baseline ecological risk assessment
bgs	below ground surface
CA	characterization area
CDM	Camp, Dresser, and McKee
CCWWTP	Choccolocco Creek Wastewater Treatment Plant
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulation
cfs	cubic feet per second
cm^2	square centimeters
CMZ	creek migration zone
CO_2e	carbon dioxide equivalents
COC	constituent of concern
COPC	constituent of potential concern
CSF	cancer slope factor
Cs-137	cesium-137
CSM	conceptual site model

CTC	critical tissue concentration
CTE	central tendency exposure
DL-PCB	dioxin-like polychlorinated biphenyl
DOI/DC	Department of Interior/Department of Commerce
DSR	data summary report
dw	dry weight
EAV	emergent aquatic vegetation
EC	effect concentration
EE/CA	engineering evaluation/cost analysis
ENSR	ENSR International
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EU	exposure unit
FEMA	Federal Emergency Management Agency
FI	fraction ingested
FS	feasibility study
FSP	field sampling plan
g/day	gram(s) per day
g-yr/kg-day	gram(s) per year/kilograms body weight per day
Geosyntec	Geosyntec Consultants, Inc.
GHG	greenhouse gas
Golder	Golder Associates
GRA	general response action
HAP	hazardous air pollutant
HDPE	high-density polyethylene
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IAF	intestinal absorption factor
IC	institutional control
ID	identification
IM	interim measure
IRIS	Integrated Risk Information System

IROD	Interim Record of Decision
ISM	Incremental Sampling Methodology
ITRC	Interstate Technology & Regulatory Council
JMWA	JM Waller™ Associates, Inc
kg	kilogram(s)
LAA	lower assessment area
LOAEL	lowest observed adverse effect
MAA	middle assessment area
MCL	maximum contaminant level
ME	measurement endpoint
µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
mg/cm^2	milligram(s) per square centimeter
mg/day	milligram(s) per day
mg/kg	milligram(s) per kilogram
mg/kg-day	milligram(s) per kilogram body weight per day
MMBtu	million British thermal unit(s)
MNR	monitored natural recovery
NCP	National Contingency Plan
NOAEL	no observed adverse effect level
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTC	non-time-critical
NTCRA	Non-Time-Critical Removal Action
NTE	not to exceed
OC	organic carbon
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
OU	operable unit
P/S	Pharmacia LLC and Solutia Inc.
PAH	polycyclic aromatic hydrocarbon
Pb-210	lead-210

PCB	polychlorinated biphenyl
PCD	Partial Consent Decree
PCDD/DF	polychlorinated dibenzo-p-dioxin and dibenzofuran
PM	particulate matter
PPIN	property parcel identification number
PRG	preliminary remediation goal
PTW	principal threat waste
RAGS	Risk Assessment Guidance for Superfund
RAL	remedial action level
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RGO	remedial goal option
RfD	reference dose
RFI	RCRA Facility Investigation
RFI/CS	RCRA Facility Investigation/Confirmatory Sampling
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
RM	river mile
RME	reasonable maximum exposure
ROD	Record of Decision
Roux	Roux Associates, Inc.
RPFSP	residential property field sampling plan
RSRWP	Residential Soil Removal Work Plan
SAIC	Science Applications International Corporation
SAV	submerged aquatic vegetation
SCS	United States Soil Conservation Service
SEFA	Spreadsheets for Environmental Footprint Analysis
SLERA	screening-level ecological risk assessment
Solutia	Solutia Inc.
SOx	sulfur oxide(s)
SPME	solid-phase microextraction
SSAP	supplemental sampling and analysis plan

SSSMA	south staging and soil management area
SVOC	semivolatile organic compound
SWAC	surface-weighted average concentration
TAL	target analyte list
TBC	to be considered
TEF	toxic equivalency factor
TEQ	toxic equivalent
TOC	total organic carbon
TRV	toxicity reference value
TSCA	Toxic Substance Control Act
TSS	total suspended solids
UAA	upper assessment area
UCL	upper confidence limit
URS	URS Corporation
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCB	United States Census Bureau
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WHO	World Health Organization
WOE	weight of evidence
ww	wet weight
WWTP	wastewater treatment plant

1 INTRODUCTION

This Operable Unit 4 Feasibility Study (OU-4 FS) identifies and evaluates a range of remedial alternatives for the OU-4 portion of the Anniston PCB Site (Site). This OU-4 FS presents the results of the detailed and comparative analysis of remedial alternatives for OU-4 that were initially presented in the *Technical Memorandum Summarizing Results of Comparative Analysis of Alternatives* (OU-4 Comparative Analysis Memorandum) that was submitted to the United States Environmental Protection Agency (USEPA) in July 2020 (Geosyntec Consultants, Inc. [Geosyntec] 2020). An initial version of the OU-4 FS was submitted to USEPA for review on June 21, 2021 (Geosyntec 2021). This version of the OU-4 FS, which is dated May 2023, includes additional information and addresses comments from USEPA on the April 2022 version of the OU-4 FS that were received on December 1, 2022 (USEPA 2022a).

1.1 Site Background

On August 4, 2003, the United States District Court for the Northern District of Alabama entered a revised Partial Consent Decree (PCD; USEPA 2003a) requiring, among other things, Pharmacia LLC and Solutia Inc. (together Pharmacia LLC and Solutia Inc. [Solutia] are referred to as P/S) to conduct a remedial investigation/feasibility study (RI/FS) for the Site. The Site is located in portions of Calhoun and Talladega Counties in the north-central part of Alabama, near Anniston (Figure 1-1). The Site has been investigated for the past 25 years based on the presence of polychlorinated biphenyls (PCBs) and other chemical constituents in various environmental media. The Site encompasses the Solutia Anniston Plant (the Facility) (formerly owned and operated by Monsanto Company, now known as Pharmacia LLC), other properties currently owned by Solutia Inc., certain residential and nonresidential properties owned by third parties, and portions of both Choccolocco Creek and Snow Creek and their 100-year floodplains. The Site is not on the Superfund National Priorities List and is being addressed through the Superfund Alternative Approach.

Because the Site is large and has varied land uses, it was initially divided into four OUs to facilitate parallel evaluation efforts in the different areas and to streamline the completion of remedial measures in specific locations, as appropriate. The work under the PCD identified the four separate OUs.

OU-3 includes the Facility and two closed landfills adjoining the Facility. An Interim Record of Decision (IROD) for OU-3 was issued on September 29, 2011 (USEPA 2011). The remedial design (RD) and remedial action activities for OU-3 are complete (GSI Environmental Inc. 2018) with the exception of ongoing long-term operation and maintenance (O&M). OU-1 and OU-2 have been combined into OU-1/OU-2 and include residential and nonresidential properties, respectively, around and downstream of the Facility along Snow Creek to Highway 78. The ROD for the OU-1/OU-2 portion of the Site was issued by USEPA on November 8, 2017 (USEPA 2017), and a Consent Decree for Remedial Design/Remedial Action was entered on March 26, 2021 (USEPA 2021a).

The OU-4 portion of the Site is the subject of this OU-4 FS and includes Snow Creek and its floodplain from Highway 78 to the confluence of Snow and Choccolocco Creeks and Choccolocco Creek and its floodplain from the backwater area upstream of Snow Creek to the embayment of

Lake Logan Martin on the Coosa River. USEPA has reserved the right to identify other OUs for the Anniston PCB Site after data from OU-4 and any other studies become available and are reviewed.

1.2 Purpose of this Report

This OU-4 FS has been prepared as a deliverable under the PCD (USEPA 2003a) between USEPA and P/S. The content and schedule for the OU-4 FS are based on the PCD and the additional schedule information presented in a letter from P/S dated August 26, 2015 (Solutia 2015). USEPA approved the schedule in a letter dated September 2, 2015 (USEPA 2015). The OU-4 FS is the final technical deliverable and follows the OU-4 Comparative Analysis Memorandum (Geosyntec 2020) inclusive of USEPA's January 20, 2021, comments (USEPA 2021b). The OU-4 FS addresses USEPA comments on a prior version of the OU-4 FS (Geosyntec 2022) and also summarizes the results of the OU-4 RI (Geosyntec 2019), the OU-4 human health risk assessment (OU-4 HHRA; JM Waller™ and Associates [JMWA] and Avatar Environmental 2013), the OU-4 baseline ecological risk assessment (OU-4 BERA; Arcadis 2016), and the OU-4 BERA Addendum that was issued on August 24, 2018 (USEPA 2018a). The OU-4 RI and risk assessments are important supporting documents that provide the bases for this OU-4 FS.

This OU-4 FS presents the detailed and comparative analysis of remedial alternatives for OU-4 using seven of the nine detailed evaluation criteria from the National Contingency Plan (NCP) recognizing that USEPA will evaluate community and State acceptance as part of preparing the OU-4 ROD.

1.3 Report Organization

The following outlines how the remainder of this OU-4 FS is organized:

- Section 2 presents information regarding characteristics for the OU-4 portion of the Site.
- Section 3 provides a summary of previously implemented removal actions, interim measures (IMs) and final corrective measures within OU-4.
- Section 4 presents a summary of RI results for OU-4.
- Section 5 presents a summary of the OU-4 HHRA, the OU-4 BERA, and the OU-4 BERA Addendum.
- Section 6 presents potential applicable and relevant and appropriate requirements (ARARs) and preliminary remedial action objectives (RAOs) and preliminary remediation goals (PRGs).
- Section 7 presents the preliminary remedial areas and volumes for residential soil, IM areas, nonresidential soil, and creek banks and sediment.
- Section 8 presents the identification of general response actions (GRAs) and evaluates a wide range of potentially applicable remedial technologies.
- Section 9 presents the development and screening for a range of remedial alternatives.
- Section 10 presents the detailed analysis of remedial alternatives.

- Section 11 presents the comparative analysis of remedial alternatives.
- Section 12 provides references used in preparation of this OU-4 FS.

Tables and figures are referenced throughout the document and are included in their own sections following the text.

The following is an overview of the OU-4 FS appendices:

- Appendix A presents the scope of work of special studies needed to fill data gaps regarding the nature and extent of PCBs and other constituents of concern (COCs) in the areas downstream of OU-4 to support future decision-making by USEPA. The proposed special studies, which include floodplain soil, sediment, surface water, fish tissue, and fish movement investigations, have been developed at the conceptual level and will be refined as part of the OU-4 RD.
- Appendix B presents the proposed long-term monitoring plan that will be conducted to assess the effectiveness of the remedy selected by USEPA for OU-4 in the ROD. The proposed long-term monitoring efforts are focused on the aquatic and floodplain portions of OU-4. The aquatic monitoring focuses on creek and creek bank portions of OU-4 and areas in Lake Logan Martin that are immediately downstream of Choccolocco Creek. Proposed long-term monitoring activities also include soil management support to assist in managing residual PCBs should they be present in areas where intrusive construction activities are planned that could disturb creek bank soil or sediment. Soil management in floodplain areas will focus on the potential disturbance of PCB residuals and potential changes in land use from nonresidential to residential.
- Appendix C is a letter from USEPA dated August 19, 2005, that provides clarification on the preliminary RAOs and data quality objectives developed for the Anniston PCB Site.
- Appendix D describes how the surface-weighted average concentrations (SWACs) were developed for floodplain soil. This includes SWAC values for ecological receptors that might contact the 0–0.5-foot horizon and SWAC values for the 0–1-foot horizon where human exposure is evaluated.
- Appendix E describes three alternative remediation scenarios for remediation of floodplain soil. The appendix includes figures showing the remediation footprint and depths of removal and preliminary engineering cost estimates to implement construction and engineering support activities to achieve SWACs for PCBs.
- Appendix F includes a description of the creek bank erosion model that was developed to evaluate the effect of creek bank source control actions.
- Appendix G includes a description of the sediment recovery model used to evaluate monitored natural recovery (MNR) in the depositional portions of OU-4. The MNR model was used during the OU-4 FS alternatives analysis of the seven remedial alternatives developed and evaluated for creek banks and sediment.

- Appendix H provides a summary of the findings based on review of the 2019 article "Review of Remediation Goals at Contaminated Sediment Sites in the United States" authored by Derek Pelletier and others (Pelletier et al. 2019) to evaluate the number of sites with remediation goals based on SWACs.

A complete electronic copy of this OU-4 FS can be found at OU-4 FS, and an overall public access folder for the Site including this document can be found at Anniston PCB Site - Public Share.

2 SITE CHARACTERISTICS

The characteristics of OU-4 are described in this section under the subheadings of climate, geology, hydrogeology, surface water hydrology, geomorphology, National Resources Conservation Service channel project, demographics and land use, Conservation Corridor, and ecological habitat.

This section shows that although the habitat has been affected by human activity, there is valuable aquatic and riparian habitat in OU-4.

2.1 Climate

The climate in OU-4 is characterized as humid and subtropical, with hot summers, mild winters, and some precipitation during each month of the year. Rainfall is the primary form of precipitation, with an average of 54 inches per year, the majority of which occurs during winter. Droughts are infrequent, and the average annual evapotranspiration rate in the area is approximately 42 inches. The mean annual temperature is 62 degrees Fahrenheit (°F). The average temperature for January is 44°F, and the average temperature for July is 80°F.

Based on data collected in Anniston from April 1, 2003, to March 31, 2004 (ENSR International [ENSR] 2004), the atmosphere is generally thermally stable. The ENSR data indicate that the prevailing winds generally blow from the southeast approximately 11 percent (%) of the year and from the west-southwest approximately 8% of the year. Additionally, the winds are calm (i.e., 0–1 mile per hour) 17% of the year.

The OU-4 FS also recognizes that the evaluation of the remedial alternatives and subsequent implementation of the selected remedy will need to consider climate resilience as described in the *Climate Resilience Technical Fact Sheet: Contaminated Sediment* (USEPA 2019) and *Consideration of Climate Resilience in the Superfund Clean-up Process for Non-Federal National Priorities List Sites* (USEPA 2021c). Considerations related to climate change are initially evaluated as part of the long-term effectiveness criteria in the detailed analysis of remedial alternatives presented in Section 10 of this OU-4 FS. Additional consideration of climate change will be conducted as part of the RD for OU-4 and as part of long-term monitoring following remedy construction.

2.2 Geology

2.2.1 Physiographic Province

The study area for OU-4 lies almost entirely within the Valley and Ridge physiographic province, one of the five physiographic regions into which Alabama is divided. The provinces are differentiated by geologic structure, rock types, and topographic relief (Kopaska-Merkel et al. 2005). The Valley and Ridge province consists of a series of converging and diverging ridges and valleys that generally trend northeast to southwest (Raymond et al. 1988). The Valley and Ridge province features the complicated polydeformed strata of the sedimentary foreland fold-and-thrust belt and the lower greenschist facies (Whiting 2009). The ridges are formed largely by sandstone and chert beds, and the valleys are underlain by shale and carbonate rocks (Raymond et al. 1988).

The folded strata are punctuated by thrust faults, and the most prominent of these near the Site is the Jacksonville Fault (Scott et al. 1987).

2.2.2 Stratigraphy of Study Area

The stratigraphy of the study area is principally comprised of three Cambrian-age geologic units, from oldest to youngest, as follows: the Rome Formation, the Conasauga Formation, and the overlying Knox Group. The Rome Formation is predominantly a grayish-red-purple and green shale that grades upward to tan, medium-grained sandstone and siltstone with intermittent beds of thinly laminated dolomitic limestone exposed in some areas (Erickson 1985). The Conasauga Formation is a sequence of medium-gray to blue, micritic, argillaceous locally oolitic limestone and dark brown to green shale (Whiting 2009). The units of the Knox Group are marked by heavily weathered outcrops of deep red carbonate residuum with blocks of gray to tan chert, which are typically massive but locally laminated/bedded or brecciated (i.e., composed of sharp fragments embedded in a fine-grained matrix such as sand or clay). The topography of the Knox Group is characterized by broad, flat valleys, with discontinuous low hills and ridges comprised of chert and dolomite (Whiting 2009).

2.2.3 Surface Water Features of Study Area

OU-4 is defined by the boundaries of Choccolocco Creek and the adjacent 100-year floodplain. The flow of Choccolocco Creek is generally near the centerline of the 100-year floodplain. The 100-year floodplain was developed for OU-4 using site-specific surface water modeling results generated during the Resource Conservation and Recovery Act (RCRA) program and documented in the *Off-Site RCRA Facility Investigation (RFI) Report* (Off-Site RFI Report; Blasland Bouck & Lee [BBL] 2000a). While the project footprint for the 100-year floodplain is similar to the 100-year floodplain developed by the Federal Emergency Management Agency (FEMA) for the general area, the 100-year floodplain developed for the project was selected for use in the OU-4 RI. This decision was based on using site-specific hydraulic modeling to set the initial floodplain and subsequent refinements (expansions of the floodplain) that were developed using topographic information from the National Elevation Data Set published by the United States Geological Survey (USGS) in 2009. The process to refine the footprint of the 100-year floodplain and the associated revisions are presented in Attachment A to the 2010 *Phase 3 Field Sampling Plan for Operable Unit 4* (OU-4 Phase 3 FSP; Arcadis 2010a).

A variety of native materials, including soils ranging from clays to gravels as well as areas in contact with bedrock, comprise the bed of the Choccolocco Creek basin. The Choccolocco Creek-Lake Logan Martin watershed consists of unconsolidated Quaternary and Tertiary fluvial deposits and a weathered bedrock residuum, forming a mantle over the Paleozoic stratigraphy in much of the watershed (Warman and Causey 1962). The fluvial deposit consists of a mix of gravel, silt, and clay and extends to a thickness of up to 100 feet (Scott et al. 1987). The bedrock residuum is comprised of mixed residual clay and chert boulders and fragments ranging in thickness from 30 to 100 feet, where present (Scott et al. 1987).

Upstream of the confluence of Choccolocco Creek and Snow Creek, weathering of the Knox Group provides a clay overburden with chert gravel and cobbles. At the area of confluence, weathering of the Conasauga Formation, comprised of mudstones and shales with interbedded limestones and siltstones, provides a creek bed of silty sands and intermittent gravel bars. Below

the confluence and beyond the Conasauga Formation, the Knox Group again dominates the underlying geology, providing a source of cobbles to Choccolocco Creek's creek bed. Several miles farther downstream, the stream grade increases as Choccolocco Creek intersects a ridge of Conasauga dolomite and limestone. Farther downstream, Jackson Shoals is formed by an outcrop of quartzose sandstone of the Rome Formation. Downstream of Jackson Shoals, the channel and virtually all of Lake Logan Martin are underlain by the Knox Group. Soils entering Lake Logan Martin as suspended sediment via surface water runoff are generally cherty loams from the limestone dolomite residuum (BBL 1999a). The geology of the vicinity of Choccolocco Creek is depicted on Figure 2-1.

2.3 Hydrogeology

2.3.1 Regional Aquifers

OU-4 lies within the Alabama Valley and Ridge physiographic section, which encompasses the following districts, from west to east (Kopaska-Merkel et al. 2005):

- Birmingham-Big Canoe Valley
- Cahaba Ridges
- Cahaba Valley
- Coosa Ridges
- Coosa Valley
- Weisner Ridges

Major aquifers within these physiographic sections include the Knox-Shady aquifer and the Tuscumbia-Fort Payne aquifer. The Knox-Shady is the predominant of these two aquifers within or near OU-4 and is composed of fractured quartzite of the Weisner Formation and limestones and dolomites of the Shady Formation, Conasauga Formation, Copper Ridge, and Chepultepec Dolomites (Planert and Pritchett 1989). In the Birmingham-Big Canoe Valley, where the Conasauga Formation is composed of limestone, yields are substantial where the dominantly calcareous and steeply dipping strata contain well-developed dissolution channels (Kopaska-Merkel et al. 2005). In the Coosa Valley, where the Conasauga Formation includes shale, the limestone aquifer is low-yielding and is used only for domestic supplies. The water-bearing areas are usually associated with valleys and not ridges (Kopaska-Merkel et al. 2005).

2.3.2 Aquifer Recharge

Rainfall is the principal source of recharge to aquifers in OU-4; however, occasionally snowfall contributes to the recharge (Kopaska-Merkel et al. 2005). A large portion of the 54 inches per year of precipitation runs off during and directly after rainstorms. Most of the remainder is returned to the atmosphere by evapotranspiration. A relatively small portion of the total rainfall infiltrates to the water table, thereby providing aquifer recharge. Based on data from six long-term gauging stations within the study area, the estimate for aquifer recharge in the area is about 5 inches per year (Planert and Pritchett 1989).

2.3.3 Groundwater Occurrence

Groundwater within the shallow residuum generally occurs under unconfined (i.e., water table) conditions beneath Choccolocco Creek. Typically, the water table surface reflects the ground surface, and shallow groundwater flow follows surface topography. This aquifer system's natural annual groundwater level fluctuations are generally less than 10 feet. Groundwater generally flows from the higher altitudes next to the ridges toward the center of the valleys and then down valley (Planert and Pritchett 1989). Within the Choccolocco Creek watershed, groundwater flow generally follows the topographic terrain toward Choccolocco Creek (Scott et al. 1987).

2.3.4 Groundwater-Surface Water Interaction

Incised streams can gain water from the aquifers they penetrate, and this is a factor in OU-4 (Planert and Pritchett 1989). Potentiometric data from the Choccolocco Creek watershed indicate that Choccolocco Creek is a gaining stream, with groundwater discharging into the creek. Average potentiometric surface contours in the upper residuum along the path of Choccolocco Creek show groundwater table contour lines that point in the upstream direction (Scott et al. 1987, Kopaska-Merkel et al. 2005), thereby indicating that groundwater is discharging to the creek (Todd 1980).

2.3.5 Groundwater Quality

The groundwater in the Valley and Ridge aquifer system is generally high quality, though it ranges from moderately hard to very hard, reflecting the mineral composition of carbonate rocks (i.e., limestone and dolostone) that comprise the aquifer system. Dissolved iron occurs naturally in the shallow groundwater of the Valley and Ridge geologic province (Kopaska-Merkel et al. 2005).

2.3.6 Springs

A number of springs have been identified and located within and near OU-4. Discharge rates of the springs range from less than 1 gallon per minute to greater than 20,000 gallons per minute (Kopaska-Merkel et al. 2005). Many of these springs are found along the trace of thrust faults and produce sufficient water for domestic uses and, in some cases, for municipal supply. The two most significant springs located near or within the OU-4 area are Collateral Spring and Coldwater Spring. Collateral Spring is located within the city of Oxford, just south of Interstate 20. Coldwater Spring is west of the city of Oxford, approximately 1 mile north of Interstate 20 (see Figure 2-2).

2.3.7 Water Supply

Coldwater Spring is the primary water source for the city of Anniston, Fort McClellan, Anniston Ordinance Depot, and other municipalities and communities within Calhoun County (Scott et al. 1987). During an observation period from 1957 to 1983, the average discharge of Coldwater Spring was approximately 31 million gallons per day, and the minimum discharge was 23.5 million gallons per day (Scott et al. 1987). The city of Oxford currently relies on groundwater as its primary water source and operates five production wells (each approximately 300 feet deep) that draw water from the Knox Group and Shady Dolomite Aquifer. The water from each well is tested regularly and meets all drinking water regulations without treatment (Oxford 2011). Additional public supply wells are located throughout Talladega County, near the 100-year floodplain of Choccolocco Creek. Locations of identified springs, public water supply wells, and the OU-4 RI

wells are depicted on Figure 2-2. In addition, Figure 2-2 shows the active groundwater investigation wells in the OU-1/OU-2 portions of the Site as well as the locations of two private water supply wells that were sampled as part of the OU-4 investigation.

2.4 Surface Water Hydrology

Snow Creek is a high-gradient stream with a slope of typically 20 to 30 feet per mile, flowing through an urbanized corridor of Anniston and Oxford. Snow Creek is a key tributary to Choccolocco Creek that drains the upstream portions of the Site. The mean flow within Snow Creek increases from approximately 5 cubic feet per second (cfs) at the confluence with the 11th Street Ditch to 28 cfs as it discharges to Choccolocco Creek. The steep basin terrain produces sharp peak flows. The estimated 10-year and 100-year recurrence interval floods for Snow Creek at the point it discharges to Choccolocco Creek are 4,030 cfs and 6,900 cfs, respectively (FEMA 1993). Other key tributaries include Coldwater Creek, Eastaboga Creek, and Cheaha Creek (Figure 1-1).

Some sections of the Snow Creek channel have been substantially modified (e.g., paved, relocated). These modifications cause the velocity profile of the stream to be erratic near bridge and culvert restrictions. At its confluence with Choccolocco Creek, the drainage area of Snow Creek is 19 square miles. Because of the steeply sloped basins, floodwaters rise and fall quickly, and flooding occurs at numerous locations (often associated with backwater pooling caused by bridges and culverts affecting the natural course of the stream). To date, flood protection measures have been limited to minor, localized efforts, including widening and/or installing concrete-lined sections of the Snow Creek channel. Additional flooding problems are caused by debris that collects at the bridges or culverts, which further restricts flows. The most downstream (500–900-foot) portion of Snow Creek before it joins Choccolocco Creek can be influenced by backwater conditions from Choccolocco Creek during periods of high flow.

Average surface water flows are shown on Figure 2-3, and flow rates for several historical high-flow events at two locations along Choccolocco Creek (near the confluence with Coldwater Creek and the Jackson Shoals/Highway 77 area) are included in Table 2-1. Comparing these observed flow measurements with the estimated 10-year and 100-year flood events presented in Table 2-2 shows that the 10-year flow event has occurred frequently over the past 60 years. While the 100-year flow event has not occurred during this time period, a near 100-year event was measured during 1951. Despite not having a 100-year flood event occur over the past 60 years, the channel and banks of Choccolocco Creek regularly experience high surface water flows as the creek overflows its banks three to four times per year (BBL 2000a). The additional floodwaters conveyed in the floodplain during the out-of-bank condition results in the in-creek surface water velocities being similar to runoff events that occur throughout each year. During the out-of-bank condition, surface water flows extend 1,000 to 4,000 feet into the floodplain and have low velocities (1 to 1.5 feet per second). This is due to the larger cross-section flow area through the combined in-creek and floodplain areas. Since the additional surface water flows during the 1-, 2-, 10- or 100-year events are largely conveyed outside of the creek channel, the creek banks are exposed to high flows several times throughout the year with surface water velocities similar to the less frequent high-flow events (e.g., the 10-year event).

During low-flow conditions (dry weather), groundwater provides base flow for streams and creeks in the area (Scott et al. 1987). During periods of high precipitation and correspondingly high surface water flows, gradients reverse and floodwaters from streams provide groundwater recharge. Overall, both the Snow Creek and Choccolocco Creek portions of OU-4 are considered gaining streams.

A defining surface water flow feature for OU-4 is the backwater area located at the confluence of Snow Creek and Choccolocco Creek (Figure 2-3). The backwater area receives direct surface water flow from both creeks, and, because of the area's physical configuration and hydraulic characteristics, much of the area acts as a settling basin for solids suspended in the water column. Sediment deposits in large portions of this backwater area are fine grained and, in some locations, up to 5 feet thick. During high-flow conditions, surface water velocities from Snow Creek flows decrease as they enter the larger backwater area. The surface water flows from Snow and Choccolocco Creeks on the upstream sides of the backwater area, combined with the confining nature of the Friendship Road embankment on the downstream side of the backwater area, create this settling-basin effect. Under high-flow conditions, the downstream flow of Choccolocco Creek (including the flow from Snow Creek) is limited by the bridge opening where the Friendship Road bridge crosses over Choccolocco Creek. A small relief opening is also located in the southeastern end of the Friendship Road embankment. This relief opening only receives flow during the more extreme flooding events; its presence does not change the settling basin characteristics of the backwater area. The overall flow of surface water into the backwater area during periods of high flow is greater than the amount of water that can exit through the Friendship Road bridge. As a result, surface water from Snow and Choccolocco Creeks backs up or is impounded in the backwater area. As surface water is impounded in the backwater area, including a braided-stream network that is somewhat stagnant during low-flow periods, the surface water velocities are lowered to a point where the solids suspended in the water column settle and become part of the sediment matrix. Surface water flow velocities in this braided stream network are quite low, even during periods of high flow on the main stem of Choccolocco Creek. As a result, a portion of the fine-grained sediment suspended in the water column may settle from the water column and become part of the sediment matrix in the backwater area. Data to determine when sediment was deposited in the backwater area (geochronological data) are presented and discussed in Section 4.2.2 of this OU-4 FS and support the historical deposition of sediment in large portions of the backwater area.

2.5 Geomorphology

In the portion of Alabama where the Choccolocco Creek watershed is located, both topography and surface soil composition depend closely on the parent bedrock material. The channel morphology and sediment transport characteristics of Choccolocco Creek, in turn, depend on the topography and surficial soils of the basin through which it flows. Surface soil development is related to sediment transport; more soil series in this area have been developed from transported material than from residual material (United States Soil Conservation Service [SCS] 1961).[1] As discussed above, the native materials in the Snow and Choccolocco basins include a broad range of solids ranging from clays to gravels, as well as bedrock contact areas.

[1] The SCS is currently known as the Natural Resources Conservation Service (NRCS).

In general, the Choccolocco Creek streambed is in a state of dynamic equilibrium, with the possible exception of the section where the NRCS projects were completed (described in Section 2.6). Although there can be a short-term response to specific events that cause either temporary aggrading or degrading of the sediment bed, due to the state of equilibrium, there is a tendency for the bed to return to its current form. In the section of Choccolocco Creek containing the NRCS-dredged pits known as sediment traps, the streambed might be erosional because these traps were designed by NRCS to destabilize and erode areas of the sediment bed immediately upstream.

Choccolocco Creek can be viewed as a sand channel, which has had excess gravel loaded through the lower two-thirds of the basin. The creek is characterized as an older system with little channel erosion and only a small portion of bedload. Channel meander appears to develop, and the broad floodplain and natural levees with mature trees on both banks are also characteristics of a mature, relatively stable system.

The abundant gravel in the streambed plays a significant role in providing stability to the Choccolocco Creek streambed channel. Much of the gravel has been derived from the Chilhowee and Knox Groups through which the creek flows. In addition, tributaries to Choccolocco Creek that flow through the Knox Group appear to have contributed significant gravel bedload to Choccolocco Creek in the past. Currently, Dry Creek is the only tributary making a significant gravel contribution, estimated to be as much as 400 cubic yards per year (SCS 1989).

Most of the gravel-size sediments in the system are old and were derived from frost action during glacial epochs and chemical weathering. The primary production of gravel no longer occurs. Past geologic processes during the historical valley entrenchment and fill periods distributed the coarser sands and gravels within the stream alluvium. This gravel horizon is extensive, underlying much of the floodplain, and is evidenced by historical gravel mining operations in the floodplain area downstream of Snow Creek. Presently, there is little movement of gravel other than very localized bank erosion followed by redeposition in gravel bars.

Sands presently constitute the most mobile sediments internal to the channel. The entire channel system contains significant quantities of sand originating from disintegration of quartzite and sandstone of the Chilhowee Group and Rome Formation. Sands are also generated from other formations that outcrop within the basin. Although tributaries still deliver sands to Choccolocco Creek, decreased agricultural development has substantially reduced the transport of sands. In terms of energy, Choccolocco Creek would be in equilibrium with a sand channel. The median particle diameter of Choccolocco Creek samples is predominantly in a sand-size range.

Fine sediments make up the majority of the suspended sediment load transported by Choccolocco Creek. Virtually all the residuum in the watershed contains significant amounts of fines. Residuum of limestone, shale, and slates are high in clays. Residuum of mudstone and sandstone are high in silts. Even under the relatively nonintrusive land uses that currently exist in the watershed, soil erosion can produce significant quantities of fines. Most of the fines move readily through the system, discharging to Lake Logan Martin. To a lesser extent, some may be carried to overbank areas and deposited in the floodplain.

In 1980, SCS conducted a survey of 30 miles of Choccolocco Creek (SCS 1989). Channel bank erosion was noted in only 10 locations. All 10 locations occurred on the outside of sharp curves in

the channel. The only other localized areas of bank erosion noted were in areas where debris (usually fallen trees) deflected flows directly into the banks. In several areas downstream of the Highway 21 bridge, channelization resulted in cutting off three oxbows.

In 2005, USEPA conducted an aerial photographic historical analysis of Snow and Choccolocco Creeks to

> *"document visible changes in the creek channels caused by natural and anthropogenic processes and identify fluvial features that are potential locations of contaminated deposits containing pollutants such as polychlorinated biphenyls" (Environmental Photographic Interpretation Center [EPIC] Study; USEPA 2005a).*

The results of the USEPA analysis of Choccolocco Creek are presented on Figures 2-4a through 2-4c. These figures denote the 100-year floodplain along with "historical fluvial features" as identified by USEPA. The fluvial features and interpretations regarding their character are presented in Table 2-3. Fluvial features identified in Choccolocco Creek in the EPIC study fall into two categories: those that are clearly associated with either the creek or its floodplain over the last 65 years and those features that are either obviously not associated with Choccolocco Creek or predate 1940. This second class of features tends to add some "noise" to Figures 2-4a through 2-4c and appears to be related to tributary features or alignments of Choccolocco Creek prior to 1940. Examples of the noisy features include fluvial features 25, 37, 39, and 51 (Figure 2-4a).

Fluvial features such as 28 through 31 (Figure 2-4a) were previously identified and sampled under the Off-Site RFI program. These features are currently in the Choccolocco Creek floodplain and were referred to as former oxbows in the Off-Site RFI. These former oxbows are related to channel modifications designed and constructed by NRCS (Figure 2-5). The channel modifications were implemented to reduce flooding in the area, and field observations during the Off-Site RFI indicate that although they are not connected to the creek during normal flow conditions, the former oxbows are low-lying areas and occasionally contain ponded water. PCB concentrations in these areas are elevated, as is expected in low-energy areas of the former creek and current floodplain.

The fluvial features identified in the EPIC study report provide additional information regarding the distribution of PCBs in certain areas of the floodplain. For example, additional floodplain soil sampling was conducted outside the floodplain in the general area of features 24 and 25 to complete the definition of nature and extent of contamination in this portion of the floodplain.

2.6 National Resources Conservation Service Channel Projects

NRCS developed and implemented a plan to physically modify the Choccolocco Creek channel. The plan was to enlarge the Choccolocco Creek channel such that the channel capacity could carry the maximum low-stage release from 10 floodwater-retarding structures plus 1.5 inches of runoff from the uncontrolled portion of the basin. The plan was intended to give the channel the capacity to carry a flow volume approximately equivalent to that generated by a 0.5-year to 1-year storm.

As part of the planning for the channel enhancement project between 1980 and 1985, NRCS independently and in cooperation with Monsanto Company, collected sediment samples for PCB, mercury, and other contaminants. NRCS used the sample analyses to delineate PCB-containing

sediment in excess of 50 milligrams per kilogram (mg/kg) to determine if sediment removed from the channel needed to be managed under the Toxic Substance Control Act (TSCA). None of the sediment sample results showed PCB concentrations in excess of 50 mg/kg, so NRCS did not manage any of the sediment under TSCA and did not take any measures to reduce the disturbance and transport of PCB-impacted sediment downstream.

The Choccolocco Creek channel enhancement project was conducted in three phases during 1990, 1993, and 1994. This work was conducted along an approximate 15-mile reach centered near the confluence of the Snow and Choccolocco Creeks (Figure 2-5). Modification of the channel consisted of the following activities:

- Clearing and snagging to improve capacity and removing debris that was causing bank erosion
- Excavating pits in the sediment bed to allow the flow in Choccolocco Creek to scour sediment and provide traps to capture bedload sediment
- Excavating channel cutoffs and floodways to reduce meanders and improve capacity at select locations
- Installing rock riprap to stabilize probable erosion
- Following up with additional cleanout of the sediment traps

The intended result of these modifications was to create a channel with essentially the same bank conditions and make the channel 1 to 4 feet deeper.

As part of the streambed-deepening portion of the project, bed sediment from approximately 25% of the channel length was proposed for excavation. The designated sediment was located at point bars or other major armored sediment deposits to remove as much of the coarse material and the deepest sediment controlling stream grade as possible. NRCS anticipated that the select removal would destabilize the remaining sediment bed, thus, inducing sediment movement, including sediment containing PCBs or other contaminants. The original excavations would serve as sediment traps for remobilized material and would be dredged periodically until the creek scoured the bed to the desired elevation.

The project design called for streambed material to be placed on land in existing depressions or in spoil piles near the creek (Figures 2-6a and 2-6b). Spoil piles were covered with 6 inches of topsoil. The *Dredge Spoil Area Evaluation Report, Snow Creek and Choccolocco Creek, Calhoun and Talladega Counties, Alabama* (Roux Associates, Inc., [Roux] 1998) provides detailed measurements and descriptions and photographs of each dredge spoil area. All sediment disposal areas are within the footprint of the floodplain and away from the creek bank.

2.7 Demography and Land Use

The following subsections provide information on land use within OU-4 as well as data on the demography for the surrounding cities of Oxford, Munford, Talladega, and Lincoln and their respective counties. The city of Oxford is in both Calhoun and Talladega Counties and is located at the most upstream portion of OU-4 at the confluence of Snow Creek and Choccolocco Creek. The cities of Munford, Talladega, and Lincoln are within Talladega County only. Munford is

located approximately 8 miles downstream from the confluence of Snow Creek, and only the northern portion of the city is located within the OU-4 100-year floodplain. Talladega's northern city limit is located approximately 4 miles south of Choccolocco Creek and 14 miles downstream from the confluence of Snow Creek. Choccolocco Creek runs through the center of the city of Lincoln, approximately 18 miles downstream from the confluence of Snow Creek.

The area land use for the entire Site ranges from heavy industrial and manufacturing to largely agricultural or forested. The majority of OU-1/OU-2 is a mixture of residential and nonresidential properties with the nonresidential areas including a range of industrial and commercial uses. The southern portion of OU-1/OU-2 forms the northeastern border of OU-4 and is in the city of Oxford. This northeastern portion of OU-4 is different than the remainder of OU-4 and includes residential, commercial, and some manufacturing. The majority of OU-4 includes agricultural and forested areas that together comprise 87% of the land use for OU-4 (Section 2.7.2).

2.7.1 Demographics

Population, demography, and growth estimates for the cities of Oxford, Munford, Talladega, and Lincoln are based on the latest census information—the 2020 Census conducted by the United States Census Bureau (USCB):

- Oxford: The total population of the city of Oxford was 22,069, with 25.2% of the population under the age of 18, 74.8% of the population 18 years old or over, and 14.5% of the population over the age of 65. Oxford's population was estimated to drop less than 1% by 2022 (USCB 2020).
- Munford: The total population of the city of Munford was 1,351, with 23% of the population under the age of 18, 77% of the population 18 years old or over, and 13.4% of the population over the age of 65. Munford's population was estimated to decrease by less than 1% by 2022 (USCB 2020).
- Talladega: The total population of the city of Talladega was 15,861, with 16.9% of the population under the age of 18, 83.1% of the population 18 years old or over, and 18.2% of the population over the age of 65. The city of Talladega's population was estimated to decrease by less than 1% by 2022 (USCB 2020).
- Lincoln: The total population of the city of Lincoln was 6,845, with 22.9% of the population under the age of 18, 77.1% of the population 18 years old or over, and 13.1% of the population over the age of 65. The population of Lincoln was estimated to grow by approximately 1.5% by 2022 (USCB 2020).

In 2020, Calhoun County, Alabama (which includes the city of Oxford), had a population of 116,441, with 21.5% of the population under the age of 18, 78.5% of the population over the age of 18, and 18.1% of the population over the age of 65 (USCB 2020). In 2020, Talladega County, Alabama (including the cities of Oxford, Munford, Talladega, and Lincoln), had a population of 82,149 with 20.9% of the population under the age of 18, 79.1% of the population over the age of 18, and 18.5% of the population over the age of 65 (USCB 2020).

2.7.2 Land Use

The Choccolocco Creek floodplain encompasses approximately 6,000 acres. Numerous properties within OU-4 are owned by private and public entities and are used for forestry, agricultural, commercial, industrial, recreational, and residential purposes. Figure 2-7 depicts land use within the 100-year floodplain. Agricultural and forested lands account for 87% of current land use within the floodplain. Residential land use is currently limited to several isolated areas. The commercial and industrial areas consist of the airport property and two publicly operated wastewater treatment plants (WWTPs) serving the cities of Anniston and Oxford.

The percentage of each land use in OU-4 is shown on the pie chart inset on Figure 2-7 and is as follows:

- Agricultural: 44%
- Forest: 34%
- Scrub: 8%
- Commercial/Industrial: 6%
- Residential: 3%
- Roads: 3%
- WWTP: 1%
- Parks: 1%

2.8 Conservation Corridor

In 2001, a Conservation Corridor was proposed as part of a broader watershed framework for areas surrounding Choccolocco Creek and along downstream portions of Snow Creek. The need for land use controls to protect Choccolocco Creek was recognized due to a combination of (i) land use practices occurring at the time, (ii) the effects of urban drainage from the broader watershed entering the creek, and (iii) a series of point discharges that entered the creek. These concerns were initially identified through a water quality and habitat study conducted by Auburn University (Bayne 1997) and were supported by habitat studies conducted under the RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) programs. The vision for these land use controls was to limit the impacts of urban runoff and agricultural practices on the creek and floodplain.

The Conservation Corridor concept was formalized in 2005 and has since been executed through the nonprofit Georgia-Alabama Land Trust, Inc. (including predecessor organizations: Alabama Land Trust, Inc., and The Chattowah Open Land Trust, Inc., collectively known as the Land Trust). In combination, this Land Trust safeguards over 448,000 acres of conservation land (Georgia-Alabama Land Trust 2023). This Land Trust has received national recognition for their land conservation practices and procedures and received national accreditation from the Land Trust Accreditation Commission, an independent program of the Land Trust Alliances. Additionally, this Land Trust has a local presence and has demonstrated effectiveness at maintaining active and sustainable engagement with the local community and providing ongoing stewardship of the

properties—both of which are essential for effective long-term implementation of a Conservation Corridor.

The key concepts of the Conservation Corridor are to protect and enhance water quality in Choccolocco Creek by limiting development of and implementing best practices for lands bordering the creek. These concepts are also consistent with the overall watershed management concepts being implemented nationwide. The following is the list of goals that the Land Trust used for guiding development of the Conservation Corridor:

- Protect the undeveloped nature of land bordering Choccolocco Creek.
- Create a natural habitat terrestrial corridor along Choccolocco Creek.
- Minimize stream bank and soil erosion by creating and protecting forested riparian buffers.
- Protect natural habitat for rare, endangered, or threatened species.
- Preserve open space for public enjoyment.
- Protect the land surrounding Choccolocco Creek from land fragmentation and preserve its contiguous, open-space nature.
- Provide land use protections (e.g., formal deed restrictions) that survive in perpetuity.
- Protect the existing land uses and landowners' rights.

These goals and the expertise of the Land Trust were used to target land for acquisition—through conservation easements or purchase—for the Conservation Corridor.

Property easements or land acquisitions were obtained in a phased approach with the initial focus on the first 10 miles of Choccolocco Creek downstream from its confluence with Snow Creek. The areas targeted along this reach included the creek bank outward to the 100-year floodplain or 1,000 feet from the creek bank, whichever was less. The downstream end of this initial 10-mile reach was the confluence of Choccolocco Creek and Coldwater Creek. The second area of focus began at the Coldwater Creek confluence and extended downstream to approximately Highway 77. The targeted width of the Conservation Corridor along this lower 21-mile portion of Choccolocco Creek was narrower and included a 150-foot buffer on each creek bank. This narrower corridor was deemed appropriate because land development pressures were lower in these downstream areas and protecting the riparian buffer zone immediately adjacent to the creek is a high priority for the Conservation Corridor. It also minimized the size (acreage) of the area that would be placed under easement or acquired, which in turn, provided a cost-effective use of funding resources.

Over 1,500 acres of land are currently part of the Conservation Corridor (Figures 2-8a through 2-8t). Figure 2-8a is a summary key for the Conservation Corridor figure series. Figures 2-8b through 2-8t show the Conservation Corridor as it currently exists. The easement areas on the figures are often identified by zone, based on the distance from the creek bank. The use limitations of the zones are detailed in the individual baseline data reports that are part of the conservation easements. Although the specifics vary by easement, the zones and their permitted uses generally include the following:

- Zone 1 is the area closest to the creek bank and usually extends 50 to 100 feet from the bank. The intent of Zone 1 is to leave the riparian buffer zone as natural as possible. Planting native hardwood trees is allowed with the intent of converting the acreage into a functioning hardwood forest ecosystem.
- Zone 2 is the area outside of Zone 1 and can extend up to 500 feet from the creek bank. The uses permitted in Zone 2 are more flexible than in Zone 1 but are still constrained. For example, commercial timber harvesting is permitted provided it is conducted in accordance with forestry management guidelines and the specific terms of the easement.
- Zone 3 includes the areas outside of Zone 2. In Zone 3, buildings, structures, utility lines, driveways, roads, and excavation are prohibited unless specifically accepted in the easement.
- Some of the figures and deeds include a riparian buffer zone, defined as within 50 feet of the Snow Creek bank and within 200 feet from the Choccolocco Creek bank. The riparian buffer zone is similar to Zone 1, where no agricultural uses, including timber harvesting, are permitted.

For some of the properties, an agricultural easement is also in place. The agricultural easement areas are located outside of Zones 1 and 2, and, in keeping with the conservation values and historical uses of the property (not commercial farming), agricultural activities are permitted provided they do not cause soil erosion or other harm. Domestic and farm animals must be confined so they cannot access Zones 1 or 2.

The Land Trust is responsible for inspecting easement areas and Land Trust-owned properties as part of their ongoing stewardship commitments. This includes identifying locations where activities are taking place on the properties that are inconsistent with the provisions of the conservation easements. The Land Trust is currently conducting inspections throughout the year and providing the report(s) on those inspections to P/S. P/S will periodically confirm the Land Trust's stewardship in the Conservation Corridor using the Land Trust's annual inspection reports as a technical basis.

2.9 Ecological Habitat

OU-4 is the most geographically expansive of the OUs delineated at the Anniston PCB Site. It encompasses large areas of potentially suitable habitat for ecological receptors and includes a variety of distinct habitats. It also includes a number of areas that have been substantially affected by agriculture, grazing, urbanization, and other human activities. Several ecological investigations were conducted in OU-4 between 1996 and 2010, including habitat assessments and ecological surveys of vegetation, benthic macroinvertebrates, fish, reptiles, amphibians, birds, and mammals. These data were collected to meet a variety of specific objectives and to support ecological risk assessment activities for OU-4.

The habitat within OU-4 can be divided into aquatic and terrestrial habitats. Aquatic habitats encompass the creek and its banks. Terrestrial habitats encompass the adjoining 100-year floodplain outside of the creek banks. The initial portion of the floodplain immediately adjacent to

the creek bank includes the riparian corridor that often includes a forested canopy buffer along the creek edge. The habitat types within OU-4 are described below.

2.9.1 Aquatic Habitats

The aquatic habitats and benthic substrates and communities of Choccolocco Creek were assessed by Bayne (1997), by BBL (2000a, 2005a), and by Arcadis BBL (2007). The assessments evaluated the habitat and biological communities along Choccolocco Creek. Five general habitat types were identified: riffle, run, emergent aquatic vegetation (EAV), depositional, and backwater. Instream habitat observations were dominated by riffles and EAV. The majority of both the riffle areas and EAV occur in the middle reaches of Choccolocco Creek, followed by the upper reaches (Figures 2-9a and 2-9b). Approximately 71% of the total area of EAV and 62% of the total riffle area occur between river mile (RM) 18 and RM 26. No submerged aquatic vegetation (SAV) was observed in the creek during the surveys.

Abundant deadfalls occur along the shoreline, including trees that have died and fallen into or immediately next to the creek. These deadfall trees provide habitat for aquatic species and provide shade and protection from predators. The trees also provide resting areas and an opportunity to hunt prey for many avian, amphibian, and reptile species. The greatest number of deadfalls occur within the most upstream portions of the creek, between RM 27 and RM 37. Snags or dead trees that have not fallen and provide habitat for a wide range of species also occur but are less abundant than deadfalls.

There are approximately 32 depositional islands surrounded by EAV. The majority of instream depositional areas are concentrated within the upstream reaches of Choccolocco and Snow Creeks (between RM 27 and RM 37); however, the majority of depositional islands that have associated EAV occur within the middle reaches of the creek, similar to the general trend of EAV.

The dominant creek bank features are characterized by a naturally vegetated shoreline, which accounts for approximately 85% of the total length of the creek bank within the study area. Similar to instream depositional locations, areas of sediment deposition along the creek bank as point bars or beaches are also abundant in the upstream reaches, between RM 27 and RM 37. At least 21 tributaries/backwaters of various sizes can be identified along the creek, and 11 of those 21 occur in the upstream reaches between RM 27 and RM 37. Downstream of Jackson Shoals, Choccolocco Creek is under the hydraulic influence of Lake Logan Martin. The habitat in this reach of the creek is similar to the lake in that the velocity of the creek is greatly reduced, water depths increase, and the thickness of the sediment bed increases.

The predominant instream habitat at the lower end of Snow Creek between Highway 78 and the confluence of Snow and Choccolocco Creeks is characterized as a long run with virtually no sinuosity. Riffles are limited to small areas near bridge abutments associated with Highway 78 and Recreation Drive. Creek banks were almost always vegetated. Sediment deposits (and often debris) were most noticeable around bridge abutments and were often vegetated. Deadfall was observed primarily along forested reaches of the creek.

2.9.2 Benthic Invertebrate and Fish Observations

Benthic macroinvertebrate communities have been surveyed as a part of three studies on four separate occasions: 1996 (Bayne 1997), 1999 (BBL 2000a), and 2006 and 2007 (Arcadis BBL 2007). Fish were surveyed in 2006 and 2007, and epibenthic mollusks were surveyed in 2006 (Arcadis BBL 2007). In general, bottom substrate, canopy cover, available microhabitat (e.g., presence of deadfalls or EAV), and flow regime influence the quality of the habitat and its ability to support aquatic life. Depositional areas typically support lower diversity and numbers of benthic species, while riffle and EAV areas support the highest. The dominant species within OU-4 varied by season but generally included rock snails (*Leptoxis* sp.), mayflies (*Isonychia* sp.), caddisflies (*Cheumatopsyche* sp.), dipterans (primarily midges of Chironomidae family and black fly larvae of *Simulium* sp.), clams, and damselflies (*Enallagma* sp.). Mollusks occurred most frequently in riffle and run habitats, with the Asiatic clam (*Corbicula fluminea*) being the primary species observed. Very few mollusks were observed in backwater and depositional habitats.

Fish diversity is lower in backwater areas, but the total abundance is similar between habitat types. Dominant species (by number observed) within OU-4 riffles during the habitat studies were tricolor shiner (C*yprinella trichroisti*a), emerald shiner (*Notropis atherinoides*), and largescale stoneroller (*Campostoma oligolepis)*. Dominant species within OU-4 EAV habitats included bluegill (*Lepomis macrochirus*), mimic shiner (*Notropis volucellus*), and largescale stoneroller. Dominant species in reference EAV habitats were bluegill, longear sunfish (*Lepomis megalotis*), and largescale stoneroller. Dominant species within OU-4 runs included silverstripe shiner (*Notropis stilbius*), bluegill, longear sunfish, and blacktail redhorse (*Moxostoma poecilurum*). There was some seasonal variation in abundance for invertebrates and fish between fall and spring: both had higher abundance in spring.

In addition to the forage fish identified above, other fish species observed during OU-4 field investigation activities have included a range of bass (largemouth [*Micropterus salmoides*], spotted [*Micropterus punctulatus*], white [*Morone chrysops*], striped [*Morone saxatilis*], and hybrid [*M. chrysops x M. saxatilis*]), catfish (channel *[Ictalurus punctatus*], blue *[Ictalurus furcatus*] and flathead [*Pylodictis olivaris*]), gizzard shad (*Dorosoma cepedianum*), spotted gar (*Lepisosteus oculatus*), common carp (*Cyprinus carpio*), freshwater drum (*Aplodinotus grunniens*), sunfish (Centrarchidae), and crappie (*Pomoxis*).

2.9.3 Aquatic Wildlife Observations

Aquatic bird, mammal, reptile, and amphibian surveys were conducted from canoes in 2006 and 2007. Additionally, focused reptile and amphibian surveys were conducted in late March to early April 2008 to obtain further information on community presence and to refine both Phase 2 biological tissue sampling and food web model inputs for the OU-4 BERA. While the intent of the surveys was to evaluate the aquatic species associated with the creek, a number of terrestrial species were also observed along banks. This discussion focuses on aquatic and semiaquatic species. The full list of observations can be found in Appendix G of the OU-4 RI (Geosyntec 2019). Four aquatic or semiaquatic mammal species were observed by sight, sign, or track. The beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and raccoon (*Procyon lotor*) were most frequently observed (or signs/tracks were observed) in a variety of habitats, but all were commonly seen around deposition and mudflat/bank areas. American mink (*Neovison vison*) tracks were observed in depositional, bank, or run habitats. Additionally, evidence of river otters (*Lontra*

canadensis) has been noted within OU-4 during Site visits occurring after the 2006 and 2007 surveys (Truchon 2014, personal communication).

Eleven species of birds common to aquatic habitat were observed. The most commonly observed birds associated with aquatic habitats were the great blue heron (*Ardea herodias*), the belted kingfisher (*Megaceryle alcyon*), and the wood duck (*Aix sponsa*). The heron was observed with similar frequency in a range of habitats. The kingfisher was most commonly observed in canopy and overhang areas, while the duck was most commonly observed in run and depositional areas. Additional aquatic bird species observed included American anhinga (*Ahninga anhinga*), Canada goose (*Branta canadensis*), great egret (*Ardea alba*), green heron (*Butorides virescens*), hooded merganser (*Lophodytes cucullatus*), mallard (*Anas platyrhynchos*), American osprey (*Pandion haliaetus*), and snowy egret (*Egretta thula*).

In total, 23 distinct amphibian or reptile species were observed. The most commonly recorded species during the aquatic surveys was the common map turtle (*Graptemys geographica*). Turtles were the most commonly recorded group; the top four most commonly observed species were common map turtle, common musk turtle (*Sternotherus odoratus*), river cooter (*Pseudemys concinna*), and snapping turtle (*Chelydra serpentina*).

2.9.4 Terrestrial and Riparian Habitats

Habitat was delineated and assessed in the OU-4 floodplain in 2001, 2002, 2006, and 2007. The prominent habitat types in the OU-4 floodplain include two open land habitat types (maintained fields and successional fields) and forested floodplain (Figure 2-7). Maintained fields include landscaped property, rights-of-way, mowed lawn, agriculture/silviculture/hay, and grazing by livestock or horses. Successional fields include areas in which herbaceous plants are dominant with little or no scrub/shrub layer and areas with well-represented scrub/shrub layer, intermixed herb layer, and some larger saplings. Forested floodplain includes areas with canopy of varying density with associated understory absent/sparse to well-developed. Other floodplain habitats include a small number of wetlands and open water areas that are separated from the creek and persistent.

The habitat assessments indicate that the floodplains along the Choccolocco Creek portion of OU-4 are primarily a mix of second-growth forest and human-maintained areas, including agriculture and silviculture activities. The distribution of these habitat types is relatively even between the confluence with Snow Creek and RM 19. The floodplain corresponding to RM 19 through RM 23 is narrow, and bank slopes are extremely steep. The floodplain habitat in this area is primarily floodplain forest. From downstream of this area to Jackson Shoals, the primary floodplain habitat type is agriculture and pastureland. Downstream of Jackson Shoals there is no traditional floodplain due to the control of the lake level at the dams at Lake Logan Martin—the Neely Henry Dam and the Logan Martin Dam, respectively—along this lower portion of Choccolocco Creek (downstream of Jackson Shoals). In this area, the lateral extent of OU-4 is bounded by the water line of Lake Logan Martin under normal pool conditions (elevation 465 feet above mean sea level).

The majority of the nonforested land within the floodplain is agricultural and pastureland. Agricultural fields and pastureland were dominated by goldenrod (*Solidago spp.*), Japanese honeysuckle (*Lonicera japonica*), asters (*Aster spp.*), and various grasses during the survey of the 2001/2002 transects. Grasses and clover were most commonly observed during the survey of the

2006 transects. Early successional fields were the least frequently observed on open land habitat. Open land habitats consistently showed lower diversity of vegetation and wildlife than forested areas likely due to the presence of vegetative monocultures and reduction in available habitat types for wildlife.

The majority of forest habitats were categorized as forest edge habitats, both along the creek bank and field margins. Forested habitats were predominantly deciduous; frequently observed species included sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), American elm (*Ulmus americana*), and hickories (*Carya spp*.). Forest edge and small patch forests were more common than large, contiguous forest areas. Vegetation and wildlife observations were abundant in forested habitats. Isolated wetlands and open water made up the remaining habitat observations. With the exception of Choccolocco Creek itself, these habitats were not frequently observed, and they did not encompass large areas where observed. Alligator weed (*Alternanthera philoxeroides*) and switchgrass (*Panicum virgatum*) were common species in these areas.

Approximately 600 acres of riparian area are present within the OU-4 floodplain. Within the riparian areas (identified as the 100-foot buffer on either side of the creek[2]), the majority (517 acres of the approximately 600 total acres) of the area is characterized as forested floodplain. A well-developed riparian corridor exists along most of the creek. In some areas, the corridor is narrow and abuts maintained fields (e.g., RM 35 to RM 36); in other areas the riparian area is adjacent to other quality habitat such as forested floodplain (e.g., RM 30 to RM 31). The riparian corridor, while variable in width, is densely forested and forms an important buffer zone between terrestrial/human-maintained areas and the creek. In most areas, the corridor contains a substantial number of large, older, well-established trees dominated primarily by box elder and sycamore. These trees provide an important canopy for the creek and its bank habitats and are an important factor in maintaining shoreline stability and creek habitat viability. Although these water-influenced habitats occupy approximately 10% of the project area, they are used by a disproportionate number of wildlife and plant species. The diversity of structure and cover provides nesting habitat, hiding and thermal cover, and food (insects, seeds, and vegetation) for a variety of bird and mammal species. The adjacent water provides a source of water and food for aerial insectivores. In addition, riparian habitat also helps regulate light and temperature and is a source of large woody debris, which can provide important instream habitat and stream stability. The riparian habitat also helps regulate water flow and nutrient load from upland areas (Naiman and Décamps 1990). Moreover, contiguous riparian zones create important corridors for wildlife that link a variety of ecosystems together and help maintain critical biodiversity.[3]

Terrestrial habitat along the Snow Creek portion of OU-4 was dominated by maintained fields for public recreation; I-20, including its right-of-way; a WWTP; and the final cap that was constructed over a stockpile of PCB-containing soil east of Snow Creek (see Section 3.4.2). The area also includes several businesses focused on food service, an undeveloped parcel that is owned by the Land Trust, and several small disconnected wooded areas. The riparian habitat along this portion

[2] The riparian area along either side of the creek is variable, and the 100-foot designation is an operational definition used for the exposure assessment in the OU-4 BERA to ensure that receptors that reside or forage within this zone are adequately evaluated.

[3] https://cowsandfish.org/wp-content/uploads/Biodiversity-LifeintheGreenZone.pdf

of Snow Creek is limited and dominated by maintained grass areas that directly abut the creek's edge.

2.9.5 Terrestrial Plants and Invertebrates

Vegetation was surveyed in fall 2001 and spring 2002 (BBL 2005a) and during the 2006/2007 Phase 1 ecological surveys. For forested floodplain habitats, there were 12 common dominant tree and shrub species, while the herbaceous layer indicated 3 species in common. Green ash (*Fraxinus pennsylvanica*), box elder, and tulip tree (*Liriodendron tulipifera*) were the most common tree species observed. Chinese privet (*Ligustrum sinense*), common greenbriar (*Smilax rotundifolia*), eastern hophornbean (*Ostrya virginiana*), and red maple (*Acer rubrum*) seedlings were the most common shrub species observed. Clearweed (*Pilea pumila*), false nettle (Boehmeria), and Japanese stilt grass (*Microstegium vimineum*) were the most common herbaceous plant species observed. For successional field habitats, there were 5 common dominant shrub species, while the herbaceous layer indicated 10 species in common. Blackberry (*Rubus fruticosus*) and elderberry (*Sambucus* sp.) were most common among the shrubs observed. Yellow foxtail (*Setaria pumila*), goldenrod, ironweed (*Vernonia* sp.), and little bluestem (*Schizachyrium scoparium*) were the most common herbaceous plant species observed. For maintained field habitats, there were 5 common dominant herbaceous plant species. Yellow foxtail, bahia grass (*Paspalum notatum*), and crabgrass (*Digitaria sanguinalis*) were the most commonly observed between OU-4 and reference areas.

Soil macroinvertebrates were surveyed in spring 2007. Sixteen varieties were observed, and the diversity and counts were similar among habitat types. The most dominant taxon groups observed across all habitat types included Collembola (springtails) and ants. Harvestmen (*Opillionids* sp.), moths and butterflies (*Lepidoptera* sp.), aphids and cicadas (*Hemiptera* sp.), millipedes (*Diplopoda* sp.), and earthworms (*Lumbricina* sp.) were observed infrequently.

2.9.6 Terrestrial Wildlife Observations

Wildlife frequency was surveyed within each general habitat type during fall 2001 and spring 2002 surveys, and the overall number of wildlife observations was similar between the two seasons. Observations of birds, mammals, reptiles, and amphibians were also made during the 2006/2007 surveys. In general, birds were the most commonly observed wildlife, and blue jays (*Cyanocitta cristana*) were observed frequently and in all habitat types. In the fall, wildlife observations were more common in forest and maintained field habitats than in wetland or successional field habitats. Wildlife or signs of wildlife were observed with similar frequency throughout the range of habitats in the spring.

Wildlife observations made from floodplain transects along the Choccolocco Creek portion of OU-4 included a number of aquatic species described above, including fish (fry), piscivorous birds, waterfowl, and turtles. This discussion focuses on the terrestrial observations. The eastern coyote (*Canis latrans*) was the most common species recorded in all surveys. The forested cover type was the most diverse with observations of the armadillo (Cingulata), chipmunk (Tamias), gray squirrel (*Sciurus carolinensis*), raccoon, white-tailed deer (*Odocoileus virginianus*), and long-tailed weasel (*Mustela frenata*). Domestic cattle (*Bos taurus*), eastern coyote, gray squirrel, and white-tailed deer were observed in the maintained field cover type within OU-4. Eastern cottontail rabbit (*Sylvilagus floridanus*), eastern coyote, white-tailed deer, and woodchuck (*Marmota monax*) were observed in the successional field cover type. Small-mammal trapping was conducted in 2006 and

2007 and provided variable results across habitat type and season. For example, the number of small mammals caught in each habitat type was similar (ranged from 16 to 24), but seasonally, higher numbers were caught in fall compared to winter and spring.

In the Snow Creek floodplain, common wildlife species were predominantly various species of birds, including starlings (*Sturnus vulgaris*), grackles (*Quiscalus quiscula*), mockingbirds (*Mimus polyglottos*), blue jays, catbirds (*Dumetella carolinensis*), and mourning doves (*Zenaida macroura*).

The most commonly recorded amphibian or reptile species in OU-4 during the terrestrial surveys were cricket frog (*Acris crepitans*), northern slimy salamander (*Plethodon glutinosus*), river cooter, and southern leopard frog (*Thobates sphenocephalus*).

2.9.7 Summary

As described above, a great deal of ecological data has been collected for OU-4. Based on the observations and data collected, habitat quality and the ecology within the OU-4 portions of Snow Creek and Choccolocco Creek have been affected by human activity such as urbanization, agriculture, channelization, and grazing in some areas. Portions of OU-4 also include areas with valuable aquatic and riparian habitat that should be preserved or protected during any active remediation project. The detailed habitat and species survey evaluations were used to better understand the site-specific potential for receptor exposure in conducting the OU-4 BERA. In addition, the species surveys and counts were used to compare OU-4 conditions to reference conditions. Collectively, these data provided valuable information used in evaluating potential ecological impacts in the OU-4 BERA and OU-4 BERA Addendum.

3 REMOVAL ACTIONS, INTERIM MEASURES, AND FINAL CORRECTIVE MEASURES IMPLEMENTED IN OU-4

This section summarizes residential removal actions, IMs, support for several infrastructure improvement projects, and final corrective measures that were conducted in OU-4 (Figure 3-1). Summaries for each of the activities are presented in this section with supporting details for the residential removal activities presented in the *NTC Removal Action Completion Report for Residential Properties in OU-1/OU-2 Completion Report* (Completion Report; Golder Associates [Golder] 2015) and the associated annual addenda reports (Golder 2016, 2017; Solutia 2018a, 2019, 2020, 2021). Supporting details for the IMs, infrastructure improvement projects, and final corrective measures are provided in various documents included in Appendix A (Appendices A-01 through A-36) to the OU-4 RI (Geosyntec 2019).

3.1 Residential Removal Program

As part of the residential sampling and removal activities for OU-1/OU-2, P/S previously submitted the engineering evaluation/cost analysis (EE/CA; Solutia 2003a), which USEPA approved on September 24, 2003. The EE/CA documented soil removal and disposal to be the most appropriate removal action alternative for the residential areas. The *NTC Removal Action Approval Memorandum* (USEPA 2004a) concurred with the EE/CA findings. In that memorandum, USEPA selected the residential soil action level at or above PCB concentrations of 1 mg/kg in surface soil and at or above 10 mg/kg for depths of 1 foot or more below ground surface (bgs). Provisions for indoor and crawl space sampling and removal were also included as part of the residential removal program. Additionally, the memorandum included a provision that soil with PCB concentrations less than 10 mg/kg, as determined based on five-point composite sampling results, removed from the affected properties could be placed beneath a soil cover at one of the two soil management areas located near the Facility (i.e., central soil staging management area or south soil staging management area). The memorandum identified off-site disposal at an appropriately permitted facility for soil with PCB concentrations greater than or equal to 10 mg/kg.

P/S prepared a supplemental sampling and analysis plan (SSAP) to describe the procedures that would be implemented to support the removal actions at residential properties. USEPA approved the *NTC Removal Action Supplemental Sampling and Analysis Plan for the Anniston PCB Site, Revision* (Solutia 2004a) in May 2004. The SSAP focused on residential sampling and presented a comprehensive strategy to spatially evaluate the nature and extent of contamination for residential properties. The *NTC Removal Action Residential Soil Removal Work Plan for the Anniston PCB Site* (RSRWP; Solutia 2004b) describes the approach for performing removal actions on residential use areas where composite sampling results indicated PCBs concentrations in surface soil were greater than or equal to 1 mg/kg.

The EE/CA, RSRWP, SSAP, and other related residential soil removal documents were the basis for conducting removal actions at residential use areas at the Site under the Non-Time-Critical Removal Action (NTCRA) Agreement between USEPA and P/S (NTCRA Agreement; included as Appendix G to the PCD; USEPA 2003a). Residential use area soil removal actions were conducted in accordance with the requirements of these documents. Five-point composite samples collected from no larger than 0.25-acre residential use areas were used to determine whether soil required removal based on a 1-mg/kg-PCB action level. If PCB concentrations in surface soil were

greater than or equal to 1 mg/kg, soil was excavated and clean backfill was placed in the excavation area. Sampling and removals have been conducted throughout OU-1/OU-2, including areas inside and outside of the Snow Creek floodplain. Additional sampling and removals have been conducted in OU-4. The sampling and removals in OU-4 occurred in two phases: the Evaluation Area 35 phase and the broader portions of OU-4 phase. The first set of activities were focused on Evaluation Area 35.

Evaluation Area 35 residential properties are in the upstream portion of OU-4 near the confluence of Snow and Choccolocco Creeks and were addressed at the same general time as residential properties located in OU-1/OU-2. Evaluation Area 35 was added to the residential program following requests from residents in the general area to assess the potential for PCBs to be on their properties. Within Evaluation Area 35, P/S identified 25 residential properties for sampling, 8 of which required a removal action. Removal actions were completed for all 8 properties with PCB concentrations greater than or equal to 1 mg/kg. There is no additional work pending in Evaluation Area 35.

To address properties in the broader portions of OU-4 with potential residential land use, P/S developed work plans to identify and sample such properties. The residential use areas for sampling under the OU-4 residential property field sampling plan (RPFSP) were identified under the OU-4 Phase 3 FSP (Arcadis 2010a) and addenda (Arcadis 2011a,b). P/S developed the *Operable Unit 4 Residential Property Field Sampling Plan* (OU-4 RPFSP) to describe the procedures for sampling residential use areas adjacent to residential structures identified within OU-4 (Arcadis 2012). USEPA and P/S agreed it was appropriate to apply the procedures and decision processes defined in the NTCRA Agreement to the residential use areas in broader portions of OU-4 because the approach was previously used for the residential removals that were conducted within Evaluation Area 35.

On March 5, 2012, USEPA approved the residential use surface soil sampling as described in the OU-4 RPFSP (USEPA 2012a). P/S completed surface soil sampling at each of the residential properties identified in the broader portions of OU-4. P/S subsequently provided sample results to USEPA and requested concurrence that any residential removals required in OU-4 would be conducted under the NTCRA Agreement, including the provision that excavated soil with PCB concentrations less than 10 mg/kg based on composite sampling be placed in the south soil staging management area. USEPA approved the request in July 2012 (USEPA 2012a,b).

Details regarding access, sampling, and removal activities for OU-4 residential properties located in the broader portion of the OU-4 floodplain (properties not part of Evaluation Area 35) are provided below.

3.1.1 Access and Sampling

Once a residential property was identified for sampling, a letter requesting property access was either mailed or hand-delivered to the owner/tenant(s) of the property in accordance with the requirements of the NTCRA Agreement.

Five-point composite surface soil samples were collected from the residential use areas and analyzed for PCBs and lead in accordance with procedures in the SSAP (Solutia 2004a). If the PCB concentrations in surface soil samples were below 1 mg/kg, then the area was designated as

complete, and no further sampling or removal action was required. If the PCB concentrations were greater than or equal to 1 mg/kg, additional sampling (depth sampling) and a removal action were required for that portion of the residential property. Within OU-4 (not including Evaluation Area 35), P/S identified 34 residential properties requiring sampling. P/S had previously identified 25 residential properties in Evaluation Area 35 for sampling. In total, surface soil sampling has been completed at all 59 residential properties in OU-4.

If additional sampling (e.g., depth sampling) and a removal action were required, removal action access was requested from the owner and tenant(s). The owner and tenant(s) were sent a letter and an access agreement describing the required work and requesting permission for access. If the owner and tenant(s) granted removal action access, depth soil samples were collected in 1-foot increments from 1 foot bgs until a PCB concentration below 10 mg/kg was reported for the subsurface soil.

For properties with surface soil PCB concentrations greater than or equal to 1 mg/kg, crawl spaces beneath on-site structures were sampled based on the criteria included in the SSAP (Solutia 2004a). Additionally, if indoor access was granted, indoor dust sampling was conducted.

3.1.2 Residential Removal Actions

The residential removal activities included removing the upper 1 foot of soil where PCB concentrations in the surface soil samples were greater than or equal to 1 mg/kg and access was granted (e.g., front, back, and/or side yard or portion thereof). Depending on the results of the depth sampling, soil below a depth of 1 foot was removed until the PCB concentrations were below 10 mg/kg.

Removal actions were conducted in areas where residents had unrestricted access to soil, including open yards, play areas, and gardens. The removal actions did not include improved areas covered with structures, pavement, or concrete. Partially improved areas, such as gravel-covered areas used for parking, were evaluated case by case to determine if they provided adequate exposure protection. The removal actions did not extend beyond the residential use areas and were not conducted in wooded areas, wetland areas, or other areas that were not readily accessible. Removal actions were not conducted in areas around trees with a caliper of 2 inches or larger, nor around bushes and shrubs unless the owner agreed that the bushes and shrubs could be removed. Where feasible, surface soil was scraped from under the canopy of trees and shrubs to within 2 to 3 feet of the trunk where the feeder roots surfaced; the removed soil was replaced with sod. Large stationary objects (e.g., storage sheds, animal shelters) were not moved, and setbacks around these objects were established. Hand tools were used to minimize setback requirements such that removal activities did not jeopardize the integrity of the subject structures and other property improvements.

Removals were required for 20 of these 59 residential properties because the surface soil PCB concentrations were greater than or equal to 1 mg/kg. Excavated soil with PCB concentrations less than 10 mg/kg was placed in the south soil staging management area. Soil with PCB concentrations greater than or equal to 10 mg/kg but less than 50 mg/kg was disposed of at Three Corners Regional Landfill in Piedmont, Alabama. The residential removal actions in OU-4 were completed for 19 of the 20 properties where actions were identified as being needed. There was 1 residential property where the removal action was not conducted because the landowner did not provide access to the

property to implement the work. If property access is provided in the future for the 1 property where access was denied, the removal action will be implemented. There are also 5 properties where removal actions were conducted and PCB residuals remain at depth. For these properties, soil below 1 foot has PCB concentrations that are greater than or equal to 1 mg/kg and less than 10 mg/kg.

3.2 Interim Measures

IMs were designed to reduce potential exposure to and migration of PCBs in soil and were implemented in the following OU-4 areas:

- Oxford Lake Park, including parking areas, tennis courts, and the southwestern portion of the park
- Choccolocco Creek Dredge Spoil Areas

3.2.1 Oxford Lake Park

Between 2000 and 2012, IMs were implemented to address PCBs in soil at the Oxford Lake Park located in Oxford, Alabama. Oxford Lake Park complex is a community recreational area owned by the city of Oxford and is located east of Recreation Drive and Snow Creek and north of I-20 and the confluence of Snow Creek with Choccolocco Creek. The park complex is approximately 25 acres and consists of several recreational areas, including an athletic field area (with four ball fields), a tennis court complex (with eight tennis courts), parking areas, and an open area adjacent to Snow Creek (Figures 3-1, 3-2a, 3-2b, and 3-2c).

The IMs at the Oxford Lake Park were implemented through several phases of work. Figure 3-2a shows the overall Oxford Lake Park area with the extent of IM covers installed at the park complex, locations where soil samples were collected prior to installation of the IM covers, and PCB results associated with those soil samples. Figures 3-2b and 3-2c show subset areas of the Oxford Lake Park area along with the sample identifications (IDs) for the soil samples collected prior to installation of the IM covers. Figure 3-2b shows the Oxford Lake Softball Complex, and Figure 3-2c shows the parking lot west of the softball fields, the tennis courts complex, and the southwestern portion of the park where IM isolation covers were installed. The excavation depth for soil removal activities and the locations of geotextile marker layer for the softball fields are also shown on Figure 3-2b.

Significant quantities of fill material were encountered while implementing the Oxford Lake Park IMs. The materials (e.g., foundry bricks, rebar, other industrial fill), are believed to have originated from the former US Pipe & Foundry facilities in Anniston and Oxford.

3.2.1.1 Oxford Lake Softball Complex

Between September 2000 and March 2001, IMs were conducted in the Oxford Lake Softball Complex in general accordance with the *RCRA Facilities Investigation Results and Interim Measures Plan for the Softball Fields at the Oxford Lake Softball Complex* (Solutia 2001a) and the *Oxford Lake Softball Complex Interim Measures Report* (Roux 2004). The IM activities at the softball complex were conducted under the National Pollutant Discharge Elimination System (NPDES) General Permit ALG610000 (ALR105784).

The objectives of these improvements were to mitigate potential exposure to PCB-containing soil and to control erosion and transport of PCB-containing soil. The initial plan was to remove a minimum 3-inch layer from three softball fields (Fields A, C, and D). This plan was subsequently revised to include the removal of a 1-foot soil layer within the infield areas of these three fields, and a minimum 6-inch removal from the outfield portions of Fields A, C, and D. The removal locations and associated depths, including outfield areas where a 1-foot layer of soil was removed, are presented on Figure 3-2b along. The PCB results for post-excavation samples that were collected for the soil horizon beneath the removal footprint are also presented on this figure by concentration range. The sample results are presented based on PCB concentration ranges and provide a record of PCBs remaining beneath the clean backfill that was placed as part of the restoration process. The PCB concentration results and sample coordinates are provided in Table 3-3 of the OU-4 RI, and additional details regarding the removal actions are in Appendix A-20 of the OU-4 RI. Soil was also excavated to a minimum depth of 3 inches in the grass areas between Fields A and D and between Fields C and D. Soil was not removed from Field B because the PCB results were less than 1 mg/kg.

Following excavation, a nonwoven geotextile layer was placed in the infield areas and covered by 1 foot of soil consisting of a silt and clay mix. In the outfield and grass areas, a nonwoven geotextile layer was placed in certain areas as shown on Figure 3-2b. All excavation areas were subsequently backfilled with clean soil and covered with sod.

Figure 3-2b shows the extents of the IM soil covers installed at the softball complex, sample IDs for the soil samples collected prior to the construction of the IM covers, and PCB results associated with these soil samples. There were 216 soil samples collected from 179 locations in the softball complex that characterize conditions beneath this IM. The PCB concentrations following implementation of the IM including the maximum, average, and 95% upper confidence limit (UCL) values for surface soil (0 to 12 inches) and subsurface soil (below 1 foot) for Fields A, C, and D include the following:

- Field A:
  - Surface soil PCB maximum concentration is 47.7 mg/kg, average concentration is 10.8 mg/kg, and the 95% UCL is 15.9 mg/kg.
  - Subsurface soil PCB maximum concentration is 30.6 mg/kg, average concentration is 4.5 mg/kg, and the 95% UCL is equal to 6.4 mg/kg.
- Field C:
  - Surface soil PCB maximum concentration is 22.5 mg/kg, average concentration is 6.3 mg/kg, and the 95% UCL is 8.9 mg/kg.
  - Subsurface soil PCB maximum concentration is 50.6 mg/kg, average concentration is 8.7 mg/kg, and the 95% UCL is 2.7 mg/kg.
- Field D:
  - Surface soil PCB maximum concentration is 11.8 mg/kg, average concentration is 4.8 mg/kg, and the 95% UCL is 6.4 mg/kg.

- Subsurface soil PCB maximum concentration is 8.9 mg/kg, average concentration is 1.8 mg/kg, and the 95% UCL is 2.7 mg/kg.

Excavated soil was segregated according to PCB concentrations and stockpiled. Soil with PCB concentrations greater than or equal to 50 mg/kg (approximately 1,000 tons) was transported off-site for disposal at Chemical Waste Management's TSCA-approved facility in Emelle, Alabama. Excavated soil with PCB concentrations less than 50 mg/kg (estimated at 4,500 cubic yards) was stockpiled in an area in the western portion of the park complex and subsequently capped for use as a parking lot in 2002, as described below.

3.2.1.2 Softball Fields Parking Lot

The second phase of IMs at Oxford Lake Park was conducted between June and October of 2001. The IM activities were conducted in general accordance with the *Removal Action Work Plan for the Stockpiled Soil Excavated from the Softball Fields at the Oxford Lake Softball Complex* (Solutia 2001b). The IM activities at the parking lot area were conducted under an extension to the existing NPDES General Permit ALG610000 (ALR105784) as approved by the Alabama Department of Environmental Management (ADEM) on May 25, 2001. Additional details associated with the IM conducted at the parking lot area are presented in the *Parking Lot Multi-Layer Cover Interim Measures Report* (Roux 2002a).

Under this phase of the IM activities, soil with PCB concentrations less than 50 mg/kg excavated from the softball complex IM work (described above) and soil excavated to facilitate construction of a footbridge and an apron at the park entrance from Recreation Drive were consolidated beneath a multilayer cover associated with the parking lot construction (Figures 3-2a and 3-2c).

Sampling confirmed that the concentrations of PCBs in the excavated soil were less than 50 mg/kg. The excavated soil was placed on a geotextile marker and compacted in approximately 8-inch lifts to an elevation of approximately 3 feet above the previous ground surface and sloped to surrounding grade. Areas of consolidated soil not designated for vehicular traffic were covered with a nonwoven geotextile fabric, a minimum of 12 inches of compacted fill, and grass sod. Pre-construction drainage patterns were maintained across these areas. In areas designated for vehicular traffic, the cover system included nonwoven geotextile, a 12-inch crushed aggregate layer, a 14-inch layer of 3-inch aggregate, a 4-inch layer of crushed aggregate, and a 3-inch asphalt cover.

A 2-foot-wide, gravel-filled French drain was installed around the perimeter of the asphalt cover to facilitate drainage of the gravel aggregate layer and to minimize erosion of the soil cover. The base of the drain was covered with nonwoven geotextile fabric. In August 2002, after a post-construction inspection indicated that the drain was no longer necessary to control storm water runoff/drainage, the French drain was paved over with 3 inches of asphalt.

In conjunction with the IM activities, an access road was constructed connecting the parking lot to Recreation Drive. The access road consisted of nonwoven geotextile fabric placed over the multilayer soil cover, an 8-inch layer of crushed aggregate, and 3 inches of asphalt. A culvert was constructed in the drainage channel along Recreation Drive to help convey storm water beneath the access road. A pedestrian walkway and footbridge were also constructed to provide access to the softball fields to the east. The walkway was originally constructed with a 4-inch layer of

crushed gravel placed over the multilayer soil cover, and it was subsequently paved in August 2002 to improve access for people with disabilities and minimize maintenance.

Figure 3-2c shows the extent of the IM covers installed at the parking lot area, sample IDs for the locations of soil samples collected prior to installation of the IM covers, and PCB results of those soil samples. There were 38 soil samples collected from 12 locations in the parking lot area that characterize conditions beneath this IM. PCBs were detected in 87% of these samples. PCB concentrations ranged from nondetect to 21 mg/kg, and the average PCB concentration was 2.8 mg/kg.

3.2.1.3 Tennis Court Complex

In 2002, IMs were implemented as part of the construction of the Oxford Lake Tennis Court Complex. The IMs were implemented in general accordance with the *RCRA Investigation Results and Interim Measures Plan, Oxford Lake Softball Complex, West Area* (Roux 2002b). Additional details associated with the IM at the tennis court complex and parking area are presented in the *Tennis Court and Parking Area Interim Measures Report* (Roux 2003). The IMs at the tennis court complex were implemented under an extension to the existing NPDES General Permit ALG610000 (ALR105784) as approved by ADEM on April 12, 2002.

The constructed tennis court complex covers approximately 2 acres and includes 8 tennis courts, an adjacent parking lot, and a small utility building in the parking lot (Figure 3-2c). The IMs at the tennis court complex were implemented to contain PCBs in soil below the tennis courts and an adjacent parking lot with a soil isolation cover. The tennis court and parking lot covers were overlain with asphalt to facilitate the intended end uses. As part of the IM, minor soil excavations were conducted for the installation of the lighting posts and the tennis court nets. Sampling indicated that the excavated soil had PCB concentrations below 50 mg/kg. Following excavation and sampling, the excavated soil was used as fill below the tennis courts and/or parking area prior to placement of the multilayer covers.

Prior to construction of the multilayer covers for the tennis courts, the existing ground surface was cleared, stabilized with Portland cement, compacted, and covered with a geotextile marker layer. The geotextile was covered with a minimum of 8 inches of compacted fill and a minimum of 4 inches of aggregate base course. The tennis courts were finished with a 1.5-inch compacted asphalt leveling layer and a minimum 1-inch asphalt compacted surface course layer before being sealed and painted.

A multilayer cover was also constructed in the parking lot area. The existing ground surface in the parking lot area was cleared, stabilized with Portland cement, compacted, and covered with a geotextile marker layer. The geotextile was covered with a minimum of 9 inches of crushed aggregate and 3 inches of asphalt. A vegetated soil isolation cover area, consisting of a nonwoven geotextile marker layer topped with a minimum of 9 inches of soil cover, was constructed in the central portion of the parking lot. A masonry building was constructed in the northwest corner of the parking area. The surface finish surrounding the building is a combination of asphalt and concrete.

A public access road was constructed connecting the tennis court parking lot to Recreation Drive. The public access road was constructed with nonwoven geotextile fabric placed over the existing

ground surface, a minimum of 9 inches of crushed aggregate base course, and 3 inches of asphalt. A crushed stone utility access roadway was also constructed off Recreation Drive to provide access for maintenance of the light standards located on the west side of the tennis courts.

Figure 3-2c shows the extent of the IM covers installed at the tennis court complex, sample IDs for the locations of soil samples collected from prior to installation of the IM covers, and PCB results associated with these soil samples. There were 44 soil samples collected from 14 locations in the tennis court area that characterize conditions beneath this IM. PCBs were detected in 98% of these samples. PCB concentrations ranged from nondetect to 200 mg/kg, and the average PCB concentration was 21 mg/kg.

3.2.1.4 Southwest Portion of the Park

In December 2002, IMs were constructed in an approximately 1.8-acre area in the southwestern portion of the park complex, south of Recreation Drive and west of the softball field parking lot. The 1.8-acre area was covered with geotextile fabric, 9 inches of compacted fill, and 3 inches of vegetated topsoil. The Miracle Field was later constructed as an infrastructure improvement project over a portion of the 1.8-acre soil cover as described in Section 3.3.2.

Figures 3-2a and 3-2c show the extent of the IM cover installed in the southwestern portion of the park complex, sample IDs for the locations of soil samples collected prior to IM construction, and PCB results associated with those soil samples. There were 29 soil samples collected from 9 locations in the southwestern park area that characterize conditions beneath this IM. PCBs were detected in 93% of these samples. PCB concentrations ranged from nondetect to 160 mg/kg, and the average PCB concentration was 19 mg/kg.

3.2.1.5 Monitoring and Maintenance

Long-term monitoring includes semiannual inspections of the IM cover systems and unplanned inspections after significant rain events (greater than 3 inches in 24 hours). Maintenance is conducted, as needed, based on the findings of these inspections.

The City of Oxford performs routine maintenance at the park, including mowing, fertilizing, and periodic maintenance of the ball fields, paved surfaces, and grass areas. Deed restrictions for Oxford Lake Park are in place to ensure long-term land use for the property remains consistent with current uses. In addition, the City of Oxford is required by deed restriction to notify P/S of any planned intrusive or land-disturbance work that might occur in this area such that soil management support services can be provided by P/S, if deemed appropriate.

3.2.1.6 Groundwater Monitoring

A groundwater investigation was also conducted in the Oxford Lake Park area. This OU-4 location was selected for investigation based on numerous groundwater investigations conducted for OU-1/OU-2 (ENVIRON 2015). P/S evaluated the existing soil PCB data and concluded that Oxford Lake Park was an appropriate location to assess groundwater conditions in OU-4.

The *Revised Addendum #4 to the Operable Unit 1/Operable Unit 2 Field Sampling Plan, Anniston PCB Site* (Golder 2011) provided for the installation of a temporary monitoring well (T-17) at a central location in Oxford Lake Park. Based on available soil PCB data, the temporary groundwater well was installed to the west of the tennis court complex and sampled for PCBs. The

laboratory data indicated that PCBs were not detected in either the filtered or unfiltered groundwater samples collected from temporary monitoring well T-17. Based on these results, it was concluded that PCB-containing soil in this area was not impacting groundwater, and further investigation was not warranted. The results of this investigation were reported in the *Report on Operable Unit 1/Operable Unit 2 Third Non-Residential Groundwater Investigation, Anniston PCB Site* (Golder 2012). The temporary monitoring well at location T-17 was abandoned using ADEM-approved procedures in June 2013 (ENVIRON 2015).

3.2.2 Choccolocco Creek Dredge Spoil Areas

Between 1990 and 1994, NRCS implemented flood protection measures, including dredging sediment to improve stream flows, along Choccolocco Creek near Oxford, Alabama. Dredge spoils from Choccolocco Creek were deposited in existing depressions or areas above grade and near the creek. These dredge spoils were stabilized by limiting the height and slope of the spoil areas. In addition, the dredge spoils were covered with topsoil and a vegetative cover.

Initially (1998–1999), P/S managed the dredge spoil areas under the RCRA Corrective Action Program in accordance with the requirements of its RCRA Post-Closure Permit issued by ADEM (Permit No. ALD004019048). In accordance with the *Off-Site Interim Measures Plan* (Solutia 1998), P/S located and evaluated the dredge spoil areas along Choccolocco Creek (Roux 1998). Nineteen dredge spoil deposition areas were identified along the banks of Choccolocco Creek between its confluence with Snow Creek and Coldwater Creek. Figures 3-3a, and 3-3b show the approximate locations of the dredge spoil areas. Seventeen of the 19 dredge spoil areas were located below grade (i.e., filling of low-lying areas), and 2 dredge spoil areas were located above the existing grade. At the time of the 1998 evaluation, there was no evidence of slumping, erosion, or other stability concerns at the dredge spoil areas. Sixteen of the 19 dredge spoil areas had a well-established vegetative cover.

In 1999, the dredge spoil areas were sampled and analyzed for PCB and mercury in accordance with the *Dredge Spoil Area RCRA Facility Investigation/Confirmatory Sampling (RFI/CS) Work Plan* (RFI/CS Work Plan; Roux 1999a). The RFI/CS Work Plan outlined a characterization method for selected dredge spoil areas along Choccolocco Creek. Six of the 19 dredge spoil piles were selected for sampling and analysis and were viewed as being representative of the 19 locations. Composite samples were collected from each dredge spoil pile for PCB and mercury analysis. The results of the dredge spoil sampling are summarized in the Dredge Spoil Area RFI/CS Phase I Report (RFI/CS Phase 1 Report; Roux 1999b). PCBs were detected at concentrations ranging from 0.3 to 10.8 mg/kg, and mercury was detected at concentrations ranging from 0.65 to 3.9 mg/kg (Figures 3-3a and 3-3b).

In September 2012, field reconnaissance activities were conducted to document the condition of each dredge spoil area along Choccolocco Creek. The findings of these reconnaissance activities were summarized in the *Dredge Spoil Evaluation Report, Snow Creek and Choccolocco Creek, Calhoun and Talladega Counties, Alabama* (Roux 2012). During the September 2012 reconnaissance, each dredge spoil area had a well-established vegetative cover: no evidence of slumping, erosion, or other stability issues was observed in 18 of the 19 dredge spoil areas. One dredge spoil area (CC-26) was disturbed as part of repairing a culvert. Soil disturbed during this work was regraded and stabilized with vegetation.

3.3 Infrastructure Improvement Support Projects

P/S have and continue to support infrastructure projects in the general area of the Site, including a range of development and improvement projects. Several of these projects were conducted prior to the development of a more structured approach for supporting infrastructure and repair projects through a soil management program. The infrastructure support projects described below include the following:

- Lighting and drainage upgrades to the Oxford Lake Softball Complex
- Construction of a Miracle Field over an IM cover
- Treatment system upgrades at the Choccolocco Creek Wastewater Treatment Plant (CCWWTP)
- Foundation improvements at a parcel owned by Prime Properties, LLC (Prime Properties; formerly referred to as the Borrelli property)
- Widening and bridge construction of I-20
- Parcel improvements for the former Holiday Inn property
- Parcel improvements for the City of Oxford to construct a maintenance garage at Oxford Lake Park

Information regarding these infrastructure support projects is provided below.

3.3.1 Oxford Lake Softball Complex Field Lighting and Drainage Upgrades

Between November 2010 and March 2011 and in the winters of 2011 and 2012, infrastructure support was provided in conjunction with field lighting and drainage upgrades at the Oxford Lake Softball Complex. The support activities were conducted under a planning document titled *Oxford Park Softball Complex Field Lighting and Drainage Upgrades* (Williams 2012).

The support activities included the following:

- Cable trenches were excavated to depths of approximately 54 inches (for high-voltage lines) and approximately 30 inches (for lower-voltage lines).
- The base of each trench was lined with a geotextile fabric. A 4-inch layer of shotcrete was installed over the fabric in the deeper (54-inch) trenches. After the electrical conduit and wiring were installed, excavated soil with PCB concentrations less than 5 mg/kg were placed in the cable trenches and then covered with geotextile fabric and a minimum of 1 foot of vegetated soil.
- Holes were augered for 16 new concrete light poles surrounding the ball fields (excavation depth approximately 11 feet).
- The field dugouts were expanded.
- A trench was excavated for installing a French drain to improve drainage at the ball fields and adjacent areas.

- The soil in the area between the ball fields and around the press box/concession area was graded to allow for installation of a new concrete cover to direct storm water runoff to the drainage system.

The lighting pole and cable trench locations and concrete covers located between the ballfields are shown on Figure 3-4. Soil management decisions for the lighting-related upgrades and the dugout expansion were made using the PCB results for the softball complex shown on Figure 3-2b. This figure also represents PCB concentrations for soil in the general area following implementation of these infrastructure improvements.

Approximately 90 tons of soil was generated during the lighting-related upgrades (light poles and trenches); the soil generated was placed in 7 roll-off containers and transported to the Three Corners facility. There were 140 tons of soil placed in 7 roll-off containers associated with the drainage aspects of the infrastructure support activities. These roll-off containers were transported to the Three Corners Regional Landfill. These materials were characterized as having PCB concentrations less than 50 mg/kg based on samples collected directly from the roll-off containers. PCB concentrations for the soil in these 7 roll-off containers ranged from 3.9 to 14.4 mg/kg.

3.3.2 Miracle Field Upgrades

In 2012, the City of Oxford identified the Southwestern Park Area IM as the location for a Miracle Field to host a baseball league for people with disabilities. The location of the Miracle Field was coincidental with the location of a previously implemented IM (1.8-acre cover) that is described in Section 3.2.1.4 and shown on Figure 3-1. Prior to constructing the new ball field (to occupy approximately 1.1 acres), between October 29, 2013, and April 30, 2014, P/S completed upgrades to the existing barrier system as described in the *Miracle Field Construction Completion Report* (Solutia 2014a).

Upgrades were required to address the portions of the barrier system that were installed around existing trees in the area. Approximately 28 trees were cut at their base, and the root balls were excavated. The root balls were characterized for disposal based on sampling results obtained prior to the construction of the initial cap in 2002 (ENVIRON 2014), and as such, the root balls were assumed to contain PCBs at concentrations greater than 50 mg/kg. The root balls were direct-loaded into roll-offs and disposed of at Chemical Waste Management's TSCA-approved landfill. The trees were disposed of by burning at the City of Oxford's controlled burn site.

Voids created during tree removal were filled with flowable fill concrete (approximately 44 total cubic yards). The area was compacted as needed, and a woven geotextile fabric barrier (approximately 36,000 square feet) was placed over the existing cap. Imported clean fill (a total of approximately 4,400 cubic yards of material placed at an average thickness of approximately 3 feet) was placed and compacted. Seven inches of dense-graded aggregate was placed, graded, and compacted to achieve the required elevation.

Additionally, 42 linear feet of 30-inch drainage pipe were installed perpendicular to the east side of the Miracle Field to facilitate storm water drainage, and dense-graded aggregate was placed to a thickness of approximately 7 inches in a 10-foot-wide walkway over the installed pipe. This newly installed walkway provides access from the Miracle Field to the existing parking lot located on the east side of the field.

3.3.3 Choccolocco Creek Wastewater Treatment Plant

The CCWWTP, located on Friendship Road within the incorporated limits of Oxford, Calhoun County, Alabama, is owned and operated by the Anniston Water Works and Sewer Board (AWWSB). Between 2002 and 2006, infrastructure support projects were implemented to address PCBs in soil at the CCWWTP (Figure 3-1). The infrastructure support projects at the CCWWTP were conducted as part of two phases of expansion by the AWWSB to increase the capacity of the plant. The projects were implemented in accordance with the planning documents prepared by URS Corporation ([URS] 2001a).

Soil characterization sampling to support construction activities was conducted in accordance with the *Soil Sampling Work Plan, the Anniston Wastewater Treatment Plant* (URS 2001b) and the results were included in the *Soil Investigation Report, the Anniston Wastewater Treatment Plant* (URS 2001c). Additional details associated with these activities are presented in *the Phase I/Phase II Construction Interim Remedial Measures Report, Choccolocco Creek Wastewater Treatment Plant Expansion* (Roux 2008).

Phase 1 activities were conducted between February 2002 and October 2003. During Phase 1, soil was excavated from the headworks building and ancillary structures area, the peak flow pump station area, and pipeline corridors. Phase 2 activities were conducted between April 2005 and August 2006. During Phase 2, soil was excavated during construction of the deep bed filter units and storm water drainage features, during installation of process piping and electrical conduit, and during construction of a bridge across Snow Creek that connects the treatment plant with the final corrective measure area east of Snow Creek (Section 3.4.2).

After excavation was completed, a nonwoven geotextile and a layer of clean soil or gravel were placed on each area, and disturbed soil areas were seeded. Soil containing PCB concentrations between 1 mg/kg and 50 mg/kg that was left in place was covered with a geotextile marker layer and backfilled with clean soil or gravel.

Excavated soil with PCB concentrations greater than or equal to 50 mg/kg was transported to Chemical Waste Management's TSCA-approved facility for disposal. When the construction schedule allowed, excavated soil with PCB concentrations between 1 and 50 mg/kg was used as backfill or temporarily stockpiled and subsequently consolidated in the final corrective measure containment area on the east side of Snow Creek (Section 3.4.2). When the construction schedule did not allow for consolidation in the final corrective measure containment area, excavated soil with PCB concentrations between 1 and 50 mg/kg was transported to the Three Corners Regional Landfill for disposal.

The Figure 3-5 series shows the overall area of the CCWWTP, the extent of the barriers installed across the property, the area and depth of prior excavation activities, the location of soil samples collected prior to the installation of the barriers, and PCB results associated with these soil samples.

In 2018, AWWSB approved the design for the construction of a new dewatering facility and appurtenances at the CCWWTP (*Choccolocco Creek Waste Water Treatment Plant Proposed Dewatering Facility Construction Support*; Solutia 2018b). In support of the design process and prior to the bidding of the project, soil was sampled to evaluate the presence of PCBs in areas where intrusive activities are slated to occur. The soil sampling results indicated that the highest

PCB concentration in the areas of planned intrusive construction activities was 11 mg/kg: none of the field-screened samples had PCB results above 50 mg/kg. Support from P/S for the AWWSB upgrade project was completed in 2022.Excess soil generated during the CCWWTP upgrade were used on-site as backfill or disposed of at Three Corners Regional Landfill for those situations where the materials could not be used as on-property backfill (Solutia 2022).

3.3.4 Prime Properties Foundation Preparation

Between August and September 2001, infrastructure support activities were completed in anticipation of developing the property identified in the Calhoun County tax records as 0 Recreation Drive, Oxford, Alabama (property parcel identification numbers [PPIN] 16744). The property is located north of Recreation Drive and west of Snow Creek (Figures 3-1 and 3-6) and is referred to as the Prime property in the OU-4 RI based on the name of the prior owner (Prime Properties). This parcel has also been referred to as the Borrelli Property in prior project documents.

Infrastructure support activities have been implemented at the property to reduce potential exposure to and migration of PCB-containing soil in anticipation of construction activities. The support activities included clearing trees, placing a geotextile marker layer, and installing 1 foot of soil to isolate PCB-containing soil over a 1.75-acre area along the western portion of the property. The property contains an east-west trending drainage ditch that discharges into Snow Creek. A large-diameter concrete culvert was installed in the drainage ditch near the western property limit to allow access to the northern portion of the property during construction and to help control and manage storm water at the property.

Figure 3-6 shows the extent of the improvements at the Prime property and summarizes PCB results for soil samples collected prior to the placement of additional soil. A total of 11 primary samples (not duplicates) were collected from 7 locations for laboratory analysis from the Prime property area as part of infrastructure support efforts. PCBs were detected in each of these samples, and concentrations ranged from 29 to 450 mg/kg and had an average PCB concentration of 172 mg/kg. Additional information for the property is provided in the memos entitled *Soil Sampling Results, Borrelli Property* (Genesis 2001a) and *Borrelli Property Cover Material Soil Sampling Event* (Genesis 2001b). The property currently is owned by the Land Trust, who acquired the property to protect the riparian zone that borders Snow Creek. There are permanent land use restrictions for this property through the Land Trust that restrict the property from future development and ensure that the vegetated buffer bordering Snow Creek remains in place.

3.3.5 Interstate 20 (I-20)

Alabama Department of Transportation (ALDOT) completed the expansion of the I-20 bridge system over Snow Creek in conjunction with its six-lane highway expansion and upgrade program (ALDOT Project No. IM-STPAAF-BRF-I020(333) & ST-008-021-004). As part of the bridge expansion and upgrades, infrastructure support activities were implemented between November 2010 and March 2013 to address PCB-containing soil prior to the I-20 expansion activities being conducted by ALDOT's selected contractor(s).

The I-20 project area comprises approximately 7.3 acres within the ALDOT right-of-way in Oxford, Alabama. A hotel and Oxford Lake Park are located to the north of the I-20 project area,

and the CCWWTP is located to the south (Figure 3-1). Bridges along I-20 cross Snow Creek in the central portion of the project area. Details associated with the infrastructure support activities for I-20 are presented in the *I-20 Snow Creek Bridge Expansion Support Work Plan* and addenda (Solutia 2010 and USEPA 2010a; and Solutia 2011 and USEPA 2012c) and the contract documents for the construction support activities (Roux 2010). A final report documenting support services during bridge construction was prepared and submitted to USEPA on October 7, 2014, and titled *Interstate 20 (I-20) Bridge System Over Snow Creek Remedial Completion Report, Construction Support for ALDOT Expansion of the I-20 Bridge System Over Snow Creek* (Roux 2014).

A summary of support activities provided by P/S to ALDOT during the project included the following:

- Support pre-construction geotechnical studies conducted in the project area (including cleaning drilling equipment and managing investigation-derived waste).
- Construct a 1-foot soil barrier under the bridges to provide a working surface for ALDOT contractors.
- Sample and characterize soil and sediment in areas of ALDOT intrusive work.
- Dispose of or relocate under isolation barriers (i.e., marker layer and backfill) soil and sediment with PCB concentrations above 1 mg/kg within ALDOT intrusive work areas.
- Sample soil and sediment outside the limits of the soil barrier and within the construction limits of the project where ALDOT or its contractors required access.
- Provide a 1-foot soil barrier over areas with PCB concentrations above 1 mg/kg and less than 50 mg/kg, where ALDOT or its contractors required access.

The highway expansion activities were conducted in three phases. Phase 1 was implemented between November 2010 and October 2011 and focused on the central bridge area and the soil embankment and floodplain areas on both sides of the highway. Phase 2 was implemented between June 2012 and August 2012 and focused on the eastbound lane bridge abutments. Phase 3 was implemented between November 2013 and January 2014 and focused on the westbound lane bridge abutments.

Figure 3-7a shows the overall I-20 project area and the locations of soil samples collected prior to installation of geotextile layers, clean fill materials, and a vegetation or riprap armor stone layer. The different configurations of geotextile layers, clean fill materials, and vegetation or riprap armor stone are shown and described on Figure 3-7b. PCBs results ranged from 0.19 to 44 mg/kg and had an average PCB concentration of 15 mg/kg (Figure 3-7a).

An isolation barrier was installed over approximately 7.2 acres of project area, including the area under the bridge, the bridge abutments, soil embankments, and the surrounding area of the floodplain. The key activities conducted with the I-20 infrastructure support activities are summarized below:

- Bridge Area: Infrastructure support activities in the bridge area included excavating along new bridge bent lines and around the existing bridge bents, regrading the

northeast ditch, installing drainage and marker layer geotextiles, and placing a soil layer. The barrier consisted of a geotextile marker layer; 1 foot of clean, compacted soil; a nonwoven geotextile layer; and 6 inches of aggregate around the bridge area. A drainage geotextile and 1 foot of riprap were installed in the Northeast Ditch.

- Bridge Abutment Areas: Infrastructure support activities in the bridge abutment areas included excavating around the western bridge abutment and installing a barrier consisting of a geotextile marker and 1 foot of clean fill. The area of the western abutment slope was additionally overlain with a nonwoven geotextile and riprap. No infrastructure support activities were required for the eastern abutment because soil sampling indicated that PCB concentrations were less than 1 mg/kg in that area.
- Soil Embankments: Infrastructure support activities in the soil embankment areas included clearing and grubbing, stripping topsoil, and regrading the areas (e.g., benching, excavating, or filling to reach ALDOT's required final grades). The barrier consisted of a geotextile marker layer, 1 foot (minimum) of clean imported fill, and seeding. The southern soil embankment area required significant additional fill and compaction in accordance with ALDOT specifications to provide an appropriate subgrade for the lane extension on the south side of the highway.
- Floodplain Area: Infrastructure support activities in the floodplain area generally included clearing and grubbing as well as installing a barrier. The barrier consisted of a geotextile marker layer, 1 foot (minimum) of clean imported fill, and seeding. A portion of the Northwest Quadrant also received an additional geotextile and a 6-inch layer of aggregate to minimize erosion.

Throughout the project, soil with PCBs was managed as follows:

- Excavated soil with PCB concentrations less than 1 mg/kg was used as backfill within the project area.
- During Phase 1, approximately 2,205 tons of soil with PCB concentrations between 1 and 50 mg/kg were relocated onto a geotextile marker layer in the northwestern floodplain area (within the ALDOT right-of-way). A geotextile marker was also placed on top of the relocated soil. The barrier consisted of a geotextile marker layer and 1 foot of vegetated soil or aggregate.
- In Phases 1, 2, and 3, approximately 450 tons of soil with PCB concentrations between 1 and 50 mg/kg were transported off-site for disposal at the Three Corners Regional Landfill.
- In Phases 1, 2, and 3, approximately 2,714 tons of soil with PCB concentrations above 50 mg/kg were transported off-site for disposal at Chemical Waste Management's TSCA-approved facility.

In conjunction with the I-20 expansion project, P/S elected to install two new casings beneath the highway east of Snow Creek to provide alternate routing for an existing uncased sewer line and a proposed future water line. Trenchless construction methods (i.e., jack and bore) were used for the utility casing installation to avoid penetrating the newly installed stone and soil barriers described

above. Field screening and soil sampling were conducted to characterize soil generated during utility casing installation.

Additional details associated with the utility casing installation work are presented in *the Utility Casing Installation Remedial Measures Completion Report Construction Support for ALDOT Expansion Of the I-20 Bridge System Over Snow Creek* (Roux 2011). Prior to backfilling the jacking and receiving pits, the bottoms and sidewalls of the pits were lined with a nonwoven geotextile marker layer. Approximately 60 cubic yards of bore/auger spoils with PCB concentrations less than 1 mg/kg along with approximately 300 cubic yards of additional fill were used to backfill the pits. Approximately 70 tons of soil (generated during the casing installation) with PCB concentrations between 1 and 50 mg/kg were placed in roll-off containers and subsequently transported for off-site disposal at the Three Corners Regional Landfill. Approximately 640 tons of soil with PCB concentrations above 50 mg/kg were generated and transported for off-site disposal at Chemical Waste Management's TSCA-approved facility.

3.3.6 Former Holiday Inn Redevelopment Support

In 2013, an approximately 9.2-acre parcel in Oxford, Alabama, known as the Former Holiday Inn Property (PPINs 87703 through 87706 and 65775), was acquired by Holmes Property, LLC (Holmes) for redevelopment for retail use. The redevelopment activities consisted of demolishing former structures at the property and constructing new retail pads, roadways, and utilities. A portion of the proposed redevelopment was located within the limits of the 100-year floodplain along Snow Creek. The construction activities planned for the portion of the property within the 100-year floodplain included constructing a retail pad, a roadway turnaround, and utilities (i.e., sanitary sewer, storm sewer, water, and fiber optic).

Prior to beginning redevelopment, P/S met with Holmes to review the proposed construction activities and discuss soil handling procedures. P/S subsequently prepared the *Former Holiday Inn Property Redevelopment Proposed Sampling Plan* (Solutia 2013a) to evaluate the PCB concentrations in soil anticipated to be encountered in the areas proposed for construction. The sampling plan was submitted to USEPA on March 29, 2013. USEPA approved the sampling plan on April 9, 2013.

In April 2013, P/S conducted soil sampling within the 100-year floodplain at the Former Holiday Inn Property in accordance with the approved sampling plan. The soil sampling results (Genesis 2013a) indicated that PCBs were detected in soil samples collected from the proposed roadway turnaround as well as in certain locations along the proposed storm sewer conveyance lines and proposed fiber optic line. PCBs were not detected at concentrations above 1 mg/kg in soil samples collected from the proposed footprint of the retail pad within the 100-year floodplain.

Based on the soil sampling results and subsequent meetings with the property developer, P/S developed the *Former Holiday Inn Redevelopment Support Work Plan* (Solutia 2013b) to describe the procedures for addressing PCB-containing soil encountered during the redevelopment project construction. USEPA approved the Redevelopment Support Work Plan on August 16, 2013, after discussions between P/S and USEPA regarding the scope of the proposed support and soil handling/disposal activities. Additional details related to the Former Holiday Inn Property redevelopment support work are presented in the *Former Holiday Inn Redevelopment Project Completion Report* (Solutia 2013c) that was submitted to USEPA on November 20, 2013.

Between August 26 and September 18, 2013, intrusive work within the 100-year floodplain area was conducted, and the following activities were conducted to handle the PCB-containing soil identified at the property:

- Soil was excavated along the alignment of the storm sewer piping (where design grade was below existing grade) to achieve the required design elevations and slopes; a nonwoven geotextile marker layer was installed along the excavated storm sewer pipeline where PCB concentrations were greater than 1 mg/kg. Clean fill was placed in the excavated area to meet the required elevations.
- Where excavation was not needed to meet required elevations along portions of the storm sewer pipeline, a nonwoven geotextile marker layer was installed directly on the existing ground surface, and storm sewer piping and stone/gravel were placed above the geotextile fabric.
- Soil was excavated from a portion of the roadway turnaround area, a geotextile marker layer was installed, and fill materials were placed and compacted to provide a suitable construction base for the roadway.
- Soil was excavated from two jacking and receiving pits constructed to support relocation of an existing fiber optic line; a geotextile marker layer was installed in the southern pit, and clean backfill material was used to fill the pits after the horizontal boring was complete.
- Soil was excavated from the base of the temporary staging pad and the temporary decontamination pad at the end of the project. Soil excavated from these areas was conservatively assumed to contain PCBs at concentrations greater than 50 mg/kg.
- Approximately 40 tons of excavated soil with PCB concentrations greater than or equal to 50 mg/kg (or with concentrations assumed greater than 50 mg/kg) were placed directly into roll-off containers for off-site disposal at Chemical Waste Management's TSCA-approved facility.
- Approximately 530 tons of excavated soil containing PCBs at concentrations between 1 and 50 mg/kg were collected and placed in a temporary staging pad before being transported for off-site disposal at the Three Corners Regional Landfill.

As part of the site development activities, retail structures and asphalt or concrete pavements were subsequently constructed at the properties.

Figure 3-8 shows the overall area of the Former Holiday Inn Property, the approximate extents of soil excavation areas, the extent of storm sewer piping, and where a geotextile marker layer was placed above existing soil. Figure 3-8 also shows the locations and results for soil samples collected as part of the redevelopment support project where excavation was not conducted. A total of 21 samples from 19 locations were evaluated for PCBs using a combination of immunoassay screening and analytical chemistry approaches. Of the 4 samples that were evaluated with an analytical chemistry method, PCBs were only detected in 1 sample (22.1 mg/kg).

3.3.7 Parcel Improvements for the City of Oxford's Maintenance Garage

Between March 21 and April 27, 2017, infrastructure support was implemented to address PCBs in soil at a maintenance garage to be constructed on Recreation Drive, proximate to Snow Creek in Oxford, Calhoun County, Alabama. The maintenance garage property is owned and operated by the City of Oxford. *The Maintenance Building Construction Project Support Work Plan* was submitted to USEPA on March 10, 2017, and was approved on March 16, 2017. The infrastructure support activities were implemented in accordance with the *Maintenance Building Project Construction Completion Report* (Solutia 2017).

Construction of the maintenance garage included a building, its appurtenances, and utility connections. The infrastructure support scope of work included excavating and managing PCB-containing soil located within the footprint of planned utility connections, placing a geotextile marker layer and clean fill in excavated areas, and disposing of excavated soil. The soil was characterized for disposal based on sampling results obtained during the earlier characterization of the area (ENVIRON 2014), and the soil was assumed to contain PCBs at concentrations greater than 50 mg/kg. Approximately 150 tons of excavated soil were disposed of at the Chemical Waste Management's TSCA-approved landfill.

The general location of the maintenance garage project is shown on Figure 3-1. Additional details for this infrastructure support project are shown on Figure 3-9. This includes the overall footprint for fill materials that were placed by the City of Oxford prior to constructing the building and surrounding parking lot area. These fill materials ranged in thickness from approximately 1 to 2 feet near Recreation Drive to several feet at the northern end of the construction footprint. PCB laboratory and immunoassay results for samples beneath this construction footprint are shown on Figure 3-9 and include the highest PCB concentration at each location. A total of 15 laboratory results for PCBs from 12 locations are available for the footprint area beneath the constructed maintenance garage facility. PCBs were detected in 67% of these samples. PCB concentrations ranged from nondetect to 59 mg/kg, and the average PCB concentration was 15 mg/kg. PCB results for samples collected at the base of utility connection trenches are also shown on Figure 3-9.

3.4 Final Corrective Measures

Final corrective measures completed at the Highway 21 Bridge and the CCWWTP excavated soil stockpile were conducted in association with the Facility's RCRA Post-Closure Permit. Final closure reports, ongoing monitoring reports, and maintenance are conducted through ADEM and the RCRA process (Figures 3-1, 3-10, and 3-11). Summaries for each of these final corrective measures are presented in the following subsections and additional supporting details are provided in the OU-4 RI (Geosyntec 2019).

3.4.1 Highway 21 Bridge at Choccolocco Creek

PCB-containing soil was encountered in the area where Highway 21 crosses Choccolocco Creek, and the results are presented in the *Report of Soil Sampling and Analyses* (Law 1997). Final corrective measures were implemented to address PCB-containing soil prior to ALDOT construction of a bridge replacement at State Highway 21 and Choccolocco Creek, located in Talladega and Calhoun Counties. The project was located within and adjacent to the 100-year floodplain of Choccolocco Creek. This area was identified as "Area of Concern B" in the Facility's RCRA permit (USEPA ID/Permit No. ALD004019048). ALDOT and P/S worked together to

implement the final corrective measure to address PCB-containing soil during construction of new primary and relief bridges over Choccolocco Creek and a feeder creek, respectively; construction of associated approach roadways; replacement of the existing bridges; and installation of a new utility corridor. Figure 3-10 shows the extent of covers installed as part of the Highway 21 corrective measures.

As part of the overall planning and design process, three field investigations were conducted in the State Highway 21 area adjacent to Choccolocco Creek, and the results are presented in the *RFI Results and Interim Measures Plan* (URS 2001d). Soil sampling was concentrated in areas of anticipated excavation. PCB-containing soil was generally encountered at depths ranging from 0 to 4 feet, although impacted depths extended to 6 feet in isolated areas.

P/S evaluated two alternatives as part of a corrective measure study as reported in the *Corrective Measures Study for Highway 21 Bridge at Choccolocco Creek* (Solutia 2000). P/S, with ADEM approval, selected an alternative that included on-site containment and isolation (by capping) of soil with PCB concentrations between 1 and 50 mg/kg and excavation and off-site disposal of soil with PCB concentrations greater than or equal to 50 mg/kg.

The construction at State Highway 21 was completed in two phases. The *Phase I Completion Report, Corrective Measures Implementation* (Solutia 2004c) was submitted to ADEM in accordance with the Facility's RCRA Post-Closure Permit and describes the completion of the Phase 1 corrective measure activities. The *Phase II/Final Completion Report, Corrective Measures Implementation* (Solutia 2008) was submitted to ADEM in accordance with the Facility's RCRA Post-Closure Permit and describes the completion of the Phase 2 corrective measure activities.

Phase 1 work included constructing new bridges, approach roadways, and utility corridors. As described above, sampling and analyses were conducted prior to construction in the proposed excavation footprints to characterize PCB concentrations by depth. Phase 1 excavations were conducted between October 6 and November 17, 2003. Approximately 6,300 cubic yards of soil with PCB concentrations less than 50 mg/kg were placed in the road embankment areas for consolidation and capping, and approximately 150 cubic yards of soil with PCB concentrations greater than or equal to 50 mg/kg were transported to Chemical Waste Management's TSCA-approved landfill for disposal. Following the excavation activities, a geotextile marker layer was placed in the excavations and over the remaining surface areas in the overall footprint of the Phase 1 project. The excavated areas were backfilled to design grade with imported clean fill, and, except for creek banks and the north drainage ditch, which were covered with riprap, the remainder of the work area was covered with 1 foot of soil to isolate PCB-containing material in the subgrade. The final marker layer and 1 foot of clean cover extended over a 7.18-acre area.

Phase 1 was initially intended to include the utility corridor for both gas and water lines. This was later modified so that the utility corridor included a water line only. This allowed construction of the corridor to be 6 feet deep and 6 feet wide with additional side slopes in most areas. The final utility trench locations and the PCB results for 65 soil samples collected from the horizon below where the water line was installed are shown on Figure 3-10. PCBs were detected in 42% of these samples ranged in concentration from nondetect to 4.1 mg/kg, and the average PCB concentration was 0.27 mg/kg. Although the original design was to extend the water line below Choccolocco

Creek, this approach was modified during finalization of the design, and the water line was constructed above Choccolocco Creek with an overhead connection.

Phase 2 of the corrective measures consisted of replacing the existing bridges and was completed between August 28 and October 29, 2005. Additional soil characterization was completed in the Phase 2 construction area to identify and/or delineate the extent of PCBs in the subsurface soil. All soil removed during the Phase 2 excavation had PCB concentrations less than 50 mg/kg. Excavation and general site grading for Phase 2 began on September 27, 2005. Excavated and graded materials were placed in the embankment areas followed by import and placement of approximately 3,250 cubic yards of clean fill material to achieve final design elevations. Placed materials were compacted, covered with a geotextile marker and a 1-foot-thick clean soil cover over 2.2 acres, and seeded.

Upon completion of the final corrective measures for the State Highway 21 project, a deed notice and associated survey plats providing for the long-term monitoring and maintenance of the controls were filed with Calhoun and Talladega Counties as required by the RCRA permit (Solutia 2008). P/S continue to evaluate the effectiveness of the final corrective measure annually as required by the RCRA permit. This evaluation of effectiveness includes annual contact with ALDOT to review planned road maintenance, utility crossings, or other construction activities that might potentially disturb or degrade the installed covers or the soil beneath the covers. Corrective measures effectiveness reports are submitted annually to ADEM to document continued monitoring and maintenance as described in the *Comprehensive Operations and Maintenance Plan for Remedial/Corrective Action Projects* (Solutia 2014b).

3.4.2 Choccolocco Creek Wastewater Treatment Plant: Excavated Soil Pile

P/S implemented a final corrective measure to address a soil stockpile with PCBs located at the CCWWTP in Oxford, Calhoun County, Alabama. The stockpile contained soil excavated from the floodplain of Snow Creek during the construction of detention basins at the CCWWTP. The stockpile was relocated in a final corrective measure to a 16-acre parcel located to the east of Snow Creek. The area is bordered to the north by I-20, to the east by a wooded lot, to the west by Snow Creek, and to the south by undeveloped land and Choccolocco Creek. Figure 3-11 shows the extents and details of the final corrective measure.

The final corrective measure proposed in the *Corrective Measures Study for Excavated Soil Stockpile at CCWWTP, Oxford, Alabama* (Solutia 2002a) and further detailed in the *Corrective Measures Implementation Work Plan, Excavated Soil Stockpile at Choccolocco Creek Wastewater Treatment Plant, Anniston, Alabama* (Solutia 2003b) was accepted by ADEM in August 2002 (ADEM 2002). This includes USEPA's approval to place a cap over materials with PCB concentrations greater than or equal to 50 mg/kg, as was provided in February 2004 under Section 6(e) of TSCA and the PCB regulations provided in 40 Code of Federal Regulation (C.F.R.) Section 761.61(c) (USEPA 2004b). The approval specifically noted that the PCB concentrations ranged from nondetect to approximately 200 mg/kg but averaged less than 50 mg/kg.

Construction for the final corrective measure began on April 24, 2006, and was completed by March 27, 2007. The *Final Corrective Measures Implementation Report, Excavated Soil Stockpile at Choccolocco Creek Wastewater Treatment Plant* (Roux 2007) reports that 44,000 cubic yards of PCB-containing soil were consolidated beneath the final cover. This material consisted of

approximately 39,000 cubic yards from the original stockpiled material investigated as part of the corrective measures study and an additional 5,000 cubic yards of soil with PCB concentrations between 1 and 50 mg/kg generated during expansion activities for the CCWWTP on the west side of Snow Creek. P/S submitted the Final Corrective Measures Implementation Report (Roux 2007) to ADEM in accordance with the Facility's RCRA post-closure permit.

Upon completion of the final corrective measure, a deed restriction was filed outlining the site conditions, appropriate site restrictions, and an as-built survey that indicates the location of the cover system with respect to survey benchmarks. Long-term monitoring is conducted in accordance with the *Comprehensive Operations and Maintenance Plan for Remedial/Corrective Action Projects* (Solutia 2014b). The monitoring consists of inspecting the final corrective measure (monthly and following significant storm events) with maintenance conducted as needed based on the findings of the inspections. Annual effectiveness reports are submitted to ADEM summarizing inspection and maintenance activities and documenting the effectiveness of the final corrective measure.

4 SUMMARY OF THE REMEDIAL INVESTIGATION FOR OU-4

4.1 OU-4 Investigations

This section describes various investigations that have been conducted for OU-4, including sampling and analysis of floodplain soil, sediment, surface water, groundwater, and biota; ecological studies, including a habitat survey; and a fish consumption survey. The following subsections include the general objectives for the various sampling programs implemented by P/S, USEPA, and others, as well as specific investigation activities. Results from these studies are summarized in figures and discussed briefly. Additional details are provided in the OU-4 RI (Geosyntec 2019).

The data for OU-4 were largely collected during investigations conducted under the RCRA and CERCLA programs under the work plans listed below. These data constitute a majority of the data presented in the OU-4 RI with a small percentage (less than 5%) collected by other parties, including USEPA and ADEM.

- RCRA Program
  - Supplemental RCRA Facility Investigation Work Plan for the Off-Site Portion of the RFI/CS Program (Supplemental Off-Site RFI Work Plan; BBL 1999a)
  - Phase II Off-Site (Floodplain) RFI/CS Investigation Work Plan (Phase 2 RFI/CS; BBL 2000b)
  - Supplemental Quality Assurance/Sampling and Analysis Project Plan for the Off-Site Portion of the RFI/CS Program (BBL 1999b)
- CERCLA Program
  - Remedial Investigation/Feasibility Study Work Plan for the Anniston PCB Site, Revision 2 (RI/FS Work Plan; BBL 2004)
  - Phase 1 Field Sampling Plan for Operable Unit 4 of the Anniston PCB Site, Revision 3 (OU-4 Phase 1 FSP; BBL 2006)
  - Anniston PCB Site Phase 2 Field Sampling Plan for Operable Unit 4, Revision 2 (OU-4 Phase 2 FSP; Arcadis 2010b)
  - *Phase 3 Field Sampling Plan for Operable Unit* 4 and addenda (Arcadis 2010a, Arcadis 2011a,b)
  - *Site-Wide Quality Assurance Project Plan for the Anniston PCB Site*. Revision 5. Anniston PCB Site, Anniston, Alabama (Site-Wide QAPP; Arcadis 2008)

The key elements of the sampling programs are discussed below by media (soil, sediment, surface water, biota, and groundwater).

4.1.1 Floodplain Soil Investigations

Floodplain soil data were collected in a series of sampling events under the RCRA and CERCLA programs. The first soil samples were collected as part of the RCRA program and included samples

collected from the top of the creek banks that were followed by soil sampling in the broader Choccolocco Creek floodplain. Under the more recent CERCLA program, the nature and extent of PCBs and other constituents in the Choccolocco Creek floodplain were evaluated in a phased sampling approach. This approach was designed to provide sufficient data to characterize exposure point concentrations (EPCs) for PCBs for human and ecological receptors using reasonable exposure assumptions and to define the nature and extent of contamination.

The floodplain soil sampling conducted under the CERCLA RI/FS program included 25 individual characterization areas (CAs) based on segmenting the 6,000-acre floodplain into smaller areas. The segmentation process reflected the surrounding geography, land use, and habitat and resulted in EPCs that were representative of localized conditions. The CAs were slightly reorganized by USEPA in preparing the OU-4 HHRA and were renamed as exposure units (EUs). A geographic comparison of the CAs and EUs is provided on Figure 4-1 and shows the similarity between the realignment and renaming process.

4.1.1.1 RCRA Program

Floodplain soil sampling under the RCRA program was initially focused on collecting samples from the banks of Choccolocco Creek that had the highest potential for erosion. Based on those initial results, additional sampling in the broader floodplain along a series of transects was conducted to provide additional information on PCB concentrations as a function of distance from the creek bank and distance downstream from the Snow Creek confluence. The floodplain soil transect sampling conducted under the RCRA program was reported to USEPA in the 2003 *Data Summary Report for Operable Unit 4* (OU-4 DSR; BBL 2005a). The OU-4 DSR also reported the top-of-bank sampling results that were previously reported to ADEM in the Off-Site RFI Report (BBL 2000a).

Top-of-Bank Sampling

Samples were collected from locations along the top of the banks of Choccolocco Creek to assess the potential for PCB-containing soil to erode into the creek. Results from the top-of-bank sampling showed a pattern of higher PCB concentrations upstream and decreasing concentrations with distance downstream. The highest concentrations were upstream of the confluence with Coldwater Creek where concentrations ranged from nondetect to 21 mg/kg. Downstream of Coldwater Creek, the results from each top-of-bank sample were less than 5 mg/kg with one exception (9.4 mg/kg). For all sampling locations downstream of Cheaha Creek, the top-of-bank sample PCB concentrations were less than 1 mg/kg. The top-of-bank sample collection locations and PCB results are shown on the Figure 4-2 series and Figure 4-3 series, respectively.

Nature and Extent Transect Sampling

As a follow-up based on the results from the top-of-bank sampling, a floodplain transect sampling program was conducted to provide additional information on characteristics in the floodplain. PCB concentrations were expected to decrease based on downstream and lateral distance. Also, the higher concentrations were expected to be found in the shallower depth intervals.

The floodplain soil transect sampling results (10 transects; C-FP01 through C-FP10) were reported in the Phase I conceptual site model (CSM; BBL 2003), and 1 additional transect (C-FP11) was requested by the property owner and reported in the OU-4 DSR (BBL 2005a).

PCBs

- Of the 125 samples collected from the 0–0.5-foot interval, 62 of the PCB results (50%) were nondetects. The PCB concentrations ranged from nondetect to 79 mg/kg with an average concentration of 2.9 mg/kg.
- Of the 123 samples collected from the 0.5–1-foot interval, 78 of the PCB results (63%) were nondetects. The PCB concentrations ranged from nondetect to 56 mg/kg with an average concentration of 2.8 mg/kg.
- Of the 25 samples collected from the 1–2-foot interval, 6 of the PCB results (24%) were nondetects. The PCB concentrations ranged from nondetect to 97 mg/kg with an average concentration of 6.6 mg/kg.

Mercury

- Of the 125 samples collected from the 0–0.5-foot interval, 1 of the mercury results (less than 1%) was nondetect. The mercury concentrations ranged from nondetect to 13 mg/kg with an average concentration of 1.1 mg/kg.
- Of the 123 samples collected from the 0.5–1-foot interval, 5 of the mercury results were nondetects (4%). The mercury concentrations ranged from nondetect to 12 mg/kg with an average concentration of 0.82 mg/kg.
- Of the 25 samples collected from the 1–2-foot interval, 1 of the mercury results was nondetect (4%). The mercury concentrations ranged from nondetect to 25 mg/kg with an average concentration of 2.9 mg/kg.

4.1.1.2 CERCLA Program

Floodplain soil sampling under the CERCLA program was conducted in a phased approach to provide the data needed to complete the OU-4 RI, including defining the nature and extent of constituents in the OU. The sampling also provided data needed for the OU-4 HHRA, OU-4 BERA, and OU-4 FS. The floodplain soil was sampled in specific areas to augment the top-of-bank and transect data collected during the RCRA program and to provide sufficient data to characterize PCB concentrations using reasonable geographical exposure scenario EUs for the OU-4 HHRA. Floodplain soil data were also collected for a range of IM, infrastructure support, and final corrective measure projects. The activities and results of sampling to support these projects are summarized in Section 3 of this OU-4 FS; additional supporting details are provided in the OU-4 RI (Geosyntec 2019).

The analytical chemistry program under CERCLA initially included 11 metals and 17 organic compounds, including PCBs. The list of constituents of potential concern (COPCs) was subsequently clarified in a letter dated August 19, 2005, (USEPA 2005b) and included the following:

- Compounds identified on the USEPA's Toxic Compound List volatile and semivolatile organics (including polycyclic aromatic hydrocarbons [PAHs])
- Chlorinated and organophosphorus pesticides

- Target Analyte List (TAL) list for inorganics (23 metals and cyanide)
- PCB congeners (World Health Organization [WHO] list plus BZ#153)
- Homolog groups
- 2,3,7,8-substituted chlorinated dioxins and furans

The list of Facility-related constituents (Appendix F of the PCD), available background data, and data from upstream of the Facility were used to evaluate whether constituents appeared to be Facility related. The COPC evaluation of the Phase 1 results is presented in the OU-4 Phase 2 FSP and concluded with the following recommendations for the analyses during subsequent phase of investigation:

- PCBs for all samples using methods appropriate for the anticipated concentrations (soil, sediment, and some biota using Aroclors; and surface water and other biota using homologs). Total PCB concentrations will be quantified on the basis of the sum of Aroclors or sum of homologs.
- 10% of all samples to be analyzed for Aroclors will also be analyzed for PCB homolog groups, congeners, and polychlorinated dibenzo-p-dioxin and dibenzofuran (PCDD/DFs).
- Mercury will be analyzed in soil, sediment, and biota samples.
- At 10% of the sampling locations, the list of 11 metals from the PCD will be analyzed.
- Sediment collected for the sediment toxicity testing will be analyzed for PCBs, acid volatile sulfide/simultaneously extracted metal, TAL metals, alkylated PAHs, organochlorine pesticides, and PCDD/DFs.

Other constituents identified on the USEPA wider constituent list (volatile organic compounds [VOCs], semivolatile organic compounds [SVOCs] other than PAHs, and organophosphorous pesticides) were not observed at frequencies or concentrations of concern. PAHs were included as part of the sediment toxicity program analysis.

Nature and Extent Sampling

One of the primary goals for the nonresidential floodplain soil sampling and analyses conducted under the CERCLA program was defining the nature and extent of COPCs in OU-4. For characterization of soil concentrations, the OU-4 floodplain was divided into reasonable geographical CAs (Figure 4-1). The overall sample design process was driven by the need to define the nature and extent of PCBs and to calculate EPCs for risk assessment purposes. A subset of the samples collected was analyzed for other constituents to characterize the nature and extent of impacts in the floodplain. Sampling and analysis were done using a phased approach and delineated the lateral and vertical extent of PCBs to a concentration of 1 mg/kg or less.

The constituents in OU-4 soil that were assessed in the nature and extent of contamination evaluation included PCBs, PCDD/DFs, toxic equivalent (TEQ) inclusive of dioxin-like PCBs (DL-PCBs), chromium, lead, mercury, and vanadium.

The constituents in OU-4 sediment that were assessed in the nature and extent of contamination evaluation and used in the risk assessments included PCBs, PCDD/DFs, including TEQ inclusive of DL-PCBs, barium, chromium, cobalt, mercury, and vanadium.

Development of Characterization Areas/Exposure Units

Because of the size of the floodplain area (approximately 6,000 acres), logical subdivisions called CAs were initially developed as part of the CERCLA sampling plan. As noted above, USEPA made minor modifications to the shape and sizes of the CAs in preparing the OU-4 HHRA. In some cases, the CAs were further divided or aggregated together. The names or labels were also changed from CAs to EUs for use in the OU-4 HHRA (JMWA and Avatar Environmental 2013). The original CA delineation and the EUs used in the OU-4 HHRA are shown on Figure 4-1. Since the sampling design was originally set up on a CA basis, the data were reported in that manner. The CAs in the floodplain were developed based on logical geographical changes in creek and floodplain characteristics and divided the OU into nine sections (C1 through C9, upstream to downstream). The main lateral split for the subdivisions into CAs is along the creek itself (i.e., the north [N] and south [S] sides of the creek). A brief overview of each CA is provided below, moving from upstream to downstream.

- **C1** includes the area of the Snow Creek floodplain downstream of Highway 78 to I-20. The overall C1 area is approximately 71 acres and includes C1-EU1, located east of Snow Creek, and C1-EU2, located west of Snow Creek. Several IMs and infrastructure support projects were conducted in portions of C1-EU1, and sampling conducted for these IM/infrastructure support efforts was conducted outside the floodplain soil sampling conducted under the CERCLA program.
- **C2** includes the Choccolocco Creek backwater area north of the main Choccolocco Creek Channel (the southern branch) from approximately 1 mile upstream of the Snow Creek confluence downstream to Friendship Road.
  - **C2N:** Most of this approximately 159-acre area is forest, although a portion of the CCWWTP and adjacent soil piles that were remediated through a cap and cover system in 2006 (Roux 2007) are also included in this CA. This area was further divided into C2N-EU1 north of the northern Choccolocco Creek backwater branch and C2N-EU2 for the central area between the two branches of Choccolocco Creek in the backwater area.
  - **C2S:** This is a 76-acre area that is predominantly forest; however, it abuts some residential lots to the south and includes a portion of agricultural land on the west side of Friendship Road (this area is connected via culvert to the east side of the road).
- **C3** includes the area from Friendship Road downstream to mile marker 33.5, where there is a constriction in the overall floodplain width.
  - **C3N:** This 172-acre area is on the north side of Choccolocco Creek. The land in this CA is a mixture of agriculture and forest. This area was further divided into the larger upstream C3N-EU1 and the smaller downstream piece C3N-EU2.

  - **C3S:** This 257-acre area is on the south side of Choccolocco Creek. Land use in this CA is predominantly agriculture with some residential and forest and scrub land. This area was divided into the upstream wider floodplain (C3S-EU1) and the downstream strip of floodplain along the creek (C3S-EU2).

- **C4** includes the area from mile marker 33.5—where there is a constriction in the overall floodplain width—to just downstream of the Coldwater Creek confluence where the floodplain influences of Coldwater Creek ends (as evidenced by the constriction of the floodplain).
  - **C4N:** This 709-acre area lies on the north side of Choccolocco Creek. Land use in this CA includes a portion of the airport. The remaining area is mainly scrub land changing to mainly forest heading downstream. The area was further divided to upstream, including the portion of the airport (C4N-EU1), and downstream (C4N-EU2).
  - **C4S:** This 608-acre area is on the south side of Choccolocco Creek. Land in this CA is mainly agriculture with a mixture of scrub land, agriculture, and forest. This area was further subdivided into upper, middle, and lower EUs (C4S-EU1, C4S-EU2, and C4S-EU3).

- **C5** includes the area from just upstream of the Coldwater Creek confluence, where the floodplain influence of Coldwater Creek ends, to mile marker 23.5 where a small tributary enters Choccolocco Creek and the width of the floodplain lessens dramatically.
  - **C5N:** This 446-acre area sits on the north side of Choccolocco Creek. Land use in the upstream portion of this CA is mainly forest and changes to mainly agriculture heading downstream. This area was further subdivided into the small portion of the floodplain upstream of Coldwater Creek (C5N-EU1) and a larger downstream area (C5-EU2).
  - **C5S:** This 356-acre area lies on the south side of Choccolocco Creek. Land use in this CA is a mixture of agriculture and forest.

- **C6** includes the area from mile marker 23.5, where a small tributary enters Choccolocco Creek and the width of the floodplain lessens, to mile marker 19.5, where there is less topography change and the width of the floodplain expands again.
  - **C6N:** This 95-acre area lies on the north side of Choccolocco Creek. The terrain in this CA rises sharply from the creek, creating a narrow floodplain. Land use in this CA is primarily forest.
  - **C6S:** This 101-acre area is on the south side of Choccolocco Creek. The terrain in this CA rises sharply from the creek, creating a narrow floodplain. Land use in this CA is primarily forest, with limited areas of agriculture and a few residential lots.

- **C7** includes the area from mile marker 19.5, where the width of the floodplain expands to just downstream of the Cheaha Creek confluence.

  - **C7N:** This 710-acre area is on the north side of Choccolocco Creek. Land use in this CA is mainly agriculture, with some forest and a small portion of residential use.
  - **C7S:** This 758-acre area lies on the south side of Choccolocco Creek. Land use in this CA is primarily agriculture with some forest.

- **C8** includes the area from just downstream of the Cheaha Creek confluence downstream to Jackson Shoals.
  - **C8N:** This 150-acre area sits on the north side of Choccolocco Creek. Land use in this CA is mainly agriculture, with some forest.
  - **C8S:** This 145-acre area is on the north side of Choccolocco Creek. Land use in this CA is mainly forest with some agriculture.

- **C9** includes the area from just downstream of Jackson Shoals to Highway 77.
  - **C9N:** This 111-acre CA sits on the north side of Choccolocco Creek. Land use in this CA is a mixture of forest and agriculture.
  - **C9S:** This 108-acre CA sits on the south side of Choccolocco Creek. Land use in this CA is a mixture of forest and agriculture.

CERCLA Sampling Design

The nonresidential sampling design was developed based on the understanding of PCB distribution in the floodplain. Sampling to define the nature and extent of constituents was designed using a phased approach to delineate concentrations and fill data gaps laterally and vertically. For Phase 1 and Phase 2 samples analyzed for PCBs, the number of nondetects, range of PCB concentrations, and average concentrations by depth interval are as follows:

- Of the 742 samples collected from the 0–0.5-foot interval, 313 of the PCB results (42%) were nondetects. The PCB concentrations ranged from nondetect to 75 mg/kg with an average concentration of 2.6 mg/kg.
- Of the 741 samples collected from the 0.5–1-foot interval, 402 of the PCB results (54%) were nondetects. The PCB concentrations ranged from nondetect to 194 mg/kg with an average concentration of 2.8 mg/kg.
- Of the 59 samples collected from the 1–2-foot interval, 3 of the PCB results (5%) were nondetects. The PCB concentrations ranged from nondetect to 320 mg/kg with an average concentration of 23 mg/kg.
- Of the 7 samples collected from the 2–3-foot interval, 1 PCB result (14%) was nondetect. The PCB concentrations ranged from nondetect to 28 mg/kg with an average concentration of 7.9 mg/kg.
- Of the 6 samples collected from the 3–4-foot interval, 1 PCB result (17%) was nondetect. The PCB concentrations ranged from nondetect to 23 mg/kg with an average concentration of 1.8 mg/kg.

For Phase 1 and Phase 2 samples analyzed for mercury, the number of nondetects, the range of mercury concentrations, and average concentrations by depth intervals are as follows:

- Of the 607 samples collected from the 0–0.5-foot interval, 2 mercury results (less than 1%) were nondetects. The mercury concentrations ranged from nondetect to 22 mg/kg with an average concentration of 1.1 mg/kg.
- Of the 403 samples collected from the 0.5–1-foot interval, 4 mercury results (1%) were nondetect. The mercury concentrations ranged from nondetect to 33 mg/kg with an average concentration of 0.89 mg/kg.
- For the 10 samples collected from the 1–2-foot interval, mercury was detected in each sample. The mercury concentrations ranged from 0.02 to 5.9 mg/kg with an average concentration of 0.79 mg/kg.
- Of the 6 samples collected from the 2–3-foot interval, 1 mercury result (16%) was nondetect. The mercury concentrations ranged from nondetect to 3.4 mg/kg with an average concentration of 1.3 mg/kg.
- For the 6 samples collected from the 3–4-foot interval, mercury was detected in all the samples. The mercury concentrations ranged from 0.02 to 1.8 mg/kg with an average concentration of 0.62 mg/kg.

In addition to the Phase 1 and Phase 2 sampling programs to define the nature and extent and support the risk assessments, additional data needs were identified to support the bioaccumulation aspects of the ecological risk assessment and to refine the nature and extent of contamination near the outer edge of the 100-year floodplain. The data for the ecological risk assessment included 68 samples collected from the 0–0.5-foot horizon in the general areas where biological samples were collected. The supplemental floodplain soil samples to complete the nature and extent evaluation were collected during the Phase 3 investigation. For the Phase 3 nature and extent samples, the number of nondetects, range of PCB concentrations, and average concentrations by depth interval are as follows:

- Of the 59 samples collected from the 0–0.5-foot interval, 12 (20%) were nondetect. The PCB concentrations ranged from nondetect to 43 mg/kg with an average concentration of 6.0 mg/kg.
- Of the 59 samples collected from the 0.5–1-foot interval, 19 (32%) were nondetect. The PCB concentrations ranged from nondetect to 93 mg/kg with an average concentration of 4.9 mg/kg.
- For the 2 samples collected from the 1–2-foot interval, the PCB concentrations were 2.6 and 4.2 mg/kg with an average concentration of 3.4 mg/kg.
- For the 2 samples collected from the 2–3-foot interval, the PCB concentrations were 0.86 and 1.3 mg/kg with an average concentration of 1.1 mg/kg.
- The single sample collected from the 3–4-foot interval had a PCB concentration of 2.7 mg/kg.

Most of the samples from Phase 2 and Phase 3 investigations were analyzed for both PCBs and mercury. The number of nondetects, range of mercury concentrations, and average concentrations by depth interval for the Phase 3 nature and extent sampling are as follows:

- For the 59 samples collected from the 0–0.5-foot interval, mercury was detected in all of them. Mercury concentrations ranged from 0.02 to 11 mg/kg with an average concentration of 1.8 mg/kg.
- Of the 59 samples collected from the 0.5–1-foot interval, 1 mercury result was nondetect (1.6%). Mercury concentrations ranged from nondetect to 19 mg/kg with an average concentration of 1.2 mg/kg.
- For the 2 samples from the 1–2-foot interval, mercury concentrations were 0.75 and 1.0 mg/kg with an average concentration of 0.88 mg/kg.

CERCLA Residential Soil Investigations

OU-4 is significantly less developed and includes more open space and far fewer residential areas than OU-1/OU-2. The overall process for evaluating residential structures beyond those evaluated as part of Evaluation Area 35 is shown on the flow chart included as Figure 4-4. The Figure 4-5 series begins with a key figure and then shows each of the structures located in and adjacent to the 100-year floodplain that were viewed as potentially supporting residential use activities. This evaluation was conducted by reviewing high-resolution aerial photographs and identified 388 structures that could possibly be used for residential purposes and required additional evaluation.

If the structure has the potential to be residential and the CA EPC was greater than or equal to 1 mg/kg, then the structure was carried forward for field observation. Structures in CAs with PCB concentrations below 1 mg/kg were also reviewed to evaluate whether individual residential areas had the potential to have soil concentrations above 1 mg/kg.

P/S and USEPA field teams conducted field observations from September 26 through 29, 2011. The surface elevations in some areas precluded influence from creek flooding, and these residential use areas were not considered further. Field observations also identified a few structures and areas as potentially residential that were not previously identified during the review of aerial photographs. The general areas that were sampled are shown on the Figure 4-6 series recognizing that sampling and subsequent soil removal, if required, were not conducted within improved areas such as driveways, houses, garages, or sheds. If the PCB concentrations in surface soil were greater than or equal to 1 mg/kg, the area was remediated in accordance with the NTCRA Agreement. The 11 properties where residential use area removals were conducted are also shown on the Figure 4-6 series. Only one residential use area (Structure ID 117) with concentrations greater than 1 mg/kg (1.9 mg/kg) was not remediated because the owner did not grant access (Figure 4-6h).

The residential sampling results and information for removals that were conducted are reported in the Completion Report (Golder 2015) and the associated annual addenda reports (Golder 2016, 2017; Solutia 2018a, 2019, 2020, 2021).

4.1.2 Sediment Investigations

OU-4 sediment was characterized over a series of phased investigations. The initial phase of characterization was conducted as a part of the RCRA program. Based on the results from the

RCRA program, additional sampling was conducted under the CERCLA program to close data gaps and to provide specific inputs needed for the OU-4 HHRA and the OU-4 BERA. The second component of the program involved collecting surface sediment samples from the same locations as used for fish collection. The third component of the program was collecting samples for geochronological analyses in conjunction with PCB analyses to correlate PCB concentrations with the time of deposition. The fourth component was to evaluate sediment that had been wet-sieved to assess the sediment PCB concentrations based on the grain-size distribution of the sediment. Sediment sampling under the CERCLA program was also conducted to more completely characterize the backwater area located at the confluence of Snow and Choccolocco Creeks and to provide additional data to support the OU-4 HHRA and the OU-4 BERA.

The locations of sediment samples collected in OU-4 are shown by program on the Figure 4-2 series. The PCB results for these samples are shown on the Figure 4-3 series, which includes labels on the individual sample locations.

4.1.2.1 RCRA Program Sediment Sampling

Sediment sampling was conducted to characterize Snow and Choccolocco Creeks under the RCRA program. The distribution of PCB and other constituents (metals) in sediment were assessed using a phased approach with an initial physical investigation followed by sampling for chemical parameters. Samples selected for chemical analyses were preferentially chosen to be representative of the highest concentration (expected to be associated with fine-grained sediment) sediment deposits in the creeks.

All 336 sediment samples collected during the RFI sediment program were analyzed for grain size, total organic carbon (TOC), and PCBs. Of the PCB results, 32% were nondetect. PCB concentrations ranged from nondetect to 169 mg/kg with an average concentration of 3.2 mg/kg. A subset of 55 samples was analyzed for the PCD list of metals (arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, and vanadium). Mercury concentrations ranged from 0.01 to 5.8 mg/kg with an average concentration of 0.49 mg/kg.

Nature and Extent Sampling

The first phase of investigations consisted of collecting physical creek data and identifying and mapping the lateral and vertical extent and types of sediment deposits. Samples for laboratory analyses were chosen to be representative of the geography of the creek and the types of sediment deposits with a bias toward selecting samples of finer-grained sediment to capture sediment most likely to have higher concentrations of constituents.

Snow Creek

The first phase of sediment characterization in Snow Creek involved mapping and measuring visible sediment deposits. Snow Creek's small size and shallow depth were suitable for continuous visual observation of the sediment and probing of the creek bed from the 11th Street Ditch downstream to the confluence with Choccolocco Creek. Observations and probing were conducted by wading in the creek bed. For characterization purposes, under the RCRA program, Snow Creek was divided into six sections from the 11th Street Ditch to the confluence with Choccolocco Creek. The most downstream portion of Snow Creek was labeled as section 6 and is now designated as the OU-4 portion of Snow Creek. The sediment deposits in Snow Creek (characterized as those areas penetrable by the probing rod) were identified and characterized by area of the deposit,

average thickness of the deposit, predominant sediment types, and the type of depositional environment. Each sediment deposit in this downstream reach of Snow Creek was assigned a sequential number from upstream to downstream. The locations of identified deposits and creek characteristics in OU-4 are shown on Figure 4-7 and characterized using the following categories:

- Aggrading bars, including deposits characterized as sand bars and islands
- Channel deposits, including bank wash
- Terraces, including high and low terraces as well as bank deposits

Of the 28 deposits identified in the OU-4 portion of Snow Creek, 10 deposits were characterized as fine-grained sediment deposits. Since higher PCB levels were expected to be associated with fine-grained sediment, these deposits were preferentially selected for laboratory analyses for PCBs, TOC, and grain size. A fraction of these samples (approximately 10%) was also analyzed for metals.

Most of sediment samples collected from the OU-4 portion of Snow Creek had relatively low PCB concentrations. Most sample results were less than 10 mg/kg except for the 0–2-inch surface interval from S-06-03 (41 mg/kg). The upper 1-foot length-weighted average for this location is 11 mg/kg. The average from the upper 2 inches across all locations in the OU-4 portion of Snow Creek is comparable to the average from the 2-inch to deeper interval (5 and 4 mg/kg, respectively). Only one sample (S-6-27) from below 1 foot had PCBs detected (5.6 mg/kg).

Choccolocco Creek

Sediment investigation activities in Choccolocco Creek were conducted along transects perpendicular to creek flow. The RFI Work Plan established 186 transects along the approximately 35 miles of Choccolocco Creek, or 1 transect for every 1,000 feet of creek bed from just upstream of the Snow Creek confluence, downstream to Lake Logan Martin. Three transects upstream of the confluence with Snow Creek (C-U1, C-U2, and C-U3) were also probed and sampled to evaluate the potential backwater effects in Choccolocco Creek upstream of the Snow Creek confluence. The first phase of activities in Choccolocco Creek consisted of probing sediment and collecting cores along each of the 186 proposed transects (BBL 1999a). Four cores were targeted along each transect and spaced evenly across the channel width (i.e., at approximately 20%, 40%, 60%, and 80% of the creek width). Channel geometry from these transects and the dimensions of bridge openings were used to support hydraulic modeling conducted as part of the Off-Site RFI using the United States Army Corps of Engineer (USACE) Hydraulic Engineering Center's River Analysis System software. The hydraulic modeling and results are presented in Appendix D of the Off-Site RFI Report (BBL 2000a).

Sediment probing was conducted from downstream to upstream. Sediment observations, including a textural characterization using the Unified Soil Classification System, were logged for each core recovered. In total, sediment cores were recovered at 580 of the 796 locations attempted. For the 216 locations where core recovery was not possible, either bedrock or boulders were present instead of sediment. Along each transect, physical measurements were also taken, including the channel width, channel bottom elevation (Figure 4-8), water surface elevation (Figure 4-9), water depth (Figure 4-10), surface water velocity (Figure 4-11), and sediment thickness (Figure 4-12). Based on the physical information collected for Choccolocco Creek and the location of tributary

inputs, Choccolocco Creek was divided into the following geographic reaches (also termed geographic strata):

- Backwater area (upstream of Friendship Rd)
- Friendship Rd to Coldwater Creek
- Coldwater Creek to Cheaha Creek
- Cheaha Creek to Jackson Shoals
- Jackson Shoals
- Jackson Shoals to Lake Logan Martin

For each reach, the sediment cores selected for PCB analysis were apportioned based on sediment types encountered in that reach. The numbers of samples for each reach and sediment type assumed that the probability distributions of key sediment parameters would be approximately normal or could be normalized by mathematical transformation. The numbers of samples were determined according to the size of the sediment deposits and preponderance of sediment type and the nature of the function determining standard error of the estimated mean. The process recognized that as the number of samples increased, uncertainty in the PCB distribution decreased. The principle of stratified sampling applied this knowledge to select sample sizes that provided characterization of each reach and each sediment texture within the reach.

A minimum of 30 sediment cores were selected from each of the reaches downstream from Snow Creek at a frequency proportioned for each sediment type. Within each reach and sediment type, the cores selected for PCB analysis were chosen randomly. For the backwater area reach located upstream of the confluence with Snow Creek, over 90% of the sediment cores classified as fine and coarse were analyzed for PCBs. Cores selected for laboratory analyses were segmented into the 0–2-inch depth interval, the 2–12-inch depth interval, and 1-foot intervals thereafter, unless a distinct visible horizon was encountered; in those cases, the samples were apportioned at the observed horizon. Of the 326 sediment samples analyzed for PCBs, 144 of these samples also underwent grain-size distribution testing.

The PCB results from the RCRA program evaluating nature and extent (termed “RFI nature and extent” in the figure legend) are shown on Figure 4-13. This figure presents all the sediment data for OU-4 (including the RCRA and CERLCA programs) and includes a breakout by sampling program to highlight which data were collected under each program. These sediment PCB results, including the samples collected from Snow and Choccolocco Creeks, support the CSM for OU-4 with elevated PCB concentrations in the backwater area that decline in concentration moving downstream toward the lower end of the system. These same OU-4 PCB sediment results are presented on Figure 4-14 and are segmented by Snow Creek, Choccolocco Creek, and upstream background samples collected from Choccolocco Creek upstream of the backwater area. PCB results for the sediment collected from Choccolocco Creek are also presented on the Figure 4-3 series.

Geochronological Investigations

Sediment samples for geochronological testing were collected in 1999 to provide data to assess sediment deposition rates and evaluate sediment stability. A series of four geochronological

sediment cores were collected from the mouth of Choccolocco Creek where it enters Lake Logan Martin (Figure 4-15).

These data indicate that the highest PCB concentrations correspond with the period of the 1960s to 1970s. After this period, sediment PCB concentrations in Choccolocco Creek decline until the early 1990s when a spike in concentration is apparent. The timing of this increase in PCB concentration is consistent with the timing of NRCS dredging of the creek (Section 2.6). PCB results for these geochronological sample locations are shown on the Figure 4-3 series and are included on Figures 4-13 and 4-14.

Wet Sieve Analysis

To assess the variation in the PCB concentration among various particle size classes and the potential importance of the differential transport of sediment particles (i.e., winnowing), a wet sieve analysis was conducted on sediment from eight of the cores collected from Choccolocco Creek. Cores for this evaluation were collected from individual cores from eight RCRA program transects: three transects with fine-grained sediment (C-U2, C-134, and C-180) and five transects with coarse-grained sediment (C-011, C-022, C-100, C-101, and C-138). The locations of these eight transects are presented on the Figure 4-2 series, and the associated PCB results for the samples are presented on Figure 4-16. As expected, higher PCB concentrations were generally associated with the finer material within each core. This relationship is stronger in the sediment collected upstream in Choccolocco Creek than in the downstream direction, as inputs of the various size fractions lowers the concentration of particulate-phase PCBs in each class size.

These data confirm the premise behind the stratified sampling approach, which predicts that higher and more variable PCB concentrations are expected to be found in the finer-grained sediment throughout the system. These results are not included on Figures 4-13 and 4-14 because they do not represent in-place conditions for establishing the nature and extent of contamination.

Fish Tissue Collection Areas

Surface sediment samples were also collected during the RFI at the three fish sampling locations in Choccolocco Creek (Locations 44, 43, and 35) shown on Figure 4-17. For completeness, the fish tissue sampling locations associated with the CERCLA program are also shown on Figure 4-17. Fish collection locations historically used by ADEM are also shown on Figure 4-17. Ten sediment samples were collected at each of the three RCRA program locations from the 0–2-inch horizon. This resulted in a total of 30 surface sediment samples. All samples were analyzed for PCBs, and some of these samples were also analyzed for mercury. PCB results for these locations are shown on the Figure 4-3 series and are included on Figures 4-13 and 4-14. The PCB results shown on Figure 4-13 are identified with the label of "RFI fish tissue sampling locations."

As part of the RFI fish tissue collection program an additional 30 surface (0–2 inches) sediment samples were collected and analyzed for PCBs, TOC, and grain size. PCB concentrations in surface samples ranged from nondetect (1 sample) to 2.7 mg/kg with an average concentration of 0.57 mg/kg. Of these surface sediment samples, 15 were analyzed for mercury. The mercury concentrations ranged from 0.27 to 1.7 mg/kg with an average concentration of 0.9 mg/kg.

Sediment Trap Samples

Sediment traps were deployed for several months in the backwater area near the confluence of Snow Creek and Choccolocco Creek (Figure 4-18). There were no PCB results for the sediment trap deployed at location SE-U1-1 because it was recovered 600 feet downstream of its initial placement location; therefore, sediment contained in the trap was not considered to be representative of its original location. Sediment recovered from the trap deployed at location SE-U2-1 had a PCB concentration of 0.84 mg/kg. The sediment trap that was placed at location SE-U3-1 was not found. The sediment PCB concentration of the material recovered from SE-U4-1 was approximately 3 mg/kg. This is the average of the parent sample PCB concentration of 2.9 mg/kg and duplicate sample concentration of 3.3 mg/kg. The results of these sediment traps indicate that sediment deposition rates near the confluence of Snow and Choccolocco Creeks are low and that the PCB concentrations of the most recent sediment deposited on the surface of the backwater area are also low, ranging from approximately 1 to 3 mg/kg.

4.1.2.2 CERCLA Program Sediment Sampling

While the RCRA sediment sampling and analysis program defined the coarse-scale spatial distribution and PCB concentrations within OU-4, the CERCLA sediment sampling and analysis program more completely defined the nature and extent of sediment PCBs and other constituents. Specifically, sediment samples were collected to fully characterize the nature and extent of contamination in the backwater area under the OU-4 Phase 1 FSP (BBL 2006), evaluate sediment stability in the backwater area through additional geochronological samples, and support the OU-4 HHRA and the OU-4 BERA under the OU-4 Phase 2 FSP (Arcadis 2010b). The specific sampling efforts to support the risk assessments included collecting sediment samples that were coincident with the fish tissue samples to support the OU-4 HHRA, sediment samples that were coincident with the biota samples to support the OU-4 BERA, and sediment samples that would support the sediment toxicity testing and bioaccumulation program. These sampling efforts and the results are described in more detail below.

Nature and Extent Sampling

Sediment samples were collected and analyzed under the CERCLA program to better define the nature and extent of PCBs in sediment than that established under the RCRA program. To reduce uncertainty around the nature and extent of PCBs in the backwater area near the confluence of Snow Creek and Choccolocco Creek, seven additional sediment transects were established and sampled. In addition to the collection of PCB and other chemistry data, physical measurements of water depth and sediment thickness were collected to aid in evaluating sediment stability in this area.

A total of 101 samples from 28 locations were collected and analyzed for PCBs, TOC, and grain size. Of the samples analyzed for PCBs, 69% were nondetect, and the maximum PCB concentration detected was 496 mg/kg. The maximum PCB concentration does not include results for samples that were collected for the toxicity testing program that were sieved on a 2-millimeter screen before being analyzed. The average PCB concentration for the nontoxicity testing program sediment samples was 12 mg/kg. Fifteen samples were analyzed for mercury with 33% of the sample results being nondetect. Mercury concentrations ranged from nondetect to 96 mg/kg, and the average mercury concentration was 17 mg/kg. These same 15 samples were also analyzed for the wider constituent list including VOCs, SVOCs, chlorinated and organophosphorus pesticides, TAL metals, PCB congeners, homolog groups, and PCDD/DFs.

Consistent with the technical approach used for floodplain soil, the Phase 1 findings for the wider constituent list in sediment were evaluated, and most of the constituents were found to be nondetect or below screening levels. Therefore, subsequent sampling for characterization did not include analyses for VOCs, SVOCs other than PAHs, pesticides, or metals that were not on the PCD list.

The PCB results for the sediment collected from the backwater area are presented on the Figure 4-3 series along with the corresponding sample location designation. The PCB results are also shown on Figures 4-13 and 4-14. On Figure 4-13, the results are labeled as "RI/FS nature and extent" samples.

Sediment from Fish Tissue Collection Areas

To provide additional data in support of the OU-4 HHRA, sediment samples were collected from each of the nine fish tissue sampling locations (Figure 4-17). These sediment samples were collected as composites over the same general area that was used for fish sampling. Samples were collected to be representative of direct human exposure at these areas and are also appropriate for calculating PCB biota sediment accumulation factors. The PCB concentrations for the nine locations sampled ranged from 0.08 to 150 mg/kg with an average concentration of 16 mg/kg. The high concentration sample (150 mg/kg) was collected immediately downstream of the backwater area; this concentration was significantly higher than the PCB concentrations for sediment that have been historically collected from this area. The average sediment PCB concentrations for the remaining eight fish tissue collection locations was 0.6 mg/kg. The mercury concentrations for the nine fish tissue collection locations ranged from 0.09 to 2.9 mg/kg with an average concentration of 0.95 mg/kg.

The PCB results for these samples are presented on the Figure 4-3 series and on Figures 4-13 and 4-14. On Figure 4-13, the results are labeled as "RI/FS fish tissue collection locations."

Sediment Collected to Support Ecological Risk Assessment Evaluations

Sediment samples were collected as a part of the ecological risk assessment program. Sediment samples were collected to be geographically and temporally representative of sediment conditions associated with the biota sampling conducted to support the risk assessment. For the purposes of assessing ecological risk, the creek was divided into three ecological aquatic assessment areas designated as upper, middle, and lower reach. In addition, three aquatic reference area locations were selected to be outside of possible influence from the Site. In each assessment area, 3 locations were chosen for sampling, and 3 habitat types were targeted at each location, for a total of 27 sediment sampling locations in the creek. These sampling locations are further described in Section 4.1.6 along with the broader set of investigations that were conducted to evaluate ecological risks and habitat conditions.

A total of 54 samples were collected from the 0–0.5-foot interval and submitted for analysis. The 54 samples did not include reference locations and were generally collected from lower surface water portions of Choccolocco Creek. PCBs were detected in all but one sample. The PCB concentrations ranged from nondetect to 5.2 mg/kg with an average concentration of 1.5 mg/kg. These samples were also analyzed for mercury, and mercury was detected in each sample. Mercury concentrations ranged from 0.04 to 6.3 mg/kg with an average concentration of 0.80 mg/kg. Seven samples (13%) were also analyzed for PCB congeners and homolog groups and PCDD/DFs. Six of the samples (11%) were also analyzed for PAHs, TAL metals, and methylmercury.

The PCB results are shown on the Figure 4-3 series, which includes sample location labels. The PCB results are also shown on Figures 4-13 and 4-14. On Figure 4-13, the results are labeled as "RI/FS ecological program" samples.

Samples Collected for Sediment Toxicity and Bioaccumulation Studies

As a part of the CERCLA program, sediment samples were collected to support the sediment toxicity testing and bioaccumulation studies that were being conducted by USGS and USACE. P/S used the results of sediment toxicity and bioaccumulation studies to prepare the OU-4 BERA. The sediment toxicity and bioaccumulation studies targeted portions of OU-4 that had sediment with high PCB concentration in the deeper intervals of the backwater area. The sample processing and handling procedures from USGS and USACE also required sieving and homogenizing these samples following collection and prior to analysis. As a result of these processing and handling procedures, these samples are not considered appropriate for characterizing the nature and extent of contamination in OU-4. The resulting data were acceptable for the purposes of determining sediment concentrations for a wide range of constituents, including PCBs, as a part of the sediment toxicity and bioaccumulation studies. Because the sediment data are not appropriate for characterizing the nature and extent of contamination and are not representative of exposure conditions in the OU-4 HHRA and the OU-4 BERA, the results are not presented in this OU-4 FS. However, these sediment data are provided in Appendix F to the OU-4 RI (Geosyntec 2019).

Geochronological Investigations

In addition to the sediment cores collected to define the nature and extent of contamination in the backwater area, two cores were collected for radioisotope analysis (Beryllium-7 [Be-7], Cesium-137 [Cs-137], and Lead-210 [Pb-210]).

The PCB, Cs-137, and Pb-210 results for the two cores collected at CU-GEO-01 and CU-GEO-02 are presented on Figure 4-19. A usable Cs-137 profile was generated for core CU-GEO-02. Using the Cs-137 profile for this core, a corresponding date was assigned to each sampling interval based on fixing the 1954 horizon to the first detectable Cs-137. Figure 4-20 depicts the corresponding PCB concentration to sample depth and year deposited based on this dating. Based on these data, the peak PCB concentration in the core corresponds approximately to the 1948 horizon. Based on the Cs-137 data, an annual sediment deposition rate between 0.3 and 0.4 inches per year is estimated. The Pb-210 profile indicates deposition rates may be as high as 0.5 inches per year.

A geochronological profile for core CU-GEO-01 was not developed because Cs-137 was not detected and the Pb-210 results had no apparent trend.

4.1.2.3 Other Sediment Sampling Programs

Four sediment samples were collected for the Lake Pointe development project planned for the lower reaches of Choccolocco Creek (Genesis 2007). These samples were collected as part of planning and permitting process for a shoreline development project. The sediment PCB results ranged from nondetect to 0.87 mg/kg (Genesis 2007). The four samples were also analyzed for arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, manganese, and nickel. Mercury concentrations for the Lake Pointe sediment samples ranged from 0.027 to 0.84 mg/kg with an average concentration of 0.24 mg/kg (Genesis 2007).

4.1.3 Surface Water Investigations

Surface water investigations have been conducted under both the RCRA and CERCLA programs over the past 15 years. The investigations conducted under the RCRA program were focused on understanding surface water, sediment, and PCB transport during base- and high-flow conditions for Snow and Choccolocco Creeks. These investigations included collecting suspended solids from the surface water and characterizing the concentration of PCBs on the collected solids. The investigations conducted under the CERCLA program focused on understanding the distribution of PCBs and other constituents during base- and high-flow conditions, and samples were collected as whole-water samples. The data under both programs have served to fulfill the needs of the risk assessments and define the nature and extent of constituents in surface water in OU-4. The work conducted under each program is detailed in the following subsections.

4.1.3.1 RCRA Program Surface Water Investigation

The surface water investigation under the RCRA program began in March 1999 with the installation of staff gauges at the locations shown on Figure 4-21. Samples were collected manually during six base-flow events. The Off-Site RFI Work Plan also called for collecting samples during high-flow events; however, it was difficult to access the remote sampling units in response to the quick rise and fall (flash flood nature) of surface water elevations over a short time period. These access difficulties led to installing automated samplers at four locations (one at Oxford Lake Park and three on Choccolocco Creek).

Under the RCRA program, samples were collected for total suspended solids (TSS) and particulate-phase PCBs. Water samples were collected and filtered to retain the particulates. The particulate fraction was analyzed for PCBs as a solid sample and corrected back to a water concentration based on the TSS results. For the automated samplers, TSS samples were collected as single grabs and as a composite over the period of interest. The composite sample results for TSS were used to calculate the whole-water concentration of PCBs. At each event and location, surface water flow rate measurements were taken at the time samples were collected.

Hydrologic Assessment

A hydrologic assessment of Choccolocco Creek was made by measuring flow at selected locations under base-flow and storm-event conditions. Base-flow conditions characterized normal, low-flow regimes, while storm-event conditions characterized high-flow regimes in the Choccolocco watershed. Flow information was generated using a range of techniques for the flow measurement locations shown on Figure 4-21.

Historical flow information was available from the USGS station on Choccolocco Creek at Lincoln near Jackson Shoals. This gauge was relocated from Jackson Shoals because of the impoundment at Lake Logan Martin. The Lincoln gauge is also near the Highway 77 Bridge (location of TSS and PCB sampling), thereby providing both historical and more recent information on flows in this downstream reach of Choccolocco Creek. Flow data from the time of the RCRA program are shown on Figure 4-22 along with the dates of base- and high-flow sampling events. To complement the USGS information and to provide flow for TSS transport evaluation, nonrecording staff gauges were installed at various locations on creeks in the Choccolocco Creek watershed as shown on Figure 4-21. The staff gauge locations were selected to provide flow information and to coincide with locations where samples are to be collected for TSS and PCBs. Initially, gauges were installed at one location on Snow Creek (Snow Street), three locations on Choccolocco Creek (Boiling

Springs Road, Flat Bridge Road, and Highway 77), and on Eastaboga Creek and Cheaha Creek. Two additional gauges were installed in 2002 along with automatic samplers at Oxford Lake Park (Snow Creek) and at Friendship Road (Choccolocco Creek). To characterize tributary flows into Choccolocco Creek from midbasin areas both north and south of Choccolocco Creek, as well as provide a basis for estimating inflow characteristics for ungauged tributary watersheds, two staff gauges were installed in the midbasin region of Choccolocco Creek. One gauge was installed on Eastaboga Creek and the second on Cheaha Creek.

RCRA Program Chemistry Data

Under the RCRA program, a sufficient volume of surface water was collected to filter the solids from the water. The solids were measured to determine TSS and PCB concentrations for each sample. TSS and PCB concentration data were used to calculate whole-water PCB concentrations. The TSS data as a function of flow in Choccolocco and Snow Creeks are presented on Figure 4-23. The surface water flow rates on this figure range from approximately 2 to over 9,000 cfs. As expected, TSS concentrations increase as a function of creek flow. Figure 4-24 shows PCB concentrations on particulates at the different sampling locations. Concentrations were the most variable and the highest from manual samples collected from the Snow Street location, where PCB concentrations on the particulate fraction ranged from less than 1 to 16 mg/kg and averaged approximately 5 mg/kg. The two highest particulate PCB concentrations (10 mg/kg and 16 mg/kg) from this location were under base-flow conditions compared to samples collected under high-flow conditions that were 3.3 mg/kg and 3.7 mg/kg. Particulate PCB concentrations were similar in the manual samples collected from Flat Bridge Road and Highway 77 and averaged 2 mg/kg and 1 mg/kg respectively. Figure 4-25 shows particulate PCB concentrations as a function of creek flows for the different stations and indicates that particulate-phase PCB concentrations tend to be similar regardless of flow. PCB concentrations are the highest and most variable in Snow Creek and upstream in Choccolocco Creek. Particulate PCB concentrations are lower and less variable in downstream locations. At Highway 77 and Jackson Shoals, particulate-phase PCB concentrations were less than 3 mg/kg regardless of flow.

4.1.3.2 CERCLA Program Surface Water Sampling

The CERCLA program included collecting and analyzing surface water samples from the Oxford Lake Park location during high-flow and base-flow conditions. These data were used in the assessment of the nature and extent of contamination within OU-4. These samples were analyzed for a wide range of constituents. Surface water samples were also collected during base-flow conditions under the CERCLA program throughout Choccolocco Creek and at three reference stations in support of the OU-4 BERA.

Oxford Lake Park

The high-flow samples collected from the Oxford Lake Park location in 2007 were collected to be representative of conditions at the downstream end of OU-1/OU-2 at the border with OU-4. This sampling effort included collecting whole-water samples during three different high-flow events (three samples and a duplicate) and PCBs (as Aroclors) were not detected (at a reporting limit of approximately 0.5 micrograms per liter [µg/L]) in any of the whole-water samples. Total PCBs as the sum of homolog groups were determined, and the concentrations ranged from 0.2 to 0.6 µg/L. PCBs were present at concentrations above the Ambient Water Quality Criteria (AWQC) during these high-flow conditions, and these data are consistent with the findings under the RCRA program that higher particulate concentrations are associated with higher flow conditions and that

the PCBs absorbed on those particulates contribute to PCB concentrations in whole-water samples. While surface water PCB concentrations during the limited time duration high-flow conditions were more consistent with an acute exposure period than a chronic condition, an acute AWQC value is not available; thus, the comparison was made to the chronic AWQC value. For the list of metals evaluated as part of the OU-4 BERA, concentrations of lead were above the chronic AWQC in one event, and concentrations of chromium and lead were above the acute and chronic AWQC in one event.

Choccolocco Creek

In Choccolocco Creek, a focused surface water sampling program was implemented in the backwater area. A single sample was collected in each of the two branches of the creek in the backwater area (CSW-02 and CSW-03), and the third sample was collected in the main stem of Choccolocco Creek approximately 500 feet downstream of the Snow Creek confluence at the Friendship Road Bridge (location CSW-01; Figure 4-21). Samples were collected during normal (base-flow) conditions that were representative of surface water flows that occur most of the time.

Surface water samples were also collected from Snow Creek and Choccolocco Creek to support the OU-4 BERA. The surface water samples for Choccolocco Creek were collected in the same general area as the sediment and biota samples and included three reference locations. The surface water samples were collected during base-flow conditions. Sample locations in OU-4 are shown on Figure 4-21. Based on the results from previous sampling events, samples were analyzed for a shorter list of constituents, including PCBs, PCDD/DFs, and the PCD list of metals.

For the samples collected in OU-4, the total PCB concentrations for Choccolocco Creek ranged from nondetect to 0.31 µg/L, and the average concentration was 0.075 µg/L. The PCB surface water results for the Snow Creek portion of OU-4 ranged from 0.18 to 0.5 µg/L.

Although the average PCB concentration for Choccolocco Creek is above the chronic AWQC value of 0.014 µg/L, the average value is less than the measured surface water PCB concentration at one of the reference sites (0.11 µg/L at ERA-02-43). The concentration measured at location ERA-02-43 is also similar to the overall OU-4 average, including both Snow Creek and Choccolocco Creek (0.1 µg/L). Of the 13 samples collected at the 3 reference locations, PCBs were detected in 5 samples. This included the sample result for ERA-02-43 identified above and results for 2 other samples that had PCB concentrations approximately 2 times higher than the AWQC. The average PCB concentration at the upstream reference locations (0.038 µg/L) was approximately 2 to 3 times higher than the chronic AWQC value of 0.014 µg/L. The samples collected from these reference areas indicate that PCBs are present in surface water as background conditions at concentrations similar to the AWQC.

Mercury was only detected in 1 of the 39 whole-water samples collected under this program.

It is also important to recognize that these surface water samples were collected and analyzed as whole-water samples and that future surface water samples for PCBs to assess the remedy compliance with the federal and state AWQC will be collected using two different methods. The collection methods will include grab samples and deployment of passive sampling devices. The passive samplers will provide a more direct indication of PCBs that are truly available to ecological receptors through exposure to surface waters. The grab samples will include a whole-water sample

and a separate sample that is filtered. The grab samples will be collected during periods where creek flow is not impacted by storm water runoff, and the passive sampling devices will be deployed for 4 to 8 weeks and then retrieved for analysis.

4.1.4 Fish Tissue Investigations

Several fish tissue collection programs were conducted in OU-4 over the past 20 years. These sampling programs were designed to characterize the nature and extent of contamination in fish, support the OU-4 HHRA, and evaluate temporal fish tissue concentration trends. The fish tissue sampling programs listed below have collected over 1,200 individual fish tissue samples from OU-4:

- RCRA fish tissue investigation
- CERCLA fish tissue investigation
- Other fish tissue programs (Bayne 1997 and ADEM investigations conducted from 1993 to 2016)

The 361 fish tissue samples collected under the CERCLA program were collected exclusively from OU-4. While samples collected under the RCRA program included locations in Choccolocco Creek and Lake Logan Martin, only the sample results from Choccolocco Creek were included in the OU-4 RI. The RCRA program samples included 73 fish samples and 17 whole-body young-of-year samples from Choccolocco Creek. Dr. David Bayne of Auburn University and representatives of ADEM collected a total of 1,000 fish tissue samples from OU-4 that included a combination of fish tissue and whole-body fish. All evaluations of fish relative to human health risks have been based on fish tissue results, and the ecological assessments have been based on whole-body results. The chemistry results (e.g., PCBs and mercury) for all fish samples (tissue and whole body) have been reported on a weight-wet basis.

4.1.4.1 RCRA Program Fish Tissue Sampling

The RFI fish tissue investigation was designed to produce a quantitative understanding of the factors regulating PCB levels in fish tissue within the off-site study area. Fish investigation activities were initiated in mid-November 1999 and were completed by late December 1999. All fish samples were analyzed for PCBs and lipid content, and 50% of the adult bass samples were also analyzed for mercury.

The average PCB concentration for adult bass samples ranged from 2.3 mg/kg at the downstream end of Choccolocco Creek (Station 35) to 5.4 mg/kg at Station 44 near the confluence of Coldwater Creek. The average PCB concentration for adult catfish ranged from 4.8 mg/kg at Station 35 to 8.8 mg/kg Station 44. The measured concentration of mercury in adult bass collected from the three Choccolocco Creek fish collection stations ranged from 0.21 mg/kg to 0.91 mg/kg (BBL 2000a).

The RCRA fish collection program also included an evaluation of young-of-year samples. The average whole-body PCB concentrations for Stations 44, 43, and 35 were 11.9 mg/kg, 7.2 mg/kg, and 4.0 mg/kg, respectively (BBL 2000a).

4.1.4.2 CERCLA Program Fish Tissue Sampling

The CERCLA fish tissue investigation was designed to characterize the nature and extent of contamination in fish tissue and to support the OU-4 HHRA. The samples were collected in 2008. The resulting data were used to calculate the EPCs used in the OU-4 HHRA. The data are also useful for evaluating changes in fish tissue concentrations over time. This evaluation was conducted by comparing measured fish tissue concentration with those from samples that were collected in the 1990s and the early to mid-2000s.

The sampling program collected target species from three separate trophic levels:

- Predator: largemouth bass or spotted bass
- Bottom feeder: channel catfish or blue catfish
- Forage fish: sunfish or crappie

All fish tissue samples were analyzed for PCB Aroclors, percent lipid, and mercury, and 10% of the fish tissue samples were analyzed for a wider list of constituents including PCB homologs, PCB congeners, metals, and PCDD/DFs.

The PCB results for fish tissue samples collected under the CERCLA program are presented as the average PCB concentration by species group and demonstrates a similar spatial trend as the other data sets with the highest concentrations detected in fish from the upper portion of Choccolocco Creek (Figure 4-26). This includes an average PCB concentration of 5.1 mg/kg at location HHFL-07, which is based on the combination of the three species groups of bass, catfish, and panfish (i.e., crappie and sunfish). The fish tissue PCB concentrations in the lowermost portion of OU-4 were significantly reduced, with average PCB concentrations at locations HHFL-01 and HHFL-02 equal to 2.1 mg/kg. These two fish collection locations are downstream of Highway 77 where fishing is more likely to occur given access to the creek. The average mercury concentrations in fish tissue for the nine fish-collection locations demonstrate a similar trend in concentration, yet the highest concentrations were observed farther downstream and near where a series of permitted discharges from other parties enter the creek (Figure 4-27). In all cases, the average mercury concentration for each location, based on a grouping of all species, is less than 0.5 mg/kg.

There are multiple permitted dischargers to Choccolocco Creek, and several representative examples are listed below.

- Lee Brass Foundry, LLC: Permit No. AL0003166
- NGC Industries Inc.: Permit No. AL0003930
- Oxford Tull C. Allen WWTP: Permit No. AL0058408
- Anniston CCWWTP: Permit No. AL0022195

Some of these permitted dischargers enter Choccolocco Creek in the general vicinity of where Coldwater Creek flows into Choccolocco Creek. Additionally, ADEM has identified atmospheric deposition as the source of mercury to Choccolocco Creek as part of including Choccolocco Creek on the list of impaired water bodies under Section 303(d) of the Clean Water Act (ADEM 2022).

4.1.4.3 Other Fish Tissue Sampling Programs

Historical fish tissue sampling within Choccolocco Creek was conducted by Bayne in 1996 and ADEM between 1993 and 2007. Historical fish tissue data for Choccolocco Creek show that the highest PCB concentrations were detected in samples collected from the upper reach of OU-4 with concentrations decreasing with downstream distance (BBL 1999a). These data also support a factor of 10 decline in PCB concentrations since 1994 and are consistent with the early source control actions taken in OU-1/OU-2 and OU-3. The decline in PCB concentrations with the passage of time is consistent with and a continuance of the measured decline in PCB concentrations in fish tissue for the period before 1994 (BBL 1999a). Average PCB concentrations in catfish, panfish, and bass tissue have declined to below 1 mg/kg at Station 35 in 2016 (Figure 4-28). An apparent increase in PCB concentrations in catfish for the 2014 collection year is driven by a single sample result (25 mg/kg). This result was associated with a catfish that was larger (29.5 inches) than the upper end of the allowable size range (24 inches) specified in ADEM's standard operating procedures for fish tissue collection (ADEM 1996) When this sample result is not included, the average PCB concentration in catfish for 2014 is lowered from 5.1 mg/kg to 3.1 mg/kg and is consistent with the overall temporal PCB concentration trend at Station 35 over the past 20 plus years.

4.1.5 Groundwater Investigations

Extensive groundwater investigations conducted in OU-1/OU-2 have been documented in the OU-1/OU-2 RI Report (ENVIRON 2015). Given the proximity of the OU-4 study area to OU-1/OU-2, the work conducted and the conclusions presented in the OU-1/OU-2 RI Report are a large part of the technical approach that was used for evaluating groundwater conditions within OU-4 and are summarized in the OU-4 RI (Geosyntec 2019).

Based on the work conducted in OU-1/OU-2, groundwater samples were collected at Oxford Lake Park from an area where soil with high PCB concentration was located close to the groundwater table (well T-17 on Figure 2-2). The PCB-containing soil at this location represented a balance between high PCB concentrations and the presence of lower chlorinated PCB Aroclors that were found to be impacting groundwater in OU-1/OU-2 (well T-11 area on Figure 2-2). PCBs were not detected in groundwater sampled at well T-17.

Two private wells were also sampled on December 6, 2012, as part of the OU-4 RI. The wells are associated with two properties located on Champion Lane and are shown on Figure 2-2 (Genesis 2013b). The samples were collected from the nearest collection point to the well and analyzed for Aroclors, total PCBs, and mercury: no PCBs or mercury were detected.

4.1.6 Ecological Investigations

OU-4 is the most geographically expansive of the three OUs delineated at the Anniston PCB Site. It encompasses the majority of potentially suitable habitat for ecological receptors and includes a variety of distinct habitats. Ecological investigations were conducted for OU-4 between 1996 and 2010. The following primary ecological investigations, each building upon the previous, have been conducted in OU-4.

1. Bayne Water Quality and Biological Study: This study was conducted in 1996, and results were initially reported in the study entitled Intensive Water Quality and Biological Study of Choccolocco and Snow Creeks, Coosa River Basin (Bayne 1997).
2. Off-Site RFI Habitat and Biological Assessment: The methods for this assessment were detailed in the Supplemental Off-Site RFI Work Plan (BBL 1999a). The work was conducted in 1999. The results were initially reported in the Off-Site RFI Report (BBL 2000a).
3. Off-Site RFI Phase 2 Floodplain Surveys: The methods for these surveys were detailed in the Phase 2 RFI/CS (BBL 2000b), and the work was conducted in 2001 and 2002. Results from these surveys were summarized in the Phase 1 CSM (BBL 2003) and presented in more detail in the OU-4 DSR (BBL 2005a).
4. Phase 1 Ecological Surveys: The methods for these surveys conducted under the CERCLA program were detailed in the OU-4 Phase 1 FSP (BBL 2006), and the work was conducted in 2006 and 2007. Results from these surveys were presented in the OU-4 Phase 1 Ecological Survey Report (Arcadis BBL 2007). The survey work also included supplemental efforts in spring of 2008 that focused on reptiles and amphibians based on limited observations made during the 2006 and 2007 surveys (supplemental Phase 1 ecological surveys).
5. Phase 2 Biological Sampling: The methods for this sampling program conducted under the CERCLA program were detailed in the OU-4 Phase 2 FSP (Arcadis 2010b), and the data were collected in 2009 and 2010. Results from this sampling program were presented in the OU-4 BERA (Arcadis 2016).
6. Analysis of Operable Unit 4 Sediment Toxicity Test Results and Development of Site-Specific Risk-Based Concentrations for Polychlorinated Biphenyls in Sediment: The results and use of these data are described in the OU-4 BERA (Arcadis 2016) and the OU-4 BERA Addendum (USEPA 2018a) and are also separately reported in Ingersoll et al. (2014).

Work from the ecological investigations included habitat assessments and ecological surveys of vegetation, benthic macroinvertebrates, fish, reptiles, amphibians, birds, and mammals. In addition to the habitat and survey data collected, terrestrial and aquatic biotic tissue samples were collected for chemical analysis, and a sediment toxicity testing program was implemented. The habitat-related investigations are summarized in Section 4.1.6.1. The biological sampling is summarized in Section 4.1.6.2. The sediment toxicity testing program is summarized in Section 4.6.3. The results of habitat studies conducted by Bayne during the Off-Site RFI and the results of habitat investigations conducted for the OU-4 in 2000 and 2001 are collectively presented on Figures 4-29a through 4-29n. Figure 4-29a provides a key to the specific areas covered on each of the subsequent maps. The ecological sampling stations are shown on Figure 4-30a through 4-30j, including the three ecological reference locations (Figures 4-30h, 4-30i, and 4-30j). These ecological reference locations were identified during the Phase 1 surveys, and biological sampling of these three reference areas was conducted during Phase 2.

4.1.6.1 Habitat and Population/Community Evaluations and Results Summary

The aquatic and terrestrial habitats and biotic communities within OU-4 were evaluated extensively between 1996 and 2010. For the aquatic habitat, the habitat assessment and benthic

macroinvertebrate community evaluations conducted during the Bayne study (Bayne 1997) and for the BBL assessment (BBL 2000a) indicated that there is no significant widespread impairment in Choccolocco Creek. Overall, habitat quality along Choccolocco Creek was found to be better in areas downstream of Snow Creek than upstream, as measured by habitat attributes such as riparian land use, substrate characteristics, and surface water flow. The habitat characterization data collected in 2001/2002 provide information regarding the locations of these and other specific attributes that are indicative of habitat quality. Overall, most of the locations analyzed in Choccolocco Creek indicate a functional ecology typical of small, slow-flowing creeks with a few exceptions where channel alterations and the influences of urbanization and agriculture have resulted in unsuitable habitat. During the Phase 1 ecological surveys, observations of aquatic species use of the creek also support that a variety of aquatic receptors use the creek and that higher diversity and abundance of benthic macroinvertebrates and fish were observed in areas of higher quality habitat attributes, such as riffle and EAV.

In the floodplains along Choccolocco Creek and Snow Creek within OU-4, habitat delineation and assessments conducted during the Off-Site RFI Phase 2 floodplain surveys illustrate that these areas are a mix of second growth forest and human-maintained areas. The distribution of these habitat types is relatively consistent throughout most of OU-4, except for the stretch of mostly forested floodplain from RM 19 through RM 23 (Figures 4-29i and 4-29j). Here, bank slopes are extremely steep, and the corresponding floodplain is narrow. Species and habitat observations made during the Phase 1 ecological surveys show that wildlife use of the different habitat types is variable depending on specific feeding strategies for different species and seasonal variations. Seasonal observations in the creek indicate that rainfall has a strong influence on wildlife use of the creek and the riparian area due to areas that are submerged from rising water levels and changes in water turbidity and temperature.

Based on these observations within the OU-4 portions of Choccolocco Creek and Snow Creek, habitat quality and the ecology have been impacted by human activities (e.g., urbanization, agriculture, silviculture, grazing, and industrial pollution). The potential sources of pollution include a wide range of industries located within, upstream, and upwind of OU-4 that may have contributed contaminants, including PCBs, mercury, PCDD/DFs, and multiple metals other than mercury, to OU-4. Despite the impacts associated with human activities, including industrial pollution, there are portions of OU-4 that have valuable aquatic and riparian habitat; nevertheless, the presence of valuable habitat does not mean that contaminants have had no effect on the habitat.

4.1.6.2 CERCLA Phase 2 Biological Sampling

The Phase 2 sampling was conducted to complete the ecological data sets needed for the OU-4 BERA and FS and to use available data to refine the preliminary CSM and baseline problem formulation. Specifically, Phase 1 observation results and earlier surveys were used to identify habitat types and biota in aquatic and terrestrial systems within OU-4 and reference areas. To reflect the upstream-to-downstream gradient in PCB concentrations, the OU-4 BERA evaluated the three broad assessment areas recognizing that within each of these broader assessment areas, individual types of habitat were present:

- **Upper Assessment Area (UAA)**: Includes the Choccolocco Creek backwater area from approximately 1 mile upstream of the Snow Creek confluence to Silver Run Road, where the floodplain influence of Coldwater Creek ends.

- **Middle Assessment Area (MAA)**: Includes the area from Silver Run Road (where the floodplain influence of Coldwater Creek ends) downstream to approximately mile marker 19.5 where the floodplain rapidly expands.
- **Lower Assessment Area (LAA)**: Includes the area from mile marker 19.5 where the floodplain rapidly expands, downstream to Jackson Shoals.

Three reference areas—Choccolocco Creek (Ref-1), Cheaha Creek (Ref-2), and Talladega Creek (Ref-3)—were also chosen for sampling based on the ecological survey results. All three reference areas were located outside of OU-4 and were used for defining reference conditions. While these stations are referred to as reference stations, their remote locations and disconnection from urban runoff and WWTP discharges limits their ability to serve as true aquatic reference stations for OU-4. The terrestrial portions of the reference stations are generally similar to the combined agricultural and forested conditions characterized by the OU-4 floodplain. These data were used to select the types of receptors for tissue sampling in Phase 2.

The soil and sediment analytical results for the full range of chemical constituents measured in the Phase 1 sampling were evaluated in the OU-4 Phase 2 FSP relative to conservative screening levels (Arcadis 2010b). This evaluation, in conjunction with input and recommendations from USEPA, and historical nature and extent data was used to inform the study design of the Phase 2 biological sampling. Like Phase 1, the Phase 2 biological sampling program was structured around three identified assessment areas (upper, middle, and lower) and three reference areas. Three major nonaquatic habitat types were identified within OU-4 based on Phase 1 results: forested floodplain, maintained fields, and successional fields. Five major aquatic habitat types in OU-4 were identified: riffles, runs, EAV, tributary confluences (backwaters), and depositional environments (islands, banks/bars).

Tissue collection targeted each of these three habitat types within each of the OU-4 and reference areas.[4] Representative aquatic and terrestrial biological sampling areas were selected for each habitat type within each assessment and reference area. Phase 2 targeted dominant organisms found within representative habitat types and across a COPC concentration gradient. The exhibit below (Exhibit 1) summarizes the Phase 2 biological sampling organized by constituent, general habitat type (terrestrial/floodplain and aquatic), receptors (e.g., plants, worms, fish, reptiles) under the general habitat types, and the associated number of samples that were analyzed. The exhibit includes light tan-colored shading for those constituents and receptors where an upstream-to-downstream concentration trend appeared to be present and underlined text where the measured concentrations in OU-4 were greater than the concentrations measured for the reference areas.

[4] Aquatic plants were the exception and were only collected within the areas of EAV.

Exhibit 1. Summary of Biological Tissue Collection

COPC	Terrestrial/Floodplain				Aquatic							
	Plants	Grasshopper/ Crickets	Worms	Small Mammals	Plants	Emergent Insects	Odonates	Crayfish	Mollusks	Fish	Amphibians	Reptiles
Total PCBs	54	18	27	44	27	27	27	23	27	135	16	11
Mercury	54	20	27	44	27	27	27	23	27	135	16	11
Non-Mercury Metals[1]	6	2	4	4	3	3	3	3	3	14	2	1
PCDD/DFs[1]	3	0	0	6	4	4	4	3	4	17	3	1

[1] Evaluation of concentration gradients and statistical reference comparisons were not conducted due to limited sample size.

Phase 2 Data Summary

PCBs generally appear to be elevated in biota tissue samples collected within OU-4 compared to reference locations. Several of the biota samples, including crayfish, emergent insects, frogs, and worms, demonstrated a concentration gradient in tissue similar to that seen in soil and sediment with higher PCB concentration in tissues from the UAA than in the MAA and LAA. Mercury tends to demonstrate similar concentrations between the assessment areas.

Other metals were generally similar between OU-4 and the reference area with few exceptions based on the limited number of samples collected for these analytes. PCDD/DF concentrations seemed to be elevated in the LAA and MAA compared to the UAA samples. OU-4 samples were generally elevated relative to reference areas.

4.1.6.3 Sediment Toxicity and Bioaccumulation Testing

As part of work to support the OU-4 BERA, sediment toxicity tests were conducted to provide information about the site-specific effects of PCBs in OU-4 sediment on benthic macroinvertebrates. In addition, bioaccumulation tests were conducted to evaluate whether PCBs were accumulating in, and potentially transferring to, upper trophic levels from the lower trophic levels of the food web. A summary of the testing program results is provided below; a more detailed description and analysis of the underlying sediment toxicity data by P/S and USEPA is included in the OU-4 BERA (Arcadis 2016) and the OU-4 BERA Addendum (USEPA 2018a), respectively.

A total of 32 sediment samples were collected for toxicity and bioaccumulation testing. This included 26 sediment samples from 6 different locations in OU-4 and 6 reference area sediment samples from Choccolocco Creek. The sample locations were identified to collectively span a wide range of combinations of total PCB and organic carbon (OC) concentrations, instead of randomly sampling the OU-4 sediment. Because high-concentration samples were needed, much of the sediment collection effort was conducted in the backwater area. The sediment was analyzed for a

range of geochemical parameters and for concentrations of OC, PCBs, 23 major and trace metals, 46 parent and alkylated PAHs, 21 pesticides, and17 PCDD/DF congeners. In general, the highest concentrations of PCBs were associated with the highest concentrations of PAHs, dioxins, and pesticides.

Additionally, during the toxicity tests, porewaters were analyzed for water quality parameters, PCBs, and 61 major and trace elements. Concentrations of metals or PCBs in porewater during the sediment toxicity exposures or during sediment bioaccumulation exposures were also measured using peeper samples (for metals) or solid-phase microextraction (SPME) samplers (for PCBs).

Toxicity Testing

Twelve survival, growth, and reproduction endpoints were measured in tests with *C. dilutus*, and 11 survival, growth, and reproduction endpoints were measured in tests with *H. azteca*. The complete results and specific details of the analyses and methods used during the testing program are presented in Ingersoll et al. (2014). Concentrations of metals, PAHs, and pesticides were generally lower than "consensus-based" probable effect concentrations published by MacDonald et al. (2000). Therefore, those COPCs are not likely to have contributed significantly (relative to PCBs) to toxicity in OU-4 sediment, leaving PCBs as the likely dominant contaminant. The most sensitive endpoint for *H. azteca* was 42-day young/female normalized to 42-day survival. The most sensitive endpoint for *C. dilutus* was percent emergence of the pupae from their cocoons. The effect concentrations (ECs) derived from the results of the sediment toxicity testing were used in the OU-4 BERA to identify sediment thresholds protective of the benthic invertebrate community within OU-4.

Bioaccumulation Testing

The bioaccumulation of PCBs in 14 sediment samples (12 test sediment and 2 reference sediment) were investigated by using the *Lumbriculus variegatus* 28-day bioaccumulation test in basic accordance with USEPA and ASTM International (ASTM) standard methods (ASTM 2012). A summary of the test conditions used is provided in Ingersoll et al. (2014). Oligochaetes exposed to control sediment accumulated low concentrations of PCBs compared to those exposed to OU-4 sediment.

The bioavailability of PCBs in 14 sediment samples were additionally investigated using SPME passive samplers. Tissue residues predicted using SPME-derived porewater data provide information regarding the bioavailability of PCBs in these sediments. For metals, a small dialysis chamber called a "peeper" was used to measure dissolved metal concentrations in porewater. Concentrations of metals in peeper samples were relatively low in all samples.

4.1.6.4 Summary

As described above, a significant amount and diversity of ecological data have been collected for OU-4. These data were collected for a variety of specific objectives, but all were collected to support the OU-4 BERA. The detailed habitat and species survey evaluations were used to better understand the site-specific potential for receptor exposure. In addition, the species surveys and counts were used to compare OU-4 conditions to reference conditions or to assess upstream-to-downstream trends as an additional line of evidence in evaluating possible OU-4-related ecological impacts. The biological tissue data collected were used to evaluate exposure based on dietary food chain. Lastly, the laboratory toxicity and bioaccumulation data were used to evaluate potential

impacts to the benthic community at OU-4 and biological uptake of PCBs for food web analysis. Collectively, these data provided valuable information that was used in evaluating potential ecological impacts in the OU-4 BERA (Arcadis 2016).

4.1.7 Fish Consumption Survey

A fish consumption survey was conducted to document the amount of fishing taking place in Choccolocco Creek and how much of the fish caught from the creek is eaten. The following information was collected by the survey:

- Locations where anglers access the creek
- The number of persons accessing the creek and the frequency of their visits to fish
- The number of years they have fished on the creek
- The types and sizes of fish caught for consumption
- The methods of preparation before eating the fish
- Estimated annualized rates of fish consumption
- Demographics of the population who fish and eat the fish from Choccolocco Creek

In addition, Auburn University Department of Fisheries and Allied Aquacultures conducted a statewide study for ADEM (ADEM 1993) covering high-use water bodies (29 sites in 11 river drainages). The fish consumption report includes a comparison between the 2009 Choccolocco Creek survey and the 1993 statewide survey. This comparison is summarized in Section 4.1.7.3 below and highlights why the ADEM study results are not as applicable to Choccolocco Creek as the site-specific study discussed in this section.

4.1.7.1 Survey Design

The survey was conducted over 1 year (July 2008 through June 2009) by visiting fishing locations and interviewing anglers on 101 days of the 365-day survey period (the survey was planned for 100 days, and an additional day was inadvertently conducted), capturing 27% of the available days for fishing during the year. The sampling schedule was designed to be representative of the following:

- Seasonal variability
- Day of the week (weekday or weekend)
- Time of day (morning or evening)
- Location in the creek (upstream or downstream of Jackson Shoals)

Seasonal

Weighting for seasonal variability was based on the findings from the ADEM (1993) study. The number of sampling days for each season (out of the planned total 100 days) was calculated based on the percentage of anglers who fish each season (from the ADEM study). Using this approach, sampling was most heavily weighted to summer (40 days, 40%), followed by spring (25 days, 25%), fall (20 days, 20%) and winter (16 days, 15%). As mentioned above, the survey team

inadvertently captured one additional spring weekday to make the actual number of survey days for spring 25 instead of the planned 24 days.

Day of the Week and Time of Day

Findings from other studies (e.g., Kinnell et al. 2007) indicate that the number of weekend (Saturday and Sunday) angler visits are comparable to the number of visits during the rest of the week (Monday through Friday) so weekdays were given the same weighting as sampling on weekends (i.e., for each season, sampling was done on an equal number of weekdays as weekend days) Each day was divided into a morning and an afternoon shift, and two locations (one upstream and one downstream of Jackson Shoals) were surveyed during each shift.

Locations

Jackson Shoals was chosen as the physical boundary between upstream and downstream locations. The creek downstream of Jackson Shoals is wider and more accessible from the stream bank than the creek upstream of Jackson Shoals. Additionally, downstream is accessible by boat from the Highway 77 boat ramp. The areas upstream are more difficult to access and narrower than downstream and, therefore, would most likely only attract people who live near the creek. PCB concentrations in fish and sediment tend to be higher upstream of Jackson Shoals than downstream of Jackson Shoals. Therefore, the fishing and consumption behaviors above Jackson Shoals are critical components of understanding the potential exposure in this reach. For the purposes of collecting data, equal weighting (50:50) was given to locations upstream and downstream of Jackson Shoals. The locations used for the survey were the same as those used to collect the fish tissue samples in support of the OU-4 HHRA, labeled HHFL01 through HHFL09 from downstream to upstream (Figure 4-17).

4.1.7.2 Findings

A total of 72 anglers were observed during the study, and 52 were interviewed and answered some or all of the survey questions. Based on the statistical design of the survey, these 52 anglers are predicted to represent 173 anglers who fish in the creek over a 1-year period and a total population of 1,775 anglers who might fish over a 60-year period. Sixteen anglers declined to participate in the survey, and individuals under the age of 16 (four individuals) were not interviewed. Three anglers stated that they had participated in more than one interview; however, the information they provided (e.g., phone number) could not definitively link survey responses to the same person. Of the 52 anglers who were interviewed, 8 had caught fish on the day they were interviewed, 4 kept the fish for consumption, and 3 of those anglers were willing to allow their catch to be measured. These responses form the basis for the consumption calculations discussed below.

Locational Results

Of the 52 anglers who were willing to respond to the survey, the majority (69%) were fishing below Jackson Shoals. Of the 16 individuals (31%) who were fishing above Jackson Shoals, only 2 responded that they fished only above Jackson Shoals. The others reported fishing both above and below Jackson Shoals. At Highway 77, anglers were asked if they fished from the creek bank or from a boat. Of the 28 respondents who answered, 22 fished from shore and 6 fished from a boat. None of these Highway 77 respondents caught fish on the day they were interviewed.

Population Demographics and Exposure Durations

Survey results were used to provide summary statistics describing the population who fish in Choccolocco Creek and to estimate exposure durations. Information compiled included the number of trips per year, the ages of anglers, the number of years fishing in the creek, and the distance traveled to fish in the creek. Based on the results from the survey, the mean, median, and maximum numbers of years of fishing in the creek for the local population were estimated as 45, 47, and 60 years, respectively. The distance traveled to fish was calculated from the center of the town the anglers reported as home to the interview point on the creek. The mean, median, and maximum distances traveled to fish in the creek were 8.9, 10.1, and 43.4 miles, respectively. Additional information collected during the survey regarding education level and town of residence is included in Appendix C of the OU-4 RI.

Seasonal Variability and Annual Fishing Frequency

Consistent with the design of the survey, the number of people observed and the responses to the survey confirmed that fishing frequency is seasonal. Most individuals fished more in the summer, less in the spring, and significantly less in the fall and winter. This also is consistent with the ADEM survey of Alabama anglers (ADEM 1993). Although some uncertainties are inherent in any sampling study, the extrapolated number of fishing trips per year (6 trips per year) based on the predicted 173 anglers who fish in the creek over a 1-year period, agrees well with the number of trips (7) reported by anglers who completed the survey. This agreement indicates that the survey methods appropriately captured a representative sampling of the population that fish and consume fish from Choccolocco Creek.

Annual fishing frequency was calculated based on the responses of the interviewed anglers. Anglers were asked how often they fished over the previous 4 weeks and how often they usually fished each season and which months per season. Their responses were used to calculate the frequency of fishing for each season as the days fished per week multiplied by the number of weeks fished per season (calculated from the reported number of months fished per season). If an individual reported that their fishing frequency from the previous 4 weeks was different than their usual frequency, their response for the previous 4 weeks was used for 4 weeks and their usual fishing frequency was used for the other weeks that season. The fishing frequency was calculated for each season. The results from the four seasons were summed to calculate a total annual fishing frequency.

Success of Catches

Of the 72 anglers observed, 6 caught fish, but were not interviewed, so the sizes of the fish could not be determined. A total of 52 anglers were interviewed, of these, 8 (15%) reported catching fish, and only 4 kept the fish for consumption. Two individuals reported that they fished for sport only, and two released fish because the fish or the catch was too small to keep.

Meal Preparation, Species Preferences

Of the four anglers who kept fish, each reported that they would bone, skin, and fry the fish and would eat the muscle/tissue only. Two anglers reported that they would share their meal with one other adult, and two reported that they would not share their meal.

When the 52 interviewees were asked about the species of fish and other animals that they ate, the anglers reported that they ate each of the fish species listed, and that bass was the preferred species.

Five anglers reported eating turtles one to two times per year, and one respondent reported eating turtle five times a year. No one reported eating frogs from the creek. The results for crawfish were somewhat inconsistent. One respondent stated that they ate crawfish, but when asked how often, stated that they had not eaten crawfish from Choccolocco Creek. It is possible that the respondent was stating that they ate crawfish, but not crawfish caught from Choccolocco Creek.

Size of Catches and Calculated Annualized Consumption Rates

Of the four anglers who kept fish, three allowed their catch to be measured. Weights were estimated based on field measurements of length and width and using a log transformed regression equation using data provided by Alabama Division of Wildlife and Freshwater Fisheries (ADWFF). The data provided by ADWFF is unpublished data and was provided by Damon Lee Abernethy, Fisheries Development Coordinator, July 28, 2009 (ADWFF 2009) (Appendix C of the OU-4 RI). The edible portion of fish was estimated as 30% of the calculated total weight of the catch based on USEPA guidance (USEPA 1989). Based on the results of the survey, an overall fishing success rate of 15% (8 out of 52 anglers) was calculated. This 15% was applied to each of the angler's calculated annual number of trips. Therefore, the annual consumption rate for each angler was calculated as 30% of the weight of the catch multiplied by 15% of the calculated annual fishing trips divided by the number of persons sharing the meal and 365 days per year. The estimated masses of the three catches were 350 grams, 266 grams, and 1,194 grams, and the estimated number of trips per year for these three anglers was 2, 13, and 54. Using these values, the estimated annualized consumption rates were 0.14 grams/day, 0.44 grams/day, and 7.9 grams/day (average = 2.8 grams/day).

4.1.7.3 Comparison with ADEM 1993 Study

The fish consumption survey also includes a comparison to the ADEM survey (ADEM 1993). Several differences in approach between the two surveys were identified that could explain the higher fish consumption rates reported in the 1993 ADEM survey relative to the 2008/2009 study. The most significant differences were the sizes of and public access to the water bodies where the anglers were interviewed and the assumptions for meal preparations. The ADEM survey targeted 29 sites in 11 river drainages that were considered high-use water bodies. Choccolocco Creek was not included in the ADEM survey. In addition, the ADEM survey did not take into consideration the seasonality of both the fishing frequency and catch rates or the potential for avidity bias. Avidity bias is the bias in survey results that occurs because the more frequently people fish, the more likely they are to catch and eat the fish and the more likely they are to be interviewed. Although the magnitude of the potential for seasonality and avidity bias is not directly quantifiable, the sizes of the water bodies and the assumptions regarding food preparation are directly related to the calculated consumption rates.

Choccolocco Creek is smaller than and not as accessible to the public for fishing as most of the water bodies used in the ADEM study. Of the 29 sites in the ADEM study, the Pea River was the closest in size and nature to Choccolocco Creek. Also, a fishing advisory was not in place on the Pea River when the survey was conducted (1993), which means the data collected were representative of unrestricted angling activities. The average consumption rate calculated for the Pea River was 3.4 grams/day. This was comparable to the average rate from the Choccolocco Creek survey (2.8 grams/day), and significantly lower than the overall average from the ADEM survey of 30 and 33 grams/day, depending on the calculation method.

Regarding food preparation, the ADEM study assumed 70% of the total mass of caught fish was consumed. This is based on the interview responses that the fish were cleaned (viscera removed) and that the remainder of the fish was eaten. Although small pan fish of the type likely to be caught in these smaller rivers are likely cooked with skin and bones intact, they are not necessarily eaten that way (i.e., head and bones are usually not consumed). The 2009 survey uses a 30% mass factor and is more consistent with findings from other studies (Ebert et al. 1993) and USEPA guidance (USEPA 1989).

4.1.8 Creek Bank Stability Investigation

Two creek bank conditions surveys—one in 2012 and one in 2014—were conducted for the OU-4 portions of Choccolocco Creek by P/S. The surveys were designed to build on the significant work that was previously conducted to assess creek banks under the RCRA and CERCLA programs. The 2012 and 2014 conditions surveys characterized the potential for erosion along the creek bank. The creek bank conditions rankings refer to the potential for erosion of bank material by fluvial processes and included assessment of the floodplain soil adjacent to the creek bank that could erode into the creek as part of bank sloughing.

The CERCLA Creek Bank Survey began with a desktop evaluation to identify areas with varying erosion potential as well as areas that might be representative of bank stability indicators that might be useful to assess the potential impacts of bank erosion. The findings from the bank conditions survey are presented on a series of 10 figures, including 1 location key figure (Figure 4-31a) and 9 figures (Figures 4-31b through 4-31j) showing the creek bank conditions ratings for Snow Creek and Choccolocco Creek.

The figures include the 0.6-mile-long portion of Snow Creek that is part of OU-4 (Figure 4-31b) and the 30 miles of Choccolocco Creek that were assessed on Figures 4-31b through 4-31j. The rankings for Snow Creek include both banks based on the narrow and straight nature of the creek and that conditions on both banks for a given location are consistent. The broader and meandering nature of Choccolocco Creek required that both sides of the creek at a given location be separately rated.

The creek bank survey results for the OU-4 portion of Snow Creek are generally characterized by moderate and severe erosion. These conditions are consistent with the urbanized and flashy nature of creek flows that occur in this area, and that vegetation along the creek banks is frequently cut through maintenance activities, contributing to destabilization of the banks. The portion of Snow Creek that flows under I-20 is stable and consistent with the riprap materials placed during the widening of I-20.

The creek bank conditions for Choccolocco Creek (Figures 4-31b through 4-31j) show a wide range of creek bank stability conditions along the creek. These variations from bank to bank at a given location along the creek are consistent with the geomorphological characterization of the creek including meanders and oxbows. While this side-to-side variability exists, the change in creek bank conditions moving from upstream to downstream is more gradual. While the changes moving from upstream to downstream is gradual, a change in overall character is clear at RM 29.5 (Figures 4-31b and Figure 4-31d). Upstream of RM 29.5, the creek bank conditions are generally characterized as having long reaches of minor and moderate erosion. Downstream of RM 29.5, creek bank conditions are generally characterized as stable and generally stable. Creek bank

conditions in this lower 23-mile reach of Choccolocco Creek are consistent with the characteristic of the creek including a wider distance from bank to bank, a shallower slope (or gradient) for the creek bed from upstream to downstream, and the increased level of old-growth vegetation present along the banks.

4.2 Nature and Extent of Contamination

This section presents the nature and extent of contamination within OU-4. The distributions of constituents in potential exposure media are discussed. This section is organized by potential exposure media, including floodplain soil, sediment, surface water, fish tissue, ecological species, groundwater, and air. The sections are further subdivided, where appropriate, into PCBs and other COPCs.

4.2.1 Floodplain Soil

The nature and extent of constituents in floodplain soil were developed from the comprehensive data set collected over many years and under multiple programs. The years of data collection efforts have produced a robust data set suitable for defining the nature and extent of contamination in floodplain soil in OU-4 and to inform the associated human health and ecological risk assessments and support this OU-4 FS.

The distributions of PCBs in surface and subsurface soil are presented in the Figure 4-32 series. This figure series also shows the properties where residential sampling and removals have been conducted in OU-4. The Figure 4-32 series shows the EUs from the OU-4 HHRA (JMWA and Avatar Environmental 2013) and presents the PCB concentration ranges for the surface and subsurface samples using colored symbols. Where subsurface data are available, the outer color represents the subsurface PCB concentration range. The surface soil concentrations are for the 0–1-foot interval, and the subsurface concentrations reflect the maximum PCB concentration at a given location based on samples collected below the upper foot. Locations where data in addition to PCB and mercury data are available include a black dot in the center on the sample location symbol. The floodplain soil data presented in the Figure 4-32 series documents that the nature and extent of constituents in soil have been comprehensively defined for OU-4. The data set collected for other constituents also support the OU-4 HHRA and the OU-4 BERA. These data include mercury results for more than 70% of the soil samples analyzed for PCBs and the more than 250 soil samples analyzed for the wider list of constituents.

The PCB data for floodplain soil samples are plotted on Figure 4-33 as a function of distance downstream and on Figure 4-34 based on distance away from the creek bank. The data on these figures show that PCB concentrations in soil are markedly lower beyond 500 feet from the creek bank and downstream of the confluence of Choccolocco and Coldwater Creeks. These results are consistent with the preliminary CSM for OU-4 (BBL 2003) that was developed before many of the characterization efforts presented in the OU-4 RI were completed. The elevated concentrations are generally limited to within 500 feet of the creek bank and the first 10 miles of the floodplain downstream of Choccolocco Creek's confluence with Snow Creek.

4.2.1.1 PCBs in Nonresidential Soil

PCBs in Surface Soils

The PCB data set for floodplain soil was generated by multiple parties over multiple sampling programs. Over 2,250 soil samples have been analyzed for PCBs. The OU-4 floodplain was divided into 25 EUs (Table 4-1a, Figure 4-1, Figure 4-32 series) to help manage the data and to assess different exposures throughout the 6,000 acres of floodplain. The length-weighted PCB results for the individual surface soil locations are presented in Table 4-1b.

Surface soil PCB concentrations consistently decrease with distance downstream from the confluence with Snow Creek (Figure 4-33) and decrease as a function of distance from the creek bank (Figure 4-34). The length-weighted PCB results for surface soils are presented in Table 4-1b and summarized by EU in Table 4-1a. PCB concentrations are low in a few of the upstream EUs—most notably, the two EUs located in the backwater area. In these two EUs, the surface soil PCB concentrations are well below 1 mg/kg (C2N-EU2 [0.15 mg/kg] and C2S-EU1 [0.085 mg/kg]). The average surface soil PCB concentrations in over 76% of the EUs (19 of 25) are less than 5 mg/kg, and 32% of the EUs (8 of the 25) have surface soil average PCB concentrations below 1 mg/kg. The average surface soil PCB concentration is equal to or above 10 mg/kg in three EUs including a commercial area bordering Snow Creek near Recreation Drive C1-EU2 (27 mg/kg) and two EUs that are located just downstream of the Snow Creek confluence with Choccolocco Creek. These two EUs directly border this upper reach of Choccolocco Creek and include C3N-EU1 (12 mg/kg) and C3S-EU1 (10 mg/kg).

PCB results for the 0–6-inch horizon were used to evaluate ecological risks in OU-4 and the length-weighted results for this 0–6-inch horizon are presented in Table 4-2.

PCBs in Subsurface Soils

Nonresidential subsurface soil results for PCBs in the 1–4-foot horizon are shown on the Figure 4-32 series with the outer halo on the sampling points indicating the PCB concentration range for the highest measured value at that location for samples collected below 1 foot. The length-weighted PCB results for each location are included in Table 4-3. With consideration given to overland flow and deposition as the primary mechanisms for PCBs in the floodplain, the subsurface investigations were focused on identifying the depth of constituents, especially at the locations with the highest surface concentrations. Although the surface soil sampling efforts were designed to achieve comprehensive overall spatial coverage of OU-4, the subsurface soil sampling locations were targeted to areas within the OU that had the highest surface soil PCB concentrations. For most EUs, this occurred adjacent to the creek bank.

For most of the EUs, the distributions for length-weighted subsurface (the 1–4-foot interval) PCB concentrations were similar to the distributions for length-weighted surface soils (the 0–1-foot interval) and show the same decreasing concentrations with distance downstream. For the most part, subsurface PCB concentration averages tend to be higher than the surface PCB concentration averages, indicating that higher-concentration materials were deposited in the past and have since been overlain with soil that has lower concentrations. For subsurface soil, (i) three EUs (13%) have length-weighted PCB average concentrations of less than 1 mg/kg; (ii) four EUs (17%) have PCB concentrations above 1 mg/kg and less than 5 mg/kg; (iii) five EUs (22%) have PCB concentrations between 5 and 10 mg/kg; and (iv) seven EUs (30%) have average subsurface PCB concentrations above 20 mg/kg. Because of the sampling program bias to collect samples where surface

concentrations were highest, the subsurface results provide an overestimate for the concentration of PCBs that are present at 1 foot bgs or deeper.

4.2.1.2 Other COPCs in Nonresidential Soil

There were several non-PCB constituents identified as COPCs in the OU-4 HHRA and the OU-4 BERA. These constituents were selected based on a combination of frequency of detection, toxicity, and measured concentrations. The non-PCB COPCs selected for soil included PCDD/DFs, chromium, lead, mercury, and vanadium. The nature and extent of these constituents are discussed below.

For metals, it can be difficult to discern anthropogenic sources from naturally occurring background. For comparison, the Site data are sometimes compared with representative, naturally occurring background concentration levels from nearby Fort McClellan (Science Applications International Corporation [SAIC] 1998, IT Corporation 2000). Consistent with risk assessment guidance (USEPA 2000), constituent concentrations less than twice the mean background concentration are generally considered to be naturally occurring or anthropogenic background.

PCDD/DFs in Soil

The PCDD/DF results for soil are presented on Figures 4-35 and 4-36 including concentrations as a function of distance downstream and as a function of distance from the creek bank, respectively. The PCDD/DF results are presented on a concentration basis and not a TEQ basis because the nature and extent of these constituents are driven by their sources and applicable fate and transport mechanism and not their toxicity (i.e., TEQ). The toxicity of PCDD/DFs was separately evaluated in the risk assessments on a TEQ basis in the OU-4 HHRA and the OU-4 BERA.

The concentrations of total PCDD/DFs in floodplain soil are generally less than 10 micrograms per kilogram (µg/kg) (on a mass basis) and increase in concentration moving downstream (Figures 4-35 and 4-36). In comparing the overlays for PCDD/DFs and PCBs in soil presented on Figures 4-37 and 4-38, the respective distributions are different. For PCBs, there is an obvious pattern with higher upstream concentrations and a decrease in concentration with distance downstream. In contrast to the PCBs, the concentrations of PCDD/DFs are distributed more sporadically and where there are higher concentrations, they are located farther downstream. The relatively consistent concentrations and the distribution of PCDD/DFs is consistent with atmospheric deposition and an upwind source(s) of PCDD/DFs located to the west of OU-4. There are multiple potential upwind PCDD/DF sources located to the west of OU-4. These potential sources include numerous coal-burning power plants located in the Birmingham, Alabama, area and a larger papermill located southwest of OU-4 in Childersburg, Alabama, that has operated for over 60 years (The State 1958). Other potential PCDD/DF upwind sources include a range of industries located west of OU-4, including other coal-burning industries (e.g., steel mills), medical waste incineration, and municipal waste incineration. The industry types mentioned above were identified by USEPA as potential PCDD/DF sources in an inventory of sources and environmental releases of dioxin-like compounds initially published in 2006 (USEPA 2006) and issued as a draft for public comment in 2013 (USEPA 2013).

Chromium in Soil

Soil results for chromium are presented on Figures 4-39 and 4-40. Figure 4-39 presents the results for chromium in floodplain soil based on the distance from Lake Logan Martin, and Figure 4-40

presents the results based on distance from the creek bank. The distribution of chromium in OU-4 is consistent with the presence of current and/or historical industrial sources upstream in the Anniston area. Of the 158 soil samples, only 12 (8%) had a concentration higher than twice the Fort McClellan mean of 19 mg/kg. The OU-4 mean of 16 mg/kg was slightly less than the Fort McClellan mean of 19 mg/kg, and the OU-4 maximum in soil was 80 mg/kg, which is less than the Fort McClellan maximum of 134 mg/kg. The widespread nature and concentrations of chromium are also consistent with USGS (1984) regional background data for metals in soil and data collected for Fort McClellan (SAIC 1998). These background data reflect a combination of naturally occurring materials and broader regionalized sources.

Lead in Soil

Lead concentrations in soil are shown as a function of distance downstream on Figure 4-41. Lead concentrations as a function of distance from the creek bank are shown on Figure 4-42. The lead concentrations in OU-4 soil are significantly lower than the concentrations in and around OU-1/OU-2. The former foundries in and around the Anniston area are known source(s) of lead on the Anniston Lead Site. The residential cleanup goal for lead on the residential properties in OU-1/OU-2 was 400 mg/kg. The highest lead concentration in OU-4 was 130 mg/kg, and the average lead concentration was 28 mg/kg.

Mercury in Soil

Mercury concentrations in soil are shown on Figures 4-43 and 4-44. The average mercury concentration in soil was 1.1 mg/kg, and the maximum detected concentration was 33 mg/kg. The mercury concentrations tend to be higher in OU-4 than in OU-1/OU-2 and are supported by ADEM listing Choccolocco Creek as an impaired water body under Section 303 (d) of the Clean Water Act due to atmospheric sources (ADEM 2022). Potential mercury sources include the mercury cell process that operated at the Facility and a range of nearby atmospheric sources. A mercury cell process was operated at the Facility from 1952 to 1969 for the sole purpose of generating chlorine that was reacted with biphenyl to manufacture PCBs. A wide range of other industries located upwind of OU-4 are potential atmospheric mercury sources. These industries include hospitals with incinerators and coal-fired plants, including multiple power generation plants that are located upwind in the Birmingham, Alabama, area. One power plant located in Jefferson County reportedly released over 1,000 pounds of mercury to the atmosphere in 2010 (Environment America Research & Policy Center 2011).

The distributions of PCBs and mercury in soil based on distance from Lake Logan Martin are presented in Figure 4-45a. The combined distributions of PCBs and mercury based on distance from Lake Logan Martin that were collected from the same sample location and depth interval are presented on Figure 4-45b. These combined results show that mercury concentrations are generally lower than PCBs with a similar but less dramatic decrease in concentrations in a downstream direction and that concentrations do not diminish at the most downstream end of OU-4. The combined distributions of PCBs and mercury based on distance from the creek bank are presented on Figure 4-46a. The combined distributions of PCBs and mercury based on distance from the creek bank that were collected from the same sample location and depth interval are presented on Figure 4-45b.The results for both constituents show a somewhat similar trend with concentrations decreasing with distance from the creek bank with the exception of mercury concentrations tending to be higher for samples collected more than 1,000 feet from the creek bank. These higher mercury concentrations located away from the creek bank are consistent with a combination of sources in

the watershed and upwind (west) of OU-4. The more significant sources appear to be located in the OU-4 watershed based on the higher upstream concentrations shown on Figure 4-45a.

Vanadium in Soil

Vanadium concentrations in soil are summarized on Figures 4-47 and 4-48. The concentrations in OU-4 soil are relatively low and generally lower than the concentrations in OU-1/OU-2. The maximum vanadium concentration detected was 45 mg/kg, which is less than twice the Fort McClellan mean of 31 mg/kg. The mean vanadium concentration detected in OU-4 was 20 mg/kg. Figures 4-47 and 4-48 illustrate how the concentrations are distributed around the mean, suggesting that the vanadium present in OU-4 may be naturally occurring or from a relatively low, ubiquitous, possibly atmospheric, source. The widespread nature and concentrations of vanadium are consistent with regional background data for metals in soils from USGS (1984) and data collected for Fort McClellan (SAIC 1998).

4.2.2 Sediment

The sediment data set for OU-4 is comprehensive in defining the nature and extent of PCBs and the wider list of COPCs evaluated in the OU-4 HHRA and the OU-4 BERA. The PCB results for sediment are graphically presented as a function of distance downstream on Figure 4-49. The PCB results are also presented as SWAC values for surface sediment by reach on Figure 4-50 based on the 250 individual surface sediment PCB measurements.

4.2.2.1 PCBs in Sediment

The PCB distributions in OU-4 sediment are discussed below and include separate discussions for PCBs in sediment in Snow Creek and Choccolocco Creek. Discussions are also included for other COPCs identified in the HHRA, BERA, and/or as requested by USEPA, and follow the PCB discussions.

Snow Creek Sediment

Snow Creek sediment PCB data include the mapping of 28 sediment deposits in the Snow Creek portion of OU-4 and the collection and analysis of 38 samples from the 16 deposits in the OU-4 portion of Snow Creek. The sample deposits are shown on Figure 4-7. The 16 deposits sampled included S-6-1 through S-6-5, S-6-7, S-6-9, S-6-10, S-6-13, S-6-15. S-6-17, S-6-21, S-6-23, and S-6-25 through S-6-27. The average surface sediment PCB concentration was 5.3 mg/kg (Table 4-4). Most of the measured PCB concentrations for most of the sediment samples were less than 5 mg/kg and tend to decrease slightly with distance downstream. Samples from S-6-03 had the highest PCB concentrations with a SWAC of 14 mg/kg. The average PCB concentrations from S-6-02, S-6-13, S-6-17, and S-6-27 were 5.6 mg/kg, 7.4 mg/kg, 6.8 mg/kg, and 5.1 mg/kg, respectively.

Choccolocco Creek Sediment

Choccolocco Creek sediment was sampled and analyzed through several programs that collectively provide 582 sediment samples from nearly 300 locations to define the nature and extent of PCBs in the Choccolocco Creek portion of OU-4. Over 20% of these samples were also analyzed for constituents other than PCBs and provided a complete data set to evaluate COPCs in the OU-4 HHRA and OU-4 BERA. Sediment PCB data are plotted in plan view along with soil data on the Figure 4-3 series and are plotted as a function of distance downstream on Figure 4-49. SWAC values are calculated for geographical reaches and are plotted on Figure 4-50. The SWAC

PCB concentration in the backwater area just upstream of Friendship Road is 4.9 mg/kg. SWAC values are all less than 1 mg/kg downstream from Friendship Road (Figure 4-50).

The process to develop the SWAC values presented in Table 4-4 and on Figure 4-50 uses the average PCB concentration for a given sediment textural class within a geographic reach to generate an average exposure value that is representative of the reach. The sediment textural classes include fine (f) sediment, coarse (c) sediment, gravel (g), and areas where material was not recovered (nr). The SWAC values for surface sediment in the various creek reaches in OU-4 were calculated with the nature and extent data and ecological sediment data collected under the RCRA and CERCLA programs. These data were identified by location, sediment textural class, and PCB concentration and can be used to calculate SWAC values for the various reaches of Choccolocco Creek. The sediment textural classifications for 769 samples were used to develop the SWAC based on visual classifications. These visual classifications were cross-checked with 169 individual grain-size distribution results and an independent review of sample logs and photographs.

The SWAC calculation process includes multiplying the PCB concentration by the area for a specific texture of sediment, summing these values, and then dividing by the total sediment area in the reach, as shown in the equation below:

$$SWAC = [(A_f * P_f) + (A_c * P_{c)} + (A_g * P_{g)} + (A_{nr} * 0.05)] / (A_f + A_c + A_g + A_{nr})$$

Where

f, c, g, and nr are defined as above

A = area

P = average PCB concentration

The PCB concentration of areas where no sediment was recovered (nr) is assumed to be 0.05 mg/kg, which is the approximate reporting limit for most sediment PCB samples.

The highest concentrations of PCBs in sediment are found in the backwater area upstream of the Snow Creek confluence (Figure 4-49 and Figure 4-50). This area is relatively flat with low surface water flow and backs up and floods during high-flow events. These data show that fine-grained particulates with PCBs from Snow Creek were deposited in channels and low-lying areas in the backwater area. As a result of periodic high-flow events over time that conveyed less PCBs into the backwater area, the higher concentration sediment tends to be present in the deeper sediment intervals. As the sources of PCBs in the upstream watershed have been reduced over time, the concentration of PCBs associated with particulates has decreased over time, and the concentrations in sediment near the surface are lower than those at depth. These processes are consistent with the geochronological data for the backwater area (Figures 4-19 and 4-20) that show a continuous pattern of sediment deposition, the reduction of PCB sources over time, the sequestration of higher concentrations at depth, and the long-term stability of sediment in portions of the backwater area.

4.2.2.2 Other COPCs in Sediment

Consistent with the approach used for soil, the nature and extent evaluation for non-PCB constituents in sediment includes those identified in the OU-4 HHRA and the OU-4 BERA as COPCs. The nature and extent evaluation included PCDD/DFs, barium, chromium, cobalt, mercury, and vanadium.

PCDD/DF in Sediment

The results for PCDD/DFs in sediment on a concentration basis are shown on Figure 4-51. The concentrations of samples collected from Snow Creek are higher relative to those collected in Choccolocco Creek and are reflective of the urban and industrial nature of the Anniston area. The results for Choccolocco Creek show relatively low concentrations of PCDD/DFs; the Choccolocco Creek results are lower than the highest concentration samples collected by the Natural Resource Trustees (Trustees) in Lake Logan Martin (Schein et al. 2015). The sediment samples collected by the Trustees in Lake Logan Martin are more proximate to potential upwind PCDD/DF sources, and the results are consistent with the PCDD/DF results for soil samples that the Trustees collected in this area that is upwind of OU-4.

The combined distributions of TEQ and PCBs in OU-4 sediment relative to the distance from Lake Logan Martin are presented on Figure 4-52a. The combined distributions of TEQ and PCBs in OU-4 sediment relative to Lake Logan Martin that were collected from the same sample location and depth interval are presented on Figure 4-52b. The calculation of TEQ included PCDD/DFs and DL-PCBs, and zero was used for those cases where the constituent congeners were not detected. The results indicate that the distribution of TEQ is different than PCB, with TEQ concentration in OU-4 sediment being lowest in the backwater area and relatively consistent, although slightly increasing, with distance moving downstream (Figure 4-52a). The concentrations of TEQ and PCBs for samples collected from background locations in Choccolocco Creek upstream of OU-4 are lower than the downstream results. These collective results support the potential influence of multiple TEQ sources, including the upstream Snow Creek watershed, WWTP discharges located downstream of the backwater area that discharge to Choccolocco Creek, and historical sources located upwind of OU-4.

Barium in Sediment

Barium concentrations in sediment are shown on Figure 4-53. Except for two relatively high concentrations at the confluence with Snow Creek, barium concentrations were consistently low, usually less than 250 mg/kg with a mean of 160 mg/kg. There also appears to be an area with slightly elevated barium concentrations at RM 24, which is located downstream of three permitted outfalls that discharge to Choccolocco Creek near RM 28.

Chromium in Sediment

Chromium concentrations in sediment are plotted as a function of distance downstream on Figure 4-54. Most chromium concentrations are less than 40 mg/kg, and, absent several elevated values in Snow Creek and Choccolocco Creek, the concentrations are relatively consistent. The chromium concentrations in Snow Creek are consistent with the industrial nature of the watershed, which includes many chromium-related industries. Two of the three Choccolocco Creek samples with elevated chromium concentrations (greater than 41 mg/kg) were collected at RM 24, which is located downstream of three permitted discharges.

Cobalt in Sediment

Cobalt concentrations in sediment are plotted as a function of distance downstream on Figure 4-55. Cobalt concentrations for sediment are relatively consistent with the mean concentration of 9.5 mg/kg. The similar and low cobalt concentrations throughout most of OU-4 are similar to background conditions on Choccolocco Creek upstream of OU-4 (Figure 4-55) and suggest most of the cobalt is the result of naturally occurring background. The few higher concentrations in Snow Creek and at near the outfall at RM 24 are consistent with relatively minor industrial-related sources that may be present in the watershed.

Mercury in Sediment

Mercury concentrations in sediment are plotted on Figure 4-56. In OU-4, the average mercury concentration in sediment was 2.5 mg/kg with the highest concentrations clustered in the backwater area. This is consistent with the industrial nature of the Snow Creek watershed and the depositional nature of the backwater area located at the confluence of Snow and Choccolocco Creeks. Mercury concentrations in sediment downstream of the backwater area do not decrease with distance downstream. This distribution is indicative of ambient sources and is supported by ADEM's listing of Choccolocco Creek as an impaired water body for mercury under Section 303 (d) of the Clean Water Act due to atmospheric sources (ADEM 2022). Potential atmospheric mercury sources include local hospitals with incinerators and industries with coal-fired plants, including the power generation plants located upwind of OU-4 in the Birmingham, Alabama, area. One power plant located in Jefferson County reportedly released over 1,000 pounds of mercury to the atmosphere in 2010 (Environment America Research & Policy Center 2011). Other potential mercury sources to OU-4 included a mercury cell process that operated at the Facility from 1952 to 1969 for the sole purpose of generating chlorine that was reacted with biphenyl to manufacture PCBs.

The combined distributions for PCBs and mercury in sediment are presented on Figure 4-57a. The combined distributions of PCBs and mercury in OU-4 sediment relative to Lake Logan Martin that were collected from the same sample location and depth interval are presented on Figure 4-57b. The results show that concentrations for both constituents are elevated in the backwater area and supports the presence of potential sources in the upstream Snow Creek watershed, including the Facility (OU-3). The concentrations for both constituents decline with distance downstream along Choccolocco Creek with mercury concentrations remaining more consistent over the length of the creek. This includes some of the highest mercury concentrations measured in sediment downstream of the backwater area at the most downstream end of OU-4. Similar to the findings for mercury in soil, these results are consistent with a combination of mercury sources located in and upwind of the OU-4.

Vanadium in Sediment

Vanadium concentrations in sediment are plotted as a function of distance downstream on Figure 4-58. Consistent with the distributions of barium, chromium, and cobalt in sediment, the higher concentrations were found in Snow Creek and samples collected at RM 24, which is located downstream of several permitted discharges. The mean concentration of vanadium in sediment was 18 mg/kg, and the maximum concentration was 63 mg/kg at RM 24. The vanadium concentrations in the remainder of Choccolocco Creek are 10 mg/kg or less except for the downstream end of the creek where average concentrations approach 20 mg/kg (Figure 4-58).

4.2.3 Surface Water

Surface water data used to assess the nature and extent of PCBs were collected under the RCRA and CERCLA programs for several purposes, including evaluating human health and ecological risks and the nature and extent of contamination. Sampling locations are shown on Figure 4-20, and the data include PCB, particulates, TSS, and the wider list of constituents under a range of base- and high-flow conditions.

The base-flow surface water samples collected under the CERCLA program are the most recent data representing ambient conditions in Choccolocco Creek. The average whole-water PCB concentration (total PCB homologs) for the Choccolocco Creek portion of OU-4 was 0.075 µg/L with an overall average for OU-4 inclusive of Snow Creek of 0.1 µg/L. These surface water data are also conservative because the samples were collected and analyzed as whole-water samples rather than the measurement of dissolved-phase PCBs that is more applicable to the surface water pathway for ecological receptors. Mercury was reported in only 1 of 43 samples collected.

These data are consistent with chronic exposure conditions because the samples were collected during conditions that exist approximately 90% of the time for OU-4. The periods of high surface water flow are episodic with relatively rapid increases and decreases in flow conditions in response to precipitation events (BBL 1999a).

4.2.4 Fish Tissue

Fish tissue investigations that are applicable to assessing human health risks have been conducted for more than 30 years at this Site. Long-term PCB concentration results as a function of time are presented on Figure 4-28 for the sampling station at the downstream end of OU-4 (Station 35). The PCB results shown on this figure show declines in concentration that have occurred over the past 20+ years. A site-specific, year-long fish consumption study was also conducted for OU-4 and shows that fishing pressure on Choccolocco Creek was low due to limitations in physically accessing the creek. The study estimates of fish consumption were lower than for area reservoirs. The upper portion of OU-4, where the higher PCB concentrations in fish tissue are observed, had the least fishing pressure due to limited access.

Mercury concentrations for fish tissue samples collected in support of the OU-4 HHRA in 2008 are plotted on Figure 4-27 and show a different spatial pattern than PCBs. Average concentrations of mercury in fish range from approximately 0.2 to 0.5 mg/kg. They are lowest in Snow Creek (HHFL-09) and highest in the central reaches of Choccolocco Creek (HHFL-03 through HHFL-06) for bass and catfish near where several permitted outfalls discharge to Choccolocco Creek. The overall area is also subject to atmospheric deposition of mercury (ADEM 2022) that may be related to coal-combustion facilities located upwind in the greater Birmingham, Alabama, area (Environment America Research & Policy Center 2011). Other potential mercury sources to OU-4 included a mercury cell process that operated at the Facility from 1952 to 1969 for the sole purpose of generating chlorine that was reacted with biphenyl to manufacture PCBs. The highest concentrations of mercury in sediment (Figure 4-57a) are in the backwater area and reflect the industrial nature of the Snow Creek watershed. The higher concentration mercury-containing sediments are buried at depth in the backwater area and are generally not available to fish and other organisms.

4.2.5 Ecological Species

The nature and extent of contamination in biota was extensively defined for OU-4 and supported preparation of the OU-4 BERA. These analytical chemistry data include PCBs and mercury for most samples and a wider list of other constituents for approximately 10% of the samples. These analytical chemistry data in combination with the available habitat and ecological community data form the complete data set used to prepare the OU-4 BERA. Community data and the associated comparisons to reference areas were included in the OU-4 BERA as a secondary and supporting line of evidence following preparation of the baseline problem formulation in 2006.

4.2.6 Groundwater

The nature and extent of groundwater contamination in OU-4 were assessed by comparing groundwater monitoring results to the corresponding maximum contaminant level (MCL) established under the Safe Drinking Water Act. The MCL for PCBs is not exceeded within OU-4 and is exceeded in only one location within OU-1/OU-2 outside the areas that are being addressed under OU-3; therefore, groundwater data are consistent with the non-leachability of PCBs. The MCL for PCBs was exceeded only at well T-11, which is in the northern portion of OU-1/OU-2 and several miles upgradient of OU-4. PCBs were not detected in groundwater samples collected in OU-4. These samples included groundwater from well T-17 and drinking water from two residential wells located in the downstream portions of OU-4. Based on these findings, groundwater is not a medium of concern for OU-4.

4.2.7 Air

Air concentrations of PCBs are not a significant risk in OU-4, nor do they represent a significant fate or transport mechanism. Air concentrations were evaluated for OU-3 and for OU-1/OU-2 where the highest concentrations of PCBs are present in surface soil. For OU-3, the measured concentrations of PCBs in air were within USEPA's acceptable risk range and were not risk drivers that required specific remedial actions. Similarly, ambient air concentrations measured in OU-1/OU-2 were not a risk driver in the OU-1/OU-2 HHRA prepared on behalf of USEPA (Camp Dresser and McKee [CDM] 2010). Based on the CDM (2010) finding, air samples were not included in the OU-4 investigations.

4.3 Contaminant Fate and Transport

This section evaluates data to understand fate and transport of constituents in OU-4. This evaluation considers the following:

- Sources, release mechanisms, and potential migration pathways, especially as they pertain to OU-4
- More recently available data expanding on the initial CSM evaluation conducted as part of the Phase 1 CSM report (BBL 2003)
- The OU-3 IROD and OU-1/OU-2 ROD
- Contaminant persistence and contaminant migration

PCBs are the primary focus of this assessment. Some of the PCBs within OU-4 have been identified to have originated in OU-3 and have been the most prevalent constituent identified

within the Site. Other constituents that may be of concern (including other organics and heavy metals) have an affinity for solids that is similar to PCBs and will have similar fate and transport properties, regardless of their origin.

Historical fate and transport are important factors in understanding constituent distribution in OU-4 and were considered in developing and evaluating remedial alternatives during this OU-4 FS process. Equally important is that OU-4 is a receiving body that was and continues to be affected by upstream sources. Given the hydraulic connectivity between OU-3, OU-1/OU-2, and OU-4, remedial measures conducted in the upstream OUs have already reduced the potential for ongoing migration to OU-4. Therefore, fine-grained particulates transported downstream and deposited in OU-4 will tend to have lower constituent concentrations than in the past, as evidenced by the pattern of PCBs in surface and subsurface soil and in the declining fish tissue concentrations over time.

From this combination of circumstances and the data collected to date, COPCs, including PCBs, are primarily associated with soil and sediment. Surface water concentrations of PCBs generally reflect PCBs that are present in sediment or soil entering the creeks through surface water runoff. Once sediment and floodplain soil are addressed, surface water PCB concentrations are expected to decline in a corresponding manner. The fate and transport of other COPCs collocated with PCBs are generally expected to be similar to PCBs given the affinity of these constituents for soil and sediment particles. This is particularly the case for mercury in soil and sediment where the distributions are relatively similar except for the most downstream reaches of OU-4 where the potential historical/current upwind sources appear to influence the nature and extent of contamination. The situation is different for PCDD/DFs and TEQ where the higher concentrations in soil are different than PCBs, and the results suggest that other potential sources (possibly atmospheric deposition), in combination with sources in the OU-4 watershed, have influenced PCDD/DF and TEQ distributions. This finding is based on the higher PCDD/DF and TEQ concentrations in soil located in the downstream portions of OU-4 and in locations that are away from the creek banks. The distribution for TEQ in OU-4 sediment results in a similar finding as TEQ concentrations are consistent along the length of OU-4 and are not elevated in the backwater area.

Air and groundwater are not significantly affected by the constituents in OU-4 and, therefore, do not represent complete exposure pathways; thus, they are not of concern as migration pathways. It can also be concluded that conditions in OU-4 are largely the result of historical impacts. Overall, source areas have been or are in the process of being controlled through completed remediation activities for OU-3 and forthcoming remediation activities for OU-1/OU-2.

The most significant source areas in OU-3 and in OU-1/OU-2 have been or will be addressed either through previous IMs or under the current IROD (OU-3) and ROD (OU-1/OU-2). To a lesser extent than the original source areas, upstream sediment and creek banks are the only remaining potential sources to OU-4. The floodplain soil data indicate that the floodplain is primarily a depositional environment as evidenced by surface soil concentrations being lower than subsurface soil concentrations, recognizing that eroding creek bank areas can be secondary sources of concern. The following is a detailed discussion of fate and transport factors in OU-4.

4.3.1 Source Areas

The Facility (OU-3) had documented elevated concentrations of PCBs in soil and groundwater and is a known source for historical releases of PCBs to OU-1/OU-2 and subsequently to OU-4. However, the source areas for the Site have largely been controlled, and the potential for ongoing transport from OU-3 is limited. This includes implementation of the remedial actions specified in the OU-3 IROD, including capping remaining soil areas at the Facility and additional groundwater containment and treatment actions. With these actions now complete, OU-3 no longer serves as a significant source of PCBs to OU-1/OU-2 or OU-4.

Snow Creek and its floodplain (OU-1/OU-2) were affected by historical releases (primarily via surface water flow and overland flooding). Upcoming remediation under the OU-1/OU-2 ROD will further reduce the potential for sediment and creek bank soil in Snow Creek to be transported downstream to OU-4, and OU-1/OU-2 will no longer be a potential ongoing source to OU-4. PCBs migrated via surface water from OU-3 to Snow Creek and then to Choccolocco Creek (OU-4). During transport and migration, PCBs became entrained on fine-grained particulates; hence, transport and deposition are associated with fine-grained sediment. During high-flow and flooding events, both Snow and Choccolocco Creeks overflow their banks, and fine-grained particulates are deposited in their respective floodplains. The floodplains are primarily depositional and do not represent measurable sources to OU-4. In most cases where OU-4 floodplain soil presented unacceptable risks primarily from direct exposure, IMs have already been conducted. Future remedial actions to address those risks will further reduce the already limited potential for these soils to be an ongoing source to OU-4.

The secondary release mechanisms associated with surface water runoff include mobilization and movement of sediment that has settled out in Snow Creek and Choccolocco Creek. Following remediation of the OU-1/OU-2 portion of Snow Creek, the backwater area of Choccolocco Creek will be the area remaining with the highest concentrations of PCBs in sediment. Although current data indicate that the Highway 202 culverts are primarily depositional and do not represent a significant source to OU-4, future remedial activities in Snow Creek could mobilize sediment and PCBs that have been effectively sequestered for many years. Dredging or excavation of this sediment will loosen well-bedded sediment and temporarily expose materials with higher concentrations from older deposition. No matter how diligent the engineering controls, excavation of sediment with relatively high PCB concentrations might release both particulate- and dissolved-phase PCBs (and other constituents) downstream to the OU-4 portion of Snow Creek and to Choccolocco Creek. There is potential that the OU-1/OU-2 sediment remediation will cause a measurable increase in PCB concentrations in sediment, surface water, and, possibly, fish tissue. Once the remediation of Snow Creek is complete, downstream migration of PCBs from Snow Creek is expected to decrease to very low levels.

An additional release mechanism is the potential release of PCBs (and possibly mercury) associated with eroding creek banks. While PCBs that have migrated into floodplain soil areas generally reside there for the long term, soil located in the riparian zone adjacent to the creek could be an ongoing source as creek banks erode as part of natural geomorphological processes. The degree to which creek bank areas represent meaningful PCB sources is a function of the degree of erosion and the associated PCB concentration of the creek bank soil. This is an important distinction because creeks will undergo geomorphological changes over time and based on this,

remedy monitoring of the long term must account for potential changes in the locations of the creek. For these reasons, the RD for OU-4 would include a creek migration zone (CMZ) evaluation that would be used to inform the long-term monitoring program. The CMZ assessment will be used to predict lateral movement of the creeks' channels over time to limit residual creek bank sources from becoming a primary source once other sources have been addressed.

Given the history of PCBs in a variety of applications, there are other potential historical sources of PCBs not associated with the manufacture of PCBs at the Facility (e.g., electrical equipment, such as transformers and capacitors; automobile shredder fluff, appliances, paint products). In addition, soil disturbance activities conducted by NRCS in Choccolocco Creek and the AWWSB at the Choccolocco Creek WWTP potentially contributed to the mobilization of PCBs and the dispersion of PCBs within OU-4.

4.3.2 Potential Routes of Migration

Data collected over the past 20 years for the Site support the CSM initially summarized in 2003 (BBL 2003). Since 2003, additional data collected have affirmed the model fate and transport mechanisms and further refined the nature and extent of constituents to the point where USEPA has issued the OU-3 IROD and the OU-1/OU-2 ROD defining the remedial actions that have been or will be taken in those OUs. The nature-and-extent discussion also defines the limits of constituents consistent with the fate and transport mechanisms initially discussed in the 2003 CSM. This section provides the details of the CSM developed for the Site with a focus on OU-4 including the CSM model illustrated on Figure 4-59.

The primary historical release mechanism for PCBs from OU-3 was through surface water runoff via the 11th Street Ditch and subsequent downstream flow into Snow Creek. Secondary release mechanisms from OU-3 were groundwater and air. Migration from the creek to floodplain soil in OU-4 occurred during periodic flood events with the deposition of fine-grained particles with PCBs within the lateral limits of the 100-year floodplain. Several potential release mechanisms are discussed below, including surface water transport, leaching, and volatilization/dust.

4.3.2.1 Surface Water and Sediment

The primary historical migration pathway from OU-3 to Snow Creek and Choccolocco Creek was surface water runoff. The surface water migration pathway from OU-3 to Snow and Choccolocco Creeks was the historical route for PCBs absorbed on to particulates, primarily fine-grained particulates. The movement of sediment (and, therefore, PCBs) within the creeks and their respective floodplains have occurred during and immediately following significant precipitation events. Historically, surface water runoff from the Facility followed a series of drainage ditches that, combined with overland flow, led to the 11th Street Ditch. From the 11th Street Ditch, particulates were conveyed via surface water to and along Snow Creek. During periods of higher flows, the waters of Snow Creek would transport PCBs into OU-4. During these high-flow events, particulates in the surface waters of the OU-4 portion of Snow Creek and Choccolocco Creek were transported outside of the banks into the broader portions of the floodplains. Once the surface waters were outside of the creek bank, water velocities dropped dramatically due to the increased cross-sectional area for flow, and particulates (and PCBs) present in the overflow waters were deposited within the footprint of the floodplain.

This surface water flow transport pathway is particularly important for the floodplain areas located at the OU-4 portion of Snow Creek where a combination of low-lying areas and the Friendship Road embankment results in surface water transport of COPC-containing particulates into floodplain areas. The Friendship Road embankment with limited bridge-size openings also creates a settling basin effect upstream of the embankment in the backwater area (Figure 4-60). This process of downstream migration, flooding, and deposition is the source for the historical sediment deposits in OU-4 that contain PCBs and other COPCs from the Snow Creek watershed. As source control measures upstream for OU-3 and OU-1/OU-2 have been implemented, the particulate PCB concentrations have decreased over time as clean sediment from portions of the watershed becomes entrained in the Choccolocco Creek flows. The heavier portion of these materials move along Snow Creek and the higher velocity portions of Choccolocco Creek (i.e., the reach downstream of Friendship Road and upstream of Jackson Shoals) through bedload transport. The fine-grained portion of the cleaner sediment is either deposited in the backwater area, becomes mixed (to a lesser degree) with the sands and gravels located in the high-velocity portions of Choccolocco Creek, or settles out of the water column within the lower reaches of OU-4 or in Lake Logan Martin. Most of the materials deposited in the floodplain are fine grained because the surface water velocities decrease for floodwaters that flow outside of the creek bank. There is a sharp reduction in the surface water velocities for flows outside the creek banks. These out-of-bank surface water flows are typically 1 to 1.5 feet per second based on surface water modeling conducted as part of the Off-Site Work Plan (BBL 1999a). Based on this, the higher PCB concentrations in floodplain soil are generally in the 6–12-inch horizon (or deeper) rather than in the 0–0.5-foot horizon. A similar trend is seen for PCB concentrations associated with fine-grained sediment located in the backwater area. This low-energy area is located at the confluence of Snow Creek and Choccolocco Creek where the reduction in particulate PCB concentrations is evident through the presence of lower PCB concentrations in the surface sediment over the higher PCB concentrations in the deeper sediment.

A source of PCBs to surface water and sediment is eroding creek bank areas with elevated PCB concentrations. The creek bank erosion is most prevalent along the upper 10 miles of OU-4 (Figure 4-31 series and Figure 4-61). This portion of the creek is also where elevated PCB concentrations (Figure 4-33) are present, and the highest PCB concentrations are closest to the creek banks (Figure 4-34). Eroding creek banks as a potential source to surface water and sediment is congruous with the consistency between the average surface water PCB concentrations measured along the length of OU-4 downstream of the backwater area despite declining PCB concentrations in sediment (Figure 4-45a). The average surface water PCB concentrations for the upper, middle, and lower portions of Choccolocco Creek downstream of the backwater area are 0.068 µg/L, 0.087 µg/L, and 0.073 µg/L, respectively. The surface water PCB concentrations for OU-4 as a whole average 0.1 µg/L and are influenced by the elevated surface water PCB concentrations in the Snow Creek portion of OU-4 (0.00036 µg/L). A trend of slight increases in surface water PCB concentrations for the middle portion of Choccolocco Creek is also evident in the fish tissue where the average PCB results are highest (Figure 4-27) in portions of Choccolocco Creek located downstream of areas with creek bank erosion. The potential for eroding creek bank areas in the upstream portion of OU-4 to be PCB (and mercury) sources to surface water, creek bed sediment, or water bodies located downstream of OU-4 are further evaluated in this OU-4 FS. This evaluation is important from an FS perspective because USEPA's first principal for managing contaminated sediment is focused on controlling sources early (USEPA 2002a).

4.3.2.2 Floodplain Soil

Migration from surface water to floodplain soil during overbank flooding events was the primary historical transport pathway. Based on this transport mechanism and as confirmed by the floodplain soil data collected from OU-4, the lateral extent of PCB-containing soil in floodplain areas is generally within the 100-year floodplain. Once flooding occurs and water is in an overbank condition, water velocities over the floodplain are much lower than in the creek channels. This low water velocity creates a primarily depositional environment in the floodplain, and floodplain soil is not likely to further erode or migrate. The potential for creek bank portions of the floodplain to be a PCB source is discussed in Section 4.3.4.2 and recognizes the concerns for creek bank areas that exhibit a combination of elevated PCB concentrations and moderate and severe erosion.

Soil with high constituent concentrations also provides the potential for constituents to dissolve or leach into groundwater. Because PCBs have low water solubility and a high affinity for particulates and they are primarily confined to shallow soil rather than in soil below the groundwater table, PCB migration from soil to groundwater is not of concern. This is supported by soil and groundwater data from OU-3, OU-1/OU-2, and OU-4 where groundwater concentrations above MCLs have not been identified in OU-4.

4.3.2.3 Groundwater

Based on the data from OU-3, OU-1/OU-2, and OU-4, constituent migration via groundwater to OU-4 is not a viable pathway. In some localized areas near the border between OU-3 and OU-1/OU-2, groundwater concentrations are influenced by soil concentrations. PCBs are leaching from soil to groundwater on a limited basis in OU-1/OU-2 (well T-11), in association with relatively high soil concentrations and lower chlorinated PCB compounds. The OU-3 IROD and the OU-1/OU-2 ROD address the additional steps that have been or will be taken to address the limited additional groundwater remediation that will be needed in these respective portions of the Site. For both OUs, the groundwater issues are localized near OU-3, and there are no indications that groundwater is affected as far away as OU-4.

Studies were also conducted specifically in OU-4 to confirm that groundwater was not a medium of concern for this OU. These studies included installing and sampling a groundwater well placed in the upper reaches of OU-4 (T-17) and sampling two residential drinking water wells located in the downstream portion of OU-4. PCBs were not detected in the groundwater samples collected from well T-17, and PCBs were not detected in the two residential wells. The combination of investigation results support the conclusion that PCBs have not migrated to OU-4 via groundwater, and groundwater is not a pathway of concern.

4.3.2.4 Volatilization/Fugitive Dust

Migration of PCBs in air is not a significant pathway for OU-4. The air data collected for OU-3 and OU-1/OU-2 show that the farther away samples are collected from the source (OU-3), the lower the concentrations are expected to be. Based on air data collected for these other OUs, PCBs in OU-4 air are not expected to be a source from a concentration or migration pathway perspective.

4.3.3 Contaminant Persistence

PCBs are known to be persistent organic chemicals over a wide range of conditions. Although some small amount of weathering and attenuation will occur, chemical degradation, substantial reduction in concentration, or change in distribution pattern is not expected over the near term.

Although some anaerobic dechlorination may be occurring in PCBs in deeper sediment in the backwater area, it is not likely to be the primary contributor to changes in surface sediment concentrations, and it is not likely to be occurring at rates that would change exposure risks or risk-based decisions. The non-PCB COPCs for OU-4 (PCDD/DFs and several metals) are similar to PCBs in that they have an affinity for fine-grained particulates and are persistent over time. These non-PCB constituents are often collocated with PCBs in backwater area sediment due to the depositional nature of the backwater area and its hydraulic connection to the industrialized Snow Creek watershed.

4.3.4 Migration Pathways

Historically, the primary mechanism for the movement of PCBs from OU-3 was surface water discharge/runoff to Snow Creek via the 11th Street Ditch. From Snow Creek, surface water and suspended particulates were further transported to OU-4. Fine-grained particulates were deposited in the backwater area created by the confluence of Snow and Choccolocco Creeks. During flood events, those particulates were transported and deposited in the Choccolocco Creek floodplain. With a significant number of source control measures already implemented for OU-3, OU-1/OU-2, and OU-4 and subsequent measures to be implemented in the latter two OUs, the concentration of constituents associated with suspended solids has decreased to the point where the potential for the migration of constituents via surface water is low. PCBs remaining in Snow Creek (OU-1/OU-2) sediment will be addressed in the OU-1/OU-2 remediation, and the concentrations potentially available for downstream transport will be further decreased. Also, the OU-4 floodplain is depositional and does not represent a secondary source area or have potential for migration. The most significant areas that could represent secondary or tertiary source areas is the sediment in Choccolocco Creek and the potential for erosion and migration via surface water flow. Sediment and creek bank stability conditions are key factors in understanding this potential and are discussed below.

4.3.4.1 Sediment

Surface water and sediment data were evaluated using an integrated, weight-of-evidence (WOE) approach to assess the stability of sediment in Choccolocco Creek. The findings were presented in a technical memorandum that was included as Appendix H to the OU-4 RI (*OU-4 Sediment Stability Technical Memorandum* dated June 2010 [Arcadis 2010c]). The findings of the memorandum are important relative to migration pathways for OU-4 because the PCB-containing sediment currently in OU-4 represents a potential ongoing migration pathway. The OU-4 sediment stability evaluation included several lines of evidence and focused on the Choccolocco Creek portion of OU-4. The evaluation considered a combination of physical characteristics of Choccolocco Creek and chemical data to understand where PCBs have been deposited in the creek bed and how likely these are to migrate under base-flow and high-flow conditions. The following are the general characteristics considered:

- Water velocity and flow
- Bathymetry and gradient
- Sediment thickness and grain size distribution
- PCB data

- Radioisotope dating
- Channel alignment

Based on an evaluation of the factors listed above, the technical memorandum concluded that most of the sediment in Choccolocco Creek was not stable; however, there were three defined portions of the creek where the sediment was stable. These three creek areas include a portion of the backwater area, sediment located just upstream of Jackson Shoals that is influenced by the former dam structure, and the embayment area downstream of Jackson Shoals that is influenced by the dam at Lake Logan Martin. Each of these three areas is discussed below.

Backwater Area

The backwater area is upstream of the confluence of Snow and Choccolocco Creeks and is created where Snow Creek (28 cfs) meets the relatively large flows (274 cfs) of Choccolocco Creek. The grade in the backwater area is relatively flat (0.25 feet per mile) and includes several channels and wetland areas. In this area, Choccolocco Creek is divided into a northern and southern branch that reunite just downstream of the confluence with Snow Creek at Friendship Road. Water pools in the backwater area even under base-flow condition, especially in the southern portion of the backwater area, which is comprised of several braided creek channels. Under higher flows, large volumes of water will stall and backup along this 0.5-mile section of Choccolocco Creek. The confluence with Snow Creek (the backwater area) has the highest reported PCB concentrations in Choccolocco Creek (Figure 4-24) and some of the highest average sediment thicknesses (Figure 4-12).

A review of aerial photographs from 1940, the 1960s, and 1977 indicate that two small portions of the creek channel in the backwater area have changed over time (Arcadis 2010c). A continuation of Snow Creek that was present between 1940 and 1977 is no longer evident. The channel from the southern branch of the creek to the confluence was not present in the 1960s. This new channel is presumed to be human-made based on its shape, the construction of two gas pipelines in this area, and the relatively low PCB concentrations in sediment in the new channel. The adjacent small piece of older channel appears to have filled in over time as the result of natural deposition after the new channel became the preferred hydraulic route for the creek. The new channel allowing direct drainage has likely increased the sediment stability in the other oxbow and wetland areas of the backwater area.

Investigations in the backwater area included collecting 40 sediment cores from 10 transects as well as 2 cores for radioisotope dating. The radioisotope and PCB data from this area were evaluated to understand changes in PCB concentrations with depth. Figure 4-19 presents PCB data as a function of sample depth for cores collected in the backwater area. The sediment samples were also evaluated geochronologically, and, based on the Cs-137 data, an annual sediment deposition rate of between 0.3 and 0.4 inches per year is estimated, while the Pb-210 profile indicates deposition rates may be as high as 0.5 inches per year. These deposition rates, along with the presence of the highest PCB concentrations at depth, provide further support that the sediment in this portion of the backwater area is stable.

In summary, the physical characteristics of the streambed in the backwater area combined with the PCB and geochronological data provide a strong basis for concluding that the sediment in the backwater area is stable. This relatively flat region of the creek, lower water flows, and the

thickness and fine-grained nature of the sediment deposits, indicate that this is a depositional area of the creek. The highest concentrations of PCBs are isolated and immobile under more recently deposited, lower-concentration surface sediment. Significant flow events since 1948, (Figure 4-62) appear to be responsible for sediment with lower concentrations of PCB being deposited over sediment with higher concentrations of PCBs. Based on the available data, the backwater area appears to be more depositional than erosional, yet surface sediment in these depositional areas may have PCB concentrations higher than the proposed PRGs or remedial action levels (RALs) identified for sediment in this OU-4 FS.

Upstream of Former Dam at Jackson Shoals

This reach of Choccolocco Creek is located just upstream of Jackson Shoals and includes the base structure for a former hydroelectric dam that was constructed before 1913. This hydroelectric dam was one of the oldest hydroelectric facilities in the United States. Once power generation ceased, the power generation equipment was removed. Under normal flow conditions, surface water flows around both sides of the former dam structure. The alignment of the creek in this area has not changed visibly since 1940, and the remaining underwater dam structure likely impounds surface water to some degree. As a result, surface water velocities in this section of creek are somewhat lower than they would be if the dam structure was not present, especially under base-flow conditions.

The overall stream gradient in this area is very low at 0.35 feet per mile (Figure 4-8), and water depths are deeper than in other parts of the creek (9.6 feet vs. 3.7 feet for the rest of the creek) (Figure 4-10). As expected with the deeper waters, the water velocities measured under base-flow conditions were lower than those measured in the rest of the creek. PCB concentrations in this area were less than 3 mg/kg with an average concentration of 0.73 mg/kg. Sediment is approximately 1 foot thick in this portion of the creek and is predominately fine-grained sediment. The low PCB concentrations and thin sediment layer for this reach of creek result in the sediment representing approximately 3% of the total PCB mass for Choccolocco Creek. The preponderance of data indicate that this is a relatively stable, depositional area of the creek. Sediment from upstream with lower PCB concentrations is likely to continue to accrete over previous deposits. Furthermore, PCB concentrations and the total mass of PCBs in this portion of the creek indicate that this reach is not likely to represent a significant potential source for downstream migration and is characterized by relative low PCB concentrations that might be similar to RALs proposed in this OU-4 FS.

Embayment Area

The third area of sediment stability is the portion of Choccolocco Creek influenced by the impoundment of Lake Logan Martin at the Logan Martin Dam on the Coosa River. This embayment area was created when the Logan Martin Dam was completed in 1964; the dam is still used to generate power. The hydraulic effects of the impoundment extend approximately 7 miles upstream in Choccolocco Creek from the original confluence point with the Coosa River at Ogletree Island to the downstream end of the Jackson Shoals area. In this stretch of Choccolocco Creek, the surface water elevation is controlled by the dam, and there is little or no change in the grade of the sediment bed. Base-flow surface water velocities average 0.5 feet per second. The wide cross-sectional area and low velocities in this area of the creek create conditions for the deposition of solids transported from upstream reaches of the creek. The results of sediment investigations conducted in the embayment area indicate average water depths of approximately

12 feet and sediment deposits averaging 2 feet (Figures 4-10 and 4-12, respectively). Most sediment cores collected in this area were visually characterized as fine grained, and sediment PCB concentrations in this portion of the creek generally do not exceed 1 mg/kg (Figure 4-34) and have an average surface sediment concentration of 0.52 mg/kg (Figure 4-46).

As part of the Off-Site RFI, radioisotope cores were collected from the embayment area. The Cs-137 profile for MLM-GEO-7 was suitable for dating and had a peak activity in the 26–28-inch interval of the core, which corresponds to the 1954 horizon. This results in an average sediment accumulation rate of approximately 0.4 inches per year, recognizing that differences in the amount of sediment that accumulates annually would most likely vary. When PCB concentrations are plotted with the sediment deposition time frame (Figure 4-15), the data indicate that the PCB concentrations in accumulated sediment are relatively low (less than 1 mg/kg). Sediment in the most recently deposited surface intervals shows a decrease in PCB concentrations, although an increase in PCB concentration during the mid-1990s is evident and may be linked to the NRCS dredging of Choccolocco Creek.

As expected in the embayment area, the combination of slower surface water flows, deeper water, and less change in grade creates a depositional area for sediment to accumulate. Sediment thicknesses and PCB and geochronological data also support that this is a stable, depositional area. Furthermore, the concentrations of PCBs in this sediment are low, generally less than 1 mg/kg and have an average surface sediment concentration of 0.52 mg/kg. Additionally, surface increments indicate that sediment with lower PCB concentrations (less than 0.2 mg/kg) is accreting over older deposits that have higher PCB concentrations (approximately 1 mg/kg), which further sequesters PCBs in sediment in this area and lowers exposure concentrations that are generally consistent with PCB sediment Site PRGs and lower than typical PCB sediment Site RALs.

4.3.4.2 Creek Bank Soil

Creek bank soil has the potential to erode, especially under high-flow conditions, and contribute soil (particulates) to the creek. The erosion is a normal part of geomorphological processes for these creeks. Depending on the amount of soil loss and the associated constituent concentrations, erosion could be a source of clean sediment for natural recovery processes or it could be a secondary source of constituents to the waterway. The creek bank survey results for OU-4 presented in the Figure 4-31 series are summarized on Figure 4-61. The chart shows the five erosion potential rankings and whether the areas are located above or below RM 29.5. This RM location was an approximate breakpoint between upstream areas with more erosion potential and downstream areas with less erosion potential. The creek bank condition survey results for OU-4 indicate that 84% of the creek banks in OU-4 are rated as being stable or relatively stable. The creek bank survey results for the remaining sections of creek in OU-4 include minor erosion (12%), moderate erosion (4%), and severe erosion (less than 1%). Additional evaluation of creek stability and potential implications for PCB source control are discussed in multiple locations within this OU-4 FS, including the candidate remedial areas for creek banks and sediment (Section 7.4.1) and the detailed analysis of remedial alternatives for creek bank and sediment alternatives (Section 10.7).

4.3.5 Conceptual Site Model

Sources and fate and transport mechanisms are important factors for understanding the nature and extent of PCBs in OU-4. The sources include historical sources that have been remediated and

ongoing sources, such as other upstream OUs that have yet to be remediated (i.e., OU-1/OU-2), sediment areas that are not stable, and creek banks with a combination of elevated PCB concentrations and meaningful erosion. In all cases, the surface water flow transport pathway has been and will be a significant factor for the distribution of PCBs for the OU-4 portion of the Site. Historically, PCB-containing solids were conveyed from OU-3 via surface water to and down Snow and Choccolocco Creeks. During periods of the highest flows, the waters of the creeks would flow in and out of the banks, and PCB-containing solids were transported outside of the banks into the broader portions of the floodplains. Once the surface waters were outside of the creek banks, the surface water velocities would drop dramatically, and the PCB-containing solids were deposited within the floodplain. This process of downstream migration, flooding, and deposition is the primary source for the historical deposition of PCBs. As historical sources in upstream OUs are mitigated through a series of remedial actions, addressing the remaining sources will set the trajectory for future conditions in the absence of any remediation in OU-4. While this trajectory will be lower than historical conditions due to the implementation of upstream measures, it will be important to address residual sources such as creek banks for the selected remedy to be effective over the long term.

5 SUMMARY OF HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS

5.1 Human Health Risk Assessment

JMWA and Avatar Environmental prepared the OU-4 HHRA (Appendix I; JMWA and Avatar Environmental 2013) on behalf of USEPA. The OU-4 HHRA primary objectives were to identify and quantify the risks to human health and provide a basis for this OU-4 FS evaluation of remedial alternatives to address the contaminants of concern and exposure pathways. As a final step in the risk assessment process, USEPA developed a range of remedial goal options (RGOs) for PCBs and mercury in fish tissue and for PCBs in floodplain soil based on several agricultural use scenarios. Tables with RGOs and a discussion of how they were developed were provided by USEPA via email (email from Pamela Scully of USEPA dated June 3, 2014). This section and subsections summarize the findings from the OU-4 HHRA.

The OU-4 HHRA evaluated and quantified potential risks to human health from exposure to chemical constituents in OU-4. The HHRA employed a systematic, step-wise process based on USEPA guidance. COPCs were identified for each exposure pathway, and the HHRA evaluated each of the pathways separately and then evaluated the cumulative risks of combining the pathways in an integrated risk assessment approach. The following subsections (5.1.1 through 5.1.3) introduce the exposure pathways and risk assessment approach, identify the hazards in OU-4, and discuss toxicity data that are used to quantitatively evaluate the risks. Sections 5.1.4 through 5.1.6 discuss each of the three exposure pathways individually. Section 5.1.7 summarizes the uncertainties identified in the process and the parameters used in the HHRA process. Section 5.1.8 discusses the results from integrating the three exposure pathways to develop a summary of the cumulative risks. Section 5.1.9 discusses RGOs, and Section 5.1.10 is a summary of the OU-4 HHRA findings.

5.1.1 Exposure Pathways and OU-4 Human Health Risk Assessment Strategy

A CSM for human exposure describes the following:

- Contaminant sources
- Release and transport mechanisms
- Receiving media
- Exposure media
- Exposure routes
- Potentially exposed populations

For the OU-4 HHRA, the CSM identifies complete and incomplete exposure pathways (Figure 5-1). A complete exposure pathway has each of the above-listed components, whereas an incomplete pathway is missing one or more of those components. A review of the CSM identified three complete human health exposure pathways that warranted quantitative risk evaluation:

- Ingesting fish caught in Choccolocco Creek in the absence of a fish consumption advisory
- Directly contacting floodplain soil (ingestion, dermal contact and absorption, and inhalation of particulates)
- Ingesting agricultural products (vegetables, meat, eggs, and dairy products) grown in the floodplain

Children and adults could be exposed to soil while engaging in a variety of activities around their homes or recreational activities at other locations. Adults could be exposed to soil while working in agricultural, landscaping, utility maintenance, and other occupations. Exposure from sediment and soil in shoreline areas and surface water could occur along the creek banks or in shallow areas of the creek during recreational activities (e.g., fishing, canoeing, swimming, wading). Anglers, farmers, and hunters and their families could be exposed to COPCs from consuming fish caught from the creek and crops grown and other agricultural products raised in the floodplain.

Table 5-1 presents the exposure scenarios evaluated at each of the direct-contact EUs. A determination was made as to whether low-contact or high-contact recreational exposure is likely to occur at the EU. Low-contact recreational exposure (adolescent and adult) was the predominant recreational exposure evaluated because the floodplain areas are remote, land ownership issues limit access to the floodplain, and vegetation and terrain along the floodplain make access difficult. High-contact recreational exposure (child, adolescent, and adult) was evaluated at the areas where access was not restricted, such as near parks (i.e., Oxford Lake Park) and near residences.

The potential exposure associated with consuming wild game (e.g., deer and turkey) taken from the floodplain was considered for inclusion in the OU-4 HHRA. However, USEPA determined that the exposure from consuming game is expected to be negligible given the home ranges of the game, the limited contact time with the affected media in OU-4, and the subsequent lack of contaminant uptake and transfer into the tissues of targeted game species. In addition, the assumptions related to human consumption of beef and chicken raised in the floodplain that were quantified in the OU-4 HHRA exceed any reasonable estimate of the potential consumption of wild game from the same areas. Therefore, consumption of game was not quantitatively evaluated in the OU-4 HHRA.

Other complete exposure pathways for OU-4, including sediment, surface water, and air, were evaluated in the OU-4 HHRA. Creek sediment was not quantitatively evaluated for direct contact risks in accordance with USEPA Region 4 guidance, which recommends sediment that is covered by water is generally not contacted and/or incidentally ingested to any significant extent by human receptors. Contaminants in sediment are relevant to the fish ingestion pathway for humans.

The available surface water data were screened in the OU-4 HHRA, and it was determined that the detected surface water contaminants were at sufficiently low concentrations such that quantitative assessment of risks from direct human contact was not warranted. Contaminants in surface water are relevant to the fish ingestion pathway for humans.

In previous investigations, air PCB data were quantitatively assessed for risks to residents based on air samples collected at the property boundary (fence line) between the Facility (OU-3) and the

adjacent residential areas and portions of OU-1/OU-2 with the highest PCB concentrations in soil. Since the health risks from these measured airborne concentrations were within USEPA's target risk range for the nearby residents, no further quantitative assessment of human risks from exposure via the air pathway was warranted for OU-4.

5.1.2 Hazard Identification

The hazard identification presents the data available to assess Site risks, describes the approach used to summarize Site data, and identifies COPCs. The following sections describe the methods used for data reduction, data evaluation, and COPC selection for the three different exposure pathways.

5.1.2.1 Available Data

The data set presented in the OU-4 RI is the most recent and includes additional data points since the OU-4 HHRA was prepared. Also, as described below, many sampling events were designed to target specific information (e.g., ecological risk assessment, historical fish tissue) not directly pertinent to evaluating human exposure in the OU-4 HHRA. The differences in the data sets would not significantly change the OU-4 HHRA analyses or conclusions and are not discussed further in this section. The data set and calculation used for the OU-4 HHRA are described briefly below.

Fish

Fish concentration data have been collected from Choccolocco Creek dating back to approximately 1993. Fish data collected by P/S during the Phase 2 sampling (November–December 2008) were collected to be representative of human consumption (i.e., were collected as fillets with skin off). The HHRA used only Phase 2 fish data. There were 362 fish samples collected from Choccolocco Creek—122 bass, 113 catfish, and 127 sunfish. All fish samples were analyzed for total PCBs based on the sum of detected Aroclors, select metals (i.e., arsenic, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, and vanadium), and mercury. Approximately 10% of the sample locations were analyzed for DL-PCB congeners (36 samples) and PCDD/DF congeners (35 samples).

Soil

At the time of the OU-4 HHRA, there were 901 soil sample locations within the OU-4 floodplain area. Surface soil samples (0–1 foot bgs) were collected at nearly every location (896). At approximately 130 locations, samples were collected between 1 and 4 feet bgs. All floodplain soil samples were analyzed for PCBs. Mercury was analyzed at 666 locations. Subsets of the sample locations were analyzed for DL-PCB congeners (119 locations), PCDD/DFs (114 locations), other metals (83 locations), and other constituents such as VOCs, SVOCs, pesticides, and herbicides (15 locations).

5.1.2.2 Data Reduction

Data reduction involves evaluating data qualifiers and their potential use in the HHRA process and describes the treatment of duplicate and collocated samples. If an analyte was not detected in any sample from a given medium, it was not considered further for that medium. In the case of field duplicates for a given analyte, the higher (detected) value was used as the concentration for that location.

Calculation of Total PCBs
The most common constituent for this Site is PCB. Total PCB concentrations were calculated as the sum of detected Aroclors or the sum of detected homologs, as appropriate.

Calculation of Toxic Equivalency Values
WHO (Van den Berg et al. 2006) developed toxic equivalency factors (TEFs) to evaluate the relative toxic potencies and risks for the seventeen 2,3,7,8-substituted PCDD/DF congeners and the twelve DL-PCB congeners. A 2,3,7,8- TCDD TEQ concentration was calculated for each PCDD/DF and DL-PCB congener by multiplying the concentration of each congener by its respective TEF. If a given congener was not detected in any samples in a medium, that congener was not included in the TEQ calculation for that medium. If the congener was detected at least once in a sample set, the TEQ concentration was determined by multiplying the detected concentrations and the nondetects at the reporting limit with the TEF. For each sample, the individual congener TEQs were summed to obtain a PCDD/DF TEQ and a DL-PCB TEQ.

The exceptions to the DL-PCB TEQ calculation above were for DL-PCB congeners PCB-126 and PCB-167 in fish tissue. These two congeners were detected only once in 36 fish samples. To include these at the full reporting limit would inappropriately inflate the individual sample TEQs by assuming their presence. Therefore, TEQ contributions from PCB-126 and PCB-167 to the total DL-PCB TEQ were made only for the fish sample with the detected concentration of these congeners.

5.1.2.3 Fish Data Groupings
The analytical data used to determine the fish EPCs were derived from samples that represent fish species, fish length, and fish tissue (fillet with the skin removed) that are typically caught from Choccolocco Creek and consumed by the local population. The EPCs for the fish ingestion pathway were calculated by grouping the fish data by location based on creek accessibility and location (PCB concentrations in fish decrease with distance downstream) and by the different species caught from the creek and eaten.

Based on the results of the creel survey (Arcadis 2009) and the U.S. Fish and Wildlife National Survey of Fishing, Hunting and Wildlife-Associated Recreation in Alabama (Department of Interior/Department of Commerce [DOI/DC] 2006), fish were grouped into the following four species groups, which includes an all-species group to capture the exposure to anglers who consume what they catch regardless of species:

- Bass (i.e., largemouth and spotted)
- Catfish
- Panfish (i.e., crappie and sunfish)
- All species

The fish data were further grouped based on creek accessibility and distance downstream into location groupings based on the fish sampling locations shown on Figure 4-17.

- Group A – Locations HHFL01 and HHFL02

- Group B – Locations HHFL03 and HHFL04
- Group C – Locations HHFL05 through HHFL09

The data for fish tissue concentrations based on these species and location groupings are shown on Figure 4-26 for PCBs and Figure 4-27 for mercury.

5.1.2.4 Floodplain Soil Sample Location Averaging

The direct contact exposure pathway used EPC values calculated on an EU- or OU-wide basis, depending on the COPC. To avoid biasing the data set toward locations with multiple results, a representative concentration was calculated per location. For surface soil, the samples collected between the 0–0.5-foot and 0.5–1-foot depth intervals at a location were averaged. For subsurface soil, the samples collected from multiple intervals between 0 and 4 feet bgs were averaged. The concentration results at each location were averaged as follows:

- If the constituent was detected in each sample, the observed concentrations were averaged.
- If the result was detected in one of the samples and not detected in the other sample(s), the detected concentration(s) was averaged with the nondetect reporting limit assuming the contaminant was present at the reporting limit.

The average concentrations for each sampling location were used to develop the EPCs used to evaluate the potential floodplain soil exposure and risks.

5.1.2.5 Data Summary and Chemicals of Potential Concern

The available data were screened based on frequency and concentrations detected in the various media and comparison to screening levels and background data. The following media and constituents were identified as COPCs for further evaluation in the OU-4 HHRA.

Fish

The COPCs in fish were identified as PCBs, DL-PCB TEQs, PCDD/DF TEQs, and mercury.

Soil

PCBs and mercury were identified as the primary COPCs for OU-4 soil. Based on the relationship between PCBs and the DL-PCB TEQs, the DL-PCB TEQs were also evaluated as a primary COPC.

The other analytes detected in soil samples (PCDD/DF TEQ, carcinogenic PAHs, and metals other than mercury [aluminum, arsenic, chromium, cobalt, iron, manganese]) were termed "other COPCs." These COPCs are evaluated on an OU-wide basis rather than on an individual EU basis.

5.1.3 Toxicity Assessment

The toxicity assessment examines information concerning the potential human health effects of exposure to COPCs. The goal of the toxicity assessment is to provide, for each COPC, a quantitative estimate of the relationship between the magnitude and type of exposure and the severity or probability of human health effects. The toxicity values presented in this section are

integrated with the information presented in the exposure assessment to characterize the potential for the occurrence of adverse health effects.

Cancer slope factors (CSFs) are the dose-response values used to evaluate potential carcinogens. Noncancer effects, such as organ damage or reproductive effects, are evaluated by reference doses (RfDs). The following hierarchy was used to select toxicity values:

- Tier 1: Integrated Risk Information System (IRIS) (USEPA 2012d)
- Tier 2: Values presented on the Regional Screening Levels Table (USEPA 2012e)

Toxicity values presented on the Regional Screening Levels Table are from a variety of sources, including USEPA (Provisional Peer-Reviewed Toxicity Values), California Environmental Protection Agency, and the Agency for Toxic Substance and Disease Registry.

5.1.3.1 Noncancer Effects

Potential noncancer health effects were evaluated by calculating hazard quotients (HQs) and hazard indices (HIs). An HQ is the ratio of the average daily dose for an individual exposure route to the constituent-specific RfD. HQs were summed to calculate HIs for each scenario. A total HI was calculated based on exposure to one or more constituents from the exposure routes for each receptor. HIs of less than 1 indicate that adverse health effects associated with the exposure scenario are not likely to occur.

For noncancer effects, it is assumed a dose exists below which no adverse health effects would occur. Below this threshold dose, exposure to a COPC can be tolerated without adverse effects. Therefore, for noncancer effects, a range of exposures exist that can be tolerated. The potential for noncancer health effects resulting from oral or dermal exposure to COPCs is assessed by comparing an exposure estimate (intake or dose) to an RfD. The RfD is defined as an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure of a chemical to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime (USEPA 2012d). The RfD is expressed in units of milligrams per kilogram bodyweight per day (mg/kg-day) and represents a daily intake of COPC per kilogram of body weight that is not sufficient to cause the threshold effect of concern. An RfD is specific to the COPC, the route of exposure, and the duration over which the exposure occurs. For noncancer toxicity data used for the OU-4 HHRA see Table 5-2.

Two exposure durations—subchronic and chronic—are applicable to noncancer doses calculated in the OU-4 HHRA. Subchronic exposures are those greater than subacute (approximately 27 days) but less than 10% of a lifetime (7 years based on a lifetime of 70 years). Child recreational direct-contact exposures were considered subchronic; therefore, subchronic RfDs were used to calculate HQs for those receptors. Chronic RfDs (corresponding to exposures of at least 10% of a lifetime) were used to assess all other noncancer exposures.

Dermal RfDs are derived from the corresponding oral RfD values. To derive the dermal RfD, the oral RfD (based on an administered dose) is multiplied by the intestinal absorption factor (IAF) to determine an RfD based on an absorbed dose rather than an administered dose. The resulting dermal RfD was used to evaluate the dermal (absorbed) dose calculated by the dermal exposure algorithms.

5.1.3.2 Cancer Effects

The toxicity information considered in the assessment of potential carcinogenic risks included slope factors and a WOE narrative consistent with USEPA 2005 *Guidelines for Carcinogenic Risk Assessment* (USEPA 2005c). These guidelines use standard narrative descriptors (Carcinogenic to Humans, Likely to Be Carcinogenic to Humans, Suggestive Evidence of Carcinogenic Potential, Inadequate Information to Assess Carcinogenic Potential, and Not Likely to Be Carcinogenic to Humans) to describe the likelihood that a COPC is a human carcinogen. The guidelines are based on an evaluation of the available data from human and animal studies. For cancer toxicity data used for the OU-4 HHRA see Table 5-3.

The CSF is the toxicity value used to quantitatively express the carcinogenic risk of cancer-causing COPCs via oral and dermal routes of exposure. It is defined in the IRIS glossary as

> *"An upper-bound, approximately a 95 percent confidence limit, on the increased cancer risk from a lifetime exposure to an agent. This estimate, usually expressed in units of proportion (of a population) affected per mg/kg-day, is generally reserved for use in the low-dose region of the dose-response relationship, that is, for exposures corresponding to risks less than 1 in 100."*

As with noncancer effects, cancer effect dermal CSFs are derived from the corresponding oral CSF values. To derive the dermal CSF, the oral CSF is divided by the IAF to determine a CSF based on an absorbed dose rather than an administered dose.

5.1.3.3 Toxicity Values for Assessing 2,3,7,8-TCDD TEQs

The 2,3,7,8-TCDD RfD and CSF were used to quantify hazards and risks from both PCDD/DF and DL-PCB TEQ concentrations. To provide a range of exposure and risks, the reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios were evaluated (USEPA 1992). The RME is an estimate of the high-end exposure in a population and is based on a combination of average and high-end estimates of exposure parameters typically representing the 90th percentile or greater of expected exposure. The CTE represents an estimate of the average exposure in a population and is based on central tendency estimates of exposure parameters.

5.1.4 Risks from Fish Consumption

This section evaluates the fish ingestion pathway for anglers who fish and consume their catch from Choccolocco Creek. USEPA risk assessment policy directs that risks be evaluated without reducing the likely exposures because of the fish consumption advisory. Therefore, it was assumed, for the purposes of the HHRA, that there are no restrictions on fish consumption.

Risks are estimated by calculating an exposure dose and comparing that exposure dose to the toxicity factors discussed in Section 5.1.3. The exposure dose is calculated by multiplying the EPC by the ingestion rate and an IAF divided by the weight of the person over a given period of time (exposure parameters). The exposure parameters and their bases are discussed further below.

The OU-4 HHRA states that

> *"The evaluation of subsistence anglers was considered for this assessment, but was not included because no evidence has been found of subsistence angling practices in OU-4."*

5.1.4.1 Fish Consumption Exposure Assessment

The EPC for a given data set is represented by the 95% UCL (USEPA 2010b,c). The equations used for the 95% UCL calculations are based on the shape and underlying distribution of the concentration data. Each contaminant per data set is looked at individually, and professional judgment is used, guided by both the ProUCL Technical Manual (USEPA 2010b) and the ProUCL User's Guide (USEPA 2010c) to determine the appropriate 95% UCL to select. The EPCs for the COPCs in fish tissue used in the HHRA are presented by species group in Tables 5-4, 5-5, and 5-6, for location Groups A, B, and C, respectively. The same EPC values were used for the RME and CTE scenarios.

The recreational fisherman scenario consists of an adult or child who may be exposed to COPCs by ingesting fish from Choccolocco Creek. Dose estimates for recreational anglers were calculated for an individual who consumes fish as a child (1 through 6 years) and then as an adult (age 7 to 30 years). Exposure doses were calculated separately for the years as a child and the years as an adult using age-adjusted factors.

Fish Ingestion Rate

The adult fish ingestion rate for the RME scenario was derived from the ADEM study that estimated adult consumption rates of recreationally caught freshwater fish in Alabama (ADEM 1993). The mean consumption rate of 30 grams per day (g/day), calculated by the serving-size method for all respondents based on Site meals only, was used in the evaluation. This consumption rate equates to eating one 8-ounce meal per week. Based on ratios of child-to-adult ingestion rates, 15 g/day was used as a reasonable estimate of the consumption rate for the child of a recreational angler. An age-adjusted ingestion rate of 16.3 grams per year/kilograms body weight per day (g-yr/kg-day) was calculated.

Data presented in the creel/angler survey for Choccolocco Creek (Appendix F of the OU-4 RI; Geosyntec 2019) was used to derive the CTE ingestion rates. Fish ingestion rates estimated from the interviews ranged from 0.14 to 7.9 g/day with an average of 2.8 g/day (sample size was 3). This average was selected as the adult CTE ingestion rate. The CTE rate equates to eating between four and five 8-ounce meals per year. One-half of the adult consumption rate was used to determine the child ingestion rate of 1.4 g/day. An age-adjusted ingestion rate of 1.5 g-yr/kg-day was calculated.

Fraction Ingested

Fraction ingested (FI) refers to the fraction of the recreationally caught fish consumed by anglers from Choccolocco Creek if there were no fish consumption advisories. Given that the fish consumption rates were based on Site-only values instead of consumption from all Alabama waters, the starting point for an FI was 1.0 for the recreational angler scenario. That is, it was assumed that the recreational angler catches and consumes all their fish from Choccolocco Creek up to the amount assumed in the consumption rate estimation. For the portion of Choccolocco Creek downstream of Jackson Shoals (Group A) an FI of 1.0 was used.

Because the type of fishing in Choccolocco Creek upstream of Jackson Shoals (location Groups B and C) differs from the sites ADEM used to derive the ingestion rates (i.e., wading and bank fishing versus fishing from a boat in reservoirs and dam tailwaters), it was necessary to consider a

modified consumption rate to account for these differences. Therefore, fish ingestion FIs other than 1.0 were considered for upstream portions of Choccolocco Creek.

The upstream portions of the creek (Groups B and C) are unlikely to consistently provide catch amounts high enough to support the 30 g/day adult ingestion rate. To achieve this rate, approximately 2.2 pounds of fish would need to be caught at each outing. This would be difficult to accomplish in the upstream portions of Choccolocco Creek, and anglers who consume that much fish are more likely to fish in areas with larger numbers of sizable fish. Therefore, the FIs for location Groups B and C were estimated at 0.5 or 50% of the rate derived for Group A. These FI values were used for both the RME and CTE scenarios.

Cooking Loss
PCBs tend to sequester in the fat of fish. When skin-on fish fillets are cooked, most of the fat is cooked off, which lowers the PCB concentrations of the cooked fish. Although the laboratory analysis was conducted on raw fish, cooking loss was not considered because the fish tissue concentrations were based on the laboratory analysis of skin-off fillet samples. Skinning the raw fillets prior to analysis effectively removes most fat deposits. It is estimated that removing most fat deposits by skinning the raw fish results in similar concentration loss that occurs by cooking the skin-on fish fillets.

Intestinal Absorption Factor
The IAF used for fish COPCs was set at 1 (USEPA 1986).

Body Weight
The average body weight values for the young child (1 through 6 years) and the adult were 15 kilograms (kg) and 70 kg, respectively (USEPA 1989, 2008).

Averaging Time
The cancer-based averaging time was based on a 70-year lifetime for all age groups and equates to 25,550 days (70 years x 365 days/year) (USEPA 1989). The noncancer averaging time for each of the scenarios was based on the receptor- and scenario-specific exposure duration in years multiplied by 365 days/year. The noncancer-based averaging time is constant across the scenarios in that it is always the exposure duration multiplied by 365 days/year.

5.1.4.2 Fish Consumption Risk Characterization
The fish consumption risk characterization integrates the information developed in the exposure assessment and the toxicity assessment into an evaluation of the potential risks from consuming fish caught from Choccolocco Creek. Cancer risks were calculated for carcinogenic COPCs where cancer toxicity values were available. Noncancer health effects were evaluated for COPCs (i.e., including carcinogens) where noncancer toxicity values were available.

The RME cancer risks and HQs are summarized in Tables 5-7 and 5-8 for the primary COPCs and TEQs, respectively. The corresponding CTE summary tables are presented in Tables 5-9 and 5-10.

The greatest risks were calculated for the PCB cancer and the PCB and mercury noncancer RME scenarios. Lower risks were calculated for the other COPCs in fish (DL-PCB TEQ, PCDD/DF TEQ). The risks calculated for DL-PCB TEQ were lower than the risks calculated for PCBs for

the RME and CTE scenarios. The risks from the targeted species groupings were similar to the risks calculated for the all-species category.

The RME HQs for PCBs were greater than 10 for every location. The RME HQs for mercury, DL-PCB TEQ, and PCDD/DF TEQ were greater than 1 at several locations and were less than the PCB HQs.

The CTE cancer risks and HQs were less than the RME. Cancer risks were within or slightly above the USEPA acceptable risk range, and HQs for PCBs were greater than 1. The risks calculated for location Group A were slightly less than the risks calculated for location Groups B and C. Within the location group, the risks calculated for the individual species and the all-species were similar.

5.1.5 Risk from Direct-Contact Exposure

This section presents an evaluation of risks from the direct contact pathway, which includes exposure from incidental ingestion and dermal absorption from floodplain soil. Because the floodplain in OU-4 is more than 6,000 acres, has numerous property owners, and varied land use, the floodplain area was separated into 25 EUs to facilitate the evaluation of exposure and risk for the recreational user, utility worker, and farmer. Residential areas are being evaluated as part of the NTCRA Agreement between Solutia and USEPA and, as a result, were not included in the OU-4 HHRA.

The calculations of risk were similar to the fish ingestion pathway and involved using EPCs, ingestion rates, dermal absorption rates, and other parameters to calculate an exposure dose. The exposure dose was compared with the toxicity factors identified in Section 5.1.3.

5.1.5.1 Direct-Contact Exposure

The OU-4 floodplain area was divided into the 25 EUs (Figure 4-1). Seven EUs were eliminated from further consideration in the HHRA because PCB concentrations (either maximum detected concentration or 95% UCLs) were less than 1 mg/kg. Four EUs had utility lines or industrial facilities (e.g., WWTP) and are, therefore, applicable to the utility or industrial worker. These four EUs had PCB total soil EPCs greater than 1 mg/kg and were evaluated for the utility or industrial worker exposure pathway in the OU-4 HHRA.

Soil exposure was evaluated as both surface soil and total soil, with surface soil defined as 0–1 feet bgs and total soil defined as 0–4 feet bgs. Surface soil concentrations were applied to the recreational user and to the farmer because for them, most exposure would likely be to the top foot of soil. Exposure to total soil (0–4 feet bgs) was evaluated for the utility or industrial worker who could be exposed to a greater depth interval during typical work activities. Agricultural EUs (Figures 5-2 through 5-5) were used to develop data sets/statistics to use in calculating direct-contact exposures to the farmer.

For PCBs and mercury, the EPC for direct-contact exposure is represented by the 95% UCL (USEPA 2010b,c). The equations used for the 95% UCL calculations are based on the shape and underlying distribution of the concentration data. Each contaminant was looked at individually, and professional judgment was used, guided by the ProUCL Technical Manual (USEPA 2010b) and the ProUCL User's Guide (USEPA 2010c). The EPCs for PCBs and mercury in the direct contact EUs in surface and total soil are included in Tables 5-11 and 5-12, respectively. EPCs for

the agricultural EUs are presented in Table 5-13. The same EPC values were used for the RME and CTE scenarios.

For other floodplain soil COPCs, a site-wide approach was used to calculate EPCs for PCDD/DF TEQ, PAHs, and metals other than mercury. A single EPC was calculated for each of these soil COPCs to be representative of the COPC concentration throughout OU-4. The USEPA ProUCL program was used to calculate the EPCs. For EPCs used in the risk assessment for the other soil COPCs see Table 5-14.

5.1.5.2 Direct-Contact Exposure Assessment

The presentation and discussion of exposure parameters were streamlined by separating the exposure parameters into two categories. The first category is the constant exposure parameters that were similar for all exposure scenarios. These parameters are not repeated in each scenario-specific discussion. The second category is the receptor-specific exposure parameters. These parameters were usually different for each receptor and are presented in the exposure scenario-specific discussions.

Constant Exposure Parameters

The following exposure parameters values were constant for all exposure scenarios:

- Body weight
- Averaging time: cancer and noncancer
- Dermal absorption factor (ABS)
- IAF from soil

The average body weight values for the young child (1 through 6 years) and the adult were 15 kg and 70 kg, respectively (USEPA 1989, 2008). For the adolescent (7 through 16 years), the body weight was 45 kg (USEPA 1997, 2000). These values were used in the RME and CTE evaluations and are constant across all scenarios.

The cancer-based averaging time was based on a 70-year lifetime for all age groups and equates to 25,550 days (70 years x 365 days/year) (USEPA 1989). The noncancer averaging time for each of the scenarios was based on the receptor- and scenario-specific exposure duration in years multiplied by 365 days/year. The noncancer-based averaging time was constant across all scenarios in that it was always the exposure duration multiplied by 365 days/year.

The ABS term (unitless) represents the fraction of a COPC that was assumed to penetrate the skin following contact with contaminated soil. Similar to the HHRAs for OU-1/OU-2 and OU-3 of the Anniston PCB Site, an ABS value of 0.06 was used for PCBs (Solutia 2002b). The ABS values for the other COPCs were used in the RME and CTE evaluation and were obtained from USEPA *Risk Assessment Guidance for Superfund* (RAGS) Part E guidance (USEPA 2004c).

The IAF term (unitless) represents the fraction of COPCs assumed to be absorbed through the gastrointestinal tract following the incidental ingestion of soil. Similar to the HHRAs for OU-1/OU-2 and OU-3, an IAF value of 0.3 was used for PCBs in soil (Solutia 2002b). IAF values

for the other COPCs were 1.0. The IAF values were used in the RME and CTE evaluations for all scenarios involving the soil ingestion route of exposure.

Receptor-Specific Exposure Parameters

Receptor-specific exposure parameters were used depending on the exposure scenario and are discussed below for the recreational user, the utility worker, and the farmer.

Recreational User Exposure Parameters

Recreational users are potentially exposed to COPCs in surface soil (0–1 foot bgs) through incidental ingestion, dermal contact, and absorption and the inhalation of particulates. For PCBs, the inhalation pathway usually has minimal exposure and risks compared to the ingestion and dermal exposure pathways. As a screening step, the highest (worst-case) PCB concentrations and the most conservative inhalation exposure parameters were used to evaluate risks. The exposure and risk from inhaling particulates were calculated and found to be well below the other soil-related exposures. Therefore, the inhalation pathway was not further evaluated quantitatively in the OU-4 HHRA.

The recreational receptors included young children, adolescents, and adults that use the OU-4 floodplain for various recreational activities, including walking, hiking, picnicking, riding all-terrain vehicles, hunting, fishing, and related activities. The exposure parameters for the recreational-user scenario were developed to cover the potential exposure associated with the recreational activity that would involve the most exposure to soil. The age groups of the recreational-user receptors evaluated at an EU were determined based on the EU's access characteristics. The young child receptor was evaluated at EUs located close to residences or at areas with easy access to the floodplain. The adolescent and adult were evaluated for each recreational EU. Table 5-1 presents the recreational user exposure scenario evaluated per EU.

- For soil ingestion, an FI value of 1.0 was used. An FI of 1.0 assumes that the exposed individual receives 100% of their daily soil intake while engaging in recreational activities at the EU.
- For dermal contact and absorption, exposure frequency can vary at different EUs as a function of the location and accessibility of the EUs. Because of vegetation, many floodplain areas are not readily accessible; a reduced recreational user exposure frequency of 52 days/year was used for low-contact recreational. At recreational EUs located near residential properties or areas where access is not restricted by vegetation (e.g., along maintained pathways), a higher exposure frequency value of 104 days/year was used. This is termed "high-contact recreational." For a summary of EU exposure scenarios and receptors see Table 5-1.

The RME parameters for exposed skin surface area were also used for the CTE analysis. The young child and adolescent RME exposure duration values were also used for the CTE. An exposure duration value of 15 years was used for the adult recreational user. This value is half the RME value. A soil FI value of 0.5 was used. This assumes that the exposed individual receives 50% of their daily soil intake from within the EU. At most of the recreational EUs, the recreational users were assumed to be exposed to soil 26 days/year, which assumes exposure 1 day every 2 weeks over the course of a year (52 weeks). An exposure frequency value of 52 days/year (once a week) was used at recreational EUs located near residential properties.

Utility Worker Exposure Parameters
Utility workers, or other industrial workers, could be exposed to COPCs in surface and subsurface soil (total soil) in OU-4 via the incidental soil ingestion and dermal contact routes of exposure during typical work activities that require excavation. The exposure was based on short-duration intense soil contact activities.

The soil ingestion rate was 330 milligrams per day (mg/day) (USEPA 2002b). The exposed skin surface area value was 3,300 square centimeters (cm^2) and assumes that the head, hands, and forearms are exposed (USEPA 2004c). The skin adherence factor was 0.3 milligrams per square centimeter (mg/cm^2), which corresponds to the 95th percentile value for the construction workers activity (USEPA 2004c). The utility worker exposure duration was 1 year. The exposure frequency was 10 days/year, which assumes the utility worker maintains easements and inspects, repairs, and replaces equipment. The FI was 1.0.

The RME parameters for skin adherence factor and exposure duration were also used for the CTE analysis. A soil ingestion rate of 100 mg/day was used (USEPA 2003b). The skin adherence factor was 0.1 mg/cm^2, which corresponds to the geometric mean value for the construction workers activity (USEPA 2004c). The exposure frequency was 5 days/year, which is half of the RME value. The FI was 0.5.

Farmer Exposure Parameters
The farmer exposure scenario consists of an adult contacting floodplain soil during typical farming activities, such as planting and harvesting. It was applied to EUs used for agricultural (Figures 5-2 through 5-5). The agricultural EUs were used for the direct-contact exposure scenario for the farmer. As described in detail in Section 5.1.6, because actual farming in OU-4 is limited, the assessment of risks from agricultural products consumption uses a hypothetical range of assumptions to address potential future uses and does not use the agricultural EUs included on Figures 5-2 through 5-5.

Higher soil ingestion rates are used for contact-intensive activities such as farming. USEPA recommends a soil ingestion rate of 330 mg/day for construction work activities (USEPA 2002b). This value represents the 95th percentile rate based on Stanek at al. (1997). The 90th percentile ingestion rate from the Stanek study was 200 mg/day. The soil ingestion rate of 200 mg/day was used in the RME for the adult farmer. This rate applies to planting and harvesting activities in which heavy equipment can be used and fugitive dust can be generated.

The RME exposure frequency for the adult farmer contact with floodplain soil was 10 days per year. This value is based on a 200-day growing season and assumes that a farmer spends 5 days per year planting and 5 days per year harvesting in the floodplain. An exposed skin surface area value of 3,300 cm^2 was used. An adherence factor value of 0.4 mg/cm^2, which is the 95th percentile value for the farmer activity, was used (USEPA 2004c). The farmer-based exposure duration value of 40 years was used in the RME evaluation (USEPA 2005c). An FI value of 1.0 was used.

The RME parameters for the skin adherence factor and exposure duration were also used for the CTE analysis. The soil ingestion rate was 100 mg/day (USEPA 2003b). The CTE exposure frequency for the adult farmer contact with floodplain soil was 5 days/year. A skin adherence

factor value of 0.1 mg/cm^2, which is the geometric mean value for the farmer activity, was used (USEPA 2004c). A soil FI value of 0.5 was used.

5.1.5.3 Direct-Contact Exposure Risk Characterization

The following subsections present the results of the RME risk calculations. The EU-specific risks were based on the primary COPCs (PCBs, DL-PCB TEQ, and mercury). Site-wide (i.e., OU-4 area) risks were estimated based on the assumption that the calculated EPCs were representative of the entire OU-4 area.

Exposure Unit Risks

Tables 5-15 and 5-16 present a summary of the total RME cancer risks and noncancer HIs from the primary COPCs (PCBs, DL-PCB TEQ, and mercury) at each direct contact EU and agricultural EU, respectively. The recreational cancer risks based on both PCBs and DL-PCB TEQ were either within or less than the USEPA acceptable cancer risk range of 1 x 10^{-6} to 1 x 10^{-4}.

The noncancer RME HIs for all soil contact exposure scenarios (recreational, worker, and farmer) were less than or equal to the noncancer benchmark of 1 at all the direct contact EUs. Recreational user, utility worker, and farmer CTE cancer risks were less than the USEPA acceptable cancer risk range of 1 x 10^{-6} to 1 x 10^{-4} at all direct contact and agricultural EUs. Recreational user, utility worker, and farmer CTE HIs were less than the noncancer benchmark of 1 at all direct contact and agricultural EUs.

Site-Wide Risks

Site-wide RME risks were estimated for PCDD/DF TEQ, carcinogenic PAHs—benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene—aluminum, arsenic, chromium, cobalt, iron, and manganese. Risks were estimated assuming high-contact and low-contact recreational exposure. Table 5-17 presents the results of the RME cancer risk calculations. Table 5-18 presents the RME noncancer HIs.

The site-wide cancer risks were within the USEPA acceptable risk range. The risks ranged from 2 x 10^{-6} to 9 x 10^{-6}. The noncancer HIs were less than the noncancer benchmark of 1, ranging from 0.04 to 0.7.

Cancer risks and HQs estimated for direct-contact exposure were all within or less than typical acceptable risk ranges for both RME and CTE exposures. Based on the conservative approach taken in calculating these risks, it is unlikely that direct-contact exposure of recreational users, farmers, or workers to floodplain soil would result in unacceptable human health risks.

5.1.6 Risk from Agricultural Products Consumption

Current agricultural activities in the OU-4 floodplain are primarily beef cattle grazing and row crop production. Row crops were considered as animal feed crops and not as human consumables. Raising dairy cows (milk consumption) and poultry (chicken and egg consumption) and growing vegetables within the floodplain were considered potential future activities.

5.1.6.1 Agricultural Products Consumption Exposure Assessment

Previously conducted investigations did not analyze agricultural products that would be consumed by humans. Therefore, the concentrations of PCBs that would be ingested were estimated from

soil concentrations using uptake/transfer models. The models predict the degree to which PCBs measured in the floodplain soil could be transferred to plants (root uptake) and animals (incidental soil ingestion and ingesting feed grown in the floodplain). Predictive models were used to estimate the concentrations of PCBs in plants (i.e., vegetables and animal feed) and animal products. The approach and models presented in USEPA's *Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (USEPA 2005d) were preferentially used. The types of plants evaluated include aboveground and belowground (root) vegetables for human consumption and animal feed (e.g., pasture grass, silage). The predicted concentrations of PCBs in vegetables were used to estimate exposure from human consumption of homegrown garden vegetables. The predicted concentrations in animal feed (i.e., forage, silage, grain) were used to model uptake into animals grazing and foraging in the floodplain and consuming feed raised in the floodplain.

Predicted PCB concentrations in livestock were modeled based on a variety of livestock ingestion assumptions. This range of livestock ingestion assumptions was created by setting the fractions of food that were assumed to be grown in the floodplain (FI) factors to 10%, 25%, 50%, and 100%, depending on the agricultural product.

Exposure Parameters

Because current farming (and home gardens) in the floodplain is limited and to account for the potential for future farming uses, a range of PCB concentrations in floodplain soil was selected for evaluation rather than using calculated EPCs for the agricultural EUs. Consumption of homegrown vegetables, beef, dairy products (milk), chicken, and eggs were evaluated for the adult and young child using 1 mg/kg, 5 mg/kg, 20 mg/kg, and 40 mg/kg PCBs in floodplain soil. Only RME exposures were calculated. CTE exposure parameters were not used in the agricultural assessment because of the hypothetical nature of the exercise along with the use of variable percent grown/raised in the floodplain.

Information presented in USEPA's *CSFII Analysis of Food Intake Distributions* (USEPA 2003c) was used to estimate the potential exposure resulting from consuming food products grown or raised in the floodplain. Per capita food intake estimates on an as-consumed basis were used. As-consumed intake rates are based on the weight of the food in the form that it is consumed. As a result, preparation and cooking losses of contaminants were not applied to the intake rates.

For the RME analysis, the averages of the 95th percentile intake values across the appropriate age categories were used. The per capita intake rates were multiplied by the fraction of the intake that is home produced to arrive at the estimate of the as-consumed homegrown intake rate used in the OU-4 HHRA. The fraction of intake that is home produced was obtained from the *Exposure Factors Handbook* (USEPA 1997).

The fraction of produce (aboveground and belowground vegetables) ingested from the floodplain (the FI term) is typically based on the fraction of the planted area within the floodplain. A range of FI values was used to account for potential future changes in agricultural areas. For this analysis, the FI term for vegetable ingestion was set at the following values: 10%, 25%, 50%, 75%, and 100%. An exposure factor of 350 days/year was used for the child and adult. The farmer-based exposure duration value of 40 years (USEPA 2005c) was used in the RME evaluation: 6 years of child exposure and 34 years of adult exposure.

5.1.6.2 Agricultural Products Consumption Risk Characterization

The estimated risks for each of the agricultural products using the range of PCB concentrations and FI percentages are presented in Tables 5-19 through 5-23. The tables use shading to denote risks that are within or above the USEPA range of acceptable risks. Table entries that are not shaded show cancer and noncancer estimated risks that are less than the USEPA acceptable range of risks.

Vegetable Ingestion

The risk matrix for homegrown vegetable ingestion is presented in Table 5-19. Even at the highest FI assumption and the highest PCB soil concentration, the calculated cancer risks from the ingestion of homegrown vegetables were within USEPA's acceptable risk range. The total HI slightly exceeded the noncancer benchmark of 1 at the highest PCB soil concentration of 40 mg/kg and the highest FI assumption of 100%. Given that homegrown vegetables are typically raised near the actual residences (that are addressed under the NTCRA Agreement and not included in the OU-4 HHRA) and the highest soil PCB concentrations in most of the agricultural EUs are away from the residential areas and closer to the creek, the potential for any unacceptable risks from consuming homegrown vegetables is low.

Beef Ingestion

The risk matrix for beef ingestion is presented in Table 5-20. Two cattle ingestion scenarios were assumed. The first scenario assumed cattle ingest forage, silage, grain, and soil from the floodplain. The second assumed cattle ingest only forage and soil from the floodplain. For both scenarios, the FI terms were set at 10%, 25%, and 50%.

The cancer risks at 1 mg/kg PCBs in soil for all cattle ingestion scenarios were within the USEPA acceptable risk range of 1×10^{-6} to 1×10^{-4}. The HQs for 1 mg/kg PCBs in soil for each FI percentage from the floodplain scenarios were less than the noncancer benchmark of 1.

The cancer risks at 5 mg/kg PCBs in soil for all cattle ingestion scenarios were within the USEPA acceptable risk range of 1×10^{-6} to 1×10^{-4}. The HQs were slightly greater than 1 at the 5 mg/kg PCBs soil level assuming the 50% FI ingestion scenario.

At the 20 mg/kg PCB soil level, the cancer risks were greater than 1×10^{-4} for the 50% FI scenario. The HQs were greater than 1 (up to a maximum of approximately 10) at the 20 mg/kg soil levels for all ingestion scenarios.

At the 40 mg/kg PCB soil level, the cancer risks were greater than 1×10^{-4} for the 25% and 50% ingestion scenarios. The HQs were greater than 1 (up to a maximum of approximately 19) at the 40 mg/kg PCB soil level for each ingestion scenario.

Based on these results, consuming meat on a regular basis over a long period of time from cattle grazed in areas with the highest soil PCB concentrations found in agricultural areas (20 and 40 mg/kg) would be a potential health concern for local farmers.

Dairy Ingestion

The risk matrix for dairy (milk) ingestion is presented in Table 5-21. Two cattle ingestion scenarios were assumed. The first assumed cattle ingest forage, silage, grain, and soil. The second assumed

cattle ingest only forage and soil from the floodplain. For both scenarios, the FI terms were set at 10%, 25%, and 50%.

The cancer risks at 1 mg/kg PCBs in soil for both ingestion scenarios were within the USEPA acceptable risk range of 1 x 10^{-6} to 1 x 10^{-4}. The HQs at 1 mg/kg PCBs in soil for both cattle ingestion scenarios were less than the noncancer benchmark of 1.

At the 5 mg/kg PCBs soil level, the cancer risks were within the USEPA acceptable risk range for both ingestion scenarios. The HQ was slightly greater than 1 at the 5 mg/kg PCB soil level for the 50% FI for the ingestion of forage, silage, grain, and soil from the floodplain.

At the 20 mg/kg PCBs soil level, the cancer risks were within the USEPA acceptable risk range for all scenarios. The HQs were greater than 1 for the 25% and 50% FI ingestion scenarios (up to a maximum of 6).

At the 40 mg/kg PCB soil level, the cancer risks were greater than 1 x 10^{-4} for the 50% ingestion scenarios. The HQs were greater than 1 (up to a maximum of 13) at the 40 mg/kg PCB soil level for each ingestion scenario.

Although there are currently no known dairy farms within the OU-4 floodplain where elevated levels of PCBs exist, the potential exists for risks to local dairy farmers should they consume milk on a regular basis over a long period of time from dairy cows from a future dairy operation with grazing sited in the highest PCB concentration areas of the floodplain.

Chicken and Eggs Ingestion

The risks from the ingestion of chicken and eggs raised in the floodplain are shown in Tables 5-22 and 5-23, respectively. The calculated cancer risks were either within or less than the USEPA acceptable risk range. The HQs were less than the noncancer benchmark of 1. Although there are no known chicken-raising operations in the floodplain where elevated levels of PCBs exist, if such operations were considered in the future, there is little likelihood for any unacceptable health risks from the consumption of locally raised chicken or eggs.

Soil Bioavailability to Farm Animals

A sensitivity analysis was conducted to determine the impact to the risk estimates if a lower soil bioavailability was used. Only beef and dairy consumption were evaluated because they represented the primary exposure pathways that resulted in risk estimates greater than 1 x 10^{-4} and/or greater than an HI of 1. The other exposure assumptions used for the two pathways were kept the same.

Tables 5-24 and 5-25 present the modified risk estimates for beef and dairy ingestion, respectively, assuming the lower-end bioavailability factors. Only the most conservative set of assumptions for beef ingestion, including the highest soil concentrations, result in predicted cancer risks greater than 1x 10^{-4} (Table 5-24). For noncancer HIs, only soil concentrations at 20 and 40 mg/kg resulted in HIs greater than 1. The cancer risk and HIs for dairy consumption show similar results in that only the higher soil concentrations and more conservative exposure assumptions result in risks greater than typical benchmarks (Table 5-25).

The actual bioavailability for PCBs in cattle/cows is most likely somewhere between 50% and 100%, but reliable data are not available to determine a more definitive value. It is very likely that assuming 100% soil bioavailability of PCBs in the risk assessment overestimates the risk from beef and dairy cattle to some degree.

5.1.7 HHRA Uncertainties Analysis

As with any HHRA, there are numerous sources of uncertainty associated with an attempt to estimate current and future potential human health risks. Following USEPA guidance tends to result in overestimates of risks; in light of uncertainties, this helps to ensure public health protectiveness. While uncertainties for some factors relevant to the OU-4 HHRA could result in underestimates of risk, the conservative inputs used likely result in overestimates of risk overall.

The assumptions, input variables, and calculations used for the OU-4 HHRA include multiple uncertainties that could result in over- or underestimating risk from the consumption of fish from Choccolocco Creek. The overall RME approach to the risk assessment tends to overestimate risk for all but the most-exposed individuals, while the CTE risk was based on the actual creel survey conducted on the Site. Choccolocco Creek has long had state-issued fish consumption advisories due to PCB and mercury contaminant levels. USEPA, however, cannot consider such advisories in assessing baseline health risks at hazardous waste sites This is because assuming that the fish consumption prohibition was effective would result in underestimating risk.

The calculation of risks through the ingestion of agricultural products pathway differs from risks associated with fish ingestion and direct contact with soil in that agricultural practices are uncommon in the floodplain and risk matrices were calculated for a hypothetical range of PCB concentrations along with a range of farming practices and human consumption rates. The models used in the OU-4 HHRA were designed to be conservative and may result in overestimating the concentrations of PCBs in the agricultural products of interest and potentially overestimating risk to humans who are assumed to consume these products.

5.1.8 Integrated Risk Characterization

The OU-4 HHRA evaluated potential risk from the three primary exposure pathways individually. These exposure pathways included fish ingestion, direct contact with floodplain soil, and the ingestion of agricultural products grown on floodplain soil. Of these three exposure pathways, the ingestion of fish (assuming no fish consumption prohibition) poses the most significant risks. Currently, beef and dairy farming is limited in the OU-4 floodplain; therefore, the risks associated with these practices are also low. Beef and dairy consumption could be a significant risk if an individual raised a significant amount of beef or dairy products for personal consumption in the most highly contaminated areas of the floodplain for a long period of time. Other than the worst-case agricultural pathway assumptions (highest consumption rates from the highest concentration areas), combining the direct contact and agricultural product risks to the risks associated with fish ingestion has little impact on the magnitude of the risk. Conversely, if an individual heeded the fish consumption advisory and did not consume fish from Choccolocco Creek on a regular basis, most farming and recreational activities are not likely to create risks that exceed the USEPA acceptable range.

5.1.9 Remedial Goal Options

As the final step in the OU-4 HHRA process, JMWA and Avatar Environmental, on behalf of USEPA, developed media-specific RGOs for OU-4. Tables with RGOs and a discussion of how they were developed were provided by USEPA via email (email from Pamela Scully of USEPA dated June 3, 2014). RGOs are site- and media-specific long-term goals that will be used while evaluating potential alternatives and, in the long term, to assess the effectiveness of the implemented remedy. RGOs were developed for the human consumption of fish tissue and for the consumption of agricultural products (vegetables, beef, and dairy) grown in the OU-4 floodplain. RGOs for fish tissue were developed for PCBs and mercury in fish tissue. RGOs for agricultural products were developed for PCBs in soil that would be used to grow agricultural products.

Based on the results of the OU-4 HHRA, RGOs were calculated for exposure scenarios with a cancer risk $\geq 1 \times 10^{-4}$ or an HI >1 for COPCs with an individual cancer risk $\geq 1 \times 10^{-6}$ or an HQ ≥ 0.1. For OU-4, RGOs were not developed for direct contact with soil, sediment, surface water, air, or other media or constituents, as the OU-4 HHRA concluded that none of the direct-contact exposures to these media were outside of the USEPA acceptable risk range.

RGOs were developed for fish tissue (Table 5-26) based on the range of cancer risks (1×10^{-4}, 1×10^{-5}, and 1×10^{-6}) and the range of noncancer risks (HIs of 0.1, 1, and 3). RGOs for fish tissue were developed recognizing that direct remediation of fish is not possible and that RGOs will be approached or achieved through a decrease in sediment concentration.

RGOs for agricultural products grown in the floodplain are expressed as PCB concentrations in soil. These were calculated based on hypothetical future use scenarios (based on uptake and transfer models). The future use scenarios used are hypothetical because current agricultural uses of the floodplain are uncommon and there is no evidence of people eating locally grown dairy or beef at the frequency and rates that would calculate risks above the USEPA acceptable risk range. For dairy and beef cattle, RGOs were developed for a range of assumptions for how much of the cattle feed would be grown in the floodplain; the range of assumptions included 10%, 25%, or 50% of the cattle feed would be grown in the floodplain in addition to the direct exposure of the cattle to floodplain soil while foraging. RGOs for PCBs in soil were also developed for growing vegetables in the floodplain, with the conservative assumption that 100% of a person's vegetable portion of diet would be grown in the floodplain. Even with this conservative assumption, the RGOs calculated for eating vegetables grown in the floodplain are significantly higher than the RGOs calculated (for soil) for the human ingestion of dairy and beef from cattle with some fraction of their diet grown in the floodplain. The RGOs for PCBs in soil calculated by USEPA for the ingestion of agricultural products grown in the floodplain are included in Table 5-27.

Site-specific RGOs were calculated by USEPA by rearranging the risk assessment equations that calculate site-specific risks:

$$EPC \div cancer\ risk\ = RGO\ \div target\ risk\ (TR)$$

or

$$EPC\ \div HQ = RGO\ \div target\ HQ\ (THQ)$$

By rearranging the equations above, site-specific RGOs for fish and soil were calculated using the following equations:

$$RGO = EPC \times TR \div cancer\ risk$$

or

$$RGO = EPC \times THQ \div noncancer\ HQ$$

Where:

TR = target risk, expressed as the risk of cancer (1/10,000 = 10^{-4}, 1/100,000 = 10^{-5}, or 1/1,000,000 = 10^{-6}) from exposure to the specific medium (fish or agricultural product)

THQ = target noncancer risk, expressed as the ratio (quotient) of concentration in the medium relative to the concentration that may cause adverse noncancer health effects

JMWA and Avatar Environmental concluded that site-specific data should be collected prior to implementing remediation based on the hypothetical agricultural product(s) scenario. Examples of site-specific data are included as actual human ingestion rates of agricultural products from the floodplain and/or the collection and the laboratory analysis of agricultural products.

The fish tissue RGOs are based on the premise that reducing sediment concentrations will, over time, result in lower fish tissue concentrations. Soil RGOs (based on agricultural products) are somewhat hypothetical based on a future possible use scenario that is not directly applicable to current uses in the floodplain. Therefore, the RGOs for soil are not directly applicable in the conventional sense to identify, remove, or treat materials that are above the RGO concentration(s). Instead, the RGOs are used as a guideline to identify those areas of the floodplain with concentrations above soil RGOs as a basis for future remedial management decisions. The OU-4 HHRA did not include predictive RGOs for PCBs in sediment that could result in fish tissue concentrations achieving their RGOs. While predictive RGOs were not included in the OU-4 HHRA, predictive PRGs were developed in this OU-4 FS for sediment to be protective of fish tissue.

5.1.10 OU-4 Human Health Risk Assessment Summary and Conclusions

The OU-4 HHRA evaluated risks from three nonresidential exposure pathways identified for OU-4. Residential uses are addressed under the NTCRA Agreement and were not included in the HHRA. The three exposure pathways evaluated were exposure to anglers who fish in Choccolocco Creek in the absence of a fish consumption advisory, direct-contact exposure in the floodplain, and ingestion of agricultural products grown in the floodplain.

The OU-4 HHRA calculated that the most significant risk to human health in OU-4 would be from catching and eating fish from Choccolocco Creek in the absence of a fishing or fish consumption advisory. Fish consumption would pose a potentially significant health risk to humans if they were to regularly consume fish from Choccolocco Creek at or near the PCB concentrations assumed in

the OU-4 HHRA (2 to 7 mg/kg PCB) in fish tissue. Risks from direct-contact exposures are not likely to be of any concern even from contact with the highest concentration areas.

Risks from consuming beef and dairy products raised in the highest concentration areas of the floodplain could be outside of the USEPA acceptable risk range if current practices changed and a significant portion of beef and dairy products were locally raised and consumed over a long period of time. More typical exposures to these products, even if originating from the floodplain, are unlikely to cause any unacceptable health risks. Risks from other agricultural product consumption, including chicken, eggs, and vegetables, are not likely to be a concern under any current or future circumstances.

RGOs for sediment were developed for the human consumption of fish from the creek. The RGOs for soil are based on raising agricultural products (beef and dairy cattle) in the floodplain. RGOs for growing produce on fields in the floodplain were also developed; however, as shown on the tables, they are significantly higher than beef and dairy cattle. Sediment-based RGOs as future predictors of PCB concentrations in fish tissue were not developed as part of the OU-4 HHRA. As noted above, the RGOs from the OU-4 HHRA were focused on PCB concentrations in the fish tissue as the critical link in this human health exposure pathway. The fish tissue RGOs from the OU-4 HHRA were used to develop PRGs for fish tissue as described in Section 6.3.2.2 of this FS along with PRGs for sediment as predictive indicators of what fish tissue PCB concentrations could be based on sediment concentrations.

5.2 Ecological Risk Assessment

Risks to ecological receptors in OU-4 were initially evaluated in the *Screening-Level Ecological Risk Assessment for Operable Unit 4 of the Anniston PCB Site* (SLERA; BBL 2005b). The SLERA determined that ecological risks were possible in OU-4 and that a BERA was necessary to complete the RI/FS process for the OU.

In August 2015, P/S submitted the OU-4 BERA to USEPA. The BERA focused on key ecological receptor groups that might reside in or forage within the terrestrial and aquatic habitats of the OU. The document was revised and resubmitted in October 2016. USEPA reviewed the October 2016 OU-4 BERA and found it addressed many of their comments on the initial version of the document. Although outstanding comments were reviewed and there was a meeting between P/S and USEPA to discuss the technical issues, there were still several comments left unresolved. Rather than request another revision of the OU-4 BERA, USEPA agreed to include the October 2016 BERA in the Administrative Record for OU-4 and indicated they would conduct supplemental technical evaluations that would be presented in an addendum to the OU-4 BERA. The OU-4 BERA Addendum summarizes USEPA's evaluation and interpretation of the data relative to ecological risks in OU-4 for those specific technical topics where agreement had not been reached in the OU-4 BERA.

The remainder of this section provides an integrated summary of ecological risks based on a combination of the OU-4 BERA and the OU-4 BERA Addendum with the understanding that the OU-4 BERA Addendum takes precedence over the OU-4 BERA for those technical evaluations that are presented in both documents. Complete versions of the OU-4 BERA and OU-4 BERA Addendum are provided electronically in Appendices J and K to the OU-4 RI (Geosyntec 2019), respectively.

5.2.1 Problem Formulation

The OU-4 BERA was based on the ecological CSM that includes sources, release mechanisms, exposure media, and exposure routes for a range of aquatic and terrestrial receptors (Figure 5-6). To complete the OU-4 BERA, chemical data were collected from abiotic media (surface water, sediment, and soil) and a range of biotic tissues. Ecological community data were also collected along with several habitat studies. The OU-4 BERA also included site-specific sediment toxicity and bioaccumulation studies. The combination of these studies and data provided an extensive site-specific data set with which to conduct a robust risk assessment. The site-specific data, complemented with relevant literature-based information, were incorporated into the OU-4 BERA to support a range of evaluations regarding risks to ecological receptors that may reside or forage within OU-4.

5.2.1.1 Constituents of Potential Concern Selection

A total of 28 COPCs were identified in the PCD for the Anniston PCB Site (USEPA 2003a). The COPC list included 17 organic constituents (organophosphorous pesticides, VOCs, and SVOCs) and 11 metals. USEPA requested that future investigations at the Site include analysis for a "wider list of constituents" in at least 10% of future samples (USEPA 2005b). In addition to the 28 constituents on the PCD list, the wider list included PCDD/DF congeners, PCBs (as total of homologs as well as congeners, including the 12 DL-PCB congeners and PCB congener 153), PAHs, and 7 additional metals (aluminum, antimony, copper, selenium, silver, titanium, and zinc). An adaptive site management process was implemented to determine which COPC required evaluation in the OU-4 BERA. In further evaluations conducted by USEPA, which considered background concentrations, bioaccumulation, and USEPA Region 4 sediment screening values, the COPCs list was refined to the following constituents in soil and constituents in sediment, in addition to PCBs, as follows:

- Soil COPCs
  - PCBs
  - Chromium
  - Lead
  - Mercury
  - Vanadium
  - PCDD/DFs/DL PCBs
- Sediment COPCs
  - PCBs
  - Barium
  - Chromium
  - Cobalt
  - Lead
  - Mercury

- Vanadium
- PCDD/DFs DL-PCBs

5.2.1.2 Ecological Endpoints and Representative Receptors

Seven assessment endpoints (AEs) were established to represent valuable ecological resources that need to be protected from risk potentially created by COPCs:

- Survival, Growth, and Reproduction of Aquatic/Terrestrial Plant Communities
- Survival, Growth, and Reproduction of Benthic Invertebrate Communities
- Survival, Growth, and Reproduction of Terrestrial Invertebrate Communities
- Survival, Growth, and Reproduction of Fish Communities
- Survival, Growth, and Reproduction of Birds
- Survival, Growth, and Reproduction of Mammals
- Survival, Growth, and Reproduction of Amphibians and Reptiles

Measurement endpoints (MEs) related to each AE were defined based on specific risk questions. MEs are quantitative expressions of observable or measurable changes that are used to evaluate the effects of chemical stressors on AEs. The risk questions and their associated MEs were used to identify risk analysis plan needs for each AE. MEs include a range of HQs, site-specific sediment toxicity testing, quantitative evaluation of site-specific biological community data, and comparisons of Site media concentrations to reference conditions and among assessment areas. HQs represent a modeled or measured exposure estimate compared to a literature-based toxicity value, and HQs provide the primary quantitative line of evidence for most AEs. Considering PCBs and mercury for benthic invertebrates, site-specific sediment toxicity testing was employed to develop site-specific toxicity thresholds representative of conservative no-effect levels or lowest observed effect levels. These values were compared to individual sediment samples in OU-4 as the primary quantitative line of evidence. The community data are a secondary line of evidence and represent an estimate of effects based on site-specific community and conditions data from within OU-4.

Representative species are selected to represent birds and mammals within each feeding guild and habitat type found in OU-4. The species were selected based on the endpoints of concern and characteristics of the Site. Other factors considered in selecting representative species include the following:

- Position in the food web
- High potential for exposure (e.g., based on feeding habits or life history)
- Availability of relevant exposure and toxicity data for the species
- Sensitivity to COPCs
- Occurrence within or near OU-4

The bird and mammal species selected for the identified aquatic and terrestrial AEs and feeding guilds are as follows:

Aquatic receptors that reside or forage within the in-stream habitat of OU-4

Receptor Class	Representative Receptor
Aerial-feeding insectivorous birds	Tree swallow (*Tachycineta bicolor*)
Aquatic or semiaquatic ground-feeding invertivorous birds	Spotted sandpiper (*Actitis macularius*)
Piscivorous birds	Belted kingfisher (*Megaceryle alcyon*) American osprey (*Pandion haliaetus*)
Wading carnivorous birds	Great blue heron (*Ardea herodias*)
Aerial-feeding insectivorous mammals	Little brown bat (*Myotis lucifugus*)
Piscivorous mammals	American mink (*Neovison vison*) and river otter (*Lontra canadensis*)
Aquatic or semiaquatic omnivorous mammals	Raccoon (*Procyon lotor*)

Terrestrial receptors that reside or forage within the floodplain or riparian habitat within OU-4

Receptor Class	Representative Receptor
Herbivorous birds	Mourning dove (*Zenaida macroura*)
Omnivorous birds	Blue jay (*Cyanocitta cristata*)
Terrestrial and semiaquatic ground-feeding invertivorous birds	Carolina wren (*Thryothorus ludovicianus*)
Carnivorous birds	Red-tailed hawk (*Buteo jamaicensis*)
Ground-feeding invertivorous mammals	Southern short-tailed shrew (*Blarina carolinensis*)
Herbivorous mammals	White-tailed deer (*Odocoileus virginianus*)
Carnivorous mammals	Long-tailed weasel (*Mustela frenata*) and red fox (*Vulpes vulpes*)

5.2.2 Exposure Assessment

The exposure assessment describes the assumptions and supporting rationale used to estimate exposure to each of the AEs or representative receptors. Complete and significant exposure pathways consistent with the ecological CSM were evaluated. The intensity, spatial, and temporal extent of contact with COPCs are described by the EUs, EPCs, exposure assumptions, and intakes (i.e., dose estimates).

Exposure to COPCs for lower-trophic-level receptors consisting of benthic and terrestrial invertebrate communities, aquatic and terrestrial plant communities, and aquatic life (invertebrate, fish, and amphibian communities) were quantitatively evaluated based on direct contact with environmental media (sediment, soil, and surface water). Exposure to COPCs for upper-trophic-level receptors consisting of birds and mammals were quantitatively evaluated based on dietary food web exposure estimated using measured tissue EPCs or modeled tissue EPCs calculated from abiotic media EPCs and bioaccumulation factors (BAFs). In addition, tissue-burden-based exposures were evaluated for invertebrates, fish, birds, and small mammals. Due to lack of sufficient toxicity data for amphibians and reptiles, potential risk to these receptors were not quantitatively evaluated.

Because of the large size of OU-4 (37 creek miles and 6,000 floodplain acres) and high degree of habitat variability, the Choccolocco Creek portion of OU-4 was divided into smaller subunits/reaches for the assessment—UAA, MAA, and LAA. These assessment areas were further divided into smaller EUs where data are available to support these smaller groupings. The boundaries are based on logical break points using a combination of natural and human-made features within OU-4 that could affect the transport mechanisms of solids to and from the floodplain and the introduction of non-PCB-containing suspended solids through tributary creek inputs. For example, major roads and bridges, confluence points associated with tributaries and creeks, the physical attributes of the backwater area, and significant changes in the width of the floodplain were considered in identifying the break points between reaches.

The reaches (C1 through C10, shown on Figure 5-7a) are used as EUs for aquatic receptors. Reach C1, which is the segment of Snow Creek included in OU-4, is evaluated independently. The UAA includes reaches C2 through C4. The MAA includes reaches C5 and C6. The LAA includes reaches C7 thorough C10. The lower end of Choccolocco Creek is identified as C10 (Figure 5-7k), and this EU only includes the creek and its sediment (no adjoining floodplain soil areas). Surface water elevations in this lower portion of Choccolocco Creek are controlled by dams located on the upstream and downstream ends of Lake Logan Martin that serve to limit routine flooding of these areas.

For terrestrial or semiaquatic receptors, two types of EUs were selected. For those receptors that feed in association with Choccolocco Creek, a riparian corridor EU was established that includes the area from the creek bank to 100 feet into the floodplain on both sides of the creek. The 100-foot area was operationally defined to estimate exposure, but it is recognized that the actual riparian area might vary in width depending on specific conditions within each EU. For terrestrial receptors, north and south EUs were established from the creek bank to the edge of the 100-year floodplain. This approach is similar to the inner and outer EUs developed to support the OU-4

HHRA (JMWA and Avatar Environmental 2013). The details for each EU are shown on Figures 5-7b through 5-7k.

5.2.3 Effects Assessment

The effects assessment includes (i) identifying, selecting, and/or developing toxicity values for ecological receptors and (ii) calculating site-specific biological metrics to evaluate effects to ecological communities between OU-4 and reference habitats or within reaches. Each of these served as important lines of evidence in the WOE risk characterization for the OU-4 BERA.

5.2.3.1 Toxicity Values

Toxicity values can be media-based, diet-based, or tissue-based. For this assessment, media-based values were used to evaluate lower-trophic-level receptors (e.g., invertebrates and plants). These media-based values are referred to as toxicity benchmarks when derived from published or literature-based sources. The media-based benthic invertebrate toxicity values derived from OU-4 bioassay data are referred to as site-specific toxicity thresholds.

For upper-trophic-level receptors (e.g., birds, mammals), the dietary and tissue-based toxicity values were selected. These are referred to as toxicity reference values (TRVs) and critical tissue concentrations (CTCs) respectively. A dietary TRV is defined as a daily dose of a chemical expressed in milligrams per kilogram body weight per day (mg/kg-day). Tissue-based CTCs are expressed as milligrams per kilogram (mg/kg) of body weight on a wet-weight basis and were selected to evaluate a subset of receptors (e.g., invertebrates, fish, bird eggs, and small mammals).

Toxicity values were evaluated and selected for no observed adverse effect level (NOAEL) and lowest observed adverse effects level (LOAEL) or equivalent values. The NOAEL represents the concentration or dose at or below which no adverse effects on the test organism have been observed. The LOAEL represents the lowest value at which adverse effects have been observed. In the scientific literature, there is usually a range of both NOAELs and LOAELs reported for specific types of organisms (e.g., fish, birds, mammals). Generally, conservative values for the most sensitive species of a given receptor group (e.g., fish, birds, mammals) were selected from the range of NOAELs and LOAELs reported in the scientific literature. The toxicity values selected for use in the OU-4 BERA were based on endpoints that could result in population-level impacts, such as survival, reproduction, development, and growth. Sufficient toxicity data for reptiles and amphibians were not available for selection of benchmarks, TRVs, or CTCs; therefore, risks to these receptors were evaluated only qualitatively. The receptors and COPCs for which media-based toxicity benchmarks, dietary TRVs, or tissue-based CTCs were developed/selected for OU-4 are listed in the BERA with some changes included in the BERA Addendum.

5.2.3.2 Community Metrics

A great deal of ecological and biological data has been collected for characterizing OU-4. Although human activity (e.g., urbanization, agriculture, grazing in some areas) has impacted the habitat quality and the ecology within the OU-4 portions of Snow Creek and Choccolocco Creek, there is valuable aquatic and riparian habitat in OU-4 that might be impaired. For all communities except plants, data from the various OU-4 biological community surveys conducted were used to evaluate potential effects of COPCs to ecological communities and to understand upstream-to-downstream spatial trends. For plants, data from the Off-Site RFI Phase 2 floodplain surveys were used. In general, locations in OU-4 (Choccolocco Creek) were compared to each other and/or to

observation of habitat conditions in reference locations (upper Choccolocco Creek, Cheaha Creek, and Talladega Creek). The resulting community metrics based on these comparisons were used as a secondary line of evidence.

5.2.4 Risk Characterization

Risk characterization consists of three parts: (i) the risk estimation and description, which presents the results for the MEs for each AE; (ii) the uncertainty analysis, which describes key uncertainties and whether they are likely to over- or underestimate exposure or risk; and (iii) the risk findings, which provide an integrated interpretation of the full group of MEs and their associated uncertainty for each AE to draw risk conclusions. The OU-4 BERA and OU-4 BERA Addendum risk characterization used a WOE assessment based on consideration of the existing data available for OU-4 and appropriate computations and interpretations using those data.

The primary line of evidence in the OU-4 BERA consists of a range of HQs and OU-4 sample comparisons and includes the following five items:

- HQs based on estimated EPCs in abiotic media compared to literature-derived benchmarks for lower-trophic-level organisms
- Individual sample concentration comparisons to site-specific toxicity thresholds for benthic invertebrates
- HQs based on dietary doses in wildlife food web models estimated using modeled prey tissue concentrations compared to literature-derived dietary TRVs
- HQs based on dietary doses in wildlife food web models estimated using measured prey tissue concentrations compared to literature-derived dietary TRVs
- HQs based on measured biota tissue concentrations compared to literature-derived tissue-based CTCs

Additionally, the three secondary lines of evidence included in the OU-4 BERA to support the risk characterization are as follows:

- Site-specific field survey data statistically evaluating potential differences in community metrics between the OU-4 assessment areas and reference habitat areas
- Comparisons between site-specific COPC concentrations in soil, sediment, or biological tissue to concentrations in reference areas
- Observations and qualitative survey results for wildlife present in OU-4

The OU-4 BERA Addendum did not change the fundamental approach and analyses in the OU-4 BERA, but rather focused on the specific technical issues where agreement was not reached during the OU-4 BERA comment and review process. Using the same underlying data used in the OU-4 BERA, the OU-4 BERA Addendum evaluated several receptors using alternative inputs and/or interpretation of results to formulate WOE conclusions. The WOE assigns a confidence level of high, moderate, or low to each ME or line of evidence considering attributes such as site-specificity and the uncertainty with each of the inputs and analysis. The lines of evidence with the highest rank are used as the basis for overall risk findings.

The results of the OU-4 BERA Addendum are summarized on Table 5-28 and include a range of aquatic and terrestrial receptors. The risks for C1 through C10 are categorized as being acceptable, generally acceptable, indeterminate, unacceptable, or highly unacceptable. The table also groups EUs by overall assessment areas, including UAA (C2 through C4), MAA (C5 and C6), and LAA (C7 through C10). The results for the C1 were not grouped with the UAA results because of the physical break that I-20 forms between C1 and C2. The overall conclusions from the OU-4 BERA and OU-4 BERA Addendum are similar and include the following:

- PCBs are the primary risk driver.
- Predicted risk for aquatic receptors is highest for piscivorous birds and mammals and are driven by PCB concentrations in fish tissue.
- Predicted high risk for aquatic invertivorous/insectivorous birds is driven by modeled PCB concentrations in aquatic worms.
- Predicted risk is unacceptable for fish throughout OU-4.
- Risk to benthic invertebrates is highest and unacceptable in reaches C1 and C2, which includes Snow Creek and the backwater area, respectively. Unacceptable risk was also identified in reach C7, but this area is characterized by markedly lower PCB concentrations than C1 and C2, with C7 having PCB concentrations lower than the 20% EC (EC20) concentration. Risk was generally acceptable in other reaches with localized areas of unacceptable risk in some downstream reaches.
- Predicted risk is unacceptable for aerial insectivores (swallows and bats) in reaches C1 through C4 and acceptable in reaches C5 through C10.
- Predicted risk to terrestrial receptors is unacceptable for some receptors in reaches C1 through C4 and generally indeterminate or acceptable in reaches C5 through C10.

5.2.5 Remedial Goal Options

A wide range of RGOs was identified for OU-4 based on the results of the OU-4 BERA and the OU-4 BERA Addendum. The RGO values from the OU-4 BERA Addendum are presented in Table 5-29 and include a range of constituent concentrations for sediment and soil. Sediment RGOs were identified for benthic invertebrates, birds, and mammals. Soil RGOs were identified for birds and mammals. The RGO values included concentrations defined as NOAELs and LOAELs. These NOAELs and LOAELs were identified for PCBs, mercury, barium (sediment only), chromium, cobalt (sediment only), lead, and vanadium. For benthic invertebrates, NOAELs and LOAELs were only identified for PCBs, mercury, chromium, and lead.

6 POTENTIAL ARARS, PRELIMINARY RAOS, AND PRGS

This section presents potential ARARs and to-be-considered (TBC) criteria and establishes preliminary RAOs and PRGs for OU-4. The RAOs consist of media-specific goals for protecting human health and the environment and provide a general description of what the cleanup is expected to accomplish. The RAOs also assist in focusing the process of developing and evaluating the remedial alternatives and typically include the following:

- Constituents of concern for each media of interest
- Exposure pathways, including exposure routes and receptors
- An acceptable contaminant concentration or range of concentrations for each exposure pathway (i.e., PRG)

In some cases, potential ARARs and TBCs provide the basis for RAOs and PRGs. At a minimum, complying with ARARs during remediation and achieving ARARs upon completion of remediation are threshold criteria that must be met for a remedial alternative to be considered effective. The use of RALs for in-creek sediment is also included in this OU-4 FS. RALs are specific concentration values used to develop, design, and implement remedial alternatives for sediment sites recognizing that with source control measures implemented, long-term concentrations will be reduced over time. The RALs for OU-4 include specific concentrations that would be targeted actively for remediation recognizing that the PRGs would be achieved over the longer term through a combination of source control, active sediment remediation, and MNR. The generalized concept of using RALs to identify remedial areas has been used at other sediment sites, including the Lower Duwamish River, the Hudson River, and the Kalamazoo River.

This section includes discussions of media and COCs, potential ARARs, and a summary of RAOs and PRGs. The compilation of potential ARARs is presented in Tables 6-1 through 6-3. Section 6.3 discusses the development of potential RAOs and PRGs. The potential RAOs and PRGs were used to develop candidate remedial areas (Section 7) and to develop the range of alternatives screened in Section 9 and further evaluated on a detailed-and-comparative basis in Sections 10 and 11, respectively.

6.1 Media and Constituents of Concern

The OU-4 HHRA, the OU-4 BERA (Arcadis 2016), and the OU-4 BERA Addendum (USEPA 2018a) evaluated biotic and abiotic media within OU-4 and a wide range of constituents in addition to PCBs. The results of samples collected for OU-4 are summarized in tabular form in the Section 4 tables of the OU-4 RI (Geosyntec 2019) and included electronically in Appendix B of the OU-4 RI. The chemistry results for the non-PCB constituents are summarized in Table 4-4 of the OU-4 RI with all results provided in Appendix B. Based on the evaluations conducted as part of the OU-4 RI, the OU-4 BERA, and the OU-4 BERA Addendum, PCBs are the primary COC. This finding is further supported by an assessment of the nature and extent of contamination results that are summarized in Section 4.2 of this OU-4 FS and summarized in Table 6-4. Thus, this OU-4 FS

is focused on PCBs.[5] Details on the media and COCs addressed in this OU-4 FS, including additional detail on other non-PCB constituents, are provided below.

6.1.1 Media of Concern

Historical fate and transport are important factors in understanding the distribution of PCBs in OU-4 and were considered in developing and evaluating remedial alternatives during the OU-4 FS process. The OU-4 portion of the Site is a receiving body that was and continues to be influenced by upstream sources. Surface water flow patterns for upper OU-4 and areas upstream of OU-4, including OU-3 and OU-1/OU-2, are shown on Figure 4-60. The OU-4 RI (Geosyntec 2019) describes the historical movement of PCBs from OU-3 via surface water runoff to the 11th Street Ditch. This ditch conveyed PCBs in surface water to Snow Creek and then Choccolocco Creek. PCB-containing sediment from the creeks was distributed to the adjoining floodplain areas via surface water following larger precipitation events when the surface waters were in an out-of-bank condition. As surface waters receded, a portion of the suspended sediment in the out-of-bank flows settled, and these materials became part of the floodplain soil matrix. The PCB-containing floodplain soil is relatively shallow (generally less than 2 feet thick) except for areas where historical fill materials have been placed. The floodplain soil located away from creek banks is generally stable and does not represent a PCB source to the waterways except for certain creek bank areas where the combination of significant creek bank erosion and elevated PCB concentrations occur.

The backwater area located at the confluence of Snow Creek and Choccolocco Creek (Figure 4-60) is a significant fate-and-transport feature for OU-4 that receives flow directly from Snow Creek, with much of the area (the braided streams) historically acting as a settling basin. The braided stream portion of the backwater area is characterized by low surface water velocities even during high-flow events. As a result, fine-grained sediment has accumulated in the braided stream portion of the backwater area. While this fine-grained sediment has higher PCB concentrations than other OU-4 areas, it is not subject to erosion even during high-flow events because of the low-energy nature of the braided streams. Given the hydraulic connectivity between OU-3, OU-1/OU-2, and OU-4 and the remedial measures previously conducted in the upstream areas, PCB loading to OU-4 has already been reduced and will continue to be reduced as additional remedial measures are completed in OU-1/OU-2. The reductions in PCB loadings from actions already taken in OU-3 and portions of OU-1/OU-2 have resulted in meaningful declines in fish tissue concentrations over time (Figure 4-28). Additional reductions in upstream PCB loadings to OU-4 will continue through implementation of the OU-1/OU-2 ROD (USEPA 2017) and are expected to result in further declines in fish tissue concentrations, as will actions that may be implemented for OU-4. The past and future reductions of PCBs in OU-4 media must also consider the presence of PCB sources unrelated to the Anniston PCB Site to Snow Creek from locations upstream of OU-3 and the presence of other PCB sources to water bodies located downstream of OU-4.

This combination of circumstances, the data collected to date, and the associated human health and ecological risk assessments indicate that the primary COC is PCB, and the media of concern are soil, sediment, surface water, and biota. Surface water concentrations of PCBs generally reflect PCBs that are present in sediment or soil entering the creeks through surface water runoff,

[5] Mercury in fish tissue is also addressed in this OU-4 FS based on fish tissue. See Section 6.1.2.

including the erosion of certain creek bank areas. Once sediment and floodplain soil are addressed, surface water PCB concentrations are expected to decline. Similarly, PCB concentrations are expected to decline in biota as sediment and surface water PCB concentrations are reduced.

Snow Creek and its floodplain (OU-1/OU-2) were affected by historical releases (primarily via surface water flow and overland flooding) and, in some areas, placement of PCB-containing material as fill. Remedial measures to implement the OU-1/OU-2 ROD will further reduce the potential for sediment and creek bank soil in Snow Creek to be transported downstream to OU-4, and OU-1/OU-2 will no longer be a potential ongoing source of PCBs to OU-4. The floodplains are primarily depositional and, except for specific creek banks that are characterized by moderate or significant erosion and higher PCB concentrations, are not significant PCB sources to the aquatic portions of OU-4. A small number of creek bank areas in OU-4 have elevated PCB concentrations and are characterized as having moderate or severe erosion. These creek bank areas might serve as a secondary release mechanism to Snow and Choccolocco Creeks. The other secondary release mechanisms include surface water runoff and mobilization of sediment that has settled out in Snow Creek and Choccolocco Creek. Following remediation of the OU-1/OU-2 portion of Snow Creek, the backwater area of Choccolocco Creek will be the one area remaining with the highest concentrations of PCBs in sediment. There is a potential that the OU-1/OU-2 remediation of sediment could cause a temporary increase in PCB concentrations for sediment, surface water, and, possibly, fish tissue located in OU-4 if PCB-containing sediment is mobilized during remediation. These increases would be associated with the release of PCB-containing sediment during a dredging/in-water excavation process and might still occur to some degree despite using best management practices during removal. Once the Snow Creek remediation is complete, downstream migration of PCBs from Snow Creek is expected to continue to decrease.

The OU-4 FS process evaluated four IM projects previously constructed in Oxford Lake Park, which is located in the upper reaches of the OU-4 floodplain. Construction details for these IMs are summarized in Section 3.2 of this OU-4 FS, and additional details are provided in the OU-4 RI (Geosyntec 2019). Final corrective measures for the soil pile at the Anniston wastewater treatment facility and Highway 21 are not specifically evaluated in this OU-4 FS because the relevant construction details were presented in the OU-4 RI, and the projects are already subject to monitoring, maintenance, and long-term soil management under the RCRA program. No further remedial actions are necessary for the final corrective measures implemented at the Anniston wastewater treatment facility and Highway 21.

Infrastructure support projects described in the OU-4 RI were not evaluated as constructed remedies as part of the OU-4 FS process. The nonresidential areas where these infrastructure support project areas are located were evaluated as part of nonresidential floodplain soil. To the extent that soil was removed or permanently isolated as part of these infrastructure support projects, the post-construction conditions were evaluated as nonresidential soil.

Based on the nature and extent of contamination, the CSM, the results of the OU-4 HHRA, OU-4 BERA, OU-4 BERA Addendum, and construction details for previously implemented projects (including residential removals, final corrective measures, and IM projects), PCBs in soil, sediment, creek bank areas, biota, and surface water were the focus of this OU-4 FS, including the following:

- Surface and subsurface soil on residential properties with PCB concentrations that might contribute to human health risks
- Previously constructed IM projects
- Surface soil on nonresidential properties with concentrations of PCBs that might contribute to human health and ecological risks
- PCBs in biota that might contribute to risks to humans or ecological receptors
- Sediment concentrations of PCBs that might contribute to ecological risks
- Surface water concentrations of PCBs that might contribute to ecological risks
- Sediment that might pose a secondary pathway by contributing to surface water concentrations
- Creek bank materials that might be a PCB source to the creeks

6.1.2 Constituents of Concern

A range of constituents were evaluated in the OU-4 HHRA, the OU-4 BERA, and the OU-4 BERA Addendum based on frequency and magnitude of detection and risk. The process to evaluate COCs also incorporated the provisions of a letter from USEPA dated August 19, 2005, that was developed to clarify the RAOs and data quality objectives for the OU-1/OU-2 portion of the Site. The letter is included as Appendix C to this OU-4 FS and provides an adaptive site management process to evaluate COCs, including non-PCB constituents, through site investigation and risk assessment processes. The letter includes provisions where the evaluation of non-PCB constituents could end with risk characterization. While USEPA's letter was initially developed for the OU-1/OU-2 portion of the Site, the concepts and provisions have been applied to and approved for OU-4, including the OU-4 Phase 1 FSP (BBL 2006) and the OU-4 Phase 2 FSP (Arcadis 2010b). The specific language from the letter indicates that

> *"The compound is determined to pose unacceptable risk but will not be further characterized beyond a narrative statement in the ecological risk assessment (e.g., compound is not a primary risk driver for which a clean up* [sic] *level needs to be developed, or is not associated with Solutia lnc./Monsanto Company plant site operations)."*

The OU-4 HHRA indicated that PCBs are the primary COC and that mercury in fish tissue was also a concern for the OU-4 portion of Choccolocco Creek located downstream of Jackson Shoals. Based on this concern, risks to humans from the consumption of fish tissue with mercury were further considered in this OU-4 FS, including the development of PRGs for fish tissue. The OU-4 HHRA did not identify any other COCs as risk drivers.

The ecological risks assessments, including the OU-4 BERA (Arcadis 2016) and the OU-4 BERA Addendum (USEPA 2018a), evaluated risks for a wide range of constituents in addition to PCBs. The number of constituents was narrowed throughout the development of the OU-4 BERA and OU-4 BERA Addendum and resulted in identifying several non-PCB constituents—mercury, barium, chromium, cobalt, lead, and vanadium—that presented some level of risk. The OU-4 BERA Addendum prepared by USEPA noted that

"Although unacceptable risks were identified in some areas of OU-4 for some of these COPCs, overall risks in OU-4 are dominated by PCBs."

This finding is further supported by an assessment of the nature and extent of contamination results (Section 4.2), the comparison to background concentrations (Table 6-4), and the range of ecological RGOs (Table 5-29). These assessments are provided below on a constituent-level basis for soil and sediment from an ecological perspective:

- **Mercury:** The concentration profile for Choccolocco Creek sediment located downstream of the backwater area is flat to trending upward at the downstream end of OU-4 and supports the presence of upwind sources to the west. The average mercury concentration in sediment downstream of the backwater area is approximately 0.69 mg/kg and consistent with the low end of the RGO ranges for the NOAEL and LOAEL values (Table 5-29). Sediment in the backwater area will be separately targeted for PCBs and addressing this sediment will also remediate mercury if present. For reference purposes, the remedial goal for mercury in Snow Creek sediment from the OU-1/OU-2 ROD was 1 mg/kg. The average pre-remediation mercury concentration across the OU-4 floodplain soil is less than 1 mg/kg and would be lowered under any of the remedial alternatives identified for floodplain soil in this OU-4 FS. Additionally, the pre- and post-remediation mercury concentrations in floodplain soil are consistent with RGO ranges for the NOAEL and LOAEL values (Table 5-29). Based on these findings, ecological PRG values for mercury in sediment and soil are not included in this OU-4 FS. As described in Section 6.3.2.2, a PRG for mercury in fish tissue of 0.28 mg/kg was developed for this OU-4 FS based on the RGOs presented in the OU-4 HHRA. While this PRG for mercury in fish tissue was developed, a corresponding PRG for the sediment-to-fish tissue pathway was not developed. This PRG was not developed because average mercury concentrations in fish tissue already achieve the human health PRG and the continued presence of upwind mercury sources impacting the concentration of mercury in sediment for the downstream portion of OU-4. The concentrations of PCBs and mercury in sediment are presented together on Figure 4-57a.
- **Barium:** The highest concentration of barium in sediment is located in the backwater portion of the OU-4 (Figure 4-53) and will be remediated based on the proposed PCB PRGs and the associated cleanup footprint. The maximum concentration for barium in surface sediment downstream of the backwater area is 251 mg/kg. This concentration is lower than the maximum concentration detected in the background data set (Table 6-4). It is also within the low-end of LOAEL RGO range (i.e., 219 to 4,333 mg/kg for birds) and is essentially equivalent to the low end of the NOAEL concentration range (i.e., 109 to 2,161 mg/kg for birds). For reference purposes, the remedial goal for barium in Snow Creek sediment from the OU-1/OU-2 ROD was 322 mg/kg. Based on this finding, a PRG value for barium in sediment is not included in this OU-4 FS.
- **Chromium:** The maximum concentration for chromium in sediment (54.7 mg/kg) is lower than the maximum concentration detected in the background data set (Table 6-4). The average concentration for chromium in surface sediment (19.3 mg/kg) is lower than the low-end of the LOAEL RGO range and within the range of NOAEL-based RGOs (Table 5-29). For reference purposes, the remedial goal for chromium in Snow

Creek sediment from the OU-1/OU-2 ROD was 111 mg/kg. The concentrations of chromium in soil (Figure 4-39) are consistent with background conditions at Ft. McClellan (SAIC 1998) with an average concentration for OU-4 floodplain soil of 16 mg/kg. This average concentration for soil is lower than the low-end LOAEL RGOs, lower than low-end NOAEL RGO for mammals, and within the range of NOAEL RGOs for birds. Based on these findings, ecological PRG values for chromium in sediment and soil are not included in this OU-4 FS. Similar to other constituents, the higher chromium concentrations are generally associated with sediment in the Snow Creek portion of OU-4 and backwater area and, thus, would be addressed by the range of active remedial alternatives identified to address the presence of PCBs in these locations.

- **Cobalt:** The distribution for cobalt concentrations in sediment (Figure 4-55) is generally flat to increasing with distance downstream from the backwater area. This distribution supports conditions downstream of the backwater area as being consistent with background. The average concentration for cobalt in sediment is 9.5 mg/kg, and the maximum concentration for cobalt in Choccolocco Creek downstream of the backwater area is 57 mg/kg. The maximum concentration is lower than the low-end of the LOAEL and NOAEL RGO ranges (Table 5-29). For reference purposes, the remedial goal for cobalt in sediment from the OU-1/OU-2 ROD was 59 mg/kg. Based on this finding, a PRG value for cobalt in sediment is not included in this OU-4 FS.

- **Lead:** The concentrations of lead in sediment are consistent with background conditions at Ft. McClellan (SAIC 1998). The average concentration of lead in surface sediment is 23.3 mg/kg (Table 6-4). This concentration is within and toward the low end of the NOAEL RGO ranges (Table 5-29). For reference purposes, the remedial goal for lead in sediment from the OU-1/OU-2 ROD was 128 mg/kg. The distribution for lead in floodplain soil is presented on Figure 4-41 and includes average and maximum concentrations in surface soil of 29.3 mg/kg and 106 mg/kg, respectively (Table 6-4). The average concentration is within and toward the lower end of the NOAEL RGO ranges (Table 5-29). Based on this finding, a PRG values for lead in sediment and soil are not included in this OU-4 FS. This finding is also supported by the presence of the Anniston Lead Site that is part of the upstream Snow Creek watershed that flows into OU-4.

- **Vanadium:** The concentrations of vanadium in soil presented on Figures 4-47 and 4-48 show the uniform and background nature of this constituent. The maximum concentration detected in soil was 45 mg/kg, which is less than twice the Fort McClellan mean of 31 mg/kg and consistent with background conditions at Ft. McClellan (SAIC 1998). The mean concentration of vanadium in Choccolocco Creek sediment (17.4 mg/kg) is less than the background concentration from Fort McClellan (20 mg/kg). The maximum vanadium concentration for Choccolocco Creek sediment (63 mg/kg) is also less than the Fort McClellan maximum concentration 67 mg/kg. The average vanadium concentrations for sediment are consistent with the low end of the LOAEL RGO ranges (Table 5-29). A similar finding is made for vanadium in that average concentrations in soil are at the low end of LOAEL range, or lower. While the average concentration for surface sediment in the Snow Creek portion is higher (52.5 mg/kg), all sediment in this portion of Snow Creek is targeted for remediation. Based

on these findings, PRG values for vanadium in soil and sediment are not included in this OU-4 FS. For reference purposes, the remedial goal for vanadium in sediment that was established in the OU-1/OU-2 ROD for Snow Creek was 41 mg/kg.

Based on these findings, the remedial alternatives for ecological receptors in OU-4 are focused on reducing PCB risks, recognizing that where other constituents, including mercury, might be present (e.g., the lower portion of Snow Creek and the backwater portion of Choccolocco Creek), the remedial approaches presented in this OU-4 FS would address both PCBs and non-PCB constituents.

Groundwater and air will not be addressed further as media of concern for OU-4. The OU-4 RI documents that PCBs are not present in groundwater or air in OU-4 at levels that require media-specific remedial alternatives.

6.2 Identification of Potential ARARs and TBC Requirements

Section 121(d) of CERCLA, as amended, specifies, in part, that remedial actions for cleanup of hazardous substances must comply with requirements and standards under federal or more-stringent state environmental laws and regulations that are considered ARARs. ARARs may address a particular hazardous substance or particular circumstances at a site. If ARARs are not followed, a waiver must be obtained (see also 40 C.F.R. § 300.430(f)(1)(ii)(B)). ARARs include only federal and state environmental or facility siting laws and regulations. Compliance with Occupational Safety and Health Administration (OSHA) standards is required by 40 C.F.R. § 300.150; therefore, the CERCLA requirement for compliance with or wavier of ARARs does not apply to OSHA standards.

Under CERCLA Section 121(e)(1), federal, state, or local permits are not required for the portion of any removal or remedial action conducted entirely on-site as defined in 40 C.F.R. § 300.5 (see also 40 C.F.R. § 300.400(e)(1) & (2)). Also, CERCLA actions must only comply with the "substantive requirements," not the administrative requirements of a regulation. Administrative requirements include permit applications, reporting, record keeping, and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is recommended for determining compliance with certain requirements, such as those typically identified as location-specific ARARs.

Applicable requirements, as defined in 40 C.F.R. § 300.5, mean those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Relevant and appropriate requirements, as defined in 40 C.F.R. § 300.5, are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site.

Pursuant to 40 C.F.R. § 300.400(g)(5), only those state standards that are promulgated and identified in a timely manner and are more stringent than federal requirements may be applicable

or relevant and appropriate. For the purposes of identification and notification of promulgated state standards, the term "promulgated" means that the standards are of general applicability and are legally enforceable. State ARARs are considered more stringent where there is no corresponding federal ARAR, where the state ARAR provides a more stringent concentration of a contaminant, or where a state ARAR is broader in scope than a federal requirement.

In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance TBC for a particular release. The TBC category consists of advisories, criteria, or guidance developed by USEPA, other federal agencies, or states that may be useful in developing CERCLA remedies (see 40 C.F.R. § 300.400(g)(3)). TBCs may be used in the absence of ARARs when ARARs are insufficient to develop cleanup goals or when multiple contaminants may pose cumulative risks (USEPA 1987).

Identifying potential ARARs included several steps. The first step was assembling the ARAR information developed by USEPA for the OU-3 and OU-1/OU-2 portions of the Site. This information was updated to reflect regulatory updates, where applicable, and to include additional requirements, where needed, to reflect the differences between OU-4 and the upstream OUs.

While there may be additional ARARs identified in the ROD or through the RD process, the ARARs included in this OU-4 FS are considered to be comprehensive for USEPA's evaluation of remedial alternatives under the NCP and selection of the remedy for OU-4 in a ROD.

The key ARARs considered for OU-4 are identified below:

- Regulations at 40 C.F.R. § 262.11(a)-(d) for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at ADEM Admin. Code r. 335-13-14-.17, 19, and 20 for capping waste materials and institutional controls (ICs)
- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC and the parallel regulations under the State of Alabama's Administrative Code 335-6-10
- Regulations 40 C.F.R. § 131.36 for the chronic AWQC for the ingestion of surface water as a drinking water source and consumption of biota and the parallel regulations under the State of Alabama's Administrative Code 335-6-10 as a TBC criterion
- Regulations at 40 C.F.R. § 230 regarding dredging and filling in creeks
- Regulations at 42 United States Code (U.S.C.) § 4001 et seq. and 42 U.S.C. § 4101 regarding alteration of creeks

6.2.1 ARAR Categories

For purposes of ease of identification, USEPA created three categories of ARARs: chemical-specific, location-specific, and action-specific. Under 40 C.F.R. § 300.400(g)(5), the lead and

support agencies identify their specific ARARs for a particular site and notify each other in a timely manner as described in 40 C.F.R. § 300.515(d). Chemical- and location-specific ARARs should be identified as early as possible in the RI/FS process, while the action-specific ARARs are identified as part of the FS process for each remedial alternative (see 40 C.F.R. § 300.430(b)(9) and § 300.430(d)(3)).

As part of this OU-4 FS, the remedial alternatives were assessed to determine whether or not they comply with identified chemical-, location-, and action-specific ARARs. Compliance with ARARs is a threshold requirement of CERCLA that every remedy must meet. The remedial alternative evaluation process identifies the more significant ARARs that must be addressed for each alternative, recognizing that a final evaluation of ARARs will be completed during the RD phase once it is determined how the selected alternatives will be implemented.

6.2.2 Chemical-Specific ARARs and TBC Guidance

Chemical-specific ARARs are usually health- or risk-based numerical values limiting the amount or concentration of a chemical that may be found in or discharged to the environment. The state or federal AWQC established under the Clean Water Act are examples of chemical-specific ARARs used to establish remediation levels for restoring surface water. Table 6-1 lists potential chemical-specific ARARs and TBCs for OU-4.

6.2.3 Location-Specific ARARs and TBC Guidance

Location-specific requirements establish restrictions on permissible concentrations of hazardous substances or establish requirements for how activities will be conducted because they are in special locations (e.g., wetlands, floodplains, critical habitats, streams). The potential location-specific ARARs and TBCs are listed in Table 6-2.

6.2.4 Action-Specific ARARs and TBC Guidance

Action-specific ARARs are usually technology-based or activity-based requirements or limitations that control actions taken at hazardous waste sites. Action-specific requirements often include performance, design, and controls or restrictions on particular types of activities related to managing hazardous substances. Action-specific ARARs are triggered by the types of remedial activities and types of wastes that are generated, stored, treated, disposed of, emitted, discharged, or otherwise managed.

Remediation wastes generated and subsequently transferred off-site or transported in commerce along public rights-of-way must meet any applicable requirements, such as those for packaging, labeling, marking, manifesting, and placarding for hazardous materials. In addition, CERCLA Section 121(d)(3) provides that any hazardous substance, pollutant, or contaminant generated during CERCLA response actions and transferred off-site be sent to a treatment, storage, or disposal facility that complies with applicable federal and state laws and has been approved by USEPA for acceptance of CERCLA waste (see also 40 C.F.R. § 300.440 [Off-Site Rule]). Table 6-3 lists potential action-specific ARARs and TBCs for the range of remedial alternatives that are anticipated for OU-4.

6.3 Preliminary Remedial Action Objectives and Preliminary Remediation Goals

The preliminary RAOs and PRGs were developed based on the following:

- An evaluation of potential federal and state ARARs
- The preliminary RAOs presented in the RI/FS work plan
- The nature and extent of constituents presented in the OU-4 RI
- The risks and associated RGOs identified in the human and ecological risk assessments

Preliminary RAOs and PRGs were developed for four environmental media: soil, sediment, biota (fish), and surface water. The preliminary RAOs presented in Section 6.3.1 also address the removal actions for residential properties under the 2000 Removal Order and the 2003 NTCRA Agreement between USEPA and P/S that became part of the PCD (USEPA 2003a). The RGOs for human health are based on the findings in the OU-4 HHRA (OU-4 RI, Appendix I) and are included in Table 5-26 for fish tissue and Table 5-27 for agricultural products. These RGOs form the starting point for the human health PRGs presented in this OU-4 FS. The ecological PRGs were developed based on the collective findings of the OU-4 BERA and OU-4 BERA Addendum process. The wide range of ecological RGOs from the OU-4 BERA Addendum are provided in Table 5-29. As discussed in Sections 5.2 and 6.1, ecological risks are dominated by PCBs. Based on the nature and extent of the non-PCB constituents, consideration of non-site-related ambient sources, and additional background evaluation, PRGs for these non-PCB constituents were not included in this OU-4 FS.

The process of developing PRGs begins with identifying preliminary RAOs, including identifying media and potential receptors. Based on these media and receptors, applicable PRGs were developed based on the range of RGOs included in Tables 5-26 through 5-29.

6.3.1 Establishment of Preliminary Remedial Action Objectives

Preliminary RAOs for soil, sediment, surface water, and biota were developed using the preliminary RAOs from the RI/FS work plan and information presented in the OU-4 RI, including the OU-4 HHRA (JMWA and Avatar Environmental 2013), OU-4 BERA (Arcadis 2016), OU-4 BERA Addendum (USEPA 2018a), and an evaluation of potential federal and state ARARs.

6.3.1.1 Preliminary RAOs for Soil

The following are the preliminary RAOs for soil:

- Reduce risks to residents, including young children and adolescents, and other users from direct contact with, inhalation of, or incidental ingestion of PCBs in residential soil above levels that are protective.
- Reduce risks to future human agricultural consumers from ingestion of COCs in agricultural products from the floodplains above levels that are protective.
- Reduce risks to terrestrial and riparian-dependent birds and mammals from exposure to COCs in surface soil to levels that are protective of local populations.

- Reduce recontamination of surface soil from excavation of subsurface soil containing COCs above levels that are protective.
- Reduce potential violations of improper disposal of PCB remediation waste in soil.
- Reduce migration of COCs from floodplain soil to sediment that act as a source of sediment contamination.

6.3.1.2 Preliminary RAOs for Sediment

The following are the preliminary RAOs for OU-4 sediment:

- Reduce risks to benthic macroinvertebrate communities and fish communities from COCs in sediment to levels that are protective.
- Reduce risk to aquatic-feeding birds and mammals from exposure to COCs in surface sediment to levels that are protective of local populations.
- Reduce risks to human fish consumers, including pregnant women, young children, and adolescents, from COCs in sediment above levels that are protective.
- Prevent migration of COCs from creek bank soil to sediment that act as a source to sediment contamination.
- Prevent the long-term downstream transport of COCs in Choccolocco Creek.

6.3.1.3 Preliminary RAOs for Surface Water

The following are the preliminary RAOs for surface water:

- Reduce risks to human fish consumers, including pregnant women, young children, and adolescents, from COC concentrations in surface water above levels that are protective.
- Reduce risk to fish communities from COCs in surface water to levels that are protective.
- Reduce risk to aquatic-feeding birds and mammals from exposure to COCs in surface water to levels that are protective of local populations.

6.3.1.4 Preliminary RAOs for Biota

The following are the preliminary RAOs for biota:

- Reduce risks to human fish consumers, including pregnant women, young children, and adolescents, from COCs in fish above levels that are protective.
- Reduce risks for ecological receptors that consume PCBs in prey to levels that are protective.

6.3.2 Preliminary Remedial Goals

PRGs were identified to address ecological risks (Section 6.3.2.1) and human health risks (Section 6.3.2.2). The PRGs are based on the range of PCB RGOs presented in the risk assessments and the ARARs identified in Section 6.2 and are summarized in Table 6-5.

6.3.2.1 Ecological PRG Values

The ecological PRG values were developed based on the range of PCB RGOs presented in the OU-4 BERA Addendum (USEPA 2018a) for ecological receptors that may reside or forage within OU-4 (Table 5-29). A wide range of RGOs for all receptors and exposure scenarios are summarized in Table 5-29 based on more than 100 individual RGOs for PCB. Consistent with the finding of the OU-4 BERA Addendum and the evaluation of non-PCB constituents presented in Section 6.1, PCBs are the primary risk driver for OU-4, and the PRGs were developed accordingly. The RGOs were developed for the range of ecological receptors evaluated in the BERA and include values based on terrestrial plants and invertebrates, benthic invertebrates, fish, and aquatic and terrestrial birds and mammals. The RGOs were calculated using receptor-specific input parameters and toxicity values from the ecological risk assessment process and, by design, include multiple compounded layers of protectiveness. The RGO values for PCBs ranged from 0.1 to 144 mg/kg for soil and from 0.01 to 17 mg/kg for sediment. The range of RGOs provides an opportunity for selecting PRGs that are protective of ecological receptors in OU-4.

For the purposes of identifying PRGs that are protective across a range of receptor types and will not result in unnecessary habitat destruction, the PRGs are based on RGOs derived from LOAEL (or equivalent) toxicity values. The LOAELs represent levels at which some level of effect has been observed in sensitive species under laboratory conditions. Because field conditions are often very different from laboratory conditions and Site receptor exposure is much more variable than what would be expected under laboratory conditions, it is not necessary to select the lowest RGO value as a PRG. In addition, the interpretation of numerical risk estimates and RGOs must be considered along with secondary lines of evidence, including actual field observations of local receptor communities. For most receptor groups, the OU-4 BERA included at least one line of evidence comparing modeled or assumed exposure estimates for a receptor group to primarily literature-based toxicity values (i.e., HQs) and at least one other supporting line of evidence providing site-specific community-level evaluation to determine whether the modeled results are consistent with actual field observations. As a secondary line of evidence with less weighting, the community observations are consistent with information and findings interpreted from the modeled HQs. The community observations provide site-specific information on the apparent seasonal diversity and abundance of various receptors within OU-4 relative to the reference areas/conditions or relative to upstream or downstream Site areas. While considered as a secondary line of evidence, the community data provide site-specific observations regarding apparent ecological health relative to the predicted potential population risks developed from the HQ line of evidence. The use of both lines of evidence is supported by the 1998 USEPA *Guidelines for Ecological Risk Assessment*:

> *"It is important that risk assessors provide a thorough representation of all lines of evidence developed in the risk assessment rather than simply reduce their interpretation and description of the ecological effects that may result from exposure to stressors to a system of numeric calculations and results."* (USEPA 1998)

The following discussion provides specific rationale for the proposed PRGs for floodplain soil, sediment, biota (whole-body fish), and surface water that are protective of ecological populations or communities present within OU-4.

Floodplain Soil PRGs

The proposed PRG for floodplain soil for protection of ecological receptors is 6 mg/kg on a SWAC basis. This PRG was selected from the range of LOAEL-based RGOs for terrestrial and semiterrestrial receptors evaluated in the OU-4 BERA Addendum. Figure 6-1 shows the RGO values graphically by receptor group. The selected value is protective of at least one exposure scenario for all receptor groups evaluated, including avian and mammalian herbivores, omnivores, invertivores, and carnivores.

There are four LOAEL-based RGO values from the OU-4 BERA Addendum that have low-end RGOs below the selected value of 6 mg/kg:

- Carolina wren (terrestrial ground-feeding invertivore): scenario 1 is 3 mg/kg.
- Sandpiper (semiaquatic ground-feeding invertivore): scenario 1 is 4 mg/kg.
- Hawk (carnivorous birds): 5 mg/kg in sediment.
- Shrew (ground-feeding invertivore): both scenarios are 2 mg/kg.

For each of these four receptors, multiple exposure scenarios were evaluated, and there is a PCB concentration that is equal to or higher than 6 mg/kg that is equally supportable to be protective for that receptor. The higher values for the wren, sandpiper, and hawk are provided in OU-4 BERA Addendum Tables AD-64 and AD-65, and the higher value for the shrew are described below.

The lowest value for the Carolina wren was not selected because there is a high level of uncertainty associated with the key dietary assumption (i.e., that most of the diet is composed of terrestrial invertebrates that uptake PCBs at the same rate as earthworms). The lowest value for the sandpiper was not selected because it assumes that a sandpiper (which is a primarily aquatic feeding bird), would consume 50% of its diet as earthworms. Given this unrealistic scenario and the fact that numerous other terrestrial feeding invertivorous and omnivorous birds were considered, the selection of the lowest value for these receptors is not warranted. The lowest value for the hawk is for sediment. The associated soil RGO for the terrestrial portion of the diet is 47 mg/kg. Moreover, the hawk is a very wide-ranging receptor and does not provide a useful basis for evaluating individual exposure areas.

The higher value for the shrew is derived using a tissue-based TRV selected from the same single study that provides the basis for the dietary mammal TRV used in the OU-4 BERA Addendum. Because of the relatively larger number of variables that go into modeling dietary exposure, the tissue burden-based exposure estimate has relatively lower uncertainty. This is particularly true in a multigenerational feeding study (as is the case for the study that provides the basis for the TRVs). To estimate a dietary TRV from the daily doses given to the test animals, a static assumption regarding the amount of food ingested is applied across a range of ages and body sizes for which the actual ingestion rate is highly variable. For example, a lactating female consumes a larger amount of food per day than a non-pregnant/non-lactating animal (Shirley 1984), growing young generally consume more food on a body-weight-normalized basis than older animals, and nursing animals are exposed entirely differently through mother's milk. Thus, the estimated dietary dose that is based on a fixed ingestion rate for 16–18-week-old unpaired animals is more uncertain than simply comparing a tissue-based TRV to the measured tissue concentrations in the test animals.

For the tissue-based estimate from the McCoy et al. (1995) study, there is some uncertainty as to whether the reported tissue burdens in the referenced study are wet weight or dry weight. Based on the methods presented in the study that do not mention drying samples and their consistency with other known PCB analytical methods, it is likely that the reported values are wet weight concentrations. To err on the side of underpredicting rather than overpredicting a remedial goal, the RGO was calculated using the assumption that the reported tissue burden was in dry weight. The resulting RGO for the shrew was 11 mg/kg, and, thus, the selected PRG of 6 mg/kg is protective of shrews. If the tissue LOAEL concentration from this study was evaluated as a wet weight concentration, the RGO would increase by an approximate factor of 8.

The large ranges of RGO values presented for Site receptors were based on varying exposure assumptions and the variation and uncertainty associated with the measured and modeled inputs. The lower ends of these ranges were based on a combination of assumptions that are typically a mathematical product of multiple conservative exposure and effects assumptions. Based on this approach, selecting the lowest RGO value as the PRG is not warranted. As such, the selected PRG of 6 mg/kg is considered protective of the receptors that use the floodplain and riparian area within OU-4.

Sediment PRGs

The proposed PRG for sediment to protect ecological receptors is 0.63 mg/kg as a long-term SWAC. This PRG is based on the range of LOAEL-based RGOs estimated for the nonpiscivorous and non-fish aquatic or semiaquatic receptors evaluated in the OU-4 BERA Addendum. Figure 6-2 shows the values graphically by receptor group. Based on the estimated RGOs, the most sensitive nonpiscivorous receptor group is aerial-feeding birds and mammals: this group is represented by the tree swallow and the little brown bat. This PRG is proposed for application as a SWAC to be protective of this receptor group and is lower than the low-end of the RGO range for the other receptor groups. Based on this, the proposed PRG of 0.63 mg/kg will be protective for the range of aquatic ecological receptors within OU-4 recognizing that there are separate PRGs for whole-body fish to protect piscivorous receptors and that a predictive PRG for sediment to whole-body fish has also been included.

For PCBs in sediment, an ecologically based not-to-exceed (NTE) PRG value for PCBs of 2.6 mg/kg is proposed to be protective of benthic invertebrate reproduction. This PRG is based on the 10% EC (EC10*) value for the most sensitive species and endpoint that was developed as part of the site-specific toxicity testing program conducted for OU-4. This value is also consistent with the remedial goal for Snow Creek sediment selected by USEPA in the OU-1/OU-2 ROD. This RGO is also 50% lower than the EC20* value (i.e., 4.4 mg/kg) that is considered to be protective of population-level effects.

Ecological PRGs for Biota (Whole-Body Fish)

Consistent with the fish-based PRGs for human health described in Section 6.3.2.2, the PRGs for piscivorous wildlife and fish were developed based on a range of measured PCB concentrations in fish. The one difference in approach is PCB concentrations in fish for ecological purposes are assessed on a whole-body basis in contrast to fish tissue PCB concentrations that are used to quantify human health exposure conditions. A PCB concentration range of 1.3 to 27.3 mg/kg dry weight in whole-body fish is proposed as the target PRG range for fish and receptors that consume fish. Five primarily piscivorous receptors were evaluated in the OU-4 BERA: osprey, great blue

heron, kingfisher, mink, and otter. To develop the range of PRGs for these receptors based on whole-body fish PCB concentrations, the HQ calculations (receptor exposure assumptions and TRVs) employed in the OU-4 BERA were used, and a fish tissue concentration that resulted in a LOAEL HQ equal to 1 was calculated. Values ranged from 1.3 mg/kg for the mink to 19.8 mg/kg for the osprey. The RGO for whole-body fish protective of the fish themselves was equal to the LOAEL CTC identified in the OU-4 BERA Addendum of 6.8 mg/kg wet weight from Foekema et al. (2014). This value is converted to a dry weight concentration assuming 75% moisture and results in a tissue-based RGO of 27.3 mg/kg dry weight. This value was the lowest value observed out of numerous studies that included NOAELs and LOAELs higher (sometimes over two-fold) than this value. Thus, the proposed PRG range for PCBs in whole-body fish of 1.3 to 27.3 mg/kg is considered protective of both piscivorous wildlife and fish. The range of whole-body fish-tissue RGOs considered for protection of fish and piscivorous wildlife is shown on Figure 6-3.

Ecological PRGs for Biota (Sediment)

PRGs were also developed as estimates of long-term sediment concentrations that could achieve the fish-tissue PRGs. As described in Section 6.3.2.2 below for human health PRGs, this approach was included recognizing the significant uncertainties associated with relying on a singular relationship between sediment and biota even when the lipid concentrations in fish and the OC content of the sediment are considered. Despite the uncertainties associated with developing a bulk sediment PRG to potentially predict a fish-tissue PRG for ecological receptor consumption of fish, a sediment value is provided.

The sediment PRGs that were calculated to be protective of fish and piscivorous ecological receptors range from 0.13 to 1.5 mg/kg. The range of LOAEL-based RGOs is based on the estimated values for fish and the piscivorous receptors evaluated in the OU-4 BERA and the OU-4 BERA Addendum. Figure 6-2 shows the values graphically by receptor group. Given the uncertainties associated with estimating a sediment PRG protective of fish tissue, it is expected that the selected sediment PRG of 0.63 mg/kg will also be protective of piscivorous receptors given that this value is within the range of sediment PRGs for piscivorous receptors within OU-4. The most important long-term metric for fish consumption by piscivorous receptors will be the PCB concentrations for whole-body fish relative to the PRGs.

Ecological Surface Water PRG

The ecological PRG for surface water is the AWQC for chronic exposure to dissolved-phase PCBs (0.014 µg/L). This PRG provides for the protection of wildlife and is an applicable chemical-specific ARAR based on State of Alabama regulations recognizing that background conditions will need to be considered as part of assessing long-term attainment of this criteria.

6.3.2.2 Human Health PRG Values

The human health PRG values for PCBs were developed based on the findings presented in the OU-4 HHRA (JMWA and Avatar Environmental 2013), including the range of RGOs identified for contact with floodplain soil and fish consumption. For floodplain soil, PRGs were identified to address residential and nonresidential receptors that could contact these PCB-containing materials, including a future agricultural scenario for nonresidential receptors. The human health PRGs also address risks associated with the ingestion of fish tissue for all of OU-4 and mercury in fish tissue for the portion of Choccolocco Creek located downstream of Jackson Shoals. A long-term PRG for sediment that is projected to result in the long-term PRG in fish tissue has also been included.

Human Health PRG Value for Floodplain Soil

The human health PRGs proposed for exposure to residential and nonresidential floodplain soil in OU-4 are based on the results of the OU-4 HHRA, and the range of RGOs is presented in Tables 5-26 and 5-27. The proposed residential soil PRG for OU-4 (1 mg/kg) is protective of noncancer risks below the HQ value of 1 and corresponds to a cancer risk of $1x10^{-6}$.

The OU-4 HHRA did not identify unacceptable human health risks (current or future conditions) for nonresidential contact with surface soil for receptors other than under a future agricultural scenario. To protect this future exposure pathway/receptor, a PRG of 10 mg/kg is proposed based on a post-remediation condition SWAC. This PRG considers the range of agricultural product RGOs presented in Table 5-27 and supporting information provided in the OU-4 HHRA (JMWA and Avatar Environmental 2013). The supporting information in the OU-4 HHRA includes this statement:

> *"Although there is currently no evidence to suggest that the consumption of locally raised beef is currently occurring in OU-4, based on these results, consuming beef on a regular basis over a long period of time from cattle grazed in areas with the highest soil tPCB concentrations found in agricultural areas (e.g., 20 and 40 mg/kg) would be a potential health concern for local farmers."*

The highly protective nature of the modeling conducted as part of the risk assessment included receptors that only consume dairy and/or beef products from their properties and the consumption of these home-grown products taking place continuously for 40 years, including 6 years as a child. The proposed PRG is 50% of the low end of the concentration range (20 to 40 mg/kg) identified in the OU-4 HHRA that would result in unacceptable risks should this unique set of exposure conditions exist at some point in the future for a continuous 40-year period. Application of this PRG would be protective of future agricultural exposures using the highly protective values assumed in the OU-4 HHRA. The proposed PRG of 10 mg/kg is protective for the future agricultural pathway based on an FI of up to 50% and an HI of 3 (Table 6-5). Consistent with USEPA Region 4 guidance (USEPA 2018b), the overly protective nature of the assumptions adopted in this hypothetical exposure scenario (Section 9.3 of the OU-4 HHRA) and the uncertainty associated with the PCB RfD, selecting a PRG using an HI range of 1 to 3 is appropriate (USEPA 2018b).

Human Health PRG Values for Biota (Fish Tissue)

The human health PRGs for PCBs in fish tissue include a range of values for different consumption rates for portions of Choccolocco Creek located upstream and downstream of Jackson Shoals. This difference in potential exposures is the result of additional opportunities for public access in locations downstream of Jackson Shoals compared to locations upstream of Jackson Shoals where access is limited by private land ownership. The fish-tissue PRGs are also presented as a range of values, or an envelope, recognizing the value of using the CTE scenario for setting near-term goals and the protective nature of the RME scenario that forms the lower-end of the PRG concentration range. This approach is consistent with USEPA's approach for other large PCB sediment sites, including the Housatonic River and the Grasse River.

The adult RME and CTE values are protective of cancer and noncancer risks and are protective of the child receptor based on the uncertainties associated with the meal size selected for the child in

the OU-4 HHRA as being one-half of the adult meal. Data provided in the USEPA document *Estimated per Capita Fish Consumption in the United States* (USEPA 2002c) suggest that this estimate of consumption by young children (ages 3 to 5) is overstated.

For the purposes of developing the PRG range for fish tissue, an HQ of 1 and the RME and CTE conditions for the adult were used to be protective of noncancer risks and cancer risks of $1x10^{-5}$. The resulting PRG ranges for PCBs and mercury include the following:

- Upstream of Jackson Shoals: Range in fish tissue PCB concentrations of 0.11 to 1.18 mg/kg based on the adult RME and CTE, respectively.
- Downstream of Jackson Shoals: Range in fish tissue PCB concentrations of 0.056 to 0.59 mg/kg based on the adult RME and CTE, respectively.
- Downstream of Jackson Shoals: Range in fish tissue mercury concentrations of 0.28 to 2.95 mg/kg based on the adult RME and CTE, respectively.

The exposure assumptions used to develop the lower end of the PRG range (i.e., the RME scenario) are protective as they reflect fishing for locations with broader public access (e.g., tailwater areas located downstream of dams). Areas with increased fishing access are typically associated with higher fish consumption rates; Choccolocco Creek has limited public access for fishing. An additional measure of protectiveness for the PRGs is that they did not explicitly include PCB reductions associated with cooking skin-off fillets. Reductions in PCBs associated with skin-off fillets were partially accounted for in the OU-4 HHRA because the skin was removed before the fish were analyzed. An additional level of protectiveness for the proposed PRGs occurs when PCBs are removed from skin-off fillets through cooking. Information provided in USEPA (2000) indicates that meaningful reductions in PCB concentrations (averaging 28%) occur when fish fillets are cooked without the skin (skin-off fillets), which is the preparation method preferred by local anglers (Arcadis 2009). These findings are consistent with the results reported for fish with similar lipid content to catfish (e.g., lake trout) that were evaluated for dioxin, a chemical like PCB, where dioxin concentrations were reduced over 40% regardless of the cooking or preparation method (Zabik and Zabik 1995). The additional protections provided through a combination of RMEs that are representative of areas with higher fish pressures and additional cooking loses for skin-off fillets are mentioned to highlight the protective nature of the proposed PRGs.

Human Health PRG Values for Biota (Sediment)

PRGs were also developed as estimates for sediment concentrations that could result in achieving the fish-tissue PRGs. This was done recognizing the significant uncertainties associated with relying on a singular relationship between sediment and biota even when the lipid concentrations in fish and the OC content of the sediment are considered. These uncertainties include multiple factors relating to the fish exposure to PCBs and other physical influences, such as drought conditions. Example exposure conditions that might influence PCB concentrations in fish include the physical/chemical nature of the sediment; surface water chemistry, including particulate and dissolved-phase constituents; a range of prey based on dietary preferences and the availability of specific food sources; and the specific fish's life history, including their actual home range and duration of time in a given area. These factors could significantly influence the PCB concentrations of fish and might not be captured adequately by estimating a ratio between sediment and fish tissue concentrations. In addition, sediment concentrations do not directly account for water column

exposure that could be positively affected by source control actions included in the remedial alternatives for OU-4 sediment.

Despite these uncertainties for developing a bulk sediment PRG to potentially predict a fish-tissue PRG for human consumption of fish, one was developed. The process included calculating a site-specific BAF for fish at the downstream end of OU-4 at Station 35 (Figure 4-28) using the 2016 fish tissue PCB results and the PCB SWAC result for this area (0.52 mg/kg from Table 4-4). The fish tissue results for 2016 were used for this evaluation because they represent the most current data set and are the least influenced by a PCB release to surface water in the early 2000s that occurred when construction at a WWTP located along the downstream edge of Snow Creek resulted in PCB-containing soil being directly placed in Snow Creek at its confluence with Choccolocco Creek.

The equation used for calculating the site-specific BAFs is provided below (Kracko 2010), and the fish-tissue PCB concentrations are in mg/kg on a wet-weight basis (mg/kg ww) and sediment PCB concentrations are in mg/kg on a dry-weight (dw) basis:

$$\text{BAF} = \frac{\text{Mean Fish tissue concentration } (\frac{\text{mg}}{\text{kg}}\ ww)}{\text{Mean sediment PCB concentration } (\frac{\text{mg}}{\text{kg}}\ \text{dw})}$$

The average fish tissue concentrations for catfish, bass, and panfish were 0.56 mg/kg, 0.61 mg/kg, and 0.81 mg/kg, respectively. The overall average was 0.66 mg/kg. The calculated BAFs were 1.1 for catfish, 1.2 for bass, and 1.6 for panfish. The overall average BAF was 1.3. Using the overall BAF of 1.3, the long-term PRG for sediment is 0.09 mg/kg (say 0.10 mg/kg or 100 µg/kg). Other terms used to calculate this long-term PRG for sediment include the RME fish tissue concentration for areas downstream of Jackson Shoals (0.056 mg/kg), that fish derive 50% of their PCB load from the sediment and the remaining 50% from the water column, and that upstream sediment remediation, including source control actions, will result in significant reductions of water column PCBs. For sediment upstream of Jackson Shoals, the long-term PRG for sediment is based on sediment-to-fish-tissue is 0.18 mg/kg (say 0.2 mg/kg or 200 µg/kg) using the same calculation approach that was used for downstream of Jackson Shoals and the applicable fish-tissue PRG (0.11 mg/kg). It is important to restate that there is uncertainty regarding these PRGs and that the PCB concentrations in fish tissue as the exposure medium are the important PRGs.

A sediment-to-fish-tissue PRG for mercury was not developed for two reasons. The first reason is that the average concentration of mercury in fish tissue already meets the PRG (0.28 mg/kg). This PRG was also developed using the upper-end of the fish consumption assumptions from the OU-4 HHRA (the RME scenario) that assumes that one (8-ounce) meal is consumed every week over a lifetime. This average mercury concentration in fish tissue of 0.28 mg/kg is based on a total of 84 samples collected downstream of Jackson Shoals during a single collection event to support the OU-4 HHRA. The individual species averages included 0.16 mg/kg for catfish, 0.27 mg/kg for panfish, and 0.42 mg/kg for bass. While the PRG is currently being met, the second reason for not developing a sediment PRG for the sediment-to-biota pathway is the long-term role of non-site-related upwind mercury sources that are expected to continue impacting sediment in this portion

of OU-4. The relative distributions for mercury and PCBs in sediment are provided on Figure 4-57a and show the influence of these upwind sources in elevating mercury concentrations for this downstream portion of OU-4.

Human Health Surface Water PRG

The human health PRGs for PCBs in surface water to protect for the ingestion of surface water and the consumption of biota is 0.000064 µg/L. This value was identified as a chemical-specific ARAR and could be waived as a federal ARAR because the equivalent standards presented in Section 6.3.2.2 of this OU-4 FS (i.e., fish tissue PRGs that are protective of human health) have been established on the site-specific basis. In addition, the criteria value (0.000064 µg/L) was also developed to incorporate the use of surface water as a drinking water source, which is not occurring in OU-4. The analogous numerical criteria under state regulations should also be waived as the criteria is not consistently applied by the State.

6.3.2.3 Summary of Ecological and Human Health PRG Values

A summary of the proposed PRG values for ecological and human health receptors includes the range of RGOs considered for each media (e.g., soil, sediment, surface water, biota) for each receptor (e.g., birds, fish, humans, ecological mammals), the critical PRGs, and the PRG values that were proposed for use in developing and evaluating remedial alternatives for OU-4 (Table 6-5).

7 CANDIDATE REMEDIAL AREAS

Defining the areas and volumes to be addressed in the remedial process is an important step in defining and evaluating remedial options. The information generated during this step assisted with quantifying the amount and nature of materials to be addressed in combination with the site-specific attributes that are critical to evaluating candidate remedial technologies. This section identifies the candidate remedial areas and volumes (where applicable) for the four categories of remedial alternatives. These categories reflect a range in environmental media and settings and were based on a combination of the preliminary RAOs, PRGs, potential receptors, associated environmental media, and previous remedial measures that have been implemented. The following are the resulting categories of remedial alternatives:

- Residential soil
- IM areas
- Nonresidential soil
- Creek banks and sediment

While surface water and biota were identified as being above acceptable risk levels and/or ARARs, these two media were not specifically evaluated in the FS process because the concentrations in surface water and biota are a function of the concentrations in sediment and other sources. Therefore, remedial actions to address PCBs in surface water and biota are included under the remedial alternatives for sediment and creek bank/source control.

The proposed remedial areas for each of the four categories are described below. For two categories (residential soil and IMs), the remedial alternatives include actions that have already been implemented.

7.1 Residential Soil

Residential sampling and soil removals in OU-4 (Figure 4-6b through Figure 4-6j) were conducted in two phases under the NTCRA Agreement. An overall location key for this series of figures is provided on Figure 4-6a. The two phases included an initial phase of work conducted for Evaluation Area 35 located in the upstream portion of the OU-4 floodplain near Friendship Road and a subsequent phase of sampling and removals conducted for portions of the floodplain downstream of Evaluation Area 35 under USEPA-approved sampling plans (USEPA 2012a,b). The general approach for residential sampling and removals used for OU-4 (and OU-1/OU-2) under the NTCRA Agreement was also carried forward in the OU-1/OU-2 ROD (USEPA 2017).

Residential use areas were identified, categorized, and sampled and, if needed, soil was removed. Based on sampling and analytical results from 59 residential properties, removals were required on 20 residential properties; removals were completed for 19 of these 20 properties in accordance with the NTCRA Agreement. The 59 residential properties included 25 properties located in Evaluation Area 35 and 34 properties located in the remainder of OU-4. Removals were conducted for 8 of the 25 residential properties sampled in Evaluation Area 35. There are no PCB residuals at depth for the Evaluation Area 35 properties. There were 34 residential properties sampled outside of Evaluation Area 35, and removals were conducted for 11 of the 12 properties where

removals were required. For the 11 residential areas where surface soil was removed, PCB residuals at depth remain at 5. In these areas, residual PCBs with concentrations less than 10 mg/kg are present below the 1-foot horizon and covered by a 1-foot layer of clean backfill that was placed following the removal action. There is one property where the residential removal has not been implemented due to the lack of property access (Structure ID 117 shown on Figure 4-6h). A summary of the residential properties where long-term soil management support will be required is provided in Table 7-1. The table identifies PPINs for the five properties where PCB residuals are present at depth. Table 7-1 includes references to the Figure 4-6 series where the properties and areas with residuals are shown along with the one residential property where access was denied and PCBs remain in surface soil. The table also identifies 14 properties (including a property with PCB residuals at depth) where structures remain in place and sampling will need to be conducted in the future if these structures are removed. The work conducted for the Evaluation Area 35 identified residential use areas based on parcel IDs and PPINs and are identified on Figure 4-6b with the PPINs provided in Table 7-1. The subsequent evaluation of residential use areas in the remaining portion of the OU-4 floodplain was based on Structure IDs, and these ID numbers are used to show property locations on the Figure 4-6 series and are also provided in Table 7-1 along with the associated PPIN for the property.

If the landowner grants access for the one property where the residential removal has not been conducted, it is expected that removing the top 1 foot would address PCBs above 1 mg/kg in the upper foot and that no PCB residuals above 10 mg/kg are present in subsurface soil. The estimated area and volume of soil with PCB concentrations above 1 mg/kg for this residential use area are 0.25 acres and 400 cubic yards, respectively.

For the purposes of estimating the area and volume for the five areas where PCB residuals remain at depth, it is assumed that residuals extend up to a maximum of 4 feet below the current ground surface. If these subsurface soils are included in a remedial alternative, the area associated with removals at depth is 1.1 acres and includes five individual noncontiguous areas. The estimated volume for subsurface soil at these five residential use areas is 7,000 cubic yards, including the clean surface material that was placed following the initial removal actions.

The summed areas and volumes for the six residential areas (one remaining property with PCBs in surface soil and the five areas with residuals at depth) are 1.35 acres and 7,400 cubic yards, respectively.

7.2 Interim Measures

IMs in OU-4 include four previous actions implemented at Oxford Lake Park (Figures 3-2a, b, and c). Information regarding the presence of residual PCBs in the Oxford Lake Softball Complex, including the calculated EPCs, is provided in Section 3.2.1.1. Construction details for the four IMs are provided in the OU-4 RI. Each IM mitigated potential exposure to PCB-containing soil and limited the potential for the erosion of this soil. An overview of the four IMs is as follows:

- Softball Fields: Soil was excavated from three softball fields, and a geotextile marker layer was placed following excavation The excavated areas were backfilled with clean imported soil (Figure 3-2b).

- Parking Lot: Soil excavated from the three softball fields was isolated under a multilayer cover system, including an upper layer of asphalt, as part of constructing the parking lot (Figure 3-2c).
- Tennis Courts: Several tennis courts were constructed by placing geotextiles, clean fill materials, and an asphalt cover system over an area with PCB-containing soil (Figure 3-2c).
- Southwestern Park Area: A 1.8-acre portion of Oxford Lake Park located west of the parking lot (Figure 3-2c) was covered with a 1-foot soil layer as the initial IM. The materials beneath the soil cover were further isolated through subsequent construction of a baseball field (Miracle Field) that was built to support athletic events for children with disabilities (Figure 3-2c). The Miracle Field was an infrastructure support project described in the OU-4 RI.

While all four previous IMs are effective with long-term O&M, candidate remedial areas were developed for the outfield portions of Fields A, C and D. The candidate remedial areas included the surface soil layer (upper 1 foot including the narrow areas between the applicable outfields). The candidate remedial areas were developed to minimize the potential for future soil management support to interrupt access for recreational opportunities (Figure 3-2c). The potential for the repair or installation of irrigation or other related equipment could in some cases require soil management support that could interfere with scheduled recreation activities. The candidate remedial areas were also expanded to include a single portion in Field C where PCB concentrations in the 1–2-foot horizon were 50.6 mg/kg. In a similar but less likely scenario, soil management support for these deeper materials, if needed, could potentially impact ongoing recreational activities.

The remedial footprints are based on the specific fields where soil would be removed (approximately 2.2 acres for Field D, and when Fields A and C are added to the remedial footprint, a total of 6.1 acres). The associated removal volumes range from 3,740 to 9,842 cubic yards. The remedial volume for the Field A outfield also includes the narrow area between Fields A and D. The remedial volumes for alternatives incorporating Fields D, C, and A also include the two narrow areas between three fields that are shown on Figure 3-2b. The upper end of the volume range includes the removal of soil from the 1–2-foot horizon for a small portion of Field C where the PCB concentrations exceed 50 mg/kg.

7.3 Nonresidential Soil

This section of the OU-4 FS includes the preliminary identification of areas and volumes that are associated with the nonresidential soil PRGs identified in Section 6. The areas and volumes are based on post-remediation conditions meeting the ecological PCB PRG for soil (6 mg/kg PCB SWAC 0–0.5-foot horizon) and the human health PRG for the future agricultural exposure scenario (10 mg/kg PCB SWAC for 0–1-foot horizon).

Three different scenarios with alternative PRGs for nonresidential soil are also presented in Section 7.3.2. A summary for each approach is provided along with the size of the remedial footprint and the associated volume of soil that would need to be removed to achieve the alternative PRG. The cost implications of implementing these different PRG scenarios are also provided. This

information is being provided to assess the significant and widespread impact of potentially implementing a cleanup with differing PRGs.

Floodplain soil in OU-4 does not have PCB concentrations that are greater than or equal to a potential principal threat waste (PTW) waste threshold concentration of 500 mg/kg. The lack of PTW-soil is supported by the groundwater data for OU-4 where results of groundwater and well-water samples were nondetect for PCBs.

7.3.1 Preliminary Areas and Volumes for Ecological and Human Health PRGs

For the purposes of defining the nature and extent of constituents and for assessing risk, the 6,000-acre OU-4 floodplain was divided into smaller geographical units defined as EUs. The development and definitions of the human health and ecological EUs are described in additional detail in the OU-4 HHRA (JMWA and Avatar Environmental 2013) and the OU-4 BERA (Arcadis 2016). A summary of the process to delineate the human health and ecological EUs is also provided in the OU-4 RI (Geosyntec 2019). The primary differences between the human health and ecological EUs are in the Oxford Lake Park area where the ecological EUs are separated by Snow Creek and have eastern and western EUs. The human health EU along the western portion of Snow Creek extends over the creek toward the north, based on the premise that this area has similar opportunities for human access and use. The ecological EUs also include separate riparian EUs bordering the creeks.

7.3.1.1 Preliminary Areas and Volumes for Ecological PRGs

The ecological PRG for nonresidential floodplain soil (6 mg/kg) was applied on a SWAC basis for the 0–0.5-foot horizon. The process to identify the target remedial areas to achieve this ecological PRG included segmenting the floodplain into Thiessen polygons where existing PCB results were used to define the PCB concentration for each polygon. The existing PCB conditions for the ecological EUs based on this approach are presented on Figure 7-1, and the post-remediation conditions are presented on Figure 7-2a. The target removal areas to achieve this ecological PRG are also presented on Figures 7-2b through 7-2t. The estimated removal area is approximately 71 acres, and the approximate removal volume is 57,475 cubic yards.

The reduction in PCB concentrations associated with ecological exposures for implementing advance soil management north of I-20 (Figure 7-3a) is not numerically significant. One advance soil management would include removal of soils with PCB concentrations greater than or equal to 50 mg/kg located in the upper 1 foot. The size and location of the remedial footprint including the advance soil management is essentially the same at approximately 71 acres if the advance soil management is applied to areas located north of I-20. The removal volume increases to 73,345 cubic yards with this approach because large portions of the remedial footprint address soil in the 6–12-inch horizon with PCB concentrations greater than or equal to 50 mg/kg (Figure 7-3b). The remainder of the target removal areas located south of I-20 are the same as shown on Figures 7-2c through 7-2t and target the 6–12-inch horizon. The results of a more widespread approach to advance soil management are shown on Figure 7-4a for proactively removing soil with PCB concentrations greater than or equal to 50 mg/kg in the upper 1 foot of the entire OU-4 floodplain. The target removal areas to achieve this ecological PRG are also presented on Figures 7-4b through 7-4j. Since target removal areas were not identified for the EUs downstream of EUs C4N and C4S, PCB concentrations for these areas are as shown on Figures 7-2k through 7-2j. The resulting removal footprint and volumes are 116 acres and 143,801 cubic yards. A final approach was

developed that included applying a mean 6 mg/kg SWAC for the 0–6-inch horizon and addressing soils across OU-4 with PCB concentrations greater than or equal to 50 mg/kg in the 0–4-foot horizon. This larger-scale approach resulted in the removal of 303,533 cubic yards of soil over 137 acres.

The areas and volumes identified above were developed using a SWAC approach that is common practice for FS and RD projects. To further understand the application of SWACs to FS and RD projects involving PCBs and mercury, an evaluation of where SWACs have been used was conducted. This included assessing an evaluation presented in Pelletier et al. (2019), which is summarized in Appendix H. While Pelletier et al. (2019) presented SWACs for sediment sites, the results are applicable to FS and RD projects that address soil and sediment, The results from Pelletier et al. indicate that SWAC-based sediment remediation goals have increased over time. From 2010 through 2017 (the end of the document review period by Pelletier et al.), SWAC-based remediation goals were used in decision documents for most sites to account for the integrated exposure of the bioaccumulative COCs for receptors (e.g., foraging fish). For sites where SWAC-based remediation goals were included in decision documents, the SWAC calculation method was based on calculating the weighted mean concentration for the majority of uses versus an upper confidence level of the mean approach. The Pelletier et al. remediation goals database has 182 entries, of which 121 have remediation goals driven by action levels, 40 by SWACs, and 21 by unspecified cleanup goals. For the sites with SWAC-specified remediation goals, 27 (68%) were calculated using the weighted mean concentration. The prevalent use of the area-weighted average indicates that it is a common method to establish remediation goals for contaminated sediment in the United States, and, moreover, is applicable to the Anniston PCB Site COCs. More recently, USEPA used mean-based SWACs to identify remedial areas for sediment in the ROD for the Lower Passaic River Study Area (USEPA 2021d), and mean-based SWACs have been recommended for use by the Contaminated Sediment Technical Advisory Group for this site (USEPA 2020a), the Newark Bay Study Area (USEPA 2020b), and Newtown Creek (USEPA 2020c) in 2020.

The 2021 ROD for the Lower Passaic River Study Area specifically highlights outreach efforts with the local Community Advisory Group where USEPA presented several topics including

> *"the concept of surface weighted average concentration (SWAC), which is a weighted average of sample data intended to estimate a mean contaminant concentration over a specified spatial area, as well as the anticipated range of remedial alternatives and remedial action objectives (RAOs)."*

Application of the SWAC for the Lower Passaic River Study Area was further discussed by USEPA in responding to comments (Section A.4 of the Responsiveness Summary). USEPA's response indicated that

> *"The SWAC is a weighted average of sample data intended to estimate a mean contaminant concentration over a specified spatial area. If data are collected on an unbiased grid, the SWAC can be estimated as the average of the sample data. However, if there are variations in the spatial density of the data across that spatial area, the sample concentrations need to be weighted by the portion of the area that each sample represents in order to estimate the mean over that area. A*

SWAC, like all averages, includes concentrations above and below the average concentration."

The technical approach for developing the nonresidential floodplain soil SWACs for this OU-4 FS is presented in Appendix D. This includes the use of Thiessen polygons and EUs with slightly different footprints that reflect exposures for ecological and human health receptors. While the EU footprints are similar, there are small differences based on the respective risk assessments. Because of these differences, the geographic footprints (and concentration values) for the pre- and post-remediation conditions for ecological and human health receptors are slightly different. The pre- and post-remediation for the ecological and human health receptors also account for the different exposure horizons with 0–0.5-foot horizon for the ecological receptors and 0–1-foot horizon for human health receptors.

The predesign investigation program could use an Incremental Sampling Methodology (ISM) to further refine the target nonresidential soil areas identified in this OU-4 FS. The ISM approach is detailed in the Interstate Technology & Regulatory Council (ITRC) technical/regulatory guidance on ISM (ITRC 2020). ISM is a statistically supported assessment technique to characterize the mean contaminant concentration in a defined area/volume of environmental media (i.e., soil, sediment), and by design, developed to provide confidence around the mean value for a given decision unit. For OU-4, decision units would likely be defined horizontally by the EU boundaries shown in Figures 7-2a-t, and vertically by the selected alternative's maximum depth horizon (e.g., 0–0.5-foot, 0–1-foot, or 0–4-feet). Typically, 30 to 100 increments of soil are collected from a decision unit or sampling unit, and combined, processed, and subsampled for laboratory analysis. As part of the ISM-based predesign investigation, replicates would be collected for a decision unit to allow for calculation of a 95% UCL to minimize underestimation of the true mean of the decision unit. Three or more ISM replicates are required to calculate a 95% UCL. Details of the ISM program would be developed as part of the predesign investigation work plan to be reviewed and approved by USEPA.

7.3.1.2 Preliminary Areas and Volumes for Human Health PRGs

The floodplain soil conditions relative to human health risks were assessed as part of this OU-4 FS and focused on future agricultural exposure conditions as the OU-4 HHRA. No current risks associated with exposure to nonresidential soil were identified. The PRG for nonresidential soil (the future agricultural scenario) is 10 mg/kg SWAC for the upper 1-foot horizon. Existing PCB concentrations on an EU-basis for nonresidential floodplain soil based on the 0–1-foot horizon are presented on Figure 7-6. The resulting SWAC concentrations for the upper 1 foot are shown on Figure 7-7a following the removal of soil from the 0–0.5-foot horizon to achieve the ecological PRG of 6 mg/kg. The post-removal concentrations were developed based on an average PCB concentration for the 0–1-foot horizon. This average PCB concentration was calculated using existing PCB results for the 0.5–1-foot horizon that would not be removed and a site-specific PCB nondetect concentration to represent the clean backfill that would be placed in the upper 0.5-foot horizon following soil removal. This calculation approach is presented in Exhibit 2 below for the remedial alternatives where only the upper 0.5 feet of soil is actively removed. There are remedial alternatives evaluated in the OU-4 FS where soil is removed to a depth of 1 foot bgs. For these alternatives, the resulting post-remediation SWACs for the EUs were calculated using the full 1-foot removal for these locations.

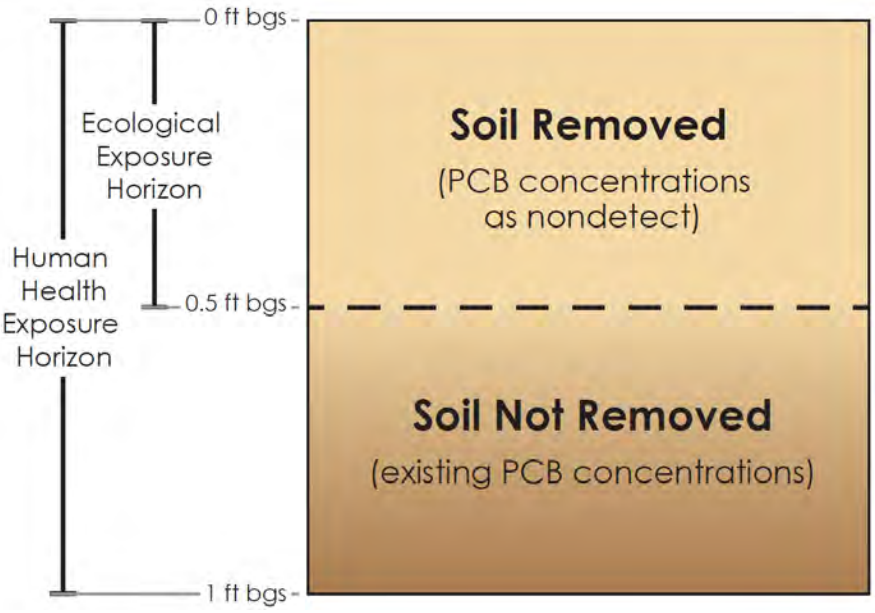


Exhibit 2. Ecological and Human Health Exposure Horizons

The target removal areas to achieve the ecological PRG of 6 mg/kg and pre-remediation concentrations for human health exposure conditions are shown on Figures 7-7b through 7-7m for human health EUs C3N-EU1 through C5S-EU1. The human heath EUs used to develop these figures have a slightly different footprints than the ecological EUs. The figures also show the agricultural EUs from the OU-4 HHRA and Zones 1 and 2 from the Conservation Corridor. The figures show that large portions of the agricultural areas are located away from Choccolocco Creek, and PCB concentrations tend to be elevated immediately adjacent to the creek. Where the agricultural EUs border Choccolocco Creek, the fencing associated with Zone 2 of the Conservation Corridor prevents livestock from entering the creek and the near-creek areas with higher PCB concentrations (especially in the upstream portion of the floodplain). A similar approach was used to develop the post-removal PCB concentrations for the three proactive advance soil management scenarios. The post-remediation SWAC for the scenario where PCB concentrations greater than or equal to 50 mg/kg would be removed from the upper 1 foot of soil located upstream of I-20 is presented on Figure 7-8. The target removal areas for this scenario are the same as shown on Figures 7-7b through 7-7m. The same information is presented on Figure 7-9a through 7-9m and Figure 7-10a through 7-10x for locations where PCB concentrations greater than or equal to 50 mg/kg would be removed from the upper 1 foot of floodplain soil and upper 4 feet of floodplain soil in OU-4, respectively.

7.3.2 Alternative Remediation Scenarios

Three alternative remediation scenarios were developed to understand the level of impact in terms of areas disturbed and volumes removed. The areas disturbed included the overall acreage for the remedial footprint, how much of this acreage was in riparian habitat areas, and the number of affected landowners. The estimated costs to design and implement these alternative scenarios are also identified below with the supporting details provided in appendices along with figures showing the areas and depths of removal. The three alternative remediation scenarios presented in Appendix E are as follows:

- Alternative Remediation Scenario 1: 2 mg/kg PCB SWAC in floodplain soil for the 0–0.5-foot horizon
- Alternative Remediation Scenario 2: 2 mg/kg PCB SWAC in floodplain soil for the 0–0.5-foot horizon and 50 mg/kg for the 0–4-foot horizon
- Alternative Remediation Scenario 3: 1 mg/kg PCB SWAC in the 0–4-foot horizon

7.3.2.1 Alternative Remediation Scenario 1

The first alternative remediation scenario includes removing floodplain soil based on achieving a post-remediation PCB SWAC of 2 mg/kg for the 0–0.5-foot horizon. The remediation footprint for this alternative scenario is 306 acres, and the removal volume is 247,070 cubic yards (approximately 4 times the removal volume of nonresidential soil alternative 2 [NRS-2]). The estimated cost for this alternative remedial scenario is approximately $128.2 million (Appendix E). A figure showing the remediation footprint for this scenario is included in Appendix E as Figure E-1. A total of 47 landowners, 75 parcels, and 81.5 riparian acres would be impacted under this alternative remediation scenario. The improvement in protectiveness for this additional effort and cost would be approximately 4% on a site-wide basis. This estimate is based simply on the difference in area remaining after removal efforts that would be greater than 2 mg/kg and greater than 6 mg/kg. In comparison to NRS-2, an additional 62.2 riparian acres (or 4 times the number of riparian acres) would be impacted under this alternative remediation scenario. Also, an additional 25 landowners and 41 parcels would be impacted under this alternative remediation scenario compared to NRS-2.

7.3.2.2 Alternative Remediation Scenario 2

The second alternative remediation scenario includes removing floodplain soil based on achieving a post-remediation PCB SWAC of 2 mg/kg for the 0–0.5-foot horizon and removing PCB-containing soil with concentrations greater than or equal to 50 mg/kg to a depth of 4 feet bgs. The remediation footprint for this alternative scenario is 327 acres, and the removal volume is 456,709 cubic yards (approximately 8 times the removal volume of NRS-2).

The estimated costs for Alternative Remediation Scenario 2 are approximately $242.5 million (Appendix E). The remediation footprint and removal depths for this scenario are shown on Figure E-9 in Appendix E. A total of 47 landowners, 75 parcels, and 89.9 riparian acres would be impacted under this alternative scenario. In comparison to NRS-2, the remediation footprint is more than 4 times the remedial footprint of NRS-2, and an additional 70.2 riparian acres would be impacted. More than 2 times the number of landowners and parcels would be impacted under this alternative remediation scenario. As described above, the reduction to a SWAC target of 2 mg/kg only improves protectiveness by approximately 4% over the OU-4 footprint. The additional removal of concentrations at depth does not improve protectiveness for ecological receptors because they are not exposed to this deeper soil.

7.3.2.3 Alternative Remediation Scenario 3

The third alternative remediation scenario includes removing floodplain soil based on achieving a post-remediation PCB SWAC of 1 mg/kg and a removal depth of 4 feet bgs. The remediation footprint for this alternative scenario is 533 acres, and the removal volume is 1,240,194 cubic yards (approximately 21 times the removal volume of NRS-2).

The estimated costs for Alternative Remediation Scenario 3 are approximately $484.8 million (Appendix E). The remediation footprint and removal depths for this scenario are shown on Figure E-17 in Appendix E. A total of 96 landowners, 134 parcels, and 216.8 riparian acres would be impacted under this alternative remediation scenario. In comparison to NRS-2, the remediation footprint is more than 7 times the remedial footprint of NRS-2, and an additional 197.6 riparian acres would be impacted. Between 3 and 4 times the number of landowners and parcels would be impacted under this alternative remediation scenario. This scenario would result in catastrophic habitat destruction of over 200 acres of riparian habitat and would not improve protectiveness because populations of all ecological receptor groups evaluated would be protected at a post-remedial SWAC target of 2 mg/kg.

7.4 Creek Banks and Sediment

Remediation areas for creek banks and sediment were developed based on reducing risks to human and ecological receptors, including the potential ingestion of fish by humans. The target remedial areas for PCB source control include creek bank areas that were identified based on addressing the more significant potential loadings that might be occurring considering the potential for creek and erosion. The approach for developing target remedial areas and volumes for sediment located in OU-4, including Snow Creek and Choccolocco Creek, is presented below and, consistent with the approach for creek bank areas, is based on the RAOs and PRGs developed in Section 6 of this OU-4 FS.

7.4.1 Creek Bank Areas

The OU-4 RI presented the results of the creek bank stability investigations conducted under the RI/FS program for Snow and Choccolocco Creeks. These results document that most of the creek banks rated as having moderate or severe erosion are located along Snow Creek or the upper portion of Choccolocco Creek (Figures 4-31b through 4-31d). The upstream creek bank areas with moderate or severe erosion are also located in the upstream portion of OU-4, which has higher PCB concentrations in bank soil than in the downstream areas. This is especially so for creek bank areas located along Snow Creek. To reduce the potential for creek bank areas being a significant source of PCBs to OU-4 sediment and surface water, creek bank areas located upstream of RM 29.5 that are rated as having moderate or severe erosion would be targeted for PCB source control actions (Figure 7-11). Combining the amount of soil eroding from the creek bank areas with the average PCB concentration for these lengths of creeks provides an estimate of annual PCB loadings (Figure 7-12). The linear feet of creek banks to be stabilized versus annual PCB loading on a cumulative basis is shown on Figure 7-13. The results show that without the PCB inputs from upstream OUs that are being addressed under separate RODs, approximately 81% of the annual PCB load to the aquatic systems are associated with creek banks having severe and moderate erosion that are located upstream of RM 29.5.

The targeted Snow Creek banks with moderate or severe creek erosion include most of the creek from Highway 78 to its confluence with Choccolocco Creek, absent the creek banks under I-20. The creek banks under I-20 were previously stabilized as part of an infrastructure support project when this highway was widened. The source control actions would target both sides of Snow Creek over its entire length in OU-4 and would result in stabilizing approximately 6,800 linear feet of creek bank. The targeted creek bank areas along Choccolocco Creek include portions of the backwater area and several downstream creek bank areas to RM 29.5. Downstream of RM 29.5,

Choccolocco Creek begins to widen, and the distance from the water's surface to the top of bank decreases. There is an estimated 10,300 linear feet of creek bank areas along Choccolocco Creek with moderate or severe erosion. The targeted creek bank areas are located on both the northern and southern sides of Choccolocco Creek, but, unlike Snow Creek, the targeted actions will not necessarily occur on opposing sides of the creek.

Some of the remedial alternatives in this OU-4 FS include additional source control measures for creek bank areas upstream of RM 29.5. The additional efforts are focused on creek bank areas with minor erosion and would be addressed along with the moderate and severe erosion areas located upstream of RM 29.5. This variation was being included in some of the remedial alternatives to assess potential reductions in the time following remedy implementation to achieve the PRGs. The additional creek bank source control measures for the minor erosion areas would be implemented along Choccolocco Creek and Snow Creek and would increase the overall length of creek bank work from 15,700 linear feet to 39,300 linear feet. Details for the efforts to estimate creek bank erosion rates and the associated PCB loadings are provided in Appendix F to this OU-4 FS.

7.4.2 Sediment

There are several proposed PRGs for PCBs in sediment based on a combination of ecological and human health receptors:

- 0.63 mg/kg as a long-term SWAC to protect ecological receptors
- 2.6 mg/kg as a NTE concentration to protect benthic communities
- 0.10 mg/kg downstream of Jackson Shoals and 0.2 mg/kg upstream of Jackson Shoals as long-term SWAC values as potential predictors for PCB concentrations in fish tissue that would be protective of human health
- 0.13 mg/kg as a long-term SWAC as a potential predictor of whole-body PCB concentrations in fish that are protective of ecological receptors

The approach for identifying candidate remedial areas for sediment includes RALs for sediment that, in combination with source control actions and MNR, would be protective of ecological receptors and achieve the target range of human health PRGs for PCBs in fish tissue over time. Two sediment PCB RALs are used for OU-4, including an NTE of 2.6 mg/kg (based on the benthic PRG) and achieving a post-remediation SWAC less than 1 mg/kg as a RAL. The PCB results for OU-4 sediment show that sediment in Snow Creek and the backwater area portion of OU-4 will be included in the candidate remedial areas based on concentrations above the target goals (Figure 4-49 for Snow Creek and Figure 4-50 for the backwater area). The PCB results presented on Figure 4-50 as SWACs for the various reaches of sediment in Choccolocco Creek show that SWAC values for the reaches downstream of the backwater area are already less than 1 mg/kg. The largest portion of the target remedial footprint for OU-4 sediment includes Snow Creek and the backwater area, including a relatively small sediment deposit located immediately downstream of the Friendship Road Bridge. Implementing the NTE PRG as a RAL and addressing the small sediment deposit located just downstream of Friendship Road will also serve to lower the SWACs for the upper and middle reaches of Choccolocco Creek.

The remedial footprint for sediment located in the upper portion of OU-4 (Figure 7-14) is approximately 13 acres and includes approximately 32,700 cubic yards of sediment with PCB concentrations above the NTE 2.6 mg/kg. Addressing the sediment areas shown in Figure 7-14 will achieve a post-implementation SWAC of 1 mg/kg as a RAL in this portion of OU-4. A small portion of the backwater area has been identified as having sediment with PCB concentrations greater than or equal to 500 mg/kg. This 0.04-acre area is shown on Figure 7-15, and the estimated volume of sediment associated with this area is 225 cubic yards.

Based on the PCB results for Choccolocco Creek presented on Figure 4-46, some isolated target sediment areas are in lower OU-4 (Figure 7-15). These target areas were developed based on addressing locations that exceed the NTE concentration of 2.6 mg/kg. Based on the reach-based SWACs presented on Figure 4-50, addressing these small-isolated areas will achieve a post-implementation SWAC of 1 mg/kg as a RAL for this lower portion of OU-4. The estimated remedial footprint for the target sediment areas in lower OU-4 totals 12 acres and was developed based on going to locations where the surface sediment PCB concentrations exceed 2.6 mg/kg and extending a removal footprint upstream and downstream halfway to locations where the PCB concentrations were equal to or below 2.6 mg/kg. The remedial footprint development process also included maximum upstream and downstream distances of 200 feet. The estimated volume for these downstream deposits was calculated based on an assumed 1-foot removal thickness over the 12-acre collective footprint and totals 19,400 cubic yards. These estimates are based on sediment investigation results developed during the RCRA Off-Site RFI program in 1999 and the OU-4 RI/FS conducted from 2006 to 2010 under the PCD. The estimated areas and volumes will be refined through predesign investigations conducted during the RD for OU-4. The predesign investigations would focus on the specific target areas identified in Figure 7-15 (lower OU-4) and could use the same ISM approach described in Section 7.3.1 that is being used for target nonresidential soil areas. Predesign investigations are not needed for the target remedial areas identified in Figure 7-14 for upper OU-4 as it reasonable to assume that the target remedial footprint presented in this figure exceeds the NTE concentration value.

For estimating purposes, the total remedial area for OU-4 sediment is estimated as 25 acres and includes approximately 52,100 cubic yards of sediment. These target volumes do not include an estimate of overdredging that may occur during sediment removal.

There is one location downstream of Jackson Shoals with a PCB concentration exceeding 2.6 mg/kg (Figure 7-15) that was not included in the remedial footprint for lower OU-4. The PCB result for this location (2.7 mg/kg) was for a surface sediment sample collected as part of the Off-Site RFI around fish collection Station 35 in 1999. There were 10 individual surface sediment samples collected as part of the Station 35 evaluation, and only 2 of the 10 samples had PCB concentrations exceeding 1 mg/kg. The average PCB concentration for the 10 samples collected for Station 35 was 0.79 mg/kg. Sediments in this depositional portion of OU-4 are highly stable, and given the 20 plus years since the same was collected, it is reasonable to assume that the surface sediment concentrations are below the NTE value of 2.6 mg/kg. This isolated area could also be assessed during predesign investigations conducted as part of the OU-4 RD.

To provide context for the remedial alternatives for sediment presented in this OU-4 FS, an alternative scenario was evaluated using a PCB RAL of 0.1 mg/kg. Implementation of this potential scenario would result in bank-to-bank dredging across the entire OU-4 footprint,

including the removal of thick sediment deposits in the portion of Choccolocco Creek that transitions into Lake Logan Martin. The estimated volume of sediment that would be removed using a PCB RAL of 0.1 mg/kg is presented in the Off-Site RFI (BBL 2000) for Choccolocco Creek. Accounting for the thickness of sediment, the estimated volume of sediment in Choccolocco Creek using this RAL is approximately 2 million cubic yards. This includes approximately 300,000 cubic yards located upstream of Jackson Shoals and 1,700,000 cubic yards located downstream of Jackson Shoals. This volume was appropriate to use for this evaluation because the volume of sediment in the OU-4 portion of Snow Creek is negligible relative to total volume of sediment in Choccolocco Creek. Implementation of this scenario would result in significant damage to ecological resources, including habitat for threatened and endangered mollusks that are currently returning to portions of Choccolocco Creek. In addition to the destructive nature of such a dredging project, additional impacts would be associated with placing 2 million cubic yards of backfill to the dredged areas. The time to implement a project of this scale is decades, not years, and the estimated costs could range from $600 million to $1 billion dollars.

8 GENERAL RESPONSE ACTIONS AND REMEDIAL TECHNOLOGIES

This section identifies GRAs for OU-4 and evaluates remedial technologies and associated process options. The remedial technology evaluation process is consistent with USEPA *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (USEPA 1988). Remedial technologies for sediment are also evaluated and are consistent with applicable sediment remediation guidance from USEPA's *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (USEPA 2005e). The technology evaluation process includes two steps.

The first step is an initial evaluation of technical implementability for each technology. This initial screening step is designed to answer the threshold question as to whether a technology is capable of being implemented at the Site to achieve the RAOs. The second step in the screening process evaluates individual remedial technology process options. Those remedial technologies and associated process options that remain after this second screening step are used to evaluate the remedial alternatives in Section 9.

This section provides a listing of the applicable GRAs (Section 8.1) followed by a summary of the technology evaluation process (Section 8.2). The details of the technology evaluation process are included in Tables 8-1 and 8-2. The remaining portions of this section were developed to summarize the technology evaluation process based on media as a bridge to the four categories of remedial alternatives evaluated in this memorandum, including residential soil, IMs, nonresidential soil, and creek banks and sediment.

8.1 General Response Actions

The potential GRAs for OU-4 are listed below and, in some cases, might apply to more than one environmental medium (e.g., ICs could apply to soil and sediment). In a similar manner, multiple GRAs could be used to address a singular medium. For example, removal and containment could be used together as part of a remedial alternative to realign a section or sections of creek to address sediment-related concerns.

- No action
- Source control
- ICs/access controls and monitoring
- MNR
- In-place containment and control for soil or sediment
- In-place soil/sediment treatment
- Ex situ soil/sediment treatment
- Soil/sediment removal
- Creek bank stabilization
- Soil/sediment transport
- Soil/sediment disposal

- Residuals management for soil and sediment

8.2 Identifying and Screening Remedial Technologies

The inventory of remedial technologies included in the screening process is provided in Table 8-1 and are grouped by GRA. This inventory was based on the initial list of remedial technologies presented in the RI/FS work plan for the Site (BBL 2004) and has been updated based on the OU-3 FS (Golder 2010), the OU-1/OU-2 FS (Ramboll Environ 2016), the Comparative Analysis Memorandum (Geosyntec 2020), and available information regarding the applicability and performance of remedial technologies. The initial step in the screening process focused on identifying technologies that alone or in combination with other technologies were technically implementable, meaning that the technologies are both effective and reliable in addressing PCBs in a given medium. The technologies retained through the initial screening step are evaluated in Table 8-2 based on effectiveness, implementability, and cost. The evaluations are qualitative and have rankings of high, moderate, or low. The following are definitions of these three rankings for the three evaluation criteria used in the Table 8-2 evaluation:

- Effectiveness
  - High: Standalone technology is highly effective for addressing PCBs under site-specific conditions.
  - Moderate: Technology is moderately effective at meeting RAOs for PCBs under site-specific conditions. May require combining other technologies to meet RAOs.
  - Low: Technology is ineffective at meeting RAOs for PCBs under site-specific conditions. Would require a complex array of other technologies to meet RAOs.
- Implementability
  - High: No difficulties with implementing technology under site-specific conditions. Technology is readily available, proven, and reliable.
  - Moderate: Some difficulties with implementing technology under site-specific conditions but no fatal flaws. Technology is available, proven, and of average reliability.
  - Low: Major difficulties with implementing technology under site-specific conditions. Fatal flaws identified. Technology is not readily available or is unproven and has low reliability.
- Cost
  - High: The technology requires substantial capital investment and O&M intensity.
  - Moderate: The technology requires moderate capital investment and O&M intensity.
  - Low: The technology requires low capital investment and O&M intensity.

8.2.1 Source Control

Efforts to eliminate or reduce the source(s) of contamination span a wide range of remedial approaches and may include addressing materials already present in OU-4 and addressing

materials located outside of OU-4 that may act as a source. Example source control activities include removing soil and/or placing a cap to prevent direct exposure, limit migration, and prevent impacts to surface water. Examples of source control upstream of OU-4 include the work conducted for the Facility under the RCRA program and under the OU-3 IROD, the work planned for upstream in Snow Creek under the OU-1/OU-2 ROD to limit the movement of PCBs into downstream portions of the Site, and actions within OU-4, such as targeting creek banks that might serve as a PCB source to sediment and surface waters of Snow and Choccolocco Creeks.

8.2.2 Monitored Natural Recovery

MNR for sediment uses natural processes to reduce exposure concentrations of a given contaminant over time. For PCBs in sediment, the primary MNR mechanism is introducing and mixing relatively cleaner sediment brought into the aquatic system through flow from upstream. Other processes for sediment, such as biodegradation, volatilization, dispersion, adsorption, and dissolution, play a lesser role in MNR.

8.2.3 Institutional Controls and Monitoring

ICs generally refer to measures intended to affect human activities to prevent or reduce exposure to media that have chemical concentrations exceeding risk thresholds or ARARs. An example IC for OU-4 would be a fish consumption advisory that provides recommendations for the amount and type of fish that may be consumed from Choccolocco Creek. The fish consumption advisories may vary by water body or reach of the water body. An IC for fish consumption would be supported through a combination of informational devices, such as public notices, educational outreach programs, signage, or applications designed for use on mobile smart phones. Other types of ICs include programs like the Alabama 811 system that may be used to assist with implementing the long-term management of soil containing residual PCBs. Use of the Alabama 811 system may be selected as part of the long-term soil management approach presented in the OU-1/OU-2 ROD. A similar approach is envisioned for PCB-containing residual soil in OU-4. Land use limitations may also be considered for areas in OU-4 where IM projects or final corrective measures under the RCRA program have been previously implemented.

Monitoring plays an important role in demonstrating remedy effectiveness and will be critical to assessing the long-term effectiveness of remedies implemented for Snow and Choccolocco Creeks. Traditional monitoring and associated remedy metrics for sediment sites often rely heavily on changes in fish tissue concentrations over time to assess whether the remedy is effective. Since the time frames to achieve the PRGs are often decades and include MNR as an important component of achieving these goals, traditional monitoring indicators (sediment, surface water, and biota) will need to be augmented with alternative monitoring tools and associated metrics. Alternative monitoring tools and remedy metrics will be critical for demonstrating progress in meeting the goals over shorter time periods. Example alternative remedy monitoring tools include passive sampling using polyethylene sampling devices to understand temporal changes in exposure conditions and sediment traps deployed over extended periods to understand changes in PCB concentration for sediment that is accumulating and becoming part of the new biologically active zone (BAZ) as part of MNR. Example alternative remedy metric endpoints include positive trends toward the long-term goal based on the alternative monitoring approach results, achieving positive improvements for reducing some aspects of the fish consumption advisories, and/or achieving fish tissue concentrations consistent with the CTE exposure conditions identified in the OU-4 HHRA.

8.2.4 In-Place Containment: Capping

Containment remedies are often implemented to prevent or significantly reduce the exposure of potential receptors to contaminated soil or sediment and to prevent or significantly reduce the migration of contaminants to surface water. Containment is often used when contaminated soil or sediment is left in place. Caps can be constructed with a range of materials (e.g., sand, geotextiles). Active caps for isolating sediment may include materials such as organoclay or granulated activated carbon to assist in isolating the contaminated sediment from the overlying surface water. Caps require long-term, periodic inspections and maintenance.

8.2.5 In-Place Treatment

The evaluation of in-place treatment technologies was focused on sediment and not soil because no locations in OU-4 have soil PCB concentrations above 500 mg/kg. The in-place treatment of PCBs in sediment is limited to a range of vendor options that deliver activated carbon to the sediment matrix to reduce the bioavailability of PCBs. The activated carbon is mixed into the BAZ through natural processes (e.g., bioturbation and sedimentation). Site-specific treatability testing is typically conducted during the RD to determine optimum dosing. One limitation of this technology is the need to have a stable sediment setting. Based on the hydrodynamics of OU-4, the technology is likely only applicable to the braided stream portion of the backwater area.

8.2.6 Ex Situ Treatment

The evaluation of ex situ treatment technologies was focused on sediment and not soil because no locations in OU-4 have soil PCB concentrations above 500 mg/kg. The only ex situ treatment approach retained for sediment is off-site incineration. The sediment may require dewatering following removal, including the potential for gravity or the addition of a dewatering agent if needed to pass the paint filter test as a Department of Transportation requirement for transport over public roadways. The residual ash materials remaining after the soil and sediment are incinerated would be disposed of in an appropriately permitted, off-site landfill facility. No Site soil had PCB concentrations greater than or equal to 500 mg/kg; therefore, treatment of soil was not included in the remedial alternatives.

8.2.7 Excavation

Excavation is the process of removing soil and sediment. Routinely available mechanical equipment (e.g., backhoes, bulldozers) is often used to remove these materials. Water-based dredging equipment (e.g., crane-mounted dragline buckets, hydraulic dredges) are likely not applicable to OU-4. A long-reach excavator is more applicable for dredging in this shallow creek setting. Dredging sediment involves different challenges than excavating soil. For instance, sediment concentrations after dredging are affected by the resuspension of sediment during dredging and residuals remaining after dredging. These residuals are largely due to the constraints of working in an aquatic environment. Using long-reach excavators to remove sediment from creek bank areas will present challenges similar to water-based dredging regarding sediment resuspension and residual contamination.

8.2.8 Creek Bank Stabilization

There are two general approaches to creek bank stabilization. These include an engineered approach (i.e., hardening of the shoreline or reshaping the shoreline) and a natural approach

(Georgia Soil and Water Conservation Commission 2000). Common engineered approaches include placing riprap armor stone, reinforced mats, and sheet piling, as well as reshaping or grading creek banks. Riprap is very common and has been used in the general area with more common application near local infrastructure such as bridges. The reinforced mats may be constructed with a wide range of materials that are focused on the particular application. Mats constructed with articulating concrete blocks are common for steeply sloped areas with high surface water velocities. Other mats include a reinforced geotextile material and a growing medium. Sheet piling is often used for vertical bank areas with high-value assets located close to the edge of the waterway. Reshaping or grading is a common approach for redirecting or alternating flow regimes, including the removal of materials to reduce surface water velocities for particular reaches of a creek system.

Natural approaches to creek bank stabilization are becoming more common as the tendency of creeks and streams to degrade the engineered approaches over time is being recognized (FEMA 2009). A cost-effective approach to natural creek bank stabilization is to maintain a riparian buffer zone and limit access. These actions allow the terrestrial plant succession to naturally stabilize a creek bank area that was previously unstable due to shoreline activities. In some cases, all that may be needed is to prevent regular human activities, such as cutting the grass all the way to the edge of the creek. Natural approaches to creek bank stabilization may also include live planting or placing felled trees, brush that has been cut, and/or root balls to facilitate natural plant succession. These materials may be configured along the creek banks to reduce erosion and provide a substrate for additional vegetative growth. There are also settings where the engineered and natural approaches may be combined, such as placing live tree stakes within the spaces between riprap armor stone. This technique stabilizes the shoreline while softening the approach by providing habitat and an opportunity for naturalized vegetative growth. Creek bank stabilization may also include some removal of existing soil. Soil would be removed to increase the cross-section flow area of the creek and reduce surface water velocities. Reducing the velocities along the creek banks would also reduce the potential for erosion.

8.2.9 On-Site Disposal

The application of on-site disposal is limited to residential soils with PCB concentrations less than 10 mg/kg and use of a previously designated on-site management area. On-site disposal has been previously used for residential removals conducted in OU-1/OU-2 and in OU-4. This includes an on-site disposal area for residential materials categorized as having PCB concentrations less than 10 mg/kg. Consistent with previous residential removals conducted under the NTCRA Agreement, the south staging and soil management area (SSSMA) would be the proposed on-site soil management area for excavated residential soil with PCB concentrations less than 10 mg/kg. If the logistics and cost-effectiveness of on-site disposal were not feasible, off-site disposal for excavated soils at an approved facility would also be acceptable. On-site disposal has also been retained as a remedial technology for the potential disposal of nonresidential soil and sediment. This application would be similar to the on-site approach previously used for soil excavated during the construction of detention basins at the CCWWTP as described in Section 3.4.2. This approach recognizes that on-site disposal could be combined in part with off-site disposal as described in Section 8.2.10 based on relative distances to available disposal facilities and market conditions at the time of project implementation.

8.2.10 Off-Site Disposal

Disposal and management of soil and sediment includes using permitted off-site landfills. Off-site disposal facilities typically used for materials with PCB concentrations greater than or equal to 50 mg/kg are different than those facilities used for materials with PCB concentrations less than 50 mg/kg. There are more disposal facilities located in the Anniston area permitted to accept materials with PCB concentrations of less than 50 mg/kg than facilities located in the state of Alabama that are permitted to accept materials with PCB concentrations greater than or equal to 50 mg/kg.

8.2.11 Support Technologies

Remedial technologies were also retained to support other GRAs and technologies. These support technologies include transporting excavated soil and sediment via truck. Trucks would transport the excavated materials to an off-site disposal facility or an on-site soil management area. Other support technologies include managing the waste residuals generated while handling PCB-containing soil and sediment. These waste residuals would be disposed of using the same options available for the soil and sediment.

The discussion below organizes the retained technologies by media: soil and sediment. The technologies and process options associated with no action, monitoring, ICs/access controls, and MNR are not discussed below as they will apply to alternatives for both soil and sediment.

8.3 Evaluation of Remedial Technologies for Soil

A range of technologies and process options have been retained for use in developing remedial alternatives for residential and nonresidential soil. These technologies and process options may be used to limit or eliminate direct contact with PCBs in the candidate remedial areas. The representative process option for the removal of soil is mechanical excavation. Mechanical excavation could be combined with transportation to an off-site disposal facility or, in the case of residential soil with PCB concentrations less than 10 mg/kg, an on-site disposal facility (the SSSMA). If the soil can be excavated and placed into over-the-road trucks for direct transport to the selected disposal facility, no additional support facilities would be needed. For those technologies that involve temporarily storing or processing materials, a material handling pad and water treatment system would be needed.

All remedial alternatives that address soil include soil management activities to the extent applicable. These activities would be conducted under a long-term O&M plan for OU-4, and ultimately, for the Site as a whole.

8.4 Evaluation of Remedial Technologies for Sediment and Creek Banks

The remedial technologies and process options retained for sediment include capping, in-place treatment, dredging/removal using mechanical excavation, creek bank stabilization, off-site disposal, and off-site treatment. Capping sediment is applicable to portions of the backwater area with lower surface water velocities and can be used innovatively as part of a channel realignment approach that holistically addresses the backwater area. Placing a cap in other aquatic portions of OU-4 would be difficult due to the high surface water velocities and thickness of armor stone that would be needed as part of the cap to prevent it from eroding. In-place treatment may also be applied for the same portions of the backwater area with low surface water velocities. Technologies

and process options for a sediment staging and dewatering pad have been retained because they might be needed to dewater sediment before transport to an off-site disposal or treatment facility. If a dewatering pad is necessary, it may be equipped with a water-collection-and-treatment system. The common technologies and process options to treat accumulated waters from staging pads include gravity settling, filtration, and granulated activated carbon. Stabilization agents (e.g., fly ash) may also be used at times instead of dewatering the sediment. If a water treatment system is used, the treated waters (i.e., water treatment system effluent) are typically released to the water body from which the sediment was removed, but the treated waters could also be sent to a publicly or privately owned treatment works. Based on the remote nature of the sediment deposits, discharge of treated water back to Choccolocco Creek is the logical option. The range of engineered and natural creek bank approaches identified and retained for PCB source control are highly applicable to OU-4.

9 SUMMARY OF REMEDIAL ALTERNATIVE SCREENING

This section presents how the remedial alternatives for OU-4 were developed and screened and identifies the alternatives proposed for further consideration. The development of remedial alternatives for OU-4 began by identifying GRAs and the associated remedial technology process options presented in Section 8 that can meet the RAOs for a given media of concern (e.g., nonresidential soil). An example remedial alternative for nonresidential soil using an assembly of process options is excavating soil, transporting that soil via truck to an off-site disposal facility, and disposing of that soil at an off-site facility. Once the range of remedial alternatives was identified for a given media of concern, the alternatives were screened based on effectiveness, implementability, and cost. The performance of each technology against these criteria was then ranked as high (H), moderate (M) or low (L), as described in Section 8.2.

Based on the preliminary areas and volumes for potential remediation presented in Section 7, four categories of remedial alternatives were developed for the media of concern:

- Residential soil
- IMs
- Nonresidential soil
- Sediment and creek banks

A summary of the screening process for the four categories of remedial alternatives is provided below. Those remedial alternatives retained through the screening process for detailed evaluation are also highlighted in green on the Table 9-1 series (9-1a through 9-1d).

9.1 Residential Soil

The three remedial alternatives developed for soil on residential properties each include the removal actions already completed in OU-4 under the NTCRA Agreement. Details of the previously implemented sampling and removal actions are presented in the OU-4 RI and are consistent with the range of remedial alternatives for residential soils evaluated by USEPA for the OU-1/OU-2 portion of the Site. The following are the three remedial alternatives developed to address residential soil:

1. No action
2. NTCRA approach with excavation and on- or off-site disposal for surface soil with PCB concentrations of greater than or equal to1.0 mg/kg and subsurface soil with PCB concentration of greater than or equal to 10.0 mg/kg (400 cubic yards)
3. Excavation and on- or off-site disposal of soil to a depth of 4 feet with PCB concentrations greater than or equal to 1 mg/kg (7,000 cubic yards)

The current status of residential removals is discussed in Sections 4.1.1 and 7.1 and shown on the Figure 4-6 series. The no action alternative would be a no further action alternative, recognizing that all residential removals in OU-4 that can be conducted, have already been implemented. There is one property within a residential use area that was slated for removal, but the landowner will not provide the necessary legal access for this work to be conducted. Under the no action

alternative, no additional actions would be conducted. This includes not conducting a removal for the property where access has not been provided and not providing soil management support (or additional removal at depth) for the residential use portions of five properties in OU-4 where the surface soil removals have been conducted and residual soil with PCB concentrations between 1 mg/kg and 10 mg/kg remain at depth.

The second remedial alternative for residential soil includes the removal actions conducted to date under the NTCRA Agreement and long-term management of PCB residuals through a soil management program. This alternative includes managing PCB residuals that remain at depth for residential use areas at five properties and the potential PCB-containing soil that might be present beneath pavement or structures. These PCB residuals would be managed in perpetuity under a long-term soil management plan that is consistent with the soil management approach selected by USEPA for the OU-1/OU-2 portion of the Site. The remaining residential removal action that has yet to be implemented due to the lack of property access would be conducted when access is provided by the landowner. The estimated removal area for this single residential use area is 0.25 acres. The associated removal volume is 400 cubic yards of soil that would be disposed of on-site in the SSSMA. It would also be acceptable to dispose of these materials at an approved off-site disposal facility based on considerations at the time the remedial alternative would be implemented. The estimated time frame to complete this remedial alternative would be several months after the property owner grants access, recognizing the time frame necessary to mobilize construction equipment for this relatively small project. The in-field construction time at the property would be 1 to 2 weeks; the remainder of time necessary for planning, coordinating, and final reporting.

The third remedial alternative for this category is complete residential removals for all surface and subsurface soil up to a depth of 4 feet bgs with PCB concentrations greater than or equal to 1 mg/kg. This would require addressing PCBs remaining in subsurface soil with concentrations between 1 and 10 mg/kg for the five residential use areas where surface removals have already been conducted. This process would include removing the clean surface soil that was placed several years ago as part of the surface soil removals before the subsurface soil is excavated. Removal would be required for 1.35 acres of residential use area and 7,000 cubic yards of material that would be disposed of on-site in the SSSMA or off-site in an approved disposal facility. The area and volumes (1.35 acres and 7,000 cubic yards) under this remedial alternative include the 0.25 acres and 400 cubic yards of surface soil from the second alternative for residential soil (i.e., the property where access to conduct the surface soil removal has yet to be provided). The estimated time frame to complete construction is several months to a year after obtaining property access from the landowners. The in-field construction time at the property would be 2 to 3 months; the remainder of time would be necessary for planning, coordinating, and final reporting. This alternative would also include a long-term soil management plan to address residuals potentially remaining beneath pavement or structures, where applicable.

The long-term soil management plan for OU-4 would address residential properties to the extent that residuals at depth remained, cases where the residential use areas included structures or paved areas below which PCBs might be present, and the single location where property access has not been provided by the landowner. Long-term soil management would include using the Alabama 811 system as an IC to prevent PCB-containing soil from being excavated and managed in a manner that could adversely impact the effectiveness of the OU-4 remedy. The soil management

plan would include procedures for situations where land-disturbing activities are planned and PCB-containing residual soil might be present. The efforts to monitor and manage these properties would be guided under a long-term O&M plan for OU-4.

The remedial alternative screening process for the three alternatives developed to address residential soils is presented in Table 9-1a. All three remedial alternatives were retained for further evaluation and are highlighted in green shading. These remedial alternatives are listed below and will be referred to as named below:

- RS-1: no action
- RS-2: Excavation and on- or off-site disposal for surface soil with PCB concentrations of ≥1.0 mg/kg and subsurface soil PCB concentrations of ≥10.0 mg/kg
- RS-3: Excavation and on- or off-site disposal for surface soil and subsurface soil with PCB concentrations of ≥1.0 mg/kg

9.2 Interim Measures

Remedial alternatives for the Oxford Lake Park IMs account for several unique factors: (i) the protective nature of how the IMs were implemented, including removal and cover systems; (ii) that, where applicable, monitoring and maintenance activities have been conducted since the IMs were constructed; (iii) that the IMs are constructed on property owned by the City of Oxford and have been deed restricted from future development adverse to their current recreational purposes; and (iv) that these IM areas are prone to infrastructure repair and replacement, and proactive advance soil management may serve to alleviate future conflicts between ongoing recreational activities and soil management support. There were six remedial alternatives evaluated for the IM areas:

1. No action
2. Long-term monitoring and maintenance of all IMs, and long-term soil management
3. Excavation and on- or off-site disposal for the upper 1-foot surface soil layer from the outfield of softball Field A including the area between Fields A and D for advance soil management purposes (3,630 cubic yards) with off-site disposal, long-term monitoring and maintenance of all IMs, and long-term soil management.
4. Excavation and off-site disposal for the upper 1-foot surface soil layer from the outfields of softball Fields A, C, and D (including the areas between Fields A, C and D) for enhanced advance soil management purposes with off-site disposal (9,815 cubic yards), long-term monitoring and maintenance of all IMs, and long-term soil management
5. Excavation and off-site disposal for the upper 1-foot surface soil layer from the outfields of softball Fields A, C, and D (including the areas between Fields A, C and D) with the removal of soil with PCB concentration of greater than or equal to 50 mg/kg from the 1–2-foot horizon for a portion of Field C for enhanced advance soil management purposes (9,842 cubic yards), long-term monitoring and maintenance of all IMs, and long-term soil management

6. Excavation and off-site disposal for the upper 4 feet of soil from softball Fields A, C, and D (including the areas between Fields A, C and D) with off-site disposal for enhanced advance soil management purposes (36,370 cubic yards), long-term monitoring and maintenance of all IMs, and long-term soil management

As required by the NCP, the no action alternative will be evaluated recognizing that it reflects no further action beyond the already constructed IMs. The second remedial alternative includes long-term monitoring and maintenance and is based on the effectiveness of the as-constructed IMs. These IMs have been monitored and maintained since they were constructed, and the continuance of these activities combined with already implemented deed restrictions form an effective remedial approach. Inspections would document the effectiveness of maintenance activities routinely conducted by the City of Oxford. Ongoing soil management includes the City of Oxford notifying P/S of any intrusive or land-disturbing work that may occur in this area so that soil management support may be provided, if appropriate. This notification process is consistent with the long-term soil management approach proposed for OU-4 that includes using the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located.

The six remedial alternatives developed for the IM areas are presented in Table 9-1b. Five of six alternatives are carried through for detailed and comparative analysis in Sections 10 and 11, respectively. The sixth remedial alternative was developed to remove 4 feet of soil from Fields A, C, and D was screened-out due to the significant disruptive nature of this work relative to minimizing potential future conflicts between ongoing recreational and soil management support activities. The average subsurface PCB concentrations for these softball fields are less than 10 mg/kg, and the majority of maintenance/repair activities for irrigation-related equipment in the fields would typically be conducted in the upper 1 foot of the soil horizon. The potential need to excavate deeper than 1 foot bgs is limited, and long-term soil management would be available to support these infrequent activities.

The IM five remedial alternatives retained through the screening are listed below and will be referred to as named:

- IM-1: No action
- IM-2: Long-term monitoring and maintenance and soil management
- IM-3: Excavation and on- or off-site disposal for outfield surface soil in Field A and between Fields A and D, and long-term soil management for PCBs ≥1.0 mg/kg in and between outfield soil on Fields C and D and at depth
- IM-4: Excavation and on- or off-site disposal for outfield surface soil in and between Fields A, C, and D, and long-term soil management for PCBs ≥1.0 mg/kg in soil at depth
- IM-5: Excavation and on- or off-site disposal for outfield surface soil in and between Fields A, C, and D; excavation and off-site disposal of subsurface soil with PCB concentrations ≥50 mg/kg in Field C; and long-term soil management for PCBs ≥1.0 mg/kg in soil at depth

The four active remedial alternatives retained through the screening all include some form of soil management support for the softball field IMs recognizing that long-term O&M including soil management would be required for the other Oxford Lake Park IMs.

9.3 Nonresidential Soil

Target areas for the remediation of nonresidential soil are shown on pre- and post-remediation PCB concentration figures for ecological and human health EUs. The pre-and post-remediation conditions for ecological receptors are shown on Figures 7-1 through 7-4, and the pre- and post-remediation conditions that are applicable to the future agricultural scenario are shown on Figures 7-6 through 7-9. The candidate remedial areas for nonresidential soil were developed to achieve an ecological PRG of 6 mg/kg for the 0–0.5-foot horizon and the human health PRG for the future agricultural exposure (10 mg/kg) for the 0–1-foot horizon, should this potential exposure scenario occur at some point in the future.

The application of these ecological and human health PRGs not only use different soil horizons for exposure purposes but also have slightly different locations and geometry of their respective EUs to account for exposure patterns. For example, the ecological EUs include a riparian component adjacent to the creeks that human health EUs do not have. Additionally, future agricultural exposure is addressed by the ecological remediation that removes the upper 6 inches of the 0–1-foot horizon and replaces it with clean backfill. This clean layer then becomes part of calculating future agricultural exposure conditions for the 0–1-foot horizon.

To achieve the ecological and human health PRGs, soil needs to be removed from the 0–0.5-foot horizon over a 71-acre footprint (Figures 7-2 and 7-7). Remedial alternatives were also developed with enhancements to advance soil management support that minimizes the potential for conflict between future activities in the floodplain and soil management support. This includes two different approaches for advanced soil management: one approach is focused on floodplain soil located upstream of I-20 (the Oxford Lake Park area) (Figures 7-3 and 7-8) and the second approach uses advanced soil management over the entire OU-4 floodplain (Figures 7-4 and 7-9). The approach for advanced soil management includes removing soil with PCB concentrations greater than or equal to 50 mg/kg within the 0–1-foot horizon.

The active remedial alternatives developed for screening purposes include removing floodplain soil and disposing of it off-site. Although placing cover materials directly over the floodplain soil was initially considered as a potential remedial approach, an initial evaluation of this approach revealed that many target areas were in the FEMA floodway; therefore, placing cover soil without first excavating the existing soil would not be permitted. Based on these factors, remedial alternatives requiring placement of cover soil within the floodway were not developed.

The following are the five remedial alternatives developed for nonresidential floodplain soil:

1. No action
2. Excavation and off-site disposal of nonresidential soil from the 0–0.5-foot horizon (57,475 cubic yards) based on a PCB SWAC of 6 mg/kg and long-term soil management

3. Excavation and off-site disposal of nonresidential soil from the 0–0.5-foot horizon based on a PCB SWAC of 6 mg/kg with limited advance soil management, including the excavation of soil with PCB concentrations of greater than or equal to 50 mg/kg located in the 0–1-foot horizon upstream of I-20 (73,345 cubic yards) and long-term soil management
4. Excavation and off-site disposal of nonresidential soil from the 0–0.5-foot horizon based on a PCB SWAC of 6 mg/kg with expanded advance soil management, including the excavation of soil with PCB concentrations of greater than or equal to 50 mg/kg located in the 0–1-foot horizon for OU-4 EUs (143,801 cubic yards) and long-term soil management
5. Excavation and off-site disposal of nonresidential soil from the 0–0.5-foot horizon based on a PCB SWAC of 6 mg/kg with expanded surface and subsurface soil management, including the excavation of soil with PCB concentrations greater than or equal to 50 mg/kg located in the 0-4-foot horizon (303,533 cubic yards) and long-term soil management.

A remedial alternative involving treatment was not included because OU-4 floodplain soil does not have PCB concentrations greater than or equal to 500 mg/kg. All the active remedial alternatives include removing soil from the upper 0–0.5-foot horizon to meet the ecological and human health PRGs. Soil would be removed with traditional excavation equipment. The excavated soil would be taken off-site for disposal. The excavated areas would be backfilled with clean soil, and vegetation would be planted to stabilize the newly placed surface soil layer. The four active remedial alternatives (#2, #3, #4, and #5 above) include off-site disposal in a permitted landfill. A remedial alternative with on-site treatment of the excavated soil was not developed based on the relatively small volume of soil that would be generated under these remedial alternatives and multiple known challenges for attempting to implement on-site treatment technologies. All the active remedial alternatives include long-term soil management, including using the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy.

All five remedial alternatives were retained for further screening as detailed in Table 9-1c. These alternatives are listed below and will be referred to as named:

- NRS-1: no action
- NRS-2: excavation of soil in 0–0.5-foot soil horizon, off-site disposal, and long-term soil management including deed restrictions as needed
- NRS-3: excavation of soil in 0–0.5-foot soil horizon, off-site disposal, limited advance surface soil management for PCBs ≥50 mg/kg, and long-term soil management including deed restrictions as needed
- NRS-4: excavation soil in the 0–0.5-foot soil horizon, off-site disposal, site-wide advance surface soil management for PCBs ≥50 mg/kg, and long-term soil management including deed restrictions as needed

- NRS-5: excavation of soil in 0–0.5-foot soil horizon, off-site disposal, site-wide advance surface and subsurface soil management for PCBs ≥ 50 mg/kg, long-term soil management

Since the remedial alternatives have slightly different geographic footprints, there is a range of property owners that could be affected during remedy implementation. The number of individual property owners for the remedial alternatives includes 22 for NRS-2, 24 for NRS-3, 26 for NRS-4, and 26 for NRS-5.

9.4 Creek Banks and Sediment

The target remedial footprints for creek bank areas and sediment are discussed in Section 7.4. The same overall remedial footprint for sediment is used for each of the remedial alternatives, and each remedial alternative (other than the no action alternative) also includes a source control action for the creek bank areas. The sediment remediation footprint addresses areas with sediment PCB concentrations above the NTE value of 2.6 mg/kg and is designed to achieve a post-implementation SWAC of less than 1 mg/kg using sediment removal, removal and capping, or removal and in-place treatment.

There are two different remedial footprints to address the creek banks areas. One remedial footprint is focused on source control for creek bank areas located upstream of RM 29.5 with moderate and severe erosion. The second remedial footprint is for creek bank areas upstream of RM 29.5 with minor, moderate, and severe erosion. Both approaches for creek bank source control will meet the RAOs and PRGs for OU-4; the second approach will reduce the time to achieve these goals.

In addition to the no action alternative, six active remedial alternatives were developed and screened for sediment in OU-4, including Snow Creek and Choccolocco Creek. The remedial alternatives are listed below, and the active remedial alternatives include source control for targeted creek bank areas:

1. No action
2. Creek bank source control for areas with moderate and severe erosion with dredging RALs for high-energy areas of 2.6 mg/kg as an NTE value and a PCB SWAC less than 1 mg/kg with off-site disposal, in-place treatment for low-energy areas, long-term soil management, and MNR
3. Creek bank source control for areas with minor, moderate, and severe erosion with dredging RALs for high-energy of 2.6 mg/kg as an NTE value and a PCB SWAC less than 1 mg/kg with off-site disposal, in-place treatment for low-energy areas, long-term soil management, and MNR
4. Creek bank source control for areas with moderate and severe erosion with dredging RALs including a PCB NTE value of 2.6 mg/kg and a PCB SWAC less than 1 mg/kg with off-site disposal, long-term soil management, and MNR
5. Creek bank source control for areas with minor, moderate, and severe erosion with dredging RALs for high-energy areas of 2.6 mg/kg as an NTE value and a PCB SWAC less than 1 mg/kg with off-site disposal, capping for low-energy areas, long-term soil management, and MNR

6. Creek bank source control for areas with minor, moderate, and severe erosion with dredging RALs of 2.6 mg/kg as an NTE value and a PCB SWAC less than 1 mg/kg with off-site disposal, long-term soil management, and MNR
7. Creek bank source control for areas with minor, moderate, and severe erosion with dredging RALs of 2.6 mg/kg as an NTE value and a PCB SWAC less than 1 mg/kg with off-site treatment (incineration), off-site disposal, long-term soil management, and MNR

Each active remedial alternative relies on combining different remedial approaches with two common elements, source control and MNR. These common elements are necessary to provide an effective remedy over the long term and recognize that for large sediment sites it often takes several decades to achieve the PRGs after remediation activities have been completed. It can't be underscored enough that source control is a critical component for successful remedy performance at a sediment site. This importance is the basis for USEPA listing source control as the first principle for managing a site with contaminated sediment.

The screening of these creek bank and sediment remedial alternatives is summarized in Table 9-1d, and each is carried through to the detailed evaluation of alternatives in Section 10. The aspects of the alternatives that are common to each alternative are discussed in the following subsections for creek banks, the backwater area, and dredging and disposal. Where the alternatives differ, additional descriptions, including the quantity assumptions for use in the cost estimate, are provided for each alternative in Section 10. All the active creek bank and sediment alternatives include an allowance for a significant predesign sampling program to completely define the current nature and extent of PCBs in sediment in the areas targeted for remediation, especially the target remedial areas downstream of the backwater area. All the active remedial alternatives also include a comprehensive long-term monitoring program, including the areas located downstream of OU-4 in Lake Logan Martin. The long-term monitoring in Lake Logan Martin will provide information regarding the positive impacts of remedial activities associated with OU-4 and for the remediation work that has and will be conducted for the OUs located upstream of OU-4 (OU-3 and OU-1/OU-2).

9.4.1 Creek Bank Stabilization

The two approaches or scenarios for creek bank source control are used with various remedial alternatives to provide ranges in the time to achieve the PRGs and cost. The first scenario includes source control for creek banks with moderate and severe erosion located upstream of RM 29.5 (17,100 linear feet), and the second scenario addresses locations upstream of RM 29.5 with minor, moderate, and severe erosion (39,800 linear feet). The creek bank areas would be addressed through several actions, depending on the physical characteristics of the area and findings from the engineering design process. The creek bank stabilization measures will likely include stabilization with shoreline hardening techniques such as riprap; bioengineering, including root wads and plantings; reshaping/grading of creek banks that may include removing soil to increase the cross-section flow area; or combinations of these approaches. The conceptual approach for creek bank stabilization assumes that soil in the creek bank areas will require excavation and disposal at an approved off-site facility. This soil may be excavated to support reshaping creek banks, placing riprap, or other related support activities. The specific type of creek bank stabilization activity for the various locations targeted for creek bank stabilization will be

determined during the RD. The design process will include geomorphological and hydraulic evaluations, relevant predesign investigations, and input received through outreach with local landowners.

The conceptual approach to address creek banks along the OU-4 portion of Snow Creek that are mostly characterized as having severe erosion is shown below in Exhibit 3. The conceptual approach to address creek banks along Choccolocco Creek with severe erosion is shown in Exhibit 4. Most of the creek bank areas targeted for potential source control actions are characterized as having moderate or minor erosion and would be addressed using a with range of available natural approaches.

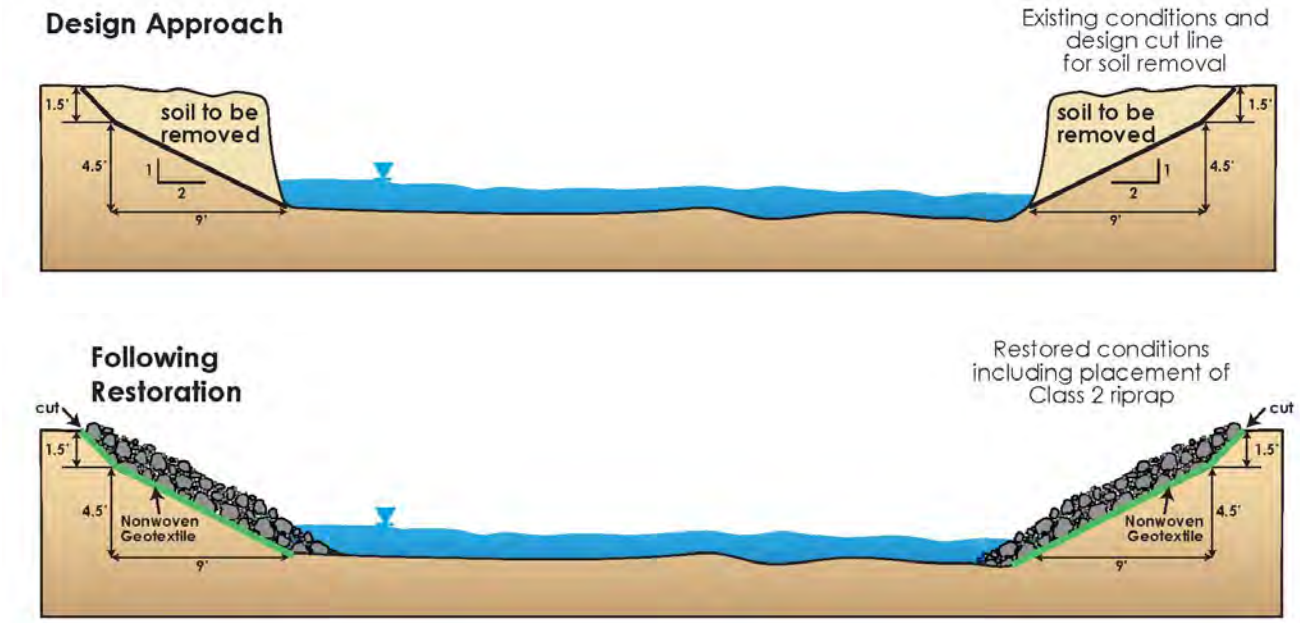
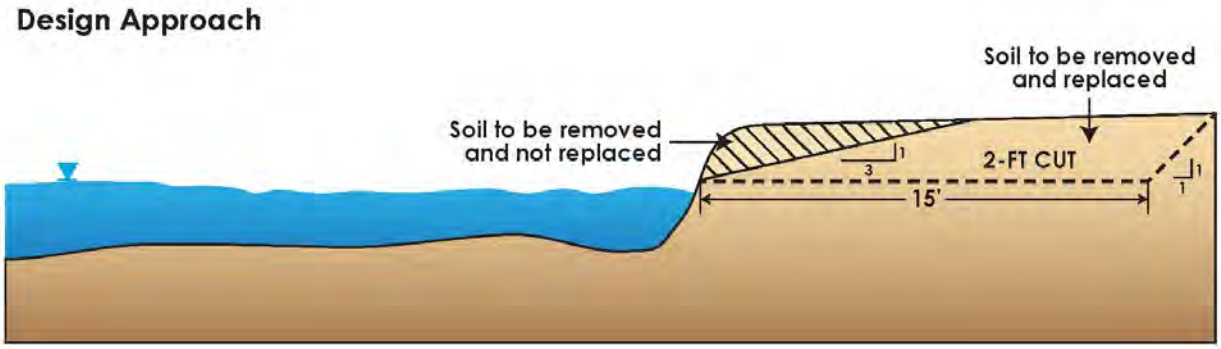


Exhibit 3. Conceptual Creek Bank Approach for OU-4 Portion of Snow Creek



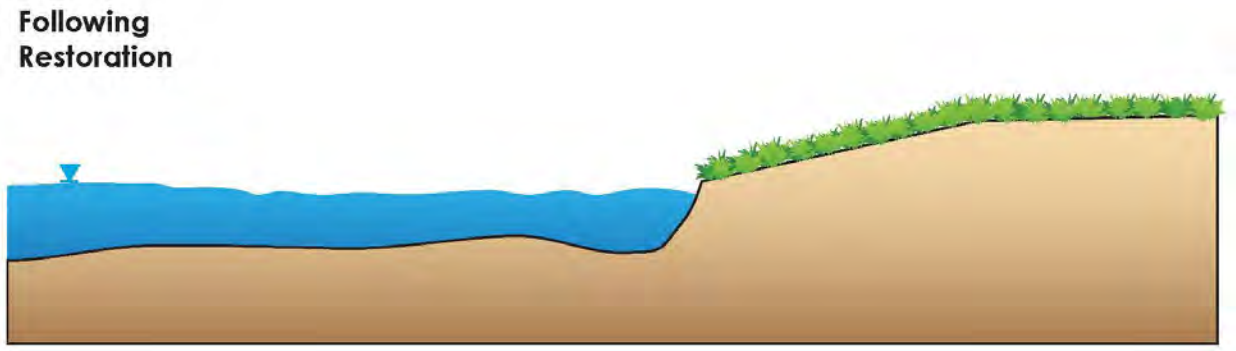


Exhibit 4. Conceptual Approach for Choccolocco Creek Banks with Severe Erosion

As noted above, final approaches for targeted creek bank source control actions would be developed during the RD and will be based on geomorphological considerations, including the potential CMZ. The design approach for creek bank areas with moderate or minor erosion would be biased toward naturalized approaches provided they met the design objective and are approved by the landowner. Pilot design studies could also be included in the RD process to iteratively evaluate the performance of different natural techniques and adaptively advance the design to provide an effective remedy over the long term.

9.4.2 Backwater Area

In addition to addressing the creek banks, each of the active sediment alternatives address the same 25-acre sediment footprint to implement the RAL SWAC of less than 1 mg/kg and NTE of 2.6 mg/kg. The differences in the alternatives are based on what remedial technologies would be used to address the sediment footprint (e.g., dredging, capping, in-place treatment). The range of alternatives developed for this sediment footprint provides an opportunity to evaluate different remedial approaches in the backwater area located at the confluence of Snow Creek and Choccolocco Creek. The creek channels, especially in the backwater area, have been identified based on flow rates as low energy or high energy to identify which remedial technology might be most effective in different areas.

The central and southern portions of the backwater area are characterized by a network of braided streams that are not subject to high surface water velocities even during high-flow events. This braided stream portion of the backwater area is the low-energy portion of the target sediment remediation footprint. Sediment deposits in this low-energy area are fine-grained materials and are documented as being stable based on a combination of higher PCB concentrations at depth and geochronological results for samples collected at location CU-GEO-02 (Figure 4-20).

The high-energy portion of the remedial footprint for sediment in OU-4 includes Snow Creek, the upper or northern branch of Choccolocco Creek that flows east-to-west through the backwater area (Figure 7-15), and the targeted portions of Choccolocco Creek sediment located downstream of the backwater area shown on Figure 7-14 (general vicinity of RM 35 to 33, RM 26 to 24, RM 19 to 17, and RM 15).

The high- and low-energy approach essentially creates a range of remedial alternatives with specialized technical approaches tailored for the backwater area, including removal, capping, and in-place treatment.

9.4.3 Dredging

Each remedial alternative involves some sediment removal (dredging) from the 25-acre sediment footprint. The sediment remediation footprint for the upper portion of OU-4, including Snow Creek and Choccolocco Creek, includes the backwater area (Figure 7-14). Additional sediment remediation is targeted for multiple locations along Choccolocco Creek based on achieving the NTE criterion of 2.6 mg/kg and meeting a post-implementation SWAC of less than 1 mg/kg (Figure 7-15). For each alternative, sediment would be dredged from Snow Creek, the high-energy portion of the backwater area, and multiple locations along Choccolocco Creek (Figures 7-14 and 7-15). The high-energy and low-energy portions for the upper portion of OU-4 are presented on Figure 7-14. The lower portion of OU-4 along Choccolocco Creek (Figure 7-15) is generally considered to be high-energy.

The alternatives differ in the way they address the 4.1 acres of sediment in the backwater area. The first two active alternatives include dredging the high-energy portions of the backwater area and in-place treatment for the low-energy portions of the backwater area without removing the existing sediment. These two alternatives also include dredging of the high-energy areas downstream of the backwater area. The third, fifth, and sixth active alternatives would require dredging the entire 25-acre remedial footprint, including the low-energy portions of the backwater area. The fourth active remedial alternative would remove a 1-foot layer of existing sediment from the low-energy portions of the backwater area and then place a 1-foot-thick sand cap layer. Removing the 1-foot sediment layer prior to placing the cap is necessary to maintain the current bathymetry after the cap is placed. The first and third active remedial alternative addresses creek bank areas with moderate and severe erosion, and the remainder of active remedial alternative also addresses the minor creek bank erosion areas. As noted above, the third, fifth, and sixth active remedial alternatives include dredging for the entire 25-acre remedial footprint.

Dredging would likely be conducted from the shore using long-reach excavators, and the materials would be placed in off-road transport vehicles. For a limited number of cases, earthen pedestals may need to be constructed along the creek banks such that the long-reach excavator can access the sediment targeted for removal. The potential need for this approach will be evaluated during the RD phase of the project following the ROD and will incorporate the results of predesign investigations and available property access along the creeks.

Consistent with other environmental dredging projects, a layer of clean backfill materials would be placed in the dredge areas once removal has been completed. For OU-4, the approach would be to replace the layer of sediment removed with clean sand backfill materials up to a maximum layer thickness of 1 foot. This backfill would replace the biological strata removed during dredging and assist in mitigating the potential for PCB residuals associated with dredging. Even with careful execution and the placement of backfill following dredging, the actions of dredging and changes to creek channel alignment associated with dredging (and creek bank work) will result in changes to channel morphology. The potential impacts of these changes will be assessed during the RD, including a CMZ evaluation.

9.4.4 Off-Site Disposal for Creek Bank Soil and Sediment

A combination of soil and sediment would be generated for off-site disposal for the remedial alternatives that address creek bank areas and in-creek sediment. The estimated quantity of soil associated with creek bank stabilization efforts requiring off-site disposal at a TSCA-regulated facility is approximately 10,000 tons, and the estimated quantity of soil requiring off-site disposal at a Subtitle D facility is approximately 1,800 tons.

For the sediment portions of these remedial alternatives, the materials would be removed from the creeks by dredging and would be transported to a staging area, dewatered, and subsequently transported to an off-site, licensed landfill or to a permitted treatment facility in the case of the last alternative. The off-road vehicles used for sediment transport would likely transport the sediment to a local consolidation area for dewatering prior to being shipped off-site. If the sediment is dry enough to pass a paint filter test upon excavation, it could be direct-loaded into over-the-road trucks and transported to the off-site disposal facility.

For off-site disposal facility purposes, it is expected that the PCB concentration category for the sediment—classifying general areas as having sediment PCB concentrations greater than or equal to 50 mg/kg or less than 50 mg/kg—can be identified before excavation. The estimated tonnage for creek sediment requiring disposal (off-site landfill or treatment) including dewatering additives, ranges across the six active remedial alternatives from approximately 26,200 tons to 87,400 tons. This includes a range in tonnage for TSCA-regulated disposal landfills from 0 to 42,500 tons. The tonnage for materials that would be disposed of at a Subtitle D facility (the non-TSCA material) ranges from 26,200 tons to 44,900 tons. The upper end off-site disposal tonnage (87,400 tons) is associated with the remedial alternative using incineration as the off-site disposal method.

All seven remedial alternatives were retained for further screening as detailed in Table 9-1d. These alternatives are as follows and will be referred to as named:

- SED-1: No action
- SED-2: Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment for sediment in low-energy areas; long-term soil management; and MNR of sediment
- SED-3: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment of sediment in low-energy areas; long-term soil management; and MNR of sediment
- SED-4: Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment
- SED-5: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil

and sediment; capping for low-energy areas; long-term soil management; and MNR of sediment

- SED-6: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment
- SED-7: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of contaminated sediment in high- and low-energy areas; off-site treatment of PTW; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment

10 DETAILED ANALYSIS OF ALTERNATIVES

Following the initial screening of alternatives (Tables 9-1a, b, c, and d), the retained alternatives for each area and media category were evaluated in detail as described in this section. The detailed analysis evaluates each alternative using the evaluation criteria described in the USEPA RI/FS guidance (USEPA 1988) and the NCP. This evaluation presents the relevant information needed for USEPA to select remedies for the different areas and media in OU-4. The selection of a remedy requires evaluating two threshold criteria and five balancing criteria, as defined in the NCP:

- Threshold Criteria
  - Overall protection of human health and the environment
  - Compliance with ARARs
- Balancing Criteria
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying Criteria
  - State acceptance
  - Community acceptance

In accordance with USEPA guidance and the PCD, modifying criteria (i.e., state acceptance and community acceptance) are not included in this OU-4 FS. USEPA will evaluate these two modifying criteria as a part of their preparation of the ROD. A description of how each criterion is used in the evaluation is provided below.

10.1 Threshold Criteria

- Overall Protection of Human Health and the Environment

  Each alternative is evaluated to determine whether it would be protective of human health and the environment in the short term and long term. This criterion is an overall assessment of protection based on the resulting mix of factors assessed under other evaluation criteria, especially long-term effectiveness and permanence and short-term effectiveness. This criterion assesses whether risks would be eliminated, reduced, or controlled by implementing the alternative. This criterion also assesses whether an alternative poses an unacceptable short-term or cross-media impact.

- Compliance with Potential ARARs

This criterion evaluates whether the alternative will comply with ARARs during implementation and whether the alternative is expected to attain ARARs following implementation. Potential federal, state, and local ARARs and TBCs are organized by chemical constituent, location, and action and are discussed in Section 6 and presented in Tables 6-1, 6-2, and 6-3, respectively. The alternative evaluation process included in this section identifies the more significant ARARs that must be addressed for each alternative. The final evaluation of ARARs will be completed during the RD phase once it is determined how the selected alternatives will be implemented.

10.2 Balancing Criteria

- Long-Term Effectiveness and Permanence

  This criterion is used to evaluate the risk that would remain following implementation of the alternative. This evaluation assesses the extent and effectiveness of the controls that may be required to manage the risk posed by treatment residuals and/or untreated wastes. This criterion also addresses the adequacy and suitability of any engineering controls and ICs that are used to manage treatment residuals or untreated wastes that remain after the alternative is implemented.

- Reduction of Toxicity, Mobility, or Volume

  This criterion only applies to alternatives that use treatment technologies to permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances as their principal element.

- Short-Term Effectiveness

  This criterion addresses the impacts to human health and the environment while implementing the remedial action. This evaluation will consider impacts to workers, the local community, and the environment during remedial actions. Examples of potential impacts include dust from excavation, truck traffic during transportation of materials, and surface water runoff during rain events. This evaluation considers the reliability of the available mitigation measures in preventing or reducing the potential impacts. This criterion also considers an estimate of the time required to achieve remedial goals.

- Implementability

  This criterion involves the technical and administrative feasibility of implementing the alternative and the availability of required goods and services. Implementability considers the technical difficulties and unknowns associated with a remedial approach, including availability of services, materials, and supplies. This criterion also considers issues that could lead to not achieving remedial objectives, schedule delays, and adverse short-term impacts. It also considers the ease of monitoring the effectiveness of the alternative and administrative considerations, such as coordination with other parties (e.g., obtaining permits for off-site activities or rights-of-way for construction).

- Cost

  This criterion considers costs, including capital cost and O&M expenditures to implement the alternative. A discount rate of 7% was applied, and costs are discussed and presented as total present worth costs for each alternative, including 30 years of O&M and contingencies.

10.3 Green and Sustainable Remediation Strategies Evaluation

The evaluation of remedial alternatives also included the quantification of environmental footprint metrics to integrate green and sustainable remediation considerations into the process. The environmental footprints of the proposed remedial alternatives were evaluated using the *Methodology for Understanding and Reducing a Project's Environmental Footprint* (USEPA 2012f). The quantified metrics represent the USEPA's five core elements: materials and waste, water, energy, air, and land and ecosystems. This framework provides for comparing environmental footprint among alternatives in terms of environmental metrics and also for assessing which remedy components have the greatest impact on the environmental footprint of each alternative.

USEPA's Spreadsheets for Environmental Footprint Analysis (SEFA) tool (USEPA 2014a) was used to quantify materials, wastes, water, energy, and air metrics, which represent the environmental footprint for the alternative. The inputs for the analysis were based on the cost estimates provided for each remedial alternative and generally consisted of areas, volumes, durations, and material quantities. The SEFA tool uses established conversion factors for various materials and common remediation/construction activities (e.g., excavation, backfilling, and associated equipment use) to quantify the following metrics (as applicable for a given alternative):

- **Materials and waste**: tons of refined materials used on-site; tons of hazardous and nonhazardous waste disposed of or treated; and portions of recycled materials and/or waste
- **On-site water use**: volume of water used from public water supply, groundwater, surface water, reclaimed water, and storm water
- **Energy**: total energy consumption, portion of energy from renewable sources, voluntary purchase of renewable energy credits, and on-site grid electricity use
- **Air**: pounds of on-site and total emissions of nitrogen oxides (NOx), sulfur oxides (SOx), particulate matter (PM), hazardous air pollutants (HAPs), and greenhouse gas emissions (GHG) as carbon dioxide equivalents (CO_2e)
- **Land and ecosystems**: the area of disturbance and duration to assess the impact to land and ecosystems for the sediment alternatives, which are most likely to impact benthic and shoreline ecosystems (No quantitative metrics are prescribed by the SEFA tool.)

The air emission and energy consumption results of the SEFA modeling are presented in terms of Scope 1, 2, 3a, and 3b emissions, defined as follows, consistent with the Global Reporting Initiative framework:

- Scope 1: On-site activities, such as earthwork equipment use

- Scope 2: Grid electricity generation for on-site power consumption
- Scope 3a: Transportation of personnel, equipment, and materials
- Scope 3b: Other off-site activities, such as waste management and disposal

The results of the SEFA modeling and environmental impacts are discussed in the short-term effectiveness sections of the detailed evaluation of remedial alternatives and in the comparative analysis.

10.4 Residential Soil

The three remedial alternatives developed for soil on residential properties include the removal actions already completed in OU-4 under the NTCRA Agreement. Details of the previously implemented sampling and removal actions are presented in the OU-4 RI (Geosyntec 2019). The three remedial alternatives developed to address residential soil are as follows:

- RS-1: No action
- RS-2: Excavation and on- or off-site disposal for surface soil with PCB concentrations of ≥1.0 mg/kg and subsurface soil PCB concentrations of ≥10.0 mg/kg
- RS-3: Excavation and on- or off-site disposal for surface soil and subsurface soil with PCB concentrations of ≥1.0 mg/kg

These three remedial alternatives are evaluated using the NCP criteria in the following subsections.

10.4.1 RS-1: No Action

Alternative RS-1 is the no action alternative, which would involve no further action beyond the residential removals that have already been completed under the NTCRA Agreement. RS-1 would leave PCBs above 1 mg/kg in surface soil in the one residential area (0.25 acres) where access for removal has not been granted and would take no further action in residential areas where PCBs remain at concentrations above 1 mg/kg and below 10 mg/kg at depths below 1 foot. The RS-1 alternative would also not implement the soil management program that is intended to monitor property uses and changes in uses throughout OU-4 in addition to monitoring the five residential areas where PCBs remain below the upper foot at concentrations above 1 mg/kg and below 10 mg/kg.

10.4.1.1 Overall Protection of Human Health and the Environment

Where removals have been conducted on residential properties in accordance with the NTCRA Agreement no further action is protective of human health and the environment for the short term. PCB-containing soil was removed from the affected areas and was disposed of in an approved manner. Potential direct contact at the affected properties by human or environmental receptors has been eliminated with the removal, as has the potential for transport by storm water.

This alternative would not be protective for the one remaining residential area with PCB concentrations exceeding the PRG of 1 mg/kg, and it would not be protective in the long term for the residential areas with residual PCB concentrations because this subsurface soil would not be managed.

10.4.1.2 Compliance with ARARs

Because the no action remedial alternative does not provide for long-term soil management support, even for those properties where access is denied, RS-1 would not comply with the following key ARAR from Table 6-3:

- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes

10.4.1.3 Short-Term Effectiveness

Risks to residential receptors in the one area that has not been addressed would remain.

There are no GHG emissions or consumption of energy associated with this remedial alternative.

10.4.1.4 Long-Term Effectiveness and Permanence

RS-1 would not be effective over the long term for the one area where residual PCBs remain in surface soil or in the five areas where PCBs at concentrations above 1 mg/kg and less than 10 mg/kg in subsurface soil would not be managed. The long-term effectiveness is also limited by the lack of soil management support.

10.4.1.5 Reduction of Toxicity, Mobility, and Volume through Treatment

RS-1 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.4.1.6 Implementability

RS-1 is straightforward and easy to implement.

10.4.1.7 Cost

There are no costs associated with implementation of RS-1.

10.4.2 RS-2: Excavation and On- or Off-Site Disposal for Surface Soil with PCB Concentrations of ≥1.0 mg/kg and Subsurface Soil PCB Concentrations of ≥10.0 mg/kg

RS-2 includes the removal actions conducted to date under the NTCRA Agreement and long-term management of PCB residuals through a soil management program. This same approach was selected by USEPA as the final remedy for residential use areas located in the OU-1/OU-2 portion of the Site. The soil management addresses PCB residuals that remain at depth for residential use areas at five properties and potential PCB-containing soil that may be present beneath pavement or structures. These PCB residuals would be managed in perpetuity under a long-term soil management plan. The remaining residential removal action that has yet to be implemented due to the lack of property access would be conducted when access is provided by the landowner. The estimated removal area for this single residential use area is 0.25 acres, and the associated removal volume is 400 cubic yards (600 tons) of soil with PCB concentrations of less than 10 mg/kg that would be disposed of on-site in the SSSMA. It would also be acceptable to dispose of these materials at an approved off-site disposal facility based on considerations at the time the remedial alternative would be implemented. To implement RS-2, 540 tons of refined materials, including sandy backfill materials, topsoil, and a high-density polyethylene (HDPE) liner (from decontamination area), would need to be used. Implementing RS-2 would generate approximately 600 tons of soil with PCB concentrations less than 50 mg/kg for off-site disposal. Restoration

water use during implementation would be limited to hydroseeding activities, totaling 700 gallons. Other water use, including public, surface, ground, storm, and reclaimed water would be negligible.

The estimated time frame to complete this remedial alternative is several months after the property owner grants access, recognizing the time frame necessary to mobilize construction equipment for this relatively small project. The in-field construction would take 1 to 2 weeks to complete; the remainder of the time is associated with planning, coordinating, and final reporting.

The long-term soil management plan for OU-4 would address residential properties to the extent that PCB residuals remain at depth, cases where the residential use areas included structures or paved areas below which PCBs may be present, and the single location where property access has not been granted by the landowner. Long-term soil management would include using the Alabama 811 system as an IC to prevent PCB-containing soil from being excavated and managed in a manner that could adversely impact the effectiveness of the OU-4 remedy. The soil management plan would include procedures for situations where land-disturbing activities are planned and PCB-containing residual soil may be present. The efforts to monitor and manage these properties would be guided under a long-term O&M plan for OU-4.

10.4.2.1 Overall Protection of Human Health and the Environment

Alternative RS-2 would be protective of human health and the environment by removing the PCB-containing soil from the one remaining residential use area and disposing of it in an appropriate manner, whether at an approved on-site soil management area or at an off-site landfill. Potential direct contact with PCB-containing surface soil in this one residential area would be eliminated with the removal. Removal would also eliminate the potential for dispersal or migration by storm water runoff.

Future exposure to PCB-containing soil remaining in subsurface soil or beneath pavement or structures would be addressed through implementing the soil management program. Should the subsurface soil need to be disturbed or if the soil beneath a residential structure (included in the soil management program) becomes accessible, measures would be implemented to manage the excavation and disposal of the soil, as necessary. Implementing the soil management program would provide overall protectiveness of human health and the environment.

10.4.2.2 Compliance with ARARs

RS-2 would comply with ARARs. Specifically, it would comply with the following key ARARs from Table 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes

10.4.2.3 Short-Term Effectiveness

The activities associated with RS-2 would result in manageable short-term risks to construction workers primarily during excavation of impacted soil. These potential risks would be managed

with engineering controls, administrative controls, and appropriate health and safety measures. Short-term impacts to the community would be relatively low (consistent with the NTCRAs conducted in OU-1/OU-2 and in OU-4) and would be associated with truck traffic for hauling materials to and from the Site. The impacts of truck traffic can be mitigated, as it has been during previous residential removals, by implementing protocols that reduce dust and debris on roadways and by adhering to traffic laws. The active remediation work remaining would likely be completed during normal construction hours (e.g., during daylight on weekdays).

Workers have additional general risks not related to potential chemical exposure while implementing this remedy, such as accidents related to these activities. These risks are addressed in applicable health and safety plans.

RS-2 would consume 1,775 million British thermal units (MMBtu), including on-site and off-site equipment use (excavator and skid-steer), transportation of personnel and waste, and grid electricity use (for charging handheld equipment). Implementing RS-2 would generate emissions of on-site and total NOx, SOx, PM, HAPs, and GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). Total GHG emissions for RS-2 would include 133 tons as CO_2e.

Land disturbance from RS-2 remedial activities would include excavation of soil for the one remaining residential property and land disposal of waste in the SSSMA. Because the land use of the Site will remain residential following implementation of the remedy and the SSSMA is an established disposal site, there would be no net impact to land or ecosystems from implementing RS-2.

10.4.2.4 Long-Term Effectiveness and Permanence

RS-2 would provide long-term permanent protection of human health and the environment by removing soil that has PCB concentrations above acceptable residential risk levels. Excavating impacted soil would eliminate long-term risk to residential receptors. Soil management and long-term O&M would mitigate risks from subsurface soil in residential areas. This alternative would meet the RAOs for residential soil.

10.4.2.5 Reduction of Toxicity, Mobility, and Volume through Treatment

RS-2 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.4.2.6 Implementability

As shown through previous work completed under the NTCRA Agreement, the remedial components provided in RS-2 are easily implemented because they use well-established practices. The services and materials required are standard within the industry and readily available. The soil management activities under RS-2 can be readily performed, as they have been under the NTCRA Agreement, and the personnel and equipment are expected to be readily available.

The construction of this alternative would be straightforward. Soil excavation and backfill would be conducted with common power construction equipment and by manual means. No specialized treatment equipment would be employed. Erosion and sedimentation controls would be

implemented, as necessary, during construction. Excavation and disposal are a proven technology that has been shown to be effective in preventing exposure to PCB-containing soil. This technology has been routinely used for previous removal actions on the Site and for remedial actions under CERCLA.

Engineering and administrative functions are not expected to impede implementation. Nevertheless, based on experience gained under the NTCRA Agreement, obtaining signed access agreements from property owners would be time consuming.

10.4.2.7 Cost

A cost estimate for RS-2 is provided in Table 10-1. The capital cost for this alternative is estimated to be $105,600. The total present worth cost for this alternative over a 30-year period, including soil management and contingency costs, is approximately $400,000. This includes soil management for five residential properties with residual PCBs. The cost estimate assumes that soil management will be addressed over the 30-year period; however, due to the nature of managing residual PCBs at the Site, soil management and O&M would extend in perpetuity.

The cost estimate for the disposal of soil generated during these removals includes disposal at an off-site Subtitle D landfill. Residential use areas will remain in the long-term soil management program for as long as PCB residuals in surface and subsurface soil above 1 mg/kg remain.

10.4.3 RS-3: Excavation and On- or Off-Site Disposal for Surface Soil and Subsurface Soil with PCB Concentrations of ≥ 1.0 mg/kg

The third remedial alternative for residential soil is complete residential removals for all surface and subsurface soil in accessible areas on residential properties up to 4 feet bgs with PCB concentrations greater than or equal to 1 mg/kg. Soil located beneath developed portions of the residential use areas (e.g., walkways, driveways, sheds) would not be removed and would be addressed through long-term soil management support. These remedial actions would address PCBs remaining in subsurface soil with concentrations between 1 mg/kg and 10 mg/kg for the five residential use areas where surface removals have already been conducted and the one residential use area with surface soil PCB concentrations greater than or equal to 1 mg/kg where access has been denied. This process would also include removing the clean surface soil that was placed on the five residential use areas several years ago as part of the surface soil removals before the subsurface soil is excavated. In total, removal would be required for 1.35 acres of residential use area, and 7,400 cubic yards of material that would be disposed of on-site in the SSSMA or off-site in an approved disposal facility. The alternative would also include removal of soil from the property where access to conduct the surface soil removal has yet to be granted.

RS-3 would require using 12,700 tons of refined materials for implementation of the remediation activities, including sandy backfill materials, topsoil, and HDPE liner (from decontamination area). Implementing RS-3 would generate 11,100 tons of soil with PCB concentrations of less than 50 mg/kg for off-site disposal. Restoration water use during implementation of the remedial activities would be limited to hydroseeding activities and would total 4,000 gallons. Other water use, including public, surface, ground, storm, and reclaimed water would be negligible.

The estimated time frame to complete construction is several months to a year after obtaining property access from the landowners. This alternative also includes long-term soil management to

address residuals potentially remaining beneath pavement or structures, where applicable. The soil management plan would be the same as described for RS-2.

10.4.3.1 Overall Protection of Human Health and the Environment

RS-3 would be protective of human health and the environment by removing the PCB-containing surface and subsurface soil from the residential use areas and disposing of it in an appropriate manner, whether in the SSSMA or at an approved off-site landfill. Potential direct contact at the affected properties by human or environmental receptors would be eliminated with the removal. The removal would also eliminate the potential for transport by storm water.

Future exposure to PCB-containing soil potentially remaining beneath pavement or structures would be addressed through soil management that would remain in place in perpetuity. Should the subsurface soil beneath pavement or a structure become accessible, measures would be implemented to manage the excavation and disposal of the soil, as necessary, to address worker exposures and potential recontamination of residential areas previously addressed under the NTCRA Agreement. Implementing the soil management program would provide an additional level of protectiveness above that anticipated under the NTCRA Program and would provide overall protectiveness of human health and the environment.

10.4.3.2 Compliance with ARARs

RS-3 would comply with ARARs and would specifically comply with the following key ARARs from Table 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes

10.4.3.3 Short-Term Effectiveness

The activities associated with RS-3 would result in manageable short-term risks to construction workers primarily as a result of excavating impacted soil. These risks would be managed by using engineering controls, administrative controls, and appropriate health and safety measures. Short-term impacts to the community would be low to moderate and would generally be associated with traffic caused by trucks hauling materials to and from the Site. Because the removals would be conducted on six properties rather than only one property (as in RS-2), it would include proportionally more traffic on the roadways versus the other alternatives. These risks can be mitigated, as they have been during other residential removals, by requiring protocols that reduce dust and debris on roadways and by adhering to traffic laws. Construction of all the remedial components included in this alternative would likely be completed during normal construction hours (e.g., during daylight on weekdays). Typical construction equipment (e.g., excavators, backhoes, and dump trucks) would be used. There would also be short-term impacts associated with excavating and disposing of the 1-foot layer of clean backfill that was previously placed at the properties where surface soil removals were conducted several years ago.

RS-3 would consume 13,147 MMBtus of energy, including on-site and off-site equipment use (excavator and skid-steer), transportation of personnel and waste, and grid electricity use (for

charging handheld equipment). Implementing RS-3 would generate emissions of on-site and total NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). The total GHG emissions for RS-3 would include 1,039 tons as CO_2e.

Land disturbance from RS-3 remedial activities would include excavation of soil on residential properties and land disposal of waste in the SSSMA or off-site landfill. Because the land use will remain residential following implementation of the remedy and the SSSMA is an established disposal site, there would be no net impact to land or ecosystems from implementing RS-3.

10.4.3.4 Long-Term Effectiveness and Permanence

RS-3 would provide long-term permanent protection of human health and the environment by removing impacted surface and subsurface soil that has PCB concentrations above acceptable risk levels from residential use areas. Soil management and long-term O&M would prevent risks from subsurface soil remaining below pavement or structures and would monitor land use for potential changes to exposure pathways and associated risk. RS-3 would meet the RAOs for residential use areas.

10.4.3.5 Implementability

As shown through previous work completed under the NTCRA Agreement, the remedial components provided in RS-3 can be implemented using established practices, services, and materials. The equipment, personnel, and facilities are readily available.

The construction of this alternative would be straightforward. Soil excavation and backfill would be accomplished with common power construction equipment and by manual means. No specialized treatment equipment would be employed. Erosion and sedimentation controls would be necessary for the affected areas. Excavation and disposal are a proven technology that has been shown to be effective in preventing exposure to PCB-containing soil. This technology has been routinely used for other residential areas on the Site and on other remedial actions under CERCLA.

Engineering and administrative functions are not expected to impede implementation. Nevertheless, based on experience gained under the NTCRA Agreement, access agreements from affected property owners could be time consuming to negotiate recognizing the potential for some landowners to have their properties disturbed again for a second round of remediation to address PCB residuals at depth.

10.4.3.6 Cost

A cost estimate for RS-3 is provided in Table 10-2. The capital cost for this alternative is estimated to be approximately $1.0M. The total present worth cost for this alternative over a 30-year period, including soil removal/disposal/restoration, long-term soil management, and contingency costs, is approximately $1.4M The cost estimate assumes that soil management will be addressed over the 30-year period; however, due to the nature of managing residual PCBs at the Site, soil management and O&M would extend in perpetuity.

The cost estimate for the disposal of soil generated during these removals includes transportation and disposal at the SSSMA. The soil may also be disposed of at an approved off-site disposal

facility pending the availability of or convenience of the SSSMA. The SSSMA was used to develop the cost estimate for RS-3 based on the larger disposal volume as compared to RS-2. Residential properties will remain in the long-term soil management program until all surface and subsurface residuals are removed from the area, including PCB residuals beneath on-site structures.

10.5 Interim Measures

Remedial alternatives developed for the Oxford Lake Park IMs take into account several factors, including (i) the protective nature of how the IMs were implemented, including removal of soil and cover systems; (ii) that, where applicable, monitoring and maintenance activities have been conducted since the IMs were constructed; and (iii) that the IMs are constructed on property owned by the City of Oxford and are deed restricted from future development adverse to their current recreational purposes. Because the IMs, as constructed and maintained, meet the nonresidential PRGs and are protective of human health and the environment, all the active remedial alternatives for the IM areas include long-term O&M and soil maintenance. Three of the remedial alternatives (IM-3, IM-4, and IM-5) also include varying degrees of advance soil management support. This advance soil management support has been included in three of the five remedial alternatives to minimize the probability that future soil management support for infrastructure repairs or improvements would interfere with ongoing recreational activities. The five remedial alternatives for detailed analysis are as follows:

- IM-1: No action
- IM-2: Long-term monitoring and maintenance and soil management
- IM-3: Excavation and on- or off-site disposal for outfield surface soil in Field A and between Fields A and D, and long-term soil management for PCBs ≥1.0 mg/kg in and between outfield soil on Fields C and D and at depth
- IM-4: Excavation and on- or off-site disposal for outfield surface soil in and between Fields A, C, and D, and long-term soil management for PCBs ≥1.0 mg/kg in soil at depth
- IM-5: Excavation and on- or off-site disposal for surface soil in and between Fields A, C, and D; excavation and off-site disposal of subsurface soil with PCB concentrations ≥50 mg/kg in Field C; and long-term soil management for PCBs ≥1.0 mg/kg in soil at depth

These alternatives are evaluated in the following subsections using the seven NCP criteria.

10.5.1 IM-1: No Action

For IM-1, no further action would be taken, recognizing the measures conducted to date. Under this alternative, no further monitoring or maintenance would be conducted on the existing IM.

10.5.1.1 Overall Protection of Human Health and the Environment

IM-1 meets the nonresidential soil PRGs and would be protective of human health and the environment in the short term. Nevertheless, because IM-1 does not include long-term monitoring to ensure that controls remain in place and are maintained, it would not offer overall protectiveness

in the long term. IM-1 would not provide adequate protection of human health and the environment in the long term.

10.5.1.2 Compliance with ARARs

IM-1 would not comply with the following key ARAR from Table 6-3:

- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes

10.5.1.3 Short-Term Effectiveness

No additional short-term risks to the community, workers, or the environment are posed by IM-1. There are no GHG emissions or consumption of energy associated with this remedial alternative.

10.5.1.4 Long-Term Effectiveness and Permanence

IM-1 would not provide long-term effectiveness as it does not monitor the condition of the caps and cover systems or maintenance activities to ensure the IM remains effective in the long term.

10.5.1.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative IM-1 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.5.1.6 Implementability

IM-1 is the no action alternative and would be easily implementable.

10.5.1.7 Cost

There are no costs associated with IM-1.

10.5.2 IM-2: Long-Term Monitoring and Maintenance and Soil Management

IM-2 includes long-term monitoring and maintenance and is based on the effectiveness of the as-constructed IMs. These IMs have been monitored and maintained since they were constructed, and the continuance of these activities combined with already implemented deed restrictions form an effective remedial approach. Inspections would document the effectiveness of maintenance activities conducted by the City of Oxford's routine maintenance. Ongoing soil management includes the City of Oxford's requirement to notify P/S of any intrusive or land-disturbance work that may occur in this area so that soil management support can be provided, if appropriate. This notification process is consistent with the long-term soil management approach planned for OU-1/OU-2 that includes using the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located.

IM-2 would require using 3,600 tons of refined materials, including asphalt and gravel for regular parking lot repairs and/or replacement. Implementing IM-2 would generate no waste requiring treatment or disposal. Water use during implementation of the remedial activities, including public, surface, ground, storm, and reclaimed water, would be negligible.

10.5.2.1 Overall Protection of Human Health and the Environment

IM-2 would provide both short-term and long-term protection of human health and the environment. Surface soil concentrations meet the nonresidential direct contact PRGs, and the subsurface is isolated from contact by surface cap and cover systems. O&M includes conducting

periodic inspections and inspections following significant rain events and includes observing the effectiveness of the City of Oxford's routine maintenance as well as soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. IM-2 would be protective of human health and the environment in the short and long term.

10.5.2.2 Compliance with ARARs

IM-2 would comply with ARARs, and would specifically comply with the following key ARAR from Table 6-3:

- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F. R § 761 for the management and disposal of PCB remediation wastes

10.5.2.3 Short-Term Effectiveness

IM-2 is essentially to continue maintenance and monitoring as has been done for the Oxford Lake Park since the IMs were constructed. Therefore, the short-term benefits have already been realized, and short-term negative impacts are almost negligible. If cap or cover repairs are needed or if subsurface intrusive activities are needed, there could be minor short-term impacts associated with construction equipment and truck traffic removing material and bringing in additional clean fill materials. If this type of short-term construction support is needed, the impacts would be minor and consistent with short-term impacts experienced during other small construction projects conducted with P/S support in the OU-4 floodplain.

IM-2 would consume 2,093,838 MMBtus of energy, including on-site and equipment use (excavator and skid-steer) and transportation of personnel for inspections and parking lot replacement. Most of this energy is associated with the asphalt materials that comprise the upper surface of the parking lot. Implementing IM-2 would generate emissions of on-site and total NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site equipment use (excavator and skid-steer) and transportation of personnel. The total GHG emissions for IM-2 would include 17,992 tons as CO_2e.

Land disturbance from IM-2 remedial activities would be limited to repairing and replacing the IM covers as needed, which does not represent a change in the current land use for the Site. As such, there would be no net impact to land or ecosystems from implementing IM-2.

10.5.2.4 Long-Term Effectiveness and Permanence

IM-2 would provide long-term, permanent protection of human health and the environment by containing and isolating impacted soil so that surface soil is below the nonresidential direct contact PRGs. The existing caps and covers would eliminate long-term risks to receptors and mitigate the potential for erosion during storm events. ICs prevent risks from subsurface soil within the IM areas. Monitoring and O&M will be conducted to provide continued long-term effectiveness of the remedy.

10.5.2.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative IM-2 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.5.2.6 Implementability

The remedial components in IM-2 are easily implemented as they use well-established practices, and the services and materials required are standard within the industry and are readily available. The long-term O&M requirements for all remedial components provided by this alternative can be readily performed and have been performed for the Oxford Lake Park IMs and on other residential and nonresidential areas on the Site. The personnel and equipment for monitoring and repairs, if needed, are expected to be readily available.

10.5.2.7 Cost

A cost estimate for IM-2 is shown in Table 10-3. The annual long-term cost for this alternative is estimated to range between $13,500 and $408,500 per year. The range includes annual inspections, repairs at year 7 and 22, and replacement of asphalt surfaces once over the 30-year period. Within the 30-year costing period, the estimated costs at years 7 and 22 include repairs to the parking lot and tennis court and are estimated to cost approximately $13,500 per event. The estimated costs for annual inspections and reporting are approximately $16,700, and the estimated costs for replacing these features at year 15 plus the annual reporting is approximately $408,500. The replacement activities at year 15 are anticipated to include the parking lot and the tennis courts. The total present worth cost for this alternative, including 30 years of O&M and contingency, is approximately $400,000 recognizing that these costs are net present worth costs reflecting the time value of money. O&M activities would continue in perpetuity.

10.5.3 IM-3: Excavation and On- or Off-Site Disposal for Outfield Surface Soil in Field A and between Fields A and D, and Long-Term Soil Management for PCBs ≥ 1.0 mg/kg in and between Outfield Soil on Fields C and D and at Depth

IM-3 would remove surface soil (0 to 1 feet bgs) from softball Field A and between Fields A and D as part of advance soil management support. The advance soil management would be implemented to minimize the potential for conflict between ongoing recreational activities for Field A and future soil management support that could be required during infrastructure repair or construction projects. The soil excavated under IM-3 (5,056 tons), would be taken off-site for disposal in a permitted landfill.

IM-3 also includes the long-term monitoring and maintenance as detailed for IM-2 (Section 10.5.2). Inspections would document the effectiveness of maintenance activities conducted by the City of Oxford's routine maintenance. Ongoing soil management includes the City of Oxford's requirement to notify P/S of any intrusive or land-disturbance work that may occur in this area so that soil management support can be provided, if appropriate. This notification process is consistent with the long-term soil management approach planned for OU-1/OU-2 that includes using the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located.

10.5.3.1 Overall Protection of Human Health and the Environment

IM-3 would provide both short-term and long-term protection of human health and the environment through the continuance of ongoing maintenance and monitoring for the previously

constructed IMs. This protectiveness is also increased through the removal of surface soil from Field A as part of advance soil management support.

Consistent with IM-2, O&M for IM-3 includes conducting periodic inspections and inspections following significant rain events and includes observing the effectiveness of the City of Oxford's routine maintenance, as well as soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. IM-3 would be protective of human health and the environment in the short and long term.

10.5.3.2 Compliance with ARARs

IM-3 would comply with ARARs and would specifically comply with the following key ARARs from Tables 6-2 and 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 42 U.S.C. § 4001 et seq. and § 42 U.S.C. 4101 regarding alteration of the floodplain that could result in flooding

10.5.3.3 Short-Term Effectiveness

IM-3 would reduce short-term impacts associated with potential conflicts between ongoing recreational activities for Field A and future infrastructure repair or construction projects for this field. These impacts could include an extended duration to implement the infrastructure-related work for this softball field if the advance soil management support is not provided.

IM-3 would result in short-term risks and impacts to Site workers and the community during implementation. These risks and impacts would be similar to those already experienced during the residential removals, IMs, infrastructure support actions, and other actions completed for the Site. The alternative involves soil removal and has the potential to create short-term dust impacts. These risks and impacts would be managed using the engineering controls already proven to be effective for this type of remediation. Short-term impacts to the creeks would be managed using siltation controls, which have also proven to be effective for this type of construction.

IM-3 would consume 2,099,774 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use.

Implementing IM-3 would generate emissions on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). The total GHG emissions for IM-3 would include 18,418 tons as CO_2e.

Land disturbance from IM-3 remedial activities would include excavation of soil on softball Field A and land disposal of waste in an off-site landfill. Since the land use of the Site would remain

unchanged following implementation of the remedy and the off-site landfill is an established disposal site, there would be no net impact to land or ecosystems from implementation of IM-3.

The estimated duration to implement IM-3 is approximately 3 to 6 months.

10.5.3.4 Long-Term Effectiveness and Permanence

IM-3 would provide long-term, permanent protection of human health and the environment by maintaining the existing caps and covers to eliminate long-term risks to receptors and mitigate the potential for erosion during storm events. ICs prevent risks from subsurface soil within the IM areas. Monitoring and O&M will be conducted to provide continued long-term effectiveness of the remedy.

10.5.3.5 Reduction of Toxicity, Mobility, and Volume through Treatment

IM-3 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.5.3.6 Implementability

IM-3 would be implementable using technologies and procedures that have already been implemented in other areas of this and other sites.

10.5.3.7 Cost

A cost estimate for IM-3 is shown in Table 10-4. The estimated capital cost (without contingencies) is $926,600. The annual long-term cost for this alternative is estimated to range between $13,500 and $408,500 per year. The total present worth cost for this alternative, including 30 years of soil management and contingency, is approximately $1.5M. This cost is based on all the excavated material (3,370 cubic yards) being disposed of in an off-site Subtitle D landfill.

10.5.4 IM-4: Excavation and On- or Off-Site Disposal for Outfield Surface Soil in and between Fields A, C, and D, and Long-Term Soil Management for PCBs ≥ 1.0 mg/kg at Depth

IM-4 would remove surface soil (0 to 1 feet bgs) from softball Fields A, C, and D as part of advance soil management support. The advance soil management would be implemented to minimize the potential for conflict between ongoing recreational activities and soil management support that could be required during future infrastructure repair or construction projects. The excavated soil (13,778 tons) would be taken off-site for disposal in a permitted landfill.

IM-4 also includes long-term monitoring and maintenance as detailed for IM-2 (Section 10.5.2). Inspections would document the effectiveness of maintenance activities conducted by the City of Oxford's routine maintenance. Ongoing soil management includes the City of Oxford's requirement to notify P/S of any intrusive or land-disturbance work that may occur in this area so that soil management support may be provided, if appropriate. This notification process is consistent with the long-term soil management approach planned for OU-1/OU-2 that includes using the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located.

10.5.4.1 Overall Protection of Human Health and the Environment

IM-4 would provide both short- and long-term protection of human health and the environment through the continuance of ongoing maintenance and monitoring for the previously constructed IMs. This protectiveness is also increased through the removal of surface soil from Fields A, C, and D as part of advance soil management support.

Consistent with IM-2 and IM-3, O&M for IM-4 includes conducting periodic inspections and inspections following significant rain events and includes observing the effectiveness of the City of Oxford's routine maintenance, as well as soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. IM-4 would be protective of human health and the environment in the short and long term.

10.5.4.2 Compliance with ARARs

IM-4 would comply with ARARs and would specifically comply with the following key ARARs from Tables 6-2 and 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alteration of the floodplain that could result in flooding

10.5.4.3 Short-Term Effectiveness

IM-4 would reduce short-term impacts associated with potential conflicts between ongoing recreational activities for Fields A, C, and D and future infrastructure repair or construction projects for these fields. These impacts could include an extended duration to implement the infrastructure-related work for these softball fields if the advance soil management support is not provided.

IM-4 would result in short-term risks and impacts to Site workers and the community. These risks and impacts would be similar to those already experienced during the residential removals, IMs, infrastructure support actions, and other actions completed for the Site. The alternative involves the removal of soil, which has the potential to create short-term dust impacts. These risks and impacts would be managed using the engineering controls already proven to be effective for this type of remediation. Short-term impacts to the creeks would be managed using siltation controls, which have also proven to be effective for this type of construction.

IM-4 would consume 2,101,952 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use.

Implementing IM-4 would generate emissions on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). The total GHG emissions for IM-4 would include 18,577 tons as CO_2e.

Land disturbance from IM-4 remedial activities would include excavation of soil on softball Fields A, C, and D and land disposal of waste in an off-site landfill. Since the land use of the Site would remain unchanged following implementation of the remedy, and the off-site landfill is an established disposal site, there would be no net impact to land or ecosystems from implementation of IM-4.

The estimated duration to implement IM-4 is approximately 6 to 9 months.

10.5.4.4 Long-Term Effectiveness and Permanence

IM-4 would provide long-term, permanent protection of human health and the environment by monitoring and maintaining the existing caps and covers to eliminate long-term risks to receptors and mitigate the potential for erosion during storm events. ICs prevent risks from subsurface soil within the IM areas. Monitoring and O&M will be conducted to provide continued long-term effectiveness of the remedy.

10.5.4.5 Reduction of Toxicity, Mobility, and Volume through Treatment

IM-4 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.5.4.6 Implementability

IM-4 would be implementable using technologies and procedures that have already been implemented in other areas of this and other sites.

10.5.4.7 Cost

A cost estimate for IM-4 is shown in Table 10-5. The estimated capital cost (without contingencies) is $2.2M. The annual long-term cost for this alternative is estimated to be between $13,500 and $408,500 per year. The total present worth cost for this alternative, including 30 years of soil management and contingency, is approximately $3.2M. This cost is based on all the excavated material 9,185 cubic yards) being disposed of in an off-site Subtitle D landfill.

10.5.5 IM-5: Excavation and On- or Off-Site Disposal for Outfield Surface Soil in and between Fields A, C, and D; Excavation and Off-Site Disposal of Subsurface Soil with PCB Concentrations ≥ 50 mg/kg in Field C; and Long-Term Soil Management for PCBs ≥1.0 mg/kg in Soil at Depth

IM-5 would remove surface soil (0 to 1 feet bgs) from softball Fields A, C, and D and subsurface soil from the 1–2-foot horizon for a portion of softball Field C. The excavated soil would be taken off-site for disposal in permitted landfills. IM-5 would generate 13,819 tons of soil for off-site disposal.

IM-5 also includes long-term monitoring and maintenance as detailed for IM-2 (Section 10.5.2). Inspections would document the effectiveness of maintenance activities conducted by the City of Oxford's routine maintenance. Ongoing soil management includes the City of Oxford's requirement to notify P/S of any intrusive or land-disturbance work that may occur in this area so that soil management support can be provided, if appropriate. This notification process is consistent with the long-term soil management approach planned for OU-1/OU-2 that includes using the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located.

10.5.5.1 Overall Protection of Human Health and the Environment

IM-5 would provide both short-term and long-term protection of human health and the environment through the continuance of ongoing maintenance and monitoring activities for the previously constructed IMs. This protectiveness is increased through advance soil management support, including the removal of surface soil from Field A, C, and D, and the removal of subsurface soil from the 1–2-foot horizon for a portion of Field C with PCB concentrations greater than or equal to 50 mg/kg.

Consistent with IM-2, IM-3, and IM-4, O&M for IM-5 includes conducting periodic inspections and inspections following significant rain events and includes observing the effectiveness of the City of Oxford's routine maintenance, as well as soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. IM-5 would be protective of human health and the environment in the short and long term.

10.5.5.2 Compliance with ARARs

IM-5 would comply with ARARs and would specifically comply with the following key ARARs from Tables 6-2 and 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alteration of the floodplain that could result in flooding

10.5.5.3 Short-Term Effectiveness

IM-5 would reduce short-term impacts associated with potential conflicts between ongoing recreational activities for Fields A, C, and D and future infrastructure repair or construction projects for these fields. These impacts could include an extended duration to implement the infrastructure-related work for these softball fields that would otherwise be needed if the advance soil management support is not provided.

IM-5 would result in short-term risks and impacts to Site workers and the community. These risks and impacts would be similar to those already experienced during the residential removals, IMs, infrastructure support actions, and other actions completed for the Site. The removal of soil has the potential to create short-term dust impacts. These risks and impacts would be managed using the engineering controls already proven to be effective for this type of remediation. Short-term impacts to the creek would be managed using siltation controls, which have also proven to be effective for this type of construction.

IM-5 would consume 2,101,998 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use.

Implementing IM-5 would generate emissions on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and

skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). The total GHG emissions for IM-5 would include 18,581 tons as CO_2e.

Land disturbance from IM-5 remedial activities would include excavation of soil on softball Fields A, C, and D and land disposal of waste in off-site landfills. Since the land use of the Site would remain unchanged following implementation of the remedy and the off-site landfill is an established disposal site, there would be no net impact to land or ecosystems from implementation of IM-5.

The estimated duration to implement IM-5 is approximately 6 to 9 months.

10.5.5.4 Long-Term Effectiveness and Permanence

IM-5 would provide long-term, permanent protection of human health and the environment by monitoring and maintaining the existing caps and covers that eliminate long-term risks to receptors and mitigates the potential for erosion during storm events. ICs prevent risks from subsurface soil within the IM areas. Monitoring and O&M will be conducted to provide continued long-term effectiveness of the remedy.

10.5.5.5 Reduction of Toxicity, Mobility, and Volume through Treatment

IM-5 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.5.5.6 Implementability

IM-5 would be implementable using technologies and procedures that have already been implemented in other areas of this and other sites.

10.5.5.7 Cost

A cost estimate for IM-5 is shown in Table 10-6. The estimated capital cost (without contingencies) is $2.2M. The annual long-term cost for this alternative is estimated to range between $13,500 and $408,500 per year. The total present worth cost for this alternative, including 30 years of soil management and contingency, is approximately $3.2M. This cost is based on all the excavated material (27 cubic yards) being disposed of in an off-site TSCA-regulated landfill and 9,185 cubic yards being disposed in an off-site Subtitle D landfill.

10.6 Nonresidential Soil

Each of the remedial alternatives developed for the nonresidential soil (except the no action alternative) have the same target remediation area footprint shown on the after-remediation panel on Figure 7-2 to meet the ecological PRG of 6 mg/kg. The resulting remediation would also meet the future agricultural PRG of 10 mg/kg. The target remedial area includes 71 acres and an estimated removal volume of approximately 57,475 cubic yards (Section 7.3). The actions taken to reduce PCB concentrations in the floodplain would also reduce exposure to mercury to an OU-wide average below 1 mg/kg. Increases in the size of and volumes for the target removal areas associated with advance soil management support are identified and discussed below where applicable for the individual remedial alternatives.

Although, placing cover materials was initially considered as a potential approach to address the floodplain soil, an initial evaluation of this approach found that a large portion of the target areas

were in the FEMA floodway; therefore, placing cover soil without excavating the existing soil would generally not be permitted. While no rise calculations could be conducted to potentially show limited flooding-related impacts (at least for the portion of OU-4 located downstream of Friendship Road), many of these floodplain areas are valuable riparian habitat or agricultural fields; therefore, placing cover soil is not a viable remedial solution. Based on a combination of concerns, including the potential for flooding, habitat destruction, and impacts to current land use practices, remedial alternatives that would place cover materials directly on existing floodplain soil were not considered further. A remedial alternative with on-site or off-site treatment of the excavated soil was not developed because soil with PCB concentrations greater than or equal to 500 mg/kg are not present in OU-4.

The five remedial alternatives developed for nonresidential floodplain soil are as follows:

- NRS-1: No action
- NRS-2: Excavation of soil in 0–0.5-foot soil horizon, off-site disposal, and long-term soil management including deed restrictions as needed
- NRS-3: Excavation of soil in 0–0.5-foot soil horizon, off-site disposal, limited advance surface soil management for PCBs ≥50 mg/kg, and long-term soil management including deed restrictions as needed
- NRS-4: Excavation of soil in the 0–0.5-foot soil horizon, off-site disposal, site-wide advance surface soil management for PCBs ≥50 mg/kg, and long-term soil management including deed restrictions as needed
- NRS-5: Excavation of soil in 0–0.5-foot soil horizon, off-site disposal, site-wide advance surface and subsurface soil management for PCBs ≥50 mg/kg, and long-term soil management

Each of these remedial alternatives is evaluated in more detail in the following subsections.

10.6.1 NRS-1: No Action

No further action beyond the removal actions and final corrective projects that have been previously implemented.

10.6.1.1 Overall Protection of Human Health and the Environment

NRS-1 would not be protective of human health or the environment. This alternative would leave PCBs in surface soil at concentrations above PRGs.

10.6.1.2 Compliance with ARARs

NRS-1 would not comply with the following key ARAR from Table 6-3:

- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes

10.6.1.3 Short-Term Effectiveness

No additional short-term risks or impacts to the community, workers, or the environment are posed by implementing NRS-1. There is no GHG or consumption of energy associated with this remedial alternative.

10.6.1.4 Long-Term Effectiveness and Permanence

NRS-1 would not provide long-term effectiveness because it does not address surface soil with PCB concentrations above risk-based levels and no long-term soil management support would be provided.

10.6.1.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative NRS-1 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.6.1.6 Implementability

NRS-1 is a no action alternative and would be easy to implement.

10.6.1.7 Cost

There are no costs associated with NRS-1.

10.6.2 NRS-2: Excavation of Soil in 0–0.5-Foot Soil Horizon, Off-Site Disposal, and Long-Term Soil Management Including Deed Restrictions as Needed

NRS-2 would remove soil using traditional excavation equipment from the 0–0.5-foot horizon based on achieving a PCB SWAC of 6 mg/kg for ecological receptors (Figure 7-2). The excavated soil would be taken off-site for disposal at an approved facility (landfill). Once soil removal was removed, the excavated areas would be backfilled with clean soil. Vegetation would be planted to stabilize the newly placed surface soil layer. The resulting PCB concentration would also meet the future agricultural PRG of 10 mg/kg on a SWAC basis (Figure 7-7).

Excavated soil would be transported off-site for disposal in a permitted landfill. NRS-2 requires using 63,554 tons of refined materials, including sand, topsoil, and HDPE liner (for decontamination area). This alternative would generate 60,340 tons of soil with PCB concentrations greater than or equal to 50 mg/kg for off-site disposal at a TSCA-regulated disposal facility and 25,860 tons of soil for disposal in an off-site Subtitle D facility.

NRS-2 includes long-term soil management, as has been implemented for the residential properties and nonresidential portion of the Site over the past 20 years. The soil management activities are anticipated to include using the Alabama 811 system to identify the potential for intrusive activities that, without proper soil management support, could negatively impact the effectiveness of the remedy. The estimated time frame to complete NRS-2 is 1 to 2 years.

10.6.2.1 Overall Protection of Human Health and the Environment

NRS-2 would be protective of human health and the environment. This alternative would reduce the surface soil concentrations to meet the PRG for ecological receptors and achieve the PRG for the future agricultural use scenario, should it occur. The PCB SWACs for NRS-2 before and after remediation are shown on Figure 7-2. The numerical values for PCB SWACs for ecological receptors before and after remediation are presented by EU on Table 10-7 including the riparian EUs. The maximum mean PCB SWAC (5.9 mg/kg) is for C3 North, and the maximum after remediation PCB concentration for the upper 0–0.5-foot horizon is 64 mg/kg (C3 South).

The before and after remediation PCB SWACs for the 0–1-foot horizon that apply to the human health EUs are shown on Figure 7-6. The numerical values for the PCB SWACs before and after

remediation are presented by EU on Table 10-8 with the highest mean PCB SWAC (10 mg/kg) located in C3N-EU1. The highest PCB concentration for the 0–1-foot exposure horizon is 130 mg/kg (C3S-EU1).

10.6.2.2 Compliance with ARARs

NRS-2 would comply with ARARs and would specifically comply with the following key ARARs from Tables 6-2 and 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61 for risk-based disposal of PCB remediation wastes
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alteration of the floodplain that could result in flooding

10.6.2.3 Short-Term Effectiveness

NRS-2 would result in short-term risks and impacts to Site workers and the community. These risks and impacts would be similar to those already experienced during the residential removals, IMs, infrastructure support actions, and other actions completed for the Site. The alternative involves removing trees and brush and creating and removing temporary staging areas as well as managing storm water, truck traffic, and associated noise. The removal of soil has the potential to create short-term dust impacts. These risks and impacts would be managed using the engineering controls already proven to be effective for this type of remediation. Short-term impacts associated with working adjacent to the creek would be managed using siltation controls, which have also proven to be effective for this type of construction.

NRS-2 would consume 79,111 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing NRS-2 would generate emissions on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). The total GHG emissions for NRS-2 would include 6,255 tons as CO_2e.

Land disturbance from NRS-2 remedial activities would include excavation of soil on nonresidential properties and disposal of waste in an off-site landfill. Since the land use of the Site would remain unchanged following implementation of the remedy and the off-site landfills are established disposal sites, there would be no net impact to land or ecosystems from implementation of NRS-2.

The estimated duration to implement NRS-2 is approximately 2 years.

10.6.2.4 Long-Term Effectiveness and Permanence

NRS-2 would provide long-term effectiveness and permanence by meeting the ecological and human health PRGs. Changes in land use or exposure to PCBs through subsurface intrusive activities would be addressed in the soil management plan and managed using controls in such a way that would continue to be protective of human health and the environment.

10.6.2.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative NRS-2 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.6.2.6 Implementability

NRS-2 would be implementable using technologies and procedures that have already been implemented in other areas of this and other sites.

10.6.2.7 Cost

A cost estimate for NRS-2 is shown in Table 10-9. The estimated capital cost (without contingencies) is $23.7M. The annual long-term cost for this alternative is estimated at $131,000 per year. The total present worth cost for this alternative, including 30 years of soil management and contingency, is approximately $30.9M. This cost is based on 60,340 tons of material being disposed of in an off-site TSCA-regulated landfill and 25,860 tons of materials being disposed of at an on-site Subtitle D facility.

10.6.3 NRS-3: Excavation of Soil in 0–0.5-Foot Soil Horizon, Off-Site Disposal, Limited Advance Surface Soil Management for PCBs ≥ 50 mg/kg, and Long-Term Soil Management Including Deed Restrictions as Needed

NRS-3 would remove soil using traditional excavation equipment from the 0–0.5-foot horizon based on achieving a PCB SWAC of 6 mg/kg for ecological receptors (Figure 7-3) and implementing advance soil management. The 73,345 cubic yards of excavated soil would be taken off-site for disposal at an approved facility (landfill). Once soil removal was complete, the excavated areas would be backfilled with clean soil. Vegetation would be planted to stabilize the newly placed surface soil layer. Consistent with NRS-2, removing soil from the 0–0.5-foot horizon under NRS-3 would achieve the ecological PRG (6 mg/kg SWAC) and the future agricultural PRG of 10 mg/kg on a SWAC basis for the 0–1-foot horizon.

The advance soil management component of NRS-3 includes the removal and off-site disposal of 15,870 cubic yards of soil from the 0–1-foot horizon with PCB concentrations greater than or equal to 50 mg/kg for EUs upstream (north) of I-20 (i.e., C1-EU1 and C1-EU2). The two applicable EUs include the Oxford Lake Park area (C1-EU1) and the undeveloped land to the west of Snow Creek (C1-EU2) as shown on Figure 7-8.

Once soil removal was complete, the excavated areas would be backfilled with clean soil, and vegetation would be planted to stabilize the newly placed surface soil layer. Excavated soil would be transported off-site for disposal in a permitted landfill. NRS-3 requires using 85,333 tons of refined materials, including sand, topsoil, and the HDPE liner (to construct the decontamination area). This alternative would generate 77,000 tons of soil with PCB concentrations greater than or equal to 50 mg/kg for off-site disposal at a TSCA-regulated disposal facility and 33,000 tons of soil for disposal at a Subtitle D facility.

NRS-3 includes long-term soil management, as has been implemented for the residential properties and other areas in OU-4 and in the upstream OUs for the Site. The soil management activities are anticipated to include using the Alabama 811 system to identify the potential for intrusive activities that, without proper soil management support, could negatively impact the effectiveness of the remedy. The estimated time frame to complete NRS-3 is 1 to 2 years.

10.6.3.1 Overall Protection of Human Health and the Environment

NRS-3 would be protective of human health and the environment. This alternative would reduce the surface soil concentrations for the 0–0.5-foot horizon to meet the PRG for ecological receptors and the PRG for the future agricultural use scenario, should it occur. The PCB SWACs before and after remediation are shown on Figure 7-3 for ecological receptors. The numerical values for PCB SWACs for ecological receptors before and after remediation are presented by EU on Table 10-10 including the riparian EUs. The highest mean PCB SWAC (5.9 mg/kg) after remediation is for C3 North and the maximum PCB concentration after remediation for the upper 0–0.5-foot horizon is 64 mg/kg (C4 South).

The PCB SWACs before and after remediation for the 0–1-foot horizon for the human health EUs are shown on Figure 7-8. The numerical values for PCB SWACs before and after remediation are presented by EU on Table 10-8. The highest mean PCB SWAC (10 mg/kg) is in C3N-EU1. The highest PCB concentration for the 0–1-foot exposure horizon is 130 mg/kg and is in C3S-EU1.

10.6.3.2 Compliance with ARARs

NRS-3 would comply with ARARs and would specifically comply with the following key ARARs from Tables 6-2 and 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alteration of the floodplain that could result in flooding

10.6.3.3 Short-Term Effectiveness

NRS-3 would result in short-term risks and impacts to Site workers and the community. These risks and impacts would be similar to those already experienced during the residential removals, IMs, infrastructure support actions, and other actions completed for the Site. The alternative involves removing trees and brush and creating and removing temporary staging areas as well as managing storm water, truck traffic, and associated noise. The removal of soil has the potential to create short-term dust impacts. These risks and impacts would be managed using the engineering controls already proven to be effective for this type of remediation. Short-term impacts associated with working adjacent to the creeks would be managed using siltation controls, which have also proven to be effective for this type of construction.

NRS-3 would consume 99,451 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing NRS-3 would generate emissions on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). The total GHG emissions for NRS-3 would include 7,894 tons as CO_2e.

Land disturbance from NRS-3 remedial activities would include excavation of soil on nonresidential properties and disposal of waste in an off-site landfill. Since the land use of the Site

would remain unchanged following implementation of the remedy and the off-site landfills are established disposal sites, there would be no net impact to land or ecosystems from implementation of NRS-3.

The estimated duration to implement NRS-3 is approximately 2 years.

10.6.3.4 Long-Term Effectiveness and Permanence

NRS-3 would provide long-term effectiveness and permanence by meeting the ecological and human health PRGs. Changes in land use or exposure to PCBs through subsurface intrusive activities would be addressed in the soil management plan and managed using controls in such a way that would continue to be protective of human health and the environment.

10.6.3.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative NRS-3 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.6.3.6 Implementability

NRS-3 would be implementable using technologies and procedures that have already been implemented in other areas of this and other sites.

10.6.3.7 Cost

A cost estimate for NRS-3 is shown in Table 10-11. The estimated capital cost (without contingencies) is $29.3M. The annual long-term cost for this alternative is estimated at $131,000 per year. The total present worth cost for this alternative, including 30 years of soil management and contingency, is approximately $37.7M. This cost is based on 77,000 tons of material being disposed of in an off-site TSCA-regulated landfill and 33,000 tons of material being disposed at an off-site Subtitle D facility.

10.6.4 NRS-4: Excavation of Soil in the 0–0.5-Foot Soil Horizon, Off-Site Disposal, Site-Wide Advance Surface Soil Management for PCBs ≥ 50 mg/kg, and Long-Term Soil Management Including Deed Restrictions as Needed

NRS-4 would remove soil using traditional excavation equipment from the 0–0.5-foot horizon based on achieving a PCB SWAC of 6 mg/kg for ecological receptors (Figure 7-4) and implementing an enhanced advance soil management approach. The total removal volume (143,801 cubic yards) of excavated soil would be taken off-site for disposal at an approved facility (landfill). Once soil removal was complete, the excavated areas would be backfilled with clean soil. Vegetation would be planted to stabilize the newly placed surface soil layer. Consistent with NRS-2 and NRS-3, removing soil from the 0–0.5-foot horizon under NRS-4 would achieve the ecological PRG (6 mg/kg SWAC) and the future agricultural PRG of 10 mg/kg on a SWAC basis for the 0–1-foot horizon.

The enhanced advance soil management component of NRS-4 includes the removal and off-site disposal of 86,326 cubic yards of soil from the 0–1-foot horizon with PCB concentrations greater than or equal to 50 mg/kg.

The floodplain soil would be removed with traditional excavation equipment and taken off-site for disposal. Once removal was complete, the excavated areas would be backfilled with clean soil.

Vegetation would be planted to stabilize the newly placed surface soil layer. Excavated soil would be transported off-site for disposal in a permitted landfill. NRS-4 requires using 227,715 tons of refined materials, including sand, topsoil, and HDPE liner (from decontamination area). This alternative would generate 150,990 tons of materials with PCB concentrations greater than or equal to 50 mg/kg for off-site disposal at a TSCA-regulated disposal facility and 64,710 tons of materials for disposal at an off-site Subtitle D facility.

NRS-4 includes long-term soil management, as has been implemented for the residential properties and other areas in OU-4 and in the upstream OUs for the Site. The soil management activities are anticipated to include using the Alabama 811 system to identify the potential for intrusive activities that, without proper soil management support, could negatively impact the effectiveness of the remedy.

The estimated time frame to complete NRS-4 is 2 to 3 years.

10.6.4.1 Overall Protection of Human Health and the Environment

NRS-4 would be protective of human health and the environment. This alternative would reduce the surface soil concentrations for the 0–0.5-foot horizon to meet the PRG for ecological receptors and the PRG for the future agricultural use scenario, should it occur. The PCB SWACs before and after remediation are shown on Figure 7-4 for ecological receptors. The numerical values for the before and after remediation PCB SWACs for ecological receptors are presented by EU on Table 10-12 including the riparian EUs. The highest after remediation PCB SWAC (5.5 mg/kg) is for C1 West. The maximum PCB concentration after remediation for the upper 0–0.5-foot horizon is 38 mg/kg (C4 North).

The before and after remediation PCB SWACs for the 0–1-foot horizon for the human health EUs are shown on Figure 7-9. The numerical values for PCB SWACs before and after remediation are presented by EU on Table 10-8 with the highest mean PCB SWAC (8.7 mg/kg) located in C1-EU2. The highest PCB concentration for the 0–1-foot exposure horizon is 38 mg/kg and is in C3N-EU1.

10.6.4.2 Compliance with ARARs

NRS-4 would comply with ARARs and would specifically comply with the following key ARARs from Tables 6-2 and 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alteration of the floodplain that could result in flooding

10.6.4.3 Short-Term Effectiveness

NRS-4 would result in short-term risks and impacts to Site workers and the community. These risks and impacts would be similar to those already experienced during the residential removals, IMs, infrastructure support actions, and other actions completed for the Site. The alternative

involves removing trees and brush and creating and removing temporary staging areas as well as managing storm water, truck traffic, and associated noise. The removal of soil has the potential to create short-term dust impacts. These risks and impacts would be managed using the engineering controls already proven to be effective for this type of remediation. Short-term impacts associated with working adjacent to the creeks would be managed using siltation controls that have proven to be generally effective for this type of construction.

NRS-4 would consume 201,595 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing NRS-4 would generate emissions on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). The total GHG emissions for NRS-4 would include 16,039 tons as CO_2e.

Land disturbance from NRS-4 remedial activities would include excavation of soil on nonresidential properties and land disposal of waste in an off-site landfill. Since the land use of the Site would remain unchanged following implementation of the remedy and the off-site landfills are established disposal sites, there would be no net impact to land use from implementation of NRS-4. The ecosystems would be significantly impacted by implementation of NRS-4 due to the extensive land disturbance in valuable riparian corridor areas that, in some areas, will be difficult to replicate as part of a restoration process.

The estimated duration to implement NRS-4 is approximately 2 years.

10.6.4.4 Long-Term Effectiveness and Permanence

NRS-4 would provide long-term effectiveness and permanence by meeting the ecological and human health PRGs. Changes in land use or exposure to PCBs through subsurface intrusive activities would be addressed in the soil management plan and managed using controls in such a way that would continue to be protective of human health and the environment.

10.6.4.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative NRS-4 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.6.4.6 Implementability

NRS-4 would be implementable using technologies and procedures that have already been implemented in other areas of this and other sites.

10.6.4.7 Cost

A cost estimate for NRS-4 is shown in Table 10-13 The estimated capital cost (without contingencies) is $55.4M. The annual long-term cost for this alternative is estimated at $131,000 per year. The total present worth cost for this alternative, including 30 years of soil management and contingency, is approximately $70.1M. This cost is based on 150,990 tons of material being disposed of at an off-site TSCA-regulated landfill and 64,710 tons of material being disposed of at an off-site Subtitle D facility.

10.6.5 NRS-5: Excavation of Soil in 0–0.5-Foot Soil Horizon, Off-Site Disposal, Site-Wide Advance Surface and Subsurface Soil Management for PCBs ≥50 mg/kg, and Long-Term Soil Management

NRS-5 would remove soil using traditional excavation equipment from the 0–0.5-foot horizon based on achieving a PCB SWAC of 6 mg/kg for ecological receptors (Figure 7-5) and implementing an enhanced advance surface and subsurface soil management approach. The total removal volume (303,533 cubic yards) of excavated soil would be taken off-site for disposal at an approved facility (landfill). Once soil removal was complete, the excavated areas would be backfilled with clean soil. Vegetation would be planted to stabilize the newly placed surface soil layer. Consistent with NRS-2, NRS-3, and NRS-4, removing soil from the 0–0.5-foot horizon under NRS-5 would achieve the ecological PRG (6 mg/kg SWAC) and the future agricultural PRG of 10 mg/kg on a SWAC basis for the 0–4-foot horizon. The additional removal of concentrations at depth does not improve protectiveness for ecological receptors because they are not exposed to these deeper soils.

The enhanced advance soil management component of NRS-5 includes the removal and off-site disposal of 246,058 cubic yards of soil from the 0–4-foot horizon with PCB concentrations greater than or equal to 50 mg/kg.

The floodplain soil would be removed with traditional excavation equipment and taken off-site for disposal. Once removal was complete, the excavated areas would be backfilled with clean soil. Vegetation would be planted to stabilize the newly placed surface soil layer. Excavated soil would be transported off-site for disposal in a permitted landfill. NRS-5 requires using 63,546 tons of refined materials, including sand, topsoil, and HDPE liner (from decontamination area). This alternative would generate 429,440 tons of material with PCB concentrations greater than or equal to 50 mg/kg for off-site disposal at a TSCA-regulated disposal facility and 25,860 tons of material for disposal at an off-site Subtitle D facility.

NRS-5 includes long-term soil management, as has been implemented for the residential properties and other areas in OU-4 and in the upstream OUs for the Site. The soil management activities are anticipated to include using the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy.

The estimated time frame to complete NRS-5 is 3 to 4 years.

10.6.5.1 Overall Protection of Human Health and the Environment

NRS-5 would be protective of human health and the environment. This alternative would reduce the surface soil concentrations for the 0–0.5-foot horizon to meet the PRG for ecological receptors and the PRG for the future agricultural use scenario, should it occur. The PCB SWACs before and after remediation are shown on Figure 7-5a for ecological receptors. Additional details are presented on Figures 7-5b through 7-5t. The numerical values for the before and after remediation PCB SWACs for ecological receptors under this alternative are with NRS-4 as this alternative (NRS-5) is focused on removing soils at depth. The post-removal values are presented by EU on Table 10-12 including the riparian EUs. The maximum PCB concentration after remediation for the upper 0–0.5-foot horizon is 38 mg/kg in C4 North.

The before and after remediation PCB SWACs for the 0–4-foot horizon for the human health EUs are shown on Figure 7-10a with details shown on Figure 7-10b through 7-10x. The numerical values for PCB SWACs before and after remediation are presented by EU on Table 10-8 are consistent with those for NRS-4 as the additional soil removal for NRS-5 is occurring below 1 foot horizon.

10.6.5.2 Compliance with ARARs

NRS-5 would comply with ARARs and would specifically comply with the following key ARARs from Tables 6-2 and 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alteration of the floodplain that could result in flooding

10.6.5.3 Short-Term Effectiveness

NRS-5 would result in short-term risks and impacts to Site workers and the community. These risks and impacts would be similar to those already experienced during the residential removals, IMs, infrastructure support actions, and other actions completed for the Site. The alternative involves removing trees and brush and creating and removing temporary staging areas as well as managing storm water, truck traffic, and associated noise. The removal of soil has the potential to create short-term dust impacts. These risks and impacts would be managed using the engineering controls already proven to be effective for this type of remediation. Short-term impacts associated with working adjacent to the creeks would be managed using siltation controls that are generally proven to be effective for this type of construction but would be faced with challenges associated with excavating along creek bank areas to depths up to 4 feet bgs.

NRS-5 would consume 411,458 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing NRS-5 would generate emissions on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). The total GHG emissions for NRS-5 would include 33,068 tons as CO_2e.

Land disturbance from NRS-5 remedial activities would include excavation of soil on nonresidential properties and land disposal of waste in an off-site landfill. Since the land use of the Site would remain unchanged following implementation of the remedy and the off-site landfills are established disposal sites, there would be no net impact to land use. The ecosystems would be significantly impacted by implementation of NRS-5 due to the extensive level of land disturbance in valuable riparian corridor areas that in some locations will be difficult to impossible to replicate as part of the restoration process.

The estimated duration to implement NRS-5 is approximately 3.5 years.

10.6.5.4 Long-Term Effectiveness

NRS-5 would provide long-term effectiveness and permanence by meeting the ecological and human health PRGs. Changes in land use or exposure to PCBs through subsurface intrusive activities would be addressed in the soil management plan and managed using controls in such a way that would continue to be protective of human health and the environment.

10.6.5.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative NRS-5 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.6.5.6 Implementability

NRS-5 would be implementable using technologies and procedures that have already been implemented in other areas of this and other sites.

10.6.5.7 Cost

A cost estimate for NRS-5 is shown in Table 10-14. The estimated capital cost (without contingencies) is $129.6M. The annual long-term cost for this alternative is estimated at $131,000 per year. The total present worth cost for this alternative, including 30 years of soil management and contingency, is approximately $161.3M. This cost is based on 429,000 tons of material being disposed of at an off-site TSCA-regulated landfill and approximately 26,000 tons of material being disposed of at an off-site Subtitle D facility.

10.7 Creek Banks and Sediment

The development and screening of the sediment alternatives and those elements that are common to each alternative were discussed in Section 9. Seven remedial alternatives were developed and screened for the creek banks and sediment of OU-4. Each of these alternatives, except SED-1 (no action) include source control measures to address creek bank areas that are contributing PCBs to OU-4 and would not otherwise be addressed by upstream source measures in OU-3 and OU-1/OU-2. There are two geographic approaches for creek bank source control: an approach targeting creek banks with moderate and severe erosion located upstream of RM 29.5 that achieves the long-term PRGs and an enhanced approach for creek bank source control to reduce the time to achieve the PRGs. The source-control approach targets creek banks with minor, moderate, and severe erosion located upstream of RM 29.5. As discussed in Section 2.5, the Choccolocco Creek streambed is in a state of dynamic equilibrium. Although there may be a short-term response to specific events that cause either temporary aggrading or degrading of the sediment bed, due to the state of equilibrium, there is a tendency for the bed to return to its current form and limits overall changes in severity (minor, moderate, and severe) of bank erosion for a given area.

All six active remedial alternatives address the same 25-acre sediment footprint based on the PCB RALs include 2.6 mg/kg as a NTE value and less than 1 mg/kg as a post-remediation SWAC. All of the active remedial alternatives would also result in an average post-remediation sediment concentration for mercury of approximately 0.69 mg/kg. Further reductions in sediment mercury concentrations may not occur through MNR because current sources of upwind mercury may not decline over time.

The unique circumstances of the backwater area facilitated the development of a range of remedial alternatives with specialized technical approaches tailored for the high- and low-energy areas in

the backwater area. The range of remedial alternatives include removal, capping, and in-place treatment. One active remedial alternative for sediment also includes treatment at an approved facility (SED-7). The six active remedial alternatives all include MNR following RAL-based cleanup actions to achieve the range of PRGs identified for the ecological and human health receptors over time. This approach is consistent with the remedial approach for many large sediment sites and will be driven by clean soil entering the watershed. For OU-4, this clean sediment could be transported into OU-4 from the headwaters of Choccolocco Creek and its major tributaries, including Snow Creek, Coldwater Creek, Eastaboga Creek, and Cheaha Creek. Details for the MNR model used to calculate recovery time for achieving the long-term PRGs in the low-energy portions of OU-4 downstream of Jackson Shoals are presented in Appendix G. The appendix includes model input values based on a combination of site-specific data and sound scientific and engineering principles. The long-term PRGs will be achieved in the high-energy portions of OU-4 (located upstream of Jackson Shoals) more rapidly than in the low-energy areas through a combination of active remediation, placement of clean backfill following sediment removal, and the implementation of creek bank source control measures. Actions taken for the creek banks will greatly reduce PCB loading to the creek and for the high-energy areas that are not actively dredged, allow for the winnowing-out of residual fine-grained sediment to achieve the long-term PRGs over time.

All the active remedial alternatives for creek bank and sediment include long-term soil management to provide support for infrastructure repair, improvement, and construction projects that will occur over time adjacent to the creeks (outfalls), under the creeks (pipelines and other utilities), and over the creeks (bridges and their supporting abutments). This support is consistent with historical soil management support that has been provided at the Site for the past 20 years that has involved multiple infrastructure support projects for bridges, pipelines, and other near-creek features.

The following seven remedial alternatives for creek banks and sediment were evaluated relative to the seven NCP criteria:

- SED-1: No action
- SED-2: Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment for sediment in low-energy areas; long-term soil management, and MNR of sediment
- SED-3: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment of sediment in low-energy areas; long-term soil management; and MNR of sediment
- SED-4: Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment
- SED-5: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil

and sediment; capping for low-energy areas; long-term soil management; and MNR of sediment

- SED-6: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment
- SED-7: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of contaminated sediment in high- and low-energy areas; off-site treatment of PTW; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment

The evaluation of the long-term effectiveness and permanence of these remedial alternatives also considered climate change effects (e.g., increased storm intensity) on the potential for increased severity of creek bank erosion in accordance with USEPA's *U.S. Environmental Protection Agency Climate Change Adaption Plan* (USEPA 2014b) and the USEPA Climate Resilience Fact Sheet (USEPA 2019). Additionally, further evaluations, including considerations of climate change and other geomorphological changes over time, will be included as part of the RD for OU-4. The RD for OU-4 would include a CMZ assessment to inform the long-term monitoring program (Appendix B). The CMZ assessment will be used to predict lateral movement of the creek channels over time to limit residual creek bank sources from becoming a primary source once other sources have been addressed.

10.7.1 SED-1: No Action

For SED-1, no action would be conducted to address creek bank areas or sediment deposits in OU-4.

10.7.1.1 Overall Protection of Human Health and the Environment

SED-1 would not be protective of human health or the environment. Creek bank soil from areas upstream of RM 29.5 would continue to erode, especially under high-flow conditions, contributing sediment with PCBs to surface water and eventually to downstream sediment. Sediment with concentrations above the PRGs in upstream areas would remain in place. Both creek bank soil and existing in-creek sediment would continue to erode, and the PRGS would not be met. Long-term soil management actions to support future intrusive projects located in creek bank and sediment areas would not be conducted. These future intrusive activities could include infrastructure construction or improvement projects that might disturb targeted creek bank materials or the sediment bed.

10.7.1.2 Compliance with ARARs

SED-1 would not comply with the following key ARAR from Tables 6-1 and 6-3:

- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC for PCBs (0.014 µg/L) and the parallel regulations under the State of Alabama's Administrative Code 335-6-10

10.7.1.3 Short-Term Effectiveness

No additional short-term risks or impacts to the community, workers, or the environment would be posed by implementing SED-1. There are no GHG emissions or consumption of energy associated with this remedial alternative.

10.7.1.4 Long-Term Effectiveness and Permanence

SED-1 would not provide long-term effectiveness as it does not address the soil and sediment with PCB concentrations above the PRGs.

10.7.1.5 Reduction of Toxicity, Mobility, and Volume through Treatment

SED-1 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.7.1.6 Implementability

SED-1 is the no action alternative and would be straightforward and easy to implement.

10.7.1.7 Cost

There are no costs associated with SED-1.

10.7.2 SED-2: Creek Bank Soil Source Control for Contaminated Areas with Moderate and Severe Erosion; Dredging of Sediment in High-Energy Areas; Off-Site Disposal for Soil and Sediment; In-Place Treatment for Sediment in Low-Energy Areas; Long-Term Soil Management; and MNR of Sediment

SED-2 includes source control efforts targeted for creek banks with moderate and severe erosion located upstream of RM 29.5 (i.e., 17,100 linear feet of creek bank areas) and sediment removal with off-site disposal for sediment from high-energy creek areas, and in-place treatment for low-energy areas (Figure 7-15). Under this alternative, the PCB RALs for dredging high-energy areas include 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg. The approach to address sediment in the low-energy areas sediment is similar to SED-5 with the difference that these low-energy areas would be treated in place with activated carbon rather than being capped using clean sand, as in SED-5. The in-place treatment approach for the low-energy areas would include placing activated carbon onto the sediment surface to reduce the bioavailability of the PCBs. Because the activated carbon would not significantly raise the elevation or change the hydrology of the low-energy areas, dredging to make room for the cover materials is not necessary. The activated carbon would be mixed into the upper layer of the sediment matrix through natural processes, including bioturbation and the incorporation of additional sediment that settles out from the water column into these low-velocity areas over time. The activated carbon would absorb the PCBs, thereby reducing the bioavailability. PCBs would become bound to the carbon and not desorbed into the sediment porewater where they could otherwise be transferred to biota.

The estimated quantity of sediment to be dredged from the creeks and disposed of off-site under this remedial alternative is approximately 37,600 cubic yards, and the estimated area to receive in-place treatment is 4.1 acres. The estimated quantity of clean backfill materials for this remedial alternative is 33,800 cubic yards. The estimated quantities of sediment and creek soil for off-site disposal of sediment dredged from Snow and Choccolocco Creeks with PCB concentrations greater than or equal to 50 mg/kg is 27,900 tons. The estimated quantity of dredged sediment with PCB concentrations less than 50 mg/kg for off-site disposal is 39,200 tons.

For the purposes of estimating carbon dosing to treat the in-place sediment, 6% by weight would be applied based on treating a 0.5-foot layer of sediment (i.e., the BAZ), and the materials are anticipated to be applied over a 3-year period. The 6% dosing is an estimation for costing purposes. The actual percentage would be developed during the RD. To minimize concerns for benthic

toxicity associated with placing activated carbon and to assist in more evenly applying the materials across the BAZ, this remedial alternative includes placing one-third of the activated carbon over the treatment area, once per year for three years, during the late summer, low-flow period. Once the activated carbon materials have been placed, this remedial alternative would further rely on MNR where clean sediment from the surrounding watershed would be transported downstream into OU-4 and settle out and mix with the sediment bed to further reduce PCB concentrations in sediment, surface water, and biota over time.

Once creek bank source control, sediment removal, backfill placement, and sediment treatment are complete, this remedial alternative relies on MNR where clean sediment from the surrounding watershed would be transported downstream into OU-4 and mix with the sediment bed to further reduce PCB concentrations in sediment, surface water, and biota over time.

The MNR process will include monitoring to track the remedy effectiveness trends and implementing a range of short- and long-term remedy monitoring and metrics, including traditional approaches (e.g., assessing PCB concentration trends in sediment, surface water, and biota) to document concentration reductions over time. The conceptual approach for long-term monitoring to assess post-remedy conditions in and downstream of OU-4 is presented in Appendix B. SED-2 would also include long-term support for infrastructure construction and improvement projects.

SED-2 would require 97,269 tons of refined materials, including sand, topsoil, and HDPE liner (from decontamination area). SED-2 would generate approximately 32 million gallons of wastewater during dewatering processes. The wastewater would be treated using a temporary on-site wastewater treatment system. Additional public water for on-site use includes hydroseeding but is negligible.

This remedial alternative would take approximately 3 years to complete.

10.7.2.1 Overall Protection of Human Health and the Environment

SED-2 would be protective of human health and the environment by controlling creek bank soil as a source to OU-4 by directly remediating sediment in Snow Creek and Choccolocco Creek, including the backwater area and the middle portion of the creek, and MNR to achieve PRGs for sediment, surface water, fish tissue, and other biota over time.

To provide a temporal estimate for the MNR for SED-2 downstream of Jackson Shoals, a sediment recovery model (Appendix G) was applied to the scenario where source control measures are implemented for creek banks located upstream of RM 29.5 with moderate and severe erosion. The model results show that approximately 30 to 35 years following remedy implementation, sediment PCB concentrations are projected to achieve the long-term PRG of 0.1 mg/kg for this downstream portion of OU-4 (Figure 10-1). The sediment recovery model was applied for the depositional area located downstream of Jackson Shoals (i.e., Station 35 from the fish collection program) for existing conditions. The model calculates long-term remedy performance for sediment PCB concentration as a function of time for creek bank source control measures implemented for creek banks located upstream of RM 29.5 with severe and moderate erosion.

For the areas located upstream of Jackson Shoals where dredging is conducted, the long-term PRGs of 0.63 mg/kg and 0.2 mg/kg will be met immediately following project implementation by

virtue of the clean backfill that will be placed. The low-energy portion of the backwater area that is subject to in-place treatment is projected to have sufficiently reduced PCB bioavailability within 5 years to be consistent with the long-term PRG condition. The areas of Choccolocco Creek above Jackson Shoals that are not dredged are calculated to meet the long-term PRGs in 30 years following remedy implementation (Figure 10-2). This projection is based on an annual 6% PCB mass loss rate (winnowing or exchange rate) for fine-grained particles within the sediment matrix for these portions of the creek. Figure 10-2 also includes time projections for winnowing rates of 4% and 8% as bounding conditions. The approach used to develop these estimates includes Choccolocco Creek as a mature stream where there is little to no downstream movement of heavier sands and gravels on a large-scale basis. As a mature stream, soils that enter the creek from the surrounding watershed (most of them not containing PCBs) are predominantly fine-grained and most particles move downstream and settle out in downstream of Jackson Shoals. The finding is supported by the large and thick deposits of fine-grained sediment located downstream of Jackson Shoals and consistent with annual solids loading at Jackson Shoals of 16,000 to 35,000 tons per year (BBL 1999 and BBL 2000, respectively). As this process occurs over time, a small percentage of the fine-grained materials do not immediately move downstream of Jackson Shoals and become part of the in-creek sediment matrix. While these clean particles become entrained in the sediment matrix, a portion of the fine-grained materials containing PCBs will be mobilized and transported downstream of Jackson Shoals and become part of the MNR process presented in Figure 10-1. The positive effect of the cleaner particles becoming entrained in the sediment matrix upstream of Jackson Shoals (the exchange process) is to lower PCB concentrations over time from the post-remedy implementation condition (l mg/kg or less SWAC) to the PRG of 0.2 mg/kg in 30 years.

10.7.2.2 Compliance with ARARs

SED-2 would be designed to comply with ARARs and would specifically comply with the following key ARARs and TBCs from Tables 6-1 to 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC for PCBs (0.014 µg/L) and the parallel regulations under the State of Alabama's Administrative Code 335-6-10, recognizing that a period of several years may be necessary for MNR to achieve the AWQC
- Regulations at 40 C.F.R. §§ 230, 231, 320, 322, 323, 325, 328, 329, and 330 regarding dredging and filling in the creek
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alternation of the creek

10.7.2.3 Short-Term Effectiveness

SED-2 might cause short-term risks and impacts to Site workers and the community. These risks and impacts are associated with removing trees over an 8-acre area and constructing and removing staging and dewatering areas. Most of this clearing is located directly along the edge of the creek

and will negatively impact the riparian buffer zone. The excavation, staging, and dewatering of sediment along with the necessary truck traffic could cause noise, dust, and odors that may disturb the local public. Risks to Site workers and the community might also be associated with dust generated during excavation, stockpiling, and loading trucks for off-site transportation and disposal.

Although sedimentation controls would be in place for all activities, work along the creek bank and sediment removal will unavoidably cause a short-term increase in suspended sediment in the surface water column and an associated increase in concentrations in surface water. Creek banks may be stabilized using hard engineering (such as riprap or concrete) in places, which would permanently affect the aesthetics of the creek banks. There are significant, but manageable, logistical issues associated with accessing and removing sediment in the different reaches of OU-4.

SED-2 would consume 617,911 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing SED-2 would generate emissions of on-site and total NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). Total GHG emissions for SED-2 would include 18,854 tons as CO_2e.

Land disturbance from SED-2 remedial activities would include shoreline stabilization, sediment dredging, in-place activated carbon treatment, and backfilling of dredged areas. The low-energy areas of the backwater would undergo in-place treatment using activated carbon, and the high-energy areas would be backfilled. Land use of the Site would remain unchanged following implementation of the remedy, and the off-site landfill is an established disposal site.

The duration to implement the field construction components of SED-2 is 3 to 4 years. The time to achieve PRGs following remedy implementation is projected to be 30 to 35 years recognizing that other off-site sources for PCBs and other constituents will continue to contribute, at some level, to the concentrations in sediment, surface water, and biota.

10.7.2.4 Long-Term Effectiveness and Permanence

SED-2 would effectively and permanently control creek banks and prevent them from acting as an ongoing source to surface water, sediment, and biota. SED-2 would also remove PCB-containing sediment and provide in-place treatment as the primary mechanisms to drive the achievement of the long-term PRGs over a projected 30-year to 35-year period with the assistance of MNR. Long-term effectiveness and permanence will also be influenced by the background contributions from multiple historical and ongoing sources to Snow Creek and, ultimately, Choccolocco Creek. This alternative also includes long-term support for managing PCB residuals associated with future infrastructure construction or improvement projects that may occur in creek bank or sediment portions of OU-4.

Additional consideration of CMZ and climate change will be conducted as part of the OU-4 RD and as part of long-term monitoring following remedy construction. The key considerations for future RD activities and long-term monitoring for the selected remedy include assessing vulnerabilities and evaluating measures to increase resilience and ensure that the project is designed to have adaptive capacity based on the uncertainties in predicting climate change.

10.7.2.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative SED-2 would use activated carbon to sequester and absorb PCBs, thereby reducing the mobility and bioavailability of PCBs to fish and other biota.

10.7.2.6 Implementability

SED-2 is implementable using conventional and proven technology. Any technology issues will be manageable using appropriate management and engineering practices. This alternative would involve some significant logistical issues, especially associated with accessing and working along the creek banks. These challenges would include obtaining property access from landowners with property adjoining the creeks. These issues would be compounded with the need to access the backwater area multiple times to place the activated carbon in increments over time.

10.7.2.7 Cost

A cost estimate for SED-2 is shown in Table 10-15. The estimated capital cost (without contingencies) is $24.9M. The estimated cost is based on addressing 17,100 linear feet of creek bank areas, a sediment removal volume of 37,600 cubic yards and 33,800 cubic yards of backfill. The total present worth cost for this alternative, including 30 years of monitoring and contingencies, is approximately $43.6M. These costs vary based on the anticipated level of activity each year. Consistent with FS-costing procedures, these long-terms costs are presented on a net present worth basis to reflect the time value of money.

10.7.3 SED-3: Creek Bank Soil Source Control for Contaminated Areas with Minor, Moderate, and Severe Erosion; Dredging of Sediment in High-Energy Areas; Off-Site Disposal for Soil and Sediment; In-Place Treatment of Sediment in Low-Energy Areas; Long-Term Soil Management; and MNR of Sediment

SED-3 is the same as SED-2 with the exception of the creek bank source control actions that are implemented for SED-3. Consistent with SED-2, dredging would be conducted in high-energy areas using PCB RALs of 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg, and in-place treatment would be used to address low-energy areas. The source control approach for SED-3 includes 39,800 linear feet of source control targeted for creek banks located upstream of RM 29.5 with minor, moderate, and serve erosion. The other elements and quantities for SED-3. including sediment removal, backfill, and in-place treatment. are identical to SED-2.

Consistent with SED-2, SED-3 would include long-term remedy effectiveness monitoring (Appendix B) and long-term soil management support for infrastructure construction and improvement projects.

This remedial alternative would take approximately 3 to 4 years to complete.

10.7.3.1 Overall Protection of Human Health and the Environment

SED-3 would be protective of human health and the environment by controlling creek bank soil as a source to OU-4 by directly remediating sediment in Snow Creek and Choccolocco Creek, including the backwater area and the middle portion of the creek, and MNR to achieve PRGs for sediment, surface water, fish tissue, and other biota over time.

To provide a temporal estimate for the MNR for SED-3, the sediment recovery model (Appendix G) was applied to the scenario where source control measures are implemented for

creek banks located upstream of RM 29.5 with minor, moderate, and severe erosion. The model results for areas downstream of Jackson Shoals under this source control approach are presented on Figure 10-3, and the areas upstream of Jackson Shoals are presented on Figure 10-2. The time-based trends show that approximately 20 to 30 years following remedy implementation, sediment PCB concentrations are projected to achieve the long-term PRGs of 0.1 mg/kg and 0.2 mg/kg for the portions of OU-4 located downstream and upstream of Jackson Shoals, respectively.

10.7.3.2 Compliance with ARARs

SED-3 would be designed to comply with ARARs and would specifically comply with the following key ARARs and TBCs from Tables 6-1 to 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC for PCBs (0.014 µg/L) and the parallel regulations under the State of Alabama's Administrative Code 335-6-10, recognizing that a period of several years may be necessary for MNR to achieve the AWQC
- Regulations at 40 C.F.R. §§ 230, 231, 320, 322, 323, 325, 328, 329, and 330 regarding dredging and filling in the creek
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alternation of the creek

10.7.3.3 Short-Term Effectiveness

SED-3 might cause short-term risks and impacts to Site workers and the community. These risks and impacts are associated with removing trees over an 8-acre area and constructing and removing staging and dewatering areas. Most of this clearing is located directly along the edge of the creek and will negatively impact the riparian buffer zone. The excavation, staging, and dewatering of sediment along with the necessary truck traffic could cause noise, dust, and odors that may disturb the local public. Risks to Site workers and the community might also be associated with dust generated during excavation, stockpiling, and loading trucks for off-site transportation and disposal.

Although sedimentation controls would be in place for all activities, work along the creek bank and sediment removal will unavoidably cause a short-term increase in suspended sediment in the surface water column and an associated increase in PCB concentrations in surface water. Creek banks may be stabilized using hard engineering (such as riprap or concrete) in places, which would permanently affect the aesthetics of the creek banks. There are significant, but manageable, logistical issues associated with accessing and removing sediment in the different reaches of OU-4.

SED-3 would consume 534,843 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing SED-3 would generate emissions of on-site and total NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator,

haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). Total GHG emissions for SED-3 would include 14,497 tons as CO_2e.

Land disturbance from SED-3 remedial activities would include shoreline stabilization, sediment dredging, in-place activated carbon treatment, and backfilling of dredged areas. The low-energy areas of the backwater would undergo in-place treatment using activated carbon, and the high-energy areas would be backfilled. Land use of the Site would remain unchanged following implementation of the remedy, and the off-site landfill is an established disposal site.

The duration to implement the field construction components of SED-3 is 3 to 4 years. The time to achieve PRGs following remedy implementation is projected to be 20 to 30 years recognizing that other off-site sources for PCBs and other constituents will continue to contribute, at some level, to the concentrations in sediment, surface water, and biota.

10.7.3.4 Long-Term Effectiveness and Permanence

SED-3 would effectively and permanently control creek banks and prevent them from acting as an ongoing source to surface water, sediment, and biota. SED-3 would also remove PCB-containing sediment and provide in-place treatment to drive achievement of the long-term PRGs over a 20- to 30-year period with the assistance of MNR. Long-term effectiveness and permanence will also be influenced by the background contributions from multiple historical and ongoing sources to Snow Creek and, ultimately, Choccolocco Creek. This alternative also includes long-term support for managing PCB residuals associated with future infrastructure construction or improvement projects that may occur in creek bank or sediment portions of OU-4.

Additional consideration of the CMZ and climate change will be conducted as part of the OU-4 RD and as part of long-term monitoring following remedy construction. The key considerations for future RD activities and long-term monitoring for the selected remedy include assessing vulnerabilities and evaluating measures to increase resilience and ensure that the project is designed to have adaptive capacity based on the uncertainties in predicting climate change.

10.7.3.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative SED-3 would use activated carbon to sequester and absorb PCBs, thereby reducing the mobility and bioavailability of PCBs to fish and other biota.

10.7.3.6 Implementability

SED-3 is implementable using conventional and proven technology. Any technology issues will be manageable using appropriate management and engineering practices. This alternative would involve some significant logistical issues, especially associated with accessing and working along the creek banks. These challenges would include obtaining property access from landowners with property adjoining the creeks. These issues would be compounded with the need to access the backwater area multiple times to place the activated carbon in increments over time.

10.7.3.7 Cost

A cost estimate for SED-3 is shown in Table 10-16. The estimated capital cost (without contingencies) is $27.8M. The estimated cost is based on addressing 39,800 linear feet of creek bank areas, a sediment removal volume of 37,600 cubic yards and 33,800 cubic yards of backfill. The total present worth cost for this alternative, including 30 years of monitoring and

contingencies, is approximately $47.4M. These costs vary based on the anticipated level of activity each year. Consistent with FS-costing procedures, these long-terms costs are presented on a net present worth basis to reflect the time value of money.

10.7.4 SED-4: Creek Bank Soil Source Control for Contaminated Areas with Moderate and Severe Erosion; Dredging of Sediment in High- and Low-Energy Areas; Off-Site Disposal for Soil and Sediment; Long-Term Soil Management; and MNR of Sediment

SED-4 includes source control actions for 17,100 feet of targeted creek bank areas and the removal of approximately 52,100 cubic yards of in-creek sediment deposits distributed over 25 acres. Dredging would be conducted in the high-energy and low-energy areas using PCB RALs of 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg. The sediment removed through dredging would be transported to a staging area, dewatered, and subsequently transported to an off-site, licensed landfill. Dredging operations would likely be conducted from the shore using long-reach excavators, and the materials would be placed in off-road transport vehicles. For a limited number of cases, earthen pedestals may need to be constructed along the creek banks such that the long-reach excavator can access the sediment targeted for removal. The potential need for this approach will be evaluated during the RD phase of the project following the ROD and will incorporate the results of predesign investigations and available property access along the creeks.

The off-road vehicles used for sediment transport would likely transport the sediment to a localized consolidation area to be dewatered before being shipped off-site for disposal. If the sediment was sufficiently dry that it would pass a paint filter test after a brief period of drying at the consolidation areas, it could be direct-loaded into over-the-road trucks and transported to the off-site disposal facility. Sediment dredged from the low-energy portions of OU-4 is expected to be finer grained and require the addition of a dewatering admixture (e.g., Portland cement) to pass the paint filter test. For off-site disposal facility purposes, it is expected that the PCB concentration category for the sediment can be identified prior to removal. This includes classifying general areas as having sediment PCB concentrations greater than or equal to 50 mg/kg and less than 50 mg/kg. For the purposes of this OU-4 FS, the estimated quantity of materials for off-site disposal with PCB concentrations greater than or equal to 50 mg/kg is 48,200 tons. The estimated quantity of materials with PCB concentrations less than 50 mg/kg for off-site disposal is 39,200 tons.

Consistent with other environmental dredging projects, a layer of clean backfill material would be placed in the 25 acres of dredge areas once removal has been completed. For OU-4, the approach would be to replace the layer of sediment removed with clean sand backfill up to a maximum layer thickness of 1 foot. This backfill would replace the biological strata removed during dredging and assist in mitigating the potential for PCB residuals associated with dredging to be present. The estimated quantity of clean backfill materials for this remedial alternative is 44,200 cubic yards. Once the target sediment is removed and backfill is placed, this remedial alternative would further rely on a combination of creek bank source control and MNR to achieve the long-term PRGs. This would include the addition of clean sediment from the surrounding watershed being transported into OU-4 and mixing with the sediment bed to further reduce PCB concentrations in sediment, surface water, and biota over time.

The MNR process will include monitoring to track the remedy effectiveness trends and implementing a range of short- and long-term remedy monitoring and metrics, including traditional

approaches (e.g., assessing PCB concentration trends in sediment, surface water, and biota) to document PCB concentration reductions over time. The traditional tools and metrics for monitoring remedy effectiveness may also be supported by a range of alternative approaches, including passive sampling devices deployed to assess multiple exposure points for fish (e.g., water column, sediment BAZ, and sediment epilayer). Monitoring would continue until fish tissue concentrations achieve the long-term goals, which may take several decades. It is important to highlight that, during this time, current fish consumption limitations in OU-4 might become less restrictive. That is, some fish species might show lower PCB concentrations than other species, and/or fish consumption frequencies might be increased (e.g., one meal per week or one meal per month). The conceptual approach for long-term monitoring to assess post-remedy conditions in and downstream of OU-4 is presented in Appendix B. The monitoring approach recognizes the importance of documenting the collective positive effects of remediation conducted for the Site, including OU-3, OU-1/OU-2, and OU-4. The proposed monitoring includes monitoring stations in OU-4 and downstream of OU-4 (Lake Logan Martin) to assess changes in concentrations over time for sediment, surface water, and biota. The monitoring results will provide information regarding background conditions for assessing the performance of the OU-4 remedy and information that USEPA can use for outreach with local stakeholders for the Site and Lake Logan Martin.

SED-4 would also include long-term soil management support for infrastructure construction and improvement projects. There are many existing infrastructure features that traverse Snow and Choccolocco Creeks, and those features may require repair or replacement over time. Examples include bridges, outfalls associated with wastewater treatment plants, fiber optic cables, and a range of pipelines (e.g., water supply, sewer, petroleum, and natural gas). New infrastructure features, such as fiber optic cables and pipelines, might also be constructed in OU-4.

SED-4 would require using 105,713 tons of refined materials, including sand, topsoil, and HDPE liner (from decontamination area). SED-4 would generate approximately 30.2 million gallons of wastewater during dewatering processes. The wastewater would be treated using a temporary on-site wastewater treatment system. Additional public water for on-site use includes hydroseeding but would be negligible.

SED-4 would take approximately 3 to 4 years to complete.

10.7.4.1 Overall Protection of Human Health and the Environment

SED-4 would be protective of human health and the environment by controlling creek bank soil as a source to OU-4 by directly remediating sediment in Snow Creek and Choccolocco Creek, including the backwater area and the middle portion of the creek, and would drive the achievement of PRGs for sediment, surface water, fish tissue, and other biota over time with the assistance of MNR.

10.7.4.2 Compliance with ARARs

SED-4 would be designed to comply with ARARs and would specifically comply with the following key ARARs and TBCs from Tables 6-1 to 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes

- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC for PCBs (0.014 µg/L) and the parallel regulations under the State of Alabama's Administrative Code 335–6-10, recognizing that a period of several years may be necessary for MNR to achieve the AWQC
- Regulations at 40 C.F.R. §§ 230, 231, 320, 322, 323, 325, 328, 329, and 330 regarding dredging and filling in the creek
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alternation of the creek

10.7.4.3 Short-Term Effectiveness

SED-4 may cause short-term risks and impacts to Site workers and the community. These risks and impacts are associated with removing trees over an 8-acre area and constructing and removing staging and dewatering areas. Most of this clearing is located directly along the edge of the creek and will negatively impact the riparian buffer zone. The excavation, staging, and dewatering of sediment along with the necessary truck traffic could cause noise, dust, and odors that might disturb the local public. Risks to Site workers and the community could also be associated with dust generated during excavation, stockpiling, and loading trucks for off-site transportation and disposal.

Although sedimentation controls would be in place for all intrusive activities, work along the creek bank and sediment removal will unavoidably cause a short-term increase in suspended solids in the surface water column and an associated increase in concentrations in surface water. Stabilizing the creek banks may use hard engineering (such as riprap or concrete) in places or reshaping/grading of the banks, which may permanently affect the aesthetics of the creek banks and surface water flow patterns. There are significant, but manageable, logistical issues associated with accessing and removing sediment in the different reaches of OU-4.

SED-4 would consume 540,909 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing SED-4 would generate emissions of on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). Total GHG emissions for SED-4 would include 14,967 tons as CO_2e.

Land disturbance from SED-4 remedial activities would include shoreline stabilization, sediment dredging, and backfilling of dredged areas. Land use of the Site would remain unchanged following implementation of the remedy, and the off-site landfill is an established disposal site.

The duration to implement the field construction components of SED-4 is 3 to 4 years. The time to achieve the PRGs, especially in surface water and aquatic biota, may take several decades as the alternative relies on a combination of source control and MNR. Furthermore, although significant actions have been taken to control sources in OU-3 and in OU-1/OU-2, other off-site

sources for PCBs and other constituents will continue to contribute, at some level, to the concentrations in sediment, surface water, and biota.

10.7.4.4 Long-Term Effectiveness and Permanence

SED-4 would effectively and permanently control creek banks and prevent them from acting as an ongoing source to surface water, sediment, and biota. SED-4 would also remove sediment with PCBs to achieve the long-term PRGs through MNR over a projected 30- to 35-year period. Long-term effectiveness and permanence will also be influenced by the background contributions from multiple historical and ongoing sources to Snow Creek and, ultimately, Choccolocco Creek. This alternative also includes long-term support for managing PCB residuals associated with future infrastructure construction or improvement projects that may occur in creek bank or sediment portions of OU-4.

Additional consideration of CMZ and climate change will be conducted as part of the RD for OU-4 and as part of long-term monitoring following remedy construction. The key considerations for future RD activities and long-term monitoring for the selected remedy include assessing vulnerabilities and evaluating measures to increase resilience and ensure that the project is designed to have adaptive capacity based on the uncertainties in predicting climate change.

10.7.4.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative SED-4 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.7.4.6 Implementability

SED-4 is implementable using conventional and proven technology. Any technology issues would be manageable using appropriate management and engineering practices. This alternative would involve some significant logistical issues, especially associated with accessing and working along the creek banks. These challenges would include obtaining property access from landowners with property adjoining the creeks.

10.7.4.7 Cost

A cost estimate for Alternative SED-4 is shown in Table 10-17. The estimated capital cost (without contingencies) is $29.9M. The estimated cost is based on addressing 17,100 linear feet of creek banks and a sediment removal volume of 52,100 cubic yards and placement of 40,400 cubic yards of backfill. The long-term annual costs vary based on the anticipated level of activity each year. For example, over the 30-year period for which these long-term costs are evaluated, the collection and analysis of fish tissue samples is planned for seven events. These events include establishing baseline conditions and supporting the subsequent 5-year reviews that occur following remedy implementation. Other costs, such as regular inspections and reporting, are expected to occur annually. Consistent with FS-costing procedures, these long-terms costs are presented on a net present worth basis to reflect the time value of money. These long-term costs are the same for the other sediment alternatives given the similarities in the overall nature and duration of the remedial alternatives to address creek banks and sediment. The total present worth cost for this alternative, including 30 years of monitoring and contingencies, is approximately $49.7M.

10.7.5 SED-5: Creek Bank Soil Source Control for Contaminated Areas with Minor, Moderate, and Severe Erosion; Dredging of Sediment in High-Energy Areas; Off-Site Disposal for Soil and Sediment; Capping for Low-Energy Areas; Long-Term Soil Management; and MNR of Sediment

SED-5 would include the same source control actions for the creek banks as SED-3 (i.e., 39,800 linear feet of creek bank areas with minor, moderate, and severe erosion located upstream of RM 29.5). SED-5 would also include sediment removal with off-site disposal for materials from the high-energy portions of the creeks and capping sediment in the low-energy areas (Figure 7-15). Dredging in the high-energy areas would be conducted using PCB RALs of 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg. The high-energy areas are not amenable to capping given the thickness of armor stone that would be necessary to protect the underlying sediment from erosion during high-flow events. The existing sediment in the high-energy areas is typically underlain by bedrock; therefore, the removal of additional material to place a cap without changing the hydrology of the creek is not practicable. The high-energy areas targeted for sediment removal include Snow Creek, the main reach of Choccolocco Creek that flows east-to-west through the backwater area, and the portion of Choccolocco Creek located downstream of the backwater area.

The low-energy portions of sediment targeted for capping include the braided stream network portion of the backwater area. Capping the 4.1 acres of the low-energy areas would include removing the upper 1 foot of sediment and replacing it with a 1-foot layer of clean capping materials (e.g., sand). The 1-foot-thick sand cap would provide an effective chemical isolation barrier to prevent PCBs from moving upward and impacting exposure conditions for biota that might otherwise contact sediment in the BAZ that is assumed for this Site to be the 0–0.5-foot horizon. Removing a 1-foot layer of existing sediment prior to placing the cap would be necessary because placing the cap directly over the existing sediment would change the hydraulic characteristics of this braided stream network and could potentially contribute to local flooding.

The estimated quantity of sediment to be dredged under this remedial alternative is 44,200 cubic yards, and the area to be capped is 4.1 acres. The estimated quantities of sediment for off-site disposal of materials with PCB concentrations greater than or equal to 50 mg/kg is 37,200 tons, and the estimated quantity of sediment for off-site disposal with PCB concentrations less than 50 mg/kg is 39,200 tons.

Consistent with other remedial alternatives, up to a 1-foot layer of clean backfill materials would be placed in the areas that are dredged and not capped. The combined quantities estimated for clean backfill and cap materials for this remedial alternative is 40,400 cubic yards.

Once creek bank source control, sediment removal, backfill placement, and capping are complete, this remedial alternative relies on MNR where clean sediment from the surrounding watershed would be transported downstream into OU-4 and would mix with the sediment bed to further reduce PCB concentrations in sediment, surface water, and biota over time.

The MNR process would include monitoring to track the remedy effectiveness trends and implementing a range of short- and long-term remedy monitoring and metrics, including traditional approaches (e.g., assessing PCB concentration trends in sediment, surface water, and biota) to document concentration reductions over time. The conceptual approach for long-term monitoring

to assess post-remedy conditions in and downstream of OU-4 is presented in Appendix B. SED-5 would also include long-term support for infrastructure construction and improvement projects.

SED-5 would require using 199,307 tons of refined materials, including sand, topsoil, and HDPE liner (from decontamination area). SED-5 would generate approximately 27.7 million gallons of wastewater during dewatering processes. The wastewater would be treated using a temporary on-site wastewater treatment system. Additional public water for on-site use includes hydroseeding but would be negligible.

This remedial alternative would take approximately 3 years to complete.

10.7.5.1 Overall Protection of Human Health and the Environment

SED-5 would be protective of human health and the environment by controlling creek bank soil as a source to OU-4 and directly remediating sediment in Snow Creek and Choccolocco Creek, including the backwater area and the middle portion of the creek, to collectively drive the achievement of the PRGs for sediment, surface water, fish tissue, and other biota over time with the assistance of MNR.

The sediment recovery model results presented in Figures 10-2 and 10-3 show that approximately 20 to 30 years following remedy implementation, sediment PCB concentrations are projected to achieve the long-term PRGs.

10.7.5.2 Compliance with ARARs

SED-5 would be designed to comply with ARARs and would specifically comply with the following key ARARs and TBCs from Tables 6-1 to 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC for PCBs (0.014 µg/L) and the parallel regulations under the State of Alabama's Administrative Code 335-6-10, recognizing that a period of several years may be necessary for MNR to achieve the AWQC
- Regulations at 40 C.F.R. §§ 230, 231, 320, 322, 323, 325, 328, 329, and 330 regarding dredging and filling in the creek
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alternation of the creek

10.7.5.3 Short-Term Effectiveness

SED-5 might cause short-term risks and impacts to Site workers and the community. These risks and impacts are associated with removing trees over an 8-acre area and constructing and removing staging and dewatering areas. Most of this clearing is located directly along the edge of the creek and will negatively impact the riparian buffer zone. The excavation, staging, and dewatering of sediment along with the necessary truck traffic could cause noise, dust, and odors that could disturb

the local public. Risks to Site workers and the community might also be associated with dust generated during excavation, stockpiling, and loading trucks for off-site transportation and disposal.

Although sedimentation controls would be in place for all activities, work along the creek bank and sediment removal will unavoidably cause a short-term increase in suspended sediment in the surface water column and an associated increase in concentrations in surface water. Creek banks may be stabilized using hard engineering (such as riprap or concrete) in places, which would permanently affect the aesthetics of the creek banks. There are significant, but manageable, logistical issues associated with accessing and removing sediment in the different reaches of OU-4.

SED-5 would consume 542,431 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing SED-5 would generate emissions of on-site and total NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). Total GHG emissions for SED-5 would include 14,946 tons as CO_2e.

Land disturbance from SED-5 remedial activities would include shoreline stabilization, sediment dredging, capping of target areas, and backfilling of dredged areas. The low-energy areas of the backwater will be capped with a sand layer, and the high-energy areas will be backfilled. Land use of the Site will remain unchanged following implementation of the remedy, and the off-site landfill is an established disposal site.

The duration to implement the field construction components of SED-5 is 3 to 4 years. The time to achieve PRGs following remedy implementation is projected to be 20 years recognizing that other off-site sources for PCBs and other constituents will continue to contribute, at some level, to the concentrations in sediment, surface water, and biota.

10.7.5.4 Long-Term Effectiveness and Permanence

SED-5 would effectively and permanently control creek banks and prevent them from acting as an ongoing source to surface water, sediment, and biota. SED-5 would also remove and cap PCB-containing sediment as primary components to drive the achievement of the long-term PRGs over a projected 20-year period with the assistance of MNR. Long-term effectiveness and permanence will also be influenced by the background contributions from multiple historical and ongoing sources to Snow Creek and, ultimately, Choccolocco Creek. This alternative also includes long-term support for managing PCB residuals associated with future infrastructure construction or improvement projects that may occur in creek bank or sediment portions of OU-4.

Additional consideration of the CMZ and climate change will be conducted as part of the OU-4 RD and as part of long-term monitoring following remedy construction. The key considerations for future RD activities and long-term monitoring for the selected remedy include assessing vulnerabilities and evaluating measures to increase resilience and ensure that the project is designed to have adaptive capacity based on the uncertainties in predicting climate change.

10.7.5.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative SED-5 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.7.5.6 Implementability

SED-5 is implementable using conventional and proven technology. Any technology challenges would be manageable using appropriate management and engineering practices. This alternative would involve some significant logistical issues, especially those associated with accessing and working along the creek banks. These challenges would include obtaining property access from landowners with property adjoining the creek.

10.7.5.7 Cost

A cost estimate for SED-5 is shown in Table 10-18. The estimated capital cost (without contingencies) is $29.2M. The estimated cost is based on addressing 39,800 linear feet of creek bank areas, a sediment removal volume of 44,200 cubic yards and 40,400 cubic yards of backfill and cap materials. The total present worth cost for this alternative, including 30 years of monitoring and contingencies, is approximately $50.6M. These costs vary based on the anticipated level of activity each year. Consistent with FS-costing procedures, these long-terms costs are presented on a net present worth basis to reflect the time value of money.

10.7.6 SED-6: Creek Bank Soil Source Control for Contaminated Areas with Minor, Moderate, and Severe Erosion; Dredging of Sediment in High- and Low-Energy Areas; Off-Site Disposal for Soil and Sediment; Long-Term Soil Management; and MNR of Sediment

SED-6 is identical to SED-4 with the exception that it includes an enhanced approach for creek bank source control to reduce the time for achieving the PRGs. Dredging would be conducted in the high-energy and low-energy areas using PCB RALs of 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg. SED-6 includes creek bank source control actions for 39,800 linear feet of targeted creek bank areas and the removal of approximately 52,100 cubic yards of in-creek sediment deposits distributed over 25 acres. Consistent with the other active remedial alternatives, SED-6 included long-term monitoring of remedy effectiveness (Appendix B), and long-term soil management support for infrastructure construction and improvement projects.

SED-6 would require using 105,713 tons of refined materials, including sand, topsoil, and HDPE liner (from decontamination area). SED-6 would generate approximately 32 million gallons of wastewater during dewatering processes. The wastewater would be treated using a temporary on-site wastewater treatment system. Additional public water for on-site use includes hydroseeding but would be negligible.

SED-6 would take approximately 3 to 4 years to complete.

10.7.6.1 Overall Protection of Human Health and the Environment

SED-6 would be protective of human health and the environment by controlling creek bank soil as a source to OU-4 and by directly remediating sediment in Snow Creek and Choccolocco Creek, including the backwater area and the middle portion of the creek, to collectively drive the achievement of the PRGs for sediment, surface water, fish tissue, and other biota over time with the assistance of MNR.

The sediment recovery model results presented in Figures 10-2 and 10-3 show that approximately 20 to 30 years following remedy implementation, sediment PCB concentrations are projected to achieve the long-term PRGs.

10.7.6.2 Compliance with ARARs

SED-6 would be designed to comply with ARARs and would specifically comply with the following key ARARs and TBCs from Tables 6-1 to 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 761.61(c) for risk-based disposal of PCB remediation wastes
- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC for PCBs (0.014 µg/L) and the parallel regulations under the State of Alabama's Administrative Code 335—6-10, recognizing that a period of several years may be necessary for MNR to achieve the AWQC
- Regulations at 40 C.F.R. §§ 230, 231, 320, 322, 323, 325, 328, 329, and 330 regarding dredging and filling in the creek
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alternation of the creek

10.7.6.3 Short-Term Effectiveness

SED-6 may cause short-term risks and impacts to Site workers and the community. These risks and impacts are associated with removing trees over an 8-acre area and constructing and removing staging and dewatering areas. Most of this clearing is located directly along the edge of the creek and will negatively impact the riparian buffer zone. The excavation, staging, and dewatering of sediment along with the necessary truck traffic could cause noise, dust, and odors that might disturb the local public. Risks to Site workers and the community could also be associated with dust generated during excavation, stockpiling, and loading trucks for off-site transportation and disposal.

Although sedimentation controls would be in place for all intrusive activities, work along the creek bank and sediment removal will unavoidably cause a short-term increase in suspended solids in the surface water column and an associated increase in concentrations in surface water. Creek banks may be stabilized using hard engineering (such as riprap or concrete) in places, or by reshaping/grading the banks, which may permanently affect the aesthetics of the creek banks and surface water flow patterns. There are significant, but manageable, logistical issues associated with accessing and removing sediment in the different reaches of OU-4.

SED-6 would consume 527,550 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing SED-6 would generate emissions of on-site and NOx, SOx, PM, HAPs, and total GHG emissions (in units of CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). Total GHG emissions for SED-6 would include 13,875 tons as CO_2e.

Land disturbance from SED-6 remedial activities would include shoreline stabilization, sediment dredging, and backfilling of dredged areas. Land use of the Site would remain unchanged following implementation of the remedy, and the off-site landfill is an established disposal site.

The duration to implement the field construction components of SED-6 is 3 to 4 years. The time to achieve PRGs following remedy implementation is projected to be 20 years recognizing that other off-site sources for PCBs and other constituents will continue to contribute, at some level, to the concentrations in sediment, surface water, and biota.

10.7.6.4 Long-Term Effectiveness and Permanence

SED-6 would effectively and permanently control creek banks and prevent them from acting as an ongoing source to surface water, sediment, and biota. SED-6 would also remove sediment with PCBs to drive the achievement of long-term PRGs over a 20-year period with the assistance of MNR. Long-term effectiveness and permanence will also be influenced by the background contributions from multiple historical and ongoing sources to Snow Creek and, ultimately, Choccolocco Creek. This alternative also includes long-term support for managing PCB residuals associated with future infrastructure construction or improvement projects that may occur in creek bank or sediment portions of OU-4.

Additional consideration of CMZ and climate change will be conducted as part of the OU-4 RD and as part of long-term monitoring following remedy construction. The key considerations for future RD activities and long-term monitoring for the selected remedy include assessing vulnerabilities and evaluating measures to increase resilience and ensure that the project is designed to have adaptive capacity based on the uncertainties in predicting climate change.

10.7.6.5 Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative SED-6 does not include treatment and would not reduce the toxicity, mobility, or volume of the materials.

10.7.6.6 Implementability

SED-6 is implementable using conventional and proven technology. Any technology challenges would be manageable using appropriate management and engineering practices. This alternative would involve some significant logistical issues, especially associated with accessing and working along the creek banks. These challenges would include obtaining property access from landowners with property adjoining the creeks.

10.7.6.7 Cost

A cost estimate for SED-6 is shown in Table 10-19. The estimated capital cost (without contingencies) is $32.7M. The estimated cost is based on addressing 39,800 linear feet of creek banks and a sediment removal volume of 52,100 cubic yards and 40,400 cubic yards of backfill. The long-term annual costs vary based on the anticipated level of activity each year. For example, over the 30-year period for which these long-term costs are evaluated, the collection and analysis of fish tissue samples is planned for seven events. These events include establishing baseline conditions and supporting the subsequent 5-year reviews that occur following remedy implementation. Other costs, such as regular inspections and reporting, are expected to occur annually. Consistent with FS-costing procedures, these long-terms costs are presented on a net present worth basis to reflect the time value of money. These long-term costs are the same for the

other sediment alternatives given the similarities in the overall nature and duration of the remedial alternatives to address creek banks and sediment. The total present worth cost for this alternative, including 30 years of monitoring and contingencies, is approximately $53.5M.

10.7.7 SED-7: Creek Bank Soil Source Control for Contaminated Areas with Minor, Moderate, and Severe Erosion; Dredging of Contaminated Sediment in High- and Low-Energy Areas; Off-Site Treatment of PTW; Off-Site Disposal for Soil and Sediment; Long-Term Soil Management; and MNR of Sediment

SED-7 is similar to SED-6 with one exception that includes the use of off-site treatment (incineration) for a small portion of the excavated sediment. This alternative includes dredging the high-energy and low-energy areas using PCB RALs of 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg, and creek bank source control actions for areas with minor, moderate and severe erosion located upstream of RM 29.5.

The dredged sediment would be removed, staged, and dewatered. A small portion of the dredged sediment (with PCB concentrations greater than or equal to 500 mg/kg) would be transported to a licensed facility for off-site treatment. As described for soil, off-site incineration is the most commercially available technology and was used as an example technique for off-site treatment in the screening analysis. Materials would be transported to one of the three TSCA-permitted facilities in Texas or Kansas and incinerated, and the resulting ash would be disposed of by the treatment facility. The remaining sediment (sediment with PCB concentrations below 500 mg/kg) would be transported to a licensed facility for disposal.

Consistent with the other active remedial alternatives, SED-7 included long-term term remedy effectiveness monitoring (Appendix B) and long-term soil management support for infrastructure construction and improvement projects.

This remedial alternative would take approximately 3 to 4 years to complete.

10.7.7.1 Overall Protection of Human Health and the Environment

SED-7 would be protective of human health and the environment by controlling creek bank soil as a source to OU-4, by directly remediating sediment in Snow Creek and Choccolocco Creek, including the backwater area and the middle portion of the creek, and MNR to achieve PRGs for sediment, surface water, fish tissue, and other biota over time.

The sediment recovery model results presented in Figures 10-2 and 10-3 show that approximately 20 to 30 years following remedy implementation, sediment PCB concentrations are projected to achieve the long-term PRGs.

10.7.7.2 Compliance with ARARs

SED-7 would be designed to comply with ARARs and would specifically comply with the following key ARARs and TBCs from Tables 6-1 to 6-3:

- Regulations at 40 C.F.R. § 261 for the management and disposal of remediation wastes
- Regulations at 40 C.F.R. § 761 for the management and disposal of PCB remediation wastes

- Regulations at 40 C.F.R. § 131.36 for the chronic AWQC for PCBs (0.014 µg/L) and the parallel regulations under the State of Alabama's Administrative Code 335-6-10, recognizing that a period of several years may be necessary for MNR to achieve the AWQC as part of the adaptive site management process under this alternative
- Regulations at 40 C.F.R. §§ 230, 231, 320, 322, 323, 325, 328, 329, and 330 regarding dredging and filling in the creek
- Regulations at 42 U.S.C. § 4001 et seq. and 42 U.S.C. § 4101 regarding alternation of the creek

10.7.7.3 Short-Term Effectiveness

SED-7 would cause short-term risks and impacts to Site workers and the community. These risks and impacts include those associated with removing trees over an 8-acre area and constructing and removing staging and dewatering areas as well as the construction work along the creek banks and in the creek. Most of this clearing is located directly along the edge of the creek and would result negatively impact the riparian buffer zone. The excavation, staging, and dewatering of sediment along with the necessary truck traffic could cause noise, dust, and odors that might disturb the local public. Risks to Site workers and the community might also be associated with dust generated during excavation, stockpiling, and loading trucks for off-site transportation and disposal.

Although sedimentation controls would be in place for all activities, work along the creek bank and sediment removal will unavoidably cause a short-term increase in suspended sediment in the surface water column and an associated increase in concentrations in surface water and probably in wildlife and fish that live and feed in the creek and along its banks. Creek banks may be stabilized using hard engineering (such as riprap or concrete) in places, which would permanently affect the aesthetics of the creek banks. There are significant, but manageable, logistical issues associated with accessing and removing sediment in the different reaches of OU-4.

SED-7 consumes 549,657 MMBtus of energy, including on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use. Implementing SED-7 generates emissions of on-site and total NOx, SOx, PM, HAPs, and total GHG emissions (in CO_2e) from on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and waste, and grid electricity use (for laboratory analysis). Total GHG emissions for SED-7 would include 16,135 tons as CO_2e.

Land disturbance from SED-7 remedial activities include shoreline stabilization, sediment dredging, and backfilling of dredged areas. Land use of the Site will remain unchanged following implementation of the remedy, and the off-site treatment facility and associated landfill for the ash residue are already established.

10.7.7.4 Long-Term Effectiveness and Permanence

SED-7 would effectively and permanently control creek banks and prevent them from acting as an ongoing source to surface water, sediment, and biota. SED-7 would also remove PCB-containing sediment to drive achievement of the long-term PRGs over a 20-year period with the assistance of MNR. Long-term effectiveness and permanence will also be influenced by the background contributions from multiple historical and ongoing sources to Snow Creek and, ultimately, Choccolocco Creek. This alternative also includes long-term support for managing PCB residuals

associated with future infrastructure construction or improvement projects that may occur in creek bank or sediment portions of OU-4.

Additional consideration of the CMZ and climate change will be conducted as part of the OU-4 RD and as part of long-term monitoring following remedy construction. The key considerations for future RD activities and long-term monitoring for the selected remedy include assessing vulnerabilities and evaluating measures to increase resilience and ensure that the project is designed to have adaptive capacity based on the uncertainties in predicting climate change.

10.7.7.5 Reduction of Toxicity, Mobility, and Volume through Treatment

SED-7 would involve off-site treatment that would reduce the toxicity and mobility of PCBs in sediment. Based on the current state of licensed treatment facilities approved for the treatment of PCBs, the treatment would most likely be incineration at a facility in Texas or Kansas, and the treated residuals (ash) would be disposed of by the facility.

10.7.7.6 Implementability

SED-7 would be implementable from a technology perspective using established construction methods and a permitted TSCA waste treatment facility for incineration. There would be challenges to obtain property access along the creeks to remove and transport the sediment to a local staging area for dewatering.

10.7.7.7 Cost

A cost estimate for SED-7 is shown in Table 10-20. The estimated capital cost (without contingencies) is $33.2M. The estimated cost is based on addressing 39,800 linear feet of creek banks, a sediment removal volume of 52,100 cubic yards, placing 40,400 cubic yards of backfill and off-site incineration for a portion (225 cubic yards) of the excavated creek bank soil and sediment, and off-site disposal for the remainder of sediment. The total present worth cost for this alternative, including 30 years of monitoring and contingencies, is approximately $54.0M. These costs vary based on the anticipated level of activity each year. Consistent with FS-costing procedures, these long-terms costs are presented on a net present worth basis to reflect the time value of money.

11 COMPARATIVE EVALUATION OF ALTERNATIVES

In this section, the evaluation from the detailed analysis of each category is used to compare the alternatives under each specific evaluation criterion. The purpose of this comparative analysis is to identify the advantages and disadvantages of each alternative relative to one another so that the key benefits and disadvantages of each alternative may be understood and weighed against each other. This comparison is especially important and easiest to understand in the circumstances where one alternative offers a small benefit with a corresponding large negative aspect. The comparative analysis also allows evaluation of some of the subtle differences between two alternatives that may not be fully realized when the alternatives are only evaluated with respect to the individual criterion.

Overall protection of human health and the environment and compliance with ARARs are used as threshold determinations. These must be met by any alternative in order for it to be eligible for selection. The next five criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; and cost) are the primary focus of the comparative evaluation because the major differences, benefits, and disadvantages among alternatives usually relate to one or more of these five criteria (USEPA 1988).

Under the NCP, evaluation of state and community acceptance is not included in this OU-4 FS. USEPA is required to evaluate the range of remedial alternatives against these two modifying criteria as a part of developing the ROD for OU-4.

The following subsections are organized in the same manner as Sections 9 and 10, first by category (residential soil, IMs, etc.) and then by the individual evaluation criteria. An overall summary of the evaluations for each category is included as the last subsection for each category. Tables 11-1a through 11-1d provide a tabular form of the summary level findings. The green and sustainable metrics for each alternative are summarized in Tables 11-2a through 11-2d. An overall summary of the costs is presented in Table 11-3.

11.1 Residential Soil Alternatives

The detailed evaluations of the residential soil alternatives are included in Section 10.4. All three RS alternatives rely on the investigations and removal actions already taken on the residential use areas in OU-4. Only one residential use area remains with PCBs above 1 mg/kg in surface soil, and five areas remain with PCBs above 1 mg/kg and below 10 mg/kg below the upper 1-foot horizon. The three RS alternatives include no action (RS-1), removal of surface soil from the one residential use area where access has been denied (RS-2), and removal of subsurface soil (along with surface soil) for the five residential use areas with residual PCB concentrations between 1 mg/kg and 10 mg/kg (RS-3) at depth. The actions under RS-3 also include removing surface soil for the residential use area where access has been denied. Both RS-2 and RS-3 include long-term monitoring under a soil management plan to address portions of the residential use areas that are currently covered by improvements such as walkways, driveways, or sheds and to identify the potential for new residential use areas in the OU-4 floodplain. A summary level of the comparative analysis for the RS alternatives is presented in Table 11-1a.

11.1.1 Overall Protection of Human Health and the Environment

Each of the RS alternatives would partially or fully meet the overall protection of human health and the environment threshold criterion. RS-1 would meet this criterion in the short term for the areas where removals have been conducted but would not meet this criterion in the short term for the one remaining residential area (0.25 acres) with surface soil concentrations above 1 mg/kg where property access has not been granted. Additionally, RS-1 would not be protective in the long term, as it does not include a soil management plan to address residual PCBs remaining in residential use areas or provide monitoring for areas converted to residential use in the future. Both RS-2 and RS-3 include provisions for monitoring (RS-2) or removing (RS-3) residual soil remaining at depth or under pavement or structures (once the structure is removed). Both RS-2 and RS-3 would manage or remove residuals and identify whether future residential development activities were to occur in portions of the OU-4 floodplain with PCB concentrations in surface soil greater than or equal to 1 mg/kg. Based on these factors, both RS-2 and RS-3 would meet this threshold criterion for protectiveness of human health and the environment, RS-2 would also be consistent with the remedy selected by USEPA for residential soils in the OU-1/OU-2 portion of the Site.

11.1.2 Compliance with ARARs

Alternative RS-1 would not meet this criterion. Alternatives RS-2 and RS-3 would meet ARARs and TBCs.

11.1.3 Short-Term Effectiveness

The comparative short-term impacts would be much higher for RS-3 than for RS-2. These impacts are associated with returning to properties where surface soil was previously removed and repeating the process to remove subsurface soil with PCB concentration between 1 mg/kg and 10 mg/kg. RS-3 would have a larger environmental impact than RS-1 and RS-2, including community disruption for excavating soil for five residential use areas where removals were previously conducted and in terms of energy use and GHG emissions (Table 11-2a).

Due to the quantity of PCB-containing soil excavated as part of RS-3, RS-3 would require approximately 23 times the quantity of refined materials than would be required for RS-2, including backfill and restoration materials. Similarly, the quantity of PCB-containing soil for off-site disposal generated by RS-3 would be approximately 18 times greater than the quantity generated by RS-2. Water use for RS-3 would be approximately 6 times the water use of RS-2, consistent with the increased number of properties requiring hydroseeding during restoration. RS-3 also would require approximately 7 times the energy (in MMBtu) of that required by RS-2. This difference is due to increased use of on-site and off-site equipment (excavator and skid-steer) and transportation of personnel and of PCB-containing soil (Table 11-2a). RS-3 remedial activities would generate approximately 8 times the total GHG emissions as RS-2 activities would generate.

While no quantitative analysis of land and ecosystem was conducted for the residential soil alternatives, both remedial alternatives have a negligible net impact on the land use of the Site and the facility designated for disposal of nonhazardous waste.

11.1.4 Long-Term Effectiveness and Permanence

Each of the active RS alternatives would provide long-term effectiveness and permanence where removals/backfill have been or will be completed. RS-1 would not provide effectiveness or permanence for the one remaining area where the property owner has not granted access for the removal. RS-1 would also not provide long-term effectiveness and permanence through soil management activities conducted over the long term, especially relative to the potential for future residential development. RS-2 and RS-3 would both provide higher levels of protection by conducting long-term residuals management and by completing the removal actions on one (RS-2) or six (one surface and five subsurface) areas. RS-3 would provide a marginally higher level of permanence through the removal of subsurface soil.

11.1.5 Reduction of Toxicity, Mobility, and Volume through Treatment

The RS alternatives are not treatment alternatives and, therefore, would not reduce the toxicity, mobility, or volume of the materials.

11.1.6 Implementability

Each of the RS alternatives are implementable. RS-2 has been or would be implemented in the same manner as previously conducted for residential properties in OU-1/OU-2 and in other areas of OU-4, including in the implementation of the ROD for OU-1/OU-2. RS-3 would be conducted similarly but is more difficult to implement given that it would require returning to areas were residential removal actions were previously completed. This would include excavating areas where removal and restoration actions have already been completed and excavating to greater depths.

11.1.7 Cost

There is no cost associated with RS-1. RS-2 is estimated to cost $400,000, and RS-3 is estimated to cost $1.4M.

11.1.8 Residential Soils Summary

RS-1, RS-2, and RS-3 are similar in that all residential areas with surface soil greater than 1 mg/kg have been addressed, except for one area where the owner has not granted access. RS-1 (no action) would not be as effective or permanent as the other alternatives because remaining residuals at depth or under pavement or structures would not be monitored through the soil management plan, and future residential development could occur in areas of the floodplain with PCB concentrations in surface soil greater than or equal to 1 mg/kg. Alternatives RS-2 and RS-3 would provide similar levels of effectiveness. The primary differences between RS-2 and RS-3 are the increased level of community impact, implementability challenges under RS-3, and the minimal increase in permanence that RS-3 provides.

11.2 Interim Measures Alternatives

The detailed evaluation of the IM alternatives is included in Section 10.5. The IM alternatives are similar in that they all rely on measures already taken that are protective and effective. The difference between IM-1 and IM-2 is that IM-2 would continue to ensure that the previously constructed IMs remain in place and are protective by continuing the inspection, monitoring, and repairs of the IMs, if needed. In addition to continuing to ensure that the IMs remain in place and

are protective by continuing the inspection, monitoring, and repairs of the measures, if needed, IM-3 though IM-5 include additional excavation and off-site disposal of soil from softball Field A (IM-3), and Fields A, C, and D (IM-4 and IM-5). A summary level of the comparative analysis for the IM alternatives is presented in Table 11-1b.

11.2.1 Overall Protection of Human Health and the Environment

All the active IM remedial alternatives (IM-2 through IM-5) would be protective of human health and the environment in the short and long term. Because the no action alternative (IM-1 does not include long-term monitoring, maintenance, or soil management for the previously constructed caps and covers, it would not offer overall protectiveness. Long-term protectiveness and permanence would be ensured with continued monitoring and maintenance and implementation of the soil management support.

11.2.2 Compliance with ARARs

IM-2 through IM-5 would comply with ARARs through the continued monitoring, maintenance, repair when necessary and soil management support. Remedial alternative IM-1 would not comply with ARARs.

11.2.3 Short-Term Effectiveness

All the active IM alternatives rely on the capping and cover systems already in place and would be effective in the short term. IM-2 has a higher potential for adverse short-term impacts than IM-3 through IM-5 based on the proactive nature of the advance soil management support included with IM-3 through IM-5. The advance soil management avoids potential conflicts between ongoing recreational activities and future soil management support that would be needed to support infrastructure repair or construction projects for the softball fields. The degree of short-term impacts reduces in moving from IM-3 through IM-5 as the level of proactive advance soil management increases. While the level of intrusive activity associated with advance soil management increases in moving from IM-3 to IM-5, the goal of advance soil management is to avoid larger-scale conflicts between ongoing recreational activities and future soil management.

The energy and GHG information for IM-2 through IM-5 are presented in Table 11-2b. IM-3 through IM-5 would use similar energy (2,099,774 to 2,101,998 MMBtu) and corresponding CO_2e (18,418 to 18,581 tons) to IM-2 (2,093,838 MMBtu and 17,992 tons CO_2e). The environmental footprint for the range of active remedial alternatives is not significantly different as they all have repaving the parking lot and tennis court areas as part of long-term maintenance, and this activity drives the environmental footprint.

There is not a significant difference between IM-4 and IM-5 based on the similarities of the two alternatives.

11.2.4 Long-Term Effectiveness and Permanence

IM-1 does not include monitoring and, therefore, has no mechanism to ensure long-term effectiveness. IM-2 through IM-5 offer long-term effectiveness and permanence through continued monitoring, maintenance, and repairs, if needed. IM-3 though IM-5 would provide additional protection by conducting long-term residuals management and by completing the removal actions.

11.2.5 Reduction of Toxicity, Mobility, and Volume through Treatment

The IM alternatives are not treatment alternatives and, thus, reductions in toxicity, mobility, and volume are not applicable.

11.2.6 Implementability

The IM alternatives are all implementable. IM-2 would require coordination with landowners to continue with ongoing monitoring, maintenance, and soil management support activities. IM-3, IM-4, and IM-5 would not require as much coordination with the landowner because advance soil management support minimizes the potential for future conflicts between ongoing recreational activities and soil management activities that may be necessary to support infrastructure repair or construction.

11.2.7 Cost

IM-1 does not have a cost as the no action alternative. IM-2 is the least costly of the active remedial alternatives at $400,000. The costs increase with IM-3 through IM-5 as the extent of advance soil management increases (IM-3 at $1.5M, IM-4 $3.2M, and IM-4 $3.2M). The costs for IM-4 and IM-5 are the same due to the similar nature of the two remedial alternatives. A summary level of the comparative analysis for the IM alternatives is presented in Table 11-1b. .

11.2.8 Interim Measures Summary

All IM alternatives rely on measures that have already been constructed and are currently effective and protective. Because IM-1 does not include long-term monitoring to ensure that controls remain in place and are maintained, it would not offer overall protectiveness in the long term. Under IM-2, long-term protectiveness and permanence would be ensured with continued monitoring, maintenance, and soil management. Under IM-3 through IM-5, long-term effectiveness and permanence would be enhanced through advance soil management that includes excavation and off-site disposal of soil from the softball fields. The extent of advance soil management increases in moving from IM-3 to IM-5.

11.3 Nonresidential Floodplain Soil Alternatives

The detailed evaluations of the nonresidential floodplain soil alternatives are included in Section 10.6. These five alternatives—NRS-1 through NRS-5—are summarized on the comparative analysis table for nonresidential soil (Table 11-1c). As with all the categories, the first alternative (NRS-1) would be no action. The other four alternatives (NRS-2 through NRS-5) actively address the same footprint to achieve the nonresidential soil PRGs for ecological and human health receptors. All four active alternatives include excavation and off-site disposal of the soil followed by backfilling of the excavated areas and stabilization with a vegetative cover. NRS-2 and NRS-3 include off-site disposal at permitted landfills. The remedial volume for soil under NRS-2 (57,475 cubic yards) reflects the excavation of soil from the 0–0.5-foot horizon over a 71-acre footprint to achieve the ecological and human health PRGs. The soil removal volumes for NRS-3 (73,345 cubic yards) and NRS-4 (143,801 cubic yards) reflect two different approaches for advance soil management. NRS-3 includes the excavation and off-site disposal of soil with PCB concentrations greater than 50 mg/kg in the 0–1-foot horizon of floodplain areas located upstream of I-20, including the Oxford Lake Park areas and the undeveloped land located to the west of Snow Creek. The additional 15,870 cubic yards of soil associated with NRS-3 was included to streamline future

soil management support for this general area where infrastructure repair and construction projects frequently occur with little advance notice. The same approach was used for NRS-4 for OU-4 and includes an additional 86,326 cubic yards of soil for advance soil management purposes as compared to the NRS-2 soil volume. Most of this additional soil is located in undeveloped portions of OU-4 where soil management support requests are far less frequent and the upcoming infrastructure projects are typically identified months to years in advance.

11.3.1 Overall Protection of Human Health and the Environment

The no action alternative, NRS-1, would not be protective of human health and the environment, as it would leave soil with concentrations above acceptable concentrations in surface soils. All other alternatives (NRS-2 through NRS-5) would remove the soil that represent an unacceptable risk and would be protective of human health and the environment.

11.3.2 Compliance with ARARs

The no action alternative (NRS-1) would not meet this criterion. All other alternatives (NRS-2 through NRS-5) would be designed to meet this criterion.

11.3.3 Short-Term Effectiveness

NRS-2 would remove and replace soil from the 0–0.5-foot horizon over a 71-acre footprint to achieve the identified PRG. This alternative would have the potential to disturb the local neighborhood and require off-site truck transport for the excavated soil.

NRS-3, NRS-4, and NRS-5 would remove additional material and, therefore, have additional short-term impacts on a local level compared to NRS-2 from an excavation and truck transport perspective. NRS-4 and NRS-5 would have a greater short-term impact on a local level than NRS-3 would have due to the large volume of soil and the high level of disturbance for removing these soils from undeveloped and remote portions of the OU-4 floodplain.

The energy and GHG information for NRS-2, NRS-3, NRS-4, and NRS-5 are presented in Table 11-2c. These alternatives have increasing energy and greenhouse emissions based on the increased quantities of excavated PCB-containing soils under each alternative. NRS-5 remedial activities would require approximately 5 times the energy (in MMBtu) and would generate approximately 5 times the total GHG emissions (tons CO_2e) of NRS-2. NRS-4 remedial activities would require approximately 2.5 times the energy (in MMBtu) and would generate 3 times the total GHG emissions (tons CO_2e) of NRS-2. NRS-3 remedial activities would require approximately 1.3 times the energy (in MMBtu) and would generate 1.3 times the total GHG emissions (tons CO_2e) of NRS-2. Emissions of the above-listed air pollutants are associated with on-site and off-site equipment use (excavator, haul truck, and skid-steer), transportation of personnel and soil, and grid electricity use. The environmental footprint for the range of active remedial alternatives is not significantly different as these remedial alternatives include transportation off-site for disposal in a permitted landfill. While no quantitative analysis of land and ecosystem was conducted for the nonresidential soil alternatives, NRS-4 and NRS-5 would have an increased and disproportionate impacted to undeveloped and ecologically relevant portions of the OU-4 floodplain and riparian corridors as compared to the other remedial alternatives.

11.3.4 Long-Term Effectiveness and Permanence

NRS-1 would not be effective in the long term as it does not address soil currently in place that has concentrations above risk-based thresholds. Other NRS alternatives would all have the same long-term effectiveness and permanence, resulting in surface soil concentrations less than the ecological and human health PRGs. NRS-3, NRS-4, and NRS-5 would have small incremental long-term effectiveness impacts as additional subsurface soil would be removed under these options as compared to NRS-2.

11.3.5 Reduction of Toxicity, Mobility, and Volume through Treatment

NRS-1 through NRS-5 do not include a treatment technology and would not reduce the toxicity, mobility, or volume of material.

11.3.6 Implementability

NRS-2 through NRS-5 would be implementable using proven technologies and licensed operators, where appropriate. NRS-2 and NRS-3 would have moderate but workable implementability challenges relative to access and coordination with local landowners. The implementability challenges for NRS-4 and NRS-5 would be more substantial given the remote locations and increased removal volumes that are 2.5 and 5 times larger, respectively, than NRS-2.

11.3.7 Cost

The costs for NRS-2, including off-site disposal (landfilling) would be $30.9M. NRS-3, NRS-4, and NRS-5, which remove and dispose of additional material, would be more expensive than NRS-2 at costs of $37.7M for NRS-3, $70.1M for NRS-4, and $161.3M for NRS-5.

11.3.8 Nonresidential Floodplain Soil Summary

The no action alternative (NRS-1) would not meet the threshold criteria for further consideration.

NRS-2, NRS-3, NRS-4, and NRS-5 would all meet the PRGs for ecological and human health receptors in a very similar manner. NRS-3 provides advantages relative to NRS-2 in terms of advance soil management support for a portion of OU-4 that is largely available to the public and frequently requires soil management support with little advance notice. While NRS-4 and NRS-5 provide an increased level of advance soil management, they do so through additional intrusive work for remote and ecologically valuable areas that do not frequently require soil management, and when it's required, there is typically a significant amount of time available for planning.

11.4 Creek Bank and Sediment Alternatives

Each of the six active creek bank and sediment alternatives address the same 25-acre footprint to meet the ecological and human health PRGs. The range in alternatives reflects different remedial technologies and combination or technologies, including removal, removal and capping, and removal and in-place treatment. The range of remedial alternatives also includes different off-site disposal methods with alternatives SED-2 through SED-6 using permitted off-site landfills and SED-7 using off-site treatment with incineration for a small quantity of sediment (225 cubic yards) with PCB concentrations ≥500 mg/kg. Each of the active remedial alternatives include source control measures to address creek bank areas that are contributing PCBs to OU-4. There are two

approaches for creek bank source control included in this OU-4 FS: one to meet the PRGs and a second approach that reduces the time necessary to achieve the PRGs. The first source control approach targets creek bank areas with moderate and severe erosion located upstream of RM 29.5, and the second, the enhanced approach, adds the creek bank areas upstream of RM 29.5 with minor erosion. The enhanced approach for creek bank source control reduces the time to achieve the PRGs to 20 years from the 30- to 35-year period calculated for the approach that only targets creek banks with moderate and severe erosion.

As with the other categories of alternatives, SED-1 would be the no action alternative. The SED-1 alternative would not meet threshold criteria and is used, in accordance with the NCP, as a reference point for comparison with the other alternatives. A summary level of the comparative analysis for the SED alternatives is presented in Table 11-1d.

11.4.1 Overall Protection of Human Health and the Environment

With the exception of SED-1, the no action alternative, it is expected that each alternative would be protective of human health and the environment and would comply with ARARs. Stabilizing the creek banks that are the least stable and that have the highest PCB concentrations would address a significant remaining source of PCB loading to Choccolocco Creek with SED-2 and SED-4 achieving the PRGs in 30 to 35 years. SED-3, SED-5, SED-6, and SED-7 are projected to achieve the PRGs in 20 to 30 years due to the enhanced creek bank source control approach that is included with these alternatives. The source control actions would be combined with active sediment remediation over a 25-acre footprint including Snow Creek, the backwater area and 12 acres of Choccolocco Creek downstream of the backwater area where relatively small pockets of sediment with higher PCB concentrations are located.

11.4.2 Compliance with ARARs

Each of the active alternatives would be designed to comply with ARARs over the long term. Compliance with the surface water AWQC for the protection of wildlife is projected within 5 to 10 years following remedy implementation recognizing that future compliance evaluations will be based on the assessment of dissolved-phase PCBs and will account for background conditions.

11.4.3 Short-Term Effectiveness

Each of the sediment alternatives would have similar short-term risks and impacts to Site workers and the community. These risks and impacts are associated with removing trees and constructing and removing staging and dewatering areas. Most of this clearing would be located directly along the edge of the creek in the riparian buffer zone. The excavation, staging, and dewatering of sediment along with the necessary truck traffic could cause noise, dust, and odors that might disturb the local public. Risks to Site workers and the community might also be associated with dust generated during excavation, stockpiling, and loading trucks for off-site transportation and disposal.

Although sedimentation controls would be in place for all activities, work along the creek bank and sediment removal would unavoidably cause a short-term increase in suspended solids in the surface water column and an associated increase in concentrations in surface water. Creek banks may be stabilized using hard engineering (such as riprap or concrete) in places, which would permanently affect the aesthetics of the creek banks. There are significant, but manageable,

logistical issues associated with accessing and removing sediment from the different reaches of OU-4.

The alternatives that would cap (SED-5) or treat sediment in situ (SED-2 and SED-3) would involve less time dredging and less disturbance of sediment that could be resuspended and transported downstream. Therefore, these alternatives would have a lower short-term temporary increase in surface water, biota, and downstream sediment concentrations and a shorter time to recover from the temporary increase in concentrations. SED-5 would involve some dredging in the low-energy areas to leave room for the cap, and SED-2 and SED-3 would be less disruptive and have fewer impacts because dredging would not be required prior to placing the activated carbon as part of the treatment process. As a result, SED-2, SED-3, and SED-5 would have less short-term impact, including resuspended sediment, because less sediment is dredged (SED-2 and SED-3 have the lowest). In addition to being more impactful to surface waters, SED-4, SED-6, and SED-7 would also generate greater amounts of sediment to be staged, handled, and transported or additional backfill with an associated increase in local disturbances with truck traffic, dust, and noise.

Each active alternative would take approximately the same amount of time to complete, approximately 3 to 4 years. The active alternatives would involve active dredging, staging, and truck traffic organized in a consecutive sequence along different portions of the creek. Although some of the construction activities are different for SED-2, SED-3, and SED-5 (i.e., capping or in-place treatment), the durations for the activities and the associated noise and other disturbances would likely to be similar.

Because SED-7 involves a longer duration for transport and the incineration of sediment and would likely involve permanent disposal at a location proximate to the incineration facility rather than in Alabama, this alternative would create the largest carbon footprint and have the largest potential to negatively impact other communities outside of the OU-4 area.

Alternatives SED-2 through SED-7 use refined materials on-site and energy at roughly the same order of magnitude as presented in Table 11-2d. Refined material usage on-site ranges from 94,143 tons for SED-3 to 199,307 for SED-5. All alternatives include sediment removal and source control, but variations exist among alternatives regarding the volume and location of sediment removal. These variations influence the quantity of refined materials required for construction and transportation of waste resulting from removal activities. Each alternative uses a temporary on-site water treatment system to treat water generated during the dewatering process. Energy usage ranges from 527,550 to 617,911 MMBtus for alternatives SED-2 through SED-7. Even though SED-7 remedial activities include off-site transportation and treatment (i.e., incineration) of the sediment at a specialized facility, similar amounts of energy (549,657 MMBtus) compared to the other alternatives is required due to the small amount of material (225 cubic yards) identified for incineration. The remedial alternatives presented in this analysis have comparable on-site air emissions ranging from 13,875 to 18,854 tons CO_2e.

All remedial alternatives would impact the land and ecosystems in the creek banks and sediment during removal of PCB-containing sediment. All alternatives have comparable construction durations and footprints with respect to dredging processes.

11.4.4 Long-Term Effectiveness and Permanence

Each of the active SED alternatives would be effective and permanent. Each alternative would stabilize creek bank soil and remove or isolate creek sediment. The PRGs would be achieved through a combination of these actions and MNR. Over time, each of the active SED alternatives is expected to achieve the ecological and human PRGs—SED-2 and SED-4 achieving the PRGs over 30 to 35 years, and SED-3, SED-5, SED-6, and SED-7 achieving the PRGs in approximately 20 years.

Dredging to remove the sediment will create some resuspension that will likely cause a temporary increase in surface water, downstream sediment, and biota concentrations. The alternatives that would dredge the most sediment (SED-4, SED-6, and SED-7) would create the largest temporary increase in concentrations and would also take the longest to recover and subsequently show a decrease in surface water and biota concentrations. The other active alternatives (SED-2, SED-3, and SED-5) would generate less resuspension to surface water proportional to the lesser amount of sediment that would be dredged.

SED-2, SED-3, and SED-5 would implement proven technologies of capping and in-place treatment where they are best suited, which are the low-energy areas of the creek. Capping (SED-5) uses physical isolation (1-foot cap) to keep the BAZ and the organisms that live in that zone from contacting the underlying sediment where PCBs remain. SED-2 and SED-3 use activated carbon to permanently absorb the PCBs, effectively negating their bioavailability and removing them from bioaccumulation in the food chain. These technologies have been proven effective under similar river systems under similar circumstances. Their long-term effectiveness and permanence for OU-4 would be confirmed through a long-term monitoring program. The long-term monitoring would include a combination remedy metrics monitoring. This monitoring program is anticipated to include traditional metrics for surface water, sediment, and biota and be supplemented with innovative techniques such as passive sampling devices and fish tracking. The proposed monitoring includes monitoring stations in OU-4 and stations located downstream of OU-4 (Lake Logan Martin) to assess changes in concentrations over time in multiple media (i.e., sediment, surface water, and biota). This downstream monitoring would include the innovative techniques and would provide information regarding background conditions for assessing the performance of the OU-4 remedy and information that USEPA can use for outreach with local stakeholders for the Site and Lake Logan Martin.

All the active creek bank and sediment alternatives provide long-term soil management support for managing PCB residuals associated with future infrastructure construction or improvement projects that may occur in creek bank or sediment portions of OU-4.

11.4.5 Reduction of Toxicity, Mobility, and Volume through Treatment

SED-2 and SED-3 would reduce the bioavailability of PCBs in sediment through in-place treatment. The addition of activated carbon to the sediment surface will sorb the PCBs, preventing them from being released to surface water and from being bioaccumulated in the food chain. For SED-2 and SED-3, the in-place treatment would result in direct benefit to the Choccolocco Creek system and would be realized on the Site as a decrease in PCB concentrations in surface water, fish tissue, and other biota, directly benefitting human health and the environment.

SED-7 would also include treatment (incineration) and would reduce the mobility and toxicity of the dredged sediment. The only reasonably reliable treatment option for this relatively small volume of sediment would be off-site incineration in Texas or Kansas. The disposal of the treated material (ash residue) would also be handled by the treatment facility. Whether or not the ash residue would have a beneficial reuse application is uncertain due to its low organic content and the potential for leachable metals to be present. Regardless of whether treatment would provide a benefit, the benefit to the surrounding community would not be different than the other SED alternatives.

11.4.6 Implementability

Each of the SED alternatives would be implementable using commercially available and proven technologies. Each alternative has specific logistical issues that would be managed using standard engineering practices. As with some of the other evaluation criteria— in particular, short-term effectiveness—the logistical issues associated with floodplain/creek bank staging areas and truck traffic would be more noticeable to the local community in proportion to the amount of material that would be transported to and from the Site. The range of active remedial alternatives can be organized into two major groups of implementability, with the first group being more implementable than the second group. The groupings are based on the quantity of sediment removed and transported off-site for disposal. With each group, the active remedial alternatives are organized from most implementable to least implementable:

- Group 1 (more implementable): SED-2, SED-3, and SED-5
- Group 2: (less implementable): SED-4, SED-6, and SED-7

11.4.7 Cost

The estimated costs for the creek bank and sediment remedial alternatives are summarized in Tables 11-1d and 11-3. The estimated costs for the alternatives that do not include off-site treatment range from $43.6M for SED-2 to $53.5M for SED-6. The estimated costs for SED-3, SED-4, and SED-5 and are in the middle of this range and are $47.4M $49.7M, and $50.6M, respectively. The cost differences between alternatives SED-3 through SED-5 are associated with the various quantities of sediment being dredged, capped, and/or treated in-place. The two different approaches to creek bank source control also account for a small portion of the differences. SED-7 is the most expensive alternative ($54M) based on transportation and treatment costs associated with off-site treatment (incineration).

11.4.8 Sediment and Creek Bank (SED) Summary

The alternatives developed and evaluated for sediment and creek bank areas provide a range of remedial alternatives that would meet the objectives of achieving ARARs, protectiveness, effectiveness, long-term permanence, and implementability. Except for SED-1, the no action alternative, which would not meet the threshold evaluation criteria, each of the SED alternatives would satisfy the NCP criteria with different considerations that would be managed during design and implementation. Each of the active alternatives include creek bank source control with a second option that reduces the time to achieve the PRGs. While creek banks located in developed areas may be stabilized with hardened approaches such as riprap, the approach for Choccolocco Creek would focus on naturalized stabilization approaches. The process to develop

location-specific stabilization designs recognizes the importance of landowner input and the need to complete engineering evaluations such that the resultant design is consistent with the overall geomorphological setting.

SED-4, SED-6, and SED-7 involve more dredging (52,100 cubic yards) than the dredging involved with SED-5 (44,200 cubic yards) and SED-2 and SED-3 (both remove of 37,600 cubic yards). The difference in water column impacts for these two groups of remedial alternatives is meaningful because the difference in removal volumes is associated with fine-grained sediment from the backwater area. This backwater area sediment has high PCB concentrations and will be the most difficult to manage once resuspended by the dredging process. An additional benefit for alternatives SED-2 and SED-3 is that they reduce toxicity, mobility, and volume through in-place treatment with activated carbon, which has proven to be effective at other PCB sediment sites.

The group of alternatives that includes SED-4, SED-6, and SED-7 (Group 2) would also have the highest level of truck traffic for off-site disposal and the import of clean backfill and, as a result, are more difficult to implement. SED-7 involves the off-site incineration of sediment as treatment. Although this alternative would reduce the toxicity and mobility of constituents, the magnitude of the treatment is uncertain, and, the benefit, if any, would not be realized at the Site. Because of the distance for transport to the incineration facility and the incineration process itself, the energy use and the costs for SED-7 are slightly more than for SED-6 ($54.0M versus $53.5M).

All the active remedial alternatives include soil management, which is critical to the long-term success of the remedy. The active alternatives all include long-term monitoring, including an expansion to innovative approaches to supplement the traditional remedy metrics for sediment, surface water, and biota. The proposed monitoring program has been expanded downstream into Lake Logan Martin based on the biological connection between OU-4 and the lake. Long-term monitoring data for the lake also provides an integrated picture for the effectiveness of remedies implemented for OU-4 and the Site and can be used by USEPA to communicate with stakeholders.

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Geosyntec consultants

Tables

Table 2-1. Drainage Areas and Flood Flows
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

	Drainage Area (mi^2)	Peak Discharge (cfs)	
		10-year	100-year
Snow Creek			
At the mouth[1]	19	4,030	6,900
Choccolocco Creek			
At Friendship Road[1]	222	16,200	31,800
USGS gage near Jenifer[2]	277	18,900	36,000
USGS gage near Lincoln[2]	496	25,500	55,000

1. From Federal Emergency Management Agency (FEMA 1993)
2. Based on USGS gauge data (USGS gauges 2404500 and 2404000)
cfs: cubic feet per second
mi^2: square miles
OU: operable unit
PCB: polychlorinated biphenyl
USGS: United States Geological Survey

Table 2-2. Flood Events on Choccolocco Creek
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Date	Flow at Jenifer (cfs) (Downstream of Coldwater Creek Confluence)	Flow at Lincoln (cfs) (Jackson Shoals or Highway 77)
January 7, 1946	12,800	27,700
March 29, 1951	20,400	49,300
February 22, 1961	15,800	25,900
April 30, 1963	22,500	36,900
March 16, 1976	--	31,600
March 30, 1977	--	35,800
April 13, 1979	23,000	30,100
March 17, 1990	--	27,400
May 8, 2003	--	27,700

Jenifer flow data based on USGS gage 2404000 (drainage area = 277 square miles)
Lincoln flow data prior to 1960 based on USGS gage 2404500 (drainage area = 496 square miles)
Lincoln flow data after 1960 based on USGS gage 2404400 (drainage area = 481 square miles)
Events selected based on flows at Lincoln exceeding the 10-year event (25,500 cfs)
cfs: cubic feet per second
--: no record available for date
OU: operable unit
PCB: polychlorinated biphenyl
USGS: United States Geological Survey

Table 2-3. Descriptions of Historical Features Identified in the EPIC Study
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Feature Number	Feature in 1940	Feature from 1961–1963	Feature in 1977	Feature from 1990 to 1997	Figure Number Reference
6	Meander scar	Meander scar	Meander scar	Meander scar, wetland	Figure 2-4a
7	Meander scar, woodland	Wetland	Oxbow lake	Oxbow lake	Figure 2-4a
8	Meander scar, woodland	Wetland	Wetland	Wetland	Figure 2-4a
9	Meander scar	Meander scar	Meander scar	Oxbow lake	Figure 2-4a
10	Meander channel	Meander scar	No feature discerned	No feature discerned	Figure 2-4a
11	Creek channel	Creek channel	Meander scar	No feature discerned	Figure 2-4a
12	Meander scar	Meander scar	No feature discerned	Drainage ditch	Figure 2-4a
13	Meander scar	Wetland	Oxbow lake, woodland	Oxbow lake, woodland	Figure 2-4a
14	Meander scar	Meander scar, woodland	Meander scar, woodland	Oxbow lake, wetland	Figure 2-4a
15	Probable meander scar	Woodland	Meander scar	Meander scar	Figure 2-4a
16	Meander scar	No feature discerned	No feature discerned	Meander scar	Figure 2-4a
17	Meander scar, wetland	Meander scar, wetland	Woodland	Meander scar, wetland	Figure 2-4a
18	Meander scar	Meander scar	Meander scar	No feature discerned	Figure 2-4a
19	Meander channel	Meander channel	Meander channel	Woodland	Figure 2-4a
20	Woodland	Woodland	Meander channel	Woodland	Figure 2-4a
21	Woodland	Creek channel	Meander channel	Partial creek channel	Figure 2-4a
22	Woodland	Meander channel	Woodland	Woodland	Figure 2-4a
23	Meander scar	Meander scar	Probable oxbow lake	Oxbow lake	Figure 2-4a
24	Meander scar	Oxbow lake	Oxbow lake	Oxbow lake	Figure 2-4a
25	Meander scar, woodland	Oxbow lake	Oxbow lake	Oxbow lake	Figure 2-4a
26	Meander scar	Wetland	Wetland	Meander scar, wetland	Figure 2-4a
27	Meander scar	Meander scar	Woodland	Meander scar, wetland	Figure 2-4a
28	Creek channel	Creek channel	Oxbow lake, wetland	Oxbow scar, wetland [1]	Figure 2-4a
29	Creek channel	Oxbow lake	Oxbow lake, wetland	Oxbow lake, wetland	Figure 2-4a
30	No feature discerned	Probable oxbow lake	Probable oxbow lake	Probable oxbow lake	Figure 2-4a
31	Creek channel	Creek channel	Oxbow lake, wetland	Oxbow lake	Figure 2-4a
32	Meander scar	Probable drainage ditch	Probable drainage ditch	Probable drainage ditch	Figure 2-4a
33	Meander scar, woodland	Meander scar, wetland	Meander scar	Oxbow lake	Figure 2-4a
34	Woodland	Woodland	Meander scar	Meander scar	Figure 2-4a
35	Creek channel	Oxbow lake	Meander scar, wetland	Meander scar, wetland	Figure 2-4a
36	Meander scar	Meander scar	Meander scar	Meander scar	Figure 2-4a
37	Meander scar	Meander scar	Meander scar	No feature discerned	Figure 2-4a
38	Meander scar	Woodland	Woodland	No feature discerned	Figure 2-4a

Table 2-3. Descriptions of Historical Features Identified in the EPIC Study
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Feature Number	Feature in 1940	Feature from 1961–1963	Feature in 1977	Feature from 1990 to 1997	Figure Number Reference
39	Meander scar	Wetland	Meander scar	Meander scar, wetland	Figure 2-4a
40	Meander scar	Meander scar	No discernible feature	Meander scar	Figure 2-4a
41	Meander scar	Wetland	Meander scar	Oxbow lake	Figure 2-4a
42	Woodland	Woodland	Woodland	Meander scar	Figure 2-4a
43	Meander scar	Meander scar, woodland	Woodland	Meander scar	Figure 2-4a
44	Meander scar	Meander scar	Woodland	Oxbow lake	Figure 2-4a
45	Meander scar	Oxbow lake , wetland	Wetland	Oxbow lake, wetland	Figure 2-4a
46	Meander scar, woodland	Meander scar, woodland	Woodland	Meander scar, wetland	Figure 2-4a
47	Meander scar	Meander scar	Meander scar	Meander scar	Figure 2-4a
48	Meander scar	Meander scar	No feature discerned	Meander scar	Figure 2-4a
49	No feature discerned	Probable excavated ponds	Wetland	Ponds, wetland	Figure 2-4a
50	Meander scar	Meander scar	Meander scar	Meander scar, wetland	Figure 2-4a
51	Meander scar	Meander scar	No feature discerned	Woodland	Figure 2-4a
52	Meander scar	Meander scar	No feature discerned	Meander scar, wetland	Figure 2-4a
53	Woodland	Woodland	Possible oxbow lake	Possible oxbow lake	Figure 2-4a
54	Meander scar, woodland	Wetland	No feature discerned	No feature discerned	Figure 2-4a
55	Meander scar	Excavation, ponds	Ponds	Ponds, partial woodland	Figure 2-4a
56	Creek channel	Creek channel	Creek channel	Meander scar	Figure 2-4a
57	Meander scar	Meander scar, pond	Meander scar, pond	Meander scar	Figure 2-4a
58	Meander scar	Meander scar	No feature discerned	Meander scar	Figure 2-4a
59	Meander scar	Meander scar, wetland	No feature discerned	No feature discerned	Figure 2-4a
60	Meander scar, woodland	Meander scar, woodland	Meander scar, woodland	Meander scar, woodland	Figure 2-4a
61	Meander scar, woodland	Meander scar, woodland	Meander scar, woodland	Meander scar, woodland	Figure 2-4b
62	Meander scar, woodland	Meander scar, woodland	Meander scar, woodland	Meander scar, woodland	Figure 2-4b
63	Meander scar, woodland	Meander scar	Meander scar, woodland	Meander scar, woodland	Figure 2-4b
64	Meander scar	Meander scar	Meander scar	Meander scar	Figure 2-4b
65	Meander scar	Meander scar	Partial woodland	Partial woodland	Figure 2-4b
66	Meander scar	Meander scar	Meander scar, pond	Meander scar, pond	Figure 2-4b
67	Meander cutoff	Meander cutoff, wetland	Creek channel	Creek channel	Figure 2-4b
68	Creek channel	Creek channel	Oxbow lake, creek channel	Oxbow lake	Figure 2-4b
69	Meander scar	Woodland	Woodland	Partial wetland	Figure 2-4b
70	Meander scar, woodland	Meander scar, woodland	Meander scar, woodland	Meander scar and woodland	Figure 2-4c

Table 2-3. Descriptions of Historical Features Identified in the EPIC Study
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Feature Number	Feature in 1940	Feature from 1961–1963	Feature in 1977	Feature from 1990 to 1997	Figure Number Reference
71	Meander scar	Meander scar	Meander scar	Oxbow lake	Figure 2-4c
72	Possible meander scar	No feature discerned	Possible meander scar	Oxbow lake	Figure 2-4c

1. Feature was identified two ways in metadata. The second description was Meander Scar, Wetland.
Features 1 through 5 are not included as they are not in OU-4.
EPIC: Environmental Photographic Interpretation Center
OU: operable unit
PCB: polychlorinated biphenyl

Table 4-1a. Summary of OU-4 Nonresidential Surface (0-1 foot) Soil PCB Data by Exposure Unit
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

EU	Locations	Surface Samples (n)[1]	Surface Maximum (mg/kg)	Surface Mean (mg/kg)	Surface UCL (mg/kg)[2]	Length Weighted Surface Mean (mg/kg)	Length Weighted Surface UCL (mg/kg)
C1-EU1	69	69 [2]	55	4.9	9.4	4.9	9.4
C1-EU2	33	33	210	27	39	27	39
C2N-EU1	38	54 [1]	110	4.4	14	3.8	16
C2N-EU2	35	63	3.6	0.16	0.43	0.15	0.48
C2S-EU1	22	44 [3]	0.67	0.085	0.16	0.085	0.17
C3N-EU1	62	117 [8]	100	12	15	12	16
C3N-EU2	17	30 [1]	120	9.6	29	9.3	26
C3S-EU1	40	79	190	11	27	10	39
C3S-EU2	28	53 [13]	110	9.2	19	9.1	16
C4N-EU1	82	155 [4]	38	3.4	5.6	3.5	8.0
C4N-EU2	57	102	24	1.8	3.8	1.6	3.8
C4S-EU1	53	106 [4]	56	8.0	10	8.1	11
C4S-EU2	45	87	21	2.0	3.8	2.1	5.0
C4S-EU3	40	80	19	2.1	3.9	2.1	3.2
C5N-EU1	12	24	14	2.5	7.0	2.5	6.0
C5N-EU2	115	211	14	0.44	0.87	0.54	1.1
C5S-EU1	101	186	33	1.1	2.2	1.1	2.4
C6N-EU1	23	46	11	1.2	2.7	1.2	3.0
C6S-EU1	24	48	23	1.3	3.6	1.3	4.3
C7N-EU1	91	173	8.4	0.25	0.51	0.27	0.59
C7S-EU1	103	193	16	0.59	1.2	0.69	1.5
C8N-EU1	24	48	11	1.3	2.7	1.3	3.1
C8S-EU1	20	40	4.3	0.33	0.96	0.33	1.2
C9N-EU1	29	49 [10]	7.9	0.48	1.3	0.47	1.3
C9S-EU1	21	41	0.58	0.17	0.29	0.17	0.30

1.Values within brackets indicate soil samples that were collected from outside the EU boundary, but included with the EU for analyses.
2. Surface UCL was calculated with ProUCL version 4.1.01.
Surface maximum, mean, and UCL calculations were rounded to two significant figures.
EU: exposure unit
mg/kg: milligram(s) per kilogram
n: sample count
OU: operable unit
PCB: polychlorinated biphenyl
UCL: upper confidence limit (95% confidence coefficient)

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Anniston Airport	C4N-EU1	ARA-12	1119965.988	646665.554	8.9	8.9
Anniston Airport	C4N-EU1	ARA-22	1119597.001	645552.219	1.6	1.6
Anniston Airport	C4N-EU1	ARA-24	1119597.001	645163.942	0.46	0.46
Anniston Airport	C4N-EU1	ARA-27	1119576.472	645015.383	1.1	1.1
Anniston Airport	C4N-EU1	ARA-28	1119562.298	644967.435	0.96	0.96
Anniston Airport	C4N-EU1	ARA-35	1119463.076	644631.793	2.5	1.7
Anniston Airport	C4N-EU1	ARA-40	1119321.014	643895.568	0.21	0.21
Anniston Airport	C4N-EU1	ARA-47	1120108.225	644516.299	0.77	0.77
Anniston Airport	C4N-EU1	ARA-53	1120160.544	647250.082	2.3	1.9
APCO FP	C5N-EU2	STR-82	1120755.264	631458.8353	0.79	0.64
APCO FP	C5N-EU2	STR-97	1114505.231	625296.807	1.3	1.3
APCO FP	C5N-EU2	STR-98	1114086.826	624867.9481	0.92	0.92
APCO FP	C5S-EU1	92 Loop In	1115246.613	619280.4366	0.14	0.14
APCO FP	C5S-EU1	STR-83	1120259.796	631008.3236	2.7	1.8
APCO FP	C5S-EU1	STR-90	1117454.963	628339.7598	0.072	0.072
APCO FP	C5S-EU1	STR-99	1113758.494	624509.0772	1	1
Borrelli	C1-EU2	BP-1	1130404.432	658640.594	71	71
Borrelli	C1-EU2	BP-2	1130344.18	658629.5077	30	30
Borrelli	C1-EU2	BP-7	1130376.071	658635.6514	0.12	0.12
Borrelli	C1-EU2	BP-8	1130401.998	658503.589	3.1	3.1
Borrelli	C1-EU2	BP-9	1130427.138	658374.6141	11	11
Borrelli	C1-EU2	NHA-1	1130178.219	658585.2198	190	20
Borrelli	C1-EU2	NHA-2	1130279.329	658595.5352	230	77
Borrelli	C1-EU2	NHA-5	1130434.917	658648.6103	230	210
Colonial Pipeline	C3S-EU2	242-1	1122222.174	653318.207	1.2	0.6
Colonial Pipeline	C4N-EU2	236-3	1120974.141	642196.357	0.085	0.085
Colonial Pipeline	C4S-EU1	239-2	1120416.905	649460.3434	5	5
Colonial Pipeline	C4S-EU1	239-3	1120402.732	649508.2925	16	11
Colonial Pipeline	C4S-EU1	239-4	1120388.559	649556.2417	13	13
Colonial Pipeline	C4S-EU1	239-5	1120373.041	649608.7394	6.5	6.5
Colonial Pipeline	C4S-EU1	239-6	1120370.207	649618.3292	18	18
Colonial Pipeline	C4S-EU1	240-1	1120314.78	649791.5323	6.3	5.3
Colonial Pipeline	C4S-EU1	240-3	1120349.053	649840.78	2.5	2.5
Colonial Pipeline	C4S-EU1	240-4	1120377.614	649881.8197	0.087	0.07
Highway 21	C3N-EU2	FP-3-d	1122376.084	652030.5705	0.25	0.25
Highway 21	C3N-EU2	FP-3-e	1122414.318	652039.4972	23	23
Highway 21	C3N-EU2	FP-3-f	1122453.665	652048.6835	0.09	0.09
Highway 21	C3N-EU2	FP-3-g	1122492.778	652057.8155	0	0
Highway 21	C3S-EU2	FP-2-d	1122312.554	652015.738	0	0
Highway 21	C3S-EU2	FP-2-e	1122274.084	652006.7563	10	10
Highway 21	C3S-EU2	FP-2-f	1122234.736	651997.5696	8.3	8.3
Highway 21	C3S-EU2	FP-2-g	1122195.448	651988.3968	12	12
Highway 21	C3S-EU2	RP-2-dx	1122292.822	652011.131	9.2	9.2
Highway 21	C4N-EU1	FP-1-d	1122081.323	651439.8717	18	18
Highway 21	C4N-EU1	FP-1-e	1122042.82	651430.7713	15	15
Highway 21	C4N-EU1	FP-4-d	1122199.874	651467.8919	26	26
Highway 21	C4N-EU1	FP-4-e	1122238.728	651477.0752	2.1	2.1
Highway 21	C4N-EU1	FP-4-f	1122315.325	651495.1791	0.07	0.07
Highway 21	C4N-EU1	FP-4-g	1122353.886	651504.2932	1.2	1.2
Highway 21	C4N-EU1	RP-4-ex	1122277.408	651486.2172	3.1	3.1
Highway 21	C4S-EU1	FP-1-f	1122003.908	651421.5743	4.6	4.6
Highway 21	C4S-EU1	FP-1-g	1121964.409	651412.2387	4	4

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
I-20 Industrial Park	C4N-EU1	Ind-CC-11	1120372.4	643535.4	0.1	0.1
I-20 Industrial Park	C4N-EU1	Ind-CC-12	1120251.2	643357.7	0.1	0.1
I-20 Industrial Park	C4N-EU1	Ind-CC-15	1120847.4	643865.5	0.081	0.081
I-20 Industrial Park	C4N-EU1	Ind-CC-16	1120746.3	643696.3	0.84	0.84
I-20 Industrial Park	C4N-EU1	Ind-CC-20	1121089.9	643874.1	0.096	0.096
I-20 Industrial Park	C4N-EU1	Ind-CC-21	1121009.1	643713.3	0.1	0.1
I-20 Industrial Park	C4N-EU1	Ind-CC-28	1120827.1	644051.7	5	5
I-20 Industrial Park	C4N-EU1	Ind-CC-4	1120705.8	643941.6	0.092	0.092
I-20 Industrial Park	C4N-EU1	Ind-CC-8	1120705.8	644000.9	4.8	4.8
I-20 Industrial Park	C4N-EU1	Ind-CC-9	1120614.9	643848.5	0.097	0.097
I-20 Industrial Park	C4N-EU2	Ind-CC-10	1120463.3	643662.4	0.1	0.1
I-20 Industrial Park	C4N-EU2	Ind-CC-13	1120160.3	643163.1	0.28	0.28
I-20 Industrial Park	C4N-EU2	Ind-CC-14	1120039.1	643002.3	0.17	0.17
I-20 Industrial Park	C4N-EU2	Ind-CC-17	1120615	643560.9	0.046	0.046
I-20 Industrial Park	C4N-EU2	Ind-CC-18	1120544.3	643400.1	0.088	0.088
I-20 Industrial Park	C4N-EU2	Ind-CC-19	1120402.9	643222.4	0.096	0.096
I-20 Industrial Park	C4N-EU2	Ind-CC-2	1120695.9	643569.4	0.096	0.096
I-20 Industrial Park	C4N-EU2	Ind-CC-22	1120877.8	643552.5	0.1	0.1
I-20 Industrial Park	C4N-EU2	Ind-CC-27	1120524.3	642892.5	1.7	1.7
I-20 Industrial Park	C4N-EU2	Ind-CC-5	1120513.9	643527	1.7	1.7
I-20 Industrial Park	C4N-EU2	Ind-CC-6	1120342.1	643459.3	0.094	0.094
Oxford Lake Park	C1-EU1	OLGP-001	1130787.54	659505.96	1.6	1.6
Oxford Lake Park	C1-EU1	OLGP-002	1130690.4	659490.33	13	13
Oxford Lake Park	C1-EU1	OLGP-003	1130594.19	659473.83	7.2	7.2
Oxford Lake Park	C1-EU1	OLGP-023	1130209.82	659008.36	7.6	7.6
Oxford Lake Park	C1-EU1	OLGP-024	1130207.36	659111.59	24	2.4
Oxford Lake Park	C1-EU1	OLGP-026	1130156.63	659108.3	4.7	4.7
Oxford Lake Park	C1-EU1	OLGP-027	1130105.16	658999.99	65	7
Oxford Lake Park	C1-EU1	OLGP-046	1130772.65	659582.38	1.4	1.4
Oxford Lake Park	C1-EU1	OLGP-047	1130674.4	659567.13	35	35
Oxford Lake Park	C1-EU1	OLGP-048	1130579.88	659544.4	55	55
Oxford Lake Park	C1-EU1	OLGP-049	1130511.08	659523.31	31	8.6
Oxford Lake Park	C1-EU1	OLGP-057	1129816.83	659279.68	35	0.2
Oxford Lake Park	C1-EU1	OLGP-058	1129817.82	659175.37	9	5.3
Oxford Lake Park	C1-EU1	OLGP-061	1129819.66	658871.18	290	4.4
Oxford Lake Park	C1-EU1	OLGP-062	1129810.42	658768.46	220	12
Oxford Lake Park	C1-EU1	OLGP-063	1129815.88	658667.39	72	8.2
Oxford Lake Park	C1-EU1	OLGP-064	1129915.13	658684.24	56	8.1
Oxford Lake Park	C1-EU1	OLGP-065	1129918.34	658783	350	9.3
Oxford Lake Park	C1-EU1	OLGP-066	1129917.34	658877.83	140	18
Oxford Lake Park	C1-EU1	OLGP-069	1129915.49	659183.93	3.9	3.9
Oxford Lake Park	C1-EU1	OLGP-074	1130015.35	659194.17	4.9	4.9
Oxford Lake Park	C1-EU1	OLGP-077	1130020.3	658895.5	85	7
Oxford Lake Park	C1-EU1	OLGP-078	1130020.62	658792.4	32	4.8
Oxford Lake Park	C1-EU1	OLGP-079	1130024.14	658692.88	24	2.1
Oxford Lake Park	C1-EU1	OLGP-080	1130116.57	659207.39	3.6	3.6
Oxford Lake Park	C1-EU1	OLGP-083	1130214.81	659404.52	9.8	4
Oxford Lake Park	C1-EU1	OLGP-084	1130212.28	659306.08	19	14
Oxford Lake Park	C1-EU1	OLGP-121	1130295.03	659801.46	0.075	0.075
Oxford Lake Park	C1-EU1	OLGP-141	1130278.79	660088.44	0.2	0.057
Oxford Lake Park	C1-EU1	OLGP-143	1130206.37	659945.44	0.037	0.037
Oxford Lake Park	C1-EU1	OLGP-144	1130285.06	660008.67	7.2	0.074

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Oxford Lake Park	C1-EU1	OLGP-145	1130351.35	660083.81	0.22	0.22
Oxford Lake Park	C1-EU1	OLGP-146	1130424.72	660014.51	0.1	0.1
Oxford Lake Park	C1-EU1	OLGP-147	1130356.08	659941.75	5.6	0.19
Oxford Lake Park	C1-EU1	OLGP-148	1130286.5	659870.93	0.08	0.08
Oxford Lake Park	C1-EU1	OLGP-149	1130360.38	659804.33	0.078	0.078
Oxford Lake Park	C1-EU1	OLGP-150	1130429.67	659874.75	0.84	0.84
Oxford Lake Park	C1-EU1	OLHA-001	1129976.08	658693.51	38	9.2
Oxford Lake Park	C1-EU1	OLHA-002	1129856.12	658678.94	110	8.7
Oxford Lake Park	C1-EU1	OLHA-003	1129966.08	658832.25	34	16
Oxford Lake Park	C1-EU1	OLHA-004	1129865.88	658837.68	220	18
Oxford Lake Park	C1-EU1	OLHA-010	1129796.71	659210.57	8.7	8.7
Oxford Lake Park	C1-EU1	OLHA-012	1129925.78	659654.07	0.074	0.074
Oxford Lake Park	C1-EU1	OLHA-016	1130359.2	660023.255	0.25	0.25
Oxford Lake Park	C1-EU1	OLHA-019	1130307.539	660269.8234	12	12
Oxford Lake Park	C1-EU1	OLHA-020	1130171.58	660673.06	0.078	0.078
Oxford Lake Park	C1-EU1	OLHA-021	1130031.06	660668.38	0.077	0.077
Oxford Lake Park	C1-EU1	OLHA-022	1130323.82	660675.41	0.093	0.093
Oxford Lake Park	C1-EU1	OLHA-023	1130180.95	660448.23	0.076	0.074
Oxford Lake Park	C1-EU1	OLHA-024	1130082.58	660502.09	0.075	0.075
Oxford Lake Park	C1-EU1	OLHA-025	1130328.5	660436.52	0.077	0.077
Oxford Lake Park	C1-EU1	OLHA-026	1130169.24	660822.96	0.086	0.076
Oxford Lake Park	C1-EU1	OLHA-027	1130066.19	660799.54	0.079	0.079
Oxford Lake Park	C1-EU1	OLHA-028	1130326.16	660818.27	0.083	0.083
Oxford Lake Park	C1-EU1	OLHA-031	1129895.45	659754.4	0.35	0.35
Oxford Lake Park	C1-EU1	OLHA-068	1130330.71	659769.71	0.04	0.04
Oxford Lake Park	C1-EU1	OLHA-069	1130248.72	659816.45	3.1	3.1
Oxford Lake Park	C1-EU1	OLHA-070	1130224.19	659840.16	1	1
Oxford Lake Park	C1-EU1	OLHA-071	1130246.86	659860.59	0.9	0.9
Oxford Lake Park	C1-EU1	OLHA-072	1130270.66	659836.81	0.35	0.35
Oxford Lake Park	C1-EU1	OLHA-091	1130312.84	660125.25	0.071	0.071
Oxford Lake Park	C1-EU1	OLHA-092	1130222.49	660070.1	0.63	0.63
Oxford Lake Park	C1-EU1	OLHA-093	1130240.4	660094.37	0.98	0.98
Oxford Lake Park	C1-EU1	OLHA-103	1130254.04	659992.69	0.072	0.072
Oxford Lake Park	C1-EU1	OLHA-104	1130295.9	659952.34	0.073	0.073
Oxford Lake Park	C1-EU1	OLHA-105	1130257.2	659902.44	0.073	0.073
Oxford Lake Park	C1-EU1	OLHA-106	1130256.17	659949.13	0.07	0.07
Oxford Lake Park	C1-EU1	OLHA-137	1129808.09	659974.03	3	3
Oxford Lake Park	C1-EU2	OLGP-009	1130517.63	658930.73	13	12
Oxford Lake Park	C1-EU2	OLGP-010	1130520.11	658830.68	130	7.8
Oxford Lake Park	C1-EU2	OLGP-011	1130525.25	658782.41	45	5.6
Oxford Lake Park	C1-EU2	OLGP-020	1130315.37	658915.27	49	13
Oxford Lake Park	C1-EU2	OLGP-021	1130330.27	658816.86	100	27
Oxford Lake Park	C1-EU2	OLGP-022	1130342.55	658736.35	21	7.4
Oxford Lake Park	C1-EU2	OLGP-028	1130115.86	658899.17	37	13
Oxford Lake Park	C1-EU2	OLGP-029	1130126.99	658799.07	150	14
Oxford Lake Park	C1-EU2	OLGP-030	1130140.24	658709.5	32	6.9
Oxford Lake Park	C1-EU2	OLGP-031	1130238.82	658719.62	84	7
Oxford Lake Park	C1-EU2	OLGP-032	1130434.92	658757.51	47	5.1
Oxford Lake Park	C1-EU2	OLGP-033	1130618.01	658819.84	90	6.1
Oxford Lake Park	C1-EU2	OLGP-034	1130718.58	658837.35	210	29
Oxford Lake Park	C1-EU2	OLGP-035	1130816.73	658859.05	170	11
Oxford Lake Park	C1-EU2	OLGP-036	1130912.6	658855.16	150	59

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Oxford Lake Park	C1-EU2	OLGP-037	1131011.85	658850.7	100	31
Oxford Lake Park	C1-EU2	OLGP-038	1131112.72	658851.3	89	38
Oxford Lake Park	C1-EU2	OLGP-039	1131173.19	658955.02	96	45
Oxford Lake Park	C1-EU2	OLGP-040	1131115.06	659012.92	41	35
Oxford Lake Park	C1-EU2	OLGP-041	1131008.65	659019.63	30	30
Oxford Lake Park	C1-EU2	OLGP-042	1130910.73	659026.31	67	34
Oxford Lake Park	C1-EU2	OLGP-043	1130813.75	659019.69	37	22
Oxford Lake Park	C1-EU2	OLGP-044	1130709.8	659016.47	18	16
Oxford Lake Park	C1-EU2	OLGP-045	1130608.67	659011.94	110	16
Phase 2 Eco Soil	C2N-EU2	EUT-01-09	1128553.1	659805.6954	0.043	0.043
Phase 2 Eco Soil	C2N-EU2	EUT-01-10	1128420.565	659797.804	0.044	0.044
Phase 2 Eco Soil	C2N-EU2	EUT-02-11	1128369.233	659411.296	0.044	0.044
Phase 2 Eco Soil	C2N-EU2	EUT-02-12	1128494.269	659420.7892	0.041	0.041
Phase 2 Eco Soil	C2N-EU2	EUT-03-13	1127904.263	659275.9857	0.044	0.044
Phase 2 Eco Soil	C2N-EU2	EUT-03-14	1127949.601	659343.8277	0.046	0.046
Phase 2 Eco Soil	C3N-EU1	EUT-04-07	1125759.361	657315.9973	3.4	3.4
Phase 2 Eco Soil	C3N-EU1	EUT-04-08	1125797.716	657333.4221	2.6	2.6
Phase 2 Eco Soil	C3N-EU1	EUT-05-05	1123875.208	655571.4555	9.7	9.7
Phase 2 Eco Soil	C3N-EU1	EUT-05-06	1123804.293	655511.9889	5.6	5.6
Phase 2 Eco Soil	C3N-EU1	EUT-06-03	1123022.795	653485.7218	7.9	7.9
Phase 2 Eco Soil	C3N-EU1	EUT-06-04	1123028.436	653583.5601	6.6	6.6
Phase 2 Eco Soil	C3N-EU2	EUT-07-01	1123480.861	653239.8875	3.9	3.9
Phase 2 Eco Soil	C3N-EU2	EUT-07-02	1123484.656	653190.2417	2.1	2.1
Phase 2 Eco Soil	C4S-EU1	EUT-08-49	1121860.878	650155.9751	6.2	6.2
Phase 2 Eco Soil	C4S-EU1	EUT-08-50	1121907.61	650110.9722	25	25
Phase 2 Eco Soil	C4S-EU1	EUT-09-51	1120111.408	648497.1604	2.7	2.7
Phase 2 Eco Soil	C4S-EU1	EUT-09-51b	1120148.629	648488.363	1.4	1.4
Phase 2 Eco Soil	C5N-EU2	EMT-01-25	1114030.126	623789.9582	0.038	0.038
Phase 2 Eco Soil	C5N-EU2	EMT-01-26	1113957.628	623769.7298	0.037	0.037
Phase 2 Eco Soil	C5N-EU2	EMT-02-17	1116077.626	621160.9444	0.41	0.35
Phase 2 Eco Soil	C5N-EU2	EMT-02-18	1116153.364	621127.3991	0.37	0.37
Phase 2 Eco Soil	C5N-EU2	EMT-03-15	1115774.95	622428.1276	0.036	0.036
Phase 2 Eco Soil	C5N-EU2	EMT-03-16	1115822.635	622355.6579	0.037	0.037
Phase 2 Eco Soil	C5N-EU2	EMT-04-19	1116485.052	623102.2279	0.33	0.33
Phase 2 Eco Soil	C5N-EU2	EMT-04-20	1116594.414	623099.0798	0.19	0.19
Phase 2 Eco Soil	C5N-EU2	EMT-05-21	1116694.942	622501.6414	5.9	5.9
Phase 2 Eco Soil	C5N-EU2	EMT-05-22	1116751.044	622470.6372	5.6	5.6
Phase 2 Eco Soil	C5N-EU2	EMT-06-23	1117136.725	622528.9092	0.075	0.075
Phase 2 Eco Soil	C5N-EU2	EMT-06-24	1117216.354	622498.0558	0.042	0.042
Phase 2 Eco Soil	C5S-EU1	EMT-07-27	1116902.437	621297.9595	0.23	0.23
Phase 2 Eco Soil	C5S-EU1	EMT-07-28	1116930.736	621228.2801	1.4	1.4
Phase 2 Eco Soil	C5S-EU1	EMT-08-29	1115762.157	619658.768	1.3	1.3
Phase 2 Eco Soil	C5S-EU1	EMT-08-30	1115756.994	619703.4425	1.6	1.6
Phase 2 Eco Soil	C5S-EU1	EMT-09-31	1114367.774	617418.7632	0.36	0.36
Phase 2 Eco Soil	C5S-EU1	EMT-09-32	1114341.759	617360.084	0.19	0.19
Phase 2 Eco Soil	C7N-EU1	ELT-02-38	1109737.275	604777.8806	0.04	0.04
Phase 2 Eco Soil	C7N-EU1	ELT-08-33	1111227.615	601254.7514	0.059	0.059
Phase 2 Eco Soil	C7N-EU1	ELT-08-34	1111186.84	601238.4801	0.082	0.082
Phase 2 Eco Soil	C7N-EU1	ELT-09-35	1110906.05	598821.342	0.11	0.11
Phase 2 Eco Soil	C7N-EU1	ELT-09-36	1110949.115	598782.2378	0.14	0.14
Phase 2 Eco Soil	C7S-EU1	ELT-01-39	1109306.01	605204.5162	0.043	0.04
Phase 2 Eco Soil	C7S-EU1	ELT-01-40	1109298.191	605268.2528	0.037	0.037

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Phase 2 Eco Soil	C7S-EU1	ELT-02-37	1109568.135	604478.0846	0.039	0.039
Phase 2 Eco Soil	C7S-EU1	ELT-03-41	1112093.434	601863.0077	0.041	0.041
Phase 2 Eco Soil	C7S-EU1	ELT-03-42	1112049.02	601898.9989	0.04	0.04
Phase 2 Eco Soil	C7S-EU1	ELT-04-43	1112300.782	601665.2614	0.038	0.038
Phase 2 Eco Soil	C7S-EU1	ELT-04-44	1112285.528	601741.3158	0.041	0.041
Phase 2 Eco Soil	C7S-EU1	ELT-05-45	1113258.904	601237.1329	2	2
Phase 2 Eco Soil	C7S-EU1	ELT-05-46	1113222.065	601290.702	5	5
Phase 2 Eco Soil	C7S-EU1	ELT-06-47	1113230.036	600900.3167	2.7	2.7
Phase 2 Eco Soil	C7S-EU1	ELT-06-48	1113201.121	600831.7198	2.6	2.6
Phase 2 Eco Soil	C7S-EU1	ELT-07-54	1112006.576	601290.7662	9.2	9.2
Phase 2 Eco Soil	C7S-EU1	ELT-07-55	1112045.959	601260.4699	5.3	5.3
Phase 3 Soil	C3N-EU1	C3NX-09	1124327.1	653889.9	7.3	4.9
Phase 3 Soil	C3N-EU1	C3NX-10	1124373.7	654400.1	17	14
Phase 3 Soil	C3N-EU1	C3NX-11	1123824.5	654439.2	2	1.7
Phase 3 Soil	C3N-EU1	C3NX-12	1124913.1	654932.2	5	4.1
Phase 3 Soil	C3N-EU1	C3NX-13	1125478.5	654922.5	0.039	0.039
Phase 3 Soil	C3N-EU1	C3NX-14	1125084.8	655481.8	0.55	0.39
Phase 3 Soil	C3N-EU1	C3NX-15	1125489.1	655322.8	0.76	0.44
Phase 3 Soil	C3N-EU1	C3NX-16	1125489.5	656054.4	8.6	8
Phase 3 Soil	C3N-EU1	C3NX-17	1126439.7	656482.9	62	53
Phase 3 Soil	C3N-EU1	C3NX-18	1126005.4	656230.8	2.1	1.8
Phase 3 Soil	C3N-EU1	C3NX-19	1126856.9	656475.7	9.5	8
Phase 3 Soil	C3N-EU1	C3NX-20	1126705.9	656815.1	93	67
Phase 3 Soil	C3N-EU1	C3NX-21	1126971.5	655943	3.7	2.5
Phase 3 Soil	C3N-EU1	C3NX-22	1126429.4	655650	3.2	2.4
Phase 3 Soil	C3N-EU1	C3NX-23	1124773.8	654294.3	9.4	6.4
Phase 3 Soil	C3N-EU1	C3NX-24	1124589.7	653793.2	3.7	1.9
Phase 3 Soil	C3N-EU1	C3NX-28	1125112.3	654345.3	1.7	1
Phase 3 Soil	C3N-EU1	C3NX-29	1125131	653579.8	3.4	2.1
Phase 3 Soil	C3N-EU1	C3NX-30	1127062.8	655650.8	0.18	0.11
Phase 3 Soil	C3N-EU1	C3NX-31	1126510.5	655144.4	0.1	0.072
Phase 3 Soil	C3N-EU1	C3NX-32	1125589.9	654138.1	0.1	0.07
Phase 3 Soil	C3N-EU2	C3NX-07	1123456.8	652448	0.08	0.061
Phase 3 Soil	C3N-EU2	C3NX-08	1123824.4	653258.3	5	2.5
Phase 3 Soil	C3N-EU2	C3NX-25	1124103.8	653024.2	0.047	0.042
Phase 3 Soil	C3S-EU2	C3SX-01	1121449.3	651849.2	27	17
Phase 3 Soil	C3S-EU2	C3SX-02	1121514.1	652219.5	5.4	3.3
Phase 3 Soil	C3S-EU2	C3SX-03	1121760.2	652828.8	15	12
Phase 3 Soil	C3S-EU2	C3SX-04	1121888	653195.6	39	28
Phase 3 Soil	C3S-EU2	C3SX-05	1121620.3	653212.6	25	13
Phase 3 Soil	C3S-EU2	C3SX-06	1121268.6	652900.8	1.5	1.2
Phase 3 Soil	C3S-EU2	C3SX-07	1121018.1	652198.4	1.9	1.1
Phase 3 Soil	C3S-EU2	C3SX-08	1121156.1	651868.6	18	11
Phase 3 Soil	C3S-EU2	C3SX-09	1120886.6	651828.1	9.9	6.5
Phase 3 Soil	C3S-EU2	C3SX-10	1120499.6	651752	0.039	0.039
Phase 3 Soil	C3S-EU2	C3SX-11	1120536.4	652206.3	0.037	0.037
Phase 3 Soil	C3S-EU2	C3SX-12	1120917.5	652749	1.1	0.57
Phase 3 Soil	C3S-EU2	C3SX-13	1121363.6	653367	1.9	1.6
Phase 3 Soil	C4N-EU1	C3NX-01	1121499.8	648859.8	3.7	2
Phase 3 Soil	C4N-EU1	C3NX-02	1122333.4	649671.6	7.4	4.5
Phase 3 Soil	C4N-EU1	C3NX-03	1122335.6	650783.1	0.19	0.16
Phase 3 Soil	C4N-EU1	C3NX-04	1122673.6	651327.6	1.6	0.81

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Phase 3 Soil	C4N-EU1	C3NX-05	1122755.8	651517.5	0.04	0.04
Phase 3 Soil	C4N-EU1	C3NX-06	1122713.8	650170.6	0.13	0.085
Phase 3 Soil	C4N-EU1	C3NX-26	1122527.5	649298.3	0.75	0.64
Phase 3 Soil	C4N-EU1	C3NX-27	1121607.2	648760	20	11
Phase 3 Soil	C4N-EU1	C3NX-33	1121769.8	648480.9	2.4	1.3
Phase 3 Soil	C4N-EU2	C4NX-01	1119505.9	639437.6	0.037	0.037
Phase 3 Soil	C4N-EU2	C4NX-02	1119272.2	639915.7	0.042	0.04
Phase 3 Soil	C4S-EU1	C3SX-14	1120827.6	651250	0.53	0.28
Phase 3 Soil	C4S-EU1	C4SX-01	1119532.1	648404.9	1	0.53
Phase 3 Soil	C4S-EU1	C4SX-02	1119355.5	647909.2	14	8.6
Phase 3 Soil	C4S-EU1	C4SX-03	1118865.8	647260.1	16	13
Phase 3 Soil	C4S-EU1	C4SX-04	1119243.3	648499.9	0.29	0.17
Phase 3 Soil	C4S-EU1	C4SX-05	1119140.4	647922.6	0.38	0.21
Phase 3 Soil	C4S-EU1	C4SX-06	1118699.5	647387	0.04	0.04
Phase 3 Soil	C8N-EU1	C8NX-01	1108350.5	584276.3	0.037	0.037
Phase 3 Soil	C8N-EU1	C8NX-02	1106249.5	585229.4	0.039	0.039
Phase 3 Soil	C8N-EU1	C8NX-03	1107214.6	585131.5	0.037	0.037
Phase 3 Soil	C8N-EU1	C8NX-04	1108252.9	585119.3	0.04	0.039
RFI Soil	C2N-EU1	C-FP01-N1	1128834.418	659509.5422	0.18	0.14
RFI Soil	C2N-EU1	C-FP01-N2	1129016.049	659292.17	1.3	0.71
RFI Soil	C2N-EU2	C-FP01-C1	1128780.126	659691.6975	0.087	0.086
RFI Soil	C2N-EU2	C-FP01-C2	1128598.727	659818.821	0.087	0.086
RFI Soil	C2N-EU2	C-FP01-C3	1128441.826	659976.3169	0.09	0.088
RFI Soil	C2N-EU2	C-FP01-C4	1128300.078	660144.497	0.081	0.08
RFI Soil	C2N-EU2	C-FP01-C5	1128128.796	660342.6714	0.087	0.086
RFI Soil	C2N-EU2	C-FP01-C6	1127957.509	660540.8945	0.086	0.085
RFI Soil	C2N-EU2	C-FP01-C7	1127786.218	660739.2267	0.085	0.084
RFI Soil	C2N-EU2	C-FP01-C8	1127622.592	660949.2056	0.082	0.082
RFI Soil	C2N-EU2	C-FP01-C9	1127441.868	661137.6357	0.084	0.083
RFI Soil	C2S-EU1	C-FP01-S1	1127365.918	661221.2309	0.085	0.084
RFI Soil	C2S-EU1	C-FP01-S2	1127216.092	661406.986	0.087	0.084
RFI Soil	C2S-EU1	C-FP01-S3	1127030.404	661637.997	0.082	0.081
RFI Soil	C2S-EU1	C-FP01-S4	1126897.489	661757.3647	0.077	0.077
RFI Soil	C2S-EU1	C-FP01-S5	1126747.911	661963.2502	0.077	0.077
RFI Soil	C2S-EU1	C-FP01-S6	1126592.021	662147.2026	0.073	0.072
RFI Soil	C3N-EU1	C-FP02-N1	1125647.334	657258.0459	8.1	4.1
RFI Soil	C3N-EU1	C-FP02-N2	1125822.133	657085.083	14	14
RFI Soil	C3N-EU1	C-FP02-N3	1125997.165	656911.8635	48	38
RFI Soil	C3N-EU1	C-FP02-N4	1126171.898	656738.9733	32	25
RFI Soil	C3S-EU1	C-FP02-S1	1124874.109	656628.7169	79	44
RFI Soil	C3S-EU1	C-FP02-S2	1124726.109	656848.0079	0.083	0.083
RFI Soil	C3S-EU1	C-FP02-S3	1124563.264	657010.8174	0.084	0.084
RFI Soil	C3S-EU1	C-FP02-S4	1124400.868	657173.6	0.08	0.079
RFI Soil	C4N-EU1	C-FP04-N1	1119143.884	644818.1209	3.5	2.9
RFI Soil	C4N-EU1	C-FP04-N2	1119477.113	644817.9374	0.8	0.51
RFI Soil	C4N-EU1	C-FP04-N3	1119810.228	644817.9272	1.2	0.68
RFI Soil	C4N-EU1	C-FP04-N4	1120142.703	644817.9694	0.14	0.12
RFI Soil	C4N-EU1	C-FP04-N5	1120475.927	644818.1173	0.52	0.44
RFI Soil	C4N-EU1	C-FP04-N6	1120808.829	644817.749	0.43	0.26
RFI Soil	C4N-EU1	C-FP04-N7	1121108.011	644820.5292	0.093	0.092
RFI Soil	C4N-EU1	C-FP04-N8	1121443.825	644817.8414	0.086	0.076
RFI Soil	C4N-EU2	C-FP05-N1	1121763.573	634823.8169	14	8.5

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RFI Soil	C4N-EU2	C-FP05-N2	1122018.849	634825.2441	0.82	0.44
RFI Soil	C4N-EU2	C-FP05-N3	1122272.495	634825.3674	0.083	0.082
RFI Soil	C4S-EU1	C-FP03-S1	1119540.594	647665.486	21	12
RFI Soil	C4S-EU1	C-FP03-S10	1120655.979	649051.0764	51	30
RFI Soil	C4S-EU1	C-FP03-S11	1120686.922	649242.6072	9.7	4.5
RFI Soil	C4S-EU1	C-FP03-S12	1120713.6	649408.98	7	5.3
RFI Soil	C4S-EU1	C-FP03-S13	1120726.073	649586.74	7.5	4.4
RFI Soil	C4S-EU1	C-FP03-S14	1120699.567	649680.1489	1.8	1.8
RFI Soil	C4S-EU1	C-FP03-S15	1120770.102	649935.8305	11	7.6
RFI Soil	C4S-EU1	C-FP03-S2	1119728.462	647898.8687	2.6	2.4
RFI Soil	C4S-EU1	C-FP03-S3	1119854.932	648055.61	4.8	2.3
RFI Soil	C4S-EU1	C-FP03-S4	1119979.648	648212.245	5.2	3
RFI Soil	C4S-EU1	C-FP03-S5	1120079.498	648335.6674	3.8	1.9
RFI Soil	C4S-EU1	C-FP03-S6	1120194.378	648479.7458	7.5	6.6
RFI Soil	C4S-EU1	C-FP03-S7	1120295.109	648586.0415	35	20
RFI Soil	C4S-EU1	C-FP03-S8	1120447.703	648797.0596	4.7	3
RFI Soil	C4S-EU1	C-FP03-S9	1120517.008	648876.0773	56	38
RFI Soil	C4S-EU2	C-FP04-S1	1118984.062	644818.0012	21	13
RFI Soil	C4S-EU2	C-FP04-S2	1118690.006	644817.8109	0.085	0.083
RFI Soil	C4S-EU2	C-FP04-S3	1118396.114	644817.8084	0.085	0.085
RFI Soil	C4S-EU2	C-FP04-S4	1118102.989	644818.0385	0.086	0.085
RFI Soil	C4S-EU3	C-FP05-S1	1121609.124	634823.0797	97	5.2
RFI Soil	C4S-EU3	C-FP05-S10	1119106.999	634814.7665	0.37	0.23
RFI Soil	C4S-EU3	C-FP05-S11	1118828.679	634813.8062	0.15	0.12
RFI Soil	C4S-EU3	C-FP05-S12	1118551.021	634812.8166	0.086	0.083
RFI Soil	C4S-EU3	C-FP05-S13	1118269.911	634811.9177	0.074	0.072
RFI Soil	C4S-EU3	C-FP05-S2	1121331.44	634821.7542	1.4	0.75
RFI Soil	C4S-EU3	C-FP05-S3	1121053.014	634821.1826	6	3.1
RFI Soil	C4S-EU3	C-FP05-S4	1120774.971	634820.1076	5.1	2.7
RFI Soil	C4S-EU3	C-FP05-S5	1120496.809	634819.1121	1.6	1.5
RFI Soil	C4S-EU3	C-FP05-S6	1120218.947	634818.2693	0.68	0.43
RFI Soil	C4S-EU3	C-FP05-S7	1119940.995	634817.3096	1.3	0.68
RFI Soil	C4S-EU3	C-FP05-S8	1119662.315	634816.5924	6.2	5.9
RFI Soil	C4S-EU3	C-FP05-S9	1119384.963	634815.7219	0.58	0.33
RFI Soil	C5N-EU2	C-FP06-N1	1120302.44	630752.1671	1.2	0.65
RFI Soil	C5N-EU2	C-FP06-N2	1120555.492	630554.5917	0.074	0.074
RFI Soil	C5N-EU2	C-FP06-N3	1120809.152	630356.7882	0.078	0.078
RFI Soil	C5N-EU2	C-FP06-N4	1121062.554	630158.9784	0.076	0.075
RFI Soil	C5N-EU2	C-FP06-N5	1121316.073	629961.5603	0.084	0.082
RFI Soil	C5N-EU2	C-FP06-N6	1121578.517	629772.7672	0.08	0.079
RFI Soil	C5N-EU2	C-FP06-N7	1121822.914	629565.1813	0.081	0.081
RFI Soil	C5N-EU2	C-FP07-N1	1116548.707	622592.856	3.9	2
RFI Soil	C5N-EU2	C-FP07-N2	1116537.901	622831.7033	0.074	0.074
RFI Soil	C5N-EU2	C-FP07-N3	1116538.045	623115.9858	0.086	0.084
RFI Soil	C5N-EU2	C-FP07-N4	1116537.711	623399.8904	0.081	0.078
RFI Soil	C5N-EU2	C-FP07-N5	1116538.042	623684.3708	0.078	0.077
RFI Soil	C5N-EU2	C-FP07-N6	1116537.982	623968.2738	0.077	0.077
RFI Soil	C5N-EU2	C-FP07-N7	1116538.015	624253.6685	0.076	0.076
RFI Soil	C5N-EU2	C-FP11-01	1114610.344	617606.3419	8.5	2.3
RFI Soil	C5N-EU2	C-FP11-02	1114782.165	617608.078	0.076	0.073
RFI Soil	C5N-EU2	C-FP11-03	1115075.54	617606.6219	0.086	0.084
RFI Soil	C5N-EU2	C-FP11-04	1115388.7	617614.2665	0.42	0.25

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RFI Soil	C5N-EU2	C-FP11-05	1115695.147	617617.4587	0.086	0.085
RFI Soil	C5N-EU2	C-FP11-06	1115891.058	617616.2213	0.085	0.084
RFI Soil	C5S-EU1	C-FP06-S1	1120190.672	630835.4145	33	20
RFI Soil	C5S-EU1	C-FP06-S2	1120008.966	630980.5766	1	0.56
RFI Soil	C5S-EU1	C-FP06-S3	1119831.409	631122.2222	1.1	0.59
RFI Soil	C5S-EU1	C-FP07-S1	1115564.145	619318.6524	1.8	0.97
RFI Soil	C5S-EU1	C-FP07-S2	1115330.711	619382.9815	0.078	0.061
RFI Soil	C5S-EU1	C-FP07-S3	1115082.354	619452.6427	0.078	0.078
RFI Soil	C5S-EU1	C-FP07-S4	1114870.733	619527.7931	1.3	0.71
RFI Soil	C5S-EU1	C-FP07-S5	1114662.956	619652.8357	0.082	0.078
RFI Soil	C6N-EU1	C-FP08-N1	1113149.79	614609.6872	2.4	1.8
RFI Soil	C6N-EU1	C-FP08-N2	1113204.186	614612.7369	0.078	0.077
RFI Soil	C6N-EU1	C-FP08-N3	1113259.856	614615.6957	0.074	0.074
RFI Soil	C6S-EU1	C-FP08-S1	1112988.399	614600.6569	5	1.9
RFI Soil	C6S-EU1	C-FP08-S2	1112909.537	614593.3338	0.24	0.16
RFI Soil	C6S-EU1	C-FP08-S3	1112827.829	614584.4599	0.077	0.077
RFI Soil	C7N-EU1	C-FP09-N1	1109517.55	605319.6485	2.3	2
RFI Soil	C7N-EU1	C-FP09-N2	1109652.894	605389.9665	0.074	0.072
RFI Soil	C7N-EU1	C-FP09-N3	1109789.831	605448.9838	0.077	0.076
RFI Soil	C7N-EU1	C-FP10-N1	1112399.138	602107.5465	0.073	0.073
RFI Soil	C7N-EU1	C-FP10-N2	1112448.961	602389.0555	0.08	0.079
RFI Soil	C7N-EU1	C-FP10-N3	1112499.077	602670.6611	0.076	0.075
RFI Soil	C7N-EU1	C-FP10-N4	1112549.702	602952.2028	0.08	0.08
RFI Soil	C7N-EU1	C-FP10-N5	1112600.146	603234.0528	0.077	0.077
RFI Soil	C7N-EU1	C-FP10-N6	1112650.26	603515.0861	0.074	0.074
RFI Soil	C7N-EU1	C-FP10-N7	1112700.142	603794.8102	0.076	0.075
RFI Soil	C7S-EU1	C-FP09-S1	1109399.671	605259.4479	0.4	0.25
RFI Soil	C7S-EU1	C-FP09-S2	1109137.708	605132.8389	0.074	0.074
RFI Soil	C7S-EU1	C-FP09-S3	1108875.735	605005.8414	0.074	0.073
RFI Soil	C7S-EU1	C-FP09-S4	1108614.037	604878.9303	0.075	0.074
RFI Soil	C7S-EU1	C-FP09-S5	1108352.38	604752.0831	0.078	0.078
RFI Soil	C7S-EU1	C-FP09-S6	1108090.391	604625.1288	0.074	0.074
RFI Soil	C7S-EU1	C-FP09-S7	1107827.86	604497.6728	0.08	0.08
RFI Soil	C7S-EU1	C-FP09-S8	1107566.441	604371.1607	0.076	0.075
RFI Soil	C7S-EU1	C-FP09-S9	1107302.28	604243.1802	0.078	0.076
RFI Soil	C7S-EU1	C-FP10-S1	1112367.47	601848.6497	2.1	1.2
RFI Soil	C7S-EU1	C-FP10-S2	1112326.333	601606.5863	0.078	0.076
RFI Soil	C7S-EU1	C-FP10-S3	1112283.204	601353.3606	0.078	0.078
RFI Soil	C7S-EU1	C-FP10-S4	1112240.456	601102.1007	2.8	1.6
RFI Soil -Top of Bank	C2N-EU2	C-U1-RB-1	1128795.721	659704.2007	0.089	0.089
RFI Soil -Top of Bank	C3N-EU1	C-008-LB-1	1123130.538	655132.5017	17	17
RFI Soil -Top of Bank	C3S-EU1	C-005-RB-1	1125390.241	657233.6562	0.081	0.081
RFI Soil -Top of Bank	C4N-EU1	C-012-LB-1	1122078.06	650770.9444	21	21
RFI Soil -Top of Bank	C4N-EU1	C-023-LB-1	1119187.3	645982.3	11	11
RFI Soil -Top of Bank	C4N-EU1	C-025-LB-1	1118905.6	644371	2.3	2.3
RFI Soil -Top of Bank	C4N-EU1	C-027-LB-1	1119135.3	642529.3	5.6	5.6
RFI Soil -Top of Bank	C4N-EU2	C-034-LB-1	1119155.609	636903.25	1.1	1.1
RFI Soil -Top of Bank	C4N-EU2	C-038-LB-1	1121164.463	636070.7188	0.69	0.69
RFI Soil -Top of Bank	C4S-EU1	C-023-RB-1	1119111.807	645961.8873	12	12
RFI Soil -Top of Bank	C4S-EU2	C-026-RB-1	1118931	643671.9	4.1	3.4
RFI Soil -Top of Bank	C4S-EU2	C-030-RB-1	1118729.1	640227	6.7	6.7
RFI Soil -Top of Bank	C4S-EU2	C-034-RB-1	1119129.99	636976.4679	5.4	5.4

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RFI Soil -Top of Bank	C5N-EU2	C-061-LB-1	1115700.43	621294.5162	2.6	2.6
RFI Soil -Top of Bank	C5N-EU2	C-063-LB-1	1116017.087	621775.0107	9.4	9.4
RFI Soil -Top of Bank	C5N-EU2	C-064-LB-1	1116363.907	622701.3728	0.49	0.49
RFI Soil -Top of Bank	C5N-EU2	C-065-LB-1	1117121.896	622185.1254	4.1	4.1
RFI Soil -Top of Bank	C5S-EU1	C-051-RB-1	1117048.699	626753.951	3.3	3.3
RFI Soil -Top of Bank	C5S-EU1	C-060-RB-1	1114784.647	621681.5169	2.6	2.6
RFI Soil -Top of Bank	C5S-EU1	C-068-RB-1	1115715.715	619476.2107	3.9	3.9
RFI Soil -Top of Bank	C5S-EU1	C-070-RB-1	1114560.486	618079.4121	2.8	2.8
RFI Soil -Top of Bank	C5S-EU1	C-071-RB-1	1114359.139	617239.4794	2.3	2.3
RFI Soil -Top of Bank	C7N-EU1	C-112-LB-1	1110807.669	595958.3922	1.6	1.6
RFI Soil -Top of Bank	C7N-EU1	C-114-LB-1	1109722.045	594576.0655	2.5	2.5
RFI Soil -Top of Bank	C7N-EU1	C-119-LB-1	1106427.901	590864.9218	1.4	1.3
RFI Soil -Top of Bank	C9N-EU1	C-158-LB-1	1113212.096	567478.2658	0.78	0.78
RFI Soil -Top of Bank	C9N-EU1	C-159-LB-1	1114053.052	566658.2873	0.53	0.53
RFI Soil -Top of Bank	C9N-EU1	C-159-RB-1	1113841.282	566507.3422	0.63	0.63
RFI Soil -Top of Bank	C9N-EU1	C-160-RB-1	1114478.696	566051.6402	0.46	0.46
RFI Soil -Top of Bank	C9N-EU1	C-161-RB-1	1115138.094	565385.254	0.31	0.31
RFI Soil -Top of Bank	C9N-EU1	C-165-RB-1	1117352.691	562574.1235	0.69	0.69
RFI Soil -Top of Bank	C9N-EU1	C-166-LB-1	1117176.586	561749.6308	0.076	0.076
RFI Soil -Top of Bank	C9N-EU1	C-172-LB-1	1116567.196	557160.6363	0.075	0.075
RFI Soil -Top of Bank	C9N-EU1	C-172-RB-1	1116214.609	557100.4168	0.084	0.084
RFI Soil -Top of Bank	C9S-EU1	C-182-RB-1	1112501.053	551958.2453	0.028	0.028
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-03	1129392.7	661168.1	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-06	1129366.5	660696	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-11	1129130.6	660632.8	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-15	1129253.5	660232	0.05	0.047
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-19	1129269.9	659783	0.047	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-20	1128855.4	659681.6	0.044	0.042
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-23	1128937.8	659201.2	0.18	0.11
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-24	1129444.4	659322.4	5.3	3
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-25	1129220.8	658858	20	17
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-28	1128759	658739	270	73
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-29	1129095.1	658396.6	0.09	0.053
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-30	1128626	658279.1	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-31	1129395.2	657934.1	1.8	1.4
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-32	1128471.1	657997.9	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-01	1128844.1	661511.8	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-02	1128380.7	661693.5	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-04	1128468.8	661232.7	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-05	1127918.8	661241.2	0.049	0.049
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-07	1128485.7	660770.6	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-08	1128004.2	660779.3	0.048	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-09	1127546.4	660797	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-10	1127097.2	660735.7	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-12	1127557.1	660338.3	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-13	1128024.4	660318.6	0.046	0.045
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-14	1128311.7	660309	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-16	1127388.3	659873.7	0.046	0.042
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-17	1127849.7	659856.1	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-18	1128346.2	659846.8	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-21	1127883.8	659393.1	0.07	0.057
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-22	1128475.6	659384.7	0.046	0.045

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-26	1128296.3	658923.1	0.049	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-27	1128013.1	658936.7	0.56	0.52
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2S-18	1128323.1	658580.1	3.6	2.7
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-01	1127649.1	662305.3	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-02	1127923.1	661682.3	0.045	0.044
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-03	1127523.5	661922	0.047	0.046
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-04	1127142.7	661853.6	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-05	1127163.9	661490.6	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-06	1126767.3	661705.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-07	1126728.6	661339.9	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-08	1126396.5	660804.9	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-09	1126555.3	660546.9	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-12	1126802.9	660161	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-14	1127052.9	659549.2	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-15	1127441.8	659209.9	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-16	1127681.3	659011.8	0.057	0.052
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-17	1127933.2	658596.4	0.38	0.27
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-19	1128138	658194.6	0.18	0.12
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-20	1127751.9	658205.8	0.76	0.44
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-01	1127867.7	657217	3.8	2.1
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-02	1126321.1	657275.8	35	28
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-03	1125895	657118.9	47	16
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-04	1125488.1	656816.5	61	45
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-05	1125093.6	656355.7	100	90
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-06	1124691.6	656488.3	61	16
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-07	1124536	656054.4	30	21
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-08	1124049.4	655857.5	20	11
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-09	1123581.2	655714.1	3.7	2
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-10	1123573.4	655404.2	9.3	8.8
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-11	1123408.2	654943.5	2.3	1.7
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-12	1123253.4	654482.2	3.5	1.9
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-13	1123183.9	654164.6	8.2	7.6
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-14	1123029	653703.8	6.7	3.8
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-01	1125697.1	656559.5	54	52
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-02	1125457.9	656345.8	24	19
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-03	1124551.6	655918.1	0.9	0.61
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-04	1124494.5	655618.3	6.6	6.4
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-05	1124283	655598.3	34	27
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-06	1124425.3	655290.3	12	6.2
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-07	1124125.9	655242.3	4.7	3.6
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-08	1123826	655255.9	13	12
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-09	1124376.4	654990.1	7.5	4.3
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-10	1124077	654942.5	10	8.4
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-11	1123777	654955.7	14	12
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-12	1123966.8	654640.3	6.6	6.1
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-13	1123614.7	654655.3	4.8	3.5
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-14	1123863.5	654155.5	6.2	5
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-15	1123888.2	653863.9	9.6	7.2
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-16	1123691.8	653528.5	6.9	6.7
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-15	1122926.1	653251.7	48	24
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-16	1123170.7	652695.9	12	10
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-17	1122684.9	652864.8	120	71

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-18	1122487.4	652429.8	59	19
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-19	1122566.7	651910.8	0.51	0.27
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3NF-17	1123469.3	653041	1.9	1.2
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3NF-18	1123410.1	652649.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3NF-19	1123364.7	652318	0.66	0.41
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3NF-20	1123293.3	652090.9	0.06	0.052
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C2S-10	1126184.7	660394.6	0.2	0.12
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C2S-11	1126367.7	660045.1	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C2S-13	1126661.4	659774.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-01	1127643.9	658191.6	1.4	0.97
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-02	1127438.5	657723.1	190	130
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-03	1127093.3	657253	52	35
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-04	1126968.7	657348.4	190	110
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-05	1126447.2	657402.4	26	16
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-06	1126814.8	657586.4	74	69
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-07	1126274.2	657827.4	0.18	0.11
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-08	1125837.8	657915.8	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-09	1125558.7	657713.3	0.047	0.044
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-10	1125213.5	657243.4	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-11	1125068.8	657389.5	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-12	1124773.8	656874	0.29	0.26
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-13	1124189.8	656564.5	0.96	0.84
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-01	1127490.4	658474.7	0.28	0.18
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-02	1127209.1	658854	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-03	1126671.2	659405.1	0.041	0.04
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-04	1126388.3	659989.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-05	1126851.6	659001.6	0.044	0.043
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-06	1127053.6	658432.7	0.99	0.52
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-07	1127296.1	658047	12	6.3
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-08	1126829.6	658592.2	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-09	1126522.5	659223.8	0.048	0.045
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-10	1126267.9	659627.2	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-11	1126710.7	658195.1	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-12	1127060.6	657863.1	7	3.6
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-13	1125998.2	658861.3	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-14	1125594.5	658646.6	0.042	0.041
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-15	1125278.5	658054.3	0.042	0.041
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-16	1124796	658805.2	0.046	0.044
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-17	1124693.3	658413.4	0.043	0.041
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-18	1124874.2	657998.4	0.041	0.04
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-19	1124967.8	657599.4	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-14	1123475.8	656038.9	0.24	0.14
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-15	1122987	654837.5	0.74	0.46
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-16	1122920.1	654365.2	0.25	0.14
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-17	1122658.6	653807.7	0.66	0.36
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-18	1122655.3	653328.6	110	69
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-19	1122336.5	653300.4	0.62	0.33
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-20	1122171.4	652862.6	13	6.8
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-21	1121935.6	652396.4	12	6.2
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-22	1122269.3	651938.3	15	7.1
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-23	1121811.7	651928.5	33	30
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-20	1122115.1	651134.7	16	8.2

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-21	1122398.5	650527.7	1.1	0.55
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-22	1121916.9	649623.4	15	7.3
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-23	1121559.9	649912.4	38	25
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-24	1121011.3	649602.3	0.91	0.63
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-25	1121099.2	649148.3	28	21
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-01	1120862.8	648140.9	11	5.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-02	1120676.9	647742.6	7.4	3.9
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-03	1120170.9	647558.6	13	6.9
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-04	1120112.2	647076.6	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-05	1119858.3	646845.3	0.77	0.56
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-06	1120458.6	646540.6	4.1	3.8
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-07	1120592.7	646292.9	3	1.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-08	1120322	645678.6	0.46	0.25
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-09	1119855.8	645913.3	0.59	0.32
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-10	1119273	646398.8	31	16
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-11	1119390	645946.7	1.8	1.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-12	1119479.9	645481	0.66	0.35
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-13	1119187.8	645015.3	18	14
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-14	1119210.7	644549.5	9.8	8.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-15	1118805.8	644132.3	3.3	3.1
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-16	1119271.5	644083.7	1.6	0.88
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-17	1119127.4	643617.7	10	7.8
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-18	1119636.4	643118	2.2	1.1
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-19	1119746.7	642652.3	0.41	0.23
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-20	1119280.4	642685.9	5.1	4.1
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-01	1121360.5	647793.5	1.2	0.64
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-02	1122023.4	647272	0.17	0.11
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-03	1121515.7	647138.5	0.61	0.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-04	1120839	647095.1	0.22	0.12
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-05	1121634	646347.1	0.66	0.61
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-06	1120961.6	646324.8	0.047	0.043
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-07	1121252.5	645792.6	0.2	0.14
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-08	1119925.6	645382.5	20	12
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-09	1121153.5	645149.2	0.49	0.27
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-10	1120431.4	645180.8	0.63	0.53
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-11	1119818	644718.8	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-12	1120836.1	644407.7	0.61	0.33
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-13	1119509.1	644074.7	1.1	0.59
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-14	1120172.8	644056	1.5	0.79
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-15	1120525.8	643783.4	0.65	0.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-16	1119910.5	643376.3	0.94	0.49
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-17	1120140.2	643208.4	1.1	0.85
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-24	1119790.7	642728.3	0.5	0.27
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-21	1118851.1	642271.6	13	6.9
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-22	1119155.4	641797.3	0.23	0.14
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-23	1118672.5	641807.8	23	14
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-24	1118212.4	641805.6	12	8.3
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-25	1118691.5	641338.5	0.24	0.14
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-26	1119107.5	639890.8	14	9.9
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-27	1119026.6	639418.1	1.7	0.9
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-28	1119468.5	638959.3	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-29	1119255.6	638489.5	7.4	3.9

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-30	1119414.2	638028.5	0.35	0.2
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-31	1119349.2	637562.5	3.4	1.8
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-32	1119467.6	637083.1	0.16	0.098
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-33	1118946.2	636681.7	4.9	2.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-34	1119409.7	636630.1	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-35	1119975.8	636642.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-36	1120341.9	636361.3	0.084	0.062
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-37	1120149.8	635894	1.6	0.86
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-38	1120613.3	636053.9	6	4.2
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-39	1121080.5	636180.1	0.31	0.2
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-40	1121546.1	636186.3	0.81	0.43
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-41	1121999.5	636277	0.11	0.079
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-42	1122332.4	635128.7	0.045	0.041
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-43	1121894.2	634876.4	24	20
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-44	1121662	634322	5.4	2.9
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-18	1121208.2	643160.6	0.044	0.042
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-19	1121862.3	643288.4	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-20	1122366	642958.1	0.099	0.071
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-21	1121786.2	642631.8	0.046	0.045
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-22	1121135.4	642544.9	0.052	0.049
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-23	1120415.7	642411.1	0.047	0.046
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-25	1119741.1	641977.1	0.14	0.091
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-26	1119671.9	641400.1	0.075	0.059
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-27	1119955.1	638084.5	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-28	1120592.7	637786.5	0.062	0.053
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-29	1119937.7	637423.8	1.2	0.66
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-30	1120482	637103.5	0.13	0.085
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-31	1121081.3	637116.5	0.1	0.075
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-32	1120595.2	636446.4	0.063	0.052
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-33	1121837	636654.5	0.32	0.18
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-24	1121922.3	651461.8	12	9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-25	1121926.7	650991.4	25	24
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-26	1121452.7	650894.3	4.6	3.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-27	1121629.1	650422.8	1.4	0.89
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-28	1121223	650378.6	46	35
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-29	1120730.5	650178	2.5	1.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-30	1120505.5	649756.4	7.4	3.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-31	1120768.8	649238.6	1.6	0.92
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3SF-20	1120491.7	649969.6	3.4	1.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-01	1120829.6	648901.1	320	20
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-02	1120366.9	648972.1	7.4	4.6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-03	1120618.5	648510.1	5.3	4.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-04	1120010	648293.8	52	43
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-05	1120087.9	647836.1	3.5	2.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-06	1119519.9	647880.1	150	29
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-07	1119544.7	647424.1	0.27	0.21
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-08	1119143.9	647220.1	22	12
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-09	1119295.6	646769.1	13	10
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-10	1118801.9	646533.4	3.5	2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-11	1118796	646124.5	0.046	0.042
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-12	1118932.9	645857.2	0.036	0.035
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4SF-01	1119745	648788.4	0.41	0.23

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4SF-02	1118661.5	646898.1	0.13	0.095
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4SF-03	1118148	646168.3	0.044	0.043
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-13	1118842.5	645188.4	0.048	0.047
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-14	1118697.9	644725	0.045	0.044
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-15	1118272.8	644590.9	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-16	1118417.2	643801.3	5.7	4.6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-17	1118846.5	643339.3	4.4	2.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-18	1118380.5	643647.3	1.6	1.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-19	1118979	643066	4	3.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-20	1118211.1	642278.5	0.58	0.31
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-21	1117732.2	641403.5	2.3	1.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-22	1117856.6	640959.8	4.1	2.1
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-23	1118289.6	640905.3	0.36	0.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-24	1118081.3	640396.7	9	6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-25	1118611.7	640022.7	17	10
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-26	1118476.7	639887.4	1.3	0.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-27	1118693.2	639191.2	4.3	1.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-28	1118949.7	638811.8	11	7.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-29	1118673.5	638259.7	4.5	2.3
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-30	1118953	637985.9	10	6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-31	1119019.3	637523.4	3.6	1.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-32	1118557.2	637270.3	0.65	0.35
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-33	1118946.6	637029.2	17	9.1
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-04	1118062.2	645515.8	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-05	1118004.4	644535.8	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-06	1117852	643883.5	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-07	1117056.8	641681.5	0.2	0.14
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-08	1117423.4	641279.8	1.5	0.85
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-09	1116780.7	641029.7	0.81	0.43
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-10	1116709	640494.5	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-11	1117259.6	640376.4	0.061	0.054
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-12	1116641.3	640015.5	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-13	1117968.8	639964.8	0.59	0.34
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-14	1117294.5	639723.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-15	1116545.4	639362.9	0.047	0.045
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-16	1117849.7	639315.4	0.69	0.37
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-17	1117479.4	638657.8	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-18	1118136	638262.8	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-19	1117877.6	638016.5	0.049	0.048
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-20	1118542.9	637728.5	0.051	0.047
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-34	1118526.6	636411.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-35	1118411.7	636294.7	0.044	0.043
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-36	1118826.8	635928.8	1.1	0.71
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-37	1119091.8	635673.8	0.063	0.051
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-38	1119340.6	636136.4	0.4	0.34
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-39	1119554.5	635878.7	0.37	0.21
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-40	1119801.7	636340.5	16	8.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-41	1119702.7	635415.1	4.7	3.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-42	1120163.8	635361.8	0.31	0.18
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-43	1120477.9	635574.3	1.2	1.1
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-44	1120861.4	635501.5	13	7.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-45	1121401.9	635649.8	0.12	0.096

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-46	1121864	635704.8	1.2	0.85
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-47	1121546	635195.3	11	6.6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-48	1121293.4	634726.4	1.4	0.81
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-49	1121012.9	634117.9	8.6	5
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-50	1120550.4	634188.2	3.4	1.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-21	1118546.7	635725	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-22	1118548.8	635072.6	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-23	1119201.3	635123.6	0.36	0.22
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-24	1119854.2	635081.4	3.6	2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-25	1118821.8	634470.6	0.23	0.14
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-26	1119474.7	634428.7	0.18	0.12
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-27	1120506.7	634978.3	0.071	0.061
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-28	1121134.2	635184.1	2.4	1.3
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-29	1120779.7	634552	5.7	4.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-30	1120127.6	634325.9	19	16
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-45	1121488.3	633856.3	0.18	0.11
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-46	1121025.7	633835.4	2.8	2.4
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-47	1120957.6	633384	5.6	4.9
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-48	1120600.7	633259.5	38	7.2
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-49	1120535.4	632793.1	2.8	1.6
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-50	1120705.3	632327.2	1.6	0.84
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-51	1120238.3	632171.5	1.4	0.79
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-52	1120507.2	631871.1	6.8	3.5
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4NF-34	1121221	633186.7	14	9
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4NF-35	1121884.5	632675.9	0.076	0.057
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4NF-36	1121408.1	632523.2	0.085	0.063
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4NF-38	1121028.8	631860	0.12	0.08
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4N-53	1120834.6	631391.2	0.71	0.26
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4N-54	1120689.6	630965.7	0.96	0.78
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4N-55	1120445.1	630463.8	0.041	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-37	1122029.5	631951.5	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-39	1122033.4	630721.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-40	1121695.3	631353.7	0.2	0.14
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-41	1121419.4	631200.5	0.9	0.47
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-42	1121015.8	630532.9	0.11	0.075
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-43	1121667.6	630032	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-44	1121224.7	629869.2	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-01	1119143.9	629538	0.44	0.26
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-02	1118122.6	628506.2	0.058	0.045
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-03	1118115.9	628045.1	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-04	1117640.9	628108	0.44	0.37
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-05	1117911.7	627607.6	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-06	1117656.2	627173.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-07	1117506.3	626712.6	0.041	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-08	1117406.1	626251.5	0.05	0.049
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-09	1117523.3	625790.5	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-10	1116443.5	625208.4	0.049	0.045
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-11	1115521	625342.2	0.96	0.72
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-12	1115058.5	625233.8	3.2	2
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-13	1114610	625150.2	2.4	1.3
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-14	1114139.8	625330.1	1.2	0.71
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-15	1113679.4	625246	1.5	0.9

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-16	1113999.4	624783.7	0.45	0.25
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-17	1114293.8	624409.6	0.044	0.042
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-18	1113833	624326.1	14	8
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-19	1113874.6	623861.6	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-20	1114544.5	622381.8	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-21	1114829.2	621899.5	0.47	0.3
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-22	1115271.8	622007.9	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-23	1115569.4	621654.1	0.077	0.061
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-24	1115984.6	621235.7	0.42	0.23
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-25	1116030.7	621697.1	6.5	2.8
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-26	1115732.2	622115.1	0.45	0.38
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-27	1115924	622619	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-28	1116225.9	623079.9	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-29	1116686.7	622903.4	0.053	0.047
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-30	1116840.5	622511.6	0.32	0.18
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-31	1117306.9	622563.5	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-32	1117359.8	621155.4	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-33	1117206	620663.1	0.26	0.17
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-34	1116613.7	619677	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-35	1115820.6	619349	0.41	0.22
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-36	1115877.8	618887.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-37	1115417.6	618780.6	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-38	1115563.7	618426.9	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-39	1115103	618319.5	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-40	1114870.2	617761.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-41	1114977.2	617309.4	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-42	1114926.2	616848.2	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-43	1114655.3	616387.8	0.067	0.054
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-44	1114479.1	616112.5	0.63	0.37
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-45	1114511.8	615651.6	0.13	0.088
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-46	1114971.9	615475	0.28	0.16
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-01	1118350.4	627135.6	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-02	1118233.8	626466.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-03	1114592.7	624909.5	0.13	0.086
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-04	1114772	623541.3	0.039	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-05	1114882.6	622888.5	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-06	1115439.3	623223.2	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-07	1115288.3	623898.6	0.039	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-08	1115958	623991.9	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-09	1116112.7	623322.3	0.089	0.065
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-10	1116889.7	623003.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-11	1118433.1	621180	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-12	1117761.7	621112.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-13	1116781.9	619657.4	0.041	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-14	1115344.1	617874.5	0.16	0.12
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-15	1115374.1	616536.2	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-16	1115563.8	615866.2	0.3	0.3
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-17	1115400.1	615198.3	0.094	0.084
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-18	1116095.9	615278.3	0.041	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-19	1116233.7	614628.5	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-20	1116752.3	614328.7	0.045	0.042
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-51	1120039.4	633983.8	0.077	0.063

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-52	1120158	633515.8	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-53	1119906.6	633047.1	0.35	0.2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-54	1119824.4	632582.4	0.55	0.3
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-55	1119710.1	632182.5	0.044	0.042
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-56	1120078.5	631132.8	3.2	1.7
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-57	1120112.2	630738.7	35	13
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-58	1119662.3	630831.3	0.059	0.051
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4SF-31	1119403.1	633716.5	4.8	2.5
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4SF-32	1118692.3	633809.1	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4SF-33	1119436.5	633118.7	3.6	2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-01	1119624.5	630235.4	2	1.3
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-02	1119164.6	630353.1	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-03	1119243.9	629908.1	0.49	0.27
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-04	1118809.8	629766.2	0.89	0.47
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-05	1118469.1	629346.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-06	1117986.5	629343.2	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-07	1118230.4	628957.8	16	15
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-08	1117747.6	628890.3	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-09	1117534.1	628290.7	3.8	3.7
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-10	1117033.6	628378.3	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-11	1116976.8	626997	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-12	1116695.9	626326.2	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-13	1117012.9	626073.6	1.5	1.1
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-14	1116735.1	625611.9	1.1	0.62
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-15	1116276.1	625416.1	5.5	3.8
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-16	1115812.7	625702.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-17	1114890.5	625646	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-18	1114429.7	625565.3	0.073	0.054
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-19	1113968.5	625796	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-20	1113507.8	625644.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-21	1113435.7	625099.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-22	1113563.4	624732.6	0.3	0.18
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-23	1113642.1	624263.6	0.31	0.18
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-24	1113218	624174.8	0.043	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-25	1113650.5	623797.2	1.5	1.3
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-26	1113211.2	623712.9	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-27	1113670.1	623339.5	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-28	1113796	622872.4	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-29	1114096.4	622569.1	0.39	0.25
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-30	1114284.3	622114	0.053	0.046
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-31	1114949	621487.2	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-32	1116129.9	622020.3	3.9	2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-33	1116412.3	622178.3	1.1	0.73
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-34	1116554.8	621712.7	1.7	1.6
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-35	1117045.7	621917.9	3.5	2.1
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-36	1116838.8	621466.6	6.4	4.3
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-37	1116603.8	620783.8	0.042	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-38	1116339.1	620332.5	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-39	1115967.5	619767.2	1.7	1.2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-40	1115532.8	619740.3	0.34	0.2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-41	1115352.5	619277.2	0.24	0.14
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-42	1114728	618651	0.039	0.039

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-43	1114428.9	618189.9	0.045	0.043
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-44	1114477.7	617755.1	0.048	0.044
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-45	1114215.4	617036.7	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-46	1114310.1	616581.5	8.1	5.3
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-47	1114197.3	616115.4	0.064	0.053
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-01	1118858.3	630368.8	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-02	1118534	629855.9	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-03	1118022.3	629942	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-04	1117509.7	629736.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-05	1117078.4	629593.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-06	1117590.8	629227.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-07	1117200	629613.2	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-08	1115023.9	626994	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-09	1114683.4	626127.7	0.042	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-10	1114171.1	626158.3	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-11	1113627.1	626329.4	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-12	1113229.2	625976	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-13	1115110.9	620848.2	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-14	1115235.5	620336.2	0.85	0.44
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-15	1114598.9	620494.7	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-16	1114086.2	620521.6	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-17	1115062.3	619824.1	1.8	1.4
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-18	1114723.3	619982.9	0.18	0.11
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-19	1114541.2	619470.7	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-20	1114555.7	618958.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-01	1114200.1	614990.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-02	1113281.5	614992.1	5.2	3
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-03	1112949	613902.5	0.055	0.048
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-04	1112769.1	613485.9	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-05	1112422.8	613027.4	4.8	3.5
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-06	1112005.8	612627	0.24	0.14
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-07	1111560.6	612543.7	0.92	0.49
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-08	1111085.6	612286.3	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-09	1110620.2	612511.8	1.9	1.1
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-10	1110697.3	612070	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-11	1111181.2	610905	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-12	1111063.9	610001.9	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-13	1108941.2	608199	0.4	0.22
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-14	1106820	608591.9	4.4	3
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-15	1106655.8	608140.9	0.4	0.22
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-16	1107216	607884.7	1.9	1
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-17	1107592.6	606913.8	0.82	0.43
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-18	1106793.5	606312.7	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-19	1107071.9	606036.8	11	7.9
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-20	1108654	606157.3	7.5	4.9
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-01	1113923	615548.4	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-02	1113616.7	615338.8	23	16
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-03	1112327	613486.5	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-04	1111531.3	612842.6	4.7	2.4
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-05	1110371.1	611745.4	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-06	1110597.2	610832.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-07	1111062.6	610508.2	1.2	0.7

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-08	1112848.4	614486.2	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-09	1110737.6	612727.6	6.6	4.7
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-10	1109370.2	608430.5	0.13	0.085
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-11	1106513.3	607924.6	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-12	1107101.4	605854.6	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-13	1108255.1	608520.6	0.27	0.17
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-14	1107449	608734.6	1	0.89
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-15	1107001.8	608906.2	0.067	0.054
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-16	1106456	608636.2	0.079	0.07
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-17	1107392	607390	1.5	0.75
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-18	1105911.7	606583.3	0.045	0.041
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-19	1106264.9	606397.3	0.56	0.32
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-20	1108515.3	605681.3	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-21	1108963.1	605867.8	2.7	2
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-01	1109602.1	605264.3	1.2	0.64
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-02	1109993.5	604734.3	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-03	1110166.6	604480	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-04	1110410.8	604026.4	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-05	1110856.9	603701.5	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-06	1111285	603293.2	0.064	0.064
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-07	1111174.1	602875.8	0.2	0.13
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-08	1111628.8	602996.3	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-09	1111889.6	602540.3	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-10	1112345.7	602500.5	0.059	0.049
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-11	1112581.5	602231	0.1	0.069
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-12	1113022.3	601947.9	0.038	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-13	1113493.5	602016.8	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-14	1114103.2	601756.8	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-15	1114133.9	601303.5	8.4	5
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-16	1114558.9	601483.4	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-17	1114511.5	601216.4	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-18	1114800	600857	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-19	1114798.5	600458	0.079	0.057
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-20	1114326.6	600076.6	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-21	1114090	599932.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-22	1113713.7	599656.7	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-23	1113177.9	599660.1	0.34	0.21
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-24	1112923.2	600116.2	0.053	0.045
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-25	1112467.2	600407	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-26	1112107.6	600676.5	0.19	0.17
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-27	1111651.7	600716.3	0.25	0.25
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-28	1111397.9	601048.1	0.038	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-29	1110643.1	600488.5	0.05	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-30	1110442.1	599922.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-31	1110404.4	599487.1	0.12	0.099
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-32	1110847.6	599576.7	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-33	1110804	599120.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-34	1111260	598768.3	0.16	0.11
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-35	1111577.7	598436.5	0.11	0.094
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-36	1111377.3	597858.9	2	1.9
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-37	1111771.6	597524.3	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-38	1111318.9	597379	0.092	0.064

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-39	1110806.8	595931.3	13	2.2
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-40	1110854.4	595473.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-41	1110690.2	595016.6	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-42	1109973.8	594250.1	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-43	1109517.7	594319.9	0.036	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-44	1109061.8	594297.5	0.17	0.13
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-45	1108605.7	594164.6	0.079	0.076
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-46	1108250.8	593708.8	0.087	0.074
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-47	1108235.9	593661.3	0.05	0.047
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-48	1108124	593205.4	0.09	0.085
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-49	1107798.8	592709.4	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-50	1107815	592293.4	0.059	0.052
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-51	1107367.7	591836	0.33	0.26
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-52	1107341.6	591379.9	0.21	0.15
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-53	1106885.5	591305.8	0.66	0.4
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-01	1111749.6	603851.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-02	1112823	602900.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-03	1113556.9	602286.9	0.052	0.047
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-04	1113810.8	603272.8	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-05	1114707.6	603835	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-06	1115655.4	604857.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-07	1116489.8	601353.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-08	1116314.9	600367	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-09	1117108.7	599525.4	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-10	1115327.9	599924.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-11	1116122	599380.3	0.056	0.049
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-12	1115137	598938.9	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-13	1114145.4	598854	0.065	0.065
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-14	1113161.9	599326.8	0.67	0.54
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-15	1112368.1	599939.8	0.039	0.038
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-16	1111381	599904.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-17	1112175	598953.3	1.6	1.4
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-18	1109070.1	592758.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-19	1108872.8	593745.8	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-20	1107739.7	591723.3	0.11	0.07
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-01	1109175.7	605298.5	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-02	1109256.6	604835.5	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-03	1109716.1	604494.7	1.8	1.5
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-04	1109905.2	603578.5	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-05	1110324.8	603584.7	3.1	2.3
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-06	1110487.8	603151.4	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-07	1110611.6	602871.4	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-08	1111104.534	602684.1113	0.26	0.2
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-09	1111002.3	602438.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-10	1111465.4	602221.2	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-11	1111743.2	601897.5	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-12	1112205.8	601710	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-13	1112640.9	601427.1	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-14	1113309.6	601107.6	2.2	1.8
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-15	1113565.8	601486.6	0.18	0.11
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-16	1113781	601010.6	0.67	0.36
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-17	1113981.7	600705.2	0.36	0.23

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-18	1113524.7	600087	0.61	0.49
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-19	1113518.9	600550	0.13	0.098
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-20	1113055.9	600647	9.1	4.6
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-21	1112854.9	600961.9	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-22	1112181.6	601248.2	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-23	1111715	601435	0.21	0.16
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-24	1111279.9	601758	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-25	1110788.6	601512.6	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-26	1110538	600895.9	9.9	9.9
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-27	1110031.9	600831.5	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-28	1109814.8	600337.3	0.075	0.057
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-29	1109820.9	599876.4	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-30	1109749.5	599411.3	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-31	1110199.6	599457.6	0.054	0.046
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-32	1110114	598984.6	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-33	1110418.4	598521.5	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-34	1110891.2	598288.8	0.32	0.22
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-35	1110890.3	597808.7	0.081	0.071
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-36	1110761.2	597345.4	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-37	1110854.7	596870.8	3.6	2.8
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-38	1110433.5	596669.3	0.037	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-39	1110747.7	596416.3	1.8	1.2
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-40	1110314.4	596206.4	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-41	1110406.411	595743.5597	0.075	0.063
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-42	1110545.4	595495.2	3.9	2.4
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-43	1110084.1	595280.5	0.084	0.076
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-44	1110042.9	594780.4	16	8.4
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-45	1109578.6	595112.6	0.047	0.042
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-46	1109108.2	594618.4	0.28	0.25
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-47	1108643	594644.4	0.64	0.37
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-48	1108189.5	594870	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-49	1108183.8	594406.7	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-50	1107818.5	593942.6	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-51	1107635.1	593666.1	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-52	1107396.5	593203.2	0.056	0.051
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-53	1107408.4	592679.5	0.094	0.065
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-54	1106962.8	592300.8	0.051	0.05
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-55	1106550.5	591629.7	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-56	1106501.9	591148.3	0.36	0.23
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-57	1106204.6	590964.1	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-01	1107457.5	605257.3	0.041	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-02	1108140.2	604521.4	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-03	1107705.9	603506.4	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-04	1109735.7	603137.4	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-05	1108601.8	602712.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-06	1110701.8	601910.8	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-07	1108672.5	601697.8	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-08	1109687.5	601107.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-09	1109297.8	600682.9	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-10	1108297.5	600431	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-11	1109113	599666.4	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-12	1109763.8	598062.8	0.04	0.04

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-13	1110010.2	597047.9	0.19	0.18
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-14	1109114.6	596623.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-15	1110129.6	596033	0.068	0.053
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-16	1109481.2	595608.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-17	1108466.3	595387.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-18	1107420.4	594090	0.039	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-19	1106325.1	592918.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-20	1104905.2	592384.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-01	1105853.8	590056.4	0.25	0.24
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-02	1105724.9	589484.5	0.13	0.084
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-03	1105881.4	589247.7	0.11	0.073
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-04	1105748.1	588340.8	0.13	0.12
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-05	1107156.8	587224.8	0.65	0.5
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-06	1107728.5	587285.2	0.27	0.2
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-07	1108106.8	586713.2	0.038	0.037
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-08	1108380.7	585985.1	0.14	0.11
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-09	1107838.9	585570.5	5.3	3.3
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-10	1107268.4	585504.8	2.3	1.2
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-11	1106693.7	585652.8	12	2.3
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-12	1106118.9	585782.9	4	3.7
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-13	1106178.2	584684	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-14	1107639.5	583859.4	2.8	1.8
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-15	1110339.5	583157.1	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-16	1110654.8	581246.6	11	8.1
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-17	1109026.8	581339.8	4.4	3.8
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-18	1108446.6	581414	0.057	0.048
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-19	1107873.8	581530.9	10	3.1
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-20	1107149.4	580921.1	3.3	2.5
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-01	1105215.9	590441.8	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-02	1105026.6	590091.9	0.038	0.037
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-03	1104759.2	589522.6	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-04	1105003.9	588967.3	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-05	1107515.3	586560.1	0.054	0.046
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-06	1107606.4	585998.2	0.081	0.062
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-07	1107043.9	585939.4	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-08	1106480.1	586031	0.037	0.036
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-09	1105919.4	586152	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-10	1105341.2	585948	0.091	0.078
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-11	1105676.7	585010	3.1	1.7
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-12	1106769.6	583689.2	0.17	0.11
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-13	1107353.7	583705	8.3	3.6
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-14	1108457.5	583570.3	0.063	0.053
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-15	1108896.1	583007.9	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-16	1109426.6	582843	0.11	0.08
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-17	1110422.3	582158.4	0.22	0.2
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-18	1109130.8	581720.9	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-19	1107439.2	581496.4	0.41	0.21
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-20	1106860.6	579192.3	0.054	0.051
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-01	1107461.8	579512.8	7.9	4.5
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-02	1108175.9	578004.7	5.1	2.9
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-03	1108643.8	577709.6	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-04	1108816.4	577483.8	0.04	0.04

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-05	1109074.2	577010.2	0.077	0.058
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-06	1109739.7	575662.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-07	1110586.7	575019.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-08	1110873.6	574549.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-09	1111087.8	574309.9	0.096	0.07
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-10	1111388.5	573838.6	0.086	0.063
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-11	1109941.7	572358.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-12	1110175	571760.1	0.04	0.039
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-13	1110423.8	571287.8	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-14	1110896.6	571243.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-15	1111321.2	571007.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-16	1112011.9	570338.1	0.2	0.12
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-17	1112906.5	570023.7	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-18	1113515.1	568021	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-19	1113250.7	567652.8	2.4	1.7
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-20	1113621.8	567548.9	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-01	1107037.6	579280.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-02	1107415.6	579043.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-03	1108604.9	576769.9	0.58	0.39
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-04	1109643	575195	0.41	0.29
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-05	1110617.3	574075.3	0.33	0.18
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-06	1110916.2	573603.3	0.28	0.24
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-07	1110508	573170.4	0.45	0.44
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-08	1110042.1	573301.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-09	1109542.5	572893	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-10	1109436.9	572469.9	0.21	0.13
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-11	1110375.5	570816	0.47	0.25
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-12	1110846.6	570773.7	0.55	0.29
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-13	1111066.7	570537.7	0.54	0.29
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-14	1111490.3	570063.1	0.37	0.36
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-15	1111961.7	569973.5	0.42	0.23
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-16	1112330.1	569394.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-17	1112683.2	569079.8	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-18	1112589.8	568607.7	0.042	0.041
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-19	1112571.1	568135.8	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-20	1112924.3	567191.7	0.042	0.041
Tennis Court Water Line	C1-EU1	OLWL-3	1130504.525	659474.5942	0.59	0.59
Tennis Court Water Line	C1-EU2	OLWL-4	1130520.073	659319.9196	0.24	0.24
WWTP	C2N-EU1	PC1-08	1129276.09	657826.6345	0.13	0.13
WWTP	C2N-EU1	PC1-09	1129225.703	657825.7999	3.4	1
WWTP	C2N-EU1	PC1-21	1129281.509	658125.7031	0.49	0.49
WWTP	C2N-EU1	PC1-22	1129280.261	658147.1079	0.23	0.23
WWTP	C2N-EU1	PC1-26	1129181.838	658221.559	0.16	0.16
WWTP	C2N-EU1	PC1-27	1129160.737	658223.334	3.5	3.5
WWTP	C2N-EU1	PC1-28	1129182.228	658270.5156	0.96	0.53
WWTP	C2N-EU1	PC1-29	1129161.544	658270.0282	11	0.96
WWTP	C2N-EU1	PC3-01	1129336.586	658120.9676	0.62	0.62
WWTP	C2N-EU1	PC3-02	1129374.24	658123.99	0.14	0.14
WWTP	C2N-EU1	PC3-03	1129398.83	658136.6345	0.077	0.077
WWTP	C2N-EU1	PC3-04	1129397.434	658190.7198	12	0.22
WWTP	C2N-EU1	PC3-06	1129400.134	658300.3222	2.9	2.5
WWTP	C2N-EU1	PC3-07	1129400.298	658354.8592	9.3	9.3

Table 4-1b. OU-4 Length-Weighted Nonresidential Surface (0-1 foot) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
WWTP	C2N-EU1	PC3-08	1129400.498	658408.1599	11	11
WWTP	C2N-EU1	PC3-09	1129402.227	658464.0347	8.4	8.4
WWTP	C2N-EU1	PC3-10	1129397.216	658082.5098	3.7	3.7
WWTP	C2N-EU1	PC3-11	1129397.177	658027.3352	1.5	0.52
WWTP	C2N-EU1	PC3-12	1129393.85	657974.82	2.8	0.16
WWTP	C2N-EU1	PC3-13	1129395.37	657918.544	0.29	0.29
WWTP	C2N-EU1	PC3-14	1129392.54	657866.75	2.2	2.2
WWTP	C2N-EU1	PC3-15	1129392.99	657813.14	2.8	2.8

1. Surface (0–1 feet) total PCB concentration calculated by the following equation:

$$Surface\ Total\ PCB\ Length\ Weighted\ Concentration = (\sum([Segment\ Concentration]\times[Segment\ Length])) / (\sum([All\ Segment\ Lengths]))$$

2. Surface maximum and total PCB were rounded to two significant figures.

3. If parent/duplicate pair were both detected or both not detected, an average was taken using the reported results (reporting limit for nondetects).
4. If one of the parent/duplicate pair was detected and the other was not detected, the detected result was used.
APCO FP: Alabama Power Company floodplain
EU: exposure unit
mg/kg: milligram(s) per kilogram
OU: operable unit
P1: Phase 1
P2: Phase 2
PCB: polychlorinated biphenyl
RFI: Resource Conservation and Recovery Act (RCRA) Facility Investigation
RI/FS: remedial investigation/feasibility study
WWTP: wastewater treatment plant

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Anniston Airport	C4N-EU1	ARA-47	1120108.225	644516.299	0.77	0.77
Anniston Airport	C4N-EU1	ARA-35	1119463.076	644631.793	2.5	2.5
Anniston Airport	C4N-EU1	ARA-27	1119576.472	645015.383	1.1	1.1
Anniston Airport	C4N-EU1	ARA-24	1119597.001	645163.942	0.46	0.46
Borrelli	C1-EU2	BP-9	1130427.138	658374.6141	11	11
Borrelli	C1-EU2	BP-8	1130401.998	658503.589	3.1	3.1
Borrelli	C1-EU2	NHA-1	1130178.219	658585.2198	20	20
Borrelli	C1-EU2	NHA-2	1130279.329	658595.5352	77	77
Borrelli	C1-EU2	BP-7	1130376.071	658635.6514	0.12	0.12
Borrelli	C1-EU2	NHA-5	1130434.917	658648.6103	230	210
Colonial Pipeline	C4N-EU2	236-3	1120974.141	642196.357	0.085	0.085
Colonial Pipeline	C4S-EU1	239-2	1120416.905	649460.3434	5	5
Colonial Pipeline	C4S-EU1	239-3	1120402.732	649508.2925	16	16
Colonial Pipeline	C4S-EU1	239-4	1120388.559	649556.2417	13	13
Colonial Pipeline	C4S-EU1	239-5	1120373.041	649608.7394	6.5	6.5
Colonial Pipeline	C4S-EU1	239-6	1120370.207	649618.3292	18	18
Colonial Pipeline	C4S-EU1	240-1	1120314.78	649791.5323	6.3	6.3
Colonial Pipeline	C4S-EU1	240-3	1120349.053	649840.78	2.5	2.5
Colonial Pipeline	C4S-EU1	240-4	1120377.614	649881.8197	0.087	0.070
Colonial Pipeline	C3S-EU2	242-1	1122222.174	653318.207	1.2	1.1
I-20 Industrial Park	C4N-EU2	Ind-CC-27	1120524.3	642892.5	1.7	1.7
I-20 Industrial Park	C4N-EU2	Ind-CC-14	1120039.1	643002.3	0.17	0.17
I-20 Industrial Park	C4N-EU2	Ind-CC-13	1120160.3	643163.1	0.28	0.28
I-20 Industrial Park	C4N-EU2	Ind-CC-19	1120402.9	643222.4	0.096	0.096
I-20 Industrial Park	C4N-EU1	Ind-CC-12	1120251.2	643357.7	0.1	0.1
I-20 Industrial Park	C4N-EU2	Ind-CC-18	1120544.3	643400.1	0.088	0.088
I-20 Industrial Park	C4N-EU2	Ind-CC-6	1120342.1	643459.3	0.094	0.094
I-20 Industrial Park	C4N-EU1	Ind-CC-11	1120372.4	643535.4	0.1	0.1
I-20 Industrial Park	C4N-EU2	Ind-CC-22	1120877.8	643552.5	0.1	0.1
I-20 Industrial Park	C4N-EU2	Ind-CC-17	1120615	643560.9	0.046	0.046
I-20 Industrial Park	C4N-EU2	Ind-CC-2	1120695.9	643569.4	0.096	0.096
I-20 Industrial Park	C4N-EU2	Ind-CC-10	1120463.3	643662.4	0.1	0.1
I-20 Industrial Park	C4N-EU1	Ind-CC-16	1120746.3	643696.3	0.84	0.84
I-20 Industrial Park	C4N-EU1	Ind-CC-21	1121009.1	643713.3	0.1	0.1
I-20 Industrial Park	C4N-EU1	Ind-CC-9	1120614.9	643848.5	0.097	0.097
I-20 Industrial Park	C4N-EU1	Ind-CC-15	1120847.4	643865.5	0.081	0.081
I-20 Industrial Park	C4N-EU1	Ind-CC-20	1121089.9	643874.1	0.096	0.096
I-20 Industrial Park	C4N-EU1	Ind-CC-8	1120705.8	644000.9	4.8	4.8
I-20 Industrial Park	C4N-EU1	Ind-CC-28	1120827.1	644051.7	5	5
Oxford Lake Park	C1-EU1	OLGP-063	1129815.88	658667.39	8.2	8.2
Oxford Lake Park	C1-EU1	OLHA-002	1129856.12	658678.94	8.7	8.7
Oxford Lake Park	C1-EU1	OLGP-064	1129915.13	658684.24	8.1	8.1
Oxford Lake Park	C1-EU1	OLGP-079	1130024.14	658692.88	2.1	2.1
Oxford Lake Park	C1-EU1	OLHA-001	1129976.08	658693.51	9.2	9.2
Oxford Lake Park	C1-EU2	OLGP-030	1130140.24	658709.5	6.9	6.9
Oxford Lake Park	C1-EU2	OLGP-031	1130238.82	658719.62	7	7
Oxford Lake Park	C1-EU2	OLGP-022	1130342.55	658736.35	7.4	7.4
Oxford Lake Park	C1-EU2	OLGP-032	1130434.92	658757.51	5.1	5.1
Oxford Lake Park	C1-EU1	OLGP-062	1129810.42	658768.46	12	12

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Oxford Lake Park	C1-EU2	OLGP-011	1130525.25	658782.41	5.6	5.6
Oxford Lake Park	C1-EU1	OLGP-065	1129918.34	658783	9.3	9.3
Oxford Lake Park	C1-EU1	OLGP-078	1130020.62	658792.4	4.8	4.8
Oxford Lake Park	C1-EU2	OLGP-029	1130126.99	658799.07	14	14
Oxford Lake Park	C1-EU2	OLGP-021	1130330.27	658816.86	27	27
Oxford Lake Park	C1-EU2	OLGP-033	1130618.01	658819.84	6.1	6.1
Oxford Lake Park	C1-EU2	OLGP-010	1130520.11	658830.68	7.8	7.8
Oxford Lake Park	C1-EU1	OLHA-003	1129966.08	658832.25	16	16
Oxford Lake Park	C1-EU2	OLGP-034	1130718.58	658837.35	31	29
Oxford Lake Park	C1-EU1	OLHA-004	1129865.88	658837.68	18	18
Oxford Lake Park	C1-EU2	OLGP-037	1131011.85	658850.7	31	31
Oxford Lake Park	C1-EU2	OLGP-038	1131112.72	658851.3	38	38
Oxford Lake Park	C1-EU2	OLGP-036	1130912.6	658855.16	59	59
Oxford Lake Park	C1-EU2	OLGP-035	1130816.73	658859.05	11	11
Oxford Lake Park	C1-EU1	OLGP-061	1129819.66	658871.18	4.4	4.4
Oxford Lake Park	C1-EU1	OLGP-066	1129917.34	658877.83	18	18
Oxford Lake Park	C1-EU1	OLGP-077	1130020.3	658895.5	7	7
Oxford Lake Park	C1-EU2	OLGP-028	1130115.86	658899.17	13	13
Oxford Lake Park	C1-EU2	OLGP-020	1130315.37	658915.27	13	13
Oxford Lake Park	C1-EU2	OLGP-009	1130517.63	658930.73	12	12
Oxford Lake Park	C1-EU2	OLGP-039	1131173.19	658955.02	45	45
Oxford Lake Park	C1-EU1	OLGP-027	1130105.16	658999.99	7	7
Oxford Lake Park	C1-EU1	OLGP-023	1130209.82	659008.36	7.6	7.6
Oxford Lake Park	C1-EU2	OLGP-045	1130608.67	659011.94	16	16
Oxford Lake Park	C1-EU2	OLGP-040	1131115.06	659012.92	35	35
Oxford Lake Park	C1-EU2	OLGP-044	1130709.8	659016.47	16	16
Oxford Lake Park	C1-EU2	OLGP-041	1131008.65	659019.63	30	30
Oxford Lake Park	C1-EU2	OLGP-043	1130813.75	659019.69	22	22
Oxford Lake Park	C1-EU2	OLGP-042	1130910.73	659026.31	34	34
Oxford Lake Park	C1-EU1	OLGP-026	1130156.63	659108.3	4.7	4.7
Oxford Lake Park	C1-EU1	OLGP-024	1130207.36	659111.59	2.4	2.4
Oxford Lake Park	C1-EU1	OLGP-058	1129817.82	659175.37	5.3	5.3
Oxford Lake Park	C1-EU1	OLGP-069	1129915.49	659183.93	3.9	3.9
Oxford Lake Park	C1-EU1	OLGP-074	1130015.35	659194.17	4.9	4.9
Oxford Lake Park	C1-EU1	OLGP-080	1130116.57	659207.39	3.6	3.6
Oxford Lake Park	C1-EU1	OLHA-010	1129796.71	659210.57	8.7	8.7
Oxford Lake Park	C1-EU1	OLGP-057	1129816.83	659279.68	0.2	0.2
Oxford Lake Park	C1-EU1	OLGP-084	1130212.28	659306.08	15	14
Oxford Lake Park	C1-EU1	OLGP-083	1130214.81	659404.52	4	4
Oxford Lake Park	C1-EU1	OLGP-003	1130594.19	659473.83	7.2	7.2
Oxford Lake Park	C1-EU1	OLGP-002	1130690.4	659490.33	13	13
Oxford Lake Park	C1-EU1	OLGP-001	1130787.54	659505.96	1.6	1.6
Oxford Lake Park	C1-EU1	OLGP-049	1130511.08	659523.31	8.6	8.6
Oxford Lake Park	C1-EU1	OLGP-048	1130579.88	659544.4	55	55
Oxford Lake Park	C1-EU1	OLGP-047	1130674.4	659567.13	35	35
Oxford Lake Park	C1-EU1	OLGP-046	1130772.65	659582.38	1.4	1.4
Oxford Lake Park	C1-EU1	OLHA-012	1129925.78	659654.07	0.074	0.074
Oxford Lake Park	C1-EU1	OLHA-031	1129895.45	659754.4	0.35	0.35
Oxford Lake Park	C1-EU1	OLHA-068	1130330.71	659769.71	0.04	0.04
Oxford Lake Park	C1-EU1	OLGP-121	1130295.03	659801.46	0.075	0.075
Oxford Lake Park	C1-EU1	OLGP-149	1130360.38	659804.33	0.078	0.078
Oxford Lake Park	C1-EU1	OLHA-069	1130248.72	659816.45	3.1	3.1

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Oxford Lake Park	C1-EU1	OLHA-072	1130270.66	659836.81	0.35	0.35
Oxford Lake Park	C1-EU1	OLHA-070	1130224.19	659840.16	1	1
Oxford Lake Park	C1-EU1	OLHA-071	1130246.86	659860.59	0.9	0.9
Oxford Lake Park	C1-EU1	OLGP-148	1130286.5	659870.93	0.08	0.08
Oxford Lake Park	C1-EU1	OLGP-150	1130429.67	659874.75	0.84	0.84
Oxford Lake Park	C1-EU1	OLHA-105	1130257.2	659902.44	0.073	0.073
Oxford Lake Park	C1-EU1	OLGP-147	1130356.08	659941.75	0.19	0.19
Oxford Lake Park	C1-EU1	OLGP-143	1130206.37	659945.44	0.037	0.037
Oxford Lake Park	C1-EU1	OLHA-106	1130256.17	659949.13	0.07	0.07
Oxford Lake Park	C1-EU1	OLHA-104	1130295.9	659952.34	0.073	0.073
Oxford Lake Park	C1-EU1	OLHA-103	1130254.04	659992.69	0.072	0.072
Oxford Lake Park	C1-EU1	OLGP-144	1130285.06	660008.67	0.074	0.074
Oxford Lake Park	C1-EU1	OLGP-146	1130424.72	660014.51	0.1	0.1
Oxford Lake Park	C1-EU1	OLHA-016	1130359.2	660023.255	0.25	0.25
Oxford Lake Park	C1-EU1	OLHA-092	1130222.49	660070.1	0.63	0.63
Oxford Lake Park	C1-EU1	OLGP-145	1130351.35	660083.81	0.22	0.22
Oxford Lake Park	C1-EU1	OLGP-141	1130278.79	660088.44	0.057	0.057
Oxford Lake Park	C1-EU1	OLHA-093	1130240.4	660094.37	0.98	0.98
Oxford Lake Park	C1-EU1	OLHA-091	1130312.84	660125.25	0.071	0.071
Oxford Lake Park	C1-EU1	OLHA-019	1130307.539	660269.8234	12	12
Oxford Lake Park	C1-EU1	OLHA-025	1130328.5	660436.52	0.077	0.077
Oxford Lake Park	C1-EU1	OLHA-023	1130180.95	660448.23	0.074	0.074
Oxford Lake Park	C1-EU1	OLHA-024	1130082.58	660502.09	0.075	0.075
Oxford Lake Park	C1-EU1	OLHA-021	1130031.06	660668.38	0.077	0.077
Oxford Lake Park	C1-EU1	OLHA-020	1130171.58	660673.06	0.078	0.078
Oxford Lake Park	C1-EU1	OLHA-022	1130323.82	660675.41	0.093	0.093
Oxford Lake Park	C1-EU1	OLHA-027	1130066.19	660799.54	0.079	0.079
Oxford Lake Park	C1-EU1	OLHA-028	1130326.16	660818.27	0.083	0.083
Oxford Lake Park	C1-EU1	OLHA-026	1130169.24	660822.96	0.076	0.076
Phase 2 Eco Soil	C7N-EU1	ELT-09-36	1110949.115	598782.2378	0.14	0.14
Phase 2 Eco Soil	C7N-EU1	ELT-09-35	1110906.05	598821.342	0.11	0.11
Phase 2 Eco Soil	C7S-EU1	ELT-06-48	1113201.121	600831.7198	2.6	2.6
Phase 2 Eco Soil	C7S-EU1	ELT-06-47	1113230.036	600900.3167	2.7	2.7
Phase 2 Eco Soil	C7S-EU1	ELT-05-45	1113258.904	601237.1329	2	2
Phase 2 Eco Soil	C7N-EU1	ELT-08-34	1111186.84	601238.4801	0.082	0.082
Phase 2 Eco Soil	C7N-EU1	ELT-08-33	1111227.615	601254.7514	0.059	0.059
Phase 2 Eco Soil	C7S-EU1	ELT-07-55	1112045.959	601260.4699	5.3	5.3
Phase 2 Eco Soil	C7S-EU1	ELT-05-46	1113222.065	601290.702	5	5
Phase 2 Eco Soil	C7S-EU1	ELT-07-54	1112006.576	601290.7662	9.2	9.2
Phase 2 Eco Soil	C7S-EU1	ELT-04-43	1112300.782	601665.2614	0.038	0.038
Phase 2 Eco Soil	C7S-EU1	ELT-04-44	1112285.528	601741.3158	0.041	0.041
Phase 2 Eco Soil	C7S-EU1	ELT-03-41	1112093.434	601863.0077	0.041	0.041
Phase 2 Eco Soil	C7S-EU1	ELT-03-42	1112049.02	601898.9989	0.04	0.04
Phase 2 Eco Soil	C7S-EU1	ELT-02-37	1109568.135	604478.0846	0.039	0.039
Phase 2 Eco Soil	C7N-EU1	ELT-02-38	1109737.275	604777.8806	0.04	0.04
Phase 2 Eco Soil	C7S-EU1	ELT-01-39	1109306.01	605204.5162	0.043	0.04
Phase 2 Eco Soil	C7S-EU1	ELT-01-40	1109298.191	605268.2528	0.037	0.037
Phase 2 Eco Soil	C5S-EU1	EMT-09-32	1114341.759	617360.084	0.19	0.19
Phase 2 Eco Soil	C5S-EU1	EMT-09-31	1114367.774	617418.7632	0.36	0.36
Phase 2 Eco Soil	C5S-EU1	EMT-08-29	1115762.157	619658.768	1.3	1.3
Phase 2 Eco Soil	C5S-EU1	EMT-08-30	1115756.994	619703.4425	1.6	1.6
Phase 2 Eco Soil	C5N-EU2	EMT-02-18	1116153.364	621127.3991	0.37	0.37

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Phase 2 Eco Soil	C5N-EU2	EMT-02-17	1116077.626	621160.9444	0.41	0.35
Phase 2 Eco Soil	C5S-EU1	EMT-07-28	1116930.736	621228.2801	1.4	1.4
Phase 2 Eco Soil	C5S-EU1	EMT-07-27	1116902.437	621297.9595	0.23	0.23
Phase 2 Eco Soil	C5N-EU2	EMT-03-16	1115822.635	622355.6579	0.037	0.037
Phase 2 Eco Soil	C5N-EU2	EMT-03-15	1115774.95	622428.1276	0.036	0.036
Phase 2 Eco Soil	C5N-EU2	EMT-05-22	1116751.044	622470.6372	5.6	5.6
Phase 2 Eco Soil	C5N-EU2	EMT-06-24	1117216.354	622498.0558	0.042	0.042
Phase 2 Eco Soil	C5N-EU2	EMT-05-21	1116694.942	622501.6414	5.9	5.9
Phase 2 Eco Soil	C5N-EU2	EMT-06-23	1117136.725	622528.9092	0.075	0.075
Phase 2 Eco Soil	C5N-EU2	EMT-04-20	1116594.414	623099.0798	0.19	0.19
Phase 2 Eco Soil	C5N-EU2	EMT-04-19	1116485.052	623102.2279	0.33	0.33
Phase 2 Eco Soil	C5N-EU2	EMT-01-26	1113957.628	623769.7298	0.037	0.037
Phase 2 Eco Soil	C5N-EU2	EMT-01-25	1114030.126	623789.9582	0.038	0.038
Phase 2 Eco Soil	C4S-EU1	EUT-09-51b	1120148.629	648488.363	1.4	1.4
Phase 2 Eco Soil	C4S-EU1	EUT-09-51	1120111.408	648497.1604	2.7	2.7
Phase 2 Eco Soil	C4S-EU1	EUT-08-50	1121907.61	650110.9722	25	25
Phase 2 Eco Soil	C4S-EU1	EUT-08-49	1121860.878	650155.9751	6.2	6.2
Phase 2 Eco Soil	C3N-EU2	EUT-07-02	1123484.656	653190.2417	2.1	2.1
Phase 2 Eco Soil	C3N-EU2	EUT-07-01	1123480.861	653239.8875	3.9	3.9
Phase 2 Eco Soil	C3N-EU1	EUT-06-03	1123022.795	653485.7218	7.9	7.9
Phase 2 Eco Soil	C3N-EU1	EUT-06-04	1123028.436	653583.5601	6.6	6.6
Phase 2 Eco Soil	C3N-EU1	EUT-05-06	1123804.293	655511.9889	5.6	5.6
Phase 2 Eco Soil	C3N-EU1	EUT-05-05	1123875.208	655571.4555	9.7	9.7
Phase 2 Eco Soil	C3N-EU1	EUT-04-07	1125759.361	657315.9973	3.4	3.4
Phase 2 Eco Soil	C3N-EU1	EUT-04-08	1125797.716	657333.4221	2.6	2.6
Phase 2 Eco Soil	C2N-EU2	EUT-03-13	1127904.263	659275.9857	0.044	0.044
Phase 2 Eco Soil	C2N-EU2	EUT-03-14	1127949.601	659343.8277	0.046	0.046
Phase 2 Eco Soil	C2N-EU2	EUT-02-11	1128369.233	659411.296	0.044	0.044
Phase 2 Eco Soil	C2N-EU2	EUT-02-12	1128494.269	659420.7892	0.041	0.041
Phase 2 Eco Soil	C2N-EU2	EUT-01-10	1128420.565	659797.804	0.044	0.044
Phase 2 Eco Soil	C2N-EU2	EUT-01-09	1128553.1	659805.6954	0.043	0.043
Phase 2 Eco Soil	REF	ERT-03-64	1049790.588	581096.0275	0.044	0.044
Phase 2 Eco Soil	REF	ERT-03-65	1049741.664	581110.7788	0.05	0.05
Phase 2 Eco Soil	REF	ERT-03-66	1049096.713	581297.435	0.044	0.044
Phase 2 Eco Soil	REF	ERT-03-67	1049152.02	581312.9334	0.051	0.051
Phase 2 Eco Soil	REF	ERT-02-61	1092970.908	603867.5921	0.049	0.049
Phase 2 Eco Soil	REF	ERT-02-60	1092462.188	603885.8191	0.042	0.042
Phase 2 Eco Soil	REF	ERT-02-59	1092949.689	604105.0975	0.042	0.042
Phase 2 Eco Soil	REF	ERT-02-58	1093012.483	604116.3748	0.041	0.041
Phase 2 Eco Soil	REF	ERT-02-57	1093116.347	604136.4117	0.044	0.044
Phase 2 Eco Soil	REF	ERT-02-56	1093118.934	604196.7819	0.046	0.045
Phase 2 Eco Soil	REF	ERT-01-53	1128809.455	671560.0631	0.038	0.038
Phase 2 Eco Soil	REF	ERT-01-52	1128734.575	671637.1273	0.041	0.041
Phase 2 Eco Soil	REF	ERT-01-62	1125980.133	674509.824	0.043	0.043
Phase 2 Eco Soil	REF	ERT-01-63	1125855.645	674632.2064	0.044	0.044
Phase 3 Soil	C8N-EU1	C8NX-01	1108350.5	584276.3	0.037	0.037
Phase 3 Soil	C8N-EU1	C8NX-04	1108252.9	585119.3	0.038	0.038
Phase 3 Soil	C8N-EU1	C8NX-03	1107214.6	585131.5	0.036	0.036
Phase 3 Soil	C8N-EU1	C8NX-02	1106249.5	585229.4	0.038	0.038
Phase 3 Soil	C4N-EU2	C4NX-01	1119505.9	639437.6	0.036	0.036
Phase 3 Soil	C4N-EU2	C4NX-02	1119272.2	639915.7	0.042	0.042
Phase 3 Soil	C4S-EU1	C4SX-03	1118865.8	647260.1	16	16

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
Phase 3 Soil	C4S-EU1	C4SX-06	1118699.5	647387	0.04	0.04
Phase 3 Soil	C4S-EU1	C4SX-02	1119355.5	647909.2	14	14
Phase 3 Soil	C4S-EU1	C4SX-05	1119140.4	647922.6	0.38	0.38
Phase 3 Soil	C4S-EU1	C4SX-01	1119532.1	648404.9	1	1
Phase 3 Soil	C4N-EU1	C3NX-33	1121769.8	648480.9	2.4	2.4
Phase 3 Soil	C4S-EU1	C4SX-04	1119243.3	648499.9	0.29	0.29
Phase 3 Soil	C4N-EU1	C3NX-27	1121607.2	648760	20	20
Phase 3 Soil	C4N-EU1	C3NX-01	1121499.8	648859.8	3.7	3.7
Phase 3 Soil	C4N-EU1	C3NX-26	1122527.5	649298.3	0.75	0.75
Phase 3 Soil	C4N-EU1	C3NX-02	1122333.4	649671.6	7.4	7.4
Phase 3 Soil	C4N-EU1	C3NX-06	1122713.8	650170.6	0.037	0.037
Phase 3 Soil	C4N-EU1	C3NX-03	1122335.6	650783.1	0.17	0.13
Phase 3 Soil	C4S-EU1	C3SX-14	1120827.6	651250	0.53	0.53
Phase 3 Soil	C4N-EU1	C3NX-04	1122673.6	651327.6	1.6	1.6
Phase 3 Soil	C4N-EU1	C3NX-05	1122755.8	651517.5	0.04	0.04
Phase 3 Soil	C3S-EU2	C3SX-10	1120499.6	651752	0.038	0.038
Phase 3 Soil	C3S-EU2	C3SX-09	1120886.6	651828.1	9.9	9.9
Phase 3 Soil	C3S-EU2	C3SX-01	1121449.3	651849.2	7.6	7.6
Phase 3 Soil	C3S-EU2	C3SX-08	1121156.1	651868.6	18	18
Phase 3 Soil	C3S-EU2	C3SX-07	1121018.1	652198.4	1.9	1.9
Phase 3 Soil	C3S-EU2	C3SX-11	1120536.4	652206.3	0.037	0.037
Phase 3 Soil	C3S-EU2	C3SX-02	1121514.1	652219.5	5.4	5.4
Phase 3 Soil	C3N-EU2	C3NX-07	1123456.8	652448	0.08	0.08
Phase 3 Soil	C3S-EU2	C3SX-12	1120917.5	652749	1.1	1.1
Phase 3 Soil	C3S-EU2	C3SX-03	1121760.2	652828.8	15	15
Phase 3 Soil	C3S-EU2	C3SX-06	1121268.6	652900.8	1.5	1.5
Phase 3 Soil	C3N-EU2	C3NX-25	1124103.8	653024.2	0.047	0.047
Phase 3 Soil	C3S-EU2	C3SX-04	1121888	653195.6	39	39
Phase 3 Soil	C3S-EU2	C3SX-05	1121620.3	653212.6	25	25
Phase 3 Soil	C3N-EU2	C3NX-08	1123824.4	653258.3	5	5
Phase 3 Soil	C3S-EU2	C3SX-13	1121363.6	653367	1.4	1.4
Phase 3 Soil	C3N-EU1	C3NX-29	1125131	653579.8	3.4	3.4
Phase 3 Soil	C3N-EU1	C3NX-24	1124589.7	653793.2	3.7	3.7
Phase 3 Soil	C3N-EU1	C3NX-09	1124327.1	653889.9	7.3	7.3
Phase 3 Soil	C3N-EU1	C3NX-32	1125589.9	654138.1	0.041	0.041
Phase 3 Soil	C3N-EU1	C3NX-23	1124773.8	654294.3	9.4	8.7
Phase 3 Soil	C3N-EU1	C3NX-28	1125112.3	654345.3	1.7	1.7
Phase 3 Soil	C3N-EU1	C3NX-10	1124373.7	654400.1	11	11
Phase 3 Soil	C3N-EU1	C3NX-11	1123824.5	654439.2	2	2
Phase 3 Soil	C3N-EU1	C3NX-13	1125478.5	654922.5	0.039	0.039
Phase 3 Soil	C3N-EU1	C3NX-12	1124913.1	654932.2	3.2	3.2
Phase 3 Soil	C3N-EU1	C3NX-31	1126510.5	655144.4	0.1	0.1
Phase 3 Soil	C3N-EU1	C3NX-15	1125489.1	655322.8	0.76	0.76
Phase 3 Soil	C3N-EU1	C3NX-14	1125084.8	655481.8	0.55	0.55
Phase 3 Soil	C3N-EU1	C3NX-22	1126429.4	655650	3.2	3.2
Phase 3 Soil	C3N-EU1	C3NX-30	1127062.8	655650.8	0.18	0.18
Phase 3 Soil	C3N-EU1	C3NX-21	1126971.5	655943	3.7	3.7
Phase 3 Soil	C3N-EU1	C3NX-16	1125489.5	656054.4	7.4	7.4
Phase 3 Soil	C3N-EU1	C3NX-18	1126005.4	656230.8	2.1	2.1
Phase 3 Soil	C3N-EU1	C3NX-19	1126856.9	656475.7	9.5	9.5
Phase 3 Soil	C3N-EU1	C3NX-17	1126439.7	656482.9	43	43
Phase 3 Soil	C3N-EU1	C3NX-20	1126705.9	656815.1	41	41

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RFI Soil	C7S-EU1	C-FP10-S4	1112240.456	601102.1007	2.8	2.8
RFI Soil	C7S-EU1	C-FP10-S3	1112283.204	601353.3606	0.078	0.078
RFI Soil	C7S-EU1	C-FP10-S2	1112326.333	601606.5863	0.073	0.073
RFI Soil	C7S-EU1	C-FP10-S1	1112367.47	601848.6497	2.1	2.1
RFI Soil	C7N-EU1	C-FP10-N1	1112399.138	602107.5465	0.072	0.072
RFI Soil	C7N-EU1	C-FP10-N2	1112448.961	602389.0555	0.08	0.08
RFI Soil	C7N-EU1	C-FP10-N3	1112499.077	602670.6611	0.074	0.074
RFI Soil	C7N-EU1	C-FP10-N4	1112549.702	602952.2028	0.079	0.079
RFI Soil	C7N-EU1	C-FP10-N5	1112600.146	603234.0528	0.077	0.077
RFI Soil	C7N-EU1	C-FP10-N6	1112650.26	603515.0861	0.074	0.074
RFI Soil	C7N-EU1	C-FP10-N7	1112700.142	603794.8102	0.074	0.074
RFI Soil	C7S-EU1	C-FP09-S9	1107302.28	604243.1802	0.074	0.074
RFI Soil	C7S-EU1	C-FP09-S8	1107566.441	604371.1607	0.076	0.076
RFI Soil	C7S-EU1	C-FP09-S7	1107827.86	604497.6728	0.08	0.08
RFI Soil	C7S-EU1	C-FP09-S6	1108090.391	604625.1288	0.074	0.074
RFI Soil	C7S-EU1	C-FP09-S5	1108352.38	604752.0831	0.078	0.078
RFI Soil	C7S-EU1	C-FP09-S4	1108614.037	604878.9303	0.073	0.073
RFI Soil	C7S-EU1	C-FP09-S3	1108875.735	605005.8414	0.072	0.072
RFI Soil	C7S-EU1	C-FP09-S2	1109137.708	605132.8389	0.073	0.073
RFI Soil	C7S-EU1	C-FP09-S1	1109399.671	605259.4479	0.4	0.4
RFI Soil	C7N-EU1	C-FP09-N1	1109517.55	605319.6485	1.7	1.7
RFI Soil	C7N-EU1	C-FP09-N2	1109652.894	605389.9665	0.074	0.074
RFI Soil	C7N-EU1	C-FP09-N3	1109789.831	605448.9838	0.077	0.077
RFI Soil	C6S-EU1	C-FP08-S3	1112827.829	614584.4599	0.077	0.077
RFI Soil	C6S-EU1	C-FP08-S2	1112909.537	614593.3338	0.24	0.24
RFI Soil	C6S-EU1	C-FP08-S1	1112988.399	614600.6569	5	3.2
RFI Soil	C6N-EU1	C-FP08-N1	1113149.79	614609.6872	2.4	2.4
RFI Soil	C6N-EU1	C-FP08-N2	1113204.186	614612.7369	0.078	0.078
RFI Soil	C6N-EU1	C-FP08-N3	1113259.856	614615.6957	0.074	0.074
RFI Soil	C5N-EU2	C-FP11-01	1114610.344	617606.3419	3	3
RFI Soil	C5N-EU2	C-FP11-03	1115075.54	617606.6219	0.086	0.086
RFI Soil	C5N-EU2	C-FP11-02	1114782.165	617608.078	0.076	0.076
RFI Soil	C5N-EU2	C-FP11-04	1115388.7	617614.2665	0.42	0.42
RFI Soil	C5N-EU2	C-FP11-06	1115891.058	617616.2212	0.085	0.085
RFI Soil	C5N-EU2	C-FP11-05	1115695.147	617617.4587	0.086	0.086
RFI Soil	C5S-EU1	C-FP07-S1	1115564.145	619318.6524	1.8	1.8
RFI Soil	C5S-EU1	C-FP07-S2	1115330.711	619382.9815	0.078	0.078
RFI Soil	C5S-EU1	C-FP07-S3	1115082.354	619452.6427	0.078	0.078
RFI Soil	C5S-EU1	C-FP07-S4	1114870.733	619527.7931	1.3	1.3
RFI Soil	C5S-EU1	C-FP07-S5	1114662.956	619652.8357	0.082	0.082
RFI Soil	C5N-EU2	C-FP07-N1	1116548.707	622592.856	3.9	3.9
RFI Soil	C5N-EU2	C-FP07-N2	1116537.901	622831.7033	0.074	0.074
RFI Soil	C5N-EU2	C-FP07-N3	1116538.045	623115.9858	0.086	0.086
RFI Soil	C5N-EU2	C-FP07-N4	1116537.711	623399.8904	0.074	0.074
RFI Soil	C5N-EU2	C-FP07-N5	1116538.042	623684.3708	0.076	0.076
RFI Soil	C5N-EU2	C-FP07-N6	1116537.982	623968.2738	0.077	0.077
RFI Soil	C5N-EU2	C-FP07-N7	1116538.015	624253.6685	0.076	0.076
RFI Soil	C5N-EU2	C-FP06-N7	1121822.914	629565.1813	0.081	0.081
RFI Soil	C5N-EU2	C-FP06-N6	1121578.517	629772.7672	0.08	0.08
RFI Soil	C5N-EU2	C-FP06-N5	1121316.073	629961.5603	0.084	0.084
RFI Soil	C5N-EU2	C-FP06-N4	1121062.554	630158.9784	0.074	0.074
RFI Soil	C5N-EU2	C-FP06-N3	1120809.152	630356.7882	0.078	0.078

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RFI Soil	C5N-EU2	C-FP06-N2	1120555.492	630554.5917	0.073	0.073
RFI Soil	C5N-EU2	C-FP06-N1	1120302.44	630752.1671	1.2	1.2
RFI Soil	C5S-EU1	C-FP06-S1	1120190.672	630835.4145	7.6	7.6
RFI Soil	C5S-EU1	C-FP06-S2	1120008.966	630980.5766	1	0.56
RFI Soil	C5S-EU1	C-FP06-S3	1119831.409	631122.2222	1.1	1.1
RFI Soil	C4S-EU3	C-FP05-S13	1118269.911	634811.9177	0.074	0.074
RFI Soil	C4S-EU3	C-FP05-S12	1118551.021	634812.8166	0.086	0.086
RFI Soil	C4S-EU3	C-FP05-S11	1118828.679	634813.8062	0.15	0.15
RFI Soil	C4S-EU3	C-FP05-S10	1119106.999	634814.7665	0.37	0.37
RFI Soil	C4S-EU3	C-FP05-S9	1119384.963	634815.7219	0.58	0.58
RFI Soil	C4S-EU3	C-FP05-S8	1119662.315	634816.5924	5.6	5.6
RFI Soil	C4S-EU3	C-FP05-S7	1119940.995	634817.3096	1.3	1.3
RFI Soil	C4S-EU3	C-FP05-S6	1120218.947	634818.2693	0.68	0.68
RFI Soil	C4S-EU3	C-FP05-S5	1120496.809	634819.1121	1.5	1.5
RFI Soil	C4S-EU3	C-FP05-S4	1120774.971	634820.1076	5.1	5.1
RFI Soil	C4S-EU3	C-FP05-S3	1121053.014	634821.1826	6	6
RFI Soil	C4S-EU3	C-FP05-S2	1121331.44	634821.7542	1.4	1.4
RFI Soil	C4S-EU3	C-FP05-S1	1121609.124	634823.0797	2.9	2.9
RFI Soil	C4N-EU2	C-FP05-N1	1121763.573	634823.8169	2.9	2.9
RFI Soil	C4N-EU2	C-FP05-N2	1122018.849	634825.2441	0.82	0.82
RFI Soil	C4N-EU2	C-FP05-N3	1122272.495	634825.3674	0.083	0.083
RFI Soil	C4N-EU1	C-FP04-N6	1120808.829	644817.749	0.43	0.43
RFI Soil	C4S-EU2	C-FP04-S3	1118396.114	644817.8084	0.085	0.085
RFI Soil	C4S-EU2	C-FP04-S2	1118690.006	644817.8109	0.085	0.085
RFI Soil	C4N-EU1	C-FP04-N8	1121443.825	644817.8414	0.066	0.066
RFI Soil	C4N-EU1	C-FP04-N3	1119810.228	644817.9272	1.2	1.2
RFI Soil	C4N-EU1	C-FP04-N2	1119477.113	644817.9374	0.8	0.8
RFI Soil	C4N-EU1	C-FP04-N4	1120142.703	644817.9694	0.14	0.14
RFI Soil	C4S-EU2	C-FP04-S1	1118984.062	644818.0012	5.7	5.7
RFI Soil	C4S-EU2	C-FP04-S4	1118102.989	644818.0385	0.086	0.086
RFI Soil	C4N-EU1	C-FP04-N5	1120475.927	644818.1173	0.37	0.37
RFI Soil	C4N-EU1	C-FP04-N1	1119143.884	644818.1209	3.5	3.5
RFI Soil	C4N-EU1	C-FP04-N7	1121108.011	644820.5292	0.09	0.09
RFI Soil	C4S-EU1	C-FP03-S1	1119540.594	647665.486	21	18
RFI Soil	C4S-EU1	C-FP03-S2	1119728.462	647898.8687	2.6	2.6
RFI Soil	C4S-EU1	C-FP03-S3	1119854.932	648055.61	4.8	4.5
RFI Soil	C4S-EU1	C-FP03-S4	1119979.648	648212.245	5.2	5.2
RFI Soil	C4S-EU1	C-FP03-S5	1120079.498	648335.6674	3.8	3.8
RFI Soil	C4S-EU1	C-FP03-S6	1120194.378	648479.7458	7.5	7.5
RFI Soil	C4S-EU1	C-FP03-S7	1120295.109	648586.0415	35	35
RFI Soil	C4S-EU1	C-FP03-S8	1120447.703	648797.0596	4.7	4.7
RFI Soil	C4S-EU1	C-FP03-S9	1120517.008	648876.0773	20	20
RFI Soil	C4S-EU1	C-FP03-S10	1120655.979	649051.0764	9.3	9.3
RFI Soil	C4S-EU1	C-FP03-S11	1120686.922	649242.6072	9.7	8.3
RFI Soil	C4S-EU1	C-FP03-S12	1120713.6	649408.98	3.6	3.6
RFI Soil	C4S-EU1	C-FP03-S13	1120726.073	649586.74	1.3	1.3
RFI Soil	C4S-EU1	C-FP03-S14	1120699.567	649680.1489	1.8	1.8
RFI Soil	C4S-EU1	C-FP03-S15	1120770.102	649935.8305	11	11
RFI Soil	C3S-EU1	C-FP02-S1	1124874.109	656628.7169	79	79
RFI Soil	C3N-EU1	C-FP02-N4	1126171.898	656738.9733	32	32
RFI Soil	C3S-EU1	C-FP02-S2	1124726.109	656848.0079	0.082	0.082
RFI Soil	C3N-EU1	C-FP02-N3	1125997.165	656911.8635	27	27

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RFI Soil	C3S-EU1	C-FP02-S3	1124563.264	657010.8174	0.084	0.084
RFI Soil	C3N-EU1	C-FP02-N2	1125822.133	657085.083	14	14
RFI Soil	C3S-EU1	C-FP02-S4	1124400.868	657173.6	0.08	0.08
RFI Soil	C3N-EU1	C-FP02-N1	1125647.334	657258.0459	1.8	1.8
RFI Soil	C2N-EU1	C-FP01-N2	1129016.049	659292.17	1.3	1.3
RFI Soil	C2N-EU1	C-FP01-N1	1128834.418	659509.5422	0.09	0.09
RFI Soil	C2N-EU2	C-FP01-C1	1128780.126	659691.6975	0.086	0.086
RFI Soil	C2N-EU2	C-FP01-C2	1128598.727	659818.821	0.087	0.087
RFI Soil	C2N-EU2	C-FP01-C3	1128441.826	659976.3169	0.09	0.09
RFI Soil	C2N-EU2	C-FP01-C4	1128300.078	660144.497	0.08	0.08
RFI Soil	C2N-EU2	C-FP01-C5	1128128.796	660342.6714	0.087	0.087
RFI Soil	C2N-EU2	C-FP01-C6	1127957.509	660540.8945	0.086	0.086
RFI Soil	C2N-EU2	C-FP01-C7	1127786.218	660739.2267	0.085	0.085
RFI Soil	C2N-EU2	C-FP01-C8	1127622.592	660949.2056	0.082	0.082
RFI Soil	C2N-EU2	C-FP01-C9	1127441.868	661137.6357	0.084	0.084
RFI Soil	C2S-EU1	C-FP01-S1	1127365.918	661221.2309	0.085	0.085
RFI Soil	C2S-EU1	C-FP01-S2	1127216.092	661406.986	0.087	0.087
RFI Soil	C2S-EU1	C-FP01-S3	1127030.404	661637.997	0.08	0.08
RFI Soil	C2S-EU1	C-FP01-S4	1126897.489	661757.3647	0.076	0.076
RFI Soil	C2S-EU1	C-FP01-S5	1126747.911	661963.2502	0.077	0.077
RFI Soil	C2S-EU1	C-FP01-S6	1126592.021	662147.2026	0.073	0.073
RFI Soil -Top of Bank	C9S-EU1	C-182-RB-1	1112501.053	551958.2453	0.028	0.028
RFI Soil -Top of Bank	C9N-EU1	C-172-RB-1	1116214.609	557100.4168	0.084	0.084
RFI Soil -Top of Bank	C9N-EU1	C-172-LB-1	1116567.196	557160.6363	0.075	0.075
RFI Soil -Top of Bank	C9N-EU1	C-166-LB-1	1117176.586	561749.6308	0.076	0.076
RFI Soil -Top of Bank	C9N-EU1	C-165-RB-1	1117352.691	562574.1235	0.69	0.69
RFI Soil -Top of Bank	C9N-EU1	C-161-RB-1	1115138.094	565385.254	0.31	0.31
RFI Soil -Top of Bank	C9N-EU1	C-160-RB-1	1114478.696	566051.6402	0.46	0.46
RFI Soil -Top of Bank	C9N-EU1	C-159-RB-1	1113841.282	566507.3422	0.63	0.63
RFI Soil -Top of Bank	C9N-EU1	C-159-LB-1	1114053.052	566658.2873	0.53	0.53
RFI Soil -Top of Bank	C9N-EU1	C-158-LB-1	1113212.096	567478.2658	0.78	0.78
RFI Soil -Top of Bank	C7N-EU1	C-119-LB-1	1106427.901	590864.9218	1.4	1.3
RFI Soil -Top of Bank	C7N-EU1	C-114-LB-1	1109722.045	594576.0655	2.5	2.5
RFI Soil -Top of Bank	C7N-EU1	C-112-LB-1	1110807.669	595958.3922	1.6	1.6
RFI Soil -Top of Bank	C5S-EU1	C-071-RB-1	1114359.139	617239.4794	2.3	2.3
RFI Soil -Top of Bank	C5S-EU1	C-070-RB-1	1114560.486	618079.4121	2.8	2.8
RFI Soil -Top of Bank	C5S-EU1	C-068-RB-1	1115715.715	619476.2107	3.9	3.9
RFI Soil -Top of Bank	C5N-EU2	C-061-LB-1	1115700.43	621294.5162	2.6	2.6
RFI Soil -Top of Bank	C5S-EU1	C-060-RB-1	1114784.647	621681.5169	2.6	2.6
RFI Soil -Top of Bank	C5N-EU2	C-063-LB-1	1116017.087	621775.0107	9.4	9.4
RFI Soil -Top of Bank	C5N-EU2	C-065-LB-1	1117121.896	622185.1254	4.1	4.1
RFI Soil -Top of Bank	C5N-EU2	C-064-LB-1	1116363.907	622701.3728	0.49	0.49
RFI Soil -Top of Bank	C5S-EU1	C-051-RB-1	1117048.699	626753.951	3.3	3.3
RFI Soil -Top of Bank	C4N-EU2	C-038-LB-1	1121164.463	636070.7188	0.69	0.69
RFI Soil -Top of Bank	C4N-EU2	C-034-LB-1	1119155.609	636903.25	1.1	1.1
RFI Soil -Top of Bank	C4S-EU2	C-034-RB-1	1119129.99	636976.4679	5.4	5.4
RFI Soil -Top of Bank	C4S-EU2	C-030-RB-1	1118729.1	640227	6.7	6.7
RFI Soil -Top of Bank	C4N-EU1	C-027-LB-1	1119135.3	642529.3	5.6	5.6
RFI Soil -Top of Bank	C4S-EU2	C-026-RB-1	1118931	643671.9	4.1	3.4
RFI Soil -Top of Bank	C4N-EU1	C-025-LB-1	1118905.6	644371	2.3	2.3
RFI Soil -Top of Bank	C4S-EU1	C-023-RB-1	1119111.807	645961.8873	12	12
RFI Soil -Top of Bank	C4N-EU1	C-023-LB-1	1119187.3	645982.3	11	11

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RFI Soil -Top of Bank	C4N-EU1	C-012-LB-1	1122078.06	650770.9444	21	21
RFI Soil -Top of Bank	C3N-EU1	C-008-LB-1	1123130.538	655132.5017	17	17
RFI Soil -Top of Bank	C3S-EU1	C-005-RB-1	1125390.241	657233.6562	0.081	0.081
RFI Soil -Top of Bank	C2N-EU2	C-U1-RB-1	1128795.721	659704.2007	0.089	0.089
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-20	1112924.3	567191.7	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-20	1113621.8	567548.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-19	1113250.7	567652.8	2.4	2.4
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-18	1113515.1	568021	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-19	1112571.1	568135.8	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-18	1112589.8	568607.7	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-17	1112683.2	569079.8	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-16	1112330.1	569394.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-15	1111961.7	569973.5	0.42	0.42
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-17	1112906.5	570023.7	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-14	1111490.3	570063.1	0.37	0.37
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-16	1112011.9	570338.1	0.2	0.19
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-13	1111066.7	570537.7	0.54	0.54
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-12	1110846.6	570773.7	0.55	0.55
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-11	1110375.5	570816	0.47	0.47
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-15	1111321.2	571007.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-14	1110896.6	571243.3	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-13	1110423.8	571287.8	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-12	1110175	571760.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-11	1109941.7	572358.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-10	1109436.9	572469.9	0.21	0.21
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-09	1109542.5	572893	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-07	1110508	573170.4	0.45	0.45
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-08	1110042.1	573301.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-06	1110916.2	573603.3	0.2	0.2
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-10	1111388.5	573838.6	0.086	0.086
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-05	1110617.3	574075.3	0.33	0.33
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-09	1111087.8	574309.9	0.096	0.096
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-08	1110873.6	574549.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-07	1110586.7	575019.2	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-04	1109643	575195	0.41	0.41
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-06	1109739.7	575662.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-03	1108604.9	576769.9	0.58	0.58
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-05	1109074.2	577010.2	0.077	0.077
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-04	1108816.4	577483.8	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-03	1108643.8	577709.6	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-02	1108175.9	578004.7	5.1	5.1
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-02	1107415.6	579043.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-20	1106860.6	579192.3	0.054	0.054
RI/FS - OU-4 Soil (P1, P2)	C9S-EU1	C9S-01	1107037.6	579280.8	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C9N-EU1	C9N-01	1107461.8	579512.8	1	1
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-20	1107149.4	580921.1	3.3	3.3
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-16	1110654.8	581246.6	5.5	5.5
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-17	1109026.8	581339.8	3.2	3.2
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-18	1108446.6	581414	0.057	0.057
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-19	1107439.2	581496.4	0.41	0.38
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-19	1107873.8	581530.9	1.2	1.2
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-18	1109130.8	581720.9	0.035	0.035

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-17	1110422.3	582158.4	0.22	0.22
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-16	1109426.6	582843	0.11	0.11
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-15	1108896.1	583007.9	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-15	1110339.5	583157.1	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-14	1108457.5	583570.3	0.063	0.063
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-12	1106769.6	583689.2	0.17	0.17
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-13	1107353.7	583705	3	3
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-14	1107639.5	583859.4	0.9	0.9
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-13	1106178.2	584684	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-11	1105676.7	585010	3.1	3.1
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-10	1107268.4	585504.8	2.3	2.3
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-09	1107838.9	585570.5	1.2	1.2
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-11	1106693.7	585652.8	2.4	2.4
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-12	1106118.9	585782.9	3.5	3.4
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-07	1107043.9	585939.4	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-10	1105341.2	585948	0.091	0.091
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-08	1108380.7	585985.1	0.14	0.14
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-06	1107606.4	585998.2	0.081	0.081
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-08	1106480.1	586031	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-09	1105919.4	586152	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-05	1107515.3	586560.1	0.054	0.054
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-07	1108106.8	586713.2	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-05	1107156.8	587224.8	0.65	0.65
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-06	1107728.5	587285.2	0.27	0.27
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-04	1105748.1	588340.8	0.13	0.13
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-04	1105003.9	588967.3	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-03	1105881.4	589247.7	0.11	0.11
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-02	1105724.9	589484.5	0.13	0.13
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-03	1104759.2	589522.6	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-01	1105853.8	590056.4	0.25	0.25
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-02	1105026.6	590091.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-01	1105215.9	590441.8	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-57	1106204.6	590964.1	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-56	1106501.9	591148.3	0.16	0.096
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-53	1106885.5	591305.8	0.66	0.66
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-52	1107341.6	591379.9	0.21	0.21
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-55	1106550.5	591629.7	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-20	1107739.7	591723.3	0.11	0.099
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-51	1107367.7	591836	0.33	0.33
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-50	1107815	592293.4	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-54	1106962.8	592300.8	0.051	0.051
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-20	1104905.2	592384.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-53	1107408.4	592679.5	0.094	0.094
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-49	1107798.8	592709.4	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-18	1109070.1	592758.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-19	1106325.1	592918.7	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-52	1107396.5	593203.2	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-48	1108124	593205.4	0.079	0.079
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-47	1108235.9	593661.3	0.05	0.05
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-51	1107635.1	593666.1	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-46	1108250.8	593708.8	0.06	0.06
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-19	1108872.8	593745.8	0.04	0.04

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-50	1107818.5	593942.6	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-18	1107420.4	594090	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-45	1108605.7	594164.6	0.072	0.072
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-42	1109973.8	594250.1	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-44	1109061.8	594297.5	0.097	0.097
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-43	1109517.7	594319.9	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-49	1108183.8	594406.7	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-46	1109108.2	594618.4	0.28	0.28
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-47	1108643	594644.4	0.098	0.098
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-44	1110042.9	594780.4	1.1	1.1
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-48	1108189.5	594870	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-41	1110690.2	595016.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-45	1109578.6	595112.6	0.047	0.047
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-43	1110084.1	595280.5	0.072	0.067
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-17	1108466.3	595387.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-40	1110854.4	595473.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-42	1110545.4	595495.2	3.9	3.9
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-16	1109481.2	595608.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-41	1110406.411	595743.5597	0.075	0.075
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-39	1110806.8	595931.3	0.81	0.81
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-15	1110129.6	596033	0.068	0.068
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-40	1110314.4	596206.4	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-39	1110747.7	596416.3	1.8	1.8
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-14	1109114.6	596623.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-38	1110433.5	596669.3	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-37	1110854.7	596870.8	3.6	3.6
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-13	1110010.2	597047.9	0.18	0.18
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-36	1110761.2	597345.4	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-38	1111318.9	597379	0.092	0.092
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-37	1111771.6	597524.3	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-35	1110890.3	597808.7	0.081	0.081
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-36	1111377.3	597858.9	2	2
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-12	1109763.8	598062.8	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-34	1110891.2	598288.8	0.11	0.11
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-35	1111577.7	598436.5	0.077	0.077
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-33	1110418.4	598521.5	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-34	1111260	598768.3	0.062	0.062
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-13	1114145.4	598854	0.065	0.065
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-12	1115137	598938.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-17	1112175	598953.3	1.1	1.1
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-32	1110114	598984.6	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-33	1110804	599120.6	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-14	1113161.9	599326.8	0.67	0.67
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-11	1116122	599380.3	0.056	0.056
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-30	1109749.5	599411.3	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-31	1110199.6	599457.6	0.054	0.054
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-31	1110404.4	599487.1	0.078	0.078
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-09	1117108.7	599525.4	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-32	1110847.6	599576.7	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-22	1113713.7	599656.7	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-23	1113177.9	599660.1	0.34	0.34
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-11	1109113	599666.4	0.038	0.038

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-29	1109820.9	599876.4	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-16	1111381	599904.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-30	1110442.1	599922.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-10	1115327.9	599924.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-21	1114090	599932.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-15	1112368.1	599939.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-20	1114326.6	600076.6	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-18	1113524.7	600087	0.37	0.37
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-24	1112923.2	600116.2	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-28	1109814.8	600337.3	0.075	0.075
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-08	1116314.9	600367	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-25	1112467.2	600407	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-10	1108297.5	600431	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-19	1114798.5	600458	0.079	0.079
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-29	1110643.1	600488.5	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-19	1113518.9	600550	0.066	0.066
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-20	1113055.9	600647	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-26	1112107.6	600676.5	0.16	0.16
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-09	1109297.8	600682.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-17	1113981.7	600705.2	0.36	0.36
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-27	1111651.7	600716.3	0.24	0.24
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-27	1110031.9	600831.5	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-18	1114800	600857	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-26	1110538	600895.9	9.9	9.9
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-21	1112854.9	600961.9	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-16	1113781	601010.6	0.67	0.48
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-28	1111397.9	601048.1	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-14	1113309.6	601107.6	2.2	2.2
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-08	1109687.5	601107.7	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-17	1114511.5	601216.4	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-22	1112181.6	601248.2	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-15	1114133.9	601303.5	8.4	8.4
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-07	1116489.8	601353.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-13	1112640.9	601427.1	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-23	1111715	601435	0.21	0.21
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-16	1114558.9	601483.4	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-15	1113565.8	601486.6	0.18	0.18
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-25	1110788.6	601512.6	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-07	1108672.5	601697.8	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-12	1112205.8	601710	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-14	1114103.2	601756.8	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-24	1111279.9	601758	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-11	1111743.2	601897.5	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-06	1110701.8	601910.8	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-12	1113022.3	601947.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-13	1113493.5	602016.8	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-10	1111465.4	602221.2	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-11	1112581.5	602231	0.1	0.1
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-03	1113556.9	602286.9	0.052	0.052
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-09	1111002.3	602438.6	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-10	1112345.7	602500.5	0.059	0.059
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-09	1111889.6	602540.3	0.035	0.035

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-08	1111104.534	602684.1113	0.26	0.26
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-05	1108601.8	602712.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-07	1110611.6	602871.4	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-07	1111174.1	602875.8	0.2	0.2
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-02	1112823	602900.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-08	1111628.8	602996.3	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-04	1109735.7	603137.4	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-06	1110487.8	603151.4	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-04	1113810.8	603272.8	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-06	1111285	603293.2	0.064	0.064
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-03	1107705.9	603506.4	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-04	1109905.2	603578.5	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-05	1110324.8	603584.7	3.1	3.1
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-05	1110856.9	603701.5	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-05	1114707.6	603835	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-01	1111749.6	603851.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-04	1110410.8	604026.4	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-03	1110166.6	604480	0.035	0.035
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-03	1109716.1	604494.7	1.8	1.8
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-02	1108140.2	604521.4	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-02	1109993.5	604734.3	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-02	1109256.6	604835.5	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7NF-06	1115655.4	604857.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7SF-01	1107457.5	605257.3	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-01	1109602.1	605264.3	1.2	1.2
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-01	1109175.7	605298.5	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-20	1108515.3	605681.3	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-12	1107101.4	605854.6	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-21	1108963.1	605867.8	2.7	2.7
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-19	1107071.9	606036.8	4.9	4.9
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-20	1108654	606157.3	2.2	2.2
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-18	1106793.5	606312.7	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-19	1106264.9	606397.3	0.56	0.56
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-18	1105911.7	606583.3	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-17	1107592.6	606913.8	0.82	0.82
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-17	1107392	607390	1.5	1.5
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-16	1107216	607884.7	1.9	1.9
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-11	1106513.3	607924.6	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-15	1106655.8	608140.9	0.4	0.4
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-13	1108941.2	608199	0.4	0.4
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-10	1109370.2	608430.5	0.13	0.13
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-13	1108255.1	608520.6	0.27	0.27
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-14	1106820	608591.9	4.4	4.4
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-16	1106456	608636.2	0.06	0.06
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-14	1107449	608734.6	0.74	0.74
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-15	1107001.8	608906.2	0.067	0.067
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-12	1111063.9	610001.9	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-07	1111062.6	610508.2	1.2	1.2
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-06	1110597.2	610832.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-11	1111181.2	610905	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-05	1110371.1	611745.4	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-10	1110697.3	612070	0.038	0.038

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-08	1111085.6	612286.3	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-09	1110620.2	612511.8	1.9	1.9
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-07	1111560.6	612543.7	0.92	0.92
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-06	1112005.8	612627	0.24	0.24
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-09	1110737.6	612727.6	2.8	2.8
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-04	1111531.3	612842.6	4.7	4.7
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-05	1112422.8	613027.4	2.2	2.2
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-04	1112769.1	613485.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-03	1112327	613486.5	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-03	1112949	613902.5	0.055	0.053
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-20	1116752.3	614328.7	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-08	1112848.4	614486.2	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-19	1116233.7	614628.5	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-01	1114200.1	614990.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-02	1113281.5	614992.1	5.2	5.2
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-17	1115400.1	615198.3	0.094	0.094
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-18	1116095.9	615278.3	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-02	1113616.7	615338.8	10	10
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-46	1114971.9	615475	0.28	0.28
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-01	1113923	615548.4	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-45	1114511.8	615651.6	0.13	0.13
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-16	1115563.8	615866.2	0.3	0.3
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-44	1114479.1	616112.5	0.63	0.63
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-47	1114197.3	616115.4	0.064	0.064
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-43	1114655.3	616387.8	0.067	0.067
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-15	1115374.1	616536.2	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-46	1114310.1	616581.5	2.6	2.6
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-42	1114926.2	616848.2	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-45	1114215.4	617036.7	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-41	1114977.2	617309.4	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-44	1114477.7	617755.1	0.048	0.048
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-40	1114870.2	617761.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-14	1115344.1	617874.5	0.16	0.16
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-43	1114428.9	618189.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-39	1115103	618319.5	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-38	1115563.7	618426.9	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-42	1114728	618651	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-37	1115417.6	618780.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-36	1115877.8	618887.9	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-20	1114555.7	618958.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-41	1115352.5	619277.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-35	1115820.6	619349	0.41	0.41
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-19	1114541.2	619470.7	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-13	1116781.9	619657.4	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-34	1116613.7	619677	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-40	1115532.8	619740.3	0.34	0.34
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-39	1115967.5	619767.2	0.65	0.65
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-17	1115062.3	619824.1	1.8	1.8
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-18	1114723.3	619982.9	0.18	0.18
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-38	1116339.1	620332.5	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-14	1115235.5	620336.2	0.85	0.85
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-15	1114598.9	620494.7	0.039	0.039

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-16	1114086.2	620521.6	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-33	1117206	620663.1	0.071	0.071
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-37	1116603.8	620783.8	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-13	1115110.9	620848.2	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-12	1117761.7	621112.2	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-32	1117359.8	621155.4	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-11	1118433.1	621180	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-24	1115984.6	621235.7	0.42	0.42
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-36	1116838.8	621466.6	2.2	2.2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-31	1114949	621487.2	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-23	1115569.4	621654.1	0.077	0.077
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-25	1116030.7	621697.1	6.5	4.7
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-34	1116554.8	621712.7	1.5	1.5
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-21	1114829.2	621899.5	0.47	0.47
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-35	1117045.7	621917.9	3.5	3.5
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-22	1115271.8	622007.9	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-32	1116129.9	622020.3	3.9	3.9
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-30	1114284.3	622114	0.053	0.053
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-26	1115732.2	622115.1	0.45	0.45
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-33	1116412.3	622178.3	1.1	1.1
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-20	1114544.5	622381.8	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-30	1116840.5	622511.6	0.32	0.32
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-31	1117306.9	622563.5	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-29	1114096.4	622569.1	0.39	0.39
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-27	1115924	622619	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-28	1113796	622872.4	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-05	1114882.6	622888.5	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-29	1116686.7	622903.4	0.053	0.053
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-10	1116889.7	623003.8	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-28	1116225.9	623079.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-06	1115439.3	623223.2	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-09	1116112.7	623322.3	0.089	0.089
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-27	1113670.1	623339.5	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-04	1114772	623541.3	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-26	1113211.2	623712.9	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-25	1113650.5	623797.2	1.5	1.2
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-19	1113874.6	623861.6	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-07	1115288.3	623898.6	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-08	1115958	623991.9	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-24	1113218	624174.8	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-23	1113642.1	624263.6	0.31	0.31
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-18	1113833	624326.1	1.8	1.8
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-17	1114293.8	624409.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-22	1113563.4	624732.6	0.3	0.3
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-16	1113999.4	624783.7	0.45	0.45
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-03	1114592.7	624909.5	0.13	0.13
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-21	1113435.7	625099.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-13	1114610	625150.2	2.4	2.4
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-10	1116443.5	625208.4	0.049	0.049
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-12	1115058.5	625233.8	3.2	3.2
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-15	1113679.4	625246	1.5	1.5
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-14	1114139.8	625330.1	1.2	1.2

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-11	1115521	625342.2	0.96	0.96
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-15	1116276.1	625416.1	2.2	2.2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-18	1114429.7	625565.3	0.073	0.073
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-14	1116735.1	625611.9	1.1	1.1
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-20	1113507.8	625644.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-17	1114890.5	625646	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-16	1115812.7	625702.6	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-09	1117523.3	625790.5	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-19	1113968.5	625796	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-12	1113229.2	625976	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-13	1117012.9	626073.6	1.5	1.5
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-09	1114683.4	626127.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-10	1114171.1	626158.3	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-08	1117406.1	626251.5	0.05	0.05
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-12	1116695.9	626326.2	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-11	1113627.1	626329.4	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-02	1118233.8	626466.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-07	1117506.3	626712.6	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-08	1115023.9	626994	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-11	1116976.8	626997	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5NF-01	1118350.4	627135.6	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-06	1117656.2	627173.6	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-05	1117911.7	627607.6	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-03	1118115.9	628045.1	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-04	1117640.9	628108	0.44	0.44
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-09	1117534.1	628290.7	3.5	3.5
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-10	1117033.6	628378.3	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-02	1118122.6	628506.2	0.058	0.05
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-08	1117747.6	628890.3	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-07	1118230.4	628957.8	16	16
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-06	1117590.8	629227.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-06	1117986.5	629343.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-05	1118469.1	629346.9	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-01	1119143.9	629538	0.44	0.44
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-05	1117078.4	629593.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-07	1117200	629613.2	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-04	1117509.7	629736.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-04	1118809.8	629766.2	0.89	0.89
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-02	1118534	629855.9	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-44	1121224.7	629869.2	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-03	1119243.9	629908.1	0.49	0.45
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-03	1118022.3	629942	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-43	1121667.6	630032	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-01	1119624.5	630235.4	2	2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-02	1119164.6	630353.1	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5SF-01	1118858.3	630368.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4N-55	1120445.1	630463.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-42	1121015.8	630532.9	0.11	0.11
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-39	1122033.4	630721.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-57	1120112.2	630738.7	5	5
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-58	1119662.3	630831.3	0.059	0.059
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4N-54	1120689.6	630965.7	0.6	0.6

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-56	1120078.5	631132.8	3.2	3.2
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-41	1121419.4	631200.5	0.9	0.9
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-40	1121695.3	631353.7	0.2	0.2
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4N-53	1120834.6	631391.2	0.71	0.47
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4NF-38	1121028.8	631860	0.12	0.12
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-52	1120507.2	631871.1	6.8	6.8
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C4NF-37	1122029.5	631951.5	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-51	1120238.3	632171.5	1.4	1.4
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-55	1119710.1	632182.5	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-50	1120705.3	632327.2	1.6	1.6
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4NF-36	1121408.1	632523.2	0.085	0.085
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-54	1119824.4	632582.4	0.55	0.55
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4NF-35	1121884.5	632675.9	0.076	0.076
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-49	1120535.4	632793.1	2.8	2.8
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-53	1119906.6	633047.1	0.35	0.35
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4SF-33	1119436.5	633118.7	3.6	3.6
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4NF-34	1121221	633186.7	4.4	4.4
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-48	1120600.7	633259.5	4.8	4.8
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-47	1120957.6	633384	4.2	4.2
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-52	1120158	633515.8	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4SF-31	1119403.1	633716.5	4.8	4.8
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4SF-32	1118692.3	633809.1	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-46	1121025.7	633835.4	2.8	2.8
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-45	1121488.3	633856.3	0.18	0.18
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-51	1120039.4	633983.8	0.048	0.048
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-49	1121012.9	634117.9	3	2.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-50	1120550.4	634188.2	3.4	3.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-44	1121662	634322	5.4	5.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-30	1120127.6	634325.9	14	14
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-26	1119474.7	634428.7	0.18	0.18
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-25	1118821.8	634470.6	0.23	0.23
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-29	1120779.7	634552	5.7	5.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-48	1121293.4	634726.4	1.4	1.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-43	1121894.2	634876.4	24	24
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-27	1120506.7	634978.3	0.051	0.051
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-22	1118548.8	635072.6	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-24	1119854.2	635081.4	3.6	3.6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-23	1119201.3	635123.6	0.36	0.36
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-42	1122332.4	635128.7	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-28	1121134.2	635184.1	2.4	2.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-47	1121546	635195.3	11	11
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-42	1120163.8	635361.8	0.31	0.31
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-41	1119702.7	635415.1	4.7	4.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-44	1120861.4	635501.5	13	13
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-43	1120477.9	635574.3	1.2	1.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-45	1121401.9	635649.8	0.072	0.072
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-37	1119091.8	635673.8	0.063	0.063
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-46	1121864	635704.8	1.2	1.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4SF-21	1118546.7	635725	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-39	1119554.5	635878.7	0.37	0.37
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-37	1120149.8	635894	1.6	1.6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-36	1118826.8	635928.8	1.1	1.1

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-38	1120613.3	636053.9	6	6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-38	1119340.6	636136.4	0.4	0.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-39	1121080.5	636180.1	0.31	0.31
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-40	1121546.1	636186.3	0.81	0.81
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-41	1121999.5	636277	0.11	0.11
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-35	1118411.7	636294.7	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-40	1119801.7	636340.5	16	16
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-36	1120341.9	636361.3	0.084	0.084
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-34	1118526.6	636411.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-32	1120595.2	636446.4	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-34	1119409.7	636630.1	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-35	1119975.8	636642.7	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-33	1121837	636654.5	0.32	0.32
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-33	1118946.2	636681.7	4.9	4.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-33	1118946.6	637029.2	1.4	1.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-32	1119467.6	637083.1	0.16	0.16
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-30	1120482	637103.5	0.13	0.13
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-31	1121081.3	637116.5	0.1	0.1
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-32	1118557.2	637270.3	0.65	0.65
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-29	1119937.7	637423.8	1.2	1.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-31	1119019.3	637523.4	3.6	3.6
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-31	1119349.2	637562.5	3.4	3.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-20	1118542.9	637728.5	0.051	0.051
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-28	1120592.7	637786.5	0.062	0.062
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-30	1118953	637985.9	10	10
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-19	1117877.6	638016.5	0.049	0.049
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-30	1119414.2	638028.5	0.35	0.35
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-27	1119955.1	638084.5	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-29	1118673.5	638259.7	4.5	4.5
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-18	1118136	638262.8	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-29	1119255.6	638489.5	7.4	7.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-17	1117479.4	638657.8	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-28	1118949.7	638811.8	11	11
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-28	1119468.5	638959.3	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-27	1118693.2	639191.2	4.3	3.6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-16	1117849.7	639315.4	0.69	0.69
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-15	1116545.4	639362.9	0.047	0.047
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-27	1119026.6	639418.1	1.7	1.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-14	1117294.5	639723.7	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-26	1118476.7	639887.4	1.3	1.3
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-26	1119107.5	639890.8	6.2	6.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-13	1117968.8	639964.8	0.59	0.59
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-12	1116641.3	640015.5	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-25	1118611.7	640022.7	17	17
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-11	1117259.6	640376.4	0.061	0.061
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-24	1118081.3	640396.7	9	9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-10	1116709	640494.5	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-23	1118289.6	640905.3	0.36	0.36
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-22	1117856.6	640959.8	4.1	4.1
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-09	1116780.7	641029.7	0.81	0.81
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-08	1117423.4	641279.8	1.5	1.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-25	1118691.5	641338.5	0.24	0.24

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-26	1119671.9	641400.1	0.054	0.05
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-21	1117732.2	641403.5	2.3	2.3
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-07	1117056.8	641681.5	0.2	0.2
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-22	1119155.4	641797.3	0.23	0.23
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-24	1118212.4	641805.6	4.6	4.6
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-23	1118672.5	641807.8	4.7	4.7
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-25	1119741.1	641977.1	0.14	0.14
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-21	1118851.1	642271.6	13	13
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-20	1118211.1	642278.5	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-23	1120415.7	642411.1	0.047	0.047
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-22	1121135.4	642544.9	0.052	0.052
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-21	1121786.2	642631.8	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-19	1119746.7	642652.3	0.41	0.41
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-20	1119280.4	642685.9	3.2	3.2
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-24	1119790.7	642728.3	0.5	0.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-20	1122366	642958.1	0.099	0.099
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-19	1118979	643066	3.8	3.8
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-18	1119636.4	643118	2.2	2.2
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-18	1121208.2	643160.6	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-17	1120140.2	643208.4	1.1	1.1
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4NF-19	1121862.3	643288.4	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-17	1118846.5	643339.3	4.4	4.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-16	1119910.5	643376.3	0.94	0.94
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-17	1119127.4	643617.7	10	10
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-18	1118380.5	643647.3	1.6	1.6
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-15	1120525.8	643783.4	0.65	0.65
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-16	1118417.2	643801.3	5.7	5.7
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-06	1117852	643883.5	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-14	1120172.8	644056	1.5	1.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-13	1119509.1	644074.7	1.1	1.1
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-16	1119271.5	644083.7	1.6	1.6
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-15	1118805.8	644132.3	3.3	3.1
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-12	1120836.1	644407.7	0.61	0.61
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-05	1118004.4	644535.8	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-14	1119210.7	644549.5	9.8	9.8
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-15	1118272.8	644590.9	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-11	1119818	644718.8	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-14	1118697.9	644725	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-13	1119187.8	645015.3	18	18
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-09	1121153.5	645149.2	0.49	0.49
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-10	1120431.4	645180.8	0.43	0.43
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-13	1118842.5	645188.4	0.048	0.048
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-08	1119925.6	645382.5	20	20
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-12	1119479.9	645481	0.66	0.66
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4SF-04	1118062.2	645515.8	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-08	1120322	645678.6	0.46	0.46
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-07	1121252.5	645792.6	0.08	0.08
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-12	1118932.9	645857.2	0.036	0.036
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-09	1119855.8	645913.3	0.59	0.59
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-11	1119390	645946.7	1.8	1.8
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-11	1118796	646124.5	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4SF-03	1118148	646168.3	0.044	0.044

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-07	1120592.7	646292.9	3	3
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-06	1120961.6	646324.8	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-05	1121634	646347.1	0.66	0.66
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-10	1119273	646398.8	31	31
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-10	1118801.9	646533.4	3.5	3.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-06	1120458.6	646540.6	3.5	3.5
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-09	1119295.6	646769.1	7.9	7.9
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-05	1119858.3	646845.3	0.58	0.58
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4SF-02	1118661.5	646898.1	0.13	0.13
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-04	1120112.2	647076.6	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-04	1120839	647095.1	0.22	0.2
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-03	1121515.7	647138.5	0.4	0.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-08	1119143.9	647220.1	22	22
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-02	1122023.4	647272	0.17	0.17
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-07	1119544.7	647424.1	0.27	0.27
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-03	1120170.9	647558.6	13	13
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-02	1120676.9	647742.6	7.4	7.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4NF-01	1121360.5	647793.5	1.2	1.2
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-05	1120087.9	647836.1	3.5	3.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-06	1119519.9	647880.1	26	26
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-01	1120862.8	648140.9	11	11
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-04	1120010	648293.8	52	52
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-03	1120618.5	648510.1	4.4	4.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4SF-01	1119745	648788.4	0.41	0.41
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-01	1120829.6	648901.1	14	14
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-02	1120366.9	648972.1	7.4	7.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-25	1121099.2	649148.3	28	28
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-31	1120768.8	649238.6	1.6	1.6
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-24	1121011.3	649602.3	0.91	0.91
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-22	1121916.9	649623.4	15	14
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-30	1120505.5	649756.4	7.4	7.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-23	1121559.9	649912.4	38	38
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3SF-20	1120491.7	649969.6	3.4	3.4
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-29	1120730.5	650178	2.5	2.5
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-28	1121223	650378.6	24	24
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-27	1121629.1	650422.8	1.4	1.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-21	1122398.5	650527.7	1.1	1.1
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-26	1121452.7	650894.3	4.6	4.6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-25	1121926.7	650991.4	25	25
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-20	1122115.1	651134.7	16	16
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-24	1121922.3	651461.8	12	12
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-19	1122566.7	651910.8	0.51	0.51
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-23	1121811.7	651928.5	33	33
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-22	1122269.3	651938.3	0.43	0.43
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3NF-20	1123293.3	652090.9	0.06	0.06
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3NF-19	1123364.7	652318	0.42	0.4
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-21	1121935.6	652396.4	12	11
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-18	1122487.4	652429.8	10	10
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3NF-18	1123410.1	652649.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-16	1123170.7	652695.9	12	12
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-20	1122171.4	652862.6	13	13
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-17	1122684.9	652864.8	19	19

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3NF-17	1123469.3	653041	1.9	1.9
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-15	1122926.1	653251.7	48	48
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-19	1122336.5	653300.4	0.62	0.62
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-18	1122655.3	653328.6	31	31
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-16	1123691.8	653528.5	6.4	6.4
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-14	1123029	653703.8	6.7	6.7
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-17	1122658.6	653807.7	0.66	0.66
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-15	1123888.2	653863.9	9.6	9.6
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-14	1123863.5	654155.5	6.2	6.2
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-13	1123183.9	654164.6	8.2	8.2
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-16	1122920.1	654365.2	0.25	0.25
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-12	1123253.4	654482.2	3.5	3.5
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-12	1123966.8	654640.3	5.6	5.6
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-13	1123614.7	654655.3	2.3	2.3
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-15	1122987	654837.5	0.74	0.74
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-10	1124077	654942.5	10	10
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-11	1123408.2	654943.5	2.3	2.3
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-11	1123777	654955.7	14	14
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-09	1124376.4	654990.1	7.5	7.5
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-07	1124125.9	655242.3	4.7	4.7
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-08	1123826	655255.9	11	11
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-06	1124425.3	655290.3	12	12
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-10	1123573.4	655404.2	9.3	9.3
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-05	1124283	655598.3	21	21
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-04	1124494.5	655618.3	6.6	6.6
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-09	1123581.2	655714.1	3.7	3.7
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-08	1124049.4	655857.5	20	20
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-03	1124551.6	655918.1	0.33	0.33
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-14	1123475.8	656038.9	0.24	0.24
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-07	1124536	656054.4	30	30
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-02	1125457.9	656345.8	24	24
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-05	1125093.6	656355.7	75	75
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-06	1124691.6	656488.3	8.7	8.7
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3NF-01	1125697.1	656559.5	50	50
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-13	1124189.8	656564.5	0.72	0.72
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-04	1125488.1	656816.5	29	29
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-12	1124773.8	656874	0.29	0.29
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-03	1125895	657118.9	9.8	9.8
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-01	1127867.7	657217	3.8	3.8
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-10	1125213.5	657243.4	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-03	1127093.3	657253	52	52
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-02	1126321.1	657275.8	35	35
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-04	1126968.7	657348.4	32	32
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-11	1125068.8	657389.5	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-05	1126447.2	657402.4	13	13
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-06	1126814.8	657586.4	64	64
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-19	1124967.8	657599.4	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-09	1125558.7	657713.3	0.047	0.047
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-02	1127438.5	657723.1	64	64
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-07	1126274.2	657827.4	0.18	0.18
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-12	1127060.6	657863.1	7	6.5
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-08	1125837.8	657915.8	0.038	0.038

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-31	1129395.2	657934.1	1.8	1.8
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-32	1128471.1	657997.9	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-18	1124874.2	657998.4	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-07	1127296.1	658047	12	12
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-15	1125278.5	658054.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-01	1127643.9	658191.6	1.4	1.4
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-19	1128138	658194.6	0.18	0.18
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-11	1126710.7	658195.1	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-20	1127751.9	658205.8	0.25	0.21
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-30	1128626	658279.1	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-29	1129095.1	658396.6	0.09	0.065
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-17	1124693.3	658413.4	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-06	1127053.6	658432.7	0.99	0.99
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-01	1127490.4	658474.7	0.28	0.28
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2S-18	1128323.1	658580.1	1.8	1.8
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-08	1126829.6	658592.2	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-17	1127933.2	658596.4	0.38	0.38
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-14	1125594.5	658646.6	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-28	1128759	658739	32	32
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-16	1124796	658805.2	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-02	1127209.1	658854	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-25	1129220.8	658858	14	14
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-13	1125998.2	658861.3	0.039	0.039
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-26	1128296.3	658923.1	0.049	0.049
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-27	1128013.1	658936.7	0.49	0.49
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-05	1126851.6	659001.6	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-16	1127681.3	659011.8	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-23	1128937.8	659201.2	0.18	0.18
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-15	1127441.8	659209.9	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-09	1126522.5	659223.8	0.048	0.048
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-24	1129444.4	659322.4	5.3	5.3
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-22	1128475.6	659384.7	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-21	1127883.8	659393.1	0.07	0.07
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-03	1126671.2	659405.1	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-14	1127052.9	659549.2	0.041	0.041
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-10	1126267.9	659627.2	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-20	1128855.4	659681.6	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C2S-13	1126661.4	659774.9	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-19	1129269.9	659783	0.047	0.047
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-18	1128346.2	659846.8	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-17	1127849.7	659856.1	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-16	1127388.3	659873.7	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3SF-04	1126388.3	659989.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C2S-11	1126367.7	660045.1	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-12	1126802.9	660161	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-15	1129253.5	660232	0.05	0.05
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-14	1128311.7	660309	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-13	1128024.4	660318.6	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-12	1127557.1	660338.3	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C2S-10	1126184.7	660394.6	0.2	0.2
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-09	1126555.3	660546.9	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-11	1129130.6	660632.8	0.038	0.038

Table 4-2. OU-4 Length-Weighted Nonresidential Surface (0-6 inches) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Surface Length-Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-06	1129366.5	660696	0.038	0.038
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-10	1127097.2	660735.7	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-07	1128485.7	660770.6	0.046	0.046
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-08	1128004.2	660779.3	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-09	1127546.4	660797	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-08	1126396.5	660804.9	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-03	1129392.7	661168.1	0.037	0.037
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-04	1128468.8	661232.7	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-05	1127918.8	661241.2	0.049	0.049
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-07	1126728.6	661339.9	0.042	0.042
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-05	1127163.9	661490.6	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-01	1128844.1	661511.8	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-02	1127923.1	661682.3	0.045	0.045
RI/FS - OU-4 Soil (P1, P2)	C2N-EU2	C2N-02	1128380.7	661693.5	0.043	0.043
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-06	1126767.3	661705.3	0.04	0.04
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-04	1127142.7	661853.6	0.044	0.044
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-03	1127523.5	661922	0.047	0.047
RI/FS - OU-4 Soil (P1, P2)	C2S-EU1	C2S-01	1127649.1	662305.3	0.045	0.045

1. Surface (0–6 inches) total PCB concentration calculated by the following equation:

$$Surface\ Total\ PCB\ Length\ Weighted\ Concentration = (\sum([Segment\ Concentration]\times[Segment\ Length])) / (\sum([All\ Segment\ Lengths]))$$

2. Surface maximum and total PCB were rounded to two significant figures.
3. If parent/duplicate pair were both detected or both not detected, an average was taken using the reported results (reporting limit for nondetects).
4. If one of the parent/duplicate pair was detected and the other was not detected, the detected result was used.

APCO FP: Alabama Power Company floodplain
EU: exposure unit
mg/kg: milligram(s) per kilogram
OU: operable unit
P1: Phase 1
P2: Phase 2
PCB: polychlorinated biphenyl
RFI: Resource Conservation and Recovery Act (RCRA) Facility Investigation
RI/FS: remedial investigation/feasibility study
WWTP: wastewater treatment plant

Table 4-3. OU-4 Length-Weighted Nonresidential Subsurface (1-4 feet) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Suburface Length Weighted Total PCB (mg/kg)
Anniston Airport	C4N-EU1	ARA-12	1119965.988	646665.554	8.9	8.9
Anniston Airport	C4N-EU1	ARA-22	1119597.001	645552.219	1.6	0.84
Anniston Airport	C4N-EU1	ARA-28	1119562.298	644967.435	0.96	0.96
Anniston Airport	C4N-EU1	ARA-35	1119463.076	644631.793	2.5	1.3
Anniston Airport	C4N-EU1	ARA-40	1119321.014	643895.568	0.21	0.21
Anniston Airport	C4N-EU1	ARA-53	1120160.544	647250.082	2.3	1.7
APCO FP	C5N-EU2	116 LoopOut	1115833.16	618982.6555	0.079	0.079
APCO FP	C5N-EU2	STR-97	1114505.231	625296.807	1.3	0.69
APCO FP	C5N-EU2	STR-98	1114086.826	624867.9481	0.92	0.48
APCO FP	C5S-EU1	STR-88	1118181.271	629071.2674	0.077	0.077
Borrelli	C1-EU2	NHA-1	1130178.219	658585.2198	190	80
Borrelli	C1-EU2	NHA-2	1130279.329	658595.5352	230	170
Borrelli	C1-EU2	NHA-5	1130434.917	658648.6103	230	160
Colonial Pipeline	C4S-EU1	239-4	1120388.559	649556.2417	13	7.7
Colonial Pipeline	C4S-EU1	240-8	1120441.591	649973.7488	0.091	0.091
Highway 21	C3N-EU2	FP-3-d	1122376.084	652030.5705	0.25	0.25
Highway 21	C3N-EU2	FP-3-e	1122414.318	652039.4972	23	23
Highway 21	C3N-EU2	FP-3-f	1122453.665	652048.6835	0.09	0.09
Highway 21	C3N-EU2	FP-3-g	1122492.778	652057.8155	0	0
Highway 21	C3S-EU2	FP-2-d	1122312.554	652015.738	0	0
Highway 21	C3S-EU2	FP-2-e	1122274.084	652006.7563	10	10
Highway 21	C3S-EU2	FP-2-f	1122234.736	651997.5696	8.3	8.3
Highway 21	C3S-EU2	FP-2-g	1122195.448	651988.3968	12	12
Highway 21	C3S-EU2	RP-2-dx	1122292.822	652011.131	9.2	9.2
Highway 21	C4N-EU1	FP-1-d	1122081.323	651439.8717	18	18
Highway 21	C4N-EU1	FP-1-e	1122042.82	651430.7713	15	15
Highway 21	C4N-EU1	FP-4-d	1122199.874	651467.8919	26	26
Highway 21	C4N-EU1	FP-4-e	1122238.728	651477.0752	2.1	2.1
Highway 21	C4N-EU1	FP-4-f	1122315.325	651495.1791	0.07	0.07
Highway 21	C4N-EU1	FP-4-g	1122353.886	651504.2932	1.2	1.2
Highway 21	C4N-EU1	RP-4-ex	1122277.408	651486.2172	3.1	3.1
Highway 21	C4S-EU1	FP-1-f	1122003.908	651421.5743	4.6	4.6
Highway 21	C4S-EU1	FP-1-g	1121964.409	651412.2387	4	4
I-20 Industrial Park	C4N-EU1	Ind-CC-8	1120705.8	644000.9	4.8	3.8
I-20 Industrial Park	C4N-EU2	Ind-CC-27	1120524.3	642892.5	1.7	1.1
Oxford Lake Park	C1-EU1	OLGP-001	1130787.54	659505.96	1.6	1.1
Oxford Lake Park	C1-EU1	OLGP-002	1130690.4	659490.33	13	8.8
Oxford Lake Park	C1-EU1	OLGP-003	1130594.19	659473.83	7.2	4.2
Oxford Lake Park	C1-EU1	OLGP-023	1130209.82	659008.36	7.6	7.5
Oxford Lake Park	C1-EU1	OLGP-024	1130207.36	659111.59	24	7.2
Oxford Lake Park	C1-EU1	OLGP-026	1130156.63	659108.3	4.7	3.5
Oxford Lake Park	C1-EU1	OLGP-027	1130105.16	658999.99	65	20
Oxford Lake Park	C1-EU1	OLGP-047	1130674.4	659567.13	35	14
Oxford Lake Park	C1-EU1	OLGP-048	1130579.88	659544.4	55	22
Oxford Lake Park	C1-EU1	OLGP-049	1130511.08	659523.31	31	16
Oxford Lake Park	C1-EU1	OLGP-050	1130305.67	659515.48	13	9.3
Oxford Lake Park	C1-EU1	OLGP-051	1130216.63	659508.01	2.5	2
Oxford Lake Park	C1-EU1	OLGP-055	1129815.7	659479.78	7.3	4.5
Oxford Lake Park	C1-EU1	OLGP-056	1129815.55	659380.2	1.7	0.69
Oxford Lake Park	C1-EU1	OLGP-057	1129816.83	659279.68	35	5.7
Oxford Lake Park	C1-EU1	OLGP-058	1129817.82	659175.37	9	5.2
Oxford Lake Park	C1-EU1	OLGP-061	1129819.66	658871.18	290	73
Oxford Lake Park	C1-EU1	OLGP-062	1129810.42	658768.46	220	79

Table 4-3. OU-4 Length-Weighted Nonresidential Subsurface (1-4 feet) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Suburface Length Weighted Total PCB (mg/kg)
Oxford Lake Park	C1-EU1	OLGP-063	1129815.88	658667.39	72	40
Oxford Lake Park	C1-EU1	OLGP-064	1129915.13	658684.24	56	19
Oxford Lake Park	C1-EU1	OLGP-065	1129918.34	658783	350	70
Oxford Lake Park	C1-EU1	OLGP-066	1129917.34	658877.83	140	40
Oxford Lake Park	C1-EU1	OLGP-069	1129915.49	659183.93	3.9	1.3
Oxford Lake Park	C1-EU1	OLGP-074	1130015.35	659194.17	4.9	1.6
Oxford Lake Park	C1-EU1	OLGP-077	1130020.3	658895.5	85	39
Oxford Lake Park	C1-EU1	OLGP-078	1130020.62	658792.4	32	16
Oxford Lake Park	C1-EU1	OLGP-079	1130024.14	658692.88	24	12
Oxford Lake Park	C1-EU1	OLGP-080	1130116.57	659207.39	3.6	1.2
Oxford Lake Park	C1-EU1	OLGP-083	1130214.81	659404.52	9.8	4
Oxford Lake Park	C1-EU1	OLGP-084	1130212.28	659306.08	19	8.4
Oxford Lake Park	C1-EU1	OLGP-141	1130278.79	660088.44	0.2	0.1
Oxford Lake Park	C1-EU1	OLGP-144	1130285.06	660008.67	7.2	2
Oxford Lake Park	C1-EU1	OLGP-147	1130356.08	659941.75	5.6	1.5
Oxford Lake Park	C1-EU1	OLGP-150	1130429.67	659874.75	0.84	0.75
Oxford Lake Park	C1-EU1	OLHA-001	1129976.08	658693.51	38	19
Oxford Lake Park	C1-EU1	OLHA-002	1129856.12	658678.94	110	41
Oxford Lake Park	C1-EU1	OLHA-003	1129966.08	658832.25	34	22
Oxford Lake Park	C1-EU1	OLHA-004	1129865.88	658837.68	220	85
Oxford Lake Park	C1-EU1	OLHA-019	1130307.539	660269.8234	12	9.3
Oxford Lake Park	C1-EU1	OLHA-020	1130171.58	660673.06	0.078	0.077
Oxford Lake Park	C1-EU1	OLHA-023	1130180.95	660448.23	0.076	0.075
Oxford Lake Park	C1-EU1	OLHA-026	1130169.24	660822.96	0.086	0.079
Oxford Lake Park	C1-EU2	OLGP-009	1130517.63	658930.73	13	11
Oxford Lake Park	C1-EU2	OLGP-010	1130520.11	658830.68	130	71
Oxford Lake Park	C1-EU2	OLGP-011	1130525.25	658782.41	45	26
Oxford Lake Park	C1-EU2	OLGP-020	1130315.37	658915.27	49	27
Oxford Lake Park	C1-EU2	OLGP-021	1130330.27	658816.86	100	58
Oxford Lake Park	C1-EU2	OLGP-022	1130342.55	658736.35	21	11
Oxford Lake Park	C1-EU2	OLGP-028	1130115.86	658899.17	37	23
Oxford Lake Park	C1-EU2	OLGP-029	1130126.99	658799.07	150	67
Oxford Lake Park	C1-EU2	OLGP-030	1130140.24	658709.5	32	20
Oxford Lake Park	C1-EU2	OLGP-031	1130238.82	658719.62	84	40
Oxford Lake Park	C1-EU2	OLGP-032	1130434.92	658757.51	47	13
Oxford Lake Park	C1-EU2	OLGP-033	1130618.01	658819.84	90	47
Oxford Lake Park	C1-EU2	OLGP-034	1130718.58	658837.35	210	100
Oxford Lake Park	C1-EU2	OLGP-035	1130816.73	658859.05	170	92
Oxford Lake Park	C1-EU2	OLGP-036	1130912.6	658855.16	150	81
Oxford Lake Park	C1-EU2	OLGP-037	1131011.85	658850.7	100	37
Oxford Lake Park	C1-EU2	OLGP-038	1131112.72	658851.3	89	42
Oxford Lake Park	C1-EU2	OLGP-039	1131173.19	658955.02	96	59
Oxford Lake Park	C1-EU2	OLGP-040	1131115.06	659012.92	41	26
Oxford Lake Park	C1-EU2	OLGP-041	1131008.65	659019.63	30	22
Oxford Lake Park	C1-EU2	OLGP-042	1130910.73	659026.31	67	36
Oxford Lake Park	C1-EU2	OLGP-043	1130813.75	659019.69	37	24
Oxford Lake Park	C1-EU2	OLGP-044	1130709.8	659016.47	18	16
Oxford Lake Park	C1-EU2	OLGP-045	1130608.67	659011.94	110	50
Phase 3 Soil	C3S-EU2	C3SX-01	1121449.3	651849.2	27	6.8
Phase 3 Soil	C3S-EU2	C3SX-04	1121888	653195.6	39	9
RFI Soil	C2N-EU1	C-FP01-N1	1128834.418	659509.5422	0.18	0.16
RFI Soil	C2N-EU2	C-FP01-C1	1128780.126	659691.6975	0.087	0.087
RFI Soil	C2N-EU2	C-FP01-C9	1127441.868	661137.6357	0.084	0.081

Table 4-3. OU-4 Length-Weighted Nonresidential Subsurface (1-4 feet) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Suburface Length Weighted Total PCB (mg/kg)
RFI Soil	C2S-EU1	C-FP01-S1	1127365.918	661221.2309	0.085	0.082
RFI Soil	C3N-EU1	C-FP02-N1	1125647.334	657258.0459	8.1	6.1
RFI Soil	C3S-EU1	C-FP02-S1	1124874.109	656628.7169	79	22
RFI Soil	C4N-EU1	C-FP04-N1	1119143.884	644818.1209	3.5	3.1
RFI Soil	C4N-EU1	C-FP04-N2	1119477.113	644817.9374	0.8	0.4
RFI Soil	C4N-EU2	C-FP05-N1	1121763.573	634823.8169	14	8.5
RFI Soil	C4S-EU1	C-FP03-S12	1120713.6	649408.98	7	4.5
RFI Soil	C4S-EU1	C-FP03-S4	1119979.648	648212.245	5.2	2.6
RFI Soil	C4S-EU1	C-FP03-S6	1120194.378	648479.7458	7.5	5.9
RFI Soil	C4S-EU1	C-FP03-S8	1120447.703	648797.0596	4.7	3.6
RFI Soil	C4S-EU2	C-FP04-S1	1118984.062	644818.0012	21	15
RFI Soil	C4S-EU3	C-FP05-S1	1121609.124	634823.0797	97	51
RFI Soil	C5N-EU2	C-FP06-N1	1120302.44	630752.1671	1.2	0.37
RFI Soil	C5N-EU2	C-FP07-N1	1116548.707	622592.856	3.9	1
RFI Soil	C5N-EU2	C-FP11-01	1114610.344	617606.3419	8.5	4.6
RFI Soil	C5S-EU1	C-FP06-S1	1120190.672	630835.4145	33	13
RFI Soil	C5S-EU1	C-FP07-S1	1115564.145	619318.6524	1.8	0.55
RFI Soil	C6N-EU1	C-FP08-N1	1113149.79	614609.6872	2.4	0.98
RFI Soil	C6S-EU1	C-FP08-S1	1112988.399	614600.6569	5	0.99
RFI Soil	C7N-EU1	C-FP10-N1	1112399.138	602107.5465	0.073	0.073
RFI Soil	C7S-EU1	C-FP09-S1	1109399.671	605259.4479	0.4	0.22
RFI Soil	C7S-EU1	C-FP10-S1	1112367.47	601848.6497	2.1	0.71
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-25	1129220.8	658858	20	16
RI/FS - OU-4 Soil (P1, P2)	C2N-EU1	C2N-28	1128759	658739	270	170
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-02	1126321.1	657275.8	35	19
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-03	1125895	657118.9	47	32
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-04	1125488.1	656816.5	61	25
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-05	1125093.6	656355.7	100	51
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-06	1124691.6	656488.3	61	39
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-07	1124536	656054.4	30	11
RI/FS - OU-4 Soil (P1, P2)	C3N-EU1	C3N-10	1123573.4	655404.2	9.3	8
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-17	1122684.9	652864.8	120	50
RI/FS - OU-4 Soil (P1, P2)	C3N-EU2	C3N-18	1122487.4	652429.8	59	39
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-02	1127438.5	657723.1	190	87
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-03	1127093.3	657253	52	21
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-04	1126968.7	657348.4	190	83
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-05	1126447.2	657402.4	26	21
RI/FS - OU-4 Soil (P1, P2)	C3S-EU1	C3S-06	1126814.8	657586.4	74	38
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-18	1122655.3	653328.6	110	38
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-22	1122269.3	651938.3	15	11
RI/FS - OU-4 Soil (P1, P2)	C3S-EU2	C3S-23	1121811.7	651928.5	33	20
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-23	1121559.9	649912.4	38	13
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C3N-25	1121099.2	649148.3	28	11
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-01	1120862.8	648140.9	11	2.8
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-02	1120676.9	647742.6	7.4	2
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-03	1120170.9	647558.6	13	3.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-04	1120112.2	647076.6	0.043	0.042
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-05	1119858.3	646845.3	0.77	0.67
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-06	1120458.6	646540.6	4.1	2.5
RI/FS - OU-4 Soil (P1, P2)	C4N-EU1	C4N-13	1119187.8	645015.3	18	7.6
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-23	1118672.5	641807.8	23	7.4
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-24	1118212.4	641805.6	12	6.7
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-26	1119107.5	639890.8	14	7

Table 4-3. OU-4 Length-Weighted Nonresidential Subsurface (1-4 feet) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Suburface Length Weighted Total PCB (mg/kg)
RI/FS - OU-4 Soil (P1, P2)	C4N-EU2	C4N-43	1121894.2	634876.4	24	11
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-25	1121926.7	650991.4	25	13
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-28	1121223	650378.6	46	20
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-30	1120505.5	649756.4	7.4	1.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C3S-31	1120768.8	649238.6	1.6	0.57
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-01	1120829.6	648901.1	320	98
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-02	1120366.9	648972.1	7.4	1.3
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-03	1120618.5	648510.1	5.3	3.9
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-04	1120010	648293.8	52	17
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-05	1120087.9	647836.1	3.5	1.6
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-06	1119519.9	647880.1	150	47
RI/FS - OU-4 Soil (P1, P2)	C4S-EU1	C4S-09	1119295.6	646769.1	13	7.3
RI/FS - OU-4 Soil (P1, P2)	C4S-EU2	C4S-33	1118946.6	637029.2	17	12
RI/FS - OU-4 Soil (P1, P2)	C4S-EU3	C4S-49	1121012.9	634117.9	8.6	5.1
RI/FS - OU-4 Soil (P1, P2)	C5N-EU1	C4N-48	1120600.7	633259.5	38	23
RI/FS - OU-4 Soil (P1, P2)	C5N-EU2	C5N-18	1113833	624326.1	14	5.1
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C4S-57	1120112.2	630738.7	35	24
RI/FS - OU-4 Soil (P1, P2)	C5S-EU1	C5S-07	1118230.4	628957.8	16	9
RI/FS - OU-4 Soil (P1, P2)	C6N-EU1	C6N-19	1107071.9	606036.8	11	4.6
RI/FS - OU-4 Soil (P1, P2)	C6S-EU1	C6S-02	1113616.7	615338.8	23	9.8
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-15	1114133.9	601303.5	8.4	2.6
RI/FS - OU-4 Soil (P1, P2)	C7N-EU1	C7N-39	1110806.8	595931.3	13	7.5
RI/FS - OU-4 Soil (P1, P2)	C7S-EU1	C7S-37	1110854.7	596870.8	3.6	1.6
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-09	1107838.9	585570.5	5.3	1.9
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-11	1106693.7	585652.8	12	7.2
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-17	1109026.8	581339.8	4.4	3.5
RI/FS - OU-4 Soil (P1, P2)	C8N-EU1	C8N-19	1107873.8	581530.9	10	6.6
RI/FS - OU-4 Soil (P1, P2)	C8S-EU1	C8S-13	1107353.7	583705	8.3	6
Tennis Court Water Line	C1-EU1	OLWL-3	1130504.525	659474.5942	0.59	0.59
Tennis Court Water Line	C1-EU2	OLWL-4	1130520.073	659319.9196	0.24	0.24
WWTP	C2N-EU1	PC1-08	1129276.09	657826.6345	0.13	0.13
WWTP	C2N-EU1	PC1-09	1129225.703	657825.7999	3.4	1
WWTP	C2N-EU1	PC1-21	1129281.509	658125.7031	0.49	0.49
WWTP	C2N-EU1	PC1-22	1129280.261	658147.1079	0.23	0.23
WWTP	C2N-EU1	PC1-26	1129181.838	658221.559	0.16	0.16
WWTP	C2N-EU1	PC1-27	1129160.737	658223.334	3.5	3.5
WWTP	C2N-EU1	PC1-28	1129182.228	658270.5156	0.96	0.53
WWTP	C2N-EU1	PC1-29	1129161.544	658270.0282	11	0.96
WWTP	C2N-EU1	PC3-01	1129336.586	658120.9676	0.62	0.62
WWTP	C2N-EU1	PC3-02	1129374.24	658123.99	0.14	0.14
WWTP	C2N-EU1	PC3-03	1129398.83	658136.6345	0.077	0.077
WWTP	C2N-EU1	PC3-04	1129397.434	658190.7198	12	6.1
WWTP	C2N-EU1	PC3-06	1129400.134	658300.3222	2.9	2.5
WWTP	C2N-EU1	PC3-07	1129400.298	658354.8592	9.3	6.9
WWTP	C2N-EU1	PC3-08	1129400.498	658408.1599	11	7
WWTP	C2N-EU1	PC3-09	1129402.227	658464.0347	8.4	6.7
WWTP	C2N-EU1	PC3-10	1129397.216	658082.5098	3.7	2
WWTP	C2N-EU1	PC3-11	1129397.177	658027.3352	1.5	1
WWTP	C2N-EU1	PC3-12	1129393.85	657974.82	2.8	1.5
WWTP	C2N-EU1	PC3-13	1129395.37	657918.544	0.29	0.29
WWTP	C2N-EU1	PC3-14	1129392.54	657866.75	2.2	2.2

Table 4-3. OU-4 Length-Weighted Nonresidential Subsurface (1-4 feet) Soil PCB Data
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Program	EU	Location ID	Northing	Easting	Maximum Total PCB (mg/kg)	Suburface Length Weighted Total PCB (mg/kg)
WWTP	C2N-EU1	PC3-15	1129392.99	657813.14	2.8	1.4
WWTP	C2N-EU1	PC3-21H	1129217.372	658510.9895	130	130
WWTP	C2N-EU1	PC3-22H	1129270.718	658511.5863	110	110
WWTP	C2N-EU1	PC3-23H	1129326.335	658511.2331	95	95

1. Subsurface (0-4 feet) Total PCB concentration calculated by the following equation:
$Subsurface\ Total\ PCB\ Length\ Weighted\ Concentration = (\sum([Segment\ Concentration]\times[Segment\ Length]))/(\sum([All\ Segment\ Lengths]))$

2. Subsurface maximum and Total PCB were rounded to two significant figures.
3. If parent/duplicate pair were both detected or both not detected, an average was taken using the reported results (reporting limit for nondetects).
4. If one of the parent/duplicate pair was detect and the other was nondetect, the detected result was used.

APCO FP: Alabama Power Company floodplain
EU: exposure unit
mg/kg: milligram(s) per kilogram
OU: operable unit
P1: Phase 1
P2: Phase 2
PCB: polychlorinated biphenyl
RFI: Resource Conservation and Recovery Act (RCRA) Facility Investigation
RI/FS: Remedial Investigation/Feasibility Study
WWTP: wastewater treatment plant

Table 4-4. SWAC Calculation Details Table for PCB in Surface Sediment
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Reach	Sediment Texture	Core Locations (n)	Surface Area (acres)	PCB Samples (n)	Detected Samples (n)	Mean Surface PCB (mg/kg)	Max Surface PCB (mg/kg)	Mean PCB Area	Reach SWAC (mg/kg)
Snow Creek	Snow Creek	16	N/A	16	15	5.3	41	N/A	5.3 [1]
Backwater to Friendship Road	Fine	24	6.5	22	13	8.8	95	57.02	4.9
	Coarse	14	2.5	15	3	0.37	3.08	0.92	
	Gravel	8	2.4	2	2	0.55	0.81	1.30	
	No Recovery	2	0.7	0	N/A	0.05	N/A	0.04	
Friendship Road to Coldwater Creek	Fine	12	4.4	14	14	2.7	23.20	11.94	0.88
	Coarse	102	39.1	26	26	0.92	8.90	35.78	
	Gravel	30	13.4	4	4	0.58	1.45	7.77	
	No Recovery	16	6.9	0	N/A	0.05	N/A	0.34	
Coldwater Creek to Cheaha Creek	Fine	15	9.4	30	29	1.7	4.2	16.17	0.41
	Coarse	155	104.1	42	31	0.53	5.2	55.58	
	Gravel	26	16.5	3	2	0.07	0.09	1.21	
	No Recovery	92	54.6	0	N/A	0.05	N/A	2.73	
Cheaha Creek to Jackson Shoals	Fine	24	22.6	20	20	1.2	2.7	26.45	0.53
	Coarse	33	28.2	18	16	0.47	2.64	13.39	
	Gravel	2	1.4	0	N/A	**0.47**	N/A	0.66	
	No Recovery	33	27.4	0	N/A	0.05	N/A	1.37	
Jackson Shoals	Fine	6	6.4	6	3	0.3	0.8	1.70	0.10
	Coarse	6	6.3	6	5	0.13	0.49	0.84	
	Gravel	9	11.0	2	1	0.11	0.16	1.17	
	No Recovery	27	31.3	0	N/A	0.05	N/A	1.57	
Jackson Shoals to Lake Logan Martin	Fine	99	353.4	33	27	0.5	2.7	192.04	0.52
	Coarse	15	30.6	7	7	0.38	0.64	11.72	
	Gravel	19	35.4	0	N/A	**0.38**	N/A	13.53	
	No Recovery	0	0.0	0	N/A	0.05	N/A	0.00	

1. Areas of no sediment recovery were assumed to have an average PCB concentration of 0.05 mg/kg (approximate reporting limit for PCB).
2. Gravel areas without samples in a given reach were assumed to have a gravel PCB concentration equal to mean coarse sediment for that reach (values depicted in **Bold**).
3. Snow Creek value represents the average of 16 samples collected from individual deposits and are not spatially weighted.

mg/kg: milligram(s) per kilogram
n: number of samples
N/A: not applicable or not calculated
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration = Σ (Mean PCB * Area) / Σ (Area)

Table 5-1. Exposure Scenarios Evaluated per Exposure Unit
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Exposure Unit	Exposure Scenario	Receptors
C1-EU1	High contact recreational	Young child, adolescent, adult
C1-EU2	Low contact recreational Worker	Adolescent, adult Adult
C2N-EU1	Low contact recreational Worker	Adolescent, adult Adult
C3N-EU1	Low contact recreational	Adolescent, adult
C3N-EU2	Low contact recreational	Adolescent, adult
C3S-EU1	High contact recreational	Young child, adolescent, adult
C3S-EU2	High contact recreational	Young child, adolescent, adult
C4N-EU1	Low contact recreational Worker	Adolescent, adult Adult
C4N-EU2	Low contact recreational	Adolescent, adult
C4S-EU1	Low contact recreational	Adolescent, adult
C4S-EU2	Low contact recreational	Adolescent, adult
C4S-EU3	Low contact recreational	Adolescent, adult
C5N-EU1	Low contact recreational Worker	Adolescent, adult Adult
C5S-EU1	Low contact recreational	Adolescent, adult
C6N-EU1	Low contact recreational	Adolescent, adult
C6S-EU1	Low contact recreational	Adolescent, adult
C7S-EU1	Low contact recreational	Adolescent, adult
C8N-EU1	Low contact recreational	Adolescent, adult

Table 5-2. Noncancer Toxicity Data: Oral/Dermal
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Constituent of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (a)	Absorbed RfD for Dermal[a]		Primary Target Organs(s)	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Dates[b]
Total PCBs[c]	Chronic	2.0E-05	(mg/kg-day)	1.0	2.0E-05	(mg/kg-day)	Eyes, Immune system	300	IRIS	4/2/2012
PCB Dioxin-Like Congener TEQ	Chronic	7.0E-10	(mg/kg-day)	1.0	7.0E-10	(mg/kg-day)	Developmental	30	IRIS	3/27/2012
Mercury[d]	Chronic	3.0E-04	(mg/kg-day)	1.0	3.0E-04	(mg/kg-day)	Immune system	1,000	IRIS	4/2/2012
Methylmercury[e]	Chronic	1.0E-04	(mg/kg-day)	1.0	1.0E-04	(mg/kg-day)	Nervous system	10	IRIS	4/2/2012
Total PCBs[c]	Subchronic	6.0E-05	(mg/kg-day)	1.0	6.0E-05	(mg/kg-day)	Eyes, Immune system	100	IRIS[g]	6/13/2012
PCB Dioxin-like Congener TEQ	Subchronic	7.0E-10	(mg/kg-day)	1.0	7.0E-10	(mg/kg-day)	Developmental	30	IRIS[h]	6/13/2012
Mercury[d]	Subchronic	3.0E-03	(mg/kg-day)	1.0	3.0E-03	(mg/kg-day)	Immune system	100	IRIS[i]	6/13/2012
2,3,7,8-TCDD TEQ	Chronic	7.0E-10	(mg/kg-day)	1.0	7.0E-10	(mg/kg-day)	Developmental	30	IRIS	3/27/2012
Benzo(a)anthracene	---	NA	---	---	NA	---	---	---	---	---
Benzo(a)pyrene	---	NA	---	---	NA	---	---	---	---	---
Benzo(b)fluoranthene	---	NA	---	---	NA	---	---	---	---	---
Benzo(k)fluoranthene	---	NA	---	---	NA	---	---	---	---	---
Chrysene	---	NA	---	---	NA	---	---	---	---	---
Indeno(1,2,3-cd)pyrene	---	NA	---	---	NA	---	---	---	---	---
Aluminum	Chronic	1.0E+00	(mg/kg-day)	1.0	1.0E+00	(mg/kg-day)	Nervous system	100	PPRTV	4/2/2012
Arsenic	Chronic	3.0E-04	(mg/kg-day)	1.0	3.0E-04	(mg/kg-day)	Skin	3	IRIS	4/2/2012
Chromium, Total[f]	Chronic	3.0E-03	(mg/kg-day)	0.025	7.5E-05	(mg/kg-day)	None observed	900	IRIS	4/2/2012
Cobalt	Chronic	3.0E-04	(mg/kg-day)	1.0	3.0E-04	(mg/kg-day)	Thyroid	3,000	PPRTV	4/2/2012
Iron	Chronic	7.0E-01	(mg/kg-day)	1.0	7.0E-01	(mg/kg-day)	Gastrointestinal	1.5	PPRTV	4/2/2012
Manganese	Chronic	2.4E-02	(mg/kg-day)	0.04	9.6E-04	(mg/kg-day)	Nervous system	3	IRIS	4/2/2012
2,3,7,8-TCDD TEQ	Subchronic	7.0E-10	(mg/kg-day)	1.0	7.0E-10	(mg/kg-day)	Developmental	30	IRIS[h]	6/13/2012
Benzo(a)anthracene	---	NA	(mg/kg-day)	---	NA	(mg/kg-day)	---	---	---	---
Benzo(a)pyrene	---	NA	(mg/kg-day)	---	NA	(mg/kg-day)	---	---	---	---
Benzo(b)fluoranthene	---	NA	(mg/kg-day)	---	NA	(mg/kg-day)	---	---	---	---
Benzo(k)fluoranthene	---	NA	(mg/kg-day)	---	NA	(mg/kg-day)	---	---	---	---
Chrysene	---	NA	(mg/kg-day)	---	NA	(mg/kg-day)	---	---	---	---
Indeno(1,2,3-cd)pyrene	---	NA	(mg/kg-day)	---	NA	(mg/kg-day)	---	---	---	---
Aluminum	Subchronic	1.0E+00	(mg/kg-day)	1.0	1.0E+00	(mg/kg-day)	Nervous system	100	PPRTV[h]	6/13/2012
Arsenic	Subchronic	3.0E-04	(mg/kg-day)	1.0	3.0E-04	(mg/kg-day)	Skin	3	Chronic value	6/13/2012
Chromium, Total[f]	Subchronic	9.0E-03	(mg/kg-day)	0.025	2.3E-04	(mg/kg-day)	None observed	300	IRIS[g]	6/13/2012
Cobalt	Subchronic	3.0E-03	(mg/kg-day)	1.0	3.0E-03	(mg/kg-day)	Thyroid	300	PPTRV[i]	6/13/2012

Table 5-2. Noncancer Toxicity Data: Oral/Dermal
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Constituent of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (a)	Absorbed RfD for Dermal[a]		Primary Target Organs(s)	Combined Uncertainty/ Modifying Factors	RfD: Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Dates[b]
Iron	Subchronic	7.0E-01	(mg/kg-day)	1.0	7.0E-01	(mg/kg-day)	Gastrointestinal	1.5	PPRTV	6/13/2012
Manganese	Subchronic	2.4E-02	(mg/kg-day)	0.04	9.6E-04	(mg/kg-day)	Nervous system	3	Chronic value	6/13/2012

a. Source: RAGS Part E Guidance (USEPA 2004c)
b. Represents date source was searched.
c. Aroclor 1254 toxicity criteria used.
d. Mercuric chloride toxicity criteria used. Applicable to soil-mediated exposures.
e. Methylmercury toxicity values applicable to fish-mediated exposure only. Subchronic RfDs not presented because an age-adjusted approach (resulting in chronic exposure) was used for this pathway.
f. Chromium VI toxicity criteria used.
g. Chronic RfD times subchronic to chronic modifying factor of 3.
h. Chronic RfD times subchronic to chronic modifying factor of 1.
i. Chronic RfD times subchronic to chronic modifying factor of 10.

IRIS: Integrated Risk Information System
mg/kg-day: milligram(s) per kilogram per day
NA: not available
PCB: polychlorinated biphenyl
PPRTV: provisional peer-reviewed toxicity value
RAGS: Risk Assessment Guidance for Superfund
RfD: reference dose
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalents
USEPA: United States Environmental Protection Agency

Table 5-3. Cancer Toxicity Data: Oral/Dermal
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Constituent of Potential Concern	Oral CSF		Oral Absorption Efficiency for Dermal[a]	Absorbed CSF for Dermal[a]		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Dates[b]
Total PCBs[c]	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0	2.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/2/2012
Total PCBs[d]	1.00E+00	$(mg/kg\text{-}day)^{-1}$	1.0	1.00E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/2/2012
PCB Dioxin-Like Congener TEQ	1.30E+05	$(mg/kg\text{-}day)^{-1}$	1.0	1.30E+05	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	4/2/2012
Mercury	NA	---	---	NA	---	D	IRIS	4/2/2012
2,3,7,8-TCDD TEQ	1.30E+05	$(mg/kg\text{-}day)^{-1}$	1.0	1.30E+05	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	4/2/2012
Benzo(a)anthracene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/2/2012
Benzo(a)pyrene	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/2/2012
Benzo(b)fluoranthene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/2/2012
Benzo(k)fluoranthene	7.30E-02	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/2/2012
Chrysene	7.30E-03	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/2/2012
Indeno(1,2,3-cd)pyrene	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.0	7.30E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/2/2012
Aluminum	NA	---	---	NA	---	No information	---	---
Arsenic	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0	1.50E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/2/2012
Chromium, Total[e]	5.00E-01	$(mg/kg\text{-}day)^{-1}$	0.025	2.00E+01	$(mg/kg\text{-}day)^{-1}$	Likely to be carcinogenic	NJDEP	4/2/2012
Cobalt	NA	---	---	NA	---	No information	---	---
Iron	NA	---	---	NA	---	No information	---	---
Lead	NA	---	---	NA	---	B2	IRIS	4/2/2012
Manganese	NA	---	---	NA	---	D	IRIS	4/2/2012

a. Source: RAGS Part E Guidance (USEPA 2004c)
b. Represents date source was searched.
c. The IRIS upper bound slope factor for high risk and persistence used for reasonable maximum exposure (RME) scenario.
d. The IRIS central-estimate slope factor used for central tendency exposure (CTE) scenario.
e. Chromium VI toxicity criteria used.
B2: Probable human carcinogen: indicates sufficient evidence in animals and inadequate or no evidence in humans.
CalEPA: California Environmental Protection Agency
CSF: cancer slope factor
D: Not classifiable as a human carcinogen.
IRIS: Integrated Risk Information System
mg/kg-day: milligram(s) per kilogram per day
NA: Not available
NJDEP: New Jersey Department of Environmental Protection
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalents
USEPA: United States Environmental Protection Agancy

Table 5-4. Exposure Point Concentration Summary: Location A Fish
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Scenario Time Frame: Current/Future
Medium: Fish Tissue
Exposure Medium: Location A Fish Tissue

Exposure Point	Constituent of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Group A	**All Species**								
	Total PCBs	mg/kg	2.11	2.38	9.47	2.38	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.000012	0.000016	0.000032	0.000016	mg/kg	95% Student's-t UCL - Normal	ProUCL Recommendation
	2,3,7,8-TCDD TEQ	mg/kg	0.0000029	0.0000051	0.000011	0.0000051	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	Mercury	mg/kg	0.28	0.32	0.87	0.32	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	Bass								
	Total PCBs	mg/kg	2.2	2.75	9.5	2.75	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.000015	NC	0.000021	0.000021	mg/kg	75th Percentile[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.0000031	NC	0.0000048	0.0000039	mg/kg	75th Percentile[a]	See Text
	Mercury	mg/kg	0.42	0.48	0.87	0.48	mg/kg	95% H-UCL - Lognormal	ProUCL Recommendation
	Catfish								
	Total PCBs	mg/kg	2.44	2.97	5.8	2.97	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000042	NC	0.0000058	0.0000058	mg/kg	Maximum[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.00000091	NC	0.00000093	0.00000093	mg/kg	Maximum[a]	See Text
	Mercury	mg/kg	0.16	0.19	0.43	0.19	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	Panfish								
	Total PCBs	mg/kg	1.69	2.1	4.4	2.11	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.000011	NC	0.000032	0.000013	mg/kg	75th Percentile[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.0000036	NC	0.000011	0.0000050	mg/kg	75th Percentile[a]	See Text
	Mercury	mg/kg	0.27	0.34	0.70	0.34	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation

a. The maximum concentration used for exposure point concentration due to less than 3 samples collected; the 75th percentile used for exposure point concentration when 3−7 samples collected.
95% UCL: 95 percent upper confidence limit on the mean
mg/kg: milligram(s) per kilogram
NC: not calculated due to insufficient sample size.
PCB: polychlorinated biphenyl
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalents

Table 5-5. Exposure Point Concentration Summary: Location B Fish
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Scenario Time Frame: Current/Future
Medium: Fish Tissue
Exposure Medium: Location B Fish Tissue

Exposure Point	Constituent of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic - Data Distribution	Rationale
Group B	**All Species**								
	Total PCBs	mg/kg	2.51	2.88	11.8	2.88	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000065	NC	0.000010	0.0000074	mg/kg	75th Percentile[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.0000014	NC	0.0000024	0.0000017	mg/kg	75th Percentile[a]	See Text
	Mercury	mg/kg	0.43	0.48	1.3	0.48	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	Bass								
	Total PCBs	mg/kg	2.9	4.77	11.8	4.77	mg/kg	95% Chebyshev (Mean, Sd) UCL - Not Discernabl	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000084	NC	0.000010	0.000010	mg/kg	Maximum[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.0000017	NC	0.0000024	0.0000024	mg/kg	Maximum[a]	See Text
	Mercury	mg/kg	0.68	0.77	1.3	0.77	mg/kg	95% Student's-t UCL - Normal	ProUCL Recommendation
	Catfish								
	Total PCBs	mg/kg	3.09	4.01	10.8	4.01	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000051	NC	0.0000051	0.0000051	mg/kg	Maximum[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.00000087	NC	0.00000087	0.00000087	mg/kg	Maximum[a]	See Text
	Mercury	mg/kg	0.36	0.44	1.3	0.44	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	Panfish								
	Total PCBs	mg/kg	1.55	1.86	4.4	1.86	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000041	NC	0.0000041	0.0000041	mg/kg	Maximum[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.0000015	NC	0.0000015	0.0000015	mg/kg	Maximum[a]	See Text
	Mercury	mg/kg	0.25	0.28	0.51	0.28	mg/kg	95% Student's-t UCL - Normal	ProUCL Recommendation

a. The maximum concentration used for exposure point concentration due to less than 3 samples collected; the 75th percentile used for exposure point concentration when 3–7 samples collected.
95% UCL: 95 percent upper confidence limit on the mean
mg/kg: milligram(s) per kilogram
NC: not calculated due to insufficient sample size.
PCB: polychlorinated biphenyl
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalent

Table 5-6. Exposure Point Concentration Summary: Location C Fish
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Scenario Time Frame: Current/Future
Medium: Fish Tissue
Exposure Medium: Location C Fish Tissue

Exposure Point	Constituent of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Group C	**All Species**								
	Total PCBs	mg/kg	4.35	5.43	34	5.43	mg/kg	95% Chebyshev (Mean, Sd) UCL - Not Discernable	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000069	0.0000083	0.000018	0.0000083	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	2,3,7,8-TCDD TEQ	mg/kg	0.00000068	0.00000079	0.0000014	0.00000079	mg/kg	95% Student's-t UCL - Normal	ProUCL Recommendation
	Mercury	mg/kg	0.39	0.43	1.9	0.43	mg/kg	95% KM (BCA) UCL - Lognormal	ProUCL Recommendation
	Bass								
	Total PCBs	mg/kg	4.75	5.24	14.9	5.24	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000073	NC	0.000010	0.0000081	mg/kg	75th Percentile[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.00000077	NC	0.0000011	0.00000077	mg/kg	75th Percentile[a]	See Text
	Mercury	mg/kg	0.64	0.71	1.9	0.71	mg/kg	95% Student's-t UCL - Normal	ProUCL Recommendation
	Catfish								
	Total PCBs	mg/kg	5.61	6.68	34	6.68	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000075	NC	0.000012	0.0000088	mg/kg	75th Percentile[a]	See Text
	2,3,7,8-TCDD TEQ	mg/kg	0.00000091	NC	0.0000014	0.0000010	mg/kg	75th Percentile[a]	See Text
	Mercury	mg/kg	0.29	0.33	0.89	0.33	mg/kg	95% KM (BCA) UCL - Gamma	ProUCL Recommendation
	Panfish								
	Total PCBs	mg/kg	2.94	3.32	10.4	3.32	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	PCB Dioxin-Like Congener TEQ	mg/kg	0.0000064	0.0000094	0.000018	0.0000094	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation
	2,3,7,8-TCDD TEQ	mg/kg	0.00000053	0.00000062	0.00000072	0.00000062	mg/kg	95% Student's-t UCL - Normal	ProUCL Recommendation
	Mercury	mg/kg	0.24	0.27	0.53	0.27	mg/kg	95% Approximate Gamma UCL - Gamma	ProUCL Recommendation

a. The maximum concentration used for exposure point concentration due to less than 3 samples collected; the 75th percentile used for exposure point concentration when 3–7 samples collected.
95% UCL: 95 percent upper confidence limit on the mean
BCA: bias-corrected accelerated
KM: Kaplan-Meier
mg/kg: milligram(s) per kilogram
NC: not calculated due to insufficient sample size.
PCB: polychlorinated biphenyl
Sd: standard deviation
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalents

Table 5-7. Summary of Cancer Risks and Hazard Indices – RME Scenario – Primary Constituents of Potential Concern
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Location Grouping	Species	Cancer Risk	Hazard Index	PCB Dioxin-Like Congener TEQ	
		Total PCBs	Total PCBs and Mercury	Cancer Risk	HQ
A	All Fish	1E-03	64	5E-04	12
	Bass	1E-03	74	6E-04	15
	Catfish	1E-03	78	2E-04	4
	Panfish	9E-04	57	4E-04	9
B	All Fish	6E-04	39	1E-04	3
	Bass	1E-03	64	1E-04	4
	Catfish	9E-04	53	7E-05	2
	Panfish	4E-04	25	6E-05	2
C	All Fish	1E-03	72	1E-04	3
	Bass	1E-03	70	1E-04	3
	Catfish	1E-03	88	1E-04	3
	Panfish	7E-04	44	1E-04	4

: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard index greater than 1.0.
HQ: hazard quotient
PCB: polychlorinated biphenyl
RME: reasonable maximum exposure
TEQ: toxic equivalents

Table 5-8. Summary of Cancer Risks and Hazard Indices – RME Scenario – TEQs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Location Grouping	Species	Cancer Risk			Contribution of PCB Dioxin-Like Congener to Total TEQ Risk	HQ			Contribution of PCB Dioxin-Like Congener to Total TEQ HQ
		PCB Dioxin-Like Congener TEQ	2,3,7,8-TCDD TEQ	Total		PCB Dioxin-Like Congener TEQ	2,3,7,8-TCDD TEQ	Total	
A	All Fish	5E-04	1E-04	6E-04	76%	12	4	16	76%
	Bass	6E-04	1E-04	7E-04	84%	15	3	18	84%
	Catfish	2E-04	3E-05	2E-04	86%	4	0.7	5	86%
	Panfish	4E-04	1E-04	5E-04	71%	9	4	13	71%
B	All Fish	1E-04	3E-05	1E-04	81%	3	0.6	3	81%
	Bass	1E-04	4E-05	2E-04	81%	4	0.9	5	81%
	Catfish	7E-05	1E-05	9E-05	85%	2	0.3	2	85%
	Panfish	6E-05	2E-05	8E-05	73%	2	0.6	2	73%
C	All Fish	1E-04	1E-05	1E-04	91%	3	0.3	3	91%
	Bass	1E-04	1E-05	1E-04	91%	3	0.3	3	91%
	Catfish	1E-04	2E-05	1E-04	89%	3	0.4	4	89%
	Panfish	1E-04	9E-06	1E-04	94%	4	0.2	4	94%

: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.
HQ: hazard quotient
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalent
PCB: polychlorinated biphenyl
RME: reasonable maximum exposure

Table 5-9: Summary of Cancer Risks and Hazard Indices – CTE Scenario – Primary Constituents of Potential Concern
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Location Grouping	Species	Cancer Risk	Hazard Index	PCB Dioxin-Like Congener TEQ	
		Total PCBs	Total PCBs and Mercury	Cancer Risk	HQ
A	All Fish	5E-05	6	4E-05	1
	Bass	6E-05	7	6E-05	1
	Catfish	6E-05	7	2E-05	0.4
	Panfish	4E-05	5	3E-05	0.9
B	All Fish	6E-05	7	2E-05	0.5
	Bass	1E-04	12	3E-05	0.7
	Catfish	8E-05	10	1E-05	0.4
	Panfish	4E-05	5	1E-05	0.3
C	All Fish	1E-04	14	2E-05	0.6
	Bass	1E-04	13	2E-05	0.6
	Catfish	1E-04	17	2E-05	0.6
	Panfish	7E-05	8	3E-05	0.7

No Fill: hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard index greater than 1.0.
CTE: central tendency exposure
HQ: hazard quotient
PCB: polychlorinated biphenyl

Table 5-10. Summary of Cancer Risks and Hazard Indices - CTE Scenario - TEQs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Location Grouping	Species	Cancer Risk			Contribution of PCB Dioxin-Like Congener to Total TEQ Risk	HQ			Contribution of PCB Dioxin-Like Congener to Total TEQ HQ
		PCB Dioxin-Like Congener TEQ	2,3,7,8-TCDD TEQ	Total		PCB Dioxin-Like Congener TEQ	2,3,7,8-TCDD TEQ	Total	
A	All Fish	4E-05	1E-05	6E-05	76%	1	0.4	2	76%
	Bass	6E-05	1E-05	7E-05	84%	1	0.3	2	84%
	Catfish	2E-05	3E-06	2E-05	86%	0.4	0.07	0.5	86%
	Panfish	3E-05	1E-05	5E-05	71%	0.9	0.4	1	71%
B	All Fish	2E-05	5E-06	2E-05	81%	0.5	0.1	0.6	81%
	Bass	3E-05	7E-06	3E-05	81%	0.7	0.2	0.9	81%
	Catfish	1E-05	2E-06	2E-05	85%	0.4	0.06	0.4	85%
	Panfish	1E-05	4E-06	2E-05	73%	0.3	0.1	0.4	73%
C	All Fish	2E-05	2E-06	2E-05	91%	0.6	0.06	0.6	91%
	Bass	2E-05	2E-06	2E-05	91%	0.6	0.05	0.6	91%
	Catfish	2E-05	3E-06	3E-05	89%	0.6	0.07	0.7	89%
	Panfish	3E-05	2E-06	3E-05	94%	0.7	0.04	0.7	94%

No Fill: hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.
CTE: central tendency exposure
HQ: hazard quotient
PCB: polychlorinated biphenyl
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalents

Table 5-11. Exposure Point Concentration Summary – Total PCBs and Mercury – Surface Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Unit	Constituent of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
C1-EU1	Total PCBs	mg/kg	5.69E+00	1.05E+01	5.46E+01	1.05E+01	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
C1-EU2	Total PCBs	mg/kg	3.16E+01	4.61E+01	2.28E+02	4.61E+01	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
C2N-EU1	Total PCBs	mg/kg	6.72E+00	1.63E+01	7.25E+01	1.63E+01	mg/kg	95% KM (t) UCL	ProUCL Recommendation
	Mercury	mg/kg	3.74E-01	1.33E+00	1.65E+00	1.33E+00	mg/kg	97.5% Chebyshev (Mean, Sd) UCL	See Text
C3N-EU1	Total PCBs	mg/kg	1.20E+01	2.32E+01	8.95E+01	2.32E+01	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	2.58E+00	3.32E+00	1.44E+01	3.32E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
C3N-EU2	Total PCBs	mg/kg	1.07E+01	3.69E+01	7.09E+01	3.69E+01	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	1.49E+00	4.62E+00	6.14E+00	4.62E+00	mg/kg	95% Adjusted Gamma UCL	ProUCL Recommendation
C3S-EU1	Total PCBs	mg/kg	1.07E+01	1.95E+01	1.27E+02	1.95E+01	mg/kg	95% KM (t) UCL	ProUCL Recommendation
	Mercury	mg/kg	1.63E+00	8.96E+00	1.89E+01	8.96E+00	mg/kg	99% KM (Chebyshev) UCL	ProUCL Recommendation
C3S-EU2	Total PCBs	mg/kg	9.40E+00	2.36E+01	6.94E+01	2.36E+01	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	2.34E+00	3.90E+00	1.35E+01	3.90E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
C4N-EU1	Total PCBs	mg/kg	3.42E+00	8.12E+00	2.53E+01	8.12E+00	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	1.32E+00	2.28E+00	8.95E+00	2.28E+00	mg/kg	95% H-UCL	ProUCL Recommendation
C4N-EU2	Total PCBs	mg/kg	1.94E+00	8.50E+00	1.99E+01	8.50E+00	mg/kg	99% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	1.04E+00	2.74E+00	1.38E+01	2.74E+00	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL Recommendation
C4S-EU1	Total PCBs	mg/kg	7.49E+00	1.63E+01	4.29E+01	1.63E+01	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	2.27E+00	3.47E+00	9.15E+00	3.47E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
C4S-EU2	Total PCBs	mg/kg	1.71E+00	2.51E+00	1.01E+01	2.51E+00	mg/kg	95% KM (BCA) UCL	ProUCL Recommendation
	Mercury	mg/kg	8.45E-01	1.27E+00	4.95E+00	1.27E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
C4S-EU3	Total PCBs	mg/kg	2.33E+00	5.50E+00	1.63E+01	5.50E+00	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	1.09E+00	1.69E+00	4.25E+00	1.69E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
C5N-EU1	Total PCBs	mg/kg	2.54E+00	6.05E+00	9.01E+00	6.05E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
	Mercury	mg/kg	1.06E+00	1.51E+00	2.20E+00	1.51E+00	mg/kg	95% Student's-t UCL	ProUCL Recommendation
C5S-EU1	Total PCBs	mg/kg	8.85E-01	1.33E+00	1.45E+01	1.33E+00	mg/kg	95% KM (t) UCL	ProUCL Recommendation
	Mercury	mg/kg	4.72E-01	8.86E-01	4.65E+00	8.86E-01	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL Recommendation
C6N-EU1	Total PCBs	mg/kg	1.31E+00	2.14E+00	7.90E+00	2.14E+00	mg/kg	95% KM (BCA) UCL	ProUCL Recommendation
	Mercury	mg/kg	7.84E-01	1.41E+00	4.40E+00	1.41E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
C6S-EU1	Total PCBs	mg/kg	1.38E+00	2.88E+00	1.64E+01	2.88E+00	mg/kg	95% KM (BCA) UCL	ProUCL Recommendation
	Mercury	mg/kg	9.66E-01	2.95E+00	9.35E+00	2.95E+00	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL Recommendation

Table 5-11. Exposure Point Concentration Summary – Total PCBs and Mercury – Surface Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Unit	Constituent of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
C7S-EU1	Total PCBs	mg/kg	5.20E-01	1.32E+00	9.85E+00	1.32E+00	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	1.85E-01	6.77E-01	2.98E+00	6.77E-01	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL Recommendation
C8N-EU1	Total PCBs	mg/kg	1.31E+00	3.09E+00	8.13E+00	3.09E+00	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	1.23E+00	1.57E+00	5.20E+00	1.57E+00	mg/kg	75th Percentile	See Text

95% UCL: 95 percent upper confidence limit on the mean
BCA: bias-corrected accelerated
EU: exposure unit
KM: Kaplan-Meier
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl
Sd: standard deviation

Table 5-12. Exposure Point Concentration Summary – Total PCBs and Mercury – Total Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Total Soil

Exposure Unit	Constituent of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
C1-EU2	Total PCBs	mg/kg	4.79E+01	6.69E+01	1.72E+02	6.69E+01	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
C2N-EU1	Total PCBs	mg/kg	1.38E+01	3.62E+01	1.71E+02	3.62E+01	mg/kg	95% KM (t) UCL	ProUCL Recommendation
	Mercury	mg/kg	3.74E-01	1.33E+00	1.65E+00	1.33E+00	mg/kg	97.5% Chebyshev (Mean, Sd) UCL	See Text
C4N-EU1	Total PCBs	mg/kg	2.71E+00	6.08E+00	1.60E+01	6.08E+00	mg/kg	97.5% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	1.26E+00	2.12E+00	8.95E+00	2.12E+00	mg/kg	95% H-UCL	ProUCL Recommendation
C5N-EU1	Total PCBs	mg/kg	3.83E+00	1.19E+01	2.26E+01	1.19E+01	mg/kg	95% Adjusted Gamma UCL	ProUCL Recommendation
	Mercury	mg/kg	1.06E+00	1.51E+00	2.20E+00	1.51E+00	mg/kg	95% Student's-t UCL	ProUCL Recommendation

95% UCL: 95 percent upper confidence on the mean
KM: Kaplan-Meier
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl

Table 5-13. Exposure Point Concentration Summary – Total PCBs and Mercury in Agricultural Exposure Units – Surface Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Scenario Time Frame: Current/Future
Medium: Soil
Exposure Medium: Surface Soil

Exposure Unit	Constituent of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Ag-EU1	Total PCBs	mg/kg	2.14E+01	4.25E+01	1.27E+02	4.25E+01	mg/kg	95% KM (BCA) UCL	ProUCL Recommendation
	Mercury	mg/kg	3.30E+00	1.34E+01	1.89E+01	1.34E+01	mg/kg	97.5% Chebyshev (Mean, Sd) UCL	See Text
Ag-EU2	Total PCBs	mg/kg	1.11E+01	2.23E+01	8.95E+01	2.23E+01	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	2.44E+00	3.15E+00	1.15E+01	3.15E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
Ag-EU3	Total PCBs	mg/kg	9.57E+00	2.87E+01	4.29E+01	2.87E+01	mg/kg	95% Adjusted Gamma UCL	ProUCL Recommendation
	Mercury	mg/kg	2.60E+00	4.97E+00	9.15E+00	4.97E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
Ag-EU4	Total PCBs	mg/kg	9.64E-01	1.74E+00	4.63E+00	1.74E+00	mg/kg	95% KM (t) UCL	ProUCL Recommendation
	Mercury	mg/kg	4.99E-01	1.66E+00	2.30E+00	1.66E+00	mg/kg	97.5% Chebyshev (Mean, Sd) UCL	See Text
Ag-EU5	Total PCBs	mg/kg	1.83E+00	5.29E+00	1.63E+01	5.29E+00	mg/kg	95% KM (Chebyshev) UCL	ProUCL Recommendation
	Mercury	mg/kg	9.71E-01	1.65E+00	4.25E+00	1.65E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
Ag-EU6	Total PCBs	mg/kg	1.41E-01	4.08E-02	1.15E+00	4.08E-02	mg/kg	75th Percentile	See Text
	Mercury	mg/kg	8.34E-02	2.14E-01	3.75E-01	2.14E-01	mg/kg	95% Chebyshev (Mean, Sd) UCL	ProUCL Recommendation
Ag-EU7	Total PCBs	mg/kg	5.45E-01	7.97E-01	1.41E+00	7.97E-01	mg/kg	75th Percentile	See Text
	Mercury	mg/kg	3.85E-01	5.25E-01	7.05E-01	5.25E-01	mg/kg	75th Percentile	See Text
Ag-EU8	Total PCBs	mg/kg	4.00E-01	4.44E-01	1.37E+00	4.44E-01	mg/kg	75th Percentile	See Text
	Mercury	mg/kg	6.07E-01	1.20E+00	1.40E+00	1.20E+00	mg/kg	75th Percentile	See Text

BCA: bias-corrected accelerated
KM: Kaplan-Meier
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl
Sd: standard deviation
UCL: upper confidence limit on the mean

Table 5-14. Exposure Point Concentration Summary – Other Constituents of Potential Concern – Surface Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Scenario Time Frame: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Constituent of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration			
					Value	Units	Statistic	Rationale
PCDD/DF Congener								
2,3,7,8-TCDD TEQ	mg/kg	2.12E-05	2.50E-05	1.74E-04	2.50E-05	mg/kg	95% KM (BCA) UCL	ProUCL Recommendation
PAHs								
Benzo(a)anthracene	mg/kg	2.32E-01	1.37E-01	2.05E-01	1.37E-01	mg/kg	95% KM (t) UCL	ProUCL Recommendation
Benzo(a)pyrene	mg/kg	2.45E-01	1.20E-01	2.07E-01	1.20E-01	mg/kg	95% KM (t) UCL	ProUCL Recommendation
Benzo(b)fluoranthene	mg/kg	2.36E-01	6.37E-02	8.25E-02	6.37E-02	mg/kg	95% KM (t) UCL	ProUCL Recommendation
Benzo(k)fluoranthene	mg/kg	2.47E-01	1.25E-01	2.06E-01	1.25E-01	mg/kg	95% KM (t) UCL	ProUCL Recommendation
Chrysene	mg/kg	2.17E-01	1.32E-01	1.92E-01	1.32E-01	mg/kg	95% KM (t) UCL	ProUCL Recommendation
Indeno(1,2,3-cd)pyrene	mg/kg	2.88E-01	1.51E-01	2.00E-01	1.51E-01	mg/kg	95% KM (t) UCL	ProUCL Recommendation
Inorganics								
Aluminum	mg/kg	1.12E+04	1.27E+04	1.72E+04	1.27E+04	mg/kg	95% Student's-t UCL	ProUCL Recommendation
Arsenic	mg/kg	6.86E+00	7.46E+00	1.85E+01	7.46E+00	mg/kg	95% Student's-t UCL	ProUCL Recommendation
Chromium	mg/kg	1.69E+01	1.87E+01	6.75E+01	1.87E+01	mg/kg	95% H-UCL	ProUCL Recommendation
Cobalt	mg/kg	8.81E+00	9.47E+00	2.52E+01	9.47E+00	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
Iron	mg/kg	1.92E+04	2.43E+04	4.28E+04	2.43E+04	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation
Manganese	mg/kg	8.57E+02	9.64E+02	4.31E+03	9.64E+02	mg/kg	95% Approximate Gamma UCL	ProUCL Recommendation

95% UCL: 95 percent upper confidence limit on the mean
BCA: bias-corrected accelerated
KM: Kaplan-Meier
mg/kg: milligram(s) per kilogram
PAH: polycyclic aromatic hydrocarbon
PCDD/DF: dioxin and furan
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalents

Table 5-15. Summary of Cancer Risks and Noncancer Hazard Indices from Primary Constituents of Potential Concern – RME
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Exposure Unit	Exposure Scenario	Receptor	Cancer Risk (Total PCBs)	Hazard Index (Total PCBs and Mercury)	Cancer Risk (PCB Dioxin-Like Congener TEQ)	Hazard Index (PCB Dioxin-Like Congener TEQ)
C1-EU1	High contact recreational	Young child	4E-06	0.4	5E-07	0.06
		Adolescent	3E-06	0.5	4E-07	0.03
		Adult	2E-06	0.1	2E-07	0.006
C1-EU2	Low contact recreational	Adolescent	7E-06	1	9E-07	0.07
		Adult	4E-06	0.2	5E-07	0.01
	Worker	Adult	1E-07	0.2	2E-08	0.01
C2N-EU1	Low contact recreational	Adolescent	2E-06	0.4	3E-07	0.02
		Adult	1E-06	0.08	2E-07	0.005
	Worker	Adult	6E-08	0.1	8E-09	0.006
C3N-EU1	Low contact recreational	Adolescent	3E-06	0.6	4E-07	0.03
		Adult	2E-06	0.1	2E-07	0.006
C3N-EU2	Low contact recreational	Adolescent	5E-06	0.6	4E-07	0.03
		Adult	3E-06	0.1	2E-07	0.006
C3S-EU1	High contact recreational	Young child	7E-06	1	9E-07	0.1
		Adolescent	6E-06	1	7E-07	0.06
		Adult	3E-06	0.2	4E-07	0.01
C3S-EU2	High contact recreational	Young child	8E-06	1	3E-06	0.3
		Adolescent	7E-06	1	2E-06	0.2
		Adult	4E-06	0.2	1E-06	0.03
C4N-EU1	Low contact recreational	Adolescent	1E-06	0.2	2E-07	0.01
		Adult	7E-07	0.04	1E-07	0.003
	Worker	Adult	1E-08	0.02	2E-09	0.001
C4N-EU2	Low contact recreational	Adolescent	1E-06	0.2	2E-07	0.01
		Adult	7E-07	0.04	1E-07	0.003
C4S-EU1	Low contact recreational	Adolescent	2E-06	0.4	4E-07	0.03
		Adult	1E-06	0.09	2E-07	0.006
C4S-EU2	Low contact recreational	Adolescent	4E-07	0.06	5E-08	0.004
		Adult	2E-07	0.01	3E-08	0.0007
C4S-EU3	Low contact recreational	Adolescent	8E-07	0.1	1E-07	0.008
		Adult	5E-07	0.03	6E-08	0.002
C5N-EU1	Low contact recreational	Adolescent	9E-07	0.2	1E-07	0.009
		Adult	5E-07	0.03	7E-08	0.002
	Worker	Adult	2E-08	0.04	3E-09	0.002
C5S-EU1	Low contact recreational	Adolescent	2E-07	0.03	2E-08	0.002
		Adult	1E-07	0.007	1E-08	0.0004
C6N-EU1	Low contact recreational	Adolescent	3E-07	0.05	4E-08	0.003
		Adult	2E-07	0.01	2E-08	0.0006

Table 5-15. Summary of Cancer Risks and Noncancer Hazard Indices from Primary Constituents of Potential Concern – RME
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Exposure Unit	Exposure Scenario	Receptor	Cancer Risk (Total PCBs)	Hazard Index (Total PCBs and Mercury)	Cancer Risk (PCB Dioxin-Like Congener TEQ)	Hazard Index (PCB Dioxin-Like Congener TEQ)
C6S-EU1	Low contact recreational	Adolescent	4E-07	0.07	5E-08	0.004
		Adult	3E-07	0.02	3E-08	0.0008
C7S-EU1	Low contact recreational	Adolescent	2E-07	0.03	2E-08	0.002
		Adult	1E-07	0.007	1E-08	0.0004
C8N-EU1	Low contact recreational	Adolescent	4E-07	0.08	7E-08	0.005
		Adult	3E-07	0.02	4E-08	0.001

No Fill: total cancer risk less than 1E-06 or total hazard index less than or equal to 1.0.
: total cancer risk between 1E-06 and 1E-04.
: total cancer risk greater than 1E-4 or total hazard index greater than 1.0.
EU: exposure unit
PCB: polychlorinated biphenyl
RME: reasonable maximum exposure
TEQ: toxic equivalent

Table 5-16. Summary of Cancer Risks and Noncancer Hazard Indices from Primary Constituents of Potential Concern – Agricultural Exposure Units – RME
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Exposure Unit	Exposure Scenario	Receptor	Cancer Risk (Total PCBs)	Hazard Index (Total PCBs and Mercury)	Cancer Risk (PCB Dioxin-Like Congener TEQ)	Hazard Index (PCB Dioxin-Like Congener TEQ)
Ag-EU1	Farmer	Adult	3E-06	0.1	3E-07	0.007
Ag-EU2	Farmer	Adult	1E-06	0.06	2E-07	0.004
Ag-EU3	Farmer	Adult	2E-06	0.08	2E-07	0.005
Ag-EU4	Farmer	Adult	1E-07	0.005	1E-08	0.0003
Ag-EU5	Farmer	Adult	3E-07	0.01	4E-08	0.0008
Ag-EU6	Farmer	Adult	3E-09	0.0002	8E-11	0.000002
Ag-EU7	Farmer	Adult	5E-08	0.002	6E-09	0.0001
Ag-EU8	Farmer	Adult	3E-08	0.002	3E-09	0.00006

No Fill: total cancer risk less than 1E-06 or total hazard index less than or equal to 1.0.
: total cancer risk between 1E-06 and 1E-04.
PCB: polychlorinated biphenyl
RME: reasonable maximum exposure
TEQ: toxic equivalent

Table 5-17. Site-Wide Cancer Risks from Other Constituents of Potential Concern (RME)
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Constituent of Potential Concern	Exposure Point Concentration (mg/kg)	CSF $(mg/kg\text{-}day)^{-1}$	Cancer Risks					
			High Contact Recreational Exposure			Low Contact Recreational Exposure		
			Young Child	Adolescent	Adult	Young Child	Adolescent	Adult
PCDD/DF Congener								
2,3,7,8-TCDD TEQ	2.50E-05	1.30E+05	1E-06	5E-07	6E-07	6E-07	2E-07	3E-07
PAHs								
Benzo(a)anthracene	1.37E-01	7.30E-01	5E-08	3E-08	2E-08	3E-08	2E-08	1E-08
Benzo(a)pyrene	1.20E-01	7.30E+00	4E-07	3E-07	2E-07	2E-07	1E-07	1E-07
Benzo(b)fluoranthene	6.37E-02	7.30E-01	2E-08	2E-08	1E-08	1E-08	8E-09	6E-09
Benzo(k)fluoranthene	1.25E-01	7.30E-02	5E-09	3E-09	2E-09	2E-09	2E-09	1E-09
Chrysene	1.32E-01	7.30E-03	5E-10	3E-10	2E-10	2E-10	2E-10	1E-10
Indeno(1,2,3-cd)pyrene	1.51E-01	7.30E-01	6E-08	4E-08	3E-08	3E-08	2E-08	1E-08
Inorganics								
Aluminum	1.27E+04	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.46E+00	1.50E+00	4E-06	2E-06	2E-06	2E-06	8E-07	1E-06
Chromium	1.87E+01	5.00E-01	3E-06	8E-07	2E-06	2E-06	4E-07	8E-07
Cobalt	9.47E+00	NA	NA	NA	NA	NA	NA	NA
Iron	2.43E+04	NA	NA	NA	NA	NA	NA	NA
Manganese	9.64E+02	NA	NA	NA	NA	NA	NA	NA
		Total:	9E-06	3E-06	5E-06	4E-06	2E-06	2E-06

Cancer risks are based on the incidental ingestion and dermal contact exposure pathways.
Chromium CSF is based on hexavalent form.
CSF: cancer slope factor
mg/kg: milligram(s) per kilogram
mg/kg-day: milligram(s) per kilogram per day
NA: not available
PAH: polycyclic aromatic hydrocarbon
PCDD/DF: dioxin and furan
RME: reasonable maximum exposure
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalent

Table 5-18. Site-Wide Noncancer Hazard Indices from Other Constituents of Potential Concern (RME)
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Contaminant of Potential Concern	Exposure Point Concentration (mg/kg)	RfD (mg/kg-day)	Hazard Indices					
			High-Contact Recreational Exposure			Low-Contact Recreational Exposure		
			Young Child	Adolescent	Adult	Young Child	Adolescent	Adult
PCDD/DF Congener								
2,3,7,8-TCDD TEQ	2.50E-05	7.00E-10	0.2	0.04	0.02	0.08	0.02	0.008
PAHs								
Benzo(a)anthracene	1.37E-01	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	1.20E-01	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	6.37E-02	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1.25E-01	NA	NA	NA	NA	NA	NA	NA
Chrysene	1.32E-01	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.51E-01	NA	NA	NA	NA	NA	NA	NA
Inorganics								
Aluminum	1.27E+04	1.00E+00	0.05	0.008	0.005	0.02	0.004	NA
Arsenic	7.46E+00	3.00E-04	0.1	0.03	0.01	0.05	0.01	0.006
Chromium	1.87E+01	3.00E-03	0.02	0.004	0.003	0.01	0.002	0.001
Cobalt	9.47E+00	3.00E-04	0.1	0.02	0.01	0.06	0.01	0.006
Iron	2.43E+04	7.00E-01	0.1	0.02	0.01	0.07	0.01	0.007
Manganese	9.64E+02	2.40E-02	0.2	0.03	0.02	0.08	0.01	0.008
		Total:	0.7	0.1	0.08	0.4	0.07	0.04

Presented hazard indices are based on the incidental ingestion and dermal contact exposure pathways.
Chromium RfD is based on hexavalent form.
mg/kg: milligram(s) per kilogram
NA: Not available
PAH: polycyclic aromatic hydrocarbon
PCDD/DF: dioxin and furan
RfD: reference dose
RME: reasonable maximum exposure
TCDD: tetrachlorodibenzo-p-dioxin
TEQ: toxic equivalent

Table 5-19. Vegetable Ingestion Risk Matrix
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Fraction Ingested from Floodplain/Vegetable Growing Scenario	Cancer Risk Total PCB Soil Concentration (mg/kg)				HQ Total PCB Soil Concentration (mg/kg)			
	1	5	20	40	1	5	20	40
100%								
Aboveground	5E-07	2E-06	1E-05	2E-05	0.02	0.1	0.4	0.9
Root	6E-07	3E-06	1E-05	2E-05	0.03	0.1	0.5	1
Total	1E-06	5E-06	2E-05	4E-05	0.05	0.2	1	2
75%								
Aboveground	4E-07	2E-06	7E-06	1E-05	0.02	0.08	0.3	0.6
Root	5E-07	2E-06	9E-06	2E-05	0.02	0.10	0.4	0.8
Total	8E-07	4E-06	2E-05	3E-05	0.04	0.2	0.7	1
50%								
Aboveground	2E-07	1E-06	5E-06	1E-05	0.01	0.05	0.2	0.4
Root	3E-07	2E-06	6E-06	1E-05	0.01	0.07	0.3	0.5
Total	5E-07	3E-06	1E-05	2E-05	0.02	0.1	0.5	1
25%								
Aboveground	1E-07	6E-07	2E-06	5E-06	0.005	0.03	0.1	0.2
Root	2E-07	8E-07	3E-06	6E-06	0.007	0.03	0.1	0.3
Total	3E-07	1E-06	5E-06	1E-05	0.01	0.06	0.2	0.5
10%								
Aboveground	5E-08	2E-07	1E-06	2E-06	0.002	0.01	0.04	0.09
Root	6E-08	3E-07	1E-06	2E-06	0.003	0.01	0.05	0.1
Total	1E-07	5E-07	2E-06	4E-06	0.005	0.02	0.10	0.2

No Fill: cancer risk less than 1E-06 or hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.
HQ: hazard quotient
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl

Table 5-20. Beef Ingestion Risk Matrix
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Cattle Ingestion Scenario	Cancer Risk Total PCB Soil Concentration (mg/kg)				HQ Total PCB Soil Concentration (mg/kg)			
	1	5	20	40	1	5	20	40
Forage/Silage/Grain/Soil - FI 50%	1E-05	6E-05	2E-04	4E-04	0.5	2	10	19
Forage/Silage/Grain/Soil - FI 25%	6E-06	3E-05	1E-04	2E-04	0.2	1	5	10
Forage/Silage/Grain/Soil - FI 10%	2E-06	1E-05	4E-05	9E-05	0.1	0.5	2	4
Forage/Soil - FI 50%	1E-05	5E-05	2E-04	4E-04	0.5	2	9	19
Forage/Soil - FI 25%	5E-06	3E-05	1E-04	2E-04	0.2	1	5	9
Forage/Soil - FI 10%	2E-06	1E-05	4E-05	9E-05	0.09	0.5	2	4

No Fill: hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.
FI: fraction ingested
HQ: hazard quotient
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl

Table 5-21. Dairy Ingestion Risk Matrix
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Cattle Ingestion Scenario	Cancer Risk Total PCB Soil Concentration (mg/kg)				HQ Total PCB Soil Concentration (mg/kg)			
	1	5	20	40	1	5	20	40
Forage/Silage/Grain/Soil - FI 50%	7E-06	4E-05	1E-04	3E-04	0.3	2	6	13
Forage/Silage/Grain/Soil - FI 25%	4E-06	2E-05	7E-05	1E-04	0.2	0.8	3	6
Forage/Silage/Grain/Soil - FI 10%	1E-06	7E-06	3E-05	6E-05	0.06	0.3	1	3
Forage/Soil - FI 50%	7E-06	3E-05	1E-04	3E-04	0.3	1	6	12
Forage/Soil - FI 25%	3E-06	2E-05	7E-05	1E-04	0.1	0.7	3	6
Forage/Soil - FI 10%	1E-06	7E-06	3E-05	5E-05	0.06	0.3	1	2

No Fill: hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.
FI: fraction ingested
HQ: hazard quotient
mg/kg: milligram(s) per kilogram
PCB: polychlorinated bipheny

Table 5-22. Chicken Ingestion Risk Matrix
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Chicken Ingestion Scenario	Cancer Risk Total PCB Soil Concentration (mg/kg)				HQ Total PCB Soil Concentration (mg/kg)			
	1	5	20	40	1	5	20	40
Grain/Soil - FI 100%	3E-07	2E-06	6E-06	1E-05	0.01	0.07	0.3	0.5
Grain/Soil - FI 50%	2E-07	8E-07	3E-06	6E-06	0.007	0.03	0.1	0.3
Grain/Soil - FI 25%	8E-08	4E-07	2E-06	3E-06	0.003	0.02	0.07	0.1
Grain/Soil - FI 10%	3E-08	2E-07	6E-07	1E-06	0.001	0.007	0.03	0.05

No Fill: cancer risk less than 1E-06 or hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.
FI: fraction ingested
HQ: hazard quotient
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl

Table 5-23. Egg Ingestion Risk Matrix
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Chicken Ingestion Scenario	Cancer Risk Total PCB Soil Concentration (mg/kg)				HQ Total PCB Soil Concentration (mg/kg)			
	1	5	20	40	1	5	20	40
Grain/Soil - FI 100%	1E-07	6E-07	2E-06	5E-06	0.005	0.03	0.1	0.2
Grain/Soil - FI 50%	6E-08	3E-07	1E-06	2E-06	0.003	0.01	0.05	0.1
Grain/Soil - FI 25%	3E-08	1E-07	6E-07	1E-06	0.001	0.007	0.03	0.05
Grain/Soil - FI 10%	1E-08	6E-08	2E-07	5E-07	0.0005	0.003	0.01	0.02

No Fill: cancer risk less than 1E-06 or hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.
FI: fraction ingested
HQ: hazard quotient
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl

Table 5-24. Beef Ingestion Risk Matrix: Sensitivity Analysis for Lower Soil Bioavailability
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Cattle Ingestion Scenario	Cancer Risk Total PCB Concentration (mg/kg)				HQ Total PCB Concentration (mg/kg)			
	1	5	20	40	1	5	20	40
Forage/Silage/Grain/Soil - FI 50%	6E-06	3E-05	1E-04	3E-04	0.3	1	6	11
Forage/Silage/Grain/Soil - FI 25%	3E-06	2E-05	6E-05	1E-04	0.1	0.7	3	6
Forage/Silage/Grain/Soil - FI 10%	1E-06	6E-06	3E-05	5E-05	0.06	0.3	1	2
Forage/Soil - FI 50%	6E-06	3E-05	1E-04	2E-04	0.3	1	5	10
Forage/Soil - FI 25%	3E-06	1E-05	6E-05	1E-04	0.1	0.6	3	5
Forage/Soil - FI 10%	1E-06	6E-06	2E-05	5E-05	0.05	0.3	1	2

No Fill: hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.

All the risk values presented are based on an assumed bioavailability of 50% for PCBs in soil ingested by cattle. This is a lower bounding estimate to the 100% assumed bioavailability used in the HHRA.

FI: fraction ingested
HHRA: human health risk assessment
HQ: hazard quotient
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl

Table 5-25. Dairy Ingestion Risk Matrix: Sensitivity Analysis for Lower Soil Bioavailability
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Cattle Ingestion Scenario	Cancer Risk Total PCB Concentration (mg/kg)				HQ Total PCB Concentration (mg/kg)			
	1	5	20	40	1	5	20	40
Forage/Silage/Grain/Soil - FI 50%	5E-06	2E-05	9E-05	2E-04	0.2	1	4	8
Forage/Silage/Grain/Soil - FI 25%	2E-06	1E-05	5E-05	9E-05	0.1	0.5	2	4
Forage/Silage/Grain/Soil - FI 10%	9E-07	5E-06	2E-05	4E-05	0.04	0.2	0.8	2
Forage/Soil - FI 50%	4E-06	2E-05	8E-05	2E-04	0.2	0.9	3	7
Forage/Soil - FI 25%	2E-06	1E-05	4E-05	8E-05	0.09	0.4	2	3
Forage/Soil - FI 10%	8E-07	4E-06	2E-05	3E-05	0.03	0.2	0.7	1

No Fill: cancer risk less than 1E-06 or hazard quotient/index less than or equal to 1.0.
: cancer risk between 1E-06 and 1E-04.
: cancer risk greater than 1E-04 or hazard quotient/index greater than 1.0.

All the risk values presented are based on an assumed bioavailability of 50% for PCBs in soil ingested by cattle. This is a lower bounding estimate to the 100% assumed bioavailability used in the HHRA.

FI: fraction ingested
HHRA: human health risk assessment
HQ: hazard quotient
mg/kg: milligram(s) per kilogram
PCB: polychlorinated biphenyl

Table 5-26. Summary of Remedial Goal Options: Fish
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

	Fish Tissue RGOs (mg/kg wet weight)					
	Cancer-Based			Noncancer-Based		
COPC	**1 x 10^{-6}**	**1 x 10^{-5}**	**1 x 10^{-4}**	**0.1**	**1**	**3**
River Mile 0-10						
Total PCBs	0.002	0.02	0.2	0.004	0.04	0.1
Mercury	NA	NA	NA	0.02	0.2	0.5
River Mile 10-37						
Total PCBs	0.005	0.05	0.5	0.008	0.08	0.2
Mercury	NA	NA	NA	0.05	0.5	1

RGOs are based on recreational fisherman RME exposure assumptions.

River Mile 0-10 corresponds to fish grouping A (below Jackson Shoals), or sampling locations 1 and 2 where an FI = 1 was used.

River Mile 10-37 corresponds to fish groupings B and C (above Jacksons Shoals), or sampling locations 3 through 9 where an FI = 0.5 was used.

COPC: constituents of potential concern

FI: fraction ingested

mg/kg: milligrams per kilogram

NA: There is no applicable slope factor.

PCB: polychlorinated biphenyl

RGO: remedial goal option

Table 5-27. Summary of Remedial Goal Options: Total PCBs in Soil Based on Agricultural Product Consumption
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Product and Ingestion Scenario	Soil RGOs (mg/kg)					
	Cancer-Based			Noncancer-Based		
	1×10^{-6}	1×10^{-5}	1×10^{-4}	0.1	1	3
Vegetables[a]						
Aboveground	2	20	200	4	44	133
Root	2	20	200	4	40	120
Beef Ingestion						
Forage/Silage/Grain/Soil - FI 50%	0.1	1	10	0.2	2	6
Forage/Silage/Grain/Soil - FI 25%	0.2	2	20	0.4	4	12
Forage/Silage/Grain/Soil - FI 10%	0.4	4	44	1	10	30
Forage/Soil - 50%	0.1	1	10	0.2	2	6
Forage/Soil - 25%	0.2	2	20	0.4	4	13
Forage/Soil - 10%	0.4	4	44	1	10	30
Dairy Ingestion						
Forage/Silage/Grain/Soil - FI 50%	0.1	1	13	0.3	3	9
Forage/Silage/Grain/Soil - FI 25%	0.4	4	40	0.7	7	20
Forage/Silage/Grain/Soil - FI 10%	0.7	7	67	1	13	40
Forage/Soil - 50%	0.1	1	13	0.3	3	10
Forage/Soil - 25%	0.4	4	40	0.7	7	20
Forage/Soil - 10%	0.8	8	80	2	20	60

a. Calculated for 100% FI from floodplain.

FI: fraction ingested

PCB: polychlorinated biphenyl

mg/kg: milligrams per kilogram

RGO: remedial goal option

Table 5-28. Predicted Risk for Ecological Receptors Exposed to PCBs in OU-4
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Assessment Endpoint			UAA			MAA		LAA			
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Aquatic Receptor Predicted Risk											
Aquatic Plants/ Aquatic Life		U	A	A	A	A	A	A	A	A	A
Benthic Invertebrates		U	U	GA	GA	GA	A	U	GA	A	GA
Fish/Aquatic Life		U	U	U	U	U	U	U	U	U	U
Piscivorous Birds	Belted kingfisher	U	U	U	U	U	U	U	U	U	U
Insectivorous Birds	Sandpiper	HU	HU	U	U	U	U	U	U	U	U
Aerial Insectivorous Birds	Swallow	U	U	U	U	A	A	A	A	A	A
Piscivorous Mammals	Otter/mink	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU
Aerial Insectivorous Mammals	Bat	U	U	U	U	A	A	A	A	A	A
Terrestrial/Riparian Receptor Predicted Risk											
Terrestrial Plants		U[1]	A	A	A	A	A	A	A	A	A
Terrestrial Invertebrates		U[1]	I	I	I	A	A	A	A	A	I
Herbivorous Birds	Dove	U[1]	A	I	A	A	A	A	A	A	A
Insectivorous Birds	Wren	U	U	U	U	I	I	I	I	I	--
Omnivorous Birds	Blue jay	U	I	I	I	A	A	A	A	A	--
Carnivorous Birds	Hawk	HU	U	U	U	I	A	A	I	A	--
Herbivorous Mammals	Deer	A	A	A	A	A	A	A	A	A	--
Insectivorous/ Invertivorous Mammals	Shrew	U	U	U	U	I	I	I	I	I	--
Carnivorous Mammals	Weasel	U[1]	A	U[2]	I	A	A	A	A	A	--
Mixed Aquatic and Terrestrial Diet Receptor Predicted Risk											
Omnivorous Birds	Wren	HU	U	U	U	I	I	I	I	I	--
Omnivorous Mammals	Raccoon	I	I	I	I	I	I	I	I	I	I
Omnivorous Mammals	Mink	HU	HU	HU	HU	HU	HU	HU	HU	HU	HU

Notes:

[1]Unacceptable for C1 West only; C1 East risk is indeterminate.

[2]Unacceptable for C3 South only; C3 North risk is indeterminate.

-- Terrestrial and riparian habitat not evaluated in Reach C10

Risk categories:

A	Acceptable risk
GA	Generally acceptable risk
I	Indeterminate risk
U	Unacceptable risk
HU	High unacceptable risk

BERA: baseline ecological risk assessment

LAA: lower assessment area

LOE: line of evidence

MAA: middle assessment area

PCB: polychlorinated biphenyl

UAA: upper assessment area

Table 5-29. Summary of Remedial Goal Options for the OU-4 BERA Addendum
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Constituent		Range of Sediment RGOs (mg/kg dw)					Range of Soil RGOs (mg/kg dw)	
		Benthic Invertebrates[3]	Benthic Invertebrates[4]	Fish[5]	Birds	Mammals [1,2]	Birds	Mammals
NOAEL-Based Remedial Goal Options (mg/kg)								
Total PCB [1]	BERA Addendum	1.4–31	0.3–3	0.1–0.3	0.14–5.7	0.06–5	1.1–16	0.8–49
	BERA	1.4–152			0.6–7.6	0.3–0.9	0.9–21	3.0–7.0
Total PCB (alternative TRV) [2]	BERA Addendum	--	--	--	0.01–0.5	0.05–1.2	0.1–1.5	0.2–11
	BERA	--			0.06–0.7	--	0.09–2.0	NC
Mercury	BERA Addendum	0.4–3.6	--	0.6–2.7	0.25–1.5	7–104	0.1–4.3	0.4–550
	BERA	0.4–13			0.7–12	53–101	0.08–4.3	15–29
Barium	BERA Addendum	NC	--	--	109–2,161	2,776–7,924	--	--
	BERA	NC			221–3426	4,431–12,561	--	--
Chromium	BERA Addendum	43	--	--	20–201	25–2,649	20–140	33–2,163
	BERA	43			13–132	16–185	22–105	118–202
Cobalt	BERA Addendum	NC	--	--	70–2,450	1,487–49,911	--	--
	BERA	NC			19–1,846	65–1,136	--	--
Lead	BERA Addendum	36	--	--	5.4–1,328	924–9,542	3.8–101	16–6,342
	BERA	36			31–2,122	1,977–7,288	3.5–143	563–1026
Vanadium	BERA Addendum	NC	--	0.6–3.2	6.4–87	854–12,890	4–75	105–3,884
	BERA	NC			5.3–56	552–1,704	4.2–17	222–410
LOAEL-Based Remedial Goal Options (mg/kg)								
Total PCB [1]	BERA Addendum	2.6–105	0.7–6	0.4–1.5	0.4–17	0.13–16	3–48	2–144
	BERA	1.4–152			1.8–23	0.6–2.8	2.8–64	20–45
Total PCB (alternative) [2]	BERA Addendum	--	--	--	0.04–1.6	0.06–2.4	0.3–4.5	0.3–21
	BERA	--			0.2–2.1	0.3–0.4	0.3–6.0	--
Mercury	BERA Addendum	0.7–9.2	--	0.7–3	0.8–5	14–208	0.2–11	0.8–1,099
	BERA	0.4–13			2.0–36	107–201	0.2–13	31–58
Barium	BERA Addendum	NC	--	--	219–4,333	6,484–18,510	NA	NA
	BERA	NC			443–6,869	10,351–29,342	NA	NA

Table 5-29. Summary of Remedial Goal Options for the OU-4 BERA Addendum
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Constituent		Range of Sediment RGOs (mg/kg dw)					Range of Soil RGOs (mg/kg dw)	
		Benthic Invertebrates[3]	Benthic Invertebrates[4]	Fish[5]	Birds	Mammals [1,2]	Birds	Mammals
Chromium	BERA Addendum	111	--	--	21–212	29–3,113	21–477	38–2,542
	BERA	111			14–139	19–218	23–110	139–237
Cobalt	BERA Addendum	NC	--	--	72–2,511	2,028–68,092	NA	NA
	BERA	NC			20–1,893	89–1,550	NA	NA
Lead	BERA Addendum	128	--	--	11–2,655	1,750–18,069	8–3,515	31–12,009
	BERA	128			61–4,243	3,744–13,801	7.0–286	1,066–1,943
Vanadium	BERA Addendum	NC	--	13–75	13–177	1,706–25,748	8–153	209–7,758

1. For aquatic mammals, the mink and otter values included in the range of PCB RGOs are based on mink reproductive endpoints from Restum et al. (1998). For the bat, the RGOs included in the range are based on small mammal TRVs. Values listed for birds are based on midrange sensitivity TRVs.

2. For aquatic mammals, the PCB (alternative) RGOs include values for mink and otter based on the mink growth endpoint TRVs from Restum et al. (1998). Alternative RGOs for birds were high-sensitivity values TRVs from Lillie et al. (1974). Alternative RGOs for mammals other than mink and otter were based on TRVs from Restum et al. (1998) based on reproduction endpoint.

3. The RGO range shown reflects only EC10* values from site-specific sediment toxicity testing. The EC 20* values could also be considered LOAELS and are higher than the values shown.

4. Range of RGOs calcuated based on a secondary line of evidence that back-calculated sediment concentrations from literature-derived critical tissue concentrations by modeling uptake from sediment to tissue. Includes values for benthic invertebrates and mollusks.

5. Fish-based values back-calculated from literature-derived critical tissue concentrations by modeling uptake from sediment to fish tissue.

-- : Alternative RGOs not calculated
LOAEL: lowest observed adverse effect level
mg/kg: milligrams per kilogram
mg/kg dw: milligrams per kilogram dry weight
NA: not applicable; constituent not evaluated in soil
NC: toxicity criteria unavailable; value not calculated
NOAEL: no observed adverse effect level
PCB: polychlorinated biphenyl
RGO: remedial goal option
TRV: toxicity reference value

Table 6-1. Potential Chemical-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action/Medium	Requirements	Prerequisite	Citation
Restoration of groundwater to its beneficial uses	May not exceed MCLs for organics and inorganics established under the Safe Drinking Water Act National Revised Primary Drinking Water Regulations for community water systems.	Presence of contaminants in groundwater of the state designated as potential underground sources of drinking water as defined in ADEM Admin. Code. r. 335-6-8-.03 - **relevant and appropriate**	40 C.F.R. § 141.61(a) and (c) 40 C.F.R. § 141.62(b) ADEM Admin. Code r. 335-7-2-.03(1) ADEM Admin. Code r. 335-7-2-.04(1) ADEM Admin. Code r. 335-7-2-.05(1)
Cleanup of PCB-contaminated soil at sites in industrial areas	Recommends cleanup levels should be established within a range of 10 to 25 ppm PCB. Recommends treatment, where practicable, for principal threat wastes.	CERCLA site with PCB contamination in soil requiring response action - **TBC**	USEPA *Guidance on Remedial Actions for Superfund Sites with PCB Contamination* [EPA/540/G-90/007] (USEPA 1990), page 30
Cleanup of PCB-contaminated soil at sites in *residential* areas	Recommends cleanup levels should be established at 1 ppm PCB. Recommends treatment, where practicable, for principal threat wastes.	CERCLA site with PCB contamination in soil requiring response action - **TBC**	USEPA *Guidance on Remedial Actions for Superfund Sites with PCB Contamination* [EPA/540/G-90/007] (USEPA 1990), Page 28.
Groundwater	PCB MCLG (non-enforceable) = 0, MCL (enforceable) MCL = 0.5 µg/L	PCBs in groundwater - **relevant and appropriate**	40 C.F.R. § 141.61(a) and (c)
Surface water	PCBs in freshwater aquatic life chronic criterion (enforceable) = 0.014 µg/L	PCBs in surface water - **applicable**	33 U.S.C. §1251 et seq. 40 C.F.R. § 131.36 ADEM Admin. Code r. 335-6-10
	PCB in freshwater for ingestion of surface water and biota = 0.000064 µg/L	PCBs in surface water – **relevant and appropriate** This ARAR should be waived as equivalent standards have been developed on a site-specific basis as fish tissue PRGs. The ARAR should be waived as a State requirement because it is not consistently applied by the State.	40 C.F.R. § 131.36 33 U.S.C. § 1251 et seq. ADEM Admin. Code r. 335-6-10

µg/L: micrograms per liter
ADEM: Alabama Department of Environmental Management
ARAR: applicable and appropriate requirement
C.F.R.: Code of Federal Regulations
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
MCL: maximum contaminant level
MCLG: maximum contaminant level goal
PCB: polychlorinated biphenyl
ppm: parts per million
PRG: preliminary remediation goal
TBC: to be considered
USEPA: United States Environmental Protection Agency
U.S.C.: United States Code

Table 6-2. Potential Location-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Location	Requirement	Prerequisite	Citation
In or near the creek	USACE approval may be required to excavate or fill, to alter or modify the course, location, condition, or capacity of the channel of any navigable water of the US.	Construction activities in navigable waters - wetlands This could include dams or dikes in navigable waters of the US, as well as other structures or work including excavation, dredging, and/or disposal activities in navigable waters of the US. Particular focus is on activities that alter or modify the course, condition, location, or capacity of a navigable water of the US – **relevant and appropriate**	Rivers and Harbors Act of 1899, Section 10 USACE regulations 33 U.S.C. § 403
In or near creek or wetland areas	These regulations apply to discharges of dredged or fill materials into US waters, which include wetlands. Includes special policies, practices, and procedures to be followed by USACE in connection with the review of applications for permits to authorize the discharge of dredged or fill material into waters of the US pursuant to Section 404 of the CWA. No activity which adversely affects aquatic ecosystems, including wetlands, shall be permitted if a practicable alternative that has less adverse impacts is available. If there is no other practicable alternative, impacts must be minimized.	Wetland as defined in USACE regulations. Discharges into the waters of the US – **relevant and appropriate**	33 U.S.C. § 1344 33 C.F.R. Parts 320, 322, 323, 325, 328 and 330 33 U.S.C. § 1344 40 C.F.R. Parts 230 and 231
Presence of Federally Endangered or Threatened species listed in 50 C.F.R. 17.11(h) - or critical habitat of such species listed in 50 C.F.R. § 17.95	Federal agency shall, in consultation with and with the assistance of the Secretary, ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined by the Secretary of Interior, after consultation as appropriate with affected States, to be critical, unless such agency has been granted an exemption for such action by the Committee pursuant to subsection (h) of this section. NOTE: Despite that consultation may be considered an administrative requirement, it should be performed to ensure activities are in compliance with substantive provisions of the Endangered Species Act and regulations.	Agency action that may jeopardize listed wildlife species or destroy or adversely modify critical habitat – **applicable**	16 U.S.C. § 1536(a)(2) -or Section 7(a)(2) of the Endangered Species Act of 1973
Floodplain impacts	Land-disturbing activities within the Special Flood Hazard Area require contact with the Floodplain Administrator prior to the commencement of these activities.	Agency work in the floodplain – **relevant and appropriate**	National Flood Insurance Program administered by the Federal Emergency Management Agency 42 U.S.C. 4001 et.seq, and 42 U.S.C. 4101
Creek impacts	Require consultation with the US Fish and Wildlife Service and the fish and wildlife agency of the state where the water body is located for the purpose of preventing loss of and damage to wildlife resources.	Diversion, channeling, or other activity that modifies a stream or river and affects fish or wildlife waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified – **relevant and appropriate**	Impounding, diverting or controlling of waters 16 U.S.C. § 662(a)

Table 6-2. Potential Location-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Location	Requirement	Prerequisite	Citation
Presence of Migratory Birds listed in 50 C.F.R. § 10.13	No person may take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such bird except as may be permitted under the terms of a valid permit issued pursuant to the provisions of this part and part 13 of this chapter, or as permitted by regulations in this part, or part 20 of this subchapter (the hunting regulations).	Action that has potential impacts on or is likely to result in a "take" (as defined in 50 C.F.R. § 10.12) of migratory birds – **applicable**	Migratory Bird Treaty Act 16 U.S.C. § 703(a) 50 C.F.R. § 10.12 50 C.F.R. § 21.11
Bald or Golden Eagle habitat	This Act provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting the taking, possession, and commerce of such birds.	Determination of the presence of bald eagle or golden eagle – **relevant and appropriate**	16 U.S.C. §668 (a)-(b) 50 C.F.R. Part 22
Location Encompassing aquatic ecosystem as defined in 40 C.F.R. 230.3(c), Wetlands	Except as provided under CWA section 404(b)(2), no discharge of dredged or fill material into an aquatic ecosystem shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, or if it will cause or contribute to significant degradation of the waters of the US.	Remedial work that involves a location encompassing an aquatic ecosystem (including wetlands) as defined in 40 C.F.R. § 230.3(c). Action that involves the discharge of dredged or fill material into waters of the US, including jurisdictional wetlands – **applicable**	40 C.F.R. §§ 230.10(a) and (c) CWA regulations - Section 404(b) Guidelines
Location Encompassing aquatic ecosystem as defined in 40 C.F.R. 230.3(c), Wetlands	Except as provided under CWA section 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps (in accordance with Subpart H at 40 C.F.R. 230.70 *et seq. Actions to Minimize Adverse Effects*) have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem.		40 C.F.R. § 230.10(d) CWA Regulations - Section 404(b) Guidelines
Location Encompassing aquatic ecosystem as defined in 40 C.F.R. 230.3(c), Wetlands	Must comply with the substantive requirements of the NWP 38 General Conditions, as appropriate, and any regional or case-specific conditions recommended by the USACE District Engineer, after consultation.	On-site CERCLA action conducted by a federal agency that involves the discharge of dredged or fill material into waters of the US, including jurisdictional wetlands or work that involves a location encompassing an aquatic ecosystem (including wetlands) as defined in 40 C.F.R. § 230.3(c) – **TBC**	CWA-Nation Wide Permit (38) Cleanup of Hazardous and Toxic Waste 33 C.F.R § 323.3(b)
Wetlands	Requires that the U.S. Fish and Wildlife Service and the related state agency be consulted prior to structural modifications of any body of water, including wetlands with a view to the conservation of wildlife resources by preventing loss of and damage to such resources.	The local agencies would be consulted to determine protective measures to prevent loss of wildlife resources for actions that involve the structural modification of any water body including wetlands – **relevant and appropriate**	Fish and Wildlife Coordination Act, 16 U.S.C. §662(a) 33 C.F.R. § 323.3(b)
Presence of floodplain designated as such on a map	Shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.	Federal actions that involve potential impacts to, or take place within, floodplains – **TBC**	Executive Order No. 11988, Floodplain Management, Section 1, 42 Fed. Reg. 26951 (May 25, 1977)
	Shall consider alternatives to avoid, to the extent possible, adverse effects and incompatible development in the floodplain. Design or modify its action in order to minimize potential harm to or within the floodplain.		Executive Order No. 11988, Floodplain Management, Section 2(a)2, 42 Fed. Reg. 26951 (May 25, 1977),
	Where possible, an agency shall use natural systems, ecosystem processes, and nature-based approaches when developing alternatives for consideration.		Executive Order 13690 Section 2(c)

Table 6-2. Potential Location-Specific ARARs and TBCs
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Location	Requirement	Prerequisite	Citation
Presence of floodplain designated as such on a map	The Agency shall design or modify its actions so as to minimize[2] harm to or within the floodplain.	Federal actions affecting or affected by floodplain as defined in 44 C.F.R. § 9.4 – **relevant and appropriate**	44 C.F.R. § 9.11(b)(1) Mitigation
	The Agency shall restore and preserve natural and beneficial floodplain values.		44 C.F.R. § 9.11(b)(3) Mitigation
	The Agency shall minimize: • potential harm to lives and the investment at risk from the base flood, or in the case of critical actions[3] from the 500-year flood; • potential adverse impacts that action may have on floodplain values.		44 C.F.R. § 9.11(c)(1) Mitigation
	Evaluate and avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction, loss, degradation or modification of wetlands; avoid direct or indirect support of new construction in wetlands unless there is no practicable alternative to such construction and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use; and preserve and enhance beneficial values of wetlands.	Federal actions that involve potential impacts to or take place within wetlands – **TBC**	Executive Order No. 11990, Protection of Wetlands 42 Fed. Reg. 26961 (May 25, 1977), Sections 1. (a) and 2(a), 40 C.F.R. Part 6.302(a)
Site, where and if applicable	Establishes a program for the preservation of historic properties throughout the Nation. Proposed remedial actions must take into account effect on properties in or eligible for inclusion in the National Registry of Historic Places. Actions having an effect on a listed or eligible property must provide the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed action. Advisory Council comments must be taken into account and integrated into the decision-making process. A cultural resource survey may be necessary to identify historic properties that could be affected by remediation.	Properties in or eligible for the National Registry of Historic Places – **relevant and appropriate**	16 U.S.C. § 470 et seq. 36 C.F.R. Part 800
Floodplain and wetlands	Evaluate the potential effects of actions in a floodplain to avoid adversely impacting floodplains wherever possible. Consider flood hazards and floodplain management, including the restoration and preservation of such land areas as natural undeveloped floodplains.	Floodplains and wetlands – **TBC**	Executive Order No. 11988, 42 Fed. Reg. 26951 (May 25, 1977) 40 C.F.R. Part 6, Appendix A
	Avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.	Wetlands – **TBC**	Executive Order No. 11990, 42 Fed. Reg. 26961 (May 25, 1977)

C.F.R.: Code of Federal Regulations
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
CWA: Clean Water Act
PCB: polychlorinated biphenyl
TBC: to be considered
USACE: United States Army Corps of Engineers
U.S.C.: United States Code

Table 6-3. Potential Action-Specific ARARs and TBCs
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Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
General Construction Standards - All Land-Disturbing Activities			
Activities causing storm water runoff (e.g., clearing, grading, excavation)	Shall fully implement and regularly maintain effective BMPs to the maximum extent practicable and in accordance with the operator's CBMPP.	All new and existing construction activities as defined in ADEM Admin. Code r. 335-6-12-.02(e) disturbing one (1) acre or more in size - **applicable**	ADEM Admin. Code r. 335-6-12-.05(2)
	Appropriate, effective pollution abatement/prevention facilities, structural and nonstructural BMPs, and management strategies shall be fully implemented prior to and concurrent with commencement of the regulated activities and regularly maintained during construction as needed at the site to meet or exceed the requirements of this chapter until construction is complete, effective reclamation and/or storm water quality remediation is achieved.		
	The operator shall take all reasonable steps to prevent and/or minimize, to the maximum extent practicable, any discharge in violation of this chapter or which has a reasonable likelihood of adversely affecting the quality of groundwater or surface water receiving the discharge(s).		ADEM Admin. Code r. 335-6-12-.06(4)
	Implement a comprehensive CBMPP appropriate for site conditions consistent with the substantive requirements of ADEM Admin. Code r. 335-6-12-.21 that has been prepared and certified by a Qualified Credentialed Professional.		ADEM Admin. Code r. 335-6-12-.21(2)(a)
	The CBMPP shall include a description of appropriate, effective water quality BMPs to be implemented at the site as needed to ensure compliance with this chapter and include but not be limited to the measures provided in subsections 1 through 14.		ADEM Admin. Code r. 335-6-12-.21(2)(b)
	BMPs shall be designed, implemented, and regularly maintained to provide effective treatment of discharges of pollutants in storm water resulting from runoff generated by probable storm events expected/predicted during construction disturbance based on historic precipitation information, and during extended periods of adverse weather and seasonal conditions.		ADEM Admin. Code r. 335-6-12-.21(4)
Activities causing fugitive dust emissions	Shall not cause, suffer, allow or permit any materials to be handled, transported, or stored; or a building, its appurtenances, or a road to be used without taking reasonable precautions to prevent particulate matter from becoming airborne.	Fugitive emissions from construction operations, grading, or the clearing of land - **TBC**	ADEM Admin. Code r. 335-3-4-.02(1)[1]
	Shall not cause or permit the discharge of visible fugitive dust emissions beyond the lot line of the property on which the emissions originate.		ADEM Admin. Code r. 335-3-4-.02(2)[2]

Table 6-3. Potential Action-Specific ARARs and TBCs
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Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Waste Generation, Characterization, Segregation, and Storage—Primary Wastes (e.g., excavated soils) and Secondary Wastes (e.g., treatment residues)			
Characterization of solid waste (all primary and secondary wastes) (e.g., excavated sediment and soil)	Must determine if solid waste is excluded from regulation under 40 C.F.R. § 261.4(b); and	Generation of solid waste as defined in 40 C.F.R. § 261.2 – **applicable**	40 C.F.R. § 262.11(a)
	Must determine if waste is listed as hazardous waste under subpart D 40 C.F.R. Part 261; or	Generation of solid waste which is not excluded under 40 C.F.R. § 261.4(a) – **applicable**	40 C.F.R.§ 262.11(b)
	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 C.F.R. part 261 by either: (1) Testing the waste according to the methods set forth in subpart C of 40 C.F.R. part 261, or according to an equivalent method approved by the Administrator under 40 C.F.R. 260.21; or (2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.		40 C.F.R. § 262.11(c)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous waste – **applicable**	40 C.F.R. § 262.11(d)
Characterization of RCRA hazardous waste (all primary and secondary wastes) (e.g., excavated sediment and soil)	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 C.F.R. Parts 264 and 268.	Generation of RCRA hazardous waste for storage, treatment, or disposal – **applicable**	40 C.F.R. § 264.13(a)(1)
Determinations for management of RCRA hazardous waste (e.g., excavated sediment and soil)	Must determine if the hazardous waste has to be treated before land disposal. This is done by determining if the waste meets the treatment standards in 40 C.F.R. 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. This determination can be made concurrently with the hazardous waste determination required in 40 C.F.R. 262.11.	Generation of RCRA hazardous waste for storage, treatment, or disposal – **applicable**	40 C.F.R. § 268.7(a)(1)
	Must comply with the special requirements of 40 C.F.R. 268.9 in addition to any applicable requirements in 40 C.F.R. 268.7.	Generation of waste or soil that displays a hazardous characteristic of ignitability, corrosivity, reactivity, or toxicity for storage, treatment, or disposal – **applicable**	40 C.F.R. § 264.7(a)(1)
Determinations for management of RCRA hazardous waste (e.g., excavated sediment and soil)	Must determine each USEPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 C.F.R. 268 et seq. Note: This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of hazardous waste for storage, treatment, or disposal – **applicable**	40 C.F.R. § 268.9(a)
	Must determine the underlying hazardous constituents [as defined in 40 C.F.R. § 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment, or disposal – **applicable**	40 C.F.R. § 268.9(a)
	Must determine if the hazardous waste meets the treatment standards in 40 C.F.R. 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. Note: This determination can be made concurrently with the hazardous waste determination required in 40 C.F.R. 262.11.		40 C.F.R. § 268.7(a)

Table 6-3. Potential Action-Specific ARARs and TBCs
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Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Temporary on-site storage of RCRA hazardous waste in containers (e.g., excavated sediment and soil)	A generator may accumulate hazardous waste at the facility provided that:	Accumulation of RCRA hazardous waste on-site as defined in 40 C.F.R. § 260.10 – **applicable**	40 C.F.R. § 262.34(a)
	• Waste is placed in containers that comply with 40 C.F.R. §§ 265.171-173; and		40 C.F.R. § 262.34(a)(1)(i)
	• The date upon which accumulation begins is clearly marked and visible for inspection on each container; and		40 C.F.R. § 262.34(a)(2)
	• Container is marked with the words "hazardous waste"; or	Accumulation of 55 gallons or less of RCRA hazardous waste or 1 quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation – **applicable**	40 C.F.R. § 264.34(a)(3)
	• Container may be marked with other words that identify the contents.		40 C.F.R. § 262.34(c)(1)
Use and management of RCRA hazardous waste in containers (e.g., excavated sediment and soil)	If container is not in good condition (e.g., severe rusting, structural defects) or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers – **applicable**	40 C.F.R. § 265.171
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.		40 C.F.R. § 265.172
	Keep containers closed during storage, except to add/remove waste.		40 C.F.R. § 265.173(a)
	Open, handle, and store containers in a manner that will not cause containers to rupture or leak.		40 C.F.R. § 265.173(b)
Storage of RCRA hazardous waste in container area (e.g., excavated sediment and soil)	Area must have a containment system designed and operated in accordance with 40 C.F.R. § 264.175(b).	Storage of RCRA hazardous waste in containers with free liquids – **applicable**	40 C.F.R. § 264.175(a)
	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA hazardous waste in containers that do not contain free liquids (other than F020, F021, F022, F023, F026 and F027) – **applicable**	40 C.F.R. § 264.175(c)(1)(2)
Closure performance standard for RCRA container storage unit	Must close the facility (e.g., container storage unit) in a manner that: • Minimizes the need for further maintenance; • Controls minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run -off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere; and • Complies with the closure requirements of subpart, but not limited to, the requirements of 40 C.F.R. 264.178 for containers.	Storage of RCRA hazardous waste in containers – **applicable**	40 C.F.R. § 264.111
Closure of RCRA container storage unit (e.g., excavated sediment and soil)	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be contaminated or removed. (Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 C.F.R. 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter.)	Storage of RCRA hazardous waste in containers in a unit with a containment system – **applicable**	40 C.F.R. § 264.178

Table 6-3. Potential Action-Specific ARARs and TBCs
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Action	Requirements	Prerequisite	Citation
Temporary on-site storage of remediation waste in RCRA staging piles (e.g., excavated soils)	Must be located within the contiguous property under the control of the owner/operator where the wastes are to be managed in the staging pile originated.	Accumulation of solid nonflowing hazardous remediation waste (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 C.F.R. § 260.10 – **applicable**	40 C.F.R. § 264.554(a)(1)
	For purposes of this section, temporary storage includes mixing, sizing, blending, or other similar physical operations so long as intended to prepare the wastes for subsequent management or treatment at a facility if used only during remedial.		40 C.F.R. § 264.554(a)(1)
	Staging piles may be used to store hazardous remediation waste (or remediation waste otherwise subject to land disposal restrictions) based on approved standards and design criteria designated for that staging pile. *NOTE*: Design and standards of the staging pile should be included in CERCLA Remedial Design document approved or issued by USEPA.	Storage of remediation waste in staging pile – **applicable**	40 C.F.R. § 264.554(b)
Performance criteria for RCRA staging pile	• Must facilitate a reliable, effective, and protective remedy;	Storage of remediation waste in staging pile – **applicable**	40 C.F.R. § 264.554(d)(1)(i)
	• Must be designed to prevent or minimize releases of hazardous wastes and constituents into the environment, and minimize or adequately control cross-media transfer as necessary to protect human health and the environment (e.g., use of liners, covers, run-off/run-on controls); and		40 C.F.R. § 264.554(d)(1)(ii)
	• Must not operate for more than 2 years, except when an operating term extension under 40 C.F.R. 264.554(i) is granted. Note: Must measure the 2-year limit (or other operating term specified) from first time remediation waste is placed in staging pile.		40 C.F.R. § 264.554(d)(1)(iii)
	• Must not use staging pile longer than the length of time designated by USEPA in appropriate decision document.		40 C.F.R. § 264.554(i)(1)
	Extension of up to an additional 180 days beyond the operating term limit may be granted provided the continued operation of the staging pile: • Will not pose a threat to human health and the environment; and • Is necessary to ensure timely and efficient implementation of remedial actions at the facility.		40 C.F.R. 264.554(i)(1)(i) and (ii)
Design criteria for RCRA staging pile	In setting standards and design criteria, must consider the following factors: • Length of time pile will be in operation; • Volumes of waste you intend to store in the pile; • Physical and chemical characteristics of the wastes to be stored in the unit; • Potential for releases from the unit; • Hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and • Potential for human and environmental exposure to potential releases from the unit.		40 C.F.R. § 264.554(d)(2)(i) -(vi)
	Must not place ignitable or reactive remediation waste in a staging pile unless the remediation waste has been treated, rendered, or mixed before placed in the staging pile so that:	Storage of ignitable or reactive remediation waste in staging pile – **applicable**	40 C.F.R. §264.554(e)
	• The remediation waste no longer meets the definition of ignitable or reactive under 40 C.F.R. 261.21 or 40 C.F.R. 261.23; and • You have complied with 40 C.F.R. §264.17(b); or		40 C.F.R. §264.554(e)(1)(i) and (ii)
	• Must manage the remediation waste to protect it from exposure to any material or condition that may cause it to ignite or react.		40 C.F.R. §264.554(e)(2)

Table 6-3. Potential Action-Specific ARARs and TBCs
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Action	Requirements	Prerequisite	Citation
Operation of a RCRA staging pile	Must not place in the same staging pile unless you have complied with 40 C.F.R. § 264.17(b).	Storage of "incompatible" remediation waste (as defined in 40 C.F.R. § 260.10) in staging pile – **applicable**	40 C.F.R. § 264.554(f)(1)
	Must separate the incompatible waste or materials or protect them from one another by using a dike, berm, wall, or other device.	Staging pile of remediation waste stored nearby to incompatible wastes or materials in containers, other piles, open tanks or land disposal units – **applicable**	40 C.F.R. § 264.554(f)(2)
	Must not pile remediation waste on same base where incompatible wastes or materials were previously piled unless you have sufficiently decontaminated the base to comply with 40 C.F.R. § 264.17(b).		40 C.F.R. § 264.554(f)(3)
Closure of staging piles of RCRA remediation waste	Must be closed within 180 days after the operating term by removing or decontaminating all remediation waste, contaminated containment system components, and structures and equipment contaminated with waste and leachate.	Storage of remediation waste in staging pile in a previously contaminated area – **applicable**	40 C.F.R. § 264.554(j)(1)
	Must decontaminate contaminated subsoils in a manner that USEPA determines will protect human health and the environment.		40 C.F.R. § 264.554(j)(2)
	Must be closed within 180 days after the operating term according to 40 C.F.R. §§ 264.258(a) and 264.111, or 265.258(a) and 265.111.	Storage of remediation waste in staging pile in an uncontaminated area – **applicable**	40 C.F.R. § 264.554(k)
Waste Treatment and Disposal — Excavated Soils, Debris, and Secondary Wastes			
Discharge to surface water	These standards govern discharge of water into surface waters. Due to the degraded nature of Snow Creek, regulated discharges into the waterway must meet ambient water quality criteria at the discharge point. Prohibition on new discharges into waters that do not meet applicable water quality criteria unless certain conditions are met.	NPDES requirements for point source discharge to surface water (e.g., Snow Creek) – **relevant and appropriate**	33 U.S.C. 1342; 40 C.F.R. 122, 125,131 40 C.F.R. 122.4(i)
General duty to mitigate for discharge	Take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of effluent standards which has a reasonable likelihood of adversely affecting human health or the environment.	Discharge of pollutants to surface waters of the State – **applicable**	40 C.F.R. § 122.41(d)
Operation and maintenance of treatment system	Properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used to achieve compliance with the effluent standards. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.	Discharge of pollutants to surface waters of the State – **applicable**	40 C.F.R. § 122.41(e)
Technology-based treatment requirements for wastewater discharge	To the extent that USEPA promulgated effluent limitations are inapplicable, develop on a case-by-case Best Professional Judgment (BPJ) basis under Section 402(a)(1)(B) of the CWA, technology based effluent limitations by applying the factors listed in section 125.3(d) and shall consider: • The appropriate technology for this category or class of point sources, based upon all available information; and any unique factors relating to the discharger.	Discharge of pollutants to surface waters from other than a POTW – **applicable**	40 C.F.R. § 125.3(c)(2)
Water quality-based effluent limits for wastewater discharge	Must develop water quality based effluent limits that ensure that: • the level of water quality to be achieved by limits on point source(s) established under 40 C.F.R. § 122.44(d)(1)(vii) is derived from, and complies with all applicable water quality standards; and • effluent limits developed to protect narrative or numeric water quality criteria are consistent with the assumptions and any available waste load allocation for the discharge prepared by the State and approved by EPA pursuant to 40 *C.F.R.* § 130.7.	Discharge of pollutants to surface waters that causes, or has reasonable potential to cause, or contributes to an instream excursion above a narrative or numeric criteria within a State water quality standard – **applicable**	40 C.F.R. § 122.44(d)(1)(vii)

Table 6-3. Potential Action-Specific ARARs and TBCs
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Action	Requirements	Prerequisite	Citation
Monitoring requirements for discharges	In addition to 40 C.F.R. § 122.48 (a) and (b) and to assure compliance with effluent limitations requirements to monitor, one must monitor, as appropriate, according to the substantive requirements provided in 40 C.F.R. § 122.44(i)(1)(i) through (iv). *NOTE:* Monitoring location and frequency will be conducted in accordance with CERCLA Remedial Action Work Plan.	Discharge of pollutants to surface waters – **applicable**	40 C.F.R. § 122.44(i)(1) 40 C.F.R. § 122.44(i)(2)
	All effluent limitations, standards and prohibitions shall be established for each outfall or discharge point, except as provided under 40 C.F.R. § 122.44(k).		
	All effluent limitations, standards and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as: Maximum daily and average monthly discharge limitations for all discharges	Continuous discharge of pollutants to surface waters – **applicable**	
Discharge of PCB contaminated water	For water discharged to a treatment works (as defined in 40 C.F.R. § 503.9 (aa), or to navigable waters, meet standard of < 3 ppb PCBs; Or a PCB discharge limit included in a permit issued under section 307(b) or 402 of the CWA.	Water containing PCBs regulated for disposal – **applicable**	40 C.F.R. § 761.79(b)(1)(ii) 40 C.F.R. § 761.450(a)(3)
Discharge of treated water to surface water	Comply with any applicable substantive water quality requirements under the Alabama Water Pollution Control Act or the CWA including application of technology- or ambient water quality-based effluent limitations to ensure discharge does not cause or contribute to violation of water quality standards. Conditions for the discharge shall meet the requirements, as appropriate, provided in ADEM Admin. Code r. 335-6-6-.14 such as the following: • Technology-based effluent limitations and standards under Sections 301, 302, 303, 304, 307, 318, and 405 of the CWA, including any applicable toxic effluent standard or prohibition under 40 C.F.R. Subchapter N. • Other requirements in addition to or more stringent than promulgated effluent limitations, guidelines, or standards under Sections 301, 306, 307, 318, and 405 of the CWA where necessary to achieve water quality standards established under Section 303 of the CWA and Alabama Water Pollution Control Act §2-22-9(g)	Discharge of pollutants into waters of the State – **applicable**	ADEM Admin. Code r. 335-6-6-.04(f), (h), (i), and (j) ADEM Admin. Code r. 335-6-6-.14 (3)(a), (b), (e)
	Limitations must be applied to control all pollutants or pollutant parameters that are or may be discharged at a level which cause, have reasonable potential to cause, or contribute to an exceedance of a narrative or numerical water quality standard.		ADEM Admin. Code r. 335-6-6-.14(e)(1)(i)
Discharge to POTW	Discharge of pollutants that pass through POTW without treatment, interfere with POTW operation, contaminate POTW sludge, or endanger health/safety of POTW workers, is prohibited. Discharge must comply with local POTW pretreatment program, including POTW-specific pollutants, spill prevention program requirements, and reporting and monitoring requirements.	Discharge to a POTW – **relevant and appropriate**	40 C.F.R. 403.5 and local POTW regulations 40 C.F.R. 270.60

Table 6-3. Potential Action-Specific ARARs and TBCs
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Action	Requirements	Prerequisite	Citation
Discharge of treated water to POTW	Shall not introduce into publicly or privately owned treatment works any pollutant(s) which, alone or in conjunction with a discharge or discharges from other sources, cause pass through or interference or in any other manner adversely impact the operation or performance of the treatment works, to include the method of sludge disposal in use by the publicly or privately owned treatment works.	Discharge pollutants into POTW or privately owned treatment facility operated by a person other than the indirect discharger – **applicable**	ADEM Admin. Code r. 335-6-5-.03(1)
	The following pollutants may not be introduced into a POTW:		ADEM Admin. Code r. 335-6-5-.03(2)
	• Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit (°F) or 60 degrees Centigrade (°C) using the test methods specified in 40 C.F.R. § 261.21;		ADEM Admin. Code r. 335-6-5-.03(2)(a)
	• Pollutants which will cause corrosive structural damage to the treatment works, but in no case discharges with pH lower than 5.0, unless the treatment works are specifically designed to accommodate such discharges;		ADEM Admin. Code r. 335-6-5-.03(2)(b)
	• Solid or viscous pollutants in amounts which will cause obstruction to the flow in sewers, or other interference with the operation of the treatment works;		ADEM Admin. Code r. 335-6-5-.03(2)(c)
	• Any pollutant, including oxygen demanding pollutants released in a discharge of such volume or strength as to cause interference in the treatment works;		ADEM Admin. Code r. 335-6-5-.03(2)(d)
	• Heat in amounts which will inhibit biological activity in the treatment plant resulting in interference but in no case in such quantities that the temperature of the influent, at the treatment plant, exceeds 40 °C (104 °F) unless the treatment plant is designed to accommodate such heat;		ADEM Admin. Code r. 335-6-5-.03(2)(e)
	• Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems;		ADEM Admin. Code r. 335-6-5-.03(2)(f)
	• Any trucked or hauled pollutants, except at discharge points designated by the treatment works; and		ADEM Admin. Code r. 335-6-5-.03(2)(g)
	• Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.		ADEM Admin. Code r. 335-6-5-.03(2)(h)
Disposal of RCRA hazardous waste in a land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 C.F.R. § 268.40 before land disposal.	Land disposal, as defined in 40 C.F.R. § 268.2, of restricted RCRA waste – **applicable**	40 C.F.R. § 268.40(a)
(e.g., off-site permitted landfill)	All underlying hazardous constituents [as defined in 40 C.F.R. 268.2(i)] must meet the Universal Treatment Standard (UTS), found in 40 C.F.R. 268.48 Table UTS prior to land disposal.	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – **applicable**	40 C.F.R. §268.40(e)

Table 6-3. Potential Action-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Disposal of RCRA hazardous waste in a land-based unit (e.g., off-site permitted landfill)	To determine whether a hazardous waste identified in this section exceeds the applicable treatment standards of 40 C.F.R. § 268.40, the initial generator must test a sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentration in the waste extract or waste, or the generator may use knowledge of the waste. If the waste contains constituents (including underlying hazardous constituents in the characteristic wastes) in excess of the applicable UTS levels in 40 C.F.R. § 268.48, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.	Land disposal of RCRA toxicity characteristic wastes (D004 -D011) that are newly identified (i.e., wastes, soil, or debris identified by the toxicity characteristic leaching procedure (TCLP) but not the Extraction Procedure) – **applicable**	40 C.F.R. § 268.34(f)
Disposal of RCRA hazardous waste soil in a land-based unit (e.g., off-site permitted landfill)	Must be treated according to the alternative treatment standards of 40 C.F.R. § 268.49(c) or according to the universal treatment standards [specified in 40 C.F.R. § 268.48 Table UTS] applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal.	Land disposal, as defined in 40 C.F.R. 268.2, of restricted hazardous soils – **applicable**	40 C.F.R. § 268.49(b)
Treatment of RCRA hazardous waste soil	Prior to land disposal, all "constituents subject to treatment" as defined in 40 C.F.R. § 268.49(d) must be treated as follows:	Treatment of restricted hazardous waste soils – **applicable**	40 C.F.R. § 268.49(c)(1)
	• For nonmetals (except carbon disulfide, cyclohexanone, and methanol), treatment must achieve a 90% reduction in total constituent concentrations, except as provided in 40 C.F.R. § 268.49(c)(1)(C).		40 C.F.R. § 268.49(c)(1)(A)
	• For metals and carbon disulfide, cyclohexanone, and methanol), treatment must achieve a 90% reduction in total constituent concentrations as measured in leachate from the treated media (tested according to toxicity characteristic leaching procedure or 90% reduction in total constituent concentrations (when a metal removal technology is used), except as provided in 40 C.F.R. § 268.49(c)(1)(C).		40 C.F.R. § 268.49(c)(1)(B)
	• When treatment of any constituent subject to treatment to a 90% reduction standard would result in a concentration less than 10 times the universal treatment standard for that constituent, treatment to achieve constituent concentrations less than 10 times the universal treatment standard is not required. (UTSs are identified in 40 C.F.R. § 268.48 Table UTS).		40 C.F.R. § 268.49(c)(1)(C)
	In addition to the treatment requirement required by paragraph (c)(1) of this section, soils must be treated to eliminate these characteristics.	Land disposal of soils that exhibit the characteristic of ignitability, corrosivity, or reactivity – **applicable**	40 C.F.R. § 268.49(c)(2)
	Provides methods on how to demonstrate compliance with the alternative treatment standards for contaminated soils that will be land disposed.	On-site treatment of restricted hazardous waste soils following alternative soil treatment of 40 C.F.R. § 268.49(c) – **TBC**	Guidance on Demonstrating Compliance with the LDR Alternative Soil Treatment Standards (EPA 530-R-02-003, July 2002)
PCB Waste Generation, Management, and Storage			
Management of PCB waste (e.g., contaminated PPE, equipment, wastewater)	Any person storing or disposing of PCB waste must do so in accordance with 40 C.F.R. § 761, Subpart D.	Generation of waste containing PCBs at concentrations ≥50 ppm – **applicable**	40 C.F.R. § 761.50(a)
Management of PCB remediation waste	Any person cleaning up and disposing of PCBs shall do so based on the concentration at which the PCBs are found.	Generation of PCB remediation waste as defined in 40 C.F.R. § 761.3 – **applicable**	40 C.F.R. § 761.61

Table 6-3. Potential Action-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Temporary storage of PCB waste in a container(s)	Container(s) shall be marked as illustrated in 40 C.F.R. § 761.45(a).	Storage of PCBs and PCB Items at concentrations ≥50 ppm for disposal – **applicable**	40 C.F.R. § 761.40(a)(1)
	Storage area must be properly marked as required by 40 C.F.R. § 761.40(a)(10).		40 C.F.R. § 761.65(c)(3)
	Any leaking PCB items and their contents shall be transferred immediately to a properly marked nonleaking container(s).		40 C.F.R. § 761.65(c)(5)
	Container(s) shall be in accordance with requirements set forth in DOT HMR at 49 C.F.R. §§ 171-180.		40 C.F.R. § 761.65(c)(6)
Storage of PCB waste in non-RCRA regulated unit (Facility)	Storage facility must have:	Storage of PCBs and PCB items at concentrations of 50 ppm or greater for disposal – **applicable**	40 C.F.R. § 761.65(b)(1)
	• Adequate roof and walls to prevent rainwater from reaching stored PCBs and PCB		40 C.F.R. § 761.65(b)(1)(i)
	• Adequate floor that has continuous curbing with a minimum six-inch-high curb. Floor and curb must provide a containment volume equal to at least two times the internal volume of the largest PCB article or container or 25% of the internal volume of all articles or containers stored there, whichever is greater;		40 C.F.R. § 761.65(b)(1)(ii)
	• No drain valves, floor drains, expansion joints, sewer lines, or other openings that would permit liquids to flow from curbed area;		40 C.F.R. § 761.65(b)(1)(iii)
	• Floors and curbing constructed of Portland cement, concrete, or a continuous, smooth, nonporous surface that prevents or minimizes penetration of PCBs; and		40 C.F.R. § 761.65(b)(1)(iv)
	• Storage facility must not be located at a site that is below the 100-year flood water elevation.		40 C.F.R. § 761.65(b)(1)(v)
	• Storage area must be properly marked as required by 40 C.F.R. § 761.40(a)(10).		40 C.F.R. § 761.65(c)(3)
Storage of PCB waste in a RCRA-regulated container storage area	Does not have to meet storage unit requirements in 40 C.F.R. § 761.65(b)(1) provided unit:	Storage of PCBs and PCB Items designated for disposal – **applicable**	40 C.F.R. § 761.65(b)(2)
	• Is permitted by USEPA under RCRA § 3004 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761; or		40 C.F.R. § 761.65(b)(2)(i)
	• Qualifies for interim status under RCRA § 3005 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761; or		40 C.F.R. § 761.65(b)(2)(ii)
	• Is permitted by an authorized state under RCRA § 3006 to manage hazardous waste in containers and spills of PCBs cleaned up in accordance with Subpart G of 40 C.F.R. § 761. • PCB spills cleaned up in accordance with Subpart G of 40 C.F.R. 761 NOTE: Storage unit meeting the requirements of the RCRA ARARs for container storage units identified above would qualify as "interim status."		40 C.F.R. § 761.65(b)(2)(iii) 40 C.F.R. § 761.65(b)(2)(iv)

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Table 6-3. Potential Action-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Temporary storage of Bulk PCB remediation waste in a TSCA waste pile (e.g., excavated soil)	May be stored at the cleanup site or site of generation for 180 days subject to the following conditions: • Waste must be placed in a pile designed and operated to control dispersal by wind, where necessary, by means other than wetting;	Storage of PCB remediation waste or PCB bulk product waste in a waste pile at a cleanup site or site of generation for up to 180 days – **applicable**	40 C.F.R. § 761.65(c)(9)(i)
	• Waste must not generate leachate through decomposition or other reactions.		40 C.F.R. § 761.65(c)(9)(ii)
	Storage site must have a liner designed, constructed, and installed to prevent any migration of wastes off or through liner into adjacent subsurface soil, groundwater or surface water at any time during the active life (including closure period) of the storage site.		40 C.F.R. § 761.65(c)(9)(iii)(A)
Construction of TSCA storage pile liner	Liner must be: • Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure because of pressure gradients, physical contact with waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;		40 C.F.R. § 761.65(c)(9)(iii)(A)(1)
	• Placed on foundation or base capable of providing support to liner and resistance to pressure gradients above and below the liner to present failure because of settlement compression or uplift; and		40 C.F.R. § 761.65(c)(9)(iii)(A)(2)
	• Installed to cover all surrounding earth likely to be in contact with waste.		40 C.F.R. § 761.65(c)(9)(iii)(A)(3)
Construction of a TSCA storage pile cover	The storage site must have a cover that meets the above requirements and is installed to cover all of the stored waste likely to be contacted by precipitation, and is secured so as not to be functionally disabled by winds expected under normal weather conditions at the storage site; and		40 C.F.R. § 761.65(c)(9)(iii)(B)
Construction of TSCA storage pile run-on control system	The storage site must have a run-on control system designed, constructed, operated, and maintained such that it:		40 C.F.R. § 761.65(c)(9)(iii)(C)
	• Prevents flow on the stored waste during peak discharge from at least a 25-year storm; and		40 C.F.R. § 761.65(c)(9)(iii)(C)(1)
	• Collects and controls at least the water volume resulting from a 24-hour, 25-year storm. Collection and holding facilities (e.g., tanks or basins) must be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.		40 C.F.R. § 761.65(c)(9)(iii)(C)(2)
Modification of TSCA waste pile requirements	Requirements of 40 C.F.R. § 761.65(c)(9) may be modified under the risk-based disposal option of 40 C.F.R.§ 761.61(c). NOTE: See ARAR entry below for requirements associated with use of 40 C.F.R. § 761.61(c)		40 C.F.R. § 761.65(c)(9)(iv)

Table 6-3. Potential Action-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
PCB Treatment/Disposal			
Disposal of decontamination waste and residues	Such waste shall be disposed of at their existing PCB concentration unless otherwise specified in 40 C.F.R. § 761.79(g)(1)-(6).	Decontamination waste and residues – **applicable**	40 C.F.R. § 761.79(g)
	Are regulated for disposal as PCB remediation waste.	Distillation bottoms or residues and filter media – **applicable**	40 C.F.R. § 761.79(g)(1)
	Are regulated for disposal at their original concentration.	PCBs physically separated from regulated waste during decontamination, other than distillation bottoms and filter media – **applicable**	40 C.F.R. § 761.79(g)(2)
	Shall be disposed of in accordance with provisions for wastes from cleanup of PCB remediation waste at 40 C.F.R. § 761.61(a)(5)(v).	Nonliquid cleaning materials and PPE at any concentration of PCBs, including nonporous surfaces and other nonliquid materials (e.g., rags, gloves, booties) resulting from decontamination – **applicable**	40 C.F.R. § 761.79(g)(6)
Disposal of PCB contaminated porous surfaces (self-implementing)	Shall be disposed on-site or off-site as bulk PCB remediation waste according to 40 C.F.R. § 761.61(a)(5)(i) or decontaminated for use according to 40 C.F.R. § 761.79(b)(4).	PCB remediation waste porous surfaces (as defined in 40 C.F.R. § 761.3) – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(iii)
Disposal of PCB contaminated nonporous surfaces (self-implementing option)	Shall be cleaned on-site or off-site to levels in 40 C.F.R. 761.61(a)(4)(ii) using: • decontamination procedures under 40 C.F.R. 761.79; • technologies approved under 40 C.F.R. 761.60(e); or • risk-based procedures/technologies under 40 C.F.R. 761.61(c).	PCB remediation waste nonporous surfaces (as defined in 40 C.F.R. 761.3) – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(ii)(A)(*1*)-(*3*)
Disposal liquid PCB remediation waste	Shall either: • Decontaminate the waste to the levels specified in 40 C.F.R. § 761.79(b)(1) or (2); or • Dispose of the waste in accordance with 40 C.F.R. § 761.61(b) or a risk-based approval under 40 C.F.R. § 761.61(c).	Liquid PCB remediation waste (as defined in 40 C.F.R. § 761.3) – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(iv)(A) 40 C.F.R. § 761.61(a)(5)(iv)(B)
Disposal of PCB cleanup wastes (e.g., PPE, rags, nonliquid cleaning materials) (self-implementing option)	Shall be disposed of either: • in a facility permitted, licensed, or registered by a State to manage municipal solid waste under 40 C.F.R § 258 or nonmunicipal, nonhazardous waste subject to 40 C.R.R.§§ 257.5 through 257.30; or • in an RCRA Subtitle C landfill permitted by a State to accept PCB waste; or • in an approved PCB disposal facility; or • through decontamination under 40 C.F.R. § 761.79(b) or (c).	Generation of nonliquid PCBs at any concentration during and from the cleanup of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(v)(A)(1)-(4)
Disposal of PCB cleaning solvents, abrasives, and equipment (self-implementing option)	May be reused after decontamination in accordance with 40 C.F.R. §761.79; or	Generation of PCB wastes from the cleanup of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(v)(B)
	For liquids, disposed in accordance with 40 C.F.R. § 761.60(a).		40 C.F.R. § 761.60(b)(1)(i)(B)
Disposal of bulk PCB remediation waste off-site (self-implementing option)	May be sent off-site for decontamination or disposal provided the waste is either dewatered on-site or transported off-site in containers meeting the requirements of DOT HMR at 49 C.F.R. parts 171-180.	Generation of bulk PCB remediation waste (as defined in 40 C.F.R. 761.3) for disposal – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(i)(B)
	Shall be disposed of in accordance with the provisions for Cleanup wastes at 40 C.F.R. 761.61(a)(5)(v)(A).	Bulk PCB remediation waste which has been dewatered and with a PCB concentration < 50 ppm – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(i)(B)(2)*(ii)*
Disposal of bulk PCB remediation waste off-site (self-implementing option)	Shall be disposed of: • in a hazardous waste landfill permitted by USEPA under §3004 of RCRA; • in a hazardous waste landfill permitted by a State authorized under §3006 of RCRA; or in a PCB disposal facility approved under 40 C.F.R. 761.60.	Bulk PCB remediation waste which has been dewatered and with a PCB concentration ≥ 50 ppm – **relevant and appropriate**	40 C.F.R. § 761.61(a)(5)(i)(B)(2)*(iii)*

Table 6-3. Potential Action-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Performance-based disposal of PCB remediation waste	Shall dispose by one of the following methods:	Disposal of nonliquid PCB remediation waste (as defined in 40 C.F.R. § 761.3) – **relevant and appropriate**	40 C.F.R. § 761.61(b)(2)
Performance-based disposal of PCB remediation waste	• In a high-temperature incinerator approved under 40 C.F.R. § 761.70(b); • By an alternate disposal method approved under 40 C.F.R. § 761.60(e); • In a chemical waste landfill approved under 40 C.F.R. § 761.75; • In a facility with a coordinated approval issued under 40 C.F.R. § 761.77; or	Disposal of nonliquid PCB remediation waste (as defined in 40 C.F.R. § 761.3) – **relevant and appropriate** Disposal of liquid PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(b)(2)(i)
	• Through decontamination in accordance with 40 C.F.R. § 761.79. NOTE: On-site TSCA chemical waste landfill that complies with the ARARs identified in this table in the signed ROD would be considered an approved landfill		40 C.F.R. § 761.61(b)(2)(ii)
	Shall be disposed according to 40 C.F.R. § 761.60(a) or (e), or decontaminated in accordance with 40 C.F.R. § 761.79.		40 C.F.R. § 761.61(b)(1)
	May sample, cleanup or dispose of PCB remediation waste in a manner other than prescribed in 40 C.F.R. § 761.61(a) or (b) or store remediation waste in a manner other than prescribed in 40 C.F.R. § 761.65 if application approved in writing by USEPA Regional Administrator and USEPA finds that the method will not pose an unreasonable risk of injury to[sic] human health or the environment. Each application must include information described in 40 C.F.R. § 761.61(a)(3). NOTE: Appropriate information required in an application can be provided in a CERCLA document (e.g., FS, PP, or ROD) that is approved or issued by USEPA.	Disposal of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(c)
Risk-based disposal of PCB remediation waste	May dispose of in a manner other than prescribed in 40 C.F.R. § 761.61(a) or (b) if approved in writing by USEPA and method will not pose an unreasonable risk of injury to human health or the environment. NOTE: USEPA Approval of alternative disposal method will be obtained by approval of the CERCLA document (e.g., ROD)	Disposal of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(c)
PCB Decontamination/Cleanup/Cover Design and Containment of PCB Contaminated Soil			
Decontamination of PCB-contaminated water	For discharge to a treatment works as defined in 40 C.F.R. § 503.9 (aa), or discharge to navigable waters, meet standard of < 3 parts per billion PCBs; or	Water containing PCBs regulated for disposal – **applicable**	40 C.F.R. § 761.79(b)(1)(ii)
	For unrestricted use, meet standard of 0.5 parts per billion PCBs.		40 C.F.R. § 761.79(b)(1)(iii)
Decontamination of movable equipment contaminated by PCBs (self-implementing option)	May decontaminate by: • swabbing surfaces that have contacted PCBs with a solvent; • a double wash/rinse as defined in 40 C.F.R. 761.360-378; or • another applicable decontamination procedure under 40 C.F.R. § 761.79.	Movable equipment contaminated by PCBs and used in storage areas, tools and sampling equipment – **relevant and appropriate**	40 C.F.R. § 761.79(c)(2)

Table 6-3. Potential Action-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Cap requirements for PCB bulk remediation waste left in place	Must do so in accordance with 40 C.F.R. § 264.310(a) and ensure it complies with the permeability, sieve, liquid limit and plasticity index parameters in 40 C.F.R. § 761.75(b)(1)(ii) through (b)(1)(v). Must be of sufficient strength to maintain its effectiveness and integrity during the use of the cap surface which is exposed to the environment. A cap may not be contaminated at a level greater than or equal to 1 ppm PCBs. A cap of compacted soil shall have a minimum thickness of 15 cm (10 inches). A concrete or asphalt cap shall have a minimum thickness of 15 cm (6 inches). Repairs shall begin within 72 hours of discovery for any breaches which would impair the integrity of the cap.	Designing and constructing a cap for on-site disposal of PCB remediation waste – **relevant and appropriate**	40 C.F.R. § 761.61(a)(7)
Landfill cover design and construction	Must cover the landfill or cell with a final cover designed and constructed to: • provide long-term minimization of migration of liquids through the closed landfill; • function with minimum maintenance; • promote drainage and minimize erosion or abrasion of the cover; • accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of any bottom-liner system or natural subsoils present.	Closure of a RCRA hazardous waste management unit – **relevant and appropriate**	40 C.F.R. § 264.310(a)(1)-(5)
Disposal of PCB bulk product waste in a permitted Municipal Solid Waste or a Non Municipal – Nonhazardous Waste landfill	Any person may dispose of the following PCB bulk product waste in a facility permitted, licensed, or registered by a State as a municipal or non-municipal nonhazardous waste landfill: Plastics (such as plastic insulation from wire or cable; radio, television and computer casings; vehicle parts; or furniture laminates); preformed or molded rubber parts and components; applied dried paints, varnishes, waxes or other similar coatings or sealants; caulking; Galbestos; non-liquid building demolition debris; or nonliquid PCB bulk product waste from the shredding of automobiles or household appliances from which PCB small capacitors have been removed (shredder fluff).	On-site disposal of PCB bulk product waste – **applicable**	40 C.F.R. § 761.62(b)(1)(i)
Cap drainage design, construction and maintenance requirements for PCB bulk product waste left in place in capped areas	Owners and Operators of all facilities must design, construct and maintain: (1) A run-on control system to prevent flow onto the active and/or closed portions of the landfill during the peak discharge from a 25-year storm; (2) A run-off control system from the active and/or closed portions of the landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm. (3) On-site drainage structures to carry incident precipitation from the disposal site so as to minimize the generation of leachate, erosion, and sedimentation.	Construction of a RCRA Subtitle D landfill; drainage specifications – **relevant and appropriate**	ADEM Admin. Code r. 335-13-4-.17 (1)-(3) 40 C.F.R. 264.301(g)-(h)

Table 6-3. Potential Action-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Cap requirements for Bulk PCB product waste left in place (Final caps for UWDA and T-11 area)	The requirements for closure of existing and proposed landfill units shall include the following unless otherwise noted. (b) A final cover system must be installed which is designed to minimize infiltration and erosion. The final cover system must be comprised of an erosion layer(s) underlain by an infiltration layer(s) as follows: (1) The infiltration layer for MSWLF and ILF must be comprised of a minimum of 18 inches of earthen material and/or a synthetic layer that has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1 x 10-5 cm/sec, whichever is less. (c) Final soil cover shall be graded so that: (1) Surface water does not pond over the landfill unit. (2) The maximum final grade of the final cover system shall not exceed 25 percent or as specified by the Department to minimize erosion. (3) Slopes longer than 25 feet shall require horizontal terraces, of sufficient width for equipment operation, for every 20 feet rise in elevation or utilize other erosion control measures approved by the Department. (4) The minimum final grade of the final cover system shall not be less than 5 percent or as specified by the Department to minimize ponding. (d) A vegetative or some other appropriate cover must be established to minimize erosion and, when applicable, maximum evapotranspiration. Within 90 days after completion of final grading requirements on each phase the owner or operator shall prepare the final cover for the establishment of a vegetative cover or alternative cover. Deep rooted vegetation (roots that may grow below 6-inch erosion layer) shall be prohibited as vegetative cover. Preparation of a vegetative cover shall include, but not be limited to, the following: (1) Placement of appropriate species of grass seed, fertilizer and mulch; and (2) Watering and maintenance necessary such that germination of grass will occur.	Final closure requirements for a MSWLF or ILF – **relevant and appropriate**	ADEM Admin. Code r. 335-13-4.20 (2)(b)-(d)
Prevent unauthorized access	The owner or operator of the facility must control public access and prevent unauthorized vehicular traffic and illegal dumping of wastes by using artificial barriers, natural barriers, or both, as appropriate to protect human health and the environment.	Final closure of a landfill – **relevant and appropriate**	ADEM Admin. Code r. 335-13-4-.19
Transportation of Wastes			
Transportation of hazardous Waste on-site	The generator manifesting requirements of 40 C.F.R. §§ 262.20-262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 C.F.R. §§ 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way – **applicable**	40 C.F.R. § 262.20(f)
Transportation of hazardous Waste off-site	Must comply with the generator requirements of 40 C.F.R. §§ 262.20-23 for manifesting, § 262.30 for packaging, § 262.31 for labeling, § 262.32 for marking, § 262.33 for placarding, §§ 262.40 and 262.41(a) for record keeping requirements, and § 262.12 to obtain USEPA ID number.	Preparation and initiation of shipment of hazardous waste off-site – **applicable**	40 C.F.R. § 262.10(h)
Transportation of PCB wastes off-site	Must comply with the manifesting provisions at 40 C.F.R. §§ 761.207 through 761.218.	Relinquishment of control over PCB wastes by transporting or offering for transport – **applicable**	40 C.F.R.§ 761.207(a)

Table 6-3. Potential Action-Specific ARARs and TBCs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Action	Requirements	Prerequisite	Citation
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMTA and DOT HMR at 49 C.F.R. §§ 171-180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material – **applicable**	49 C.F.R. § 171.1(b) and (c)
Management of samples (i.e., contaminated soils and wastewaters)	Are not subject to any requirements of 40 C.F.R. Parts 261 through 268 or 270 when: • The sample is being transported to a laboratory for the purpose of testing; • The sample is being transported back to the sample collector after testing; and • The sample collector ships samples to a laboratory in compliance with U.S. DOT, U.S. Postal Service, or any other applicable shipping requirements, including packing the sample so that it does not leak, spill or vaporize from its packaging.	Generation of samples of hazardous waste for purpose of conducting testing to determine its characteristics or composition – **applicable**	40 C.F.R. § 261.4(d)(1)(i) and (ii) 40 C.F.R. § 261.4(d)(2)
Land Use Restrictions/Institutional Controls			
Deed restrictions for closed landfills	(2) Closure. The requirements for closure of existing and proposed landfill units shall include the following unless otherwise noted. (i) Within 90 days after permit expiration, revocation or when final closure requirements in 335-13-4-.20 are achieved as determined by the Department, the permittee or owner of a facility shall record a notation onto the land deed containing the property utilized for disposal, and/or some other legal instrument that is normally examined during a title search, that will in perpetuity, notify any potential purchaser of the property that: 1. The land has been used as a solid waste disposal facility landfill unit. 2. Its use is restricted by the items contained in 335-13-4-.20(3)(c) and 335-13-4-0(3)(d). 3. The locations and dimensions of the landfill unit with respect to permanently surveyed benchmarks and section corners shall be on a plat prepared and sealed by a land surveyor. 4. Contain a note, prominently displayed, which states the name of the Permittee or operating agency, the type of landfill unit and the beginning and closure dates of the disposal activity. 5. Certification by an Engineer or Land Surveyor that all closure requirements have been completed as determined necessary by the Department.	Closure of Industrial Waste Landfill – **relevant and appropriate**	ADEM Admin. Code r. 335-13-4.20 (2)(i)(1)-(5)
Deed restrictions for caps, fences, and low-occupancy areas	Must maintain the cap or fence, in perpetuity.	Use of a cap or fence at PCB remediation waste cleanup site – **applicable**	40 C.F.R. 761.61(a)(8)
	Within 60 days of completion of the cleanup activity the owner shall record, in accordance with State law, a notification on the deed to the property, or on some other instrument which is normally examined during a title search, that will in perpetuity notify any potential purchaser of the property:		40 C.F.R. 761.61(a)(8)(i)(A)
	• that the land has been used for PCB remediation waste disposal and is restricted to use as a low occupancy area as defined in 40 C.F.R. 761.3.		40 C.F.R. 761.61(a)(8)(i)(A)(1)
	• of the existence of the fence or cap and the requirements to maintain the fence or cap.		40 C.F.R. 761.61(a)(8)(i)(A)(2)
	• the applicable cleanup levels at the site, inside the fence, and/or under the cap.		40 C.F.R. 761.61(a)(8)(i)(A)(3)
	May remove a fence or cap after conducting additional cleanup activities and achieving levels specified in 40 C.F.R. 761.61(a)(4) which do not require a fence or cap and remove the notice on the deed no earlier than 30 days after achieving these levels.		40 C.F.R. 761.61(a)(8)(ii)

[1] ADEM Admin. Code r. 335-3-4-.02(1) and (2) were held unconstitutional for being unduly vague (335-3-4-.02(1)) and too restrictive (335-3-4-.02(2)). See Ross Neeley Express, Inc. v. Ala. Dep't of Envtl. Mgmt., 437 So.2d 82 (Ala. 1983).
[2] See supra n.1.
ADEM: Alabama Department of Environmental Management ARAR: applicable or relevant and appropriate requirement
BMP: best management practice
CBMMP: Construction Best Management Practices Plan
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.: Code of Federal Regulations
CMBST: high temperature organic destruction (combustion); 40 C.F.R. 268.42; Table 1
CWA: Clean Water Act
DEACT: deactivation 40 C.F.R. 268.42; Table 1
DOT: US Department of Transportation
> : greater than
< : less than
≥ : greater than or equal to
≤ : less than or equal to
HMR: Hazardous Materials Regulations
HMTA: Hazardous Materials Transportation Act
IDF: industrial landfill
LDR: Land Disposal Restrictions; 40 C.F.R. Part 268
MSWLF: municipal solid waste landfill
NPDES: National Pollutant Discharge Elimination System
OSWER: Office of Solid Waste and Emergency Response
PCB: polychlorinated biphenyl
POLYM: polymerization; 40 C.F.R. 268.42; Table 1
POTW: publicly owned treatment works
PPE: personal protective equipment
ppm: parts per million
RCRA: Resource Conservation and Recovery Act of 1976
RORGS: recovery of organics; 40 C.F.R. 268.42; Table 1
TBC: To be considered
TSCA: Toxic Substances Control Act of 1976 US: United States
U.S.C.: United States Code
USEPA: United States Environmental Protection Agency UTS: Universal Treatment Standard
UTS: Universal Treatment Standard

Table 6-4. Summary of Site and Background Data for Metals Evaluated in the BERA
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston Alabama

	Background				Site								
COPC	**Sample Size (# of samples)**	**Min mg/kg**	**Max mg/kg**	**Mean mg/kg**	**Sample Size (# of samples)**	**Min mg/kg**	**Max mg/kg**	**Mean mg/kg**	**2x Mean Background mg/kg**	**Range of LOAEL Avian RGOs mg/kg**	**# samples > the higher of the lowest RGO or 2x mean background**	**Samples that exceed the higher of the lowest RGO or 2x mean background**	**# of samples > max background**
Sediment													
Barium	65	5.4	272	49.46	28	14.3	251	82.98	98.91	**219–**4,333	2	C-071-SED-1, S-6-02	0
Cobalt	64	0.4	22	5.51	28	2.3	34.3	8.09	11.01	**72–**2,511	0	NA	1
Chromium	65	1.1	63	15.57	28	6	54.7	19.26	**31.50**	21–212	5	C-071-SED-1, C-172-SED-2, C-180 SED-4, S-6-02, S-6-10	0
Lead	62	1.7	110	18.91	28	4.3	110	23.27	**37.82**	11–2,655	4	C-071-SED-1, S-6-02, S-6-10, CU-008-03	0
Mercury	65	0.047	0.28	0.06	91	0.03	46.6	1.26	0.11	**0.8**–5	29	See note a	73
Soil													
Chromium	70	2	134	18.52	88	4.3	55.2	17.5	**37.0**	21–477	8	C3SX-01, C3S-04, C4N-03, C4N-43, C4NF-08, C5S-07, C7S-28, C7SF-09	0
Lead	70	2.9	83	20.02	88	7.3	106	29.34	**40.5**	8–3515	18	See note b	4
Mercury	70	0.031	0.32	0.04	845	0.006	21.7	1.13	0.08	**0.2**–11	430	See note c	384

a. See figure 4-57 showing mercury concentrations and PCB concentrations.

b. Locations that exceed the higher of the lowest RGO or 2x mean background: C3NX-30, C3SX-01, C2N-21, C3NF-14, C3S-04, C3S-14, C3S-24, C3SF-03, C4N-03, C4N-13, C4N-43, C4NF-08, C4S-04, C4S-24, C4S-44, C4S-54, C5S-07 C5S-37

c. See figure 4-43 showing mercury concentrations in OU-4 soil

d. **Bold** text is the greater of the lowest LOAEL RGO and 2x background mean.

BERA: baseline ecological risk assessment

COPC: constituent of potential concern

LOAEL: lowest observed adverse effect level

mg/kg: milligrams per kilogram

RGO: remedial goal objective

Table 6-5. Summary of Ecological and Human Health RGOs and PRGs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston Alabama

Nonresidential Receptors	PCB RGOs	Media	Low End of Range of RGO Range	Preliminary Remedial Goals in OU-4 FS
Human Health	**HHRA Ranges**			
Vegetables from floodplain	HI=1 40–44 mg/kg	Soil (0–12 in)	HI=1 40 mg/kg	SWAC 10 mg/kg dw
Beef/Chicken from floodplain				
assume floodplain only 10% source	HI=1 10–20 mg/kg HI=3 30–60 mg/kg	Soil (0–12 in)	HI=1 10–20 mg/kg HI=3 30–60 mg/kg	SWAC 10 mg/kg dw
assume floodplain only 25% source	HI=1 4–7 mg/kg HI=3 12–20 mg/kg	Soil (0–12 in)	HI=1 4–7 mg/kg HI=3 12–20 mg/kg	
assume floodplain only 50% source	HI=1 2–3 mg/kg HI=3 6–10 mg/kg	Soil (0–12 in)	HI=1 2–3 mg/kg HI=3 6–10 mg/kg	
Fish - filet				
upstream of Jackson Shoals	0.11–1.18 mg/kg ww	Tissue	0.11 mg/kg ww	0.11 mg/kg ww
downstream of Jackson Shoals	0.056–0.59 mg/kg ww	Tissue	0.056 mg/kg ww	0.056 mg/kg ww
source of contamination				
upstream of Jackson Shoals	0.2–1.9 mg/kg dw	Sediment (all)	0.2 mg/kg dw	0.2 mg/kg dw
downstream of Jackson Shoals	0.11–1.2 mg/kg dw	Sediment (all)	0.11 mg/kg dw	0.11 mg/kg dw
Ecological Health	**BERA Addendum Ranges**		**Lowest LOAEL RGO**	
Benthic Invertebrates	EC10* 2.6 mg/kg dw	Sediment (all)	2.6 mg/kg dw	NTE 2.6 mg/kg dw
Fish - whole	27.3 mg/kg dw	Whole body	27.3 mg/kg dw	27 mg/kg dw
source of contamination	0.4–1.5 mg/kg dw	Sediment (all)	0.4 mg/kg dw	SWAC 0.63 mg/kg
source of contamination	ARAR &TBC	Surface Water	ARAR &TBC	0.014 µg/L
Birds				
Aquatic (Tree Swallow, Spotted Sandpiper-2, Kinfisher-1, Kingfisher-2, Great Blue Heron, Osprey)	LOAEL 0.4–3.7 mg/kg dw	Sediment (all)	0.4 mg/kg dw	Long-term SWAC 0.63 mg/kg dw
Semiaquatic (Carolina Wren-2, Spotted Sandpiper-1)	LOAEL 1.8–17 mg/kg dw	Sediment (all)	1.8 mg/kg dw	
	LOAEL 4–10 mg/kg dw	Soil (0–6 in)	4 mg/kg dw	SWAC 6 mg/kg dw
Terrestrial (Mourning Dove, Blue Jay, Carolina Wren-1 Hawk)	LOAEL 3–48 mg/kg dw	Soil (0–6 in)	3 mg/kg dw	

Table 6-5. Summary of Ecological and Human Health RGOs and PRGs
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston Alabama

Nonresidential Receptors	PCB RGOs	Media	Low End of Range of RGO Range	Preliminary Remedial Goals in OU-4 FS
Mammals				
Aquatic (Bat, Mink-2, Otter)	LOAEL 0.13–0.63 mg/kg dw	Sediment (all)	0.13 mg/kg dw	Long-term SWAC 0.63 mg/kg dw
Semiaquatic (Mink-1, Raccoon-1, Raccoon-2)	LOAEL 0.45–16 mg/kg dw	Sediment (all)	0.45 mg/kg dw	
	LOAEL 5–144 mg/kg dw	Soil (0–6 in)	5 mg/kg dw	SWAC 6 mg/kg dw
Terrestrial (Shrew-1, Shrew2, Weasel, Fox-1, Fox-2)	LOAEL 2–20 mg/kg dw	Soil (0–6 in)	2 mg/kg dw	
Soil Invertebrates	LOAEL 36 mg/kg dw	Soil (0–6 in)	36 mg/kg dw	

1. A description of the protectiveness and the rationale for the slection of specific PRGs is provided in Section 6.3.2.1 (ecological) and 6.3.2.2 (human health).
ARAR: applicable or relevant and appropriate requirement
BERA: baseline ecological risk assessment
dw: dry weight
EC*: effect concentration
FS: feasibility study
HI: hazard index
HHRA: human health risk assessment
in: inches
LOAEL: lowest observable adverse effect level
mg/kg: milligrams per kilogram
µg/L: microgram(s) per liter
NTE: not to exceed
PCB: polychlorinated biphenyl
PRG: preliminary remedial goal
RGO: remedial goal objective
SWAC: surface-weighted area concentration
TBC: to be considered
ww: wet weight

Table 7-1. OU-4 Residential Properties with Residual PCBs or Future Sampling for PCBs beneath Structures if Removed
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston Alabama

Figure Reference[1]	Structure ID[2]	PPIN[3]	Residual Management Approach[4]	
			PCBs Remaining	Future Sampling Under Structures[6]
Figure 4-6c	401	50920[3a]	PCB residuals at depth	Yes
Figure 4-6g	407	5341[3a]	PCB residuals at depth	No
Figure 4-6g	111	6445[3a]	PCB residuals at depth	No
Figure 4-6h	117	6886[3a]	PCBs in surface soil[5]	Yes
Figure 4-6i	137	65865[3a]	PCB residuals at depth	No
Figure 4-6i	145	6777[3a]	PCB residuals at depth	No
Figure 4-6i	131	68092[3a]	Unknown	Yes
Figure 4-6b	N/A	29915[3b]	Unknown	Yes
Figure 4-6b	N/A	65958[3b]	Unknown	Yes
Figure 4-6b	N/A	65960[3b]	Unknown	Yes
Figure 4-6b	N/A	725[3b]	Unknown	Yes
Figure 4-6b	N/A	29858[3b]	Unknown	Yes
Figure 4-6b	N/A	30073[3b]	Unknown	Yes
Figure 4-6b	N/A	65955[3b]	Unknown	Yes
Figure 4-6b	N/A	29856[3b]	Unknown	Yes
Figure 4-6b	15	30075[3b]	Unknown	Yes
Figure 4-6e	85	4969[3a]	Unknown	Yes
Figure 4-6d	260	4731[3a]	Unknown	Yes

Notes:
1. Figure references from the Figure 4-6 series from the OU-4 FS where applicable.
2. Structure IDs as shown on the referenced figures where applicable.
3. PPINs are from the following:
   a. Talladega County GIS https://isv.kcsgis.com/al.talladega_revenue/
   b. Calhoun County GIS https://gis.calhouncounty.org/Parcelviewer2/
4. Residuals management to be conducted under long-term soil management.
5. Removal action for Structure ID 117/PPIN 6886 was not implemented as property access was denied by the landowner. The property will be monitored under the long-term soil management program and the removal action implemented if (and when) access is provided.
6. Future potential sampling with structure footprints should the structure be later removed.

GIS: geographic information system
ID: identification
N/A: not applicable
PCB: polychlorinated biphenyl
PPIN: property parcel identification number

Table 8-1. Identification and Preliminary Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Description	Technically Implementable YES = Retained NO = Not proven effective or reliable for PCBs given the site-specific attributes of the Anniston PCB Site
A. No Further Action			
	-----	No further remedial activities would be implemented. Natural attenuation processes would continue.	YES
B. Source Control			
	a. Identification and Elimination of Sources	Reduce potential sources of chemical constituents to and from the Site.	YES
C. Institutional/Access Controls and Monitoring			
1. Informational Devices	a. Deed Notices	May allow elevated levels of chemical-containing soil to remain permanently on-site by binding the current property owner to certain notice requirements as well as to the obligation to inspect and maintain any engineered controls.	YES
	b. Fish Consumption Advisories	Advisories may recommend that people limit or avoid eating certain species of fish caught in certain places.	YES
2. Governmental Controls	a. Land Use Restrictions	Restrictions that apply to activities on, over, or under the land (including groundwater) which shall run with the land and be binding on parties having right, title, or interest in the property or any part thereof.	YES
	b. Zoning Restrictions	Restrictions created by and for the benefit of the general public to ensure its health, safety, comfort, and morals.	YES
	c. Ordinances	An ordinance is a legislative act taken to define and regulate conduct which is detrimental to the public health, safety, welfare, or peace.	YES
	d. Building and Other Permit Requirements	A permit requirement may be included as part of the written permit agreement between the permitee and the permit-issuing entity ensuring that certain proposed work will be conducted in accordance with the requirement. This helps ensure that the work is safe and sanitary. The permit requirement would authorize the inspections of the progress of the work during normal working hours.	YES
3. Proprietary Controls	a. Easements	An easement is a grant or reservation of an interest in land that permits someone to go onto land and do something. The purpose of the easement is to ensure that the property will be managed to preserve natural features, historic sites, scenery, traditional land uses, or other values.	YES
	b. Covenants	A covenant is a promise respecting the use (or non-use) of land.	YES
	c. Access Restrictions	Constraints, such as fencing and signs, would be placed on property to limit access.	YES
4. Enforcement Actions with Institutional Components	a. USEPA Administrative Orders	An Administrative Order is an enforcement document issued by USEPA.	YES
	b. Judicial Consent Decrees	A Judicial Consent Decree is a document and process that details the steps that must be taken to bring a site into compliance with the law.	YES
5. Access Controls	a. Fencing, Signage, and Other Physical Barriers	Physical barriers that are put in place to prevent contact and hence prevent exposure.	YES

Table 8-1. Identification and Preliminary Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Description	Technically Implementable YES = Retained NO = Not proven effective or reliable for PCBs given the site-specific attributes of the Anniston PCB Site
D. Monitored Natural Recovery (MNR)			
1. MNR	a. MNR (sediment)	Natural biological, chemical, and physical processes that, under favorable conditions, act without human intervention to reduce concentration and bioavailability of chemical constituents. This process relies on long-term monitoring to demonstrate the reduction of impacts caused by chemical constituents.	YES
	b. Enhanced MNR	Addition of nutrients (e.g., oxygen, minerals) or cultured microorganisms to the soil or other chemical-containing media to facilitate or improve the rate of natural biodegradation. Could also include placing a thin layer of sediment to enhance MNR processes already occuring.	YES
E. In-Place Containment/Control for Soil or Sediment			
1. Capping	a. Clay/Soil Cap	Use of clay or soil material, including alternative landfill covers (e.g., vegetated caps), to achieve chemical isolation and to minimize storm water infiltration. Vegetated caps may be designed to minimize water infiltration.	YES
	b. Asphalt/Concrete Cap	Use of asphalt or concrete to achieve chemical isolation and to minimize storm water infiltration.	YES
	c. Multimedia Cap	Use of a clay, soil, media, and geomembrane cap over chemical-containing soils to achieve chemical isolation and to minimize storm water infiltration.	YES
	d. Reactive Cap	Geotextile material containing an absorptive media such as organo clay or activated carbon that acts as a chemical isolation barrier.	YES
F. In Situ Soil/Sediment Treatment			
1. Thermal Treatment	a. In Situ Thermal Desorption (ISTD)	Heat is applied to soil from a high-temperature surface in contact with the soil to facilitate radiation and thermal conduction heat transfer. Some chemical constituents are oxidized before they exit the soil. Two primary forms of ISTD technology are thermal blankets (surficial, 2-ft depth) and thermal wells (any depth).	NO
	b. In Situ Vitrification (Glassification)	Uses an electric current to melt soil or other earthen materials at extremely high temperatures (2,900 to 3,650°F). Inorganic chemical constituents are incorporated into the vitrified glass and crystalline mass, and organic pollutants are destroyed by pyrolysis. In situ applications use graphite electrodes to heat soil.	YES
2. Immobilization (Solidification, Stabilization, and Fixation)	a. Stabilization/Solidification (Organic and Inorganic Based)	Chemical immobilization of materials by injecting and mixing a stabilization/solidification agent into the soil or sediment.	YES
3. Sediment Amendment	a. Activated Carbon	Adding an amendment to the sediment that is mixed into the sediment matrix through the action of benthic organisms.	YES

Table 8-1. Identification and Preliminary Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Description	Technically Implementable YES = Retained NO = Not proven effective or reliable for PCBs given the site-specific attributes of the Anniston PCB Site
G. Ex Situ Soil/Sediment Treatment			
1. Immobilization (Solidification, Stabilization, and Fixation)	a. Stabilization/Solidification (Organic and Inorganic Based)	Chemical immobilization of materials by mixing a stabilization/solidification agent into the soil.	YES
2. Extraction	a. Solvent Extraction	Solvent used to extract organic chemical constituents from soils. The solvent is separated from the materials and reused.	YES
	b. Thermal Desorption	Chemical constituents are separated from the soils at a relatively low temperature and are condensed into a concentrated liquid form suitable for transport off-site to a traditional treatment or disposal facility.	YES
3. Soil Washing	a. Soil Washing	Soil washing process that isolates individual particles and removes the adsorbed chemicals and naturally occurring organic material from fine-grained solids.	NO
4. Destruction	**ULTRAVIOLET (UV) DESTRUCTION**		
	a. UV Photolysis	UV photolysis is the process by which chemical bonds of the chemical constituents are broken under the influence of UV light.	NO
	b. Ozonation	Ozone used to decompose chemical constituents in conjunction with UV radiation.	NO
	THERMAL DESTRUCTION		
	a. Incineration	Process for soils directly or for oil extracted from other soil treatment processes, such as thermal desorption or solvent extraction. Soils thermally treated in a fluidized bed, rotary kiln, cement kiln, or infrared incinerator, which may require RCRA permitting. Incineration may be performed on-site or off-site using mobile or fixed facilities.	YES
	b. Pyrolysis	Pyrolysis is a process of destructive distillation, using a reduced-oxygen atmosphere, in which organic material is thermally decomposed into elemental ions. The process converts waste into a clean product gas and an inert vitrified slag that requires no further waste treatment and is suitable for long-term storage or reuse.	YES
	c. Molten Salt Oxidation (MSO)	MSO is a thermal, flameless process that completely destroys organic constituents of mixed wastes (chlorinated solvents, spent ion exchange resin), hazardous wastes and explosives. MSO may be applicable for a range of solid, liquid, and gaseous wastes.	NO
	d. Radio Frequency (Microwave) Heating	In a radio frequency (RF) heating system, the RF generator creates an alternating electric field between two electrodes. The material to be heated is conveyed between the electrodes where the alternating energy causes polar molecules in the material to continuously reorient themselves to face opposite poles much like the way bar magnets behave in an alternating magnetic field. The friction resulting from molecular movement causes the material to rapidly heat throughout its entire mass.	NO
	e. Vitrification (Glassification)	Uses an electric current to melt soil or other earthen materials at extremely high temperatures (2,900 to 3,650°F). Inorganic chemical constituents are incorporated into the vitrified glass and crystalline mass, and organic pollutants are destroyed by pyrolysis.	YES

Table 8-1. Identification and Preliminary Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Description	Technically Implementable YES = Retained NO = Not proven effective or reliable for PCBs given the site-specific attributes of the Anniston PCB Site
G. Ex Situ Soil/Sediment Treatment (cont.)			
5. Chemical Treatment	a. Supercritical Water Oxidation	Temperature and pressure of supercritical water dissolve materials that are oxidized into carbon dioxide, water, and salts.	NO
	b. Slurry Oxidation	The same as slurry-phase biological treatment with the exception that oxidizing agents are added to decompose organics. Oxidizing agents may include ozone, hydrogen peroxide, and Fenton's Reagent.	NO
	c. Reduction/Oxidation	Reduction/Oxidation chemically converts chemicals to less toxic compounds that are more stable, less mobile, and/or inert. The oxidizing agents most commonly used are hypochlorites, chlorine, and chlorine dioxide. Another oxidizing agent used is Ruthenium Tetraoxide.	NO
	d. Precipitation	Soil is treated by chemical precipitation to remove heavy metals. Chemicals and water are added to the soil to create a sludge. The water is filtered from the sludge, treated, and pumped back into the environment. The sludge is sent off-site to a licensed disposal facility.	NO
	e. Base-Catalyzed Dechlorination (BCD)	BCD process was developed to remediate soils containing chlorinated organic chemical constituents. Constituent-containing soil is screened, processed with a crusher and pug mill, and mixed with sodium bicarbonate. The mixture is heated in a rotary reactor to partially decompose and volatilize the chemical constituents. The volatilized chemicals are captured, condensed, and treated separately.	NO
	f. Gas-Phase Reduction	Various chemical agents (e.g., sodium borohydride, sulfur dioxide) are used to destroy chemical constituents through gas-phase reduction. Chemical constituents are transferred to the gas phase through volatilization (thermal desorption unit) and destroyed in a high-temperature hydrogen environment.	NO
	g. Sodium-Based Reactions (NaPEG)	Chemical constituents broken down into oxygenated organics, sodium chloride (salt), and biodegradable glycols.	NO
	h. Alkaline Polyethylene Glycol (APEG)	Chemical-containing soils and the reagent are mixed and heated in a treatment vessel. In the APEG process, the reaction causes the polyethylene glycol to replace halogen molecules and render the compound nonhazardous or less toxic. The reagent (APEG) dehalogenates the pollutant to form a glycol ether and/or a hydroxylated compound and an alkali metal salt, which are water-soluble byproducts. Potassium polyethylene glycol (KPEG) is a common APEG reagent.	NO
	i. Solvated Electron Technology	Neutralizes halogenated and other organic chemical constituents by exposing them to free electrons in a solvated solution.	NO
6. Biological Treatment	a. Aerobic Bioremediation	Degradation of constituents by utilizing organisms in an aerobic environment with the addition of amendments and controls to enhance the process performance and decrease duration.	NO
	b. Anaerobic Bioremediation	Degradation of constituents by utilizing organisms in an anaerobic environment with the addition of amendments and controls to enhance the process performance and decrease duration.	NO
	c. Landfarming/Composting	Soil is mixed with amendments and placed on a treatment area that typically includes leachate collection. The soil and amendments are mixed using a windrow composter, conventional tilling equipment, or other means to provide aeration. Moisture, heat, nutrients, oxygen, and pH can be controlled to enhance biodegradation. Other organic amendments such as wood chips, potato waste, or alfalfa are added to composting systems.	NO
	d. Biopiles	Excavated soil is mixed with amendments and placed in aboveground enclosures. It is an aerated static pile composting process in which compost is formed into piles and aerated with blowers or vacuum pumps. Moisture, heat, nutrients, oxygen, and pH can be controlled to enhance biodegradation.	NO

Table 8-1. Identification and Preliminary Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Description	Technically Implementable YES = Retained NO = Not proven effective or reliable for PCBs given the site-specific attributes of the Anniston PCB Site
G. Ex Situ Soil/Sediment Treatment (cont.)			
6. Biological Treatment (cont.)	e. Fungal Biodegradation	Fungal biodegradation refers to the degradation of a wide variety of organ pollutants by using their lignin degrading or wood-rotting enzyme system (e.g., white rot fungus).	NO
	f. Slurry Phase Biological Treatment	An aqueous slurry is created by combining soil with water and other additives. The slurry is mixed to keep solids suspended and microorganisms in contact with the chemicals (e.g., sequential anaerobic/aerobic slurry-phase bioreactors).	NO
	g. Enhanced Biodegradation	Addition of nutrients (e.g., oxygen, minerals) to the soil to improve the rate of natural biodegradation. Use of heat to break carbon-halogen bonds and to volatilize light organic chemical constituents (e.g., D-Plus [Sinre/DRAT]).	NO
H. Ex Situ Water Treatment			
1. Biological Treatment	a. Aerobic Bioremediation	Degradation of constituents by utilizing microorganisms in an aerobic environment with the addition of amendments and controls to enhance the process performance and decrease duration.	NO
	b. Anaerobic Bioremediation	Degradation of constituents utilizing microorganisms in an anaerobic environment with the addition of amendments and controls to enhance the process performance and decrease duration.	NO
2. Chemical Treatment	a. Hydrolysis	The chemical reaction of a compound with water, usually resulting in the formation of one or more new compounds.	NO
	b. Reduction (Hydrazine)	Reduction chemically converts chemicals to less toxic compounds that are more stable, less mobile, and/or inert. The reducing agent used is Hydrazine.	NO
	c. Neutralization	A chemical reaction in which a water solution of acid is mixed with a water solution of base to form a salt and water; not included to treat polychlorinated biphenyls (PCBs) in water but may be used for pH adjustment associated with other water treatment processes.	YES
	d. Radiolytic Dechlorination	Groundwater is placed in an alkaline isopropanol solution (~ 1% solution) and then gamma irradiated to a dose of < 10. Products of this dechlorination process are biphenyl, acetone, and inorganic chloride. Process must be carried out under inert atmosphere.	NO
3. Oxidation	a. Reduction/Oxidation	Reduction/oxidation chemically converts chemicals to less toxic compounds that are more stable, less mobile, and/or inert. The oxidizing agents most commonly used are UV light, hydrogen peroxide, Fenton's reagent, hypochlorites, chlorine, and chlorine dioxide.	YES

Table 8-1. Identification and Preliminary Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Description	Technically Implementable YES = Retained NO = Not proven effective or reliable for PCBs given the site-specific attributes of the Anniston PCB Site
H. Ex Situ Water Treatment (cont.)			
4. Physical Treatment	a. Granular Activated Carbon (GAC)	GAC uses the physical adsorption process whereby attractive van der Waals forces pull the solute out of solution and onto its surface. Once the solute is bound to the carbon, it is considered "removed" from the water.	YES
	b. Modified Organoclay and Carbon Filters	Similar to GAC except filter is comprised of a combination of organoclay and carbon.	YES
	c. Dissolved Air Flotation (DAF)	This process uses dissolved air to facilitate removal of insoluble material, including solids and suspended-phase oil, tar, and grease. Air is injected, pressurized, and dissolved into a treatment vessel along with influent wastewater. The wastewater is saturated with finely dispersed microscopic air bubbles, which attach themselves to the flocculated particles causing the particles to rise to the top of the vessel where they are removed via a skimmer. Not included to treat PCBs in water, but may be used in association with other water treatment processes.	YES
	d. Oil/Water Separation	Process by which insoluble oils are removed from water via physical separation technologies, including gravity separation, baffled vessels, etc. Not included to treat PCBs in water but may be used in association with other water treatment processes.	YES
	e. Filtration	Process in which the groundwater is passed through a granular media in order to remove suspended solids by interception, straining, flocculation, and sedimentation activity within the filter.	YES
	f. Precipitation/Coagulation/ Flocculation	Process which transforms dissolved constituents into insoluble solids by adding coagulating agents to facilitate subsequent removal from the liquid phase by sedimentation/filtration. The process usually uses pH adjustment, addition of a chemical precipitant, and flocculation. Not included to treat PCBs in water but may be used in association with other water treatment processes.	YES
	g. Primary Settling	Large particulates are allowed to gravity settle typically prior to entry into the treatment train.	YES
	h. Reverse Osmosis	Use of high pressure to force water through a membrane leaving chemical constituents behind.	NO
	i. Distillation	Chemical constituents are separated from aqueous stream by vaporization and condensation.	NO
	j. Ion Exchange	Exchange of constituent cationic or anionic ions in the groundwater with ions held by an ion exchange material. Typically used to remove metallic elements and inorganic ions.	NO
	k. Liquid-Liquid Extraction	Liquid-liquid extraction is a process which allows separation of two or several components due to their unequal distribution in immiscible liquid phases.	NO
I. Soil/Sediment Removal			
1. Excavation	a. Mechanical	Use of standard excavation equipment such as crane, clamshell, excavator, bulldozer, etc.	YES
	b. Hydraulic	Removal of sediments with a hydraulic dredge.	YES
	c. Screening	Use of standard screening equipment to segregate rocks and debris from soils.	YES
	d. Ground Freezing	An array of pipes is placed in the ground and brine at a temperature of -20 to -40 degrees Celsius is circulated to freeze soil. Only recommended for short duration applications and to assist with excavation.	YES
	e. Pneumatic/Vacuum Removal	A soil removal tool is provided for removing soil, rock, and other debris from the bottom of an excavation, while permitting the operator to be located outside of a containment for that excavation. The tool includes a fixed jaw secured to one end of an elongate pipe, which cooperates with a movable jaw pivotably mounted on the pipe.	NO
J. Creek Bank Stabilization			

Table 8-1. Identification and Preliminary Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Description	Technically Implementable YES = Retained NO = Not proven effective or reliable for PCBs given the site-specific attributes of the Anniston PCB Site
1. Engineered Treatment	a. Riprap	Armor stone placed along the creek bank to prevent the erosion of soils due to surface water flow. Riprap is widely available in many sizes.	YES
	b. Sheet Piling	Sheeting fall placed along the creek bank to prevent the erosion of soils. Typically used for steep creek banks when high value assets are built along the shoreline.	YES
	c. Reinforced Mats	Mats are reinforced with a range of materials including geotextiles and articulating concrete blocks. Some mats also include a growing medium to support the vegetative growth.	YES
	d. Reshaping/Grading Creek Bank Areas	Reshaping and/or grading creek bank area to lower surface water velocities and/or redirect flow. This could include the excavation and off-site disposal of soils.	YES
2. Natural Treatment	a. Natural Growth	Allowing the riparian buffer to naturally recolonize by not actively maintaining the vegetation and in some cases can include conservation restrictions that limit access and use of this riparian buffer zone.	YES
	b. Plantings	Actively placing plantings, such as willow whips, along the shoreline to stabilize the banks.	YES
	c. Logs and Root Balls	Using fallen tree logs and root balls to reduce surface water velocities along the creek bank and prevent erosion. The logs can be tied or staked to the shoreline such that it provides a velocity break for the surface water, and the root balls can be inserted in the creek bank to help form natural snags and provide habitat.	YES
	d. Shoreline Mattress	The shoreline mattresses can be formed with a wide range of natural materials and can be used to reduce surface water velocities along the creek bank and as a growing medium to enhance vegetative growth along the shoreline.	YES
K. Soil/Sediment Dewatering			
1. Active Dewatering	a. Filtration	Filtration is possible using a variety of media and configurations under atmospheric or pressure/vacuum conditions on a batch or continuous basis.	YES
	b. Solid Bowl Centrifuge	Soil slurry fed through a central pipe that sprays into a rotating bowl. Centrate discharges out the large end of the bowl, and solids are removed from tapered end of the bowl by means of a screw conveyer.	YES
	c. Evaporator	Excess water evaporated from soil slurry	YES
	d. Hydrocyclone	Continuously operating cone-shaped device which uses centrifugal force to accelerate settling.	YES
2. Gravity Dewatering	a. Dewatering Pad	Removed soils are placed on a contained pad and allowed to gravity dewater.	YES
	b. Settling Basin	Soil slurry enters basin, then material thickens an compacts at bottom of basin. Pretreatment with chemical additives can be used to enhance settling.	YES
L. Soil/Sediment Transport			
1. Transport	a. Truck	Media would be loaded and transported to another location for further treatment and/or disposal.	YES
	b. Rail	Media would be loaded and transported to another location for further treatment and/or disposal.	YES
	c. Barge	Media would be loaded and transported to another location for further treatment and/or disposal.	NO
	d. Pipeline	Media would be pumped and transported to another location for further treatment and/or disposal.	NO

Table 8-1. Identification and Preliminary Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Description	Technically Implementable YES = Retained NO = Not proven effective or reliable for PCBs given the site-specific attributes of the Anniston PCB Site
M. Soil/Sediment Disposal			
1. Off-Site Disposal	a. New Dedicated Landfill	A newly constructed dedicated off-site landfill designed to contain chemical-containing soils removed from the Site.	YES
	b. Licensed Hazardous Waste Landfill	Off-site disposal at a licensed commercial facility that can accept hazardous waste. Depends on soil analytical data.	YES
	c. Solid Waste Landfill	Disposal of soil or stabilized sediment in existing permitted solid waste landfill. Depends on soil analytical data and RCRA-listed waste status.	YES
2. On-Site Disposal	a. On-Site Landfill (Hazardous Waste and/or Solid Waste)	Disposal of solids in landfill(s) constructed near the Site.	YES
	b. Expansion of Existing Landfill	Disposal of solids in landfill(s) existing at the Site.	YES
	c. Soil Management Area	Areas specified to contain and manage site-related soils.	YES
N. Residuals Management for Soil/Sediment/Water Treatment Processes			
1. Residuals	a. Off-Site Disposal	Off-site landfill permitted to handle residuals removed from the Site.	YES
	b. Liquid and Sludge Incineration	Chemical constituents from extraction/desorption and other process options can be destroyed in off-site incinerator.	YES
	c. Activated Carbon Recycling	Recycling is achieved using thermal reactivation techniques.	YES
	d. Soil Management Area	Area specified to contain and manage site-related soils.	YES
O. Extraction and Discharge of Treated Waters			
1. Extraction	a. Vertical Extraction Well	Vertical wells are installed and used to recover groundwater for treatment/disposal.	YES
	b. Horizontal Extraction Well	Horizontal wells are used to replace conventional cluster wells in soils.	YES
	c. Collection Trench	A zone of higher permeability material is installed within the desired capture area with a perforated collection laterally placed along the base to direct groundwater to a collection area for treatment and/or disposal.	YES
	d. Subsurface Drain	A high permeability channel is installed to provide groundwater collection and redirection of movement for treatment and/or disposal.	YES
2. Discharge	a. Discharge to a local Publicly Owned Treatment Works (POTW)	Treated or untreated water is discharged to a sanitary sewer and treated at a local POTW facility depending on constituent concentrations.	YES
	b. Discharge to Surface Water	Treated or untreated water is discharged to a surface water, provided that quality and quantity meet the allowable discharge requirements for surface waters.	YES
	c. Treatment at a privately owned treatment facility	Treated or untreated water is collected and transported to a privately owned treatment facility.	YES
	d. Beneficial Reuse	Treated groundwater is reused (e.g., irrigation, cooling water).	YES
	e. Reinjection	Groundwater is extracted via extraction wells, passed through a treatment system, and then reinjected into the ground through injection wells.	YES
	f. Deep Well Injection	The use of injection wells to place treated or untreated liquid waste into geologic formations that have no potential to allow migration of chemical constituents into potential potable water aquifers.	NO

Table 8-2. Qualitative Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Screening Criteria (see below for definition of criteria)			Decision Retain/Eliminate
		Effectiveness	Implementability	Cost	
A. No Further Action					
	-----	Moderate	High	Low	Retained
B. Source Control					
	a. Identification and Elimination of Sources	Moderate	Moderate	Moderate	Retained
C. Institutional Access Controls and Monitoring					
1. Informational Devices	a. Deed Notices	Moderate	High	Low	Retained
	b. Fish Consumption Advisories	Moderate	High	Low	Retained
2. Governmental Controls	a. Land Use Restrictions	Moderate	High	Low	Retained
	b. Zoning Restrictions	Moderate	High	Low	Retained
	c. Ordinances	Moderate	High	Low	Retained
	d. Building and Other Permit Requirements	Moderate	High	Low	Retained
3. Proprietary Controls	a. Easements	Moderate	High	Low	Retained
	b. Covenants	Moderate	High	Low	Retained
	c. Access Restrictions	Moderate	High	Low	Retained
4. Enforcement Actions with Institutional Components	a. USEPA Administrative Orders	Moderate	High	Low	Retained
	b. Judicial Consent Decrees	Moderate	High	Low	Retained
5. Access Controls	a. Fencing, Signage, and Other Physical Barriers	Moderate	High	Low	Retained
D. Monitored Natural Recovery (MNR)					
1. MNR	a. MNR	Moderate	High	Low	Retained
	b. Enhanced MNR	Moderate	High	Low	Retained
E. In-Place Containment/Control for Soil or Sediment					
1. Capping	a. Clay/Soil Cap	High	High	Moderate	Retained
	b. Asphalt/Concrete Cap	High	High	Moderate	Retained
	c. Multimedia Cap	High	Moderate	Moderate	Retained
	d. Reactive Cap	High	Moderate	Moderate	Retained
F. In Situ Soil/Sediment Treatment					
1. Thermal Treatment	a. In Situ Vitrification (Glassification)	Moderate	Low	High	Eliminate
2. Immobilization (Solidification, Stabilization, and Fixation)	a. Stabilization/Solidification (Organic and Inorganic Based)	Moderate	Moderate	Moderate	Eliminate
3. Sediment Amendment	a. Activated Carbon	Moderate	Low	Moderate	Retained for low-velocity portions of Choccolocco Creek in the backwater area

Table 8-2. Qualitative Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Screening Criteria (see below for definition of criteria)			Decision Retain/Eliminate
		Effectiveness	Implementability	Cost	
G. Ex Situ Soil/Sediment Treatment					
1. Immobilization (Solidification, Stabilization, and Fixation)	a. Stabilization/Solidification (Organic and Inorganic Based)	High	Moderate	Moderate	Eliminate
2. Extraction	a. Solvent Extraction	Moderate	Low	High	Eliminate
	b. Thermal Desorption	Moderate	Moderate	High	Eliminate
3. Destruction	**THERMAL DESTRUCTION**				
	a. Incineration	High	Low	High	Retained for potential off-site application
	b. Pyrolysis	High	Low	High	Eliminate
	c. Vitrification (Glassification)	High	Low	High	Eliminate
H. Ex Situ Water Treatment					
1. Chemical Treatment	a. Neutralization	High	Moderate	Moderate	Retained (only if needed in combination with other process options)
2. Oxidation	a. Reduction/Oxidation	Moderate	Low	High	Eliminate
3. Physical Treatment	a. Granular Activated Carbon (GAC)	High	Moderate	Moderate	Retained
	b. Modified Organoclay and Carbon Filters	Moderate	Low	Moderate	Eliminate (GAC is more effective and more readily implementable)
	c. Dissolved Air Flotation (DAF)	Moderate	Moderate	Moderate	Retained (only if needed in combination with other process options)
	d. Oil/Water Separation	High	High	Moderate	Eliminate (separate oil phase is not anticipated based on Site data)
	e. Filtration	High	High	Moderate	Retained (only if needed in combination with other process options)
	f. Precipitation/Coagulation/Flocculation	Moderate	Moderate	Moderate	Retained (only if needed in combination with other process options)
	g. Primary Settling	Moderate	High	Low	Retained (only if needed in combination with other process options)
I. Soil/Sediment Removal					
1. Excavation	a. Mechanical	High	Moderate	Moderate	Retained for soil and sediment
	b. Screening	Moderate	Moderate	Low	Retained (as a potential support process option with mechanical excavation)
	c. Ground Freezing	Low	Low	High	Eliminate
	d. Hydraulic Dredging	Moderate	Low	Moderate	Retained (may have limited applicability due to water depths)
J. Creek Bank Stabilization					
1. Engineered Treatments	a. Riprap	Moderate	Moderate	Moderate	Retained
	b. Sheet Piling	Moderate	Low	High	Retained
	c. Reinforced Mats	Moderate	Moderate	High	Retained
	d. Reshaping/Grading Creek Bank Areas	High	High	High	Retained (may include off-site disposal of creek bank soil)
2. Natural Treatments	a. Natural Growth	High	High	Low	Retained
	b. Planting	High	Moderate	Low	Retained
	c. Logs and Root Balls	Moderate	Moderate	Low	Retained
	d. Shoreline Matresses	Low	Moderate	Low	Retained
K. Soil/Sediment Dewatering					
1. Active Dewatering	a. Filtration	Moderate	Moderate	High	Retained (in association with other GRAs/process options)
	b. Solid Bowl Centrifuge	Moderate	Low	High	Eliminate
	c. Evaporator	Moderate	Low	High	Eliminate
	d. Hydrocyclone	Moderate	Low	High	Eliminate
2. Gravity Dewatering	a. Dewatering Pad	Moderate	High	Low	Retained
	b. Settling Basin	Moderate	Moderate	Moderate	Eliminate

Table 8-2. Qualitative Screening of Remedial Technologies
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

General Response Action/ Remedial Technology	Process Option	Screening Criteria (see below for definition of criteria)			Decision Retain/Eliminate
		Effectiveness	Implementability	Cost	
L. Soil/Sediment Transport					
1. Transport	a. Truck	High	High	Moderate	Retained
	b. Rail	High	Low	High	Eliminate (Volume of potential excavation material is too low to support construction of a project-specific rail spur)
M. Soil/Sediment Disposal					
1. Off-Site Disposal	a. New Dedicated Landfill	High	Low	High	Eliminate
	b. Licensed Hazardous Waste Landfill	High	High	High	Retained
	c. Solid Waste Landfill	High	High	Moderate	Retained
2. On-Site Disposal	a. On-Site Landfill (Hazardous Waste and/or Solid Waste)	High	Moderate	Moderate	Retained (an on-site landfill located within OU-4 is retained for the potential disposal of nonresidential soil and/or sediment)
	b. Expansion of Existing Landfill	High	Moderate	Moderate	Eliminate
	c. Soil Management Area	High	High	Low	Retained (already built and being used for residential soil with PCB concentrations less than 10 mg/kg)
N. Residuals Management for Soil/Sediment/Water Treatment Processes					
1. Residuals	a. Off-Site Disposal	High	Moderate	Moderate	Retained
	b. Liquid and Sludge Incineration	High	Moderate	High	Eliminate
	c. Activated Carbon Recycling	High	Moderate	High	Eliminate (carbon and other treatment-generated residuals could be disposed of at an off-site facility or an on-site soil management area)
	d. Soil Management Area	High	High	Low	Retained (on-site facilities have already been constructed)
O. Discharge of Treated Waters					
1. Discharge	a. Discharge to a local Publicly Owned Treatment Works (POTW)	High	Moderate	Low	Retained
	b. Discharge to Surface Water	High	High	Low	Retained
	c. Treatment at a Privately Owned Treatment Facility	High	Moderate	Moderate	Retained
	d. Beneficial Reuse	High	Moderate	Low	Retained
	e. Reinjection	High	Moderate	Low	Retained

Screening Criteria Definitions

Effectiveness

High - Standalone technology is highly effective at meeting remedial action objectives (RAOs) under site-specific conditions.
Moderate - Technology is moderately effective at meeting RAOs under site-specific conditions. May require combination of other technologies to meet RAOs.
Low - Technology is ineffective at meeting RAOs under site-specific conditions. Would require complex array of other technologies to meet RAOs.

Implementability

High - No difficulties with implementing technology under site-specific conditions. Technology readily available, proven, and reliable.
Moderate - Some difficulties with implementing technology under site-specific conditions but no fatal flaws. Technology available, proven, and of average reliability.
Low - Major difficulties with implementing technology under site-specific conditions. Fatal flaws identified. Technology not readily available or proven and has low reliability.

Cost

High - High degree of capital investment and operation and maintenance (O&M) intensity.
Moderate - Moderate degree of capital investment and O&M intensity.
Low - Low degree of capital investment and O&M intensity.

Table 9-1a. Development and Screening of Remedial Alternatives for Residential Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Remedial Alternative	Description of Remedial Alternative	Screening Evaluation			Retained	Rationale	Alternative
		Effectiveness	Implementability	Cost			
No action	No further action beyond the residential removals that have already been completed under the NTC Removal Action Agreement.	L	H	L	YES	Retained as required under the NCP.	RS-1
Excavation and on- or off-site disposal for surface soil with PCB concentrations of ≥1.0 mg/kg and subsurface soil PCB concentrations of ≥10.0 mg/kg	Remove surface soil on residential properties with PCB remaining concentrations ≥1.0 mg/kg and subsurface soil with PCB concentrations ≥10.0 mg/kg (1 property). This alternative is consistent with actions already taken under the NTCRA Agreement and for residential properties where property access was available. Soil management would be implemented as part of the remedial alternative for residential properties where subsurface soil PCB residuals (between 1 and 10 mg/kg) remain (5 properties). Additional removal actions would be implemented for 1 property if access is granted. Soil generated during additional removals may be disposed of on-site in the SSSMA based on the PCB concentration results from the five-point composite samples collected for the property, which was <10 mg/kg. The estimated time frame to complete is several months.	H	M	M	YES	Retained. The alternative is effective and can be implemented.	RS-2
Excavation and on- or off-site disposal for surface soil and subsurface soil with PCB concentrations of ≥1.0 mg/kg	Remove surface and subsurface soil from residential properties with PCB concentrations ≥1.0 mg/kg to a depth of 4 feet below ground surface. The actions for surface soil are consistent with removals previously completed under the NTCRA Agreement. This alternative includes returning to 5 of the properties previously addressed under the earlier agreements, removing the previously placed 1-foot layer of clean backfill, excavating deeper to achieve PCB concentrations of 1 mg/kg, and backfilling and restoring the area. Conduct additional residential removal on 1 property, if access is granted. Soil generated during the additional removals may be disposed of in the SSSMA based on the PCB concentration of the composite sample of <10 mg/kg. The estimated time frame to complete is several months.	H	L	H	YES	Retained. The alternative is effective and can be implemented.	RS-3

Alternatives that have been retained are shaded in green.
H: high
L: low
M: moderate
mg/kg: milligram(s) per kilogram
NCP: National Contingency Plan
NTCRA: non-time-critical removal action
PCB: polychlorinated biphenyl
SSSMA: south staging soil management area

Table 9-1b. Development and Screening of Remedial Alternatives for Interim Measures
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Remedial Alternative	Description of Remedial Alternative	Screening Evaluation			Retained	Rationale	Alternative
		Effectiveness	Implementability	Cost			
No action	No further action, recognizing the measures conducted to date. Under this alternative, no further monitoring or maintenance would be conducted on the existing IM.	L	H	L	YES	Retained as required under the NCP. Effectiveness ranking of medium is based on the previously completed removals and IMs.	IM-1
Long-term monitoring and maintenance and soil management	Continue periodic inspections to document that previously placed cover materials for the Oxford Lake Park IMs are intact. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed.	M	H	L	YES	Retained. The alternative is effective and implementable.	IM-2
Excavation and on- or off-site disposal for outfield surface soil in Field A and between Fields A and D, and long-term soil management for PCBs ≥1.0 mg/kg in and between outfield soil on Fields C and D and at depth	Removal of surface soil (0-1 foot bgs) from Field A with off-site disposal. Continue periodic inspections to document that previously placed cover materials for the Oxford Lake Park IMs are intact. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed.	H	M	L	YES	Retained. The alternative is effective and implementable.	IM-3
Excavation and on- or off-site disposal for outfield surface soil in and between Fields A, C, and D, and long-term soil management for PCBs ≥1.0 mg/kg in soil at depth	Removal of surface soil (0-1 foot bgs) from Fields A, C, and D for advance soil management purposes with off-site disposal. Continue periodic inspections to document that previously placed cover materials for the Oxford Lake Park IMs are intact. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed.	H	M	M	YES	Retained. The alternative is effective and implementable.	IM-4
Excavation and on- or off-site disposal for outfield surface soil in and between Fields A, C, and D; excavation and off-site disposal of subsurface soil with PCB concentrations ≥50 mg/kg in Field C; and long-term soil management for PCBs ≥1.0 mg/kg in soil at depth	Removal of surface soil (0-1 foot bgs) from Fields A, C, and D and from the 1-2-foot horizon for a portion of Field C. Continue periodic inspections to document that previously placed cover materials for the Oxford Lake Park IMs are intact. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed.	H	M	M	YES	Retained. The alternative is effective and implementable.	IM-5

Table 9-1b. Development and Screening of Remedial Alternatives for Interim Measures
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Remedial Alternative	Description of Remedial Alternative	Screening Evaluation			Retained	Rationale	Alternative
		Effectiveness	Implementability	Cost			
Excavation and off-site disposal for the upper 4 feet of soil from softball Fields A, C, and D with off-site disposal for enhanced advance soil management purposes, long-term monitoring and maintenance of all IMs, and long-term soil management	Removal of upper 4 feet of soil from Fields A, C, and D with off-site disposal of the excavated soil. Continue periodic inspections to document that previously placed cover materials for the Oxford Lake Park IMs are intact. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where PCB residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed.	H	L	H	NO	Not retained. This alternative would be very difficult to implement due to conflicts with ongoing activities at the softball complex and is not cost-effective when compared to other	N/A

Alternatives that have been retained are shaded in green.
bgs: below ground surface
H: high
IM: interim measure
L: low
M: moderate
mg/kg: milligram(s) per kilogram
N/A: not applicable
NCP: National Contingency Plan
OU: Operable Unit
PCB: polychlorinated biphenyl

Table 9-1c. Development and Screening of Remedial Alternatives for Nonresidential Floodplain Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Remedial Alternative	Description of Remedial Alternative	Screening Evaluation			Retained	Rationale	Alternative
		Effectiveness	Implementability	Cost			
No action	No further action beyond the IM and removal actions that have been previously implemented.	L	H	L	YES	Retained as required under the NCP.	NRS-1
Excavation of soil in 0-0.5-foot soil horizon, off-site disposal, and long-term soil management including deed restrictions as needed	Excavate surface soil from the 0-0.5-foot horizon based on achieving a PCB SWAC of 6 mg/kg for this upper 0-0.5-foot horizon. The resulting PCB SWAC concentrations less than 10 mg/kg for the EUs that could support future agricultural activities where the adult residents are consuming meat, vegetables, and dairy. Excavated soil would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy, including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is 1 to 2 years.	M	H	M	YES	Retained. The alternative is effective and implementable.	NRS-2
Excavation of soil in 0-0.5-foot soil horizon, off-site disposal, limited advance surface soil management for PCBs ≥50 mg/kg, and long-term soil management including deed restrictions as needed	Excavate surface soil from the 0-0.5-foot horizon based on achieving a PCB SWAC of 6 mg/kg for this upper 0-0.5-foot horizon and remove soil from the upper 1 foot of EU1 with PCB concentrations greater than or equal to 50 mg/kg to enhance the soil management aspects of the alternative. The resulting PCB SWAC concentrations less than 10 mg/kg for the EUs that could support future agricultural activities where the adult residents are consuming meat, vegetables, and dairy. Excavated soil would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy, including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is 1 to 2 years.	M	M	M	YES	Retained. The alternative is effective and implementable.	NRS-3
Excavation of soil in the 0-0.5-foot soil horizon, off-site disposal, site-wide advance surface soil management for PCBs ≥50 mg/kg, and long-term soil management including deed restrictions as needed	Excavate surface soils from the 0-0.5-foot horizon based on achieving a PCB SWAC of 6 mg/kg for this upper 0-0.5-foot horizon and remove soil from the upper 1 foot of the OU-4 EUs with PCB concentrations greater than or equal to 50 mg/kg to enhance the soil management aspects of the alternative. The resulting PCB SWAC concentrations less than 10 mg/kg for the EUs that could support future agricultural activities where the adult residents are consuming meat, vegetables, and dairy. Excavated soil would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy, including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is 1 to 2 years.	H	M	H	YES	Retained. The alternative is effective and implementable.	NRS-4
Excavation of soil in 0-0.5-foot soil horizon, off-site disposal, site-wide advance surface and subsurface soil management for PCBs ≥50 mg/kg, and long-term soil management	Excavate surface soils from the 0-0.5-foot horizon based on achieving a PCB SWAC of 6 mg/kg for this upper 0-0.5-foot horizon and remove soil from the upper 4 feet of the OU-4 EUs with PCB concentrations greater than or equal to 50 mg/kg to enhance the soil management aspects of the alternative. The resulting PCB SWAC concentrations less than 10 mg/kg for the EUs that could support future agricultural activities where the adult residents are consuming meat, vegetables, and dairy. Excavated soil would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy, including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is 3 to 4 years.	H	M	H	YES	Retained. The alternative is effective and implementable.	NRS-5

Alternatives that have been retained are shaded in green.

EU: exposure unit
H: high
IM: interim measure
L: low
M: moderate
mg/kg: milligram(s) per kilogram
NCP: National Contingency Plan
OU: Operable Unit
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal
SWAC: surface-weighted average concentration
TSCA: Toxic Substance Control Act

Table 9-1d. Development and Screening of Remedial Alternatives for Creek Banks and Sediment[1]
Technical Memorandum Summarizing Results of Comparative Analysis of Alternatives
for OU-4 of the Anniston PCB Site, Anniston, Alabama

Remedial Alternative	Description of Remedial Alternative	Screening Evaluation			Retained	Rationale	Alternative
		Effectiveness	Implementability	Cost			
No action	No action	L	H	L	YES	Retained as required under the NCP.	SED-1
Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment for sediment in low-energy areas; long-term soil management; and MNR of sediment	PCB source control by addressing targeted creek bank areas (moderate and severe erosion creek bank areas) through a range of actions, including stabilization with shoreline hardening techniques. The specific techniques for individual sections of creek bank would be determined during the remedial design process, including geomorphological and hydraulic evaluations, predesign investigations, and input from local landowners. Dredging sediment from the high-energy target areas, transporting the sediment to a materials processing area, dewatering, and loading the sediment for transport to a licensed off-site disposal facility (i.e., landfill). In-place sediment treatment by placing activated carbon on the sediment's surface in low-energy portions of the backwater area. A layer of backfill up to 1 foot thick would be placed in the high-energy areas once sediment removal is complete. This remedial alternative would take approximately 3 years to construct and would include MNR to achieve the PRGs over the long term, including remedy metrics monitoring and long-term monitoring of treatment effectiveness and soil management support for future infrastructure repair or construction projects.	M	M	M	YES	Retained. The alternative would be effective and implementable.	SED-2
Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment of sediment in low-energy areas; long-term soil management; and MNR of sediment	PCB source control by addressing targeted creek bank areas (minor, moderate, and severe erosion creek bank areas) through a range of actions, including stabilization with shoreline hardening techniques. The specific techniques for individual sections of creek bank would be determined during the remedial design process, including geomorphological and hydraulic evaluations, predesign investigations, and input from local landowners. Dredging sediment from the high-energy target areas, transporting the sediment to a materials processing area, dewatering, and loading the sediment for transport to a licensed off-site disposal facility (i.e., landfill). In-place sediment treatment by placing activated carbon on the sediment's surface in low-energy portions of the backwater area. A layer of backfill up to 1 foot thick would be placed in the high-energy areas once sediment removal is complete. This remedial alternative would take approximately 3 years to construct and would include MNR to achieve the PRGs over the long term, including remedy metrics monitoring and long-term monitoring of treatment effectiveness.	M-H	M	M	YES	Retained. The alternative would be effective and implementable.	SED-3
Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment	PCB source control by addressing targeted creek bank areas (moderate and severe erosion creek bank areas) through a range of actions, including stabilization with shoreline hardening techniques. The specific techniques for individual sections of creek bank would be determined during the remedial design process, including geomorphological and hydraulic evaluations, predesign investigations, and input from local landowners. Dredging sediment from the target areas, transporting sediment to a materials processing area, dewatering, and loading sediment for transport to a licensed off-site disposal facility (i.e., landfill). A layer of backfill that is up to 1 foot thick could be placed over the dredge area footprint once the sediment removal is complete. This remedial alternative would take approximately 3 to 4 years to construct and would include MNR to achieve the PRGs over the long term, including remedy metrics monitoring and soil management support for future infrastructure repair or construction projects.	M	M	M	YES	Retained. The alternative would be effective and implementable.	SED-4
Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; capping for low-energy areas; long-term soil management; and MNR of sediment	PCB source control by addressing targeted creek bank areas (minor, moderate, and severe erosion creek bank areas) through a range of actions, including stabilization with shoreline hardening techniques. The specific techniques for individual sections of creek bank would be determined during the remedial design process, including geomorphological and hydraulic evaluations, predesign investigations, and input from local landowners. Dredging sediment from the high-energy target areas, transporting the sediment to a materials processing area, dewatering, and loading the sediment for transport to a licensed off-site disposal facility (i.e., landfill). Dredging also includes the removal of the upper 1 foot of sediment in the low-energy portions of the backwater area that will be capped. A layer of backfill that is up to 1 foot thick would be placed in the high-energy areas once the sediment removal is complete. This remedial alternative would take approximately 3 years to construct and would include MNR to achieve the PRGs over the long term, including remedy metrics monitoring and long-term monitoring of cap stability and soil management support for future infrastructure repair or construction projects.	M-H	M	M	YES	Retained. The alternative would be effective and implementable.	SED-5
Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment	PCB source control by addressing targeted creek bank areas (minor, moderate, and severe erosion creek bank areas) through a range of actions, including stabilization with shoreline hardening techniques. The specific techniques for individual sections of creek bank would be determined during the remedial design process, including geomorphological and hydraulic evaluations, predesign investigations, and input from local landowners. Dredging sediment from the target areas, transporting sediment to a materials processing area, dewatering, and loading sediment for transport to a licensed off-site disposal facility (i.e., landfill). A layer of backfill that is up to 1 foot thick could be placed over the dredge area footprint once the sediment removal is complete. This remedial alternative would take approximately 3 to 4 years to construct and would include MNR to achieve the PRGs over the long term, including remedy metrics monitoring, and soil management support for future infrastructure repair or construction projects.	M-H	M	M	YES	Retained. The alternative would be effective and implementable.	SED-6

Table 9-1d. Development and Screening of Remedial Alternatives for Creek Banks and Sediment[1]
Technical Memorandum Summarizing Results of Comparative Analysis of Alternatives
for OU-4 of the Anniston PCB Site, Anniston, Alabama

Remedial Alternative	Description of Remedial Alternative	Screening Evaluation			Retained	Rationale	Alternative
		Effectiveness	Implementability	Cost			
Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of contaminated sediment in high- and low-energy areas; off-site treatment of PTW; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment	PCB source control by addressing targeted creek bank areas through a range of actions, including stabilization with shoreline hardening techniques. The specific techniques for individual sections of creek bank would be determined during the remedial design process, including geomorphological and hydraulic evaluations, predesign investigations, and input from local landowners. Dredging sediment from the target areas, transporting the sediment to a materials processing area, dewatering, loading sediment for off-site disposal at an appropriate disposal facility. A small portion of the sediment (sediment with PCB concentrations ≥500 mg/kg) will be transported for treatment (i.e., incineration) at a licensed off-site facility. Off-site disposal of the residual ash from incineration operations at a licensed off-site disposal facility (i.e., landfill). A layer of backfill that is up to1 foot thick would be placed over the dredge area footprint once the sediment removal is complete. This remedial alternative would take approximately 3 to 4 years to construct, and would include MNR to achieve the PRGs over the long term including, remedy metrics monitoring and soil management support for future infrastructure repair or construction projects.	M	L	H	YES	Retained. The alternative would be effective and implementable.	SED-7

Alternatives that have been retained are shaded in green.
1. To assist in differentiating between the various remedial alternatives for creek banks and sediment, the screening evaluations in some cases reflect a blended rating (e.g., M-H to reflect that the rating is between moderate and high).
H: high
L: low
M: moderate
mg/kg: milligram(s) per kilogram
MNR: monitored natural recovery
NCP: National Contingency Plan
PCB: polychlorinated biphenyl
PRG: preliminary remediation goal
PTW: principle threat waste
RAL: remedial action level
SWAC: surface-weighted average concentration

Table 10-1. Estimated Costs for Remedial Alternative RS-2
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative RS-2: Remove surface soils on residential properties with remaining polychlorinated biphenyl (PCB) concentrations ≥1 milligram per kilogram (mg/kg) and subsurface soils with PCB concentrations ≥10 mg/kg (1 property). This alternative is consistent with actions already taken under the Non-Time Critical (NTC) Removal Action Agreement for residential properties where property access was available. Soil management would be implemented as part of the remedial alternative for residential properties where subsurface soil PCB residuals (between 1 mg/kg and 10 mg/kg) remain (5 properties). This alternative would include removal actions at one property if access is granted. Soils generated during additional removal would be disposed at a permitted off-site non-hazardous disposal facility.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$3,000	$3,000
2	Soil Excavation	CY	400	$48	$19,200
3	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	600	$68	$40,800
4	Backfill	CY	300	$24	$7,200
5	Restoration	LS	1	$6,400	$6,400
6	Decontamination	LS	1	$1,500	$1,500
7	Contractor Management	LS	1	$10,500	$10,500
8	Demobilization	LS	1	$3,000	$3,000
9	Construction Management	LS	1	$11,547	$11,500
10	Predesign Sampling	LS	1	$2,500	$2,500
				Total Capital Costs:	$105,600
Administrative/Management					
11	Project Management (5% of Construction Cost or $15,000 minimum)	LS	1	$15,000	$15,000
12	Engineering Design (6% of Capital Cost or $25,000 minimum)	LS	1	$25,000	$25,000
				Administrative/Management Costs:	$40,000
13	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$29,120	$29,100
				Total Construction Cost (Capital Costs and Administrative/Management):	$174,700
Long-Term Operation, Maintenance, and Monitoring					
14	Long-Term OMM Program with 20% Contingency	Year	30	#N/A	
15	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$225,600	$225,600
				Total Estimated Cost:	$400,300
				Total Estimated Cost (Rounded):	$400,000

Acronyms:

CY: cubic yard

LS: lump sum

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative RS-2 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials to complete the work as described above and includes installation of erosion and sedimentation controls (i.e., silt fencing) around the perimeter of the remediation area at the residential property. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel to excavate soil at the residential property. The cost assumes the work will be completed using an excavator and directly loading material into an end-dump truck with no over-removal allowance. The cost also assumes a production rate of 100 cubic yards per day. Contractor uptime is assumed to be 25% due to logistical challenges of directly loading end-dump trucks on a residential property.

3. *Off-Site Transportation and Disposal*: This estimate includes the transport and disposal of excavated soil from the residential property to Advanced Disposal's Three Corners Regional non-Toxic Substance Control Act (TSCA) disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard.

4. *Backfill:* This estimate includes labor, materials, equipment, and fuel to backfill residential properties. Assumes backfill material (run-of-bank) will be delivered by end-dump trucks directly from the import material source and placed by skid-steer loader. Backfill material would be placed up to 2 inches below preexcavation grade at an assumed production rate of 300 cubic yards per day with no overplacement allowance.

5. *Restoration:* This estimate includes labor, materials, equipment, and fuel to restore residential properties in-kind. This includes placing 2 inches of topsoil (with no overplacement allowance) by skid-steer loader and hydroseeding over the course of one day.

6. *Decontamination:* This estimate includes labor and materials to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 2.5 hours to decontaminate equipment.

7. *Contractor Management:* This estimate includes labor for the contractor's management of the project. This includes having a project manager on-site for the entire project duration and per diem (i.e., lodging and meals). The estimate also includes labor and equipment needed to perform pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

8. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

9. *Construction Management:* This estimate includes labor for the Owner's Representative to perform oversight and construction quality assurance for the project. This includes having a field staff member on-site for the entire project duration, field staff travel to the jobsite, and per diem (i.e., lodging and meals).

10. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials to perform predesign investigation sampling. This includes the labor and field equipment needed to cover four composite samples for the property to provide supplemental data for the project area.

11. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, administering the work, reviewing contractor documents, and providing engineering services during construction.

12. *Engineering Design*: This estimate includes labor and fees to complete the remedial design.

13. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the total capital costs and the Administrative/Management Costs.

14. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials to conduct annual monitoring of properties with residual polychlorinated biphenyls (PCBs) greater than 1 milligram per kilogram (mg/kg). This is assumed to include an annual visual inspection of the property, associated reporting, and the consultant's project management services and includes a 20% contingency.

15. *Present Worth of Long-Term Cost*: This estimate provides the net present value for the long-term OMM program over 30 years with a 7% discount factor.

Table 10-2. Estimated Costs for Remedial Alternative RS-3
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative RS-3: Remove surface and subsurface soils from residential properties with polychlorinated biphenyl (PCB) concentrations ≥1 milligram per kilogram (mg/kg) to a depth of 48 inches below ground surface. The actions for surface soils are consistent with removals previously completed under the Non-Time Critical (NTC) Removal Action Agreement. This alternative includes returning to five properties where removal actions were previously conducted under the earlier agreements, removing the previously placed 12-inch layer of clean backfill, excavating deeper to achieve PCB concentrations of 1 mg/kg, and backfilling and restoring the area. In addition, this alternative would include removal actions at one property if access is granted, to address PCB concentrations greater than 1 mg/kg in surface soil. Soils generated during the additional removals would be disposed of in the South Staging and Soil Management Area (SSSMA) if the PCB concentrations of composite samples are <10 mg/kg.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$57,000	$57,000
2	Soil Excavation	CY	7,400	$48	$355,200
3	Transportation and Disposal at SSSMA	TON	11,100	$14	$155,400
4	Backfill	CY	7,000	$24	$168,000
5	Restoration	LS	1	$34,600	$34,600
6	Decontamination	LS	1	$9,100	$9,100
7	Contractor Management	LS	1	$92,700	$92,700
8	Demobilization	LS	1	$57,000	$57,000
9	Construction Management	LS	1	$99,200	$99,200
10	Predesign Sampling	LS	1	$16,300	$16,300
				Total Capital Costs:	$1,044,500
Administrative/Management					
11	Project Management (5% of Construction Cost or $15,000 minimum)	LS	1	$52,225	$52,200
12	Engineering Design (6% of Capital Cost or $25,000 minimum)	LS	1	$62,670	$62,700
				Administrative/Management Costs:	$114,900
13	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$231,880	$231,900
Long-Term Operation, Maintenance, and Monitoring					
14	Long-Term OMM Program with 20% Contingency	Year	30	#N/A	
15	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$0	$0
				Total Construction Cost (Capital Costs and Administrative/Management):	$1,391,300
				Total Estimated Cost:	$1,391,300
				Total Estimated Cost (Rounded):	$1,390,000

Acronyms:

CY: cubic yard

LS: lump sum

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative RS-3 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials to complete the work as described above and includes installation of erosion and sedimentation controls (i.e., silt fencing) around the perimeter of the remediation area at the residential property. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material to the south staging and soil management area (SSSMA).

2. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel to excavate soil on residential properties. The cost assumes the work will be completed using an excavator and directly loading material into an end-dump truck (cost of end-dump trucks included in line item No. 3) with no over-removal allowance. The cost assumes a production rate of 100 cubic yards per day. Contractor uptime is assumed to be 25% due to logistical challenges of directly loading end-dump trucks on a residential property.

3. *Transportation and Disposal at South Staging and Soil Management Area (SSSMA)*: This estimate includes labor, equipment, and fuel for transport and disposal of excavated soil from residential properties to the SSSMA via end-dump trucks. This estimate also includes labor, materials, equipment, and fuel to place a 0.5-foot soil cover, seed, and survey (pre- and post-construction) as part of disposing of removed material in the SSSMA. The density of the excavated soil is assumed to be 1.5 tons per cubic yard.

4. *Backfill:* This estimate includes labor, materials, equipment, and fuel to backfill residential properties. Assumes backfill material (run-of-bank) will be delivered by end-dump trucks directly from the import material source and placed by skid-steer loader. Backfill material will be placed up to 2 inches below preexcavation grade at an assumed production rate of 300 cubic yards per day with no overplacement allowance.

5. *Restoration:* This estimate includes labor, materials, equipment, and fuel to restore residential properties in-kind. This includes placing 2 inches of topsoil (with no overplacement allowance) by skid-steer loader at an assumed production rate of 250 cubic yards per day and hydroseeding at an assumed production rate of 90,000 square feet per day.

6. *Decontamination:* This estimate includes labor and materials to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 1.5 days to decontaminate equipment.

7. *Contractor Management:* This estimate includes labor for the contractor's management of the project. This includes having a project manager on-site for the entire the project duration and per diem (i.e., lodging and meals). The estimate also includes labor and equipment needed to perform pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

8. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material to the SSSMA.

9. *Construction Management:* This estimate includes labor for the Owner's Representative to perform oversight and construction quality assurance for the project. This includes having a field staff member on-site for the entire project duration, field staff travel to jobsite, and per diem (i.e., lodging and meals).

10. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials to perform predesign investigation sampling. This includes the labor and field equipment needed to cover four composite samples per property to provide supplemental data for the project area.

11. *Project Management*: This estimate includes labor needed to complete the management of the project. This includes attending meetings, administering the work, reviewing contractor documents, and providing engineering services during construction.

12. *Engineering Design*: This estimate includes labor and fees needed to complete the remedial design.

13. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the total capital costs.

14. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* Assumed no long-term operations, maintenance, and monitoring needed for this alternative as all surface and subsurface soils from residential properties with PCB concentrations greater than or equal to 1 milligram per kilogram (mg/kg) to a depth of 48 inches would be removed.

15. *Present Worth of Long-Term Cost*: Assumed no long-term operations, maintenance, and monitoring needed for this alternative as all surface and subsurface soils from residential properties with PCB concentrations greater than or equal to 1 mg/kg to a depth of 48 inches would be removed.

Table 10-3. Estimated Costs for Remedial Alternative IM-2
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative IM-2: These Interim Measures (IMs) have already been constructed and this remedial alternative provides for continued periodic inspections and inspections following significant rain events to ensure that the surface completion continues to be protective. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM at the Oxford Lake Park. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where polychlorinated biphenyl (PCB) residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	--	--	--	--	$0
				Total Capital Costs:	$0
Long-Term Operation, Maintenance, and Monitoring					
2	Long-Term OMM program with 20% contingency annual costs range from $13,500 to $408,500 (see notes for additional details)				
3	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$353,900	$353,900
				Total Estimated Cost:	$353,900
				Total Estimated Cost (Rounded):	$400,000

Acronyms:

LS: lump sum

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative IM-2 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Capital Costs*: This estimate assumes there are no construction-related capital costs for this alternative.

2. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials to conduct annual long-term monitoring. This is assumed to include an annual in-person visual inspection of the site, associated reporting, and the consultant's project management services, which equates to $15,000 per event (net present value of zero). The estimate also includes the assumed labor, equipment, and materials to remove and replace 105,000 square feet of asphalt covers at Oxford Lake Park at year 15, which equates to $431,000 (net present value of zero), and repairing 5% of the asphalt at Oxford Lake Park at Year 7 and 22, which equates to $18,000 per event (net present value of zero). This estimate assumes a 20% contingency on the annual long-term costs.

3. *Present Worth of Long-Term Cost*: This estimate provides the net present value for the long-term OMM program over 30 years with a 7% discount factor.

Table 10-4. Estimated Costs for Remedial Alternative IM-3
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative IM-3: Interim Measures (IMs) have previously been constructed and this remedial alternative provides for continued periodic inspections and inspections following significant rain events to ensure that the surface completion continues to be protective. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM at the Oxford Lake Park. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where polychlorinated biphenyl (PCB) residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed. In addition to the inspections, Alternative IM-3 includes the remvoal for 1 foot of material in Field A at Oxford Lake Park and then restoration of the softball fields to current conditions.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$43,000	$43,000
2	Site Preparation	LS	1	$49,900	$49,900
3	Soil Excavation	CY	3,741	$6.60	$24,700
4	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	5,611	$68	$381,600
5	Prepare Fields for Specialty Contractor	CY	3,531	$46	$162,100
6	Specialty Contractor Softball Field Construction	LS	1	$95,000	$95,000
7	Re-Install Fencing	LS	1	$4,500	$4,500
8	Miscellaneous Restoration Repairs	LS	1	$10,000	$10,000
9	Decontamination	LS	1	$1,600	$1,600
10	Contractor Management	MO	1	$78,100	$78,100
11	Construction Management	MO	1	$33,100	$33,100
12	Demobilization	LS	1	$43,000	$43,000
				Total Capital Costs:	$926,600
Administrative/Management					
13	Project Management (5% of Construction Cost or $15,000 minimum)	LS	1	$27,250	$27,300
14	Engineering Design (6% of Capital Cost)	LS	1	$32,700	$32,700
				Administrative/Management Costs:	$60,000
15	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$197,320	$197,300
				Total Construction Cost (Capital Costs and Administrative/Management):	$1,183,900
Long-Term Operation, Maintenance, and Monitoring					
16	Long-Term OMM program with 20% contingency annual costs range from $13,500 to $408,500 (see notes for additional details)				
17	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$353,900	$353,900
				Total Estimated Cost:	$1,537,800
				Total Estimated Cost (Rounded):	$1,500,000

Acronyms:

LS: lump sum

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative IM-3 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) and temporary site security fencing around the perimeter of Field A and temporarily remove fencing around the softball field. This estimate assumes that facilities within the current ballfield complex will be available for use (i.e., restrooms and storage area for hand equipment) at no additional cost to contractor. This estimate also assumes that all structures (less perimeter fencing) will remain in place during construction activities (e.g., light poles, backstop, dugout, parking lot, walkways).

3. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel to excavate 1 foot of soil at Field A and between Fields A and D. The cost assumes the work will be completed using an excavator and directly loading material into an end-dump truck with no over-removal allowance. The cost also assumes a production rate of 360 cubic yards per day per operation (i.e., excavator). Excavation uptime is assumed to be 75%. The estimated removal volume assumes no sloping around the extent of the exterior footprint of the ballfield (i.e., 1-foot daylight cut). It is assumed that structures (less perimeter fencing and bleachers) would not be removed.

4. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated non-TSCA soil from Field A and between Fields A and D to Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard.

5. *Prepare Fields for Specialty Contractor:* This estimate includes labor, materials, equipment, and fuel to prepare Field A for a specialty contractor. Assumes material (sand) will be delivered by end-dump trucks directly from the import material source, placed by a skid steer and compacted by a roller. Sand material would be placed in the outfield and between Fields A and D to preexcavation grade at an assumed production rate of 500 cubic yards per day per operation with no overplacement allowance. Sand material will be placed in the infield to a depth of 4 inches below preexcavation grade.

6. *Specialty Contractor Softball Field Construction:* This estimate includes the cost for a specialty contractor to finish the softball field. Work for this line item assumes the specialty contractor will place 4 inches of "infield" material in the infield, will grade the outfield in preparation for sod installation, install sod in outfield, install a sprinkler system in the field, and set the infield for play (i.e., install base pads).

7. *Reinstall Fencing:* This estimate includes the labor, equipment, and fuel to reinstall the fencing around the perimeter of Field A.

8. *Miscellaneous Restoration Repairs:* This estimate includes costs associated with repairing lighting and drainage impacted by construction activities.

9. *Decontamination:* This estimate includes labor and materials to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 1 day to decontaminate equipment.

10. *Contractor Management:* This estimate includes labor for the contractor's management of the project. This includes having a site superintendent on-site for the entire project duration and a project manager on-site for half of the project duration and per diem (i.e., lodging and meals). The estimate also includes labor and equipment needed to perform pre-construction, post-removal, post-backfill placement, and post-sand placement confirmation surveys with an assumed time of 25% of excavation and placement related activities.

11. *Construction Management:* This estimate includes labor for the Owner's Representative to perform oversight and construction quality assurance for the project. This includes having a field staff member on-site for the entire project duration, field staff travel to the jobsite, and per diem (i.e., lodging and meals).

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, administering the work, reviewing contractor documents, and providing engineering services during construction.

14. *Engineering Design*: This estimate includes labor and fees to complete the remedial design.

15. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the total capital costs and the Administrative/Management Costs.

16. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials to conduct annual long-term monitoring. This is assumed to include an annual in-person visual inspection of the site, associated reporting, and the consultant's project management services, which equates to $15,000 per event (net present value of zero). The estimate also includes the assumed labor, equipment, and materials to remove and replace 105,000 square feet of asphalt covers at Oxford Lake Park at year 15, which equates to $431,000 (net present value of zero), and repairing 5% of the asphalt at Oxford Lake Park at Year 7 and 22, which equates to $18,000 per event (net present value of zero). This estimate assumes a 20% contingency on the annual long-term costs.

17. *Present Worth of Long-Term Cost*: This estimate provides the net present value for the long-term OMM program over 30 years with a 7% discount factor.

Table 10-5. Estimated Costs for Remedial Alternative IM-4
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative IM-4: Interim Measures (IMs) have previously been constructed and this remedial alternative provides for continued periodic inspections and inspections following significant rain events to ensure that the surface completion continues to be protective. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM at the Oxford Lake Park. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where polychlorinated biphenyl (PCB) residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed. In addition to the inspections, Alternative IM-4 includes a 1-foot removal in all of Fields A, C, and D at Oxford Lake Park and then restoration of the softball fields to current conditions.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$98,000	$98,000
2	Site Preparation	LS	1	$107,200	$107,200
3	Soil Excavation	CY	9,815	$6.60	$64,800
4	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	14,722	$68	$1,001,100
5	Prepare Fields for Specialty Contractor	CY	9,210	$45	$418,100
6	Specialty Contractor Softball Field Construction	LS	1	$285,000	$285,000
7	Re-Install Fencing	LS	1	$18,000	$18,000
8	Miscellaneous Restoration Repairs	LS	1	$10,000	$10,000
9	Decontamination	LS	1	$1,800	$1,800
10	Contractor Management	MO	1	$78,100	$78,100
11	Construction Management	MO	1	$33,100	$33,100
12	Demobilization	LS	1	$98,000	$98,000
				Total Capital Costs:	$2,213,200
Administrative/Management					
13	Project Management (5% of Construction Cost or $15,000 minimum)	LS	1	$60,605	$60,600
14	Engineering Design (6% of Capital Cost)	LS	1	$72,726	$72,700
				Administrative/Management Costs:	$133,300
15	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$469,300	$469,300
				Total Construction Cost (Capital Costs and Administrative/Management):	$2,815,800
Long-Term Operation, Maintenance, and Monitoring					
16	Long-Term OMM program with 20% contingency annual costs range from $13,500 to $408,500 (see notes for additional details)				
17	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$353,900	$353,900
				Total Estimated Cost:	$3,169,700
				Total Estimated Cost (Rounded):	$3,200,000

Acronyms:

LS: lump sum

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative IM-4 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) and temporary site security fencing around the perimeter of Fields A, C, and D and temporarily remove fencing around the softball fields. This estimate assumes that facilities within the current ballfield complex will be available for use (i.e., restrooms and storage area for hand equipment) at no additional cost to contractor. This estimate also assumes that all structures (less perimeter fencing) will remain in place during construction activities (e.g., light poles, backstop, dugout, parking lot, walkways).

3. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel to excavate 1 foot of soil at and between Fields A, C, and D. The cost assumes the work will be completed using an excavator and directly loading material into an end-dump truck with no over-removal allowance. The cost also assumes a production rate of 360 cubic yards per day per operation (i.e., excavator) and assumes three operations ongoing simultaneously. Excavation uptime is assumed to be 75%. The estimated removal volume assumes no sloping around the extent of the exterior footprint of each ballfield (i.e., 1-foot daylight cut). It is assumed that structures (less perimeter fencing and bleachers) would not be removed.

4. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated non-TSCA soil from Fields A, C, and D and between Fields A/D and C/D to Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard.

5. *Prepare Fields for Specialty Contractor*: This estimate includes labor, materials, equipment, and fuel to prepare Fields A, C, and D for a specialty contractor. Assumes material (sand) will be delivered by end-dump trucks directly from the import material source, placed by a skid steer and compacted by a roller. Sand material would be placed in the outfields and between Fields A/D and C/D to preexcavation grade at an assumed production rate of 500 cubic yards per day per operation with no overplacement allowance and assumes two operations are ongoing simultaneously. Sand material will be placed in the infields to a depth of 4 inches below preexcavation grade.

6. *Specialty Contractor Softball Field Construction:* This estimate includes the cost for a specialty contractor to finish the softball fields. Work for this line item assumes the specialty contractor will place 4 inches of "infield" material in each infield, will grade the outfield in preparation for sod installation, install sod in outfields, install a sprinkler system in each field, and set the infield for play (i.e., install base pads).

7. *Reinstall Fencing:* This estimate includes the labor, equipment, and fuel to reinstall the fencing around the perimeter of Fields A, C, and D.

8. *Miscellaneous Restoration Repairs:* This estimate includes costs associated with repairing lighting and drainage impacted by construction activities.

9. *Decontamination:* This estimate includes labor and materials to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 1 day to decontaminate equipment.

10. *Contractor Management:* This estimate includes labor for the contractor's management of the project. This includes having a site superintendent on-site for the entire project duration and a project manager on-site for half of the project duration and per diem (i.e., lodging and meals). The estimate also includes labor and equipment needed to perform pre-construction, post-removal, post-backfill placement, and post-sand placement confirmation surveys with an assumed time of 25% of excavation and placement related activities.

11. *Construction Management:* This estimate includes labor for the Owner's Representative to perform oversight and construction quality assurance for the project. This includes having a field staff member on-site for the entire project duration, field staff travel to the jobsite, and per diem (i.e., lodging and meals).

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, administering the work, reviewing contractor documents, and providing engineering services during construction.

14. *Engineering Design*: This estimate includes labor and fees to complete the remedial design.

15. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the total capital costs and the Administrative/Management Costs.

16. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials to conduct annual long-term monitoring. This is assumed to include an annual in-person visual inspection of the site, associated reporting, and the consultant's project management services, which equates to $15,000 per event (net present value of zero). The estimate also includes the assumed labor, equipment, and materials to remove and replace 105,000 square feet of asphalt covers at Oxford Lake Park at year 15, which equates to $431,000 (net present value of zero), and repairing 5% of the asphalt at Oxford Lake Park at Year 7 and 22, which equates to $18,000 per event (net present value of zero). This estimate assumes a 20% contingency on the annual long-term costs.

17. *Present Worth of Long-Term Cost*: This estimate provides the net present value for the long-term OMM program over 30 years with a 7% discount factor.

Table 10-6. Estimated Costs for Remedial Alternative IM-5
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative IM-5: Interim Measures (IMs) have previously been constructed and this remedial alternative provides for continued periodic inspections and inspections following significant rain events to ensure that the surface completion continues to be protective. Inspections include observing the effectiveness of the City of Oxford's routine maintenance and soil management support to prevent intrusive or land disturbance work from impacting the effectiveness of the IM at the Oxford Lake Park. The soil management support would be consistent with the long-term soil management approach that was identified for OU-1/OU-2, including use of the Alabama 811 system to identify planned intrusive activities in areas where polychlorinated biphenyl (PCB) residuals are located. The soil management support would be used with already established deed restrictions that were put in place by the City of Oxford to ensure that land use in the area is not changed. In addition to the inspections, Alternative IM-5 includes the remvoal for 2 feet of material in a portion of Field C designated as TSCA and a 1-foot removal for the rest of Field C and in all of Fields A and D at Oxford Lake Park and then restoration of the softball fields to current conditions.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$98,000	$98,000
2	Site Preparation	LS	1	$107,200	$107,200
3	Soil Excavation	CY	9,842	$6.60	$65,000
4	Off-Site Transportation and Disposal (T&D - TSCA)	TON	82	$202	$16,500
5	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	14,681	$68	$998,300
6	Prepare Fields for Specialty Contractor	CY	9,237	$45	$419,400
7	Specialty Contractor Softball Field Construction	LS	1	$285,000	$285,000
8	Re-Install Fencing	LS	1	$18,000	$18,000
9	Miscellaneous Restoration Repairs	LS	1	$10,000	$10,000
10	Decontamination	LS	1	$1,800	$1,800
11	Contractor Management	MO	1	$78,100	$78,100
12	Construction Management	MO	1	$33,100	$33,100
13	Demobilization	LS	1	$98,000	$98,000
				Total Capital Costs:	$2,228,400
Administrative/Management					
14	Project Management (5% of Construction Cost or $15,000 minimum)	LS	1	$60,680	$60,700
15	Engineering Design (6% of Capital Cost)	LS	1	$72,816	$72,800
				Administrative/Management Costs:	$133,500
16	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$472,380	$472,400
				Total Construction Cost (Capital Costs and Administrative/Management):	$2,834,300
Long-Term Operation, Maintenance, and Monitoring					
17	Long-Term OMM program with 20% contingency annual costs range from $13,500 to $408,500 (see notes for additional details)				
18	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$353,900	$353,900
				Total Estimated Cost:	$3,188,200
				Total Estimated Cost (Rounded):	$3,200,000

Acronyms:

LS: lump sum

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative IM-5 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) and temporary site security fencing around the perimeter of Fields A, C, and D and temporarily remove fencing around the softball fields. This estimate assumes that facilities within the current ballfield complex will be available for use (i.e., restrooms and storage area for hand equipment) at no additional cost to contractor. This estimate also assumes that all structures (less perimeter fencing) will remain in place during construction activities (e.g., light poles, backstop, dugout, parking lot, walkways).

3. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel to excavate 1 foot of soil at and between Fields A, C, and D and an additional foot of material in a targeted area on Field C. The cost assumes the work will be completed using an excavator and directly loading material into an end-dump truck with no over-removal allowance. The cost also assumes a production rate of 360 cubic yards per day per operation (i.e., excavator) and assumes three operations ongoing simultaneously. Excavation uptime is assumed to be 75%. The estimated removal volume assumes no sloping around the extent of the exterior footprint of each ballfield (i.e., 1-foot daylight cut). It is assumed that structures (less perimeter fencing and bleachers) would not be removed.

4. *Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of targeted soil on Field C containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's Toxic Substance Control Act (TSCA) disposal facility located in Emelle, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard.

5. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated non-TSCA soil from Fields A, C, and D and between Fields A/D and C/D to Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard.

6. *Prepare Fields for Specialty Contractor:* This estimate includes labor, materials, equipment, and fuel to prepare Fields A, C, and D for a specialty contractor. Assumes material (sand) will be delivered by end-dump trucks directly from the import material source, placed by a skid steer and compacted by a roller. Sand material would be placed in the outfields and between Fields A/D and C/D to preexcavation grade at an assumed production rate of 500 cubic yards per day per operation with no overplacement allowance and assumes two operations are ongoing simultaneously. Sand material will be placed in the infields to a depth of 4 inches below preexcavation grade.

7. *Specialty Contractor Softball Field Construction:* This estimate includes the cost for a specialty contractor to finish the softball fields. Work for this line item assumes the specialty contractor will place 4 inches of "infield" material in each infield, will grade the outfield in preparation for sod

installation, install sod in outfields, install a sprinkler system in each field, and set the infield for play (i.e., install base pads).

8. *Reinstall Fencing:* This estimate includes the labor, equipment, and fuel to reinstall the fencing around the perimeter of Fields A, C, and D.

9. *Miscellaneous Restoration Repairs:* This estimate includes costs associated with repairing lighting and drainage impacted by construction activities.

10. *Decontamination:* This estimate includes labor and materials to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 1 day to decontaminate equipment.

11. *Contractor Management:* This estimate includes labor for the contractor's management of the project. This includes having a site superintendent on-site for the entire project duration and a project manager on-site for half of the project duration and per diem (i.e., lodging and meals). The estimate also includes labor and equipment needed to perform pre-construction, post-removal, post-backfill placement, and post-sand placement confirmation surveys with an assumed time of 25% of excavation and placement related activities.

12. *Construction Management:* This estimate includes labor for the Owner's Representative to perform oversight and construction quality assurance for the project. This includes having a field staff member on-site for the entire project duration, field staff travel to the jobsite, and per diem (i.e., lodging and meals).

13. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

14. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, administering the work, reviewing contractor documents, and providing engineering services during construction.

15. *Engineering Design*: This estimate includes labor and fees to complete the remedial design.

16. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the total capital costs and the Administrative/Management Costs.

17. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials to conduct annual long-term monitoring. This is assumed to include an annual in-person visual inspection of the site, associated reporting, and the consultant's project management services, which equates to $15,000 per event (net present value of zero). The estimate also includes the assumed labor, equipment, and materials to remove and replace 105,000 square feet of asphalt covers at Oxford Lake Park at year 15, which equates to $431,000 (net present value of zero), and repairing 5% of the asphalt at Oxford Lake Park at Year 7 and 22, which equates to $18,000

per event (net present value of zero). This estimate assumes a 20% contingency on the annual long-term costs.

18. *Present Worth of Long-Term Cost*: This estimate provides the net present value for the long-term OMM program over 30 years with a 7% discount factor.

Table 10-7. Summary of Pre- and Post-Remediation OU-4 Nonresidential Surface (0-6 inches) Soil PCB Data by Ecological Exposure Unit
Feasibility Study Report for OU-4
of the Anniston PCB Site, Anniston, Alabama

Reach or AA	Description	Subgroup	Samples (n)	Pre-Remediation				Post-Remediation				Area (acre)	Number of Detects Remediated	Area Remediated (acre)
				Number of Detects	Mean	Max	SWAC	Number of Detects	Mean	Max	SWAC			
C1	Oxford Lake Park	East	90	71	8	59	9.6	67	6	34	5.4	41	4	4
C1	Oxford Lake Park	West	6	6	53	210	64	3	2.5	11	5.5	30	3	15
C2	Backwater Area	Riparian	16	4	2.2	32	1.1	4	2.2	32	1.1	71	0	0
C2	Backwater Area	Central	35	4	0.12	1.8	0.1	4	0.12	1.8	0.1	100	0	0
C2	Backwater Area	North	38	29	2.7	32	3.2	29	2.7	32	3.2	71	0	0
C2	Backwater Area	South	20	3	0.083	0.38	0.088	3	0.083	0.38	0.088	66	0	0
C3	Friendship Road to Highway 21	Riparian	21	20	13	79	20	16	5.1	19	5.7	49	4	15
C3	Friendship Road to Highway 21	North	77	74	11	75	12	66	6.3	29	5.9	270	8	37
C3	Friendship Road to Highway 21	South	60	37	8.8	79	6.3	36	7.4	64	5.8	240	1	1.5
C4	Highway 21 to Silver Run Road	Riparian	49	46	7.5	31	6.2	45	6.8	26	5.4	140	1	3.6
C4	Highway 21 to Silver Run Road	North	147	115	3.4	38	2.9	120	3.4	38	2.9	690	0	0
C4	Highway 21 to Silver Run Road	South	145	118	5	52	3.3	120	5	52	3.3	670	0	0
UAA	Upper Assessment Area	Floodplain	522	380	5.2	79	4.4	370	4.4	64	3.5	2,100	9	39
UAA	Upper Assessment Area	Riparian	86	70	7.9	79	7.4	65	5.5	32	4.3	260	5	19
C5	Silver Run Road to Mitchell Matson Road	Riparian	56	50	2.1	16	1.9	50	2.1	16	1.9	150	0	0
C5	Silver Run Road to Mitchell Matson Road	North	127	68	0.76	9.4	0.51	68	0.76	9.4	0.51	680	0	0
C5	Silver Run Road to Mitchell Matson Road	South	101	52	1	16	0.71	52	1	16	0.71	510	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	Riparian	27	22	1.5	10	1.7	22	1.5	10	1.7	98	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	North	23	16	1.2	5.2	1.1	16	1.2	5.2	1.1	130	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	South	24	15	1.2	10	0.98	15	1.2	10	0.98	150	0	0
MAA	Middle Assessment Area	Floodplain	275	151	0.93	16	0.68	150	0.93	16	0.68	1,500	0	0
MAA	Middle Assessment Area	Riparian	83	72	1.9	16	1.8	72	1.9	16	1.8	250	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	Riparian	36	33	1.8	9.9	1.9	33	1.8	9.9	1.9	130	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	North	91	39	0.3	8.4	0.19	39	0.3	8.4	0.19	740	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	South	103	40	0.64	9.9	0.26	40	0.64	9.9	0.26	780	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	Riparian	16	15	1.3	3.4	1.4	15	1.3	3.4	1.4	110	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	North	24	18	1.1	5.5	0.68	18	1.1	5.5	0.68	410	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	South	20	10	0.38	3.1	0.26	10	0.38	3.1	0.26	490	0	0
C9	Jackson Shoals Dam to Highway 77	Riparian	14	13	0.91	5.1	1.2	13	0.91	5.1	1.2	77	0	0
C9	Jackson Shoals Dam to Highway 77	North	21	8	0.49	5.1	0.26	8	0.49	5.1	0.26	200	0	0
C9	Jackson Shoals Dam to Highway 77	South	20	11	0.24	0.58	0.19	11	0.24	0.58	0.19	210	0	0
LAA	Lower Assessment Area	Floodplain	279	126	0.5	9.9	0.3	130	0.5	9.9	0.3	2,800	0	0
LAA	Lower Assessment Area	Riparian	66	61	1.5	9.9	1.6	61	1.5	9.9	1.6	310	0	0

1. All results are in mg/kg.
2. Results are rounded to two significant figures.

AA: assessment area
mg/kg: milligram(s) per kilogram
n: sample count
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration

Table 10-8. Summary of OU-4 Nonresidential Surface (0-1 foot) Soil PCB Data by Exposure Unit
Feasibility Study Report for OU-4
for OU-4 of Anniston PCB Site, Anniston, Alabama

									NRS-2/NRS-5				NRS-3				NRS-4			
			Current Conditions						Post Remediation of 0-6" ECO SWAC 6 PPM				Post Remediation: ECO SWAC and >50 PPM HHRA Locations in C1				Post Remediation: ECO SWAC and >50 PPM HHRA Locations			
EU	Locations	Detection	Min	Max	Mean	Mean SWAC	95% UCL SWAC	ProUCL 95% UCL	Max	Mean SWAC	95% UCL SWAC	ProUCL 95% UCL	Max	Mean SWAC	95% UCL SWAC	ProUCL 95% UCL	Max	Mean SWAC	95% UCL SWAC	ProUCL 95% UCL
C1-EU1	65	46	0.037	18	5	2.5	3.3	4.8	18	2.5	3.4	4.8	18	2.5	3.3	4.8	18	2.5	3.3	4.8
C1-EU2	33	33	0.12	210	27	25	34	40	71	8.9	12	19	34	8.7	12	14	34	8.7	12	14
C2N-EU1	38	26	0.13	73	5.5	4.7	8.9	12	73	4.7	8.9	12	73	4.7	8.8	12	17	2	3.3	3.5
C2N-EU2	35	2	0.53	2.7	1.6	0.13	0.28	0.59	2.7	0.13	0.28	0.59	2.7	0.13	0.28	0.59	2.7	0.13	0.28	0.59
C2S-EU1	22	4	0.052	0.44	0.22	0.086	0.12	0.11	0.44	0.086	0.12	0.11	0.44	0.086	0.12	0.11	0.44	0.086	0.12	0.11
C3N-EU1	62	60	0.07	90	12	14	18	32	52	10	13	13	52	10	13	13	38	5.5	6.9	8.6
C3N-EU2	18	11	0.09	71	14	11	20	26	71	9.6	18	28	71	9.6	18	28	19	3.5	6	7.3
C3S-EU1	40	15	0.081	130	28	8.9	17	26	130	8.6	16	25	130	8.6	16	25	16	0.6	1.3	2.5
C3S-EU2	29	23	0.36	69	11	7.9	13	16	54	7.1	12	14	54	7.1	12	14	30	4.1	6.7	8.9
C4N-EU1	91	65	0.043	26	4.8	2.9	3.9	4.8	26	2.8	3.8	4.6	26	2.8	3.8	4.6	26	2.8	3.8	4.6
C4N-EU2	58	27	0.046	20	3.4	1.2	1.9	2.9	20	1.2	1.9	2.9	20	1.2	1.9	2.9	20	1.2	1.9	2.9
C4S-EU1	61	53	0.042	43	9.2	7.8	9.9	11	43	7.8	10	11	43	7.8	10	11	35	6.8	8.7	8.3
C4S-EU2	45	25	0.14	13	3.7	1.2	1.8	3.2	13	1.2	1.8	3.2	13	1.2	1.8	3.2	13	1.2	1.8	3.2
C4S-EU3	40	28	0.061	16	2.9	2.2	3.2	3.4	16	2.2	3.2	3.4	16	2.2	3.2	3.4	16	2.2	3.2	3.4
C5N-EU1	12	8	0.79	9	3.8	2.9	4.4	4.1	9	2.9	4.5	4.1	9	2.9	4.5	4.1	9	2.9	4.4	4.1
C5N-EU2	115	39	0.041	9.4	1.5	0.27	0.41	0.44	9.4	0.27	0.41	0.44	9.4	0.27	0.41	0.44	9.4	0.27	0.41	0.44
C5S-EU1	101	44	0.041	20	2.5	0.63	0.93	1.8	20	0.63	0.93	1.8	20	0.63	0.94	1.8	20	0.63	0.93	1.8
C6N-EU1	23	11	0.22	7.9	2.5	1.1	1.7	1.9	7.9	1.1	1.7	1.9	7.9	1.1	1.7	1.9	7.9	1.1	1.7	1.9
C6S-EU1	24	11	0.07	16	2.8	1	2.2	4.3	16	1	2.2	4.3	16	1	2.2	4.3	16	1	2.2	4.3
C7N-EU1	91	35	0.04	5	0.63	0.18	0.27	0.59	5	0.18	0.27	0.59	5	0.18	0.27	0.59	5	0.18	0.27	0.59
C7S-EU1	103	36	0.04	9.9	1.9	0.29	0.51	0.63	9.9	0.29	0.5	0.63	9.9	0.29	0.51	0.63	9.9	0.29	0.5	0.63
C8N-EU1	24	15	0.084	8.1	2.1	0.86	1.5	2	8.1	0.86	1.5	2	8.1	0.86	1.5	2	8.1	0.86	1.5	2
C8S-EU1	20	7	0.053	3.6	0.83	0.24	0.53	1.2	3.6	0.24	0.52	1.2	3.6	0.24	0.57	1.2	3.6	0.24	0.53	1.2
C9N-EU1	29	10	0.07	4.5	1.3	0.25	0.51	1.1	4.5	0.25	0.51	1.1	4.5	0.25	0.51	1.1	4.5	0.25	0.5	1.1
C9S-EU1	21	7	0.028	0.44	0.28	0.14	0.19	0.18	0.44	0.14	0.19	0.18	0.44	0.14	0.19	0.18	0.44	0.14	0.19	0.18

1. All results in mg/kg
2. Results rounded to two significant figures

EU: exposure eunit
mg/kg: milligram(s) per kilogram
n: sample count
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: Surface-weighted average concentration

Table 10-9. Estimated Costs for Remedial Alternative NRS-2
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative NRS-2: Excavate surface soils to meet a SWAC of 6 mg/kg for the 0 to 0.5 foot horizon. Excavated soils would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is one year.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$602,000	$602,000
2	Site Preparation	LS	1	$127,300	$127,300
3	Site Facilities	MO	8	$84,200	$673,600
4	Haul Road Installation and Maintenance	LS	1	$237,300	$237,300
5	Soil Excavation	CY	57,475	$37	$2,126,600
6	Backfill	CY	38,300	$32	$1,225,600
7	Off-Site Transportation and Disposal (T&D - TSCA)	TON	60,340	$202	$12,188,700
8	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	25,860	$68	$1,758,500
9	Restoration	ACRE	71.2	$22,800	$1,623,400
10	Decontamination	LS	1	$10,900	$10,900
11	Contractor Management	MO	8	$233,500	$1,868,000
12	Demobilization	LS	1	$602,000	$602,000
13	Construction Management	MO	8	$45,600	$364,800
14	Predesign Sampling	LS	1	$300,000	$300,000
				Total Capital Costs:	$23,708,700
Administrative/Management					
15	Project Management (3% of Construction Cost)	LS	1	$292,845	$292,800
16	Engineering Design (6% of Capital Cost)	LS	1	$585,690	$585,700
				Administrative/Management Costs:	$878,500
17	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$4,917,440	$4,917,400
				Total Construction Cost (Capital Costs and Administrative/Management):	$29,504,600
Long-Term Operation, Maintenance, and Monitoring					
18	Long-Term OMM Program with 20% Contingency	Year	30	$131,000	
19	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$1,369,300	$1,369,300
				Total Estimated Cost:	$30,873,900
				Total Estimated Cost (Rounded):	$30,900,000

Acronyms:

CY: cubic yard

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative NRS-2 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) around the perimeter of targeted remediation areas and to perform clearing (as needed) within targeted construction areas. This estimate assumes that site preparations associated with the Sediment and Creek Bank options can also be used during the nonresidential floodplain work at no additional cost. This includes use of the support pads constructed during the Sediment and Creek Bank work. It is also assumed that an additional four small pads would be constructed of high-density polyethylene (HDPE) liner and crusher run material outside floodplain areas where a support pad was not previously constructed.

3. *Site Facilities*: This estimate includes site facilities and accessories needed for the duration of the work. Site facilities include office trailers, storage units, sanitary facilities, generators, and access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction equipment. This estimate assumes that the costs for installation of site facilities is included in the Sediment and Creek Bank options.

4. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel needed to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run stone. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

5. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel needed to excavate targeted floodplain soils. The cost also assumes the work will be completed at a production rate between 96 and 384 cubic yards of soil per day depending on the location of the removal and the articulated dump truck used. An excavator will load material into a dump truck for transport to a transfer station. At the transfer station, the articulated dump truck will dump material on a pad where a second excavator will load stockpiled excavated material and place it in a triaxle truck that will deliver the material to the targeted disposal facility. The excavation does not include an over-removal allowance. Contractor uptime is assumed to be 25% for the smaller dump approach and 50% for the larger dump approach due to logistical challenges including creek crossings and densely forested terrain. This estimate assumes 90% of the excavation will be conducted using the method with a production rate of 384 cubic yards of soil per day and 10% will be conducted using the method with a production rate of 96 cubic yards of soil per day.

6. *Backfill:* This estimate includes labor, materials, equipment, and fuel needed to backfill targeted floodplain soils. It is assumed that triaxle trucks from the borrow source will stockpile material on

clean support pads and a loader will load an articulated dump truck that will deliver the material to the targeted placement area where a skid-steer loader will be used to grade backfill material. The production rate is assumed to be between 280 and 400 cubic yards per day depending on the location of the backfill area and the articulated dump truck used. Backfill material will be replaced up to 2 inches below pre-construction grade with no overplacement allowance. The costs to rebuild the pads with clean material and liners after excavation are included in line item No. 2.

7. *Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of excavated soil from the targeted floodplain areas containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's Toxic Substance Control Act (TSCA) disposal facility located in Emelle, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 70% of excavated soil would be disposed as TSCA.

8. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated non-TSCA soil from the targeted floodplain areas to Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 30% of excavated soil would be disposed as non-TSCA.

9. *Restoration:* This estimate includes labor, materials, equipment, and fuel needed to restore nonresidential properties after the remediation is complete. This includes placing 2 inches of topsoil (with no overplacement allowance) in removal areas by the methods described in line item No. 6. This estimate also includes hydroseeding within removal areas at an assumed production rate of 90,000 square feet per day, tree replanting within removal areas on 50-foot centers, and disposal of support pads constructed for nonresidential soil (NRS) work at Waste Management's Emelle, Alabama, TSCA disposal facility.

10. *Decontamination:* This estimate includes labor and materials needed to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 7 days to decontaminate equipment.

11. *Contractor Management:* This estimate includes labor needed for the contractor's management of the project and includes a monthly flight allowance for the project manager, health & safety officer, project engineer, quality assurance/quality control manager, and superintendent for travel to and from the site. The estimate also includes labor and equipment needed to conduct pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff

member on-site for the entire project and a monthly flight allowance for the field staff member to travel to and from the site.

14. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials needed to perform predesign investigation sampling. This includes the labor and field equipment needed to collect four cores per acre within targeted removal areas to further delineate the project area. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

15. *Project Management*: This estimate includes labor needed to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

16. *Engineering Design*: This estimate includes the labor and fees needed to complete the remedial design.

17. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

18. Long-Term Operations, Maintenance, and Monitoring (OMM) Program: This estimate includes the assumed labor and materials needed to conduct yearly long-term monitoring. This is assumed to include a yearly in-person visual inspection of the site, associated reporting, and the consultant's project management services. This estimate also includes the assumed labor needed to manage the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy. This includes tracking the Alabama 811 system, community outreach, data management, reporting, and the consultant's project management. Both the yearly in-person visual inspection and the Alabama 811 management work include a 20% contingency.

19. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 18 over 30 years with a 7% discount factor.

Table 10-10. Summary of Pre- and Post-Remediation OU-4 Nonresidential Surface (0-0.5 feet) Soil PCB Data by Ecological Exposure Unit: NRS-3
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Reach or AA	Description	Subgroup	Samples (n)	Pre				Post				Area (acre)	Number of Detects Remediated	Area Remediated(acre)
				Number of Detects	Mean	Maximum	SWAC	Number of Detects	Mean	Maximum	SWAC			
C1	Oxford Lake Park	East	90	71	8	59	9.6	67	6	34	5.4	41	4	4
C1	Oxford Lake Park	West	6	6	53	210	64	3	2.5	11	5.5	30	3	15
C2	Backwater Area	Riparian	16	4	2.2	32	1.1	3	2.2	32	1.1	71	0	0
C2	Backwater Area	Central	35	4	0.12	1.8	0.1	4	0.12	1.8	0.1	100	0	0
C2	Backwater Area	North	38	29	2.7	32	3.2	29	2.7	32	3.2	71	0	0
C2	Backwater Area	South	20	3	0.083	0.38	0.088	3	0.083	0.38	0.088	66	0	0
C3	Friendship Road to Highway 21	Riparian	21	20	13	79	20	15	5.1	19	5.7	49	4	15
C3	Friendship Road to Highway 21	North	77	74	11	75	12	66	6.3	29	5.9	270	8	37
C3	Friendship Road to Highway 21	South	60	37	8.8	79	6.3	36	7.4	64	5.8	240	1	1.5
C4	Highway 21 to Silver Run Road	Riparian	49	46	7.5	31	6.2	45	6.8	26	5.4	140	1	3.6
C4	Highway 21 to Silver Run Road	North	147	115	3.4	38	2.9	120	3.4	38	2.9	690	0	0
C4	Highway 21 to Silver Run Road	South	145	118	5	52	3.3	120	5	52	3.3	670	0	0
UAA	Upper Assessment Area	Floodplain	522	380	5.2	79	4.4	370	4.4	64	3.5	2100	9	39
UAA	Upper Assessment Area	Riparian	86	70	7.9	79	7.4	63	5.5	32	4.3	260	5	19
C5	Silver Run Road to Mitchell Matson Road	Riparian	56	50	2.1	16	1.9	50	2.1	16	1.9	150	0	0
C5	Silver Run Road to Mitchell Matson Road	North	127	68	0.76	9.4	0.51	68	0.76	9.4	0.51	680	0	0
C5	Silver Run Road to Mitchell Matson Road	South	101	52	1	16	0.71	52	1	16	0.71	510	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	Riparian	27	22	1.5	10	1.7	22	1.5	10	1.7	98	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	North	23	16	1.2	5.2	1.1	16	1.2	5.2	1.1	130	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	South	24	15	1.2	10	0.98	15	1.2	10	0.98	150	0	0
MAA	Middle Assessment Area	Floodplain	275	151	0.93	16	0.68	150	0.93	16	0.68	1500	0	0
MAA	Middle Assessment Area	Riparian	83	72	1.9	16	1.8	72	1.9	16	1.8	250	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	Riparian	36	33	1.8	9.9	1.9	33	1.8	9.9	1.9	130	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	North	91	39	0.3	8.4	0.19	39	0.3	8.4	0.19	740	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	South	103	40	0.64	9.9	0.26	40	0.64	9.9	0.26	780	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	Riparian	16	15	1.3	3.4	1.4	15	1.3	3.4	1.4	110	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	North	24	18	1.1	5.5	0.68	18	1.1	5.5	0.68	410	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	South	20	10	0.38	3.1	0.26	10	0.38	3.1	0.26	490	0	0
C9	Jackson Shoals Dam to Highway 77	Riparian	14	13	0.91	5.1	1.2	13	0.91	5.1	1.2	77	0	0
C9	Jackson Shoals Dam to Highway 77	North	21	8	0.49	5.1	0.26	8	0.49	5.1	0.26	200	0	0
C9	Jackson Shoals Dam to Highway 77	South	20	11	0.24	0.58	0.19	11	0.24	0.58	0.19	210	0	0
LAA	Lower Assessment Area	Floodplain	279	126	0.5	9.9	0.3	130	0.5	9.9	0.3	2800	0	0
LAA	Lower Assessment Area	Riparian	66	61	1.5	9.9	1.6	61	1.5	9.9	1.6	310	0	0

1. All results in mg/kg
2. Results rounded to two significant figures

AA: assessment area
mg/kg: milligram(s) per kilogram
n: sample count
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: Surface-weighted average concentration

Table 10-11. Estimated Costs for Remedial Alternative NRS-3
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative NRS-3: Excavate surface soils to achieve a 6 mg/kg SWAC for the ecological exposure units and excavate surface soils with PCB concentrations greater than or equal to 50 mg/kg in the upper 1-foot in Oxford Lake Park. Excavated soils would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is one and a half years.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$721,000	$721,000
2	Site Preparation	LS	1	$127,300	$127,300
3	Site Facilities	MO	9	$84,200	$757,800
4	Haul Road Installation and Maintenance	LS	1	$237,300	$237,300
5	Soil Excavation	CY	73,345	$37	$2,713,800
6	Backfill	CY	54,100	$32	$1,731,200
7	Off-Site Transportation and Disposal (T&D - TSCA)	TON	77,000	$202	$15,554,000
8	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	33,000	$68	$2,244,000
9	Restoration	ACRE	71.6	$22,800	$1,632,500
10	Decontamination	LS	1	$10,900	$10,900
11	Contractor Management	MO	9	$233,500	$2,101,500
12	Demobilization	LS	1	$721,000	$721,000
13	Construction Management	MO	9	$45,600	$410,400
14	Predesign Sampling	LS	1	$300,000	$300,000
				Total Capital Costs:	$29,262,700
Administrative/Management					
15	Project Management (3% of Construction Cost)	LS	1	$343,941	$343,900
16	Engineering Design (6% of Capital Cost)	LS	1	$687,882	$687,900
				Administrative/Management Costs:	$1,031,800
17	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$6,058,900	$6,058,900
				Total Construction Cost (Capital Costs and Administrative/Management):	$36,353,400
Long-Term Operation, Maintenance, and Monitoring					
18	Long-Term OMM Program with 20% Contingency	Year	30	$131,000	
19	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$1,369,300	$1,369,300
				Total Estimated Cost:	$37,722,700
				Total Estimated Cost (Rounded):	$37,700,000

Acronyms:

CY: cubic yard

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative NRS-3 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) around the perimeter of targeted remediation areas and to perform clearing (as needed) within targeted construction areas. This estimate assumes that site preparations associated with the Sediment and Creek Bank options can also be used during the nonresidential floodplain work at no additional cost. This includes use of the support pads constructed during the Sediment and Creek Bank work. It is also assumed that an additional four small pads would be constructed of high-density polyethylene (HDPE) liner and crusher run material outside floodplain areas where a support pad was not previously constructed.

3. *Site Facilities*: This estimate includes site facilities and accessories needed for the duration of the work. Site facilities include office trailers, storage units, sanitary facilities, generators, and access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction equipment. This estimate assumes that the costs for installation of site facilities is included in the Sediment and Creek Bank options.

4. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel needed to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run stone. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

5. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel needed to excavate targeted floodplain soils. The cost also assumes the work will be completed at a production rate between 96 and 384 cubic yards of soil per day depending on the location of the removal and the articulated dump truck used. An excavator will load material into a dump truck for transport to a transfer station. At the transfer station, the articulated dump truck will dump material on a pad where a second excavator will load stockpiled excavated material and place it in a triaxle truck that will deliver the material to the targeted disposal facility. The excavation does not include an over-removal allowance. Contractor uptime is assumed to be 25% for the smaller dump approach and 50% for the larger dump approach due to logistical challenges including creek crossings and densely forested terrain. This estimate assumes 90% of the excavation will be conducted using the method with a production rate of 384 cubic yards of soil per day and 10% will be conducted using the method with a production rate of 96 cubic yards of soil per day.

6. *Backfill:* This estimate includes labor, materials, equipment, and fuel needed to backfill targeted floodplain soils. It is assumed that triaxle trucks from the borrow source will stockpile material on

clean support pads and a loader will load an articulated dump truck that will deliver the material to the targeted placement area where a skid-steer loader will be used to grade backfill material. The production rate is assumed to be between 280 and 400 cubic yards per day depending on the location of the backfill area and the articulated dump truck used. Backfill material will be replaced up to 2 inches below pre-construction grade with no overplacement allowance. The costs to rebuild the pads with clean material and liners after excavation are included in line item No. 2.

7. *Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of excavated soil from the targeted floodplain areas containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's Toxic Substance Control Act (TSCA) disposal facility located in Emelle, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 70% of excavated soil would be disposed as TSCA.

8. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated non-TSCA soil from the targeted floodplain areas to Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 30% of excavated soil would be disposed as non-TSCA.

9. *Restoration:* This estimate includes labor, materials, equipment, and fuel needed to restore nonresidential properties after the remediation is complete. This includes placing 2 inches of topsoil (with no overplacement allowance) in removal areas by the methods described in line item No. 6. This estimate also includes hydroseeding within removal areas at an assumed production rate of 90,000 square feet per day, tree replanting within removal areas on 50-foot centers, and disposal of support pads constructed for nonresidential soil (NRS) work at Waste Management's Emelle, Alabama, TSCA disposal facility.

10. *Decontamination:* This estimate includes labor and materials needed to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 7 days to decontaminate equipment.

11. *Contractor Management:* This estimate includes labor needed for the contractor's management of the project and includes a monthly flight allowance for the project manager, health & safety officer, project engineer, quality assurance/quality control manager, and superintendent for travel to and from the site. The estimate also includes labor and equipment needed to conduct pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff

member on-site for the entire project and a monthly flight allowance for the field staff member to travel to and from the site.

14. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials needed to perform predesign investigation sampling. This includes the labor and field equipment needed to collect four cores per acre within targeted removal areas to further delineate the project area. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

15. *Project Management*: This estimate includes labor needed to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

16. *Engineering Design*: This estimate includes the labor and fees needed to complete the remedial design.

17. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

18. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials needed to conduct yearly long-term monitoring. This is assumed to include a yearly in-person visual inspection of the site, associated reporting, and the consultant's project management services. This estimate also includes the assumed labor needed to manage the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy. This includes tracking the Alabama 811 system, community outreach, data management, reporting, and the consultant's project management. Both the yearly in-person visual inspection and the Alabama 811 management work include a 20% contingency.

19. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 18 over 30 years with a 7% discount factor.

Table 10-12. Summary of Pre- and Post-Remediation OU-4 Nonresidential Surface (0-0.5 feet) Soil PCB Data by Ecological Exposure Unit: NRS-4
Feasibility Study Report for OU-4
of the Anniston PCB Site, Anniston, Alabama

Reach or AA	Description	Subgroup	Samples (n)	Pre				Post				Area (acre)	Number of Detects Remediated	Area Remediated(acre)
				Number of Detects	Mean	Maximum	SWAC	Number of Detects	Mean	Maximum	SWAC			
C1	Oxford Lake Park	East	90	71	8	59	9.6	67	6	34	5.4	41	4	4
C1	Oxford Lake Park	West	6	6	53	210	64	3	2.5	11	5.5	30	3	15
C2	Backwater Area	Riparian	16	4	2.2	32	1.1	3	0.19	1.8	0.18	71	1	2.1
C2	Backwater Area	Central	35	4	0.12	1.8	0.1	4	0.12	1.8	0.1	100	0	0
C2	Backwater Area	North	38	29	2.7	32	3.2	28	1.9	14	2	71	1	2.6
C2	Backwater Area	South	20	3	0.083	0.38	0.088	3	0.083	0.38	0.088	66	0	0
C3	Friendship Road to Highway 21	Riparian	21	20	13	79	20	15	4.3	17	4.3	49	5	19
C3	Friendship Road to Highway 21	North	77	74	11	75	12	64	5.7	27	5.1	270	10	46
C3	Friendship Road to Highway 21	South	60	37	8.8	79	6.3	31	3.4	39	1.9	240	6	20
C4	Highway 21 to Silver Run Road	Riparian	49	46	7.5	31	6.2	45	6.8	26	5.4	140	1	3.6
C4	Highway 21 to Silver Run Road	North	147	115	3.4	38	2.9	120	3.4	38	2.9	690	0	0
C4	Highway 21 to Silver Run Road	South	145	118	5	52	3.3	120	4.5	35	3.1	670	3	3.4
UAA	Upper Assessment Area	Floodplain	522	380	5.2	79	4.4	360	3.6	39	2.9	2100	20	72
UAA	Upper Assessment Area	Riparian	86	70	7.9	79	7.4	63	5	26	3.8	260	7	24
C5	Silver Run Road to Mitchell Matson Road	Riparian	56	50	2.1	16	1.9	50	2.1	16	1.9	150	0	0
C5	Silver Run Road to Mitchell Matson Road	North	127	68	0.76	9.4	0.51	68	0.76	9.4	0.51	680	0	0
C5	Silver Run Road to Mitchell Matson Road	South	101	52	1	16	0.71	52	1	16	0.71	510	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	Riparian	27	22	1.5	10	1.7	22	1.5	10	1.7	98	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	North	23	16	1.2	5.2	1.1	16	1.2	5.2	1.1	130	0	0
C6	Mitchell Matson Road to 2,000 feet upstream of Curry Station Road	South	24	15	1.2	10	0.98	15	1.2	10	0.98	150	0	0
MAA	Middle Assessment Area	Floodplain	275	151	0.93	16	0.68	150	0.93	16	0.68	1500	0	0
MAA	Middle Assessment Area	Riparian	83	72	1.9	16	1.8	72	1.9	16	1.8	250	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	Riparian	36	33	1.8	9.9	1.9	33	1.8	9.9	1.9	130	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	North	91	39	0.3	8.4	0.19	39	0.3	8.4	0.19	740	0	0
C7	Upstream of Curry Station Road to Eastaboga Creek	South	103	40	0.64	9.9	0.26	40	0.64	9.9	0.26	780	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	Riparian	16	15	1.3	3.4	1.4	15	1.3	3.4	1.4	110	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	North	24	18	1.1	5.5	0.68	18	1.1	5.5	0.68	410	0	0
C8	Eastaboga Creek to Jackson Shoals Dam	South	20	10	0.38	3.1	0.26	10	0.38	3.1	0.26	490	0	0
C9	Jackson Shoals Dam to Highway 77	Riparian	14	13	0.91	5.1	1.2	13	0.91	5.1	1.2	77	0	0
C9	Jackson Shoals Dam to Highway 77	North	21	8	0.49	5.1	0.26	8	0.49	5.1	0.26	200	0	0
C9	Jackson Shoals Dam to Highway 77	South	20	11	0.24	0.58	0.19	11	0.24	0.58	0.19	210	0	0
LAA	Lower Assessment Area	Floodplain	279	126	0.5	9.9	0.3	130	0.5	9.9	0.3	2800	0	0
LAA	Lower Assessment Area	Riparian	66	61	1.5	9.9	1.6	61	1.5	9.9	1.6	310	0	0

1. All results in mg/kg
2. Results rounded to two significant figures

AA: assessment area
mg/kg: milligram(s) per kilogram
n: sample count
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: Surface-weighted average concentration

Table 10-13. Estimated Costs for Remedial Alternative NRS-4
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative NRS-4: Excavate surface soils to achieve a 6 mg/kg SWAC for the ecological exposure units and excavate surface soils with PCB concentrations greater than or equal to 50 mg/kg in the upper 1-foot of Operable Unit 4 to streamline future soil management support activities and also lower PCB exposure point concentrations for potential future agricultural exposure scenarios. Excavated soils would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is one and a half years.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$1,311,000	$1,311,000
2	Site Preparation	LS	1	$127,300	$127,300
3	Site Facilities	MO	16	$84,200	$1,347,200
4	Haul Road Installation and Maintenance	LS	1	$237,300	$237,300
5	Soil Excavation	CY	143,801	$37	$5,320,600
6	Backfill	CY	116,000	$32	$3,712,000
7	Off-Site Transportation and Disposal (T&D - TSCA)	TON	150,990	$202	$30,500,000
8	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	64,710	$68	$4,400,300
9	Restoration	ACRE	103.3	$22,800	$2,355,200
10	Decontamination	LS	1	$10,900	$10,900
11	Contractor Management	MO	16	$233,500	$3,736,000
12	Demobilization	LS	1	$1,311,000	$1,311,000
13	Construction Management	MO	16	$45,600	$729,600
14	Predesign Sampling	LS	1	$300,000	$300,000
				Total Capital Costs:	$55,398,400
Administrative/Management					
15	Project Management (3% of Construction Cost)	LS	1	$614,943	$614,900
16	Engineering Design (6% of Capital Cost)	LS	1	$1,229,886	$1,229,900
				Administrative/Management Costs:	$1,844,800
17	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$11,448,640	$11,448,600
				Total Construction Cost (Capital Costs and Administrative/Management):	$68,691,800
Long-Term Operation, Maintenance, and Monitoring					
18	Long-Term OMM Program with 20% Contingency	Year	30	$131,000	
19	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$1,369,300	$1,369,300
				Total Estimated Cost:	$70,061,100
				Total Estimated Cost (Rounded):	$70,100,000

Acronyms:

CY: cubic yard

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative NRS-4 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) around the perimeter of targeted remediation areas and to perform clearing (as needed) within targeted construction areas. This estimate assumes that site preparations associated with the Sediment and Creek Bank options can also be used during the nonresidential floodplain work at no additional cost. This includes use of the support pads constructed during the Sediment and Creek Bank work. It is also assumed that an additional four small pads would be constructed of high-density polyethylene (HDPE) liner and crusher run material outside floodplain areas where a support pad was not previously constructed.

3. *Site Facilities*: This estimate includes site facilities and accessories needed for the duration of the work. Site facilities include office trailers, storage units, sanitary facilities, generators, and access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction equipment. This estimate assumes that the costs for installation of site facilities is included in the Sediment and Creek Bank options.

4. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel needed to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run stone. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

5. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel needed to excavate targeted floodplain soils. The cost also assumes the work will be completed at a production rate between 96 and 384 cubic yards of soil per day depending on the location of the removal and the articulated dump truck used. An excavator will load material into a dump truck for transport to a transfer station. At the transfer station, the articulated dump truck will dump material on a pad where a second excavator will load stockpiled excavated material and place it in a triaxle truck that will deliver the material to the targeted disposal facility. The excavation does not include an over-removal allowance. Contractor uptime is assumed to be 25% for the smaller dump approach and 50% for the larger dump approach due to logistical challenges including creek crossings and densely forested terrain. This estimate assumes 90% of the excavation will be conducted using the method with a production rate of 384 cubic yards of soil per day and 10% will be conducted using the method with a production rate of 96 cubic yards of soil per day.

6. *Backfill:* This estimate includes labor, materials, equipment, and fuel needed to backfill targeted floodplain soils. It is assumed that triaxle trucks from the borrow source will stockpile material on

clean support pads and a loader will load an articulated dump truck that will deliver the material to the targeted placement area where a skid-steer loader will be used to grade backfill material. The production rate is assumed to be between 280 and 400 cubic yards per day depending on the location of the backfill area and the articulated dump truck used. Backfill material will be replaced up to 2 inches below pre-construction grade with no overplacement allowance. The costs to rebuild the pads with clean material and liners after excavation are included in line item No. 2.

7. *Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of excavated soil from the targeted floodplain areas containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's Toxic Substance Control Act (TSCA) disposal facility located in Emelle, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 70% of excavated soil would be disposed as TSCA.

8. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated non-TSCA soil from the targeted floodplain areas to Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 30% of excavated soil would be disposed as non-TSCA.

9. *Restoration:* This estimate includes labor, materials, equipment, and fuel needed to restore nonresidential properties after the remediation is complete. This includes placing 2 inches of topsoil (with no overplacement allowance) in removal areas by the methods described in line item No. 6. This estimate also includes hydroseeding within removal areas at an assumed production rate of 90,000 square feet per day, tree replanting within removal areas on 50-foot centers, and disposal of support pads constructed for nonresidential soil (NRS) work at Waste Management's Emelle, Alabama, TSCA disposal facility.

10. *Decontamination:* This estimate includes labor and materials needed to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 7 days to decontaminate equipment.

11. *Contractor Management:* This estimate includes labor needed for the contractor's management of the project and includes a monthly flight allowance for the project manager, health & safety officer, project engineer, quality assurance/quality control manager, and superintendent for travel to and from the site. The estimate also includes labor and equipment needed to conduct pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff

member on-site for the entire project and a monthly flight allowance for the field staff member to travel to and from the site.

14. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials needed to perform predesign investigation sampling. This includes the labor and field equipment needed to collect four cores per acre within targeted removal areas to further delineate the project area. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

15. *Project Management*: This estimate includes labor needed to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

16. *Engineering Design*: This estimate includes the labor and fees needed to complete the remedial design.

17. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

18. Long-Term Operations, Maintenance, and Monitoring (OMM) Program: This estimate includes the assumed labor and materials needed to conduct yearly long-term monitoring. This is assumed to include a yearly in-person visual inspection of the site, associated reporting, and the consultant's project management services. This estimate also includes the assumed labor needed to manage the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy. This includes tracking the Alabama 811 system, community outreach, data management, reporting, and the consultant's project management. Both the yearly in-person visual inspection and the Alabama 811 management work include a 20% contingency.

19. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 18 over 30 years with a 7% discount factor.

Table 10-14. Estimated Costs for Remedial Alternative NRS-5
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative NRS-5: Excavate surface soils to meet a SWAC of 6 mg/kg for the 0 to 0.5 foot horizon and remove all material with PCB concentrations greater than 50 mg/kg from the 0 to 4 foot horizon. Excavated soils would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is three years.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$2,631,000	$2,631,000
2	Site Preparation	LS	1	$244,900	$244,900
3	Site Facilities	MO	32	$84,200	$2,694,400
4	Haul Road Installation and Maintenance	LS	1	$456,600	$456,600
5	Soil Excavation	CY	303,533	$37	$11,230,700
6	Backfill	CY	266,700	$32	$8,534,400
7	Off-Site Transportation and Disposal (T&D - TSCA)	TON	429,440	$202	$86,746,900
8	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	25,860	$68	$1,758,500
9	Restoration	ACRE	137	$22,800	$3,123,600
10	Decontamination	LS	1	$21,000	$21,000
11	Contractor Management	MO	32	$233,500	$7,472,000
12	Demobilization	LS	1	$2,631,000	$2,631,000
13	Construction Management	MO	32	$45,600	$1,459,200
14	Predesign Sampling	LS	1	$600,000	$600,000
				Total Capital Costs:	$129,604,200
Administrative/Management					
15	Project Management (3% of Construction Cost)	LS	1	$1,232,964	$1,233,000
16	Engineering Design (6% of Capital Cost)	LS	1	$2,465,928	$2,465,900
				Administrative/Management Costs:	$3,698,900
17	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$26,660,620	$26,660,600
				Total Construction Cost (Capital Costs and Administrative/Management):	$159,963,700
Long-Term Operation, Maintenance, and Monitoring					
18	Long-Term OMM Program with 20% Contingency	Year	30	$131,000	
19	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$1,369,300	$1,369,300
				Total Estimated Cost:	$161,333,000
				Total Estimated Cost (Rounded):	$161,300,000

Acronyms:

CY: cubic yard

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative NRS-5 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) around the perimeter of targeted remediation areas and to perform clearing (as needed) within targeted construction areas. This estimate assumes that site preparations associated with the Sediment and Creek Bank options can also be used during the nonresidential floodplain work at no additional cost. This includes use of the support pads constructed during the Sediment and Creek Bank work. It is also assumed that additional pads would be constructed of high-density polyethylene (HDPE) liner and crusher run material outside floodplain areas where a support pad was not previously constructed.

3. *Site Facilities*: This estimate includes site facilities and accessories needed for the duration of the work. Site facilities include office trailers, storage units, sanitary facilities, generators, and access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction equipment. This estimate assumes that the costs for installation of site facilities is included in the Sediment and Creek Bank options.

4. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel needed to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run stone. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

5. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel needed to excavate targeted floodplain soils to achieve a surface-weighted average concentration (SWAC) for polychlorinated biphenyls (PCBs) of 6 milligrams/kilogram (mg/kg) in the 0-to-0.5-foot horizon and excavate remaining floodplain soils with PCB concentrations greater than 50 mg/kg in the 0-to-4-foot horizon. The cost also assumes the work will be completed at a production rate between 96 and 384 cubic yards of soil per day depending on the location of the removal and the articulated dump truck used. An excavator will load material into a dump truck for transport to a transfer station. At the transfer station, the articulated dump truck will dump material on a pad where a second excavator will load stockpiled excavated material and place it in a triaxle truck that will deliver the material to the targeted disposal facility. The excavation does not include an over-removal allowance. Contractor uptime is assumed to be 25% for the smaller dump approach and 50% for the larger dump approach due to logistical challenges including creek crossings and densely forested terrain. This estimate assumes 90% of the excavation will be conducted using the method with a production rate of 384 cubic yards of soil per day and 10% will be conducted using the method with a production rate of 96 cubic yards of soil per day.

6. *Backfill:* This estimate includes labor, materials, equipment, and fuel needed to backfill targeted floodplain excavations. It is assumed that triaxle trucks from the borrow source will stockpile material on nearby clean support pads and a loader will load an articulated dump truck that will deliver the material to the targeted placement area where a skid-steer loader will be used to grade backfill material. The production rate is assumed to be between 280 and 400 cubic yards per day depending on the location of the backfill area and the articulated dump truck used. Backfill material will be replaced up to 2 inches below pre-construction grade with no overplacement allowance. The costs to rebuild the support pads with clean material and liners after excavation are included in line item No. 2.

7. *Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of excavated soil from the targeted floodplain areas containing PCBs greater than or equal to 50 mg/kg at Waste Management's Toxic Substance Control Act (TSCA) disposal facility located in Emelle, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 70% of excavated soil associated with achieving a SWAC for PCBs in the 0-to-0.5-foot horizon of 6 mg/kg would be disposed as TSCA as well as the remaining excavated soil associated with PCB concentrations greater than 50 mg/kg in the 0-to-4-foot horizon.

8. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated soil with PCBs less than 50 mg/kg from the targeted floodplain areas to Advanced Disposal's Three Corners Regional disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 30% of excavated soil associated with achieving a SWAC for PCBs in the 0-to-0.5-foot horizon of 6 mg/kg would be disposed under this line item.

9. *Restoration:* This estimate includes labor, materials, equipment, and fuel needed to restore nonresidential properties after the remediation is complete. This includes placing 2 inches of topsoil (with no overplacement allowance) in removal areas by the methods described in line item No. 6. This estimate also includes hydroseeding within removal areas at an assumed production rate of 90,000 square feet per day, tree replanting within removal areas on 50-foot centers, and disposal of support pads constructed for nonresidential soil (NRS) work at Waste Management's Emelle, Alabama, TSCA disposal facility.

10. *Decontamination:* This estimate includes labor and materials needed to decontaminate equipment used to remove and handle impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the potentially impacted material. It is also assumed that a laborer will need 14 days to decontaminate equipment over the course of the project.

11. *Contractor Management:* This estimate includes labor needed for the contractor's management of the project and includes a monthly flight allowance for the project manager, health & safety officer, project engineer, quality assurance/quality control manager, and superintendent for travel to and from the site. The estimate also includes labor and equipment needed to conduct pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project and a monthly flight allowance for the field staff member to travel to and from the site.

14. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials needed to perform predesign investigation sampling. This includes the labor and field equipment needed to collect four cores per acre within targeted removal areas to further delineate the project area. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

15. *Project Management*: This estimate assumes 3% of the total capital costs for labor and fees to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

16. *Engineering Design*: This estimate assumes 6% of the total capital costs for labor and fees to complete the remedial design.

17. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

18. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials needed to conduct yearly long-term monitoring. This is assumed to include a yearly in-person visual inspection of the site, associated reporting, and the consultant's project management services. This estimate also includes the assumed labor needed to manage the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy. This includes tracking the Alabama 811 system, community outreach, data management, reporting, and the consultant's project management. Both the yearly in-person visual inspection and the Alabama 811 management work include a 20% contingency.

19. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 18 over 30 years with a 7% discount factor.

Table 10-15. Estimated Costs for Remedial Alternative SED-2
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative SED-2: Polychlorinated biphenyl (PCB) source control through addressing targeted severe and moderate creek bank areas through a range of actions, including stabilization with shoreline hardening techniques. Dredging sediment from the high-energy target areas, transporting the dredged sediment to a materials processing area, dewatering, and transporting to a licensed off-site disposal facility (i.e., landfill). In-place sediment treatment through the placement of activated carbon on the sediment's surface in low-energy portions of the backwater area. A layer of backfill up to 12 inches thick would be placed in the high-energy areas once sediment removal is complete. Monitored natural recovery (MNR) to achieve the preliminary remedial goals (PRGs) over the long term, including remedy metrics monitoring and long-term monitoring of treatment effectiveness.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$735,000	$735,000
2	Site Preparation	LS	1	$107,700	$107,700
3	Clearing	LS	1	$38,100	$38,100
4	Site Facilities	MO	9	$127,600	$1,148,400
5	Haul Road Installation and Maintenance	LS	1	$1,118,100	$1,118,100
6	Staging Area Construction	LS	1	$317,300	$317,300
7	Support Pad Construction	LS	1	$363,100	$363,100
8	Dredging	CY	37,600	$46	$1,729,600
9	Sediment Processing and Loading	CY	37,600	$8	$300,800
10	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - TSCA)	TON	27,900	$202	$5,635,800
11	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	39,200	$68	$2,665,600
12	Water Treatment	MO	7	$81,100	$567,700
13	Backfill	CY	33,800	$65	$2,197,000
14	In-place treatment in low energy area	ACRE	4.1	$310,700	$1,273,900
15	Creek Bank Stabilization (not including transport and disposal)	LF	17,100	$55	$940,500
16	Restoration	ACRE	2.5	$103,500	$258,800
17	Decontamination	LS	1	$140,400	$140,400
18	Contractor Management	MO	9	$297,700	$2,679,300
19	Demobilization	LS	1	$735,000	$735,000
20	Construction Management	MO	9	$45,600	$410,400
21	Predesign Sampling	LS	1	$1,502,000	$1,502,000
				Total Capital Costs:	$24,864,500
Administrative/Management					
22	Project Management (3% of Construction Cost)	LS	1	$496,893	$496,900
23	Engineering Design (6% of Capital Cost)	LS	1	$993,786	$993,800
				Administrative/Management Costs:	$1,490,700
24	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$5,271,040	$5,271,000
				Total Construction Cost (Capital Costs and Administrative/Management):	$31,626,200
Long-Term Operation, Maintenance, and Monitoring					
25	Long-Term OMM program with 20% contingency annual costs (see notes for additional details)				
26	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$11,991,200	$11,991,200
				Total Estimated Cost:	$43,617,400
				Total Estimated Cost (Rounded):	$43,600,000

Acronyms:

CY: cubic yard

LF: linear foot

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative SED-2 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials to complete the work as described above. The mobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel to install temporary concrete culverts across Choccolocco Creek.

3. *Clearing:* This estimate includes labor, materials, equipment, and fuel to perform clearing (as needed) within targeted construction work areas. It is anticipated that approximately 38 acres of land will need to be cleared.

4. *Site Facilities*: This estimate includes site facilities and accessories for the duration of the work. Site facilities include all office trailers, storage units, sanitary facilities, light towers, and generators as well as access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction-related equipment.

5. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

6. *Staging Area Construction:* This estimate includes labor, materials, equipment, and fuel to construct a temporary Staging Area. The Staging Area will be a 1-acre area that includes a perimeter silt fence and a chain link security fence. A SPA of 0.25 acre will be located within the Staging Area footprint and consist of a high-density polyethylene (HDPE) liner overlain with crusher run stone and asphalt paving. Six dewatering bins, separated by bin blocks, will be constructed within the SPA. An additional 0.25 acre will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run which will contain approximately 1,200 feet of geotextile tubes (geotubes) for use for water treatment with a polymer used to assist with the dewatering process, a sump, and a water treatment system (see line item No. 12). The remaining 0.5 acre of the Staging Area will consist of nonwoven geotextile overlain with a 3-inch-thick layer of crusher run. This portion of the staging area will remain separate from the dredge material side of the staging area and will be used to stockpile clean materials as well as stage office trailers and parking.

7. *Support Pad Construction:* This estimate includes labor, materials, equipment, and fuel to install eight support pads used for construction operations. Each 0.5-acre support pad will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run and will have a bermed perimeter and a silt fence. A sump will be installed to collect water as dredged material passively dewaters on the support pad. It is assumed a vacuum truck (included in line item No. 12) will collect this water and transport it

to the main staging area for treatment. A portion of each support pad will remain separated from dredging activities to allow space to stockpile clean backfill and topsoil material.

8. *Dredging:* This estimate includes labor, materials, equipment, and fuel to dredge targeted sediment from Choccolocco Creek. The dredging approach used will depend on the width of the creek. Where all the sediment can be accessed from the creek bank, dredging will be conducted from the edge of the bank or the edge of the water. Where the creek is too wide to reach all targeted sediment from the edge of the bank or water, stone projections (fingers) will be constructed from the edge of the bank to provide access to reach the target sediment. The fingers will be constructed using crusher run overlain with crane mats. It is estimated between 40% and 60% of dredging will be conducted using fingers. The cost assumes between 220 and 360 cubic yards of sediment will be removed per day depending on the location and method of dredging. Regardless of which dredging method is used, an excavator will load the sediment into an articulated dump truck for transport to the SPA or support pad. The estimate assumes an over-dredge allowance of 3 inches. Contractor uptime is assumed to be 50% for dredging from the edge of the water and 30% for dredging from the fingers due to slowdowns associated with construction of the fingers. This line item assumes turbidity curtains will be installed downstream of the dredging operations and downstream of fingers that extend into the creek.

9. *Sediment Processing and Loading*: This estimate includes labor, materials, equipment, and fuel to process dredged material at the SPA or support pads and load it into dump trucks for off-site transportation and disposal. It is assumed that Portland cement will be added to material dredged from the low-energy backwater area of Choccolocco Creek to assist with dewatering at a dosage of 10% by weight. The Portland cement will be mixed into the dredged material with an on-site wheel loader.

10. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of dredged material containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's TSCA disposal facility located in Emelle, Alabama. This includes dredged material (and the associated Portland cement) and material excavated from the bank of Snow Creek in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

11. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (Non-TSCA):* This estimate includes the transport and disposal of dredged material at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. This includes dredged material, the material remaining after completing the channel realignment work (line item No. 14) and the material excavated from the severely damaged bank of Choccolocco Creek (as described in the Feasibility Study) in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material and new channel material are 1.5 tons per cubic yard.

12. *Water Treatment:* This estimate includes labor, materials, equipment, and fuel to operate a temporary WTP. The WTP costs assume treatment of 100 gallons of water per minute. The WTP includes three pumps, 1,000 feet of piping, a multimedia filter unit, a GAC filter unit, a bag filter unit, and three

tanks. The WTP will be operated throughout the duration of the dredging and sediment processing work, and treated water will be discharged into the creek.

13. *Backfill:* This estimate includes labor, materials, equipment, and fuel to backfill areas where sediments were removed within Choccolocco Creek. It is assumed a loader will be used to load an articulated dump truck at the SPA and the support pads that will deliver material to the targeted placement area where an excavator will place the backfill material. The backfill placement approach will be dependent on the width of the creek in the same fashion as dredging. Where all the placement area within the creek can be accessed from the edge of the bank or water, backfill will be placed from the edge of the bank or the edge of the water. Where the creek is too wide for the entire placement area to be accessed from the edge of the water, backfill placement will use the stone projections (fingers) constructed from the edge of the bank during the dredging process. The backfilling production rate is assumed to be between 250 and 420 cubic yards per day depending on the location of the backfill area and placement method. Backfill will consist of run-of-bank with a target thickness of 12 inches with no overplacement allowance.

14. *In-Place Treatment in Low-Energy Area:* This estimate includes labor, materials, equipment, and fuel to place AquaBlok in the low-energy area. It is assumed a loader will be used to load an articulated dump truck that will deliver material to the targeted placement area, where an excavator will place AquaBlok from the edge of the bank at an assumed rate of approximately 300 cubic yards per day and targeting an assumed thickness of 6 inches with no overplacement allowance.

15. *Creek Bank Stabilization:* This estimate includes labor, materials, equipment, and fuel to stabilize portions of Snow Creek and Choccolocco Creek with severe to moderate erosion. Stabilization of Snow Creek assumes the removal of bank soil necessary to cut back the bank to a 2:1 slope. It is assumed the soil will be removed using an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. Nonwoven geotextile overlaid by 1.5-foot-thick riprap stone will be placed by an excavator in the area of soil removal for stabilization of the bank. Stabilization of banks along Choccolocco Creek where severe erosion has been observed assumes the removal of a 2-foot cut of soil, 15 feet from the water edge up to the top of the creek bank. The cut area will then be graded to the existing grade at a 1:1 slope. It is assumed the soil will be removed by an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. A 2-foot-thick layer of backfill will be placed in the area of removed soil, with the exception of a 3:1 slope that extends into the waterway. The backfill material will be hydroseeded. The remaining portion of Choccolocco Creek where moderate erosion has been observed will be completed by placing forested material (from clearing operations) along the bank. This method will also include limited creek bank reshaping and hydroseeding. Excavated material transport and disposal associated with creek bank stabilization is accounted for in line items No. 10 and 11.

16. *Restoration:* This estimate includes labor, materials, equipment, and fuel to restore all staging and support pad areas. This includes removing all stone, asphalt, and geotextile materials and placing 2 inches of topsoil in all staging and support pad areas. This estimate also includes hydroseeding within staging and support pad areas at an assumed production rate of 90,000 square feet per day. And it

includes the removal, transport, and disposal of crusher run stone, geotextiles, and asphalt at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama.

17. *Decontamination:* This estimate includes labor and material to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) and a power washer (at the SPA) while the equipment is staged over an HDPE liner to contain the removed material and decontamination water. It is assumed that a laborer will need 4 days to decontaminate equipment.

18. *Contractor Management:* This estimate includes labor for the contractor's management for the project and includes a monthly allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, mechanic, and superintendent for travel to and from the site. The estimate also includes labor and equipment to conduct construction-related surveys at an assumed rate of 0.5 acre per day.

19. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials to complete the work described above. The demobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

20. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project, a water quality meter to collect water quality data related to in-water dredging and backfill, and a monthly flight allowance for the field staff member to travel to and from the site.

21. *Predesign Sampling*: This estimate includes labor, equipment, materials, laboratory-related costs, and testing to perform predesign investigation sampling. This includes the labor and field equipment needed to collect cores within targeted removal areas to further delineate the sediment and bank soils as well as costs for the associated lab analyses. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

22. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

23. *Engineering Design*: This estimate includes the labor and fees to complete the remedial design.

24. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

25. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program (Annual):* This estimate includes the assumed labor, equipment, materials, and laboratory costs to conduct long-term monitoring. This is assumed to include remedy monitoring (i.e., fish sampling, sediment sampling, surface water sampling, porewater sampling, and data evaluation and reporting) at years 0, 1, 3, 5, 10, 15, 20, 25, and 30, which equates to $1,600,000 per event (net present value of zero); floodplain and creekbank monitoring at years 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30, which equates to $367,000 per

event (net present value); fish movement study at years 0, 5, and 10, which equates to $692,000 per event (net present value); institutional controls (i.e., install and repair fish advisory signage and conduct educational outreach) at years 1, 2, 5, 10, 15, 20, and 25, which equates to $60,000 per event (net present value of zero); and engineering and consulting support at years 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, and 30, which equates to $120,000 per event (net present value of zero). All costs include 20% contingency.

26. *Present Worth of Long-Term Cost (Net Present Value):* This estimate provides the net present value for the long-term OMM program as described in line item No. 25 over 30 years with a 7% discount factor.

Table 10-16. Estimated Costs for Remedial Alternative SED-3
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative SED-3: Polychlorinated biphenyl (PCB) source control through addressing targeted creek bank areas through a range of actions, including stabilization with shoreline hardening techniques. Dredging sediment from the high-energy target areas, transporting the dredged sediment to a materials processing area, dewatering, and transporting to a licensed off-site disposal facility (i.e., landfill). In-place sediment treatment through the placement of activated carbon on the sediment's surface in low-energy portions of the backwater area. A layer of backfill up to 12 inches thick would be placed in the high-energy areas once sediment removal is complete. Monitored natural recovery (MNR) to achieve the preliminary remedial goals (PRGs) over the long term, including remedy metrics monitoring and long-term monitoring of treatment effectiveness.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$849,000	$849,000
2	Site Preparation	LS	1	$107,700	$107,700
3	Clearing	LS	1	$38,100	$38,100
4	Site Facilities	MO	12	$127,600	$1,531,200
5	Haul Road Installation and Maintenance	LS	1	$1,118,100	$1,118,100
6	Staging Area Construction	LS	1	$317,300	$317,300
7	Support Pad Construction	LS	1	$363,100	$363,100
8	Dredging	CY	37,600	$46	$1,729,600
9	Sediment Processing and Loading	CY	37,600	$8	$300,800
10	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - TSCA)	TON	27,900	$202	$5,635,800
11	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	39,200	$68	$2,665,600
12	Water Treatment	MO	7	$81,100	$567,700
13	Backfill	CY	33,800	$65	$2,197,000
14	In-place treatment in low energy area	ACRE	4.1	$310,700	$1,273,900
15	Creek Bank Stabilization (not including transport and disposal)	LF	39,800	$55	$2,189,000
16	Restoration	ACRE	2.5	$103,500	$258,800
17	Decontamination	LS	1	$140,400	$140,400
18	Contractor Management	MO	12	$297,700	$3,572,400
19	Demobilization	LS	1	$849,000	$849,000
20	Construction Management	MO	12	$45,600	$547,200
21	Predesign Sampling	LS	1	$1,502,000	$1,502,000
				Total Capital Costs:	$27,753,700
Administrative/Management					
22	Project Management (3% of Construction Cost)	LS	1	$583,569	$583,600
23	Engineering Design (6% of Capital Cost)	LS	1	$1,167,138	$1,167,100
				Administrative/Management Costs:	$1,750,700
24	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$5,900,880	$5,900,900
				Total Construction Cost (Capital Costs and Administrative/Management):	$35,405,300
Long-Term Operation, Maintenance, and Monitoring					
25	Long-Term OMM program with 20% contingency annual costs (see notes for additional details)				
26	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$11,991,200	$11,991,200
				Total Estimated Cost:	$47,396,500
				Total Estimated Cost (Rounded):	$47,400,000

Acronyms:

CY: cubic yard

LF: linear foot

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative SED-3 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials to complete the work as described above. The mobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel to install temporary concrete culverts across Choccolocco Creek.

3. *Clearing:* This estimate includes labor, materials, equipment, and fuel to perform clearing (as needed) within targeted construction work areas. It is anticipated that approximately 38 acres of land will need to be cleared.

4. *Site Facilities*: This estimate includes site facilities and accessories for the duration of the work. Site facilities include all office trailers, storage units, sanitary facilities, light towers, and generators as well as access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction-related equipment.

5. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

6. *Staging Area Construction:* This estimate includes labor, materials, equipment, and fuel to construct a temporary Staging Area. The Staging Area will be a 1-acre area that includes a perimeter silt fence and a chain link security fence. A SPA of 0.25 acre will be located within the Staging Area footprint and consist of a high-density polyethylene (HDPE) liner overlain with crusher run stone and asphalt paving. Six dewatering bins, separated by bin blocks, will be constructed within the SPA. An additional 0.25 acre will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run which will contain approximately 1,200 feet of geotextile tubes (geotubes) for use for water treatment with a polymer used to assist with the dewatering process, a sump, and a water treatment system (see line item No. 12). The remaining 0.5 acre of the Staging Area will consist of nonwoven geotextile overlain with a 3-inch-thick layer of crusher run. This portion of the staging area will remain separate from the dredge material side of the staging area and will be used to stockpile clean materials as well as stage office trailers and parking.

7. *Support Pad Construction:* This estimate includes labor, materials, equipment, and fuel to install eight support pads used for construction operations. Each 0.5-acre support pad will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run and will have a bermed perimeter and a silt fence. A sump will be installed to collect water as dredged material passively dewaters on the support pad. It is assumed a vacuum truck (included in line item No. 12) will collect this water and transport it

to the main staging area for treatment. A portion of each support pad will remain separated from dredging activities to allow space to stockpile clean backfill and topsoil material.

8. *Dredging:* This estimate includes labor, materials, equipment, and fuel to dredge targeted sediment from Choccolocco Creek. The dredging approach used will depend on the width of the creek. Where all the sediment can be accessed from the creek bank, dredging will be conducted from the edge of the bank or the edge of the water. Where the creek is too wide to reach all targeted sediment from the edge of the bank or water, stone projections (fingers) will be constructed from the edge of the bank to provide access to reach the target sediment. The fingers will be constructed using crusher run overlain with crane mats. It is estimated between 40% and 60% of dredging will be conducted using fingers. The cost assumes between 220 and 360 cubic yards of sediment will be removed per day depending on the location and method of dredging. Regardless of which dredging method is used, an excavator will load the sediment into an articulated dump truck for transport to the SPA or support pad. The estimate assumes an over-dredge allowance of 3 inches. Contractor uptime is assumed to be 50% for dredging from the edge of the water and 30% for dredging from the fingers due to slowdowns associated with construction of the fingers. This line item assumes turbidity curtains will be installed downstream of the dredging operations and downstream of fingers that extend into the creek.

9. *Sediment Processing and Loading*: This estimate includes labor, materials, equipment, and fuel to process dredged material at the SPA or support pads and load it into dump trucks for off-site transportation and disposal. It is assumed that Portland cement will be added to material dredged from the low-energy backwater area of Choccolocco Creek to assist with dewatering at a dosage of 10% by weight. The Portland cement will be mixed into the dredged material with an on-site wheel loader.

10. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of dredged material containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's TSCA disposal facility located in Emelle, Alabama. This includes dredged material (and the associated Portland cement) and material excavated from the bank of Snow Creek in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

11. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (Non-TSCA):* This estimate includes the transport and disposal of dredged material at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. This includes dredged material, the material remaining after completing the channel realignment work (line item No. 14) and the material excavated from the severely damaged bank of Choccolocco Creek (as described in the Feasibility Study) in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material and new channel material are 1.5 tons per cubic yard.

12. *Water Treatment:* This estimate includes labor, materials, equipment, and fuel to operate a temporary WTP. The WTP costs assume treatment of 100 gallons of water per minute. The WTP includes three pumps, 1,000 feet of piping, a multimedia filter unit, a GAC filter unit, a bag filter unit, and three

tanks. The WTP will be operated throughout the duration of the dredging and sediment processing work, and treated water will be discharged into the creek.

13. *Backfill:* This estimate includes labor, materials, equipment, and fuel to backfill areas where sediments were removed within Choccolocco Creek. It is assumed a loader will be used to load an articulated dump truck at the SPA and the support pads that will deliver material to the targeted placement area where an excavator will place the backfill material. The backfill placement approach will be dependent on the width of the creek in the same fashion as dredging. Where all the placement area within the creek can be accessed from the edge of the bank or water, backfill will be placed from the edge of the bank or the edge of the water. Where the creek is too wide for the entire placement area to be accessed from the edge of the water, backfill placement will use the stone projections (fingers) constructed from the edge of the bank during the dredging process. The backfilling production rate is assumed to be between 250 and 420 cubic yards per day depending on the location of the backfill area and placement method. Backfill will consist of run-of-bank with a target thickness of 12 inches with no overplacement allowance.

14. *In-Place Treatment in Low-Energy Area:* This estimate includes labor, materials, equipment, and fuel to place AquaBlok in the low-energy area. It is assumed a loader will be used to load an articulated dump truck that will deliver material to the targeted placement area, where an excavator will place AquaBlok from the edge of the bank at an assumed rate of approximately 300 cubic yards per day and targeting an assumed thickness of 6 inches with no overplacement allowance.

15. *Creek Bank Stabilization:* This estimate includes labor, materials, equipment, and fuel to stabilize portions of Snow Creek and Choccolocco Creek with severe to minor erosion. Stabilization of Snow Creek assumes the removal of bank soil necessary to cut back the bank to a 2:1 slope. It is assumed the soil will be removed using an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. Nonwoven geotextile overlaid by 1.5-foot-thick riprap stone will be placed by an excavator in the area of soil removal for stabilization of the bank. Stabilization of banks along Choccolocco Creek where severe erosion has been observed assumes the removal of a 2-foot cut of soil, 15 feet from the water edge up to the top of the creek bank. The cut area will then be graded to the existing grade at a 1:1 slope. It is assumed the soil will be removed by an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. A 2-foot-thick layer of backfill will be placed in the area of removed soil, with the exception of a 3:1 slope that extends into the waterway. The backfill material will be hydroseeded. The remaining portion of Choccolocco Creek where moderate and minor erosion have been observed will be completed by placing forested material (from clearing operations) along the bank. This method will also include limited creek bank reshaping and hydroseeding. Excavated material transport and disposal associated with creek bank stabilization is accounted for in line items No. 10 and 11.

16. *Restoration:* This estimate includes labor, materials, equipment, and fuel to restore all staging and support pad areas. This includes removing all stone, asphalt, and geotextile materials and placing 2 inches of topsoil in all staging and support pad areas. This estimate also includes hydroseeding within staging and support pad areas at an assumed production rate of 90,000 square feet per day. And it

includes the removal, transport, and disposal of crusher run stone, geotextiles, and asphalt at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama.

17. *Decontamination:* This estimate includes labor and material to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) and a power washer (at the SPA) while the equipment is staged over an HDPE liner to contain the removed material and decontamination water. It is assumed that a laborer will need 4 days to decontaminate equipment.

18. *Contractor Management:* This estimate includes labor for the contractor's management for the project and includes a monthly allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, mechanic, and superintendent for travel to and from the site. The estimate also includes labor and equipment to conduct construction-related surveys at an assumed rate of 0.5 acre per day.

19. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials to complete the work described above. The demobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

20. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project, a water quality meter to collect water quality data related to in-water dredging and backfill, and a monthly flight allowance for the field staff member to travel to and from the site.

21. *Predesign Sampling*: This estimate includes labor, equipment, materials, laboratory-related costs, and testing to perform predesign investigation sampling. This includes the labor and field equipment needed to collect cores within targeted removal areas to further delineate the sediment and bank soils as well as costs for the associated lab analyses. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

22. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

23. *Engineering Design*: This estimate includes the labor and fees to complete the remedial design.

24. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

25. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program (Annual):* This estimate includes the assumed labor, equipment, materials, and laboratory costs to conduct long-term monitoring. This is assumed to include remedy monitoring (i.e., fish sampling, sediment sampling, surface water sampling, porewater sampling, and data evaluation and reporting) at years 0, 1, 3, 5, 10, 15, 20, 25, and 30, which equates to $1,600,000 per event (net present value of zero); floodplain and creekbank monitoring at years 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30, which equates to $367,000 per

event (net present value); fish movement study at years 0, 5, and 10, which equates to $692,000 per event (net present value); institutional controls (i.e., install and repair fish advisory signage and conduct educational outreach) at years 1, 2, 5, 10, 15, 20, and 25, which equates to $60,000 per event (net present value of zero); and engineering and consulting support at years 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, and 30, which equates to $120,000 per event (net present value of zero). All costs include 20% contingency.

26. *Present Worth of Long-Term Cost (Net Present Value):* This estimate provides the net present value for the long-term OMM program as described in line item No. 25 over 30 years with a 7% discount factor.

Table 10-17. Estimated Costs for Remedial Alternative SED-4
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative SED-4: Polychlorinated biphenyl (PCB) source control through addressing targeted severe and moderate creek bank areas through a range of actions, including stabilization with shoreline hardening techniques. Dredging sediment from target areas, transporting dredged sediment to a materials processing area, dewatering, and transporting to a licensed off-site disposal facility (i.e., landfill). A layer of backfill that is up to 12 inches thick would be placed over the dredge area footprint once the sediment removal is complete. Monitored natural recovery (MNR) to achieve the preliminary remedial goals (PRGs) over the long term, including remedy metrics monitoring.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$768,000	$768,000
2	Site Preparation	LS	1	$112,700	$112,700
3	Clearing	LS	1	$38,100	$38,100
4	Site Facilities	MO	10	$127,600	$1,276,000
5	Haul Road Installation and Maintenance	LS	1	$1,118,100	$1,118,100
6	Staging Area Construction	LS	1	$317,300	$317,300
7	Support Pad Construction	LS	1	$363,100	$363,100
8	Dredging	CY	52,100	$44	$2,292,400
9	Sediment Processing and Loading	CY	52,100	$17	$885,700
10	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - TSCA)	TON	48,200	$202	$9,736,400
11	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	39,200	$68	$2,665,600
12	Water Treatment	MO	9	$81,100	$729,900
13	Backfill	CY	40,400	$62	$2,504,800
14	Creek Bank Stabilization (not including transport and disposal)	LF	17,100	$55	$940,500
15	Restoration	ACRE	2.5	$103,500	$258,800
16	Decontamination	LS	1	$140,400	$140,400
17	Contractor Management	MO	10	$297,700	$2,977,000
18	Demobilization	LS	1	$768,000	$768,000
19	Construction Management	MO	10	$45,600	$456,000
20	Predesign Sampling	LS	1	$1,502,000	$1,502,000
				Total Capital Costs:	$29,850,800
Administrative/Management					
21	Project Management (3% of Construction Cost)	LS	1	$523,464	$523,500
22	Engineering Design (6% of Capital Cost)	LS	1	$1,046,928	$1,046,900
				Administrative/Management Costs:	$1,570,400
23	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$6,284,240	$6,284,200
				Total Construction Cost (Capital Costs and Administrative/Management):	$37,705,400
Long-Term Operation, Maintenance, and Monitoring					
24	Long-Term OMM program with 20% contingency annual costs (see notes for additional details)				
25	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$11,991,200	$11,991,200
				Total Estimated Cost:	$49,696,600
				Total Estimated Cost (Rounded):	$49,700,000

Acronyms:

CY: cubic yard

LF: linear foot

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative SED-4 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials to complete the work as described above. The mobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel to install temporary concrete culverts across Choccolocco Creek.

3. *Clearing:* This estimate includes labor, materials, equipment, and fuel to perform clearing (as needed) within targeted construction work areas. It is anticipated that approximately 8 acres of land will need to be cleared.

4. *Site Facilities*: This estimate includes site facilities and accessories for the duration of the work. Site facilities include office trailers, storage units, sanitary facilities, wheel wash, light towers, and generators as well as access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction-related equipment.

5. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer crusher run. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

6. *Staging Area Construction:* This estimate includes labor, materials, equipment, and fuel to construct a temporary Staging Area. The Staging Area will be a 1-acre area that includes a perimeter silt fence and a chain link security fence. A sediment processing and water treatment area (SPA) of 0.25 acre will be located within the Staging Area footprint and consist of a high-density polyethylene (HDPE) liner overlain with crusher run and asphalt paving. Six dewatering bins, separated by bin blocks, will be constructed within the SPA. An additional 0.25 acre will consist of an HDPE liner overlain with 3-inch-thick layer of crusher run which will contain approximately 1,200 feet of geotextile tubes (geotubes) for use for water treatment with a polymer used to assist with the dewatering process, a sump, and a water treatment system (see line item No. 12). The remaining 0.5 acre of the Staging Area will consist of nonwoven geotextile overlain with a 3-inch-thick of crusher run. This portion of the staging area will remain separate from the dredge material side of the staging area and will be used to stockpile clean materials as well as stage office trailers and parking.

7. *Support Pad Construction:* This estimate includes labor, materials, equipment, and fuel to install eight support pads used for construction operations. The support pads will act as laydown areas for the articulated dump trucks to stockpile dredged material. The dredge material will gravity dewater, and then an excavator will load dewatered material into trucks for offsite disposal. Each 0.5-acre support pad will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run and will have a bermed perimeter and a silt fence. A sump will be installed to collect water as dredged material

passively dewaters on the support pad. It is assumed a vacuum truck (included in line item No. 12) will collect this water and transport it to the main staging area for treatment. A portion of each support pad will remain separated from dredging activities to allow space to stockpile clean backfill and topsoil material.

8. *Dredging:* This estimate includes labor, materials, equipment, and fuel to dredge targeted sediment from Choccolocco Creek. The dredging approach used will depend on the width of the creek. Where all the sediment can be accessed from the creek bank, dredging will be conducted from the edge of the bank or the edge of the water. Where the creek is too wide to reach all targeted sediment from the edge of the bank or water, stone projections (fingers) will be constructed from the edge of the bank to provide access to reach the target sediment. The fingers will be constructed using crusher run overlain with crane mats. It is estimated between 40% and 60% of dredging will be conducted using fingers. The cost assumes between 220 and 360 cubic yards of sediment will be removed per day depending on the location and method of dredging. Regardless of which dredging method is used, an excavator will load the sediment into an articulated dump truck for transport to the SPA or support pad. The estimate assumes an over-dredge allowance of 3 inches. Contractor uptime is assumed to be 50% for dredging from the edge of the water and 30% for dredging from the fingers due to slowdowns associated with constructing the fingers. This line item assumes turbidity curtains will be installed downstream of the dredging operations and downstream of fingers that extend into the creek.

9. *Sediment Processing and Loading*: This estimate includes labor, materials, equipment, and fuel to process dredged material at the SPA or support pads and load it into dump trucks for off-site transportation and disposal. It is assumed that Portland cement will be added to material dredged from the low-energy backwater area of Choccolocco Creek to assist with dewatering at a dosage of 10% by weight. The Portland cement will be mixed into the dredged material with an on-site wheel loader.

10. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of dredged material containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's TSCA disposal facility located in Emelle, Alabama. This includes dredged material (and the associated Portland cement) and material excavated from the bank of Snow Creek in association with creek bank stabilization (line item No. 14). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

11. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (Non-TSCA):* This estimate includes the transport and disposal of dredged material containing PCBs less than 50 mg/kg at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. This includes dredged material and the material excavated from the severely damaged bank of Choccolocco Creek (as described in the Feasibility Study) in association with creek bank stabilization (line item No. 14). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

12. *Water Treatment:* This estimate includes labor, materials, equipment, and fuel to operate a temporary water treatment plant (WTP). The WTP costs assume treatment of 100 gallons of water per minute. The WTP includes three pumps, 1,000 feet of piping, a multimedia filter unit, a granulated activated

carbon (GAC) filter unit, a bag filter unit, and three tanks. The WTP will be operated throughout the duration of the dredging and sediment processing work, and treated water will be discharged into the creek.

13. *Backfill:* This estimate includes labor, materials, equipment, and fuel to backfill areas where sediments were removed within Choccolocco Creek. It is assumed a loader will be used to load an articulated dump truck at the SPA and the support pads that will deliver material to the targeted placement area where an excavator will place the backfill material. The backfill placement approach will be dependent on the width of the creek in the same fashion as dredging. Where all the placement area within the creek can be accessed from the edge of the bank or water, backfill will be placed from the edge of bank or the edge of the water. Where the creek is too wide for the entire placement area to be accessed from the edge of the water, backfill placement will use the stone projections (fingers) constructed from the edge of the bank during the dredging process. The backfilling production rate is assumed to be between 250 and 420 cubic yards per day depending on the location of the backfill area and placement method. Backfill will consist of run-of-bank with a target thickness of 12 inches with no overplacement allowance.

14. *Creek Bank Stabilization:* This estimate includes labor, materials, equipment, and fuel to stabilize portions of Snow Creek and Choccolocco Creek with severe to moderate erosion. Stabilization of Snow Creek assumes the removal of bank soil necessary to cut back the bank to a 2:1 slope. It is assumed the soil will be removed using an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. Nonwoven geotextile overlaid by 1.5-foot-thick riprap stone will be placed by an excavator in the area of soil removal for stabilization of the bank. Stabilization of banks along Choccolocco Creek where severe erosion has been observed assumes the removal of a 2-foot cut of soil, 15 feet from the water edge up to the top of the creek bank. The cut area will then be graded to the existing grade at a 1:1 slope. It is assumed the soil will be removed by an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. A 2-foot-thick layer of backfill will be placed in the area of removed soil, with the exception of a 3:1 slope that extends into the waterway. The backfill material will be hydroseeded. The remaining portion of Choccolocco Creek where moderate erosion has been observed will be completed by placing forested material (from clearing operations) along the bank. This method will also include limited creek bank reshaping and hydroseeding. Excavated material transport and disposal associated with creek bank stabilization is accounted for in line items No. 10 and 11.

15. *Restoration:* This estimate includes labor, materials, equipment, and fuel to restore all staging and support pad areas. This includes removing all stone, asphalt and geotextile materials and placing 2 inches of topsoil in all staging and support pad areas. This estimate also includes hydroseeding within staging and support pad areas at an assumed production rate of 90,000 square feet per day. And it includes the removal, transport, and disposal of crusher run stone, geotextiles, and asphalt at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama.

16. *Decontamination:* This estimate includes labor and material to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) and a power washer (at the SPA) while the equipment is staged over an HDPE liner to

contain the removed material and decontamination water. It is assumed that a laborer will need 4 days to decontaminate equipment.

17. *Contractor Management:* This estimate includes labor for the contractor's management for the project and includes a monthly allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, mechanic, and superintendent for travel to and from the site. The estimate also includes labor and equipment to conduct construction-related surveys at an assumed rate of 0.5 acre per day.

18. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials to complete the work described above. The demobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

19. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project, a water quality meter to collect water quality data related to in-water dredging and backfill, and a monthly flight allowance for the field staff member to travel to and from the site.

20. *Predesign Sampling*: This estimate includes labor, equipment, materials, laboratory-related costs, and testing to perform predesign investigation sampling. This includes the labor and field equipment needed to collect cores within targeted removal areas to further delineate the sediment and bank soils as well as costs for the associated lab analyses. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

21. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

22. *Engineering Design*: This estimate includes the labor and fees to complete the remedial design.

23. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

24. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program (Annual):* This estimate includes the assumed labor, equipment, materials, and laboratory costs to conduct long-term monitoring. This is assumed to include remedy monitoring (i.e., fish sampling, sediment sampling, surface water sampling, porewater sampling, and data evaluation and reporting) at years 0, 1, 3, 5, 10, 15, 20, 25, and 30, which equates to $1,600,000 per event (net present value of zero); floodplain and creekbank monitoring at years 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30, which equates to $367,000 per event (net present value); fish movement study at years 0, 5, and 10, which equates to $692,000 per event (net present value); institutional controls (i.e., install and repair fish advisory signage and conduct educational outreach) at years 1, 2, 5, 10, 15, 20, and 25, which equates to $60,000 per event (net present value of zero); and engineering and consulting support at years 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,

15, 20, 25, and 30, which equates to $120,000 per event (net present value of zero). All costs include 20% contingency.

25. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 24 over 30 years with a 7% discount factor.

Table 10-18. Estimated Costs for Remedial Alternative SED-5
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative SED-5: Polychlorinated biphenyl (PCB) source control through addressing targeted creek bank areas through a range of actions, including stabilization with shoreline hardening techniques. Dredging sediment from high-energy target areas, transporting the dredged sediment to a materials processing area, dewatering, and transporting to a licensed off-site disposal facility (i.e., landfill). Dredging also includes the removal of the upper 12 inches of sediment in the low-energy portions of the backwater area that will be capped. A layer of backfill that is up to 12 inches thick would be placed in the high-energy areas once the sediment removal is complete. Monitored natural recovery (MNR) to achieve the preliminary remedial goals (PRGs) over the long term, including remedy metrics monitoring and long-term monitoring of cap stability.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$824,000	$824,000
2	Site Preparation	LS	1	$107,700	$107,700
3	Clearing	LS	1	$38,100	$38,100
4	Site Facilities	MO	12	$127,600	$1,531,200
5	Haul Road Installation and Maintenance	LS	1	$1,118,100	$1,118,100
6	Staging Area Construction	LS	1	$317,300	$317,300
7	Support Pad Construction	LS	1	$363,100	$363,100
8	Dredging	CY	44,200	$44	$1,944,800
9	Sediment Processing and Loading	CY	44,200	$12	$530,400
10	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - TSCA)	TON	37,200	$202	$7,514,400
11	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	39,200	$68	$2,665,600
12	Water Treatment	MO	8	$81,100	$648,800
13	Backfill	CY	33,800	$62	$2,095,600
14	Capping in low-energy area	ACRE	4.1	$118,300	$485,000
15	Creek Bank Stabilization (not including transport and disposal)	LF	39,800	$55	$2,189,000
16	Restoration	ACRE	2.5	$103,500	$258,800
17	Decontamination	LS	1	$140,400	$140,400
18	Contractor Management	MO	12	$297,700	$3,572,400
19	Demobilization	LS	1	$824,000	$824,000
20	Construction Management	MO	12	$45,600	$547,200
21	Predesign Sampling	LS	1	$1,502,000	$1,502,000
				Total Capital Costs:	$29,217,900
Administrative/Management					
22	Project Management (3% of Construction Cost)	LS	1	$571,137	$571,100
23	Engineering Design (6% of Capital Cost)	LS	1	$1,142,274	$1,142,300
				Administrative/Management Costs:	$1,713,400
24	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$6,186,260	$6,186,300
				Total Construction Cost (Capital Costs and Administrative/Management):	$37,117,600
Long-Term Operation, Maintenance, and Monitoring					
25	Long-Term OMM program with 20% contingency annual costs (see notes for additional details)				
26	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$13,523,200	$13,523,200
				Total Estimated Cost:	$50,640,800
				Total Estimated Cost (Rounded):	$50,600,000

Acronyms:

CY: cubic yard

LF: linear foot

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative SED-5 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials to complete the work as described above. The mobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel to install temporary concrete culverts across Choccolocco Creek.

3. *Clearing:* This estimate includes labor, materials, equipment, and fuel to perform clearing (as needed) within targeted construction work areas. It is anticipated that approximately 8 acres of land will need to be cleared.

4. *Site Facilities*: This estimate includes site facilities and accessories for the duration of the work. Site facilities include all office trailers, storage units, sanitary facilities, light towers, and generators as well as access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction-related equipment.

5. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

6. *Staging Area Construction:* This estimate includes labor, materials, equipment, and fuel to construct a temporary Staging Area. The Staging Area will be a 1-acre area that includes a perimeter silt fence and a chain link security fence. A SPA of 0.25 acre will be located within the Staging Area footprint and consist of a high-density polyethylene (HDPE) liner overlain with crusher run and asphalt paving. Six dewatering bins, separated by bin blocks, will be constructed within the SPA. An additional 0.25 acre will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run which will contain approximately 1,200 feet of geotextile tubes (geotubes) for use for water treatment with a polymer used to assist with the dewatering process, a sump, and a water treatment system (see line item No. 12). The remaining 0.5 acres of the Staging Area will consist of nonwoven geotextile overlain with a 3-inch-thick layer of crusher run. This portion of the staging area will remain separate from the dredge material side of the staging area and will be used to stockpile clean materials as well as stage office trailers and parking.

7. *Support Pad Construction:* This estimate includes labor, materials, equipment, and fuel to install eight support pads used for construction operations. Each 0.5-acre support pad will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run and will have a bermed perimeter and a silt fence. A sump will be installed to collect water as dredged material passively dewaters on the support pad. It is assumed a vacuum truck (included in line item No. 12) will collect this water and transport it

to the main staging area for treatment. A portion of each support pad will remain separated from dredging activities to allow space to stockpile clean backfill and topsoil material.

8. *Dredging:* This estimate includes labor, materials, equipment, and fuel to dredge targeted sediment from Choccolocco Creek. The dredging approach used will depend on the width of the creek. Where all the sediment can be accessed from the creek bank, dredging will be conducted from the edge of the bank or the edge of the water. Where the creek is too wide to reach all targeted sediment from the edge of the bank or water, stone projections (fingers) will be constructed from the edge of the bank to provide access to reach the target sediment. The fingers will be constructed using crusher run overlaid with crane mats. It is estimated between 40% and 60% of dredging will be conducted using fingers. The cost assumes between 220 and 360 cubic yards of sediment will be removed per day depending on the location and method of dredging. Regardless of which dredging method is used, an excavator will load the sediment into an articulated dump truck for transport to the SPA or support pad. The estimate assumes an over-dredge allowance of 3 inches. Contractor uptime is assumed to be 50% for dredging from the edge of the water and 30% for dredging from the fingers due to slowdowns associated with constructing the fingers. This line item assumes turbidity curtains will be installed downstream of the dredging operations and downstream of fingers that extend into the creek.

9. *Sediment Processing and Loading*: This estimate includes labor, materials, equipment, and fuel to process dredged material at the SPA or support pads and load it into dump trucks for off-site transportation and disposal. It is assumed that Portland cement will be added to material dredged from the low-energy backwater area of Choccolocco Creek to assist with dewatering at a dosage of 10% by weight. The Portland cement will be mixed into the dredged material with an on-site wheel loader.

10. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of dredged material containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's TSCA disposal facility located in Emelle, Alabama. This includes dredged material (and the associated Portland cement) and material excavated from the bank of Snow Creek in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

11. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (Non-TSCA):* This estimate includes the transport and disposal of dredged material at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. This includes dredged material and the material excavated from the severely damaged bank of Choccolocco Creek (as described in the Feasibility Study) in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

12. *Water Treatment:* This estimate includes labor, materials, equipment, and fuel to operate a temporary WTP. The WTP costs assume treatment of 100 gallons of water per minute. The WTP includes three pumps, 1,000 feet of piping, a multimedia filter unit, a GAC filter unit, a bag filter unit, and three tanks. The WTP will be operated throughout the duration of the dredging and sediment processing work, and treated water will be discharged into the creek.

13. *Backfill:* This estimate includes labor, materials, equipment, and fuel to backfill areas where sediments were removed within Choccolocco Creek. It is assumed a loader will be used to load an articulated dump truck at the SPA and the support pads that will deliver material to the targeted placement area where an excavator will place the backfill material. The backfill placement approach will be dependent on the width of the creek in the same fashion as dredging. Where all the placement area within the creek can be accessed from the edge of the bank or water, backfill will be placed from the edge of the bank or the edge of the water. Where the creek is too wide for the entire placement area to be accessed from the edge of the water, backfill placement will use the stone projections (fingers) constructed from the edge of the bank during the dredging process. The backfilling production rate is assumed to be between 250 and 420 cubic yards per day depending on the location of the backfill area and placement method. Backfill will consist of run-of-bank with a target thickness of 12 inches with no overplacement allowance.

14. *Capping in Low-Energy Area:* This estimate includes labor, materials, equipment, and fuel to place a sand cap in the low-energy area. It is assumed a loader will be used to load an articulated dump truck that will deliver material to the targeted placement area, where an excavator will place the cap material from the edge of the bank at an assumed rate of approximately 420 cubic yards per day and targeting an average thickness of 12 inches.

15. *Creek Bank Stabilization:* This estimate includes labor, materials, equipment, and fuel to stabilize portions of Snow Creek and Choccolocco Creek with severe to minor erosion. Stabilization of Snow Creek assumes the removal of bank soil necessary to cut back the bank to a 2:1 slope. It is assumed the soil will be removed using an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. Nonwoven geotextile overlain by 1.5-foot-thick riprap stone will be placed by an excavator in the area of soil removal for stabilization of the bank. Stabilization of banks along Choccolocco Creek where severe erosion has been observed assumes the removal of a 2-foot cut of soil, 15 feet from the water edge up to the top of the creek bank. The cut area will then be graded to the existing grade at a 1:1 slope. It is assumed the soil will be removed by an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. A 2-foot-thick layer of backfill will be placed in the area of removed soil, with the exception of a 3:1 slope that extends into the waterway. The backfill material will be hydroseeded. The remaining portion of Choccolocco Creek where moderate and minor erosion have been observed will be completed by placing forested material (from clearing operations) along the bank. This method will also include limited creek bank reshaping and hydroseeding. Excavated material transport and disposal associated with creek bank stabilization is accounted for in line items No. 10 and 11.

16. *Restoration:* This estimate includes labor, materials, equipment, and fuel to restore all staging and support pad areas. This includes removing all stone, asphalt, and geotextile materials and placing 2 inches of topsoil in all staging and support pad areas. This estimate also includes hydroseeding within staging and support pad areas at an assumed production rate of 90,000 square feet per day. And it includes the removal, transport, and disposal of crusher run stone, geotextiles, and asphalt at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama.

17. *Decontamination:* This estimate includes labor and material to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) and a power washer (at the SPA) while the equipment is staged over a HDPE liner to contain the removed material and decontamination water. It is assumed that a laborer will need 4 days to decontaminate equipment.

18. *Contractor Management:* This estimate includes labor for the contractor's management for the project and includes a monthly allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, mechanic, and superintendent for travel to and from the site. The estimate also includes labor and equipment to conduct construction-related surveys at an assumed rate of 0.5 acre per day.

19. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials to complete the work described above. The demobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

20. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project, a water quality meter to collect water quality data related to in-water dredging and backfill, and a monthly flight allowance for the field staff member to travel to and from the site.

21. *Predesign Sampling*: This estimate includes labor, equipment, materials, laboratory-related costs, and testing to perform predesign investigation sampling. This includes the labor and field equipment needed to collect cores within targeted removal areas to further delineate the sediment and bank soils as well as costs for the associated lab analyses. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

22. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

23. *Engineering Design*: This estimate includes the labor and fees to complete the remedial design.

24. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

25. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program (Annual):* This estimate includes the assumed labor, equipment, materials, and laboratory costs to conduct long-term monitoring. This is assumed to include remedy monitoring (i.e., fish sampling, sediment sampling, surface water sampling, porewater sampling, and data evaluation and reporting) at years 0, 1, 3, 5, 10, 15, 20, 25, and 30, which equates to $1,600,000 per event (net present value of zero); floodplain and creekbank monitoring at years 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30, which equates to $367,000 per event (net present value); fish movement study at years 0, 5, and 10, which equates to $692,000 per event (net present value); institutional controls (i.e., install and repair fish advisory signage and

conduct educational outreach) at years 1, 2, 5, 10, 15, 20, and 25, which equates to $60,000 per event (net present value of zero); and engineering and consulting support at years 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, and 30, which equates to $120,000 per event (net present value of zero). This is also assumed to include cap maintenance and monitoring (i.e., cap survey, sediment sampling, cap repair/maintenance, and data evaluation and reporting), which equates to $428,000 at years 1, 2, 5, 10, 15, and 25 (net present value of zero). All costs include 20% contingency.

26. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 25 over 30 years with a 7% discount factor.

Table 10-19. Estimated Costs for Remedial Alternative SED-6
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative SED-6: Polychlorinated biphenyl (PCB) source control through addressing targeted creek bank areas through a range of actions, including stabilization with shoreline hardening techniques. Dredging sediment from target areas, transporting dredged sediment to a materials processing area, dewatering, and transporting to a licensed off-site disposal facility (i.e., landfill). A layer of backfill that is up to 12 inches thick would be placed over the dredge area footprint once the sediment removal is complete. Monitored natural recovery (MNR) to achieve the preliminary remedial goals (PRGs) over the long term, including remedy metrics monitoring.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$883,000	$883,000
2	Site Preparation	LS	1	$112,700	$112,700
3	Clearing	LS	1	$38,100	$38,100
4	Site Facilities	MO	13	$127,600	$1,658,800
5	Haul Road Installation and Maintenance	LS	1	$1,118,100	$1,118,100
6	Staging Area Construction	LS	1	$317,300	$317,300
7	Support Pad Construction	LS	1	$363,100	$363,100
8	Dredging	CY	52,100	$44	$2,292,400
9	Sediment Processing and Loading	CY	52,100	$17	$885,700
10	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - TSCA)	TON	48,200	$202	$9,736,400
11	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	39,200	$68	$2,665,600
12	Water Treatment	MO	9	$81,100	$729,900
13	Backfill	CY	40,400	$62	$2,504,800
14	Creek Bank Stabilization (not including transport and disposal)	LF	39,800	$55	$2,189,000
15	Restoration	ACRE	2.5	$103,500	$258,800
16	Decontamination	LS	1	$140,400	$140,400
17	Contractor Management	MO	13	$297,700	$3,870,100
18	Demobilization	LS	1	$883,000	$883,000
19	Construction Management	MO	13	$45,600	$592,800
20	Predesign Sampling	LS	1	$1,502,000	$1,502,000
				Total Capital Costs:	$32,742,000
Administrative/Management					
21	Project Management (3% of Construction Cost)	LS	1	$610,200	$610,200
22	Engineering Design (6% of Capital Cost)	LS	1	$1,220,400	$1,220,400
				Administrative/Management Costs:	$1,830,600
23	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$6,914,520	$6,914,500
				Total Construction Cost (Capital Costs and Administrative/Management):	$41,487,100
Long-Term Operation, Maintenance, and Monitoring					
24	Long-Term OMM program with 20% contingency annual costs (see notes for additional details)				
25	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$11,991,200	$11,991,200
				Total Estimated Cost:	$53,478,300
				Total Estimated Cost (Rounded):	$53,500,000

Acronyms:

CY: cubic yard

LF: linear foot

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: toxic substances control act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative SED-6 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials to complete the work as described above. The mobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel to install temporary concrete culverts across Choccolocco Creek.

3. *Clearing:* This estimate includes labor, materials, equipment, and fuel to perform clearing (as needed) within targeted construction work areas. It is anticipated that approximately 8 acres of land will need to be cleared.

4. *Site Facilities*: This estimate includes site facilities and accessories for the duration of the work. Site facilities include all office trailers, storage units, sanitary facilities, light towers, and generators as well as access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction-related equipment.

5. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

6. *Staging Area Construction:* This estimate includes labor, materials, equipment, and fuel to construct a temporary Staging Area. The Staging Area will be a 1-acre area that includes a perimeter silt fence and a chain link security fence. A SPA of 0.25 acre will be located within the Staging Area footprint and consist of a high-density polyethylene (HDPE) liner overlain with crusher run and asphalt paving. Six dewatering bins, separated by bin blocks, will be constructed within the SPA. An additional 0.25 acre will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run which will contain approximately 1,200 feet of geotextile tubes (geotubes) for use for water treatment with a polymer used to assist with the dewatering process, a sump, and a water treatment system (see line item No. 12). The remaining 0.5 acre of the Staging Area will consist of nonwoven geotextile overlain with 3-inch-thick crusher run. This portion of the staging area will remain separate from the dredge material side of the staging area and will be used to stockpile clean materials as well as stage office trailers and parking.

7. *Support Pad Construction:* This estimate includes labor, materials, equipment, and fuel to install eight support pads used for construction operations. Each 0.5-acre support pad will consist of an HDPE liner overlain with a 3-inch-thick layer crusher run and will have a bermed perimeter and a silt fence. A sump will be installed to collect water as dredged material passively dewaters on the support pad. It is assumed a vacuum truck (included in line item No. 12) will collect this water and transport it to the

main staging area for treatment. A portion of each support pad will remain separated from dredging activities to allow space to stockpile clean backfill and topsoil material.

8. *Dredging:* This estimate includes labor, materials, equipment, and fuel to dredge targeted sediment from Choccolocco Creek. The dredging approach used will depend on the width of the creek. Where all the sediment can be accessed from the creek bank, dredging will be conducted from the edge of the bank or the edge of the water. Where the creek is too wide to reach all targeted sediment from the edge of the bank or water, stone projections (fingers) will be constructed from the edge of the bank to provide access to reach the target sediment. The fingers will be constructed using crusher run overlaid with crane mats. It is estimated between 40% and 60% of dredging will be conducted using fingers. The cost assumes between 220 and 360 cubic yards of sediment will be removed per day depending on the location and method of dredging. Regardless of which dredging method is used, an excavator will load the sediment into an articulated dump truck for transport to the SPA or support pad. The estimate assumes an over-dredge allowance of 3 inches. Contractor uptime is assumed to be 50% for dredging from the edge of the water and 30% for dredging from the fingers due to slowdowns associated with constructing the fingers. This line item assumes turbidity curtains will be installed downstream of the dredging operations and downstream of fingers that extend into the creek.

9. *Sediment Processing and Loading*: This estimate includes labor, materials, equipment, and fuel to process dredged material at the SPA or support pads and load it into dump trucks for off-site transportation and disposal. It is assumed that Portland cement will be added to material dredged from the low-energy backwater area of Choccolocco Creek to assist with dewatering at a dosage of 10% by weight. The Portland cement will be mixed into the dredged material with an on-site wheel loader.

10. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of dredged material containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's TSCA disposal facility located in Emelle, Alabama. This includes dredged material (and the associated Portland cement) and material excavated from the bank of Snow Creek in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

11. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (Non-TSCA):* This estimate includes the transport and disposal of dredged material at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. This includes dredged material and the material excavated from the severely damaged bank of Choccolocco Creek (as described in the Feasibility Study) in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

12. *Water Treatment:* This estimate includes labor, materials, equipment, and fuel to operate a temporary WTP. The WTP costs assume treatment of 100 gallons of water per minute. The WTP includes three pumps, 1,000 feet of piping, a multimedia filter unit, a GAC filter unit, a bag filter unit, and three tanks. The WTP will be operated throughout the duration of the dredging and sediment processing work, and treated water will be discharged into the creek.

13. *Backfill:* This estimate includes labor, materials, equipment, and fuel to backfill areas where sediments were removed within Choccolocco Creek. It is assumed a loader will be used to load an articulated dump truck at the SPA and the support pads that will deliver material to the targeted placement area where an excavator will place the backfill material. The backfill placement approach will be dependent on the width of the creek in the same fashion as dredging. Where all the placement area within the creek can be accessed from the edge of the bank or water, backfill will be placed from the edge of bank or the edge of the water. Where the creek is too wide for the entire placement area to be accessed from the edge of the water, backfill placement will use the stone projections (fingers) constructed from the edge of the bank during the dredging process. The backfilling production rate is assumed to be between 250 and 420 cubic yards per day depending on the location of the backfill area and placement method. Backfill will consist of run-of-bank with a target thickness of 12 inches with no overplacement allowance.

14. *Creek Bank Stabilization:* This estimate includes labor, materials, equipment, and fuel to stabilize portions of Snow Creek and Choccolocco Creek with severe to minor erosion. Stabilization of Snow Creek assumes the removal of bank soil necessary to cut back the bank to a 2:1 slope. It is assumed the soil will be removed using an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. Nonwoven geotextile overlaid by 1.5-foot-thick riprap stone will be placed by an excavator in the area of soil removal for stabilization of the bank. Stabilization of banks along Choccolocco Creek where severe erosion has been observed assumes the removal of a 2-foot cut of soil, 15 feet from the water edge up to the top of the creek bank. The cut area will then be graded to the existing grade at a 1:1 slope. It is assumed the soil will be removed by an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. A 2-foot-thick layer of backfill will be placed in the area of removed soil, with the exception of a 3:1 slope that extends into the waterway. The backfill material will be hydroseeded. The remaining portion of Choccolocco Creek where moderate and minor erosion have been observed will be completed by placing forested material (from clearing operations) along the bank. This method will also include limited creek bank reshaping and hydroseeding. Excavated material transport and disposal associated with creek bank stabilization is accounted for in line items No. 10 and 11.

15. *Restoration:* This estimate includes labor, materials, equipment, and fuel to restore all staging and support pad areas. This includes removing all stone, asphalt, and geotextile materials and placing 2 inches of topsoil in all staging and support pad areas. This estimate also includes hydroseeding within staging and support pad areas at an assumed production rate of 90,000 square feet per day. And it includes the removal, transport, and disposal of crusher run stone, geotextiles, and asphalt at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama.

16. *Decontamination:* This estimate includes labor and material to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) and a power washer (at the SPA) while the equipment is staged over a high-density polyethylene (HDPE) liner to contain the removed material and decontamination water. It is assumed that a laborer will need 4 days to decontaminate equipment.

17. *Contractor Management:* This estimate includes labor for the contractor's management for the project and includes a monthly allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, mechanic, and superintendent for travel to and from the site. The estimate also includes labor and equipment to conduct construction-related surveys at an assumed rate of 0.5 acre per day.

18. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials to complete the work described above. The demobilization cost is estimated at 7% of the total direct construction costs less transport and disposal of dredged and excavated material.

19. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project, a water quality meter to collect water quality data related to in-water dredging and backfill, and a monthly flight allowance for the field staff member to travel to and from the site.

20. *Predesign Sampling*: This estimate includes labor, equipment, materials, laboratory-related costs, and testing to perform predesign investigation sampling. This includes the labor and field equipment needed to collect cores within targeted removal areas to further delineate the sediment and bank soils as well as costs for the associated lab analyses. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

21. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

22. *Engineering Design*: This estimate includes the labor and fees to complete the remedial design.

23. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

24. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program (Annual):* This estimate includes the assumed labor, equipment, materials, and laboratory costs to conduct long-term monitoring. This is assumed to include remedy monitoring (i.e., fish sampling, sediment sampling, surface water sampling, porewater sampling, and data evaluation and reporting) at years 0, 1, 3, 5, 10, 15, 20, 25, and 30, which equates to $1,600,000 per event (net present value of zero); floodplain and creekbank monitoring at years 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30, which equates to $367,000 per event (net present value); fish movement study at years 0, 5, and 10, which equates to $692,000 per event (net present value); institutional controls (i.e., install and repair fish advisory signage and conduct educational outreach) at years 1, 2, 5, 10, 15, 20, and 25, which equates to $60,000 per event (net present value of zero); and engineering and consulting support at years 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, and 30 which, equates to $120,000 per event (net present value of zero). All costs include 20% contingency.

25. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 24 over 30 years with a 7% discount factor.

Table 10-20. Estimated Costs for Remedial Alternative SED-7
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Alternative SED-7: Polychlorinated biphenyl (PCB) source control through addressing targeted creek bank areas through a range of actions, including stabilization with shoreline hardening techniques. Dredging sediment from the target areas, transporting the dredged sediment to a materials processing area, dewatering, and transporting dregded material with PCB concentrations greater than 500 mg/kg for treatment (i.e., incineration) and transporting the remianing material at a licensed off-site facility. Off-site disposal of the residual ash from incineration operations at a licensed off-site disposal facility (i.e., landfill). A layer of backfill that is up to 12 inches thick would be placed over the dredge area footprint once the sediment removal is complete. Monitored natural recovery (MNR) to achieve the preliminary remedial goals (PRGs) over the long term including, remedy metrics monitoring.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$883,000	$883,000
2	Site Preparation	LS	1	$112,700	$112,700
3	Clearing	LS	1	$38,100	$38,100
4	Site Facilities	MO	13	$127,600	$1,658,800
5	Haul Road Installation and Maintenance	LS	1	$1,118,100	$1,118,100
6	Staging Area Construction	LS	1	$317,300	$317,300
7	Support Pad Construction	LS	1	$363,100	$363,100
8	Dredging	CY	52,100	$44	$2,292,400
9	Sediment Processing and Loading	CY	52,100	$17	$885,700
10	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - TSCA)	TON	47,885	$202	$9,672,800
11	Sediment and Creek Bank Soil Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	39,200	$68	$2,665,600
12	Sediment and Creek Bank Soil Off-Site Transportation & Treatment (> 500 ppm PCBs)	TON	315	$1,625	$511,900
13	Water Treatment	MO	9	$81,100	$729,900
14	Backfill	CY	40,400	$62	$2,504,800
15	Creek Bank Stabilization (not including transport and disposal)	LF	39,800	$55	$2,189,000
16	Restoration	ACRE	2.5	$103,500	$258,800
17	Decontamination	LS	1	$140,400	$140,400
18	Contractor Management	MO	13	$297,700	$3,870,100
19	Demobilization	LS	1	$883,000	$883,000
20	Construction Management	MO	13	$45,600	$592,800
21	Predesign Sampling	LS	1	$1,502,000	$1,502,000
				Total Capital Costs:	$33,190,300
Administrative/Management					
22	Project Management (3% of Construction Cost)	LS	1	$610,200	$610,200
23	Engineering Design (6% of Capital Cost)	LS	1	$1,220,400	$1,220,400
				Administrative/Management Costs:	$1,830,600
24	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$7,004,180	$7,004,200
				Total Construction Cost (Capital Costs and Administrative/Management):	$42,025,100
Long-Term Operation, Maintenance, and Monitoring					
25	Long-Term OMM program with 20% contingency annual costs (see notes for additional details)				
26	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$11,991,200	$11,991,200
				Total Estimated Cost:	$54,016,300
				Total Estimated Cost (Rounded):	$54,000,000

Acronyms:

CY: cubic yard

LF: linear foot

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Alternative SED-7 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials to complete the work as described above. The mobilization cost is estimated at 7% of the total direct construction costs less transport and treatment of dredged and excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel to install temporary concrete culverts across Choccolocco Creek.

3. *Clearing:* This estimate includes labor, materials, equipment, and fuel to perform clearing (as needed) within targeted construction work areas. It is anticipated that approximately 8 acres of land will need to be cleared.

4. *Site Facilities*: This estimate includes site facilities and accessories for the duration of the work. Site facilities include all office trailers, storage units, sanitary facilities, light towers, and generators as well as access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction-related equipment.

5. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the Sediment and Creek Bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

6. *Staging Area Construction:* This estimate includes labor, materials, equipment, and fuel to construct a temporary Staging Area. The Staging Area will be a 1-acre area that includes a perimeter silt fence and a chain link security fence. A SPA of 0.25 acre will be located within the Staging Area footprint and consist of an HDPE liner overlain with crusher run stone and asphalt paving. Six dewatering bins, separated by bin blocks, will be constructed within the SPA. An additional 0.25 acre will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run which will contain approximately 1,200 feet of geotextile tubes (geotubes) for use for water treatment with a polymer used to assist with the dewatering process, a sump, and a water treatment system (see line item No. 13). The remaining 0.5 acre of the Staging Area will consist of nonwoven geotextile overlain with a 3-inch-thick layer of crusher run. This portion of the staging area will remain separate from the dredge material side of the staging area and will be used to stockpile clean materials as well as stage office trailers and parking.

7. *Support Pad Construction:* This estimate includes labor, materials, equipment, and fuel to install eight support pads used for construction operations. Each 0.5-acre support pad will consist of an HDPE liner overlain with a 3-inch-thick layer of crusher run and will have a bermed perimeter and a silt fence. A sump will be installed to collect water as dredged material passively dewaters on the support pad. It is assumed a vacuum truck (included in line item No. 13) will collect this water and transport it

to the main staging area for treatment. A portion of each support pad will remain separated from dredging activities to allow space to stockpile clean backfill and topsoil material.

8. *Dredging:* This estimate includes labor, materials, equipment, and fuel to dredge targeted sediment from Choccolocco Creek. The dredging approach used will depend on the width of the creek. Where all the sediment can be accessed from the creek bank, dredging will be conducted from the edge of the bank or the edge of the water. Where the creek is too wide to reach all targeted sediment from the edge of the bank or water, stone projections (fingers) will be constructed from the edge of the bank to provide access to reach the target sediment. The fingers will be constructed using crusher run stone overlain with crane mats. It is estimated between 40% and 60% of dredging will be conducted using fingers. The cost assumes between 220 and 360 cubic yards of sediment will be removed per day depending on the location and method of dredging. Regardless of which dredging method is used, an excavator will load the sediment into an articulated dump truck for transport to the SPA or support pad. The estimate assumes an over-dredge allowance of 3 inches. Contractor uptime is assumed to be 50% for dredging from the edge of the water and 30% for dredging from the fingers due to slowdowns associated with construction of the fingers. This line item assumes turbidity curtains will be installed downstream of the dredging operations and downstream of fingers that extend into the creek.

9. *Sediment Processing and Loading*: This estimate includes labor, materials, equipment, and fuel to process dredged material at the SPA or support pads and load it into dump trucks for off-site transportation and disposal. It is assumed that Portland cement will be added to material dredged from the low-energy backwater area of Choccolocco Creek to assist with dewatering at a dosage of 10% by weight. The Portland cement will be mixed into the dredged material with an on-site wheel loader.

10. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (Toxic Substances Control Act (TSCA):* This estimate includes the transport and disposal of dredged material containing polychlorinated biphenyls (PCBs) greater than or equal to 50 mg/kg at Waste Management's TSCA disposal facility located in Emelle, Alabama. This includes dredged material (and the associated Portland cement) and material excavated from the bank of Snow Creek in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

11. *Sediment and Creek Bank Soil Off-Site Transportation and Disposal (Non-TSCA):* This estimate includes the transport and disposal of dredged material containing PCBs less than 50 mg/kg at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama. This includes dredged material and the material excavated from the severely damaged bank of Choccolocco Creek (as described in the Feasibility Study) in association with creek bank stabilization (line item No. 15). The density of the dredged material is assumed to be 1.4 tons per cubic yard, and the density of bank material is 1.5 tons per cubic yard.

12. *Sediment and Creek Bank Soil Off-Site Transportation & Treatment (>500 mg/kg PCBs):* This estimate includes the transport to and disposal of dredged sediment at Clean Harbor's Deer Park, Texas, incineration treatment facility. This includes dredged material (and the associated Portland cement) where PCB concentrations were detected greater than 500 mg/kg. The density of the dredged material is assumed to be 1.4 tons per cubic yard.

13. *Water Treatment:* This estimate includes labor, materials, equipment, and fuel to operate a temporary WTP. The WTP costs assume treatment of 100 gallons of water per minute. The WTP includes three pumps, 1,000 feet of piping, a multimedia filter unit, a GAC filter unit, a bag filter unit, and three tanks. The WTP will be operated throughout the duration of the dredging and sediment processing work and treated water will be discharged into the creek.

14. *Backfill:* This estimate includes labor, materials, equipment, and fuel to backfill areas where sediments were removed within Choccolocco Creek. It is assumed a loader will be used to load an articulated dump truck at the SPA and the support pads that will deliver material to the targeted placement area where an excavator will place the backfill material. The backfill placement approach will be dependent on the width of the creek in the same fashion as dredging. Where all the placement area within the creek can be accessed from the edge of the bank or water, backfill will be placed from the edge of the bank or the edge of the water. Where the creek is too wide for the entire placement area to be accessed from the edge of the water, backfill placement will use the stone projections (fingers) constructed from the edge of the bank during the dredging process. The backfilling production rate is assumed to be between 250 and 420 cubic yards per day depending on the location of the backfill area and placement method. Backfill will consist of run-of-bank with a target thickness of 12 inches with no overplacement allowance.

15. *Creek Bank Stabilization:* This estimate includes labor, materials, equipment, and fuel to stabilize portions of Snow Creek and Choccolocco Creek with severe to minor erosion. Stabilization of Snow Creek assumes the removal of bank soil necessary to cut back the bank to a 2:1 slope. It is assumed the soil will be removed using an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. Nonwoven geotextile overlain by 1.5-foot-thick riprap stone will be placed by an excavator in the area of soil removal for stabilization of the bank. Stabilization of banks along Choccolocco Creek where severe erosion has been observed assumes the removal of a 2-foot cut of soil, 15 feet from the water edge up to the top of the creek bank. The cut area will then be graded to the existing grade at a 1:1 slope. It is assumed the soil will be removed by an excavator and placed into an articulated dump truck that will transport the soil to a support pad where it will be processed prior to off-site disposal. A 2-foot-thick layer of backfill will be placed in the area of removed soil, with the exception of a 3:1 slope that extends into the waterway. The backfill material will be hydroseeded. The remaining portion of Choccolocco Creek where moderate and minor erosion have been observed will be completed by placing forested material (from clearing operations) along the bank. This method will also include limited creek bank reshaping and hydroseeding. Excavated material transport and treatment associated with creek bank stabilization is accounted for in line items No. 10 and 11.

16. *Restoration:* This estimate includes labor, materials, equipment, and fuel to restore all staging and support pad areas. This includes removing all stone, asphalt, and geotextile materials and placing 2 inches of in all staging and support pad areas. This estimate also includes hydroseeding within staging and support pad areas at an assumed production rate of 90,000 square feet per day. And it includes the removal, transport, and disposal of crusher run stone, geotextiles, and asphalt at Advanced Disposal's Three Corners Regional non-TSCA disposal facility in Piedmont, Alabama.

17. *Decontamination:* This estimate includes labor and material to decontaminate equipment used to remove impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) and a power washer (at the SPA) while the equipment is staged over an HDPE liner to contain the removed material and decontamination water. It is assumed that a laborer will need 4 days to decontaminate equipment.

18. *Contractor Management:* This estimate includes labor for the contractor's management for the project and includes a monthly allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, mechanic, and superintendent for travel to and from the site. The estimate also includes labor and equipment to conduct construction-related surveys at an assumed rate of 0.5 acre per day.

19. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials to complete the work described above. The demobilization cost is estimated at 7% of the total direct construction costs less transport and treatment of dredged and excavated material.

20. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project, a water quality meter to collect water quality data related to in-water dredging and backfill, and a monthly flight allowance for the field staff member to travel to and from the site.

21. *Predesign Sampling*: This estimate includes labor, equipment, materials, laboratory-related costs, and testing to perform predesign investigation sampling. This includes the labor and field equipment needed to collect cores within targeted removal areas to further delineate the sediment and bank soils as well as costs for the associated lab analyses. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

22. *Project Management*: This estimate includes labor to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

23. *Engineering Design*: This estimate includes the labor and fees to complete the remedial design.

24. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the Total Capital and Administrative/Management Costs.

25. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program (Annual):* This estimate includes the assumed labor, equipment, materials, and laboratory costs to conduct long-term monitoring. This is assumed to include remedy monitoring (i.e., fish sampling, sediment sampling, surface water sampling, porewater sampling, and data evaluation and reporting) at years 0, 1, 3, 5, 10, 15, 20, 25, and 30, which equates to $1,600,000 per event (net present value of zero); floodplain and creekbank monitoring at years 3, 6, 9, 12, 15, 18, 21, 24, 27, and 30, which equates to $367,000 per event (net present value); fish movement study at years 0, 5, and 10, which equates to $692,000 per event (net present value); institutional controls (i.e., install and repair fish advisory signage and

conduct educational outreach) at years 1, 2, 5, 10, 15, 20, and 25, which equates to $60,000 per event (net present value of zero); and engineering and consulting support at years 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, and 30, which equates to $120,000 per event (net present value of zero). All costs include 20% contingency.

26. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 25 over 30 years with a 7% discount factor.

Table 11-1a. Comparative Analysis of Remedial Alternatives for Residential Properties
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Alternative ID	Description	Detailed Evaluation Criteria[1]						
		Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility and/or Volume	Short-Term Effectiveness MMBtu/Tons CO2e	Implementability	Cost in millions ($M)
RS-1	No action	Would be protective in areas where removals have been conducted. Would not be protective for the one 0.25-acre property where access was denied or if other residential use areas are identified. Would not be protective in the long term as it would not include soil management for residuals remaining at depth.	Does not comply with ARARs.	Would not achieve long-term effectiveness or permanence for the one remaining property with surface soil concentrations ≥1 mg/kg. Does not include a soil management plan for residential areas with subsurface concentrations <10 mg/kg.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Effectiveness is in place; no additional short-term impacts. 0 | 0	Implementable	0
RS-2	Excavation and on- or off-site disposal for surface soil with PCB concentrations of ≥1.0 mg/kg and subsurface soil PCB concentrations of ≥10.0 mg/kg	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent over the long term.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Short-term impacts similar to previous removals and manageable. 1,775 | 133	Implementable	0.4
RS-3	Excavation and on- or off-site disposal for surface soil and subsurface soil with PCB concentrations of ≥ 1.0 mg/kg	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent over the long term.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Significant but manageable short-term impacts, similar to those from previous actions, but will last longer to address deeper soils. 13,147 | 1,039	Implementable, but would take longer and involve additional logistics to address deeper soils.	1.4

[1] National Contingency Plan evaluation criteria also include community and state acceptance, these will be evaluated by the United States Environmental Protection Agency.
ARAR: applicable or relevant and appropriate requirement
CO2e: carbon dioxide equivalent
mg/kg: milligram(s) per kilogram
MMBtu: one million British Thermal Units
NTC: non-time-critical
PCB: polychlorinated biphenyl

Table 11-1b. Comparative Analysis of Remedial Alternatives for Interim Measure Areas
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Alternative ID	Description	Detailed Evaluation Criteria[1]						
		Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility and/or Volume	Short-Term Effectiveness MMBtu/Tons CO2e	Implementability	Cost in millions ($M)
IM-1	No action	Protective, except with no long-term monitoring to ensure ongoing protection.	Does not comply with ARARs.	Effective and permanent except with no long-term monitoring to ensure continued performance.	Does not include treatment; would not reduce toxicity, mobility, or volume.	No short-term actions or negative impacts. 0 / 0	Implementable	0
IM-2	Long-term monitoring and maintenance and soil management	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent except soil is left in place.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Minimal short-term impacts associated with putting deed restrictions in place, monitoring and repairs, if needed. 2,093,838 / 17,992	Implementable and would require minimal coordination with the landowner.	0.4
IM-3	Excavation and on- or off-site disposal for outfield surface soil in Field A and between Fields A and D, and long-term soil management for PCBs ≥1.0 mg/kg in and between outfield soil on Fields C and D and at depth	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Moderate short-term impacts associated with providing advance soil management support for surface soil in Field A associated with closing one softball field at the complex to implement excavation and backfilling activities. Limited impacts for ongoing O&M at the other IMs. 2,099,774 / 18,418	Implementable and would require some coordination with the landowner for the scheduling of remediation activities to accommodate planned recreational activities at Field A, and the softball complex in general.	1.5
IM-4	Excavation and on- or off-site disposal for outfield surface soil in and between Fields A, C, and D, and long-term soil management for PCBs ≥1.0 mg/kg in soil at depth	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Significant short-term impacts associated with providing advance soil management support for surface soil in Fields A, C, and D. These impacts are associated with closing three softball fields at the complex to implement excavation and backfilling activities. Limited impacts for ongoing O&M at the other IMs. 2,101,952 / 18,577	Implementable and would require an increased level of coordination with the landowner for the scheduling of remediation activities to accommodate planned recreational activities at Field A, C, and D, and the softball complex in general.	3.2

Table 11-1b. Comparative Analysis of Remedial Alternatives for Interim Measure Areas
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Alternative ID	Description	Detailed Evaluation Criteria[1]						
		Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility and/or Volume	Short-Term Effectiveness MMBtu/Tons CO2e		Implementability	Cost in millions ($M)
IM-5	Excavation and on- or off-site disposal for outfield surface soil in and between Fields A, C, and D; excavation and off-site disposal of subsurface soil with PCB concentrations ≥ 50 mg/kg in Field C; and long-term soil management for PCBs ≥1.0 mg/kg in soil at depth	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Significant short-term impacts associated with providing advance soil management support for surface soil in Fields A, C, and D and subsurface soil with PCB concentrations ≥ 50 mg/kg in Field C. These impacts are associated with closing three softball fields at the complex to implement excavation and backfilling activities. Limited impacts for ongoing O&M at the other IMs.		Implementable and would require an increased level of coordination with the landowner for the scheduling of remediation activities to accommodate planned recreational activities at Field A, C and D, and the softball complex in general.	3.2
						2,101,998	18,581		

[1] National Contingency Plan evaluation criteria also include community and state acceptance, these will be evaluated by the United States Environmental Protection Agency.

ARAR: applicable or relevant and appropriate requirement
CO2e: carbon dioxide equivalent
IM: interim measure
mg/kg: milligram(s) per kilogram
MMBtu: one million British Thermal Units
O&M: operation and maintenance
PCB: polychlorinated biphenyl

Table 11-1c. Comparative Analysis of Remedial Alternatives for Nonresidential Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Alternative ID	Description	Detailed Evaluation Criteria[1]						
		Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility and/or Volume	Short-Term Effectiveness MMBtu / Tons CO2e	Implementability	Cost in millions (SM)
NRS-1	No action	Not protective of human health or the environment.	Does not comply with ARARs.	Does not provide long-term protectiveness or permanence.	Does not include treatment; would not reduce toxicity, mobility or volume.	No short-term negative impacts from construction. Current conditions and associated impacts would continue. 0 / 0	Implementable	0
NRS-2	Excavation of soil in 0-0.5-foot soil horizon, off-site disposal, and long-term soil management including deed restrictions as needed	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Minor short-term impacts to associated with local construction and truck traffic as compared to the other remedial alternatives (except for no action). 79,111 / 6,255	Minor implementability challenges for obtaining property access from a range of landowners and physically accessing portions of the floodplain adject to the Choccolocco Creek.	30.9
NRS-3	Excavation of soil in 0-0.5-foot soil horizon, off-site disposal, limited advance surface soil management for PCBs ≥50 mg/kg, long-term soil management including deed restrictions as needed	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Minor short-term impacts to associated with local construction and truck traffic would be increased relative to NRS-2. 99,451 / 7,894	Moderate implementable challenges with more coordination required in comparison to NRS-2 for removing additional soil in EU1.	37.7
NRS-4	Excavation of soil in the 0-0.5-foot soil horizon, off-site disposal, site-wide advance surface soil management for PCBs ≥50 mg/kg, long-term soil management including deed restrictions as needed	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Moderate short-term impacts to associated with local construction and truck traffic as compared NRS-2 and NRS-3. 201,595 / 16,029	Significant implementable challenges in comparison to NRS-2 and NRS-3 associated with removing additional soil across the OU.	70.1
NRS-5	Excavation of soil in 0-0.5-foot soil horizon, off-site disposal, site-wide advance surface and subsurface soil management for PCBs ≥50 mg/kg, and long-term soil management	Provides protection of human health and the environment.	Complies with ARARs.	Effective and permanent.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Moderate to significant short-term impacts to associated with local construction and truck traffic as compared NRS-2, NRS-3, and NRS-4. 411,458 / 33,068	Significant implementable challenges in comparison to NRS-2, NRS-3, and NRs-4 associated with removing additional subsurface soil across the OU.	161.3

[1] National Contingency Plan evaluation criteria also include community and state acceptance, these will be evaluated by United States Environmental Protection Agency.
ARAR: applicable or relevant and appropriate requirement
CO2e: carbon dioxide equivalent
mg/kg: milligram(s) per kilogram
MMBtu: one million British Thermal Units
NRS: nonresidential soil
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration

Table 11-1d. Comparative Analysis of Remedial Alternatives for Sediment and Creek Bank Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Alternative ID	Description	Detailed Evaluation Criteria[1]						
		Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility and/or Volume	Short-Term Effectiveness MMBtu/Tons CO2e	Implementability	Cost in millions ($M)
SED-1	No action	Not protective of human health or the environment.	Does not comply with ARARs.	Does not provide long-term protectiveness or permanence.	Does not include treatment; would not reduce toxicity, mobility, or volume.	Current conditions and associated impacts continue. 0 / 0	Implementable	0.0
SED-2	Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment for sediment in low-energy areas; long-term soil management; and MNR of sediment	Protective of human health or the environment	Complies with TSCA and construction-related ARARs (working, dredging, etc., in a waterway). May take several years of MNR to achieve the AWQC of 0.014µg/L PCBs.	Effective over the long term and permanent. Long-term OMM includes monitoring and repair, if needed, of creek banks and monitoring of effectiveness of in-place treatment.	Includes in-place treatment of sediment in low energy areas to reduce the mobility and bioavailability of the PCBs. Would not directly reduce toxicity or volume of PCBs in sediment.	Less impactful than SED-4, SED-6 and SED-7 due to smaller dredge volumes and less truck traffic for off-site disposal and backfill. This is the least impactful of the remedial alternatives for sediment and creek bank areas. 617,911 / 18,854	Minor implementability challenges for coordinating with local landowners during the design and implementation of the creek bank source control measures.	43.6
SED-3	Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment of sediment in low-energy areas; long-term soil management; and MNR of sediment	Protective of human health or the environment	Complies with TSCA and construction-related ARARs (working, dredging, etc., in a waterway). May take several years of MNR to achieve the AWQC of 0.014 µg/L PCBs.	Effective over the long term and permanent. Long-term OMM includes monitoring and repair, if needed, of creek banks and monitoring of effectiveness of in-place treatment. Enhanced creek bank stabilization approach reduces the time to achieve PRGs from 30 to 35 years to approximately 20 years.	Includes in-place treatment of sediment in low-energy areas to reduce the mobility and bioavailability of the PCBs. Would not directly reduce toxicity or volume of PCBs in sediment.	Less impactful than SED-4, SED-6 and SED-7 due to smaller dredge volumes and less truck traffic for off-site disposal and backfill. 534,843 / 14,497	Moderate implementability challenges relative to SED-4 for coordinating with additional local landowners during the design and implementation of the creek bank source control measures.	47.4
SED-4	Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment	Protective of human health or the environment.	Complies with TSCA and construction-related ARARs (working, dredging, etc., in a waterway). May take several years of MNR to achieve the AWQC of 0.014 µg/L PCBs.	Effective over the long term and permanent. Long-term OMM includes monitoring and repair, if needed, of creek bank remedy.	Does not include treatment; would not reduce toxicity, mobility, or volume.	More impactful than SED-2, SED-3, and SED-5 due to water column impacts associated with larger dredge volumes and increased truck traffic for off-site disposal and backfill. 540,909 / 14,967	Minor implementability challenges for coordinating with local landowners during the design and implementation of the creek bank source control measures.	49.7

Table 11-1d. Comparative Analysis of Remedial Alternatives for Sediment and Creek Bank Soil
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Alternative ID	Description	Detailed Evaluation Criteria[1]						
		Protectiveness	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility and/or Volume	Short-Term Effectiveness MMBtu/Tons CO2e	Implementability	Cost in millions ($M)
SED-5	Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; capping for low-energy areas; long-term soil management; and MNR of sediment	Protective of human health or the environment.	Complies with TSCA and construction-related ARARs (working, dredging, etc., in a waterway). May take several years of MNR to achieve the AWQC of 0.014 µg/L PCBs.	Effective over the long term and permanent. Long-term OMM includes monitoring and repair, if needed, of creek banks and cap remedies. Enhanced creek bank stabilization approach reduces the time to achieve PRGs from 30 to 35 years to approximately 20 years.	Does not include treatment; would not reduce toxicity, mobility or volume.	Less impactful than SED-4, SED-6, and SED-7 due to smaller dredge volumes and less truck traffic for off-site disposal and backfill. 542,431 / 14,946	Moderate implementability challenges relative to SED-4 for coordinating with additional local landowners during the design and implementation of the creek bank source control measures.	50.6
SED-6	Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management, and MNR of sediment	Protective of human health or the environment.	Complies with TSCA and construction-related ARARs (working, dredging, etc. in a waterway). May take several years of MNR to achieve the AWQC of 0.014 µg/L PCBs.	Effective over the long term and permanent. Long-term OMM includes monitoring and repair, if needed, of creek bank remedy. Enhanced creek bank stabilization approach reduces the time to achieve PRGs from 30 to 35 years to approximately 20 years.	Does not include treatment; would not reduce toxicity, mobility, or volume.	More impactful than SED-2, SED-3 and SED-5 due to water column impacts associated with larger dredge volumes and increased truck traffic for off-site disposal and backfill. 527,550 / 13,875	Moderate implementability challenges relative to SED-4 for coordinating with additional local landowners during the design and implementation of the creek bank source control measures.	53.5
SED-7	Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of contaminated sediment in high- and low-energy areas; off-site treatment of PTW; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment	Protective of human health or the environment.	Complies with TSCA and construction-related ARARs (working, dredging, etc., in a waterway). May take several years of MNR to achieve the AWQC of 0.014 µg/L PCBs.	Effective over the long term and permanent. Long-term OMM includes monitoring and repair, if needed, of creek bank remedy. Enhanced creek bank stabilization approach reduces the time to achieve PRGs from 30 to 35 years to approximately 20 years.	Includes off-site treatment to reduce the toxicity, mobility, and volume of PCBs.	More impactful than SED-2, SED-3, and SED-5 due to water column impacts associated with larger dredge volumes and increased truck traffic for off-site disposal and backfill. 549,657 / 16,135	Moderate implementability challenges relative to SED-2 and SED-4 for coordinating with local landowners during the design and implementation of the creek bank source control measures. Significant implementability challenges in comparison to the other remedial alternatives associated with ensuring the long-term and consistent availability of an off-site treatment facility and the availability of long-haul trucks that are in short supply.	54.0

[1] National Contingency Plan evaluation criteria also include community and state acceptance, these will be evaluated by USEPA.

µg/L: microgram(s) per liter
ARAR: applicable or relevant and appropriate requirement
AWQC: ambient water quality criteria
CO2e: carbon dioxide equivalent
mg/kg: milligram(s) per kilogram
MMBtu: one million British Thermal Units
MNR: monitored natural recovery
NTE: not to exceed
OMM: operation monitoring and maintenance
PCB: polychlorinated biphenyl
RAL: remedial action level
SED: sediment
SWAC: surface-weighted average concentration
TSCA: Toxic Substance Control Act

Table 11-2a. Environmental Analysis Footprint Summary for Residential Soil Alternatives
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Core Element	Metric		Unit of Meaure	Footprint	
				RS-2	RS-3
Materials & Waste	M&W-1	Refined materials used on-site	Tons	540.9	12,657.0
	M&W-2	% of refined materials from recycled or reused material	%	0.0%	0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000
	M&W-4	% of unrefined materials from recycled or reused material	%		
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0
	M&W-6	On-site nonhazardous waste disposed of off-site	Tons	600.0	11,100.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%	0.0%	0.0%
Water (used on-site)	W-1	Public water use	MG	0.0007	0.004
	W-2	Groundwater use	MG	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	1,774.5	13,147.2
	E-2	Energy voluntarily derived from renewable resources			
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.016	0.150
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	689.3	11,489.9
	A-2	On-site HAP emissions	Pounds	0.0	0.3
	A-3	Total NOx, SOx, and PM emissions	Pounds	1,490.4	20,367.7
	A-3A	Total NOx emissions	Pounds	1,052.9	13,715.9
	A-3B	Total SOx emissions	Pounds	144.6	1,800.8
	A-3C	Total PM emissions	Pounds	293.0	4,851.1
	A-4	Total HAP emissions	Pounds	53.0	105.4
	A-5	Total greenhouse gas emissions	Tons CO_2e[1]	133.2	1,038.8

1. Total greenhouse gases emissions include consideration of carbon dioxide, methane, and nitrous oxide emissions.

The above metrics are consistent with USEPA's *Methodology for Understanding and Reducing a Project's Environmental Footprint* (EPA 542-R-12-002) February 2012.

CO^2e: carbon dioxide equivalents of global warming potential

HAPs: hazardous air pollutants

MG: millions of gallons

MMBtu: I million British thermal units

MWh: megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)

NOx: nitrous oxide

PM: particulate matter

REC: renewable energy credits

SOx: sulfur oxide

Tons: short tons (2,000 pounds)

Table 11-2b. Environmental Analysis Footprint Summary for Interim Measure Alternatives
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Core Element	Metric		Unit of Measure	IM-2	IM-3	IM-4	IM-5
Materials & Waste	M&W-1	Refined materials used on-site	Tons	3,609.4	8,363.3	16,496.3	16,536.8
	M&W-2	% of refined materials from recycled or reused material	%	0.0%	0.0%	0.0%	0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.000
	M&W-4	% of unrefined materials from recycled or reused material	%				
	M&W-5	On-site hazardous waste disposed of off-site	Tons	0.0	0.0	0.0	82.0
	M&W-6	On-site nonhazardous waste disposed of off-site	Tons	0.0	5,611.0	14,722.0	14,681.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%		0.0%	0.0%	0.0%
Water (used on-site)	W-1	Public water use	MG	0.0	0.0	0.0	0.0
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	2,093,837.8	2,099,774.4	2,101,951.8	2,101,998.2
	E-2	Energy voluntarily derived from renewable resources					
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.000	0.039	0.035	0.036
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	116.9	3,721.3	2,831.9	2,838.6
	A-2	On-site HAP emissions	Pounds	0.0	0.1	0.1	0.1
	A-3	Total NOx, SOx, and PM emissions	Pounds	569,465.2	578,147.8	584,544.2	584,621.0
	A-3A	Total NOx emissions	Pounds	125,600.4	130,986.4	132,896.1	132,945.1
	A-3B	Total SOx emissions	Pounds	405,745.8	406,634.1	407,423.8	407,430.5
	A-3C	Total PM emissions	Pounds	38,119.1	40,527.2	44,224.3	44,245.4
	A-4	Total HAP emissions	Pounds	55,689.0	55,731.4	55,752.5	55,752.8
	A-5	Total greenhouse gas emissions	Tons CO_2e[1]	17,991.9	18,418.1	18,577.2	18,580.9

1. Total greenhouse gases emissions include consideration of carbon dioxide, methane, and nitrous oxide emissions.
The above metrics are consistent with USEPA's *Methodology for Understanding and Reducing a Project's Environmental Footprint* (EPA 542-R-12-002) February 2012.

CO2e: carbon dioxide equivalents of global warming potential

HAPs: hazardous air pollutants

MG: millions of gallons

MMBtu: I million British thermal units

MWh: megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)

NOx: nitrous oxide

PM: particulate matter

REC: renewable energy credits

SOx: sulfur oxide

Tons: short tons (2,000 pounds)

Table 11-2c. Environmental Analysis Footprint Summary for Nonresidential Soils Alternatives
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Core Element	Metric		Unit of Measure	Footprint			
				NRS-2	NRS-3	NRS-4	NRS-5
Materials & Waste	M&W-1	Refined materials used on-site	Tons	63,553.7	85,333.0	227,714.5	63,546.2
	M&W-2	% of refined materials from recycled or reused material	%	0.0%	0.0%	0.0%	0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.000
	M&W-4	% of unrefined materials from recycled or reused material	%				
	M&W-5	On-site hazardous waste disposed of off-site	Tons	60,340.0	77,475.5	150,990.0	429,440.0
	M&W-6	On-site nonhazardous waste disposed of off-site	Tons	25,860.0	33,000.0	64,710.0	25,860.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%	0.0%	0.0%	0.0%	0.0%
Water (used on-site)	W-1	Public water use	MG	0.215	0.224	0.3	0.2
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	79,111.2	99,450.5	201,595.3	411,458.1
	E-2	Energy voluntarily derived from renewable resources					
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.502	0.566	1.229	5.979
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	30,776.0	38,856.1	75,239.0	157,289.9
	A-2	On-site HAP emissions	Pounds	0.9	1.1	2.2	4.6
	A-3	Total NOx, SOx, and PM emissions	Pounds	133,567.9	169,430.4	340,723.6	709,400.5
	A-3A	Total NOx emissions	Pounds	81,718.4	103,376.1	211,077.4	436,269.0
	A-3B	Total SOx emissions	Pounds	12,701.9	15,939.1	31,482.6	62,893.3
	A-3C	Total PM emissions	Pounds	39,147.6	50,115.2	98,163.6	210,238.2
	A-4	Total HAP emissions	Pounds	605.7	762.3	1,545.8	3,087.9
	A-5	Total greenhouse gas emissions	Tons CO_2e[1]	6,254.7	7,893.6	16,038.6	33,068.4

1. Total greenhouse gases emissions include consideration of carbon dioxide, methane, and nitrous oxide emissions.

The above metrics are consistent with USEPA's *Methodology for Understanding and Reducing a Project's Environmental Footprint* (EPA 542-R-12-002) February 2012.

CO_2e: carbon dioxide equivalents of global warming potential

HAPs: hazardous air pollutants

MG: millions of gallons

MMBtu: I million British thermal units

MWh: megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)

NOx: nitrous oxide

PM: particulate matter

REC: renewable energy credits

SOx: sulfur oxide

Tons: short tons (2,000 pounds)

Table 11-2d. Environmental Analysis Footprint Summary for Creek Bank and Sediment Alternatives
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Core Element	Metric		Unit of Measure	Footprint					
				SED-2	SED-3	SED-4	SED-5	SED-6	SED-7
Materials & Waste	M&W-1	Refined materials used on-site	Tons	97,268.5	94,143.1	105,713.1	199,306.6	105,713.1	105,713.1
	M&W-2	% of refined materials from recycled or reused material	%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	M&W-3	Unrefined materials used on-site	Tons	0.000	0.000	0.000	0.000	0.000	0.000
	M&W-4	% of unrefined materials from recycled or reused material	%						
	M&W-5	On-site hazardous waste disposed of off-site	Tons	27,900.0	27,900.0	48,200.0	37,200.0	48,200.0	48,200.0
	M&W-6	On-site nonhazardous waste disposed of off-site	Tons	39,200.0	58,800.0	39,200.0	39,200.0	39,200.0	39,200.0
	M&W-7	Recycled or reused waste	Tons	0.0	0.0	0.0	0.0	0.0	0.0
	M&W-8	% of total potential waste recycled or reused	%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Water (used on-site)	W-1	Public water use	MG	0.041	0.007	0.007	0.007	0.041	0.0
	W-2	Groundwater use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-3	Surface water use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-4	Reclaimed water use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-5	Storm water use	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-6	User-defined water resource #1	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-7	User-defined water resource #2	MG	0.0	0.0	0.0	0.0	0.0	0.0
	W-8	Wastewater generated	MG	0.0	0.0	0.0	0.0	0.0	32.0
Energy	E-1	Total energy used (on-site and off-site)	MMBtu	617,910.7	534,843.2	540,908.9	542,430.9	527,549.8	549,656.5
	E-2	Energy voluntarily derived from renewable resources							
	E-2A	On-site renewable energy generation or use + on-site biodiesel use + biodiesel and other renewable resource use for transportation	MMBtu	0.0	0.0	0.0	0.0	0.0	0.0
	E-2B	Voluntary purchase of renewable electricity	MWh	0.0	0.0	0.0	0.0	0.0	0.0
	E-3	Voluntary purchase of RECs	MWh	0.0	0.0	0.0	0.0	0.0	0.0
	E-4	On-site grid electricity use	MWh	0.976	0.976	1.349	1.140	1.349	1.349

Table 11-2d. Environmental Analysis Footprint Summary for Creek Bank and Sediment Alternatives
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Core Element	Metric		Unit of Measure	Footprint					
				SED-2	SED-3	SED-4	SED-5	SED-6	SED-7
Air	A-1	On-site NOx, SOx, and PM emissions	Pounds	64,449.2	77,283.0	72,548.3	70,004.4	57,170.8	77,343.6
	A-2	On-site HAP emissions	Pounds	1.9	2.2	2.1	2.0	1.7	2.2
	A-3	Total NOx, SOx, and PM emissions	Pounds	354,762.4	312,907.5	321,202.0	317,112.5	304,777.8	329,288.9
	A-3A	Total NOx emissions	Pounds	178,217.3	170,693.8	177,012.8	177,445.9	162,018.0	183,548.1
	A-3B	Total SOx emissions	Pounds	133,082.4	94,477.3	95,144.4	95,006.1	94,151.2	96,540.0
	A-3C	Total PM emissions	Pounds	43,462.7	47,736.3	49,044.8	44,660.4	48,608.6	49,200.8
	A-4	Total HAP emissions	Pounds	11,617.5	11,598.3	11,648.2	11,678.5	11,553.5	11,737.7
	A-5	Total greenhouse gas emissions	Tons CO_2e[1]	18,853.6	14,497.0	14,967.2	14,946.3	13,874.6	16,134.7

1. Total greenhouse gases emissions include consideration of carbon dioxide, methane, and nitrous oxide emissions.

The above metrics are consistent with USEPA's *Methodology for Understanding and Reducing a Project's Environmental Footprint* (EPA 542-R-12-002) February 2012.

CO_2e: carbon dioxide equivalents of global warming potential

HAPs: hazardous air pollutants

MG: millions of gallons

MMBtu: I million British thermal units

MWh: megawatt hours (i.e., thousands of kilowatt-hours or millions of Watt-hours)

NOx: nitrous oxide

PM: particulate matter

REC: renewable energy credits

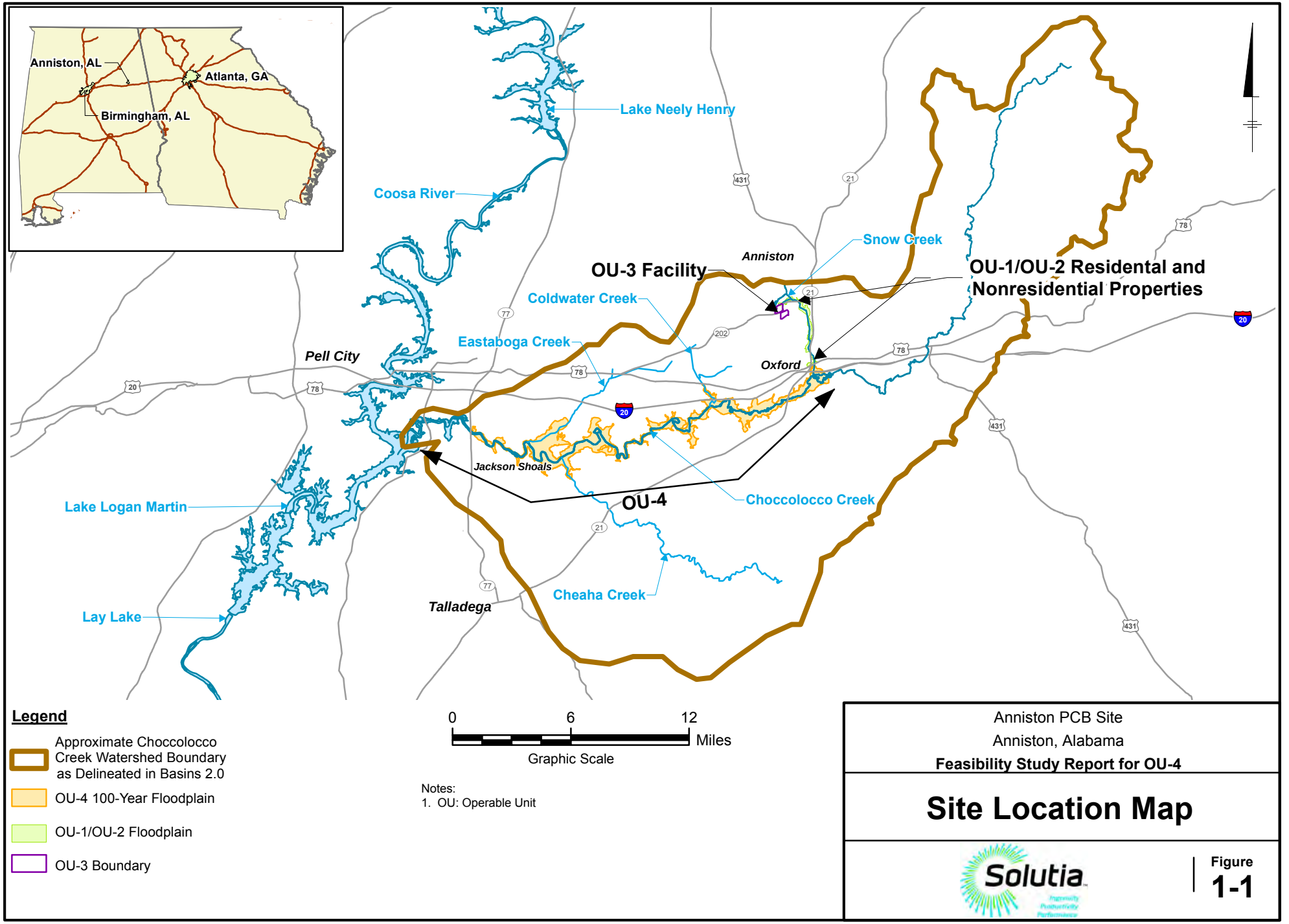
SOx: sulfur oxide

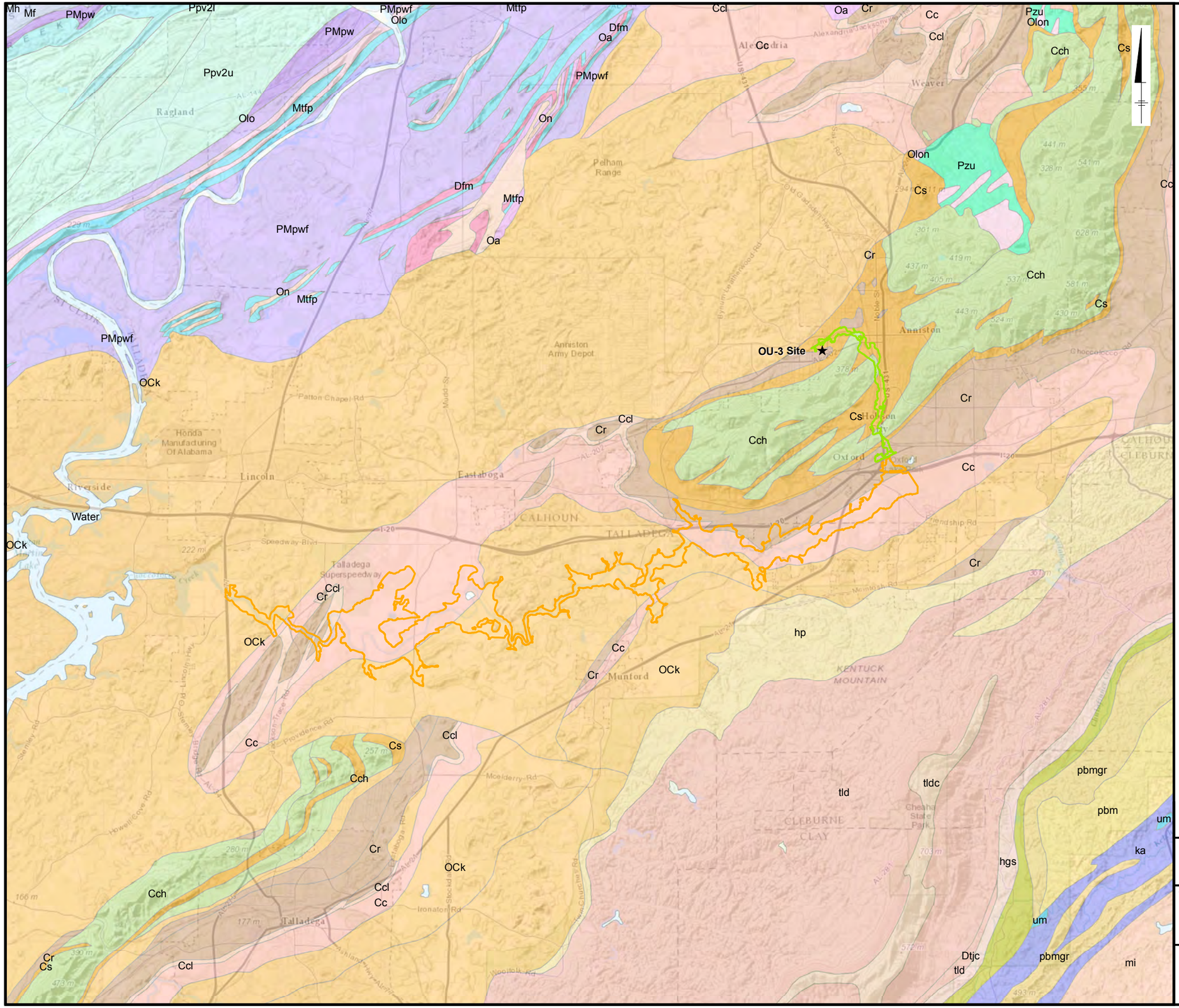
Tons: short tons (2,000 pounds)

Table 11-3. Remedial Alternatives Cost Summary
Feasibility Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Remedial Alternative		Capital Costs	Annual Long-Term Cost	Administrative/ Management Cost	Contingency Costs	Net Present Worth Cost for Long-Term O&M	Net Present Worth Cost for Remedial Alternative (Rounded)
Residential Soils (RS)	RS-1	$0	$0	$0	$0	$0	$0
	RS-2	$105,600	$0	$40,000	$29,120	$225,600	$400,000
	RS-3	$1,044,500	$0	$114,900	$231,880	$0	$1,390,000
Interim Measures (IM)	IM-1	$0	$0	$0	$0	$0	$0
	IM-2	$0	$13,500 to $408,500	$0	$0	$353,900	$400,000
	IM-3	$926,600	$13,500 to $408,500	$60,000	$197,320	$353,900	$1,500,000
	IM-4	$2,213,200	$13,500 to $408,500	$133,300	$469,300	$353,900	$3,200,000
	IM-5	$2,228,400	$13,500 to $408,500	$133,500	$472,380	$353,900	$3,200,000
Nonresidential Soils (NRS)	NRS-1	$0	$0	$0	$0	$0	$0
	NRS-2	$23,708,700	$131,000	$878,500	$4,917,440	$1,369,300	$30,900,000
	NRS-3	$29,262,700	$131,000	$1,031,800	$6,058,900	$1,369,300	$37,700,000
	NRS-4	$55,398,400	$131,000	$1,844,800	$11,448,640	$1,369,300	$70,100,000
	NRS-5	$129,604,200	$131,000	$3,698,900	$26,660,620	$1,369,300	$161,300,000
Sediment (SED)	SED-1	$0	$0	$0	$0	$0	$0
	SED-2	$24,864,500	$0	$1,490,700	$5,271,040	$11,991,200	$43,600,000
	SED-3	$27,753,700	$0	$1,750,700	$5,900,880	$11,991,200	$47,400,000
	SED-4	$29,850,800	$0	$1,570,400	$6,284,240	$11,991,200	$49,700,000
	SED-5	$29,217,900	$0	$1,713,400	$6,186,260	$13,523,200	$50,600,000
	SED-6	$32,742,000	$0	$1,830,600	$6,914,520	$11,991,200	$53,500,000
	SED-7	$33,190,300	$0	$1,830,600	$7,004,180	$11,991,200	$54,000,000

Figures


Anniston, AL
Atlanta, GA
Birmingham, AL
Lake Neely Henry
Coosa River
Snow Creek
Anniston
OU-3 Facility
OU-1/OU-2 Residental and
Nonresidential Properties
Coldwater Creek
Eastaboga Creek
Pell City
Oxford
Jackson Shoals
OU-4
Choccolocco Creek
Lake Logan Martin
Cheaha Creek
Talladega
Lay Lake
Legend
Approximate Choccolocco Creek Watershed Boundary as Delineated in Basins 2.0
OU-4 100-Year Floodplain
OU-1/OU-2 Floodplain
OU-3 Boundary
0
6
12
Miles
Graphic Scale
Notes:
1. OU: Operable Unit
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4
Site Location Map
Solutia
Figure
1-1



Legend

- ★ OU-3 Site
- OU-1/OU-2 100-Year Floodplain
- OU-4 100-Year Floodplain

Geologic Unit Descriptions

- Cc - Conasauga Formation
- Cch - Chilhowee Group Undifferentiated
- Ccl - Conasauga Formation Lower Shale Unit
- Cr - Rome Formation
- Cs - Shady Dolomite
- Dfm - Frog Mountain Sandstone
- Dtjc - Jemison Chert and Chulafinnee Schist Undifferentiated
- Mf - Floyd Shale
- Mh - Hartselle Sandstone
- Mtfp - Tuscumbia Limestone and Fort Payne Chert Undifferentiated
- OCk - Knox Group Undifferentiated
- Oa - Athens Shale
- Olo - Little Oak Limestone
- Olon - Little Oak and Newala Limestones Undifferentiated
- On - Newala Limestone
- PMpw - Parkwood Formation
- PMpwf - Parkwood Formation and Floyd Shale Undifferentiated
- Ppv2l - Pottsville Formation (Lower Part), Valley and Ridge
- Ppv2u - Pottsville Formation (Upper Part), Valley and Ridge
- Pzu - Paleozoic Shale Undifferentiated
- Water
- hgs - Hillabee Greenstone
- hp - Heflin Phyllite
- ka - Ketchepedrakee Amphilbolite
- mi - Mad Indian Group
- pbm - Poe Bridge Mountain Group
- pbmgr - Poe Bridge Mountain Group Graphitic Unit
- tld - Lay Dam Formation
- tldc - Cheaha Quartzite Member of the Lay Dam Formation
- um - Ultramafic Rock

References

1.) Digital Geologic Map of Alabama Polygons - Geological Survey of Alabama, 2006
2.) Basemap - Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

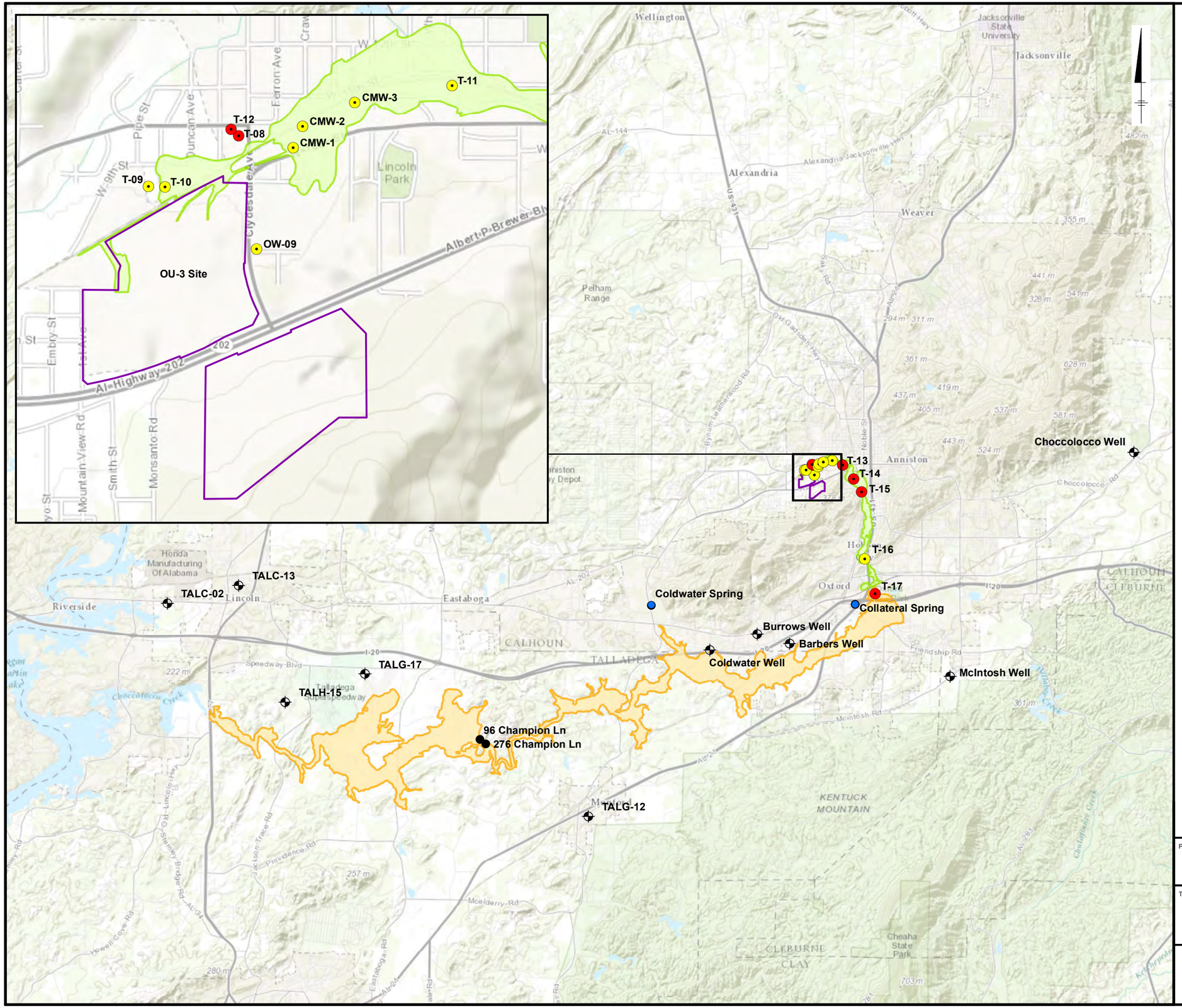
0 2.5 5 Miles

PROJECT
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

TITLE
OU-4 Regional Geologic Setting

Solutia
Ingenuity, Productivity, Performance

Figure 2-1



Legend

- Active Monitoring Well
- Abandoned Monitoring Well
- Private Well
- Public Water Supply Well
- Spring
- OU-3 Boundary
- OU-1/OU-2 100-Year Floodplain
- OU-4 100-Year Floodplain
- TALC-02 Well Identifier

NOTES

References

1.) Monitoring Well Locations - Golder, 2013
2.) Spring Locations - USGS National Water Information System
3.) Public Supply Well Locations - City of Oxford, 2013 and Hydrogeology and Vulnerability to Contamination of Major Aquifers in Alabama: Area 4 - Geological Survey of Alabama Circular 199 D, 2005.
4.) Basemap - Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

0 2.5 5 Miles

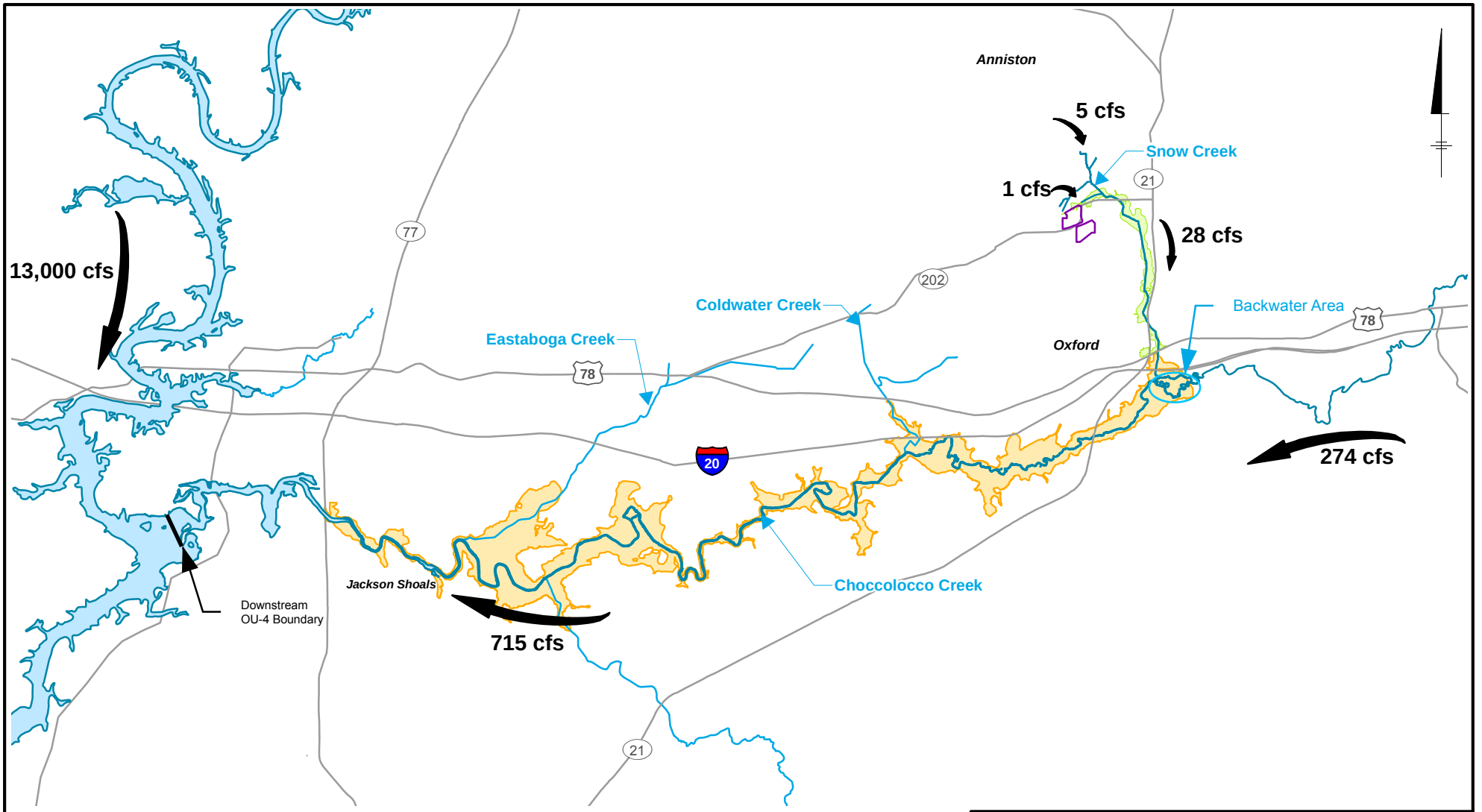
PROJECT
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

TITLE
Locations of Municipal Wells/Springs and Groundwater Investigation Wells

Solutia

Figure
2-2

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston (B0010291.2010.00001)
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F2-3_MeanStreamFlowRate.mxd 7/26/2019 1:49:26 PM



Legend

- OU-3 Boundary
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain

0 3 6 Miles

Graphic Scale

Notes:
1. cfs: cubic feet per second
   OU: operable unit

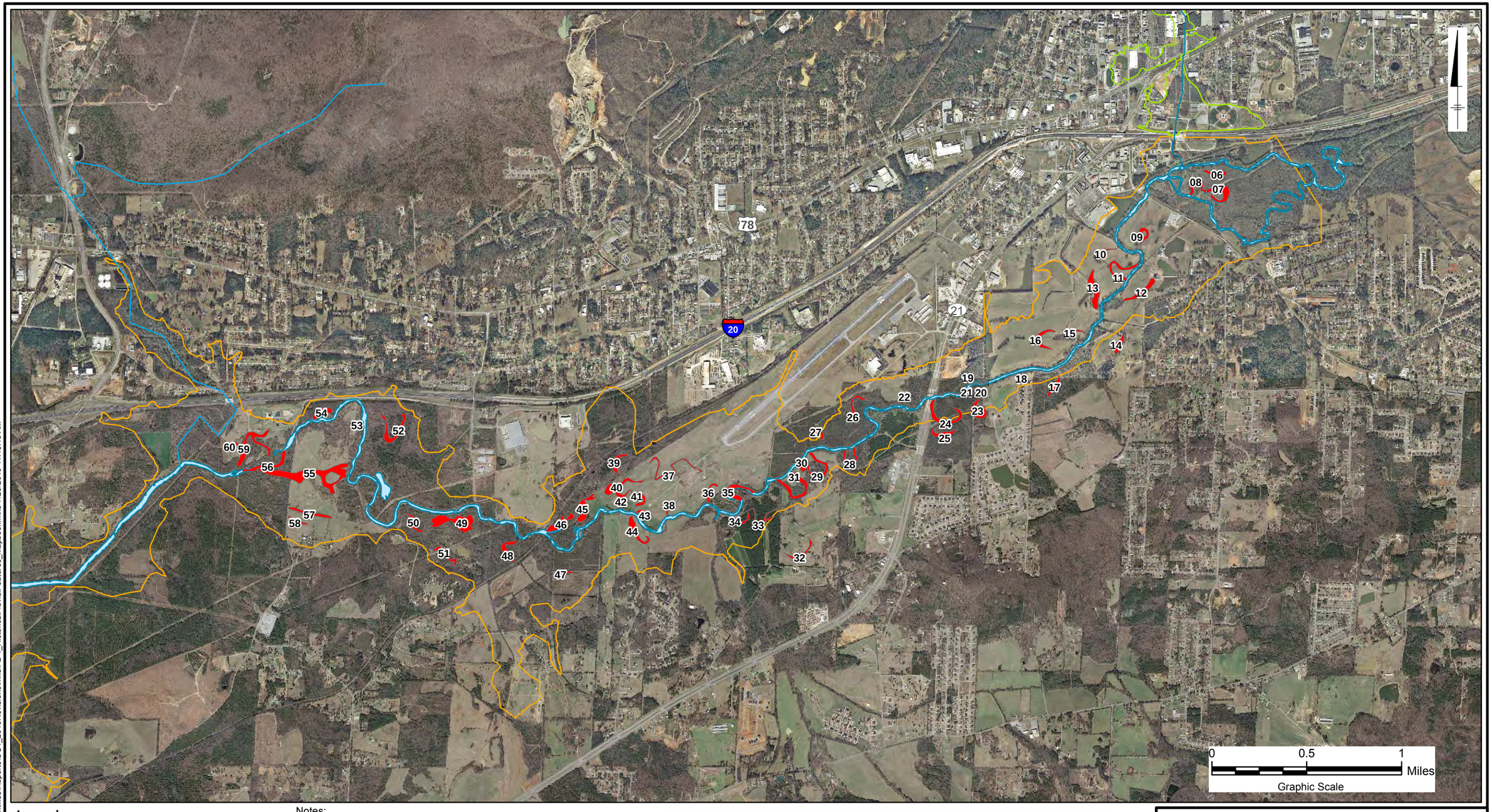
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Mean Stream Flow Rate in Cubic Feet per Second

Solutia

Figure
2-3

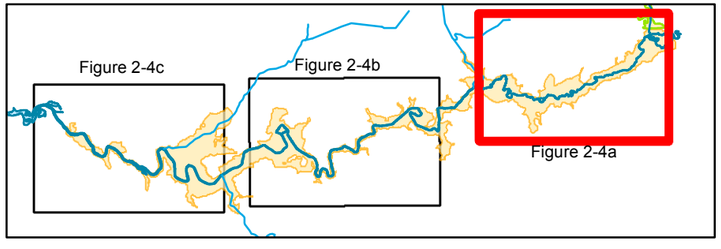


Legend

- Historical Fluvial Features
- Choccolocco Creek
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain

Notes:

1. Numbered historical fluvial features are described in Table 2-3.
2. Historical fluvial features from Mack, W.M. 2005. Environmental Photographic Interpretation Center (EPIC) Study Aerial Photographic Historical Analysis of Snow and Choccolocco Creek Channels, Calhoun and Talladega Counties, Alabama. Prepared for Environmental Sciences Division, National Exposure Research Laboratory, USEPA Office of Research and Development. Contract No. 68-D-00-267, July 2005.
3. OU: operable unit
   USEPA: United States Environmental Protection Agency
4. Aerial imagery provided by Calhoun and Talladega Counties.



Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Historical Fluvial Features

Solutia

Figure
2-4a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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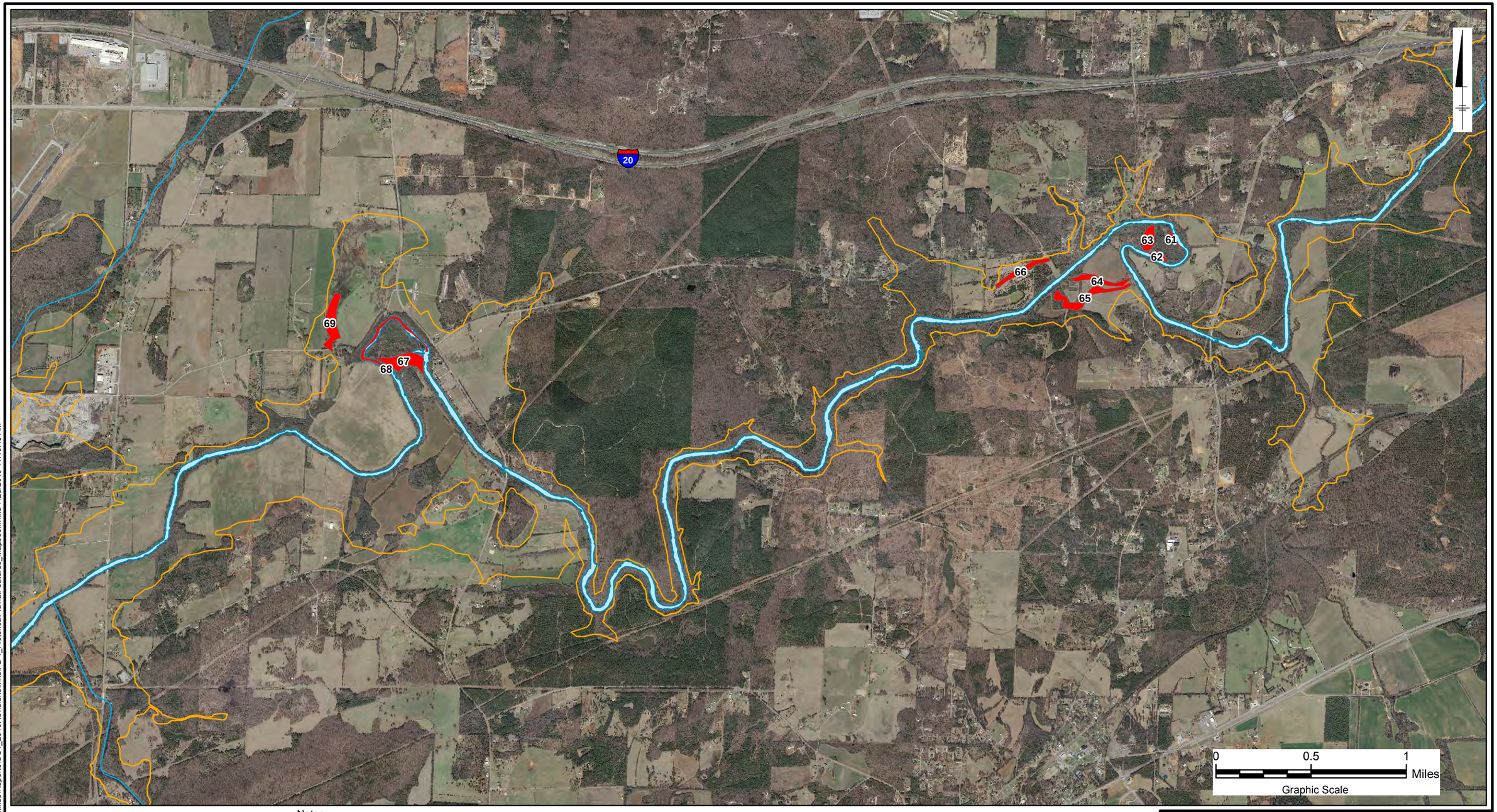
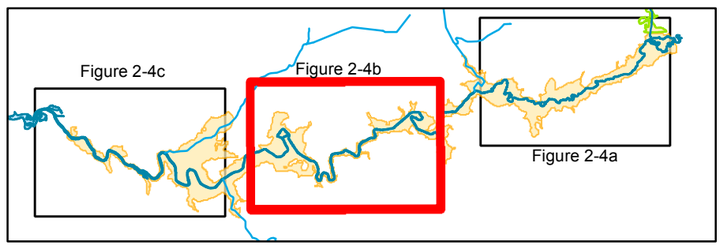


Legend

- Historical Fluvial Features
- Choccolocco Creek
- OU-4 100-Year Floodplain

Notes:

1. Numbered historical fluvial features are described in Table 2-3.
2. Historical fluvial features from Mack, W.M. 2005. Environmental Photographic Interpretation Center (EPIC) Study Aerial Photographic Historical Analysis of Snow and Choccolocco Creek Channels, Calhoun and Talladega Counties, Alabama. Prepared for Environmental Sciences Division, National Exposure Research Laboratory, USEPA Office of Research and Development. Contract No. 68-D-00-267, July 2005.
3. OU: operable unit
   USEPA: United States Environmental Protection Agency
4. Aerial imagery provided by Calhoun and Talladega Counties.



Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Historical Fluvial Features

Solutia

Figure
2-4b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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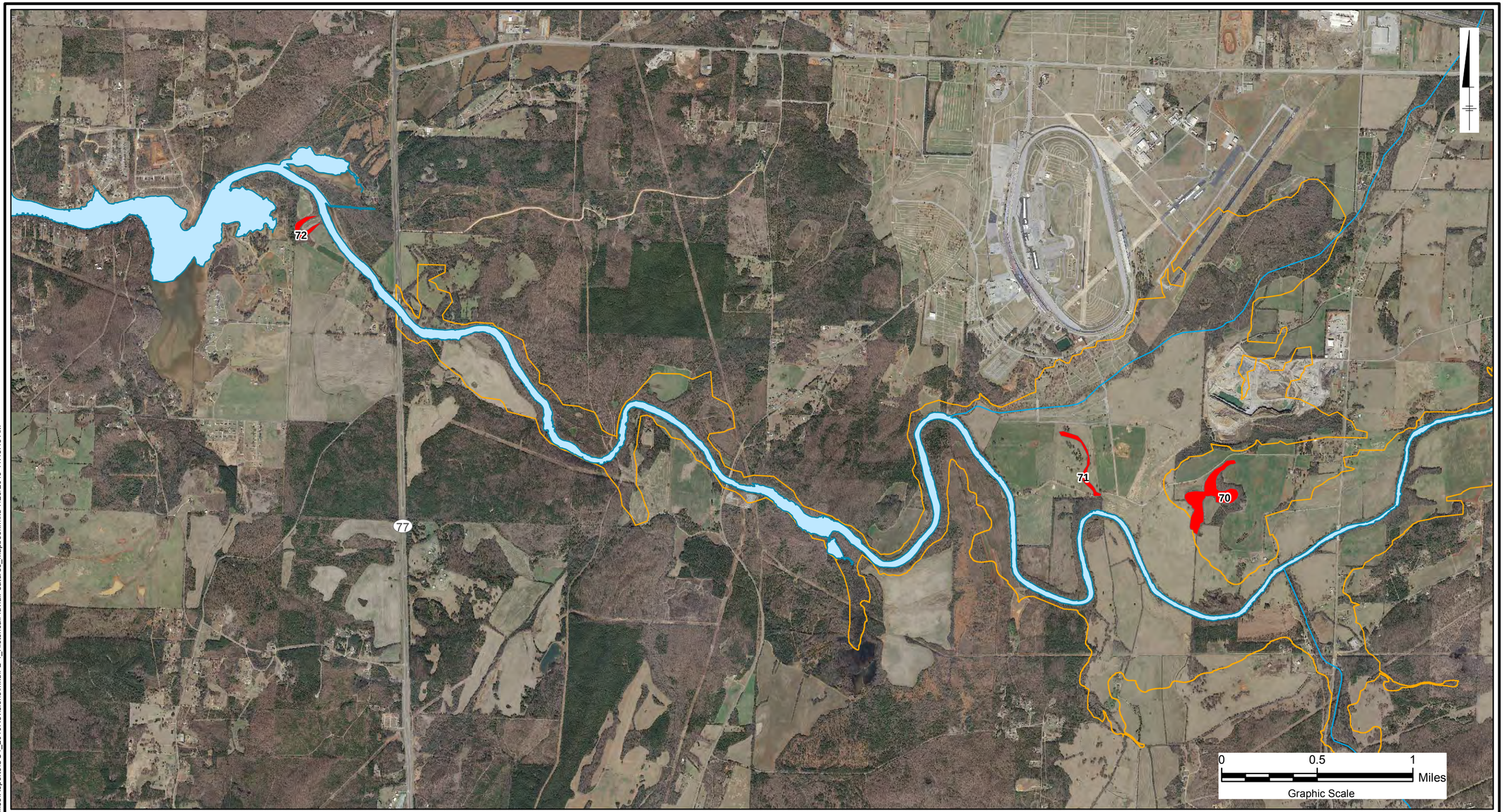
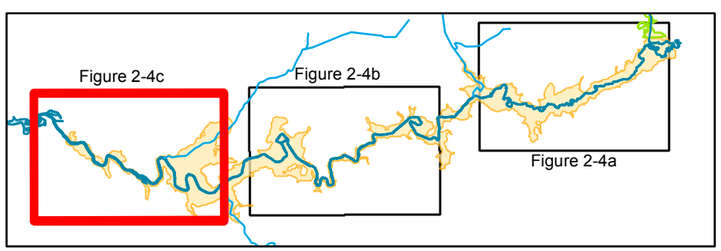


Legend

- Historical Fluvial Features
- Choccolocco Creek
- OU-4 100-Year Floodplain

Notes:

1. Numbered historical fluvial features are described in Table 2-3.
2. Historical fluvial features from Mack, W.M. 2005. Environmental Photographic Interpretation Center (EPIC) Study Aerial Photographic Historical Analysis of Snow and Choccolocco Creek Channels, Calhoun and Talladega Counties, Alabama. Prepared for Environmental Sciences Division, National Exposure Research Laboratory, USEPA Office of Research and Development. Contract No. 68-D-00-267, July 2005.
3. OU: operable unit
   USEPA: United States Environmental Protection Agency
4. Aerial imagery provided by Calhoun and Talladega Counties.



Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Historical Fluvial Features

Solutia

Figure
2-4c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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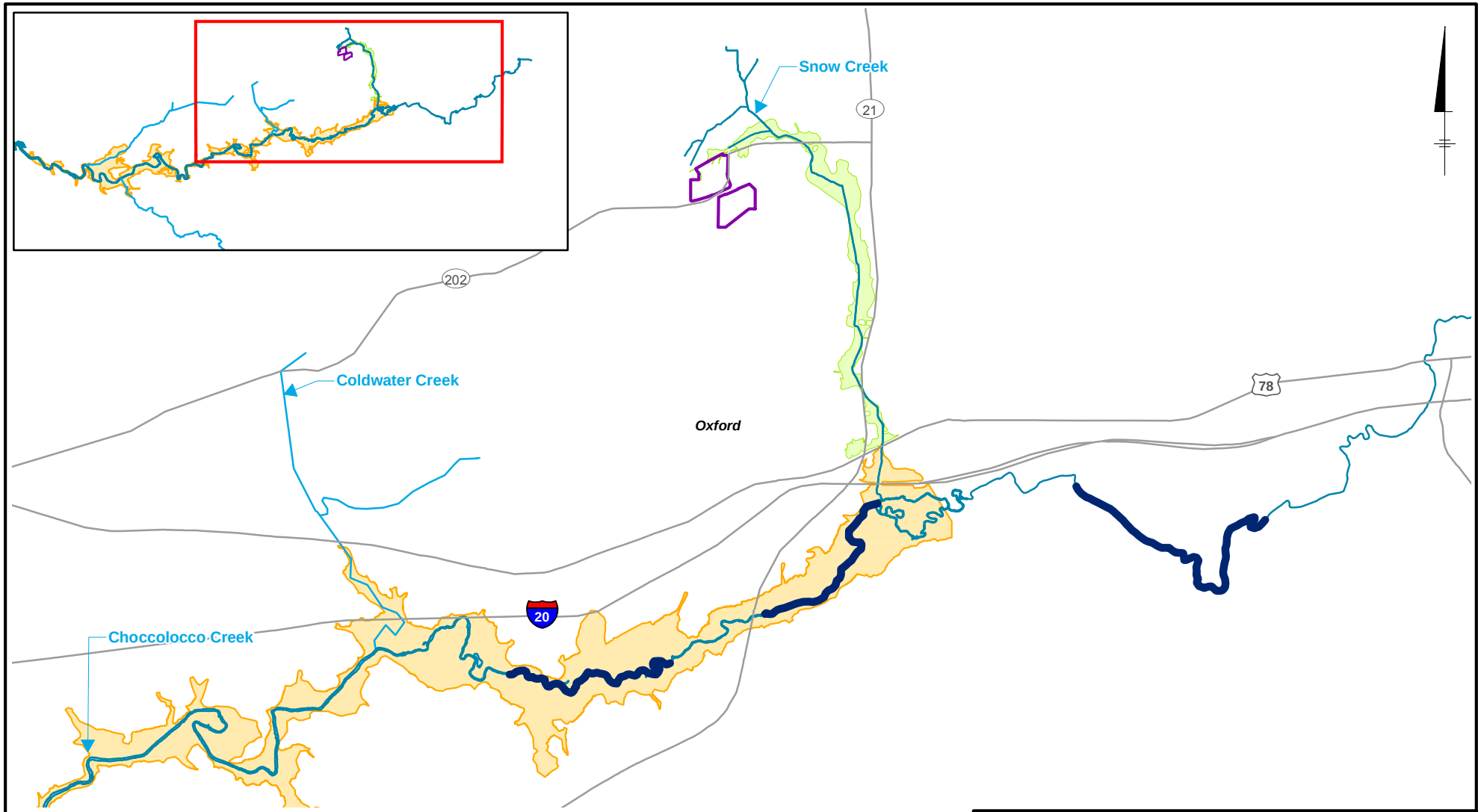


Notes:
1. OU: operable unit
   NRCS: Natural Resources Conservation Service

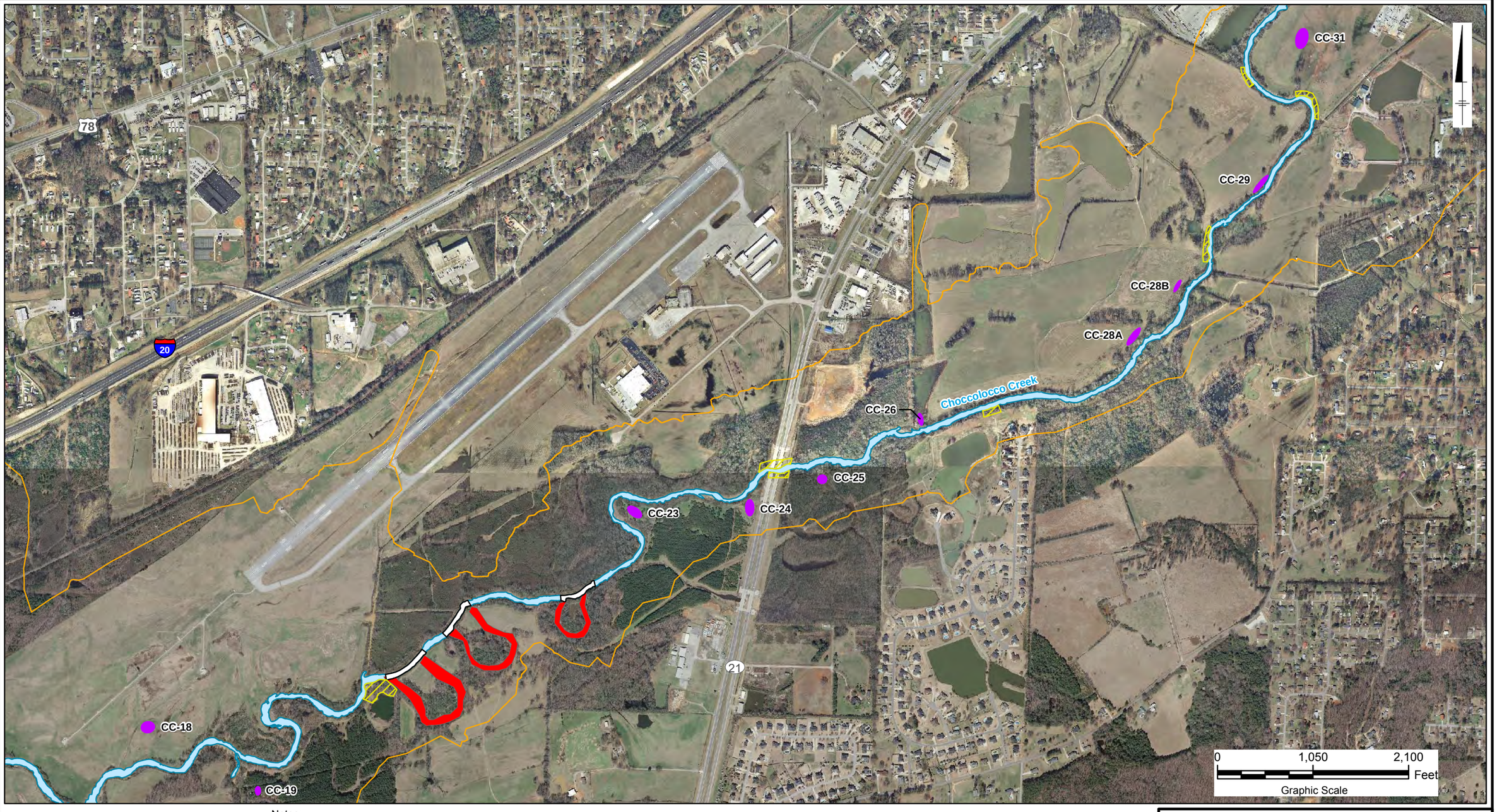
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

NRCS Dredging Locations

Solutia

Figure
2-5

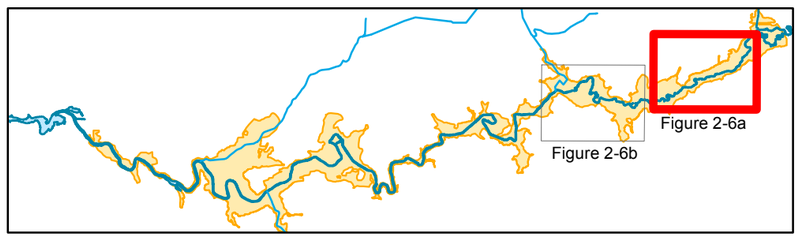


Legend

- Riprap
- NRCS Dredge Spoil Pile
- Choccolocco Creek
- OU-4 100-Year Floodplain
- Former Oxbow
- Rerouted Creek

Notes:

1. Dredge spoil pile locations from SCS (1989) Geomorphic Study for Choccolocco Creek Watershed to Assess Potential for Increasing Channel Capacity by Sediment Removal, August 1989, and Roux Associates Inc., Dredge Spoil Evaluation Report: Snow Creek and Choccolocco Creek Calhoun and Talladega Counties, Alabama (2012).
2. OU: operable unit
   NRCS: Natural Resources Conservation Service
   SCS: Soil Conservation Service
3. Aerial imagery provided by Calhoun and Talladega Counties.



Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

NRCS Dredge Spoil Disposal Locations

Solutia

Figure
2-6a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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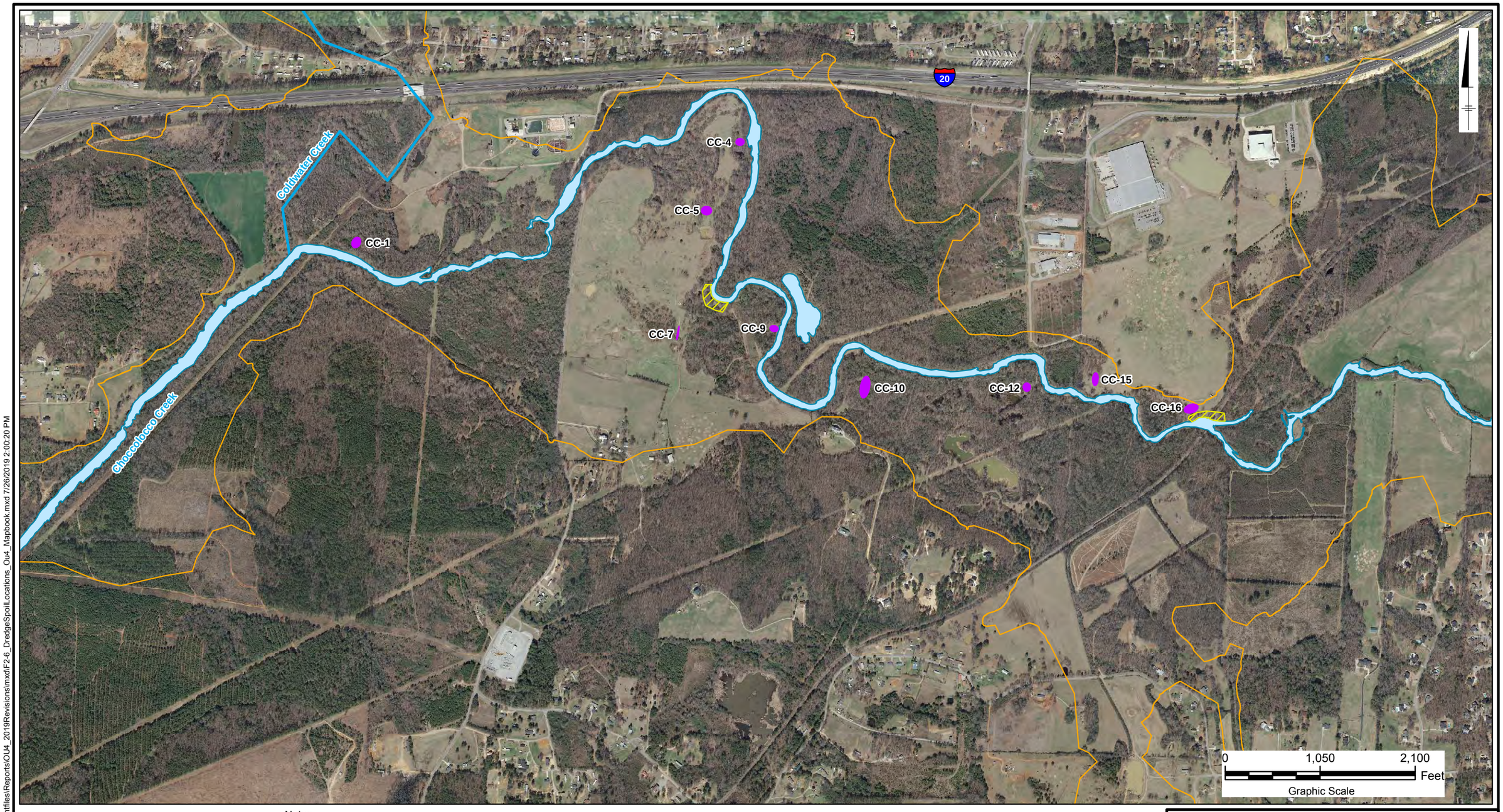


Legend

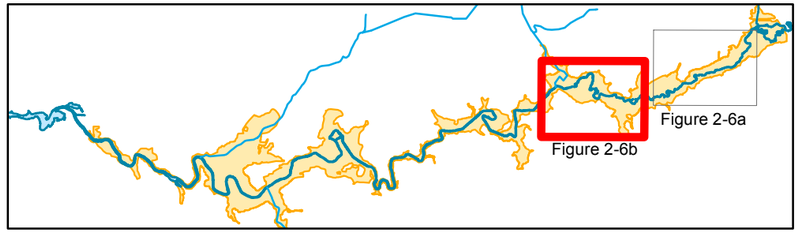
- Riprap
- NRCS Dredge Spoil Pile
- Choccolocco Creek
- OU-4 100-Year Floodplain

Notes:

1. Dredge spoil pile locations from SCS (1989) Geomorphic Study for Choccolocco Creek Watershed to Assess Potential for Increasing Channel Capacity by Sediment Removal, August 1989, and Roux Associates Inc., Dredge Spoil Evaluation Report: Snow Creek and Choccolocco Creek Calhoun and Talladega Counties, Alabama (2012).

2. OU: operable unit
   NRCS: Natural Resources Conservation Service
   SCS: Soil Conservation Service

3. Aerial imagery provided by Calhoun and Talladega Counties.



Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

NRCS Dredge Spoil Disposal Locations

Solutia

Figure
2-6b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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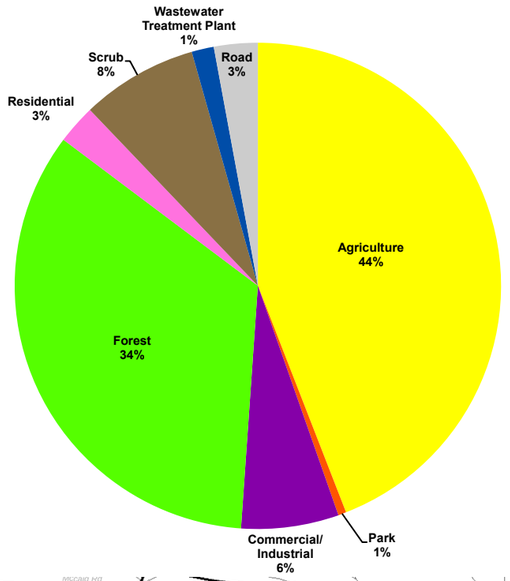


Anniston
Oxford
Jackson Shoals
Snow Creek
Coldwater Creek
Eastaboga Creek
Cheaha Creek
78
20
202
21
77
34
0 7,000 14,000 Feet
Graphic Scale

Legend

Parcel Land Use
- Agriculture
- Commercial/Industrial
- Forest
- Park
- Residential
- Scrub
- Wastewater Treatment Plant
- Road

- Local Roads
- Major Roads
- Choccolocco Creek
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- OU-3 Boundary

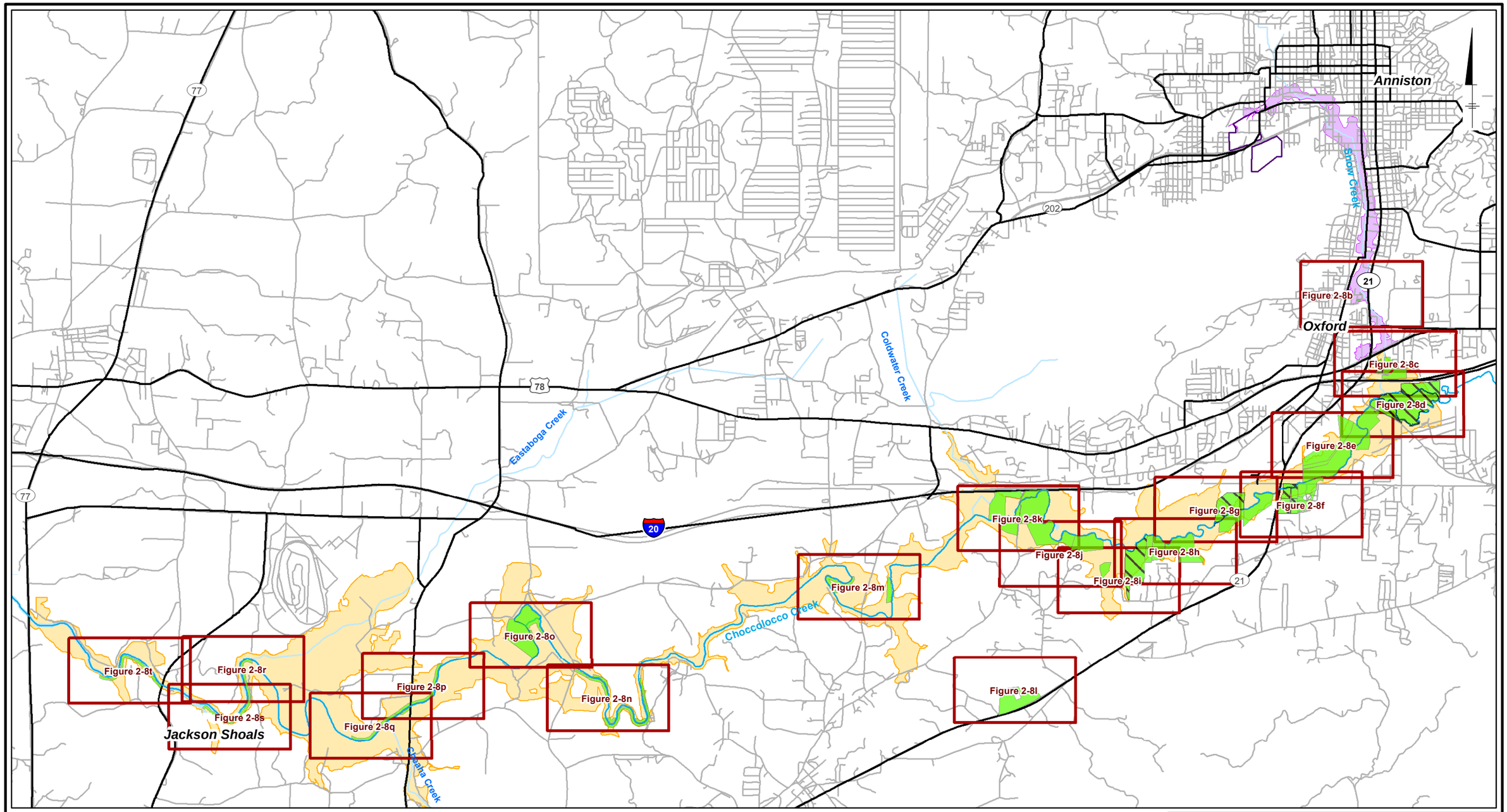
Notes:
1. Land use interpretations are based on a combination of the 2007 and 2011 aerial imagery.
2. OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Land Use within the OU-4 100-Year Floodplain

Solutia

Figure **2-7**



Legend

- Major Roadway
- Land-Trust-Owned Parcels
- Parcels with Conservation Easement
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- OU-3 Boundary
- Creek Boundary

0 6,500 13,000 Feet

Graphic Scale

Notes:
1. The Land Trust is the Georgia-Alabama Land Trust Inc., including predecessor organizations: Alabama Land Trust, Inc. and The Chattowah Open Land Trust, Inc.
2. Easement boundaries shown were provided by the Land Trust and the tax parcel boundaries were obtained from Calhoun County and Talladega County. In some cases the easement boundaries provided by the Land Trust and the parcel boundaries provided by the Counties are not in agreement.
3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

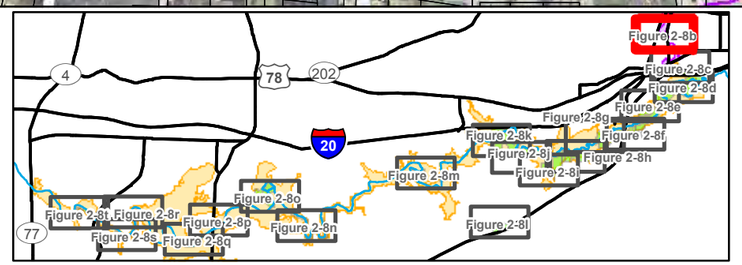
Solutia

Figure
2-8a

PPIN: 68403
PPIN: 67973
PPIN: 67975
PPIN: 67974
PPIN: 67972
Oxford

Legend

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-1/OU-2 Floodplain



0 500 1,000 Feet

Graphic Scale

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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

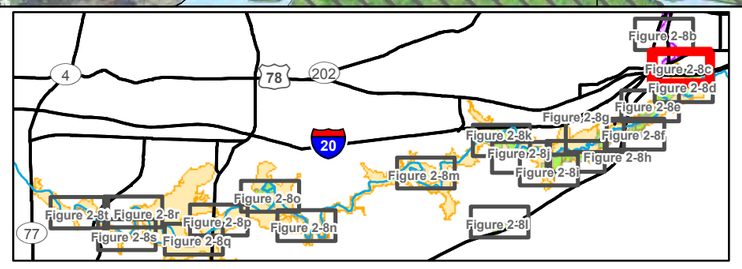
Solutia

Figure
2-8b

PPIN: 88695
PPIN: 16935
PPIN: 16744
PPIN: 16569
PPIN: 16569
PPIN: 16563
PPIN: 16564
PPIN: 16561

Legend

Conservation Easement Zone
Land-Trust Owned Parcels
Riparian Buffer Zone
Parcels with Conservation Easement
Creek Boundary
Parcel Boundary
OU-4 100-Year Floodplain
OU-1/OU-2 Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:
1. The Land Trust is the Georgia-Alabama Land Trust Inc., including predecessor organizations: Alabama Land Trust, Inc. and The Chattowah Open Land Trust, Inc.
2. Easement boundaries shown were provided by the Land Trust and the tax parcel boundaries were obtained from Calhoun County and Talladega County. In some cases the easement boundaries provided by the Land Trust and the parcel boundaries provided by the Counties are not in agreement.
3. All boundaries are approximate.

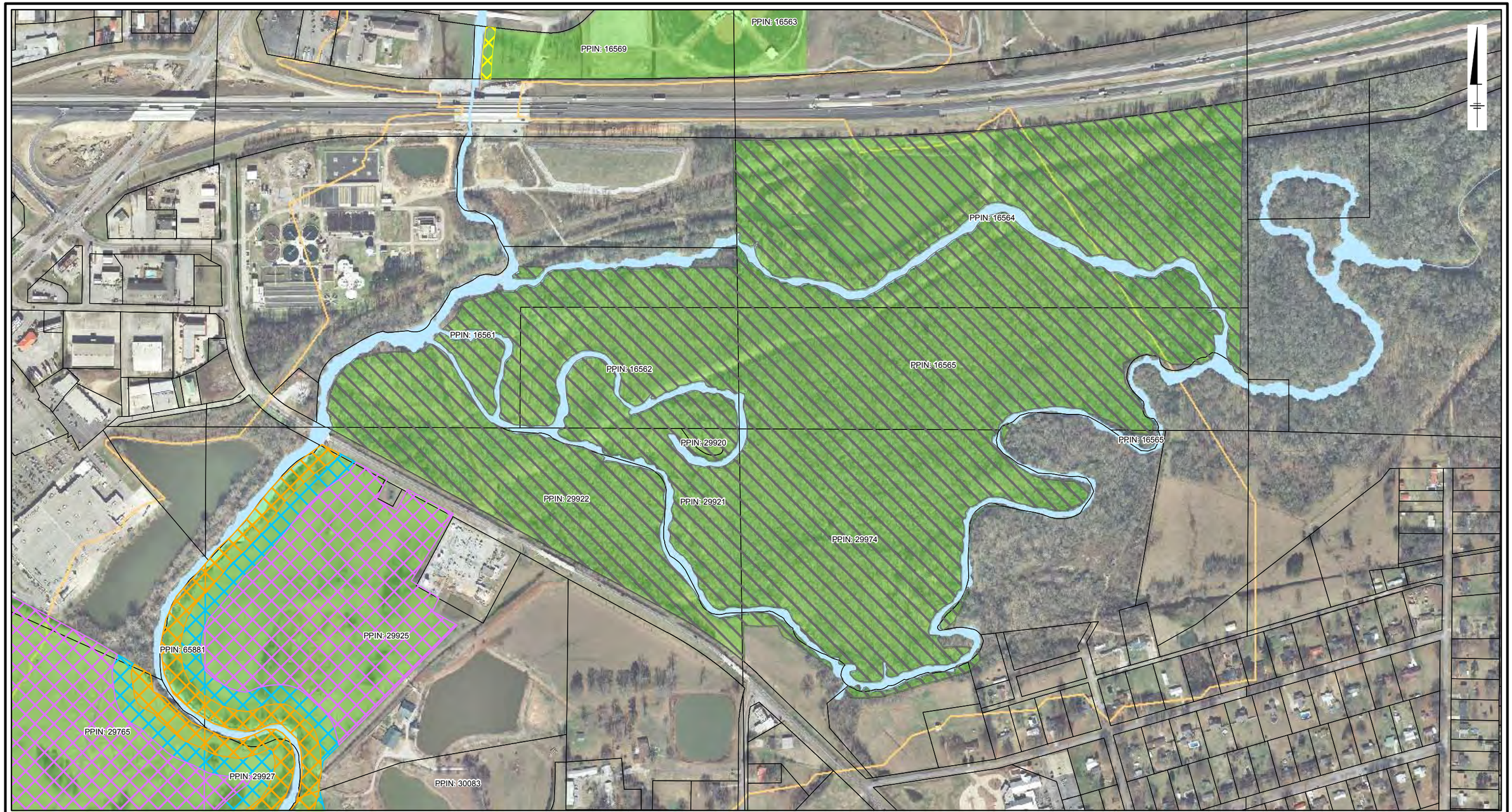
Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

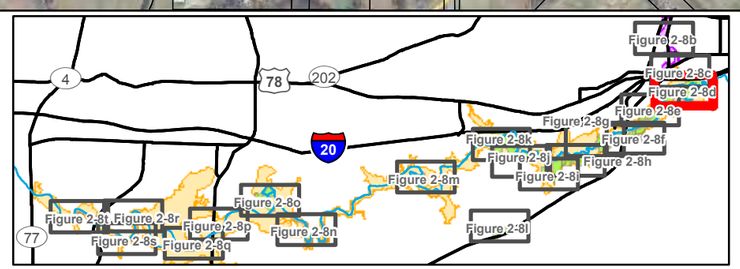
Solutia

Figure
2-8c



Legend

- Conservation Easement Zone
- Land-Trust Owned Parcels
- Zone 1
- Zone 2
- Zone 3
- Riparian Buffer Zone
- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

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2. Easement boundaries shown were provided by the Land Trust and the tax parcel boundaries were obtained from Calhoun County and Talladega County. In some cases the easement boundaries provided by the Land Trust and the parcel boundaries provided by the Counties are not in agreement.
3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure 2-8d

PPIN: 29922

PPIN: 65881

PPIN: 29925

PPIN: 29759

PPIN: 29765

PPIN: 29927

PPIN: 30083

PPIN: 29764

PPIN: 1577

PPIN: 29989

PPIN: 29962

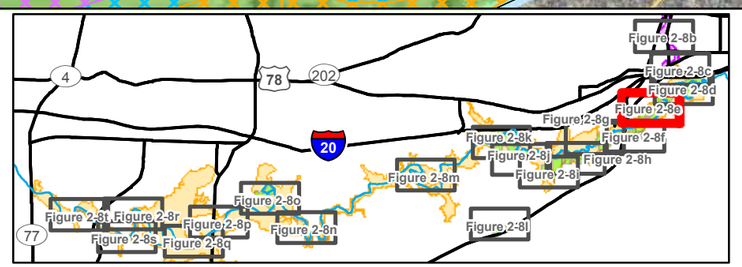
PPIN: 29818

Legend

Conservation Easement Zone

- Land-Trust Owned Parcels
- Zone 1
- Zone 2
- Zone 3

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:
1. The Land Trust is the Georgia-Alabama Land Trust Inc., including predecessor organizations: Alabama Land Trust, Inc. and The Chattowah Open Land Trust, Inc.
2. Easement boundaries shown were provided by the Land Trust and the tax parcel boundaries were obtained from Calhoun County and Talladega County. In some cases the easement boundaries provided by the Land Trust and the parcel boundaries provided by the Counties are not in agreement.
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Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8e

CALHOUN COUNTY

TALLADEGA COUNTY

PPIN: 29962

PPIN: 29818

PPIN: 65869

PPIN: 4049

PPIN: 51425

PPIN: 4058

PPIN: 4051

PPIN: 4053

PPIN: 4589

PPIN: 4052

PPIN: 4587

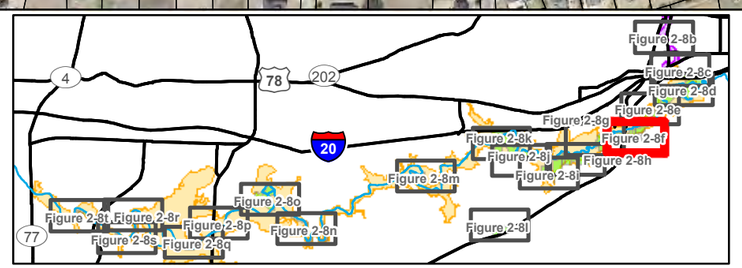
PPIN: 4050

PPIN: 4050

PPIN: 4595

Legend

- Conservation Easement Zone
- Land-Trust Owned Parcels
- Zone 1
- Zone 2
- Zone 3
- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:

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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8f

CALHOUN COUNTY

TALLADEGA COUNTY

PPIN: 4599

PPIN: 4595

PPIN: 49368

PPIN: 4679

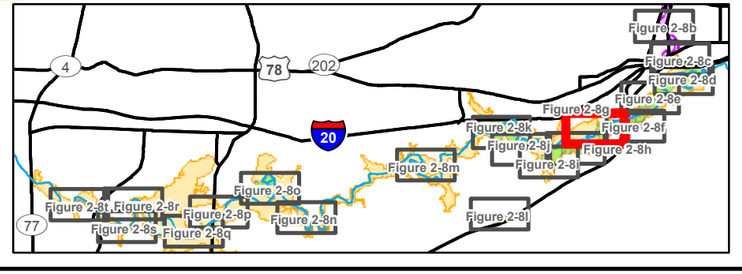
PPIN: 4677

Legend

Conservation Easement Zone

- Land-Trust Owned Parcels
- Zone 1
- Zone 2
- Zone 3

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

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Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8g

PPIN: 4599

PPIN: 49368

PPIN: 4680

PPIN: 4679

PPIN: 4677

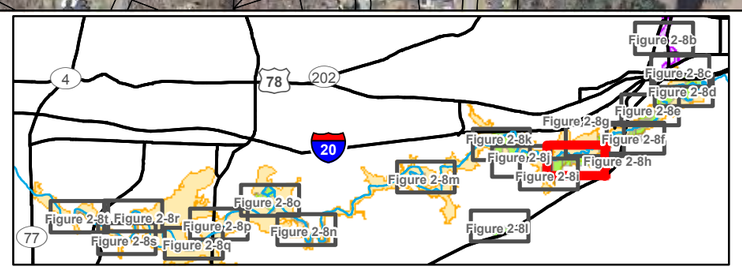
PPIN: 4681

PPIN: 4745

PPIN: 50250

Legend

- Conservation Easement Zone
- Land-Trust Owned Parcels
- Zone 1
- Zone 2
- Zone 3
- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:
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2. Easement boundaries shown were provided by the Land Trust and the tax parcel boundaries were obtained from Calhoun County and Talladega County. In some cases the easement boundaries provided by the Land Trust and the parcel boundaries provided by the Counties are not in agreement.
3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

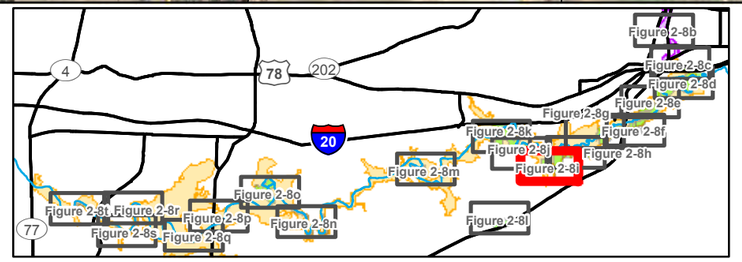
Solutia

Figure
2-8h

PPIN: 52427
PPIN: 68416
PPIN: 5067
PPIN: 4681
PPIN: 4680
PPIN: 4679
PPIN: 4677
PPIN: 4745
PPIN: 50250
PPIN: 4748

Legend

- Conservation Easement Zone
- Land-Trust Owned Parcels
- Zone 2
- Zone 3
- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:
1. The Land Trust is the Georgia-Alabama Land Trust Inc., including predecessor organizations: Alabama Land Trust, Inc. and The Chattowah Open Land Trust, Inc.
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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8i

PPIN: 4971

PPIN: 4976

PPIN: 68517

PPIN: 4944

PPIN: 52427

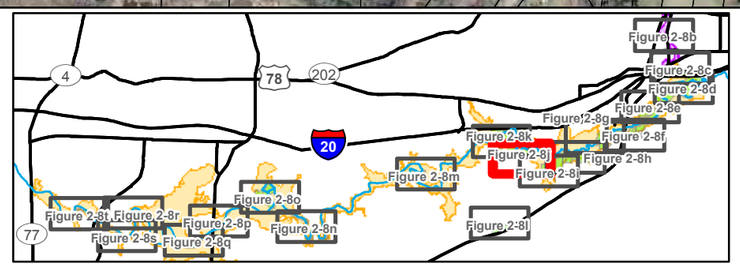
PPIN: 68416

PPIN: 5067

Legend

Conservation Easement Zone
- Zone 1
- Zone 2
- Zone 3
- Parcel Split

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:
1. The Land Trust is the Georgia-Alabama Land Trust Inc., including predecessor organizations: Alabama Land Trust, Inc. and The Chattowah Open Land Trust, Inc.
2. Easement boundaries shown were provided by the Land Trust and the tax parcel boundaries were obtained from Calhoun County and Talladega County. In some cases the easement boundaries provided by the Land Trust and the parcel boundaries provided by the Counties are not in agreement.
3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8j

PPIN: 4972

PPIN: 4972

PPIN: 4971

PPIN: 4976

PPIN: 68517

PPIN: 52427

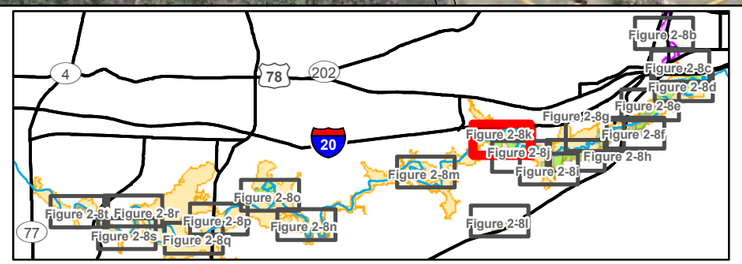
PPIN: 4944

PPIN: 68416

Legend

Conservation Easement Zone
- Zone 1
- Zone 2
- Zone 3
- Riparian Buffer Zone
- Parcel Split

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

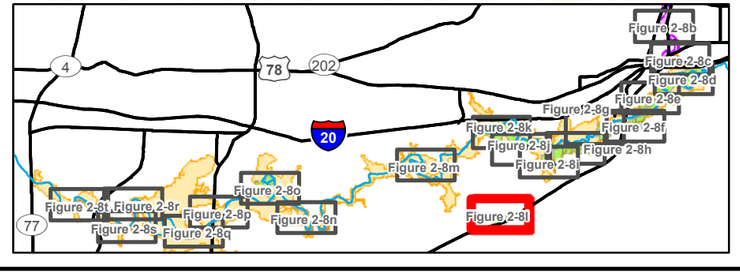
Solutia

Figure
2-8k

PPIN: 54263

Legend

- Parcels with Conservation Easement
- Parcel Boundary



0 500 1,000 Feet

Graphic Scale

Notes:
1. The Land Trust is the Georgia-Alabama Land Trust Inc., including predecessor organizations: Alabama Land Trust, Inc. and The Chattowah Open Land Trust, Inc.
2. Easement boundaries shown were provided by the Land Trust and the tax parcel boundaries were obtained from Calhoun County and Talladega County. In some cases the easement boundaries provided by the Land Trust and the parcel boundaries provided by the Counties are not in agreement.
3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure 2-8l

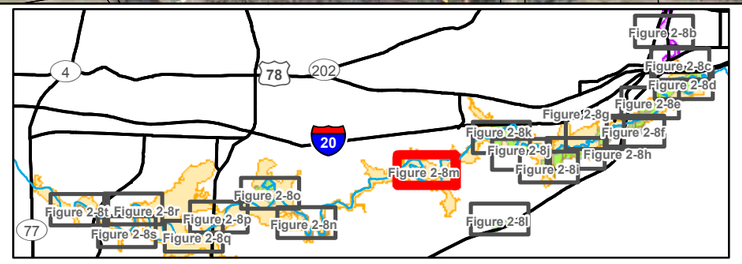
PPIN: 5345

PPIN: 5379

Legend

Conservation Easement Zone
- Zone 1
- Zone 2

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:
1. The Land Trust is the Georgia-Alabama Land Trust Inc., including predecessor organizations: Alabama Land Trust, Inc. and The Chattowah Open Land Trust, Inc.
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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8m

PPIN: 6771

PPIN: 6787

PPIN: 6780

PPIN: 6786

PPIN: 6910

PPIN: 6788

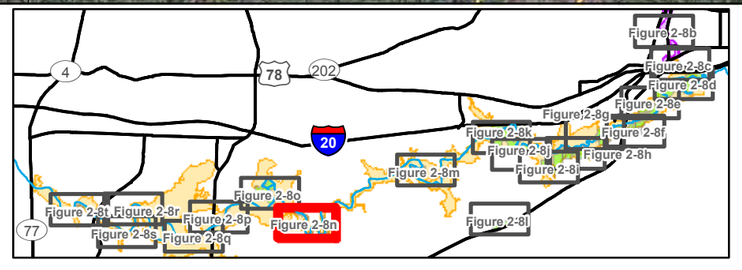
PPIN: 6836

PPIN: 6926

Legend

Conservation Easement Zone
- Zone 1
- Zone 2

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:
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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8n

PPIN: 6569

PPIN: 6570

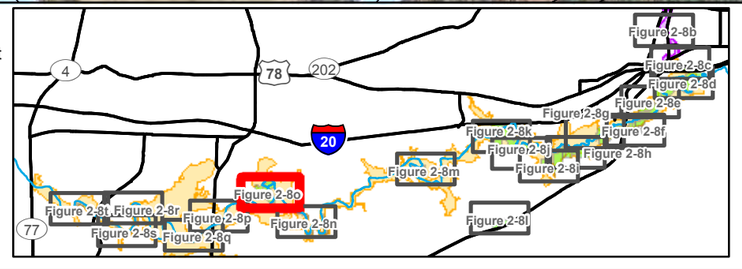
PPIN: 60541

PPIN: 6795

Legend

Conservation Easement Zone
- Zone 1
- Zone 2
- Streamside Management Zone

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8o

PPIN: 6699

PPIN: 6727

PPIN: 6727

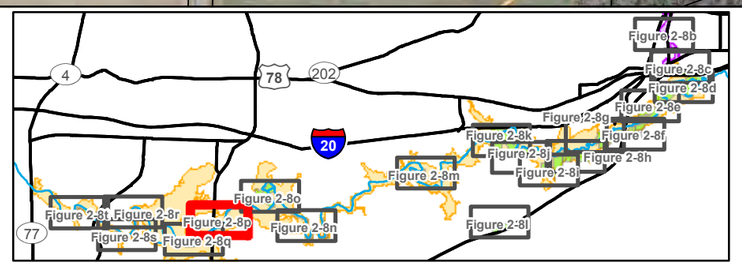
PPIN: 6731

PPIN: 6731

Legend

Conservation Easement Zone
- Zone 1
- Zone 2

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8p

PPIN: 6727

PPIN: 6699

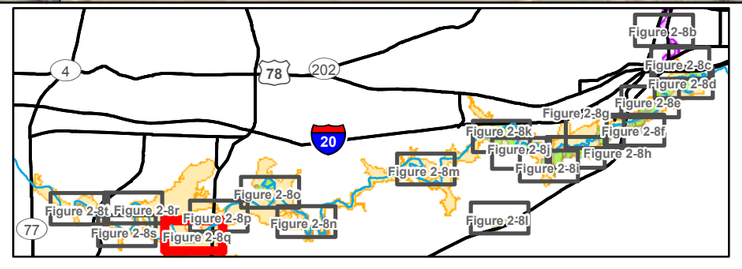
PPIN: 6727

PPIN: 6731

Legend

Conservation Easement Zone
- Zone 1
- Zone 2

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

Notes:
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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

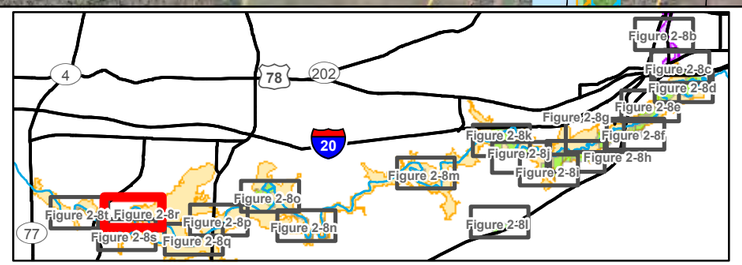
Figure
2-8q

PPIN: 8561

Legend

Conservation Easement Zone
- Zone 1
- Zone 2

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8r

PPIN: 8561

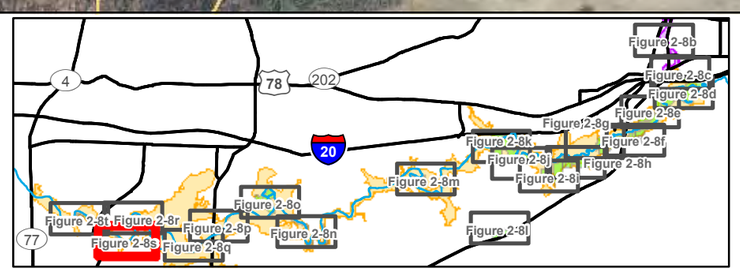
PPIN: 8565

PPIN: 8570

Legend

Conservation Easement Zone
- Zone 1
- Zone 2

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

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3. All boundaries are approximate.

Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8s

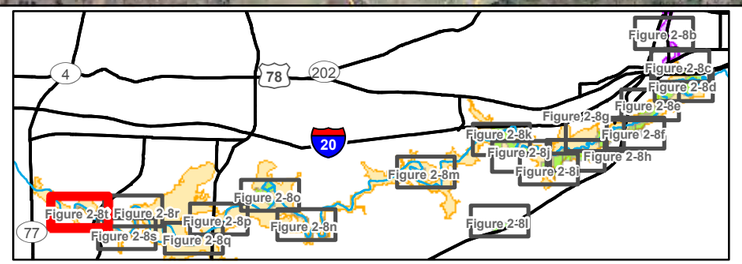
PPIN: 8486

PPIN: 8487

Legend

Conservation Easement Zone
- Zone 1
- Zone 2

- Parcels with Conservation Easement
- Creek Boundary
- Parcel Boundary
- OU-4 100-Year Floodplain



0 500 1,000 Feet

Graphic Scale

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3. All boundaries are approximate.

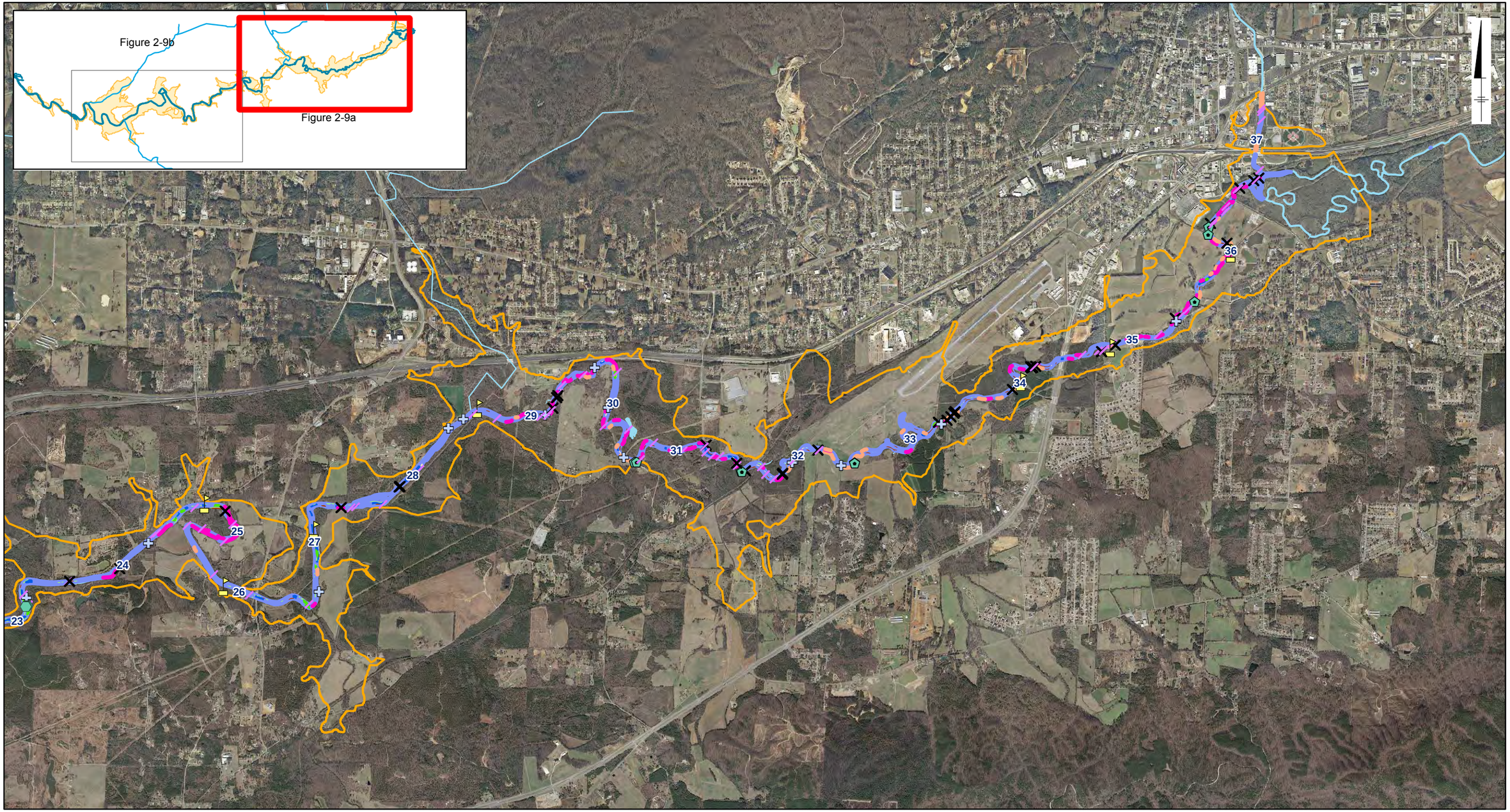
Acronyms:
OU: operable unit

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Conservation Corridor

Solutia

Figure
2-8t



Legend

- Human Use Area
- Riprap
- Deadfall
- Tributary Confluence
- Snag
- Boulder
- Bank Erosion
- Open Area
- Vegetated Shoreline
- –26– River Mile (Distance from Lake Logan Martin)
- Deposition - Bank Area
- Submerged Aquatic Vegetation
- Deposition - Area
- Riffle
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 2,750 5,500 Feet

Graphic Scale

Notes:
1. Habitat data from the Data Summary Report for Operable Unit 4 of the Anniston PCB Site (BBL 2005a).
2. OU: operable unit
   PCB: polychlorinated biphenyl
3. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

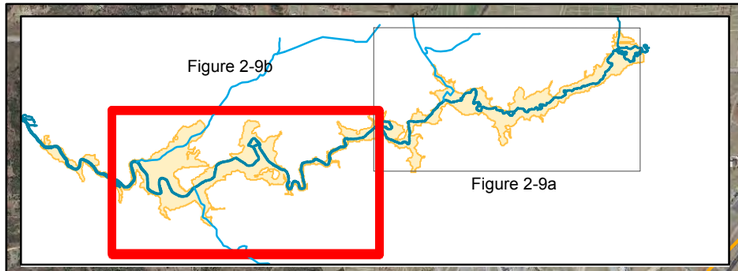
Feasibility Study Report for OU-4

Choccolocco Creek Instream and Riparian Habitat

Solutia

Figure **2-9a**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F2-10_RiparianHabitat_Section_Mapbook.mxd 7/26/2019 2:02:56 PM



Legend

- Human Use Area
- Riprap
- Deadfall
- Tributary Confluence
- Snag
- Boulder
- Bank Erosion
- Open Area
- Vegetated Shoreline
- –26– River Mile (Distance from Lake Logan Martin)
- Deposition - Bank Area
- Submerged Aquatic Vegetation
- Deposition - Area
- Riffle
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 2,750 5,500 Feet

Graphic Scale

Notes:
1. Habitat data from the Data Summary Report for Operable Unit 4 of the Anniston PCB Site (BBL 2005a).
2. OU: operable unit
   PCB: polychlorinated biphenyl
3. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Choccolocco Creek Instream and Riparian Habitat

Solutia

Figure
2-9b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F2-10_RiparianHabitat_Section_Mapbook.mxd 7/26/2019 2:02:56 PM

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F3-1_OU4_InterimMeasures.mxd 7/26/2019 2:05:51 PM

Snow Creek

Former Holiday Inn Infrastructure Support Project

Prime Property Infrastructure Support Project

City of Oxford Maintenance Building Infrastructure Support Project

Oxford Lake Park Interim Measures

Interstate 20 Snow Creek Bridge Infrastructure Support Project

Miracle Field Infrastructure Support Project

Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project

Choccolocco Creek Wastewater Treatment Plant Excavated Soil Stockpile Final Corrective Measure

Choccolocco Creek

State Highway 21 Bridge Final Corrective Measure

Legend

- Creek
- Final Corrective Measure Locations
- Interim Measure Location
- Infrastructure Support Project
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- Parcels

0 2,200 4,400 Feet
Graphic Scale

Notes:
1. OU: operable unit

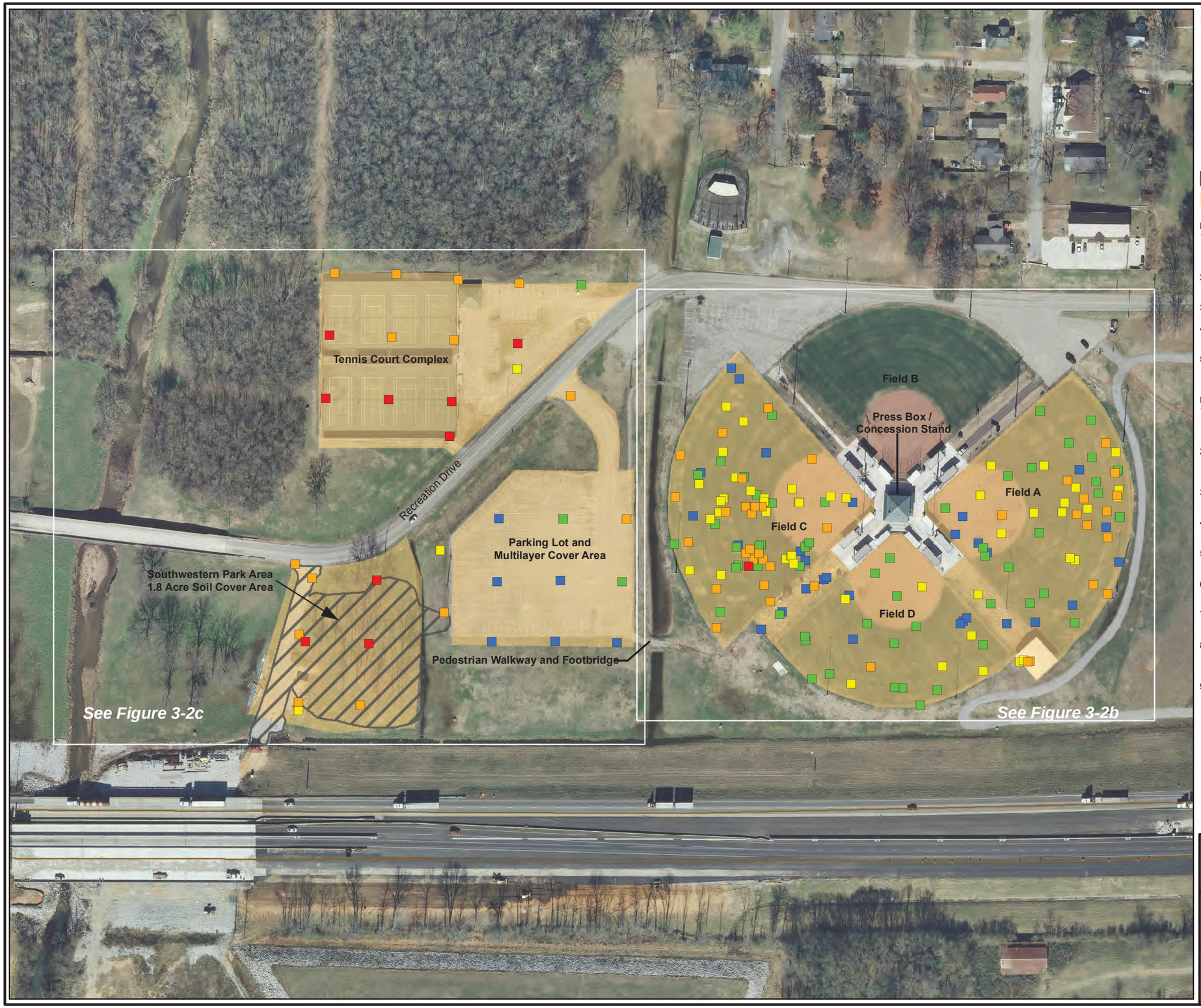
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Interim Measure, Infrastructure Support and Final Corrective Measure Projects

Solutia

Figure
3-1



Legend

Total PCB Aroclor

Concentration in Soil (mg/kg) (See Note 1)

- <1
- ≥1 to <5
- ≥5 to <10
- ≥10 to <50
- ≥50
- Miracle Field Infrastructure Support Project
- Interim Measure Location

Notes:

1. Figure presents available PCB data in the interim measure area. The maximum PCB concentration at any depth within the limits of the cover is shown for each sample location.
2. All data represent conditions below the cover limits where constructed.
3. Refer to Figures 3-2b and 3-2c for sample identification.
4. PCB data for areas outside of the interim measure cover are not shown on this figure.
5. mg/kg: milligrams per kilogram
   PCB: polychlorinated biphenyl

References:

1. Alabama Department of Environmental Management, Memorandum Re: Authorization to Increase Discharges or Modify Facility Status, December 17, 2002.
2. Roux Associates, Inc., Corrective Measures Study Oxford Lake Softball Complex Western Portion (Revision 0), October 11, 2001.
3. Roux Associates, Inc., Parking Lot Multi-Layer Cover Interim Measures Report, September 18, 2002.
4. Roux Associates, Inc., Best Management Practice Plan Construction of Soil Cap, November 14, 2002.
5. Roux Associates, Inc., Tennis Court and Parking Area Interim Measures Report, May 30, 2003.
6. Roux Associates, Inc., Oxford Lake Softball Complex Interim Measures Report, March 24, 2004.
7. R.S. Williams and Associates, Oxford Park Softball Complex Field Lighting and Drainage Upgrades, April 2012.
8. Solutia, RCRA Facilities Investigation Results and Interim Measures Plan for the Softball Fields at the Oxford Lake Softball Complex, Oxford, Alabama, January 10, 2001.
9. Aerial imagery provided by Calhoun County, 2011.

0 150 300 Feet

Graphic Scale

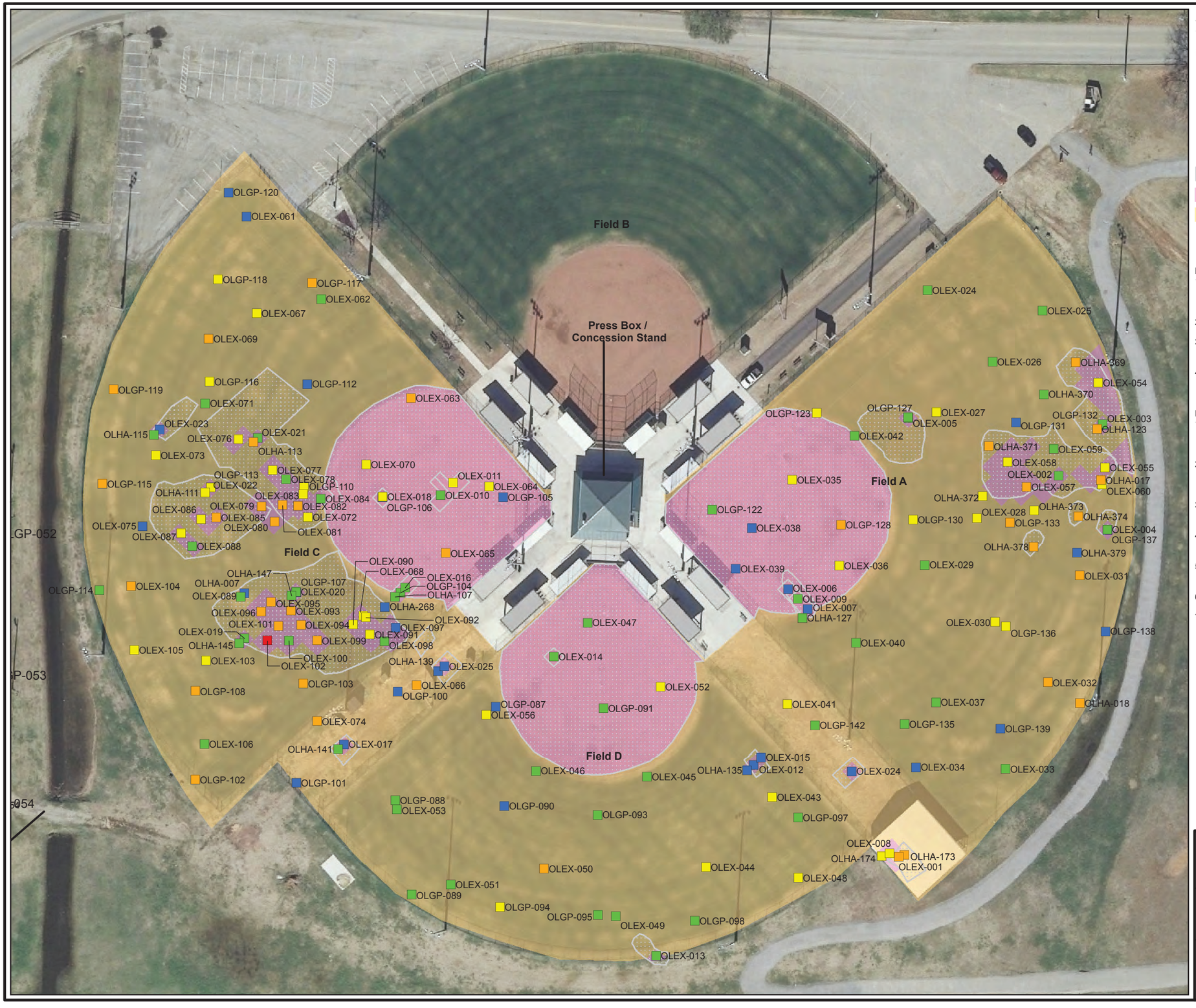
Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Oxford Lake Park - Interim Measures: Depth of Excavation

Solutia

Figure
3-2a

City: SYR Div/Group: SWG Created By: Last Saved By: TJScott
AnnistonAL
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F3-2a_OxfordLakePark_IMAreas_A_MiracleField.mxd 11/20/2019 1:51:42 PM



Legend

Total PCB Aroclor

Concentration in Soil (mg/kg) (See Note 1)

- <1
- ≥1 to <5
- ≥5 to <10
- ≥10 to <50
- ≥50
- Geotextile (7)
- Interim Measure Location (1-ft Removal Area)
- Interim Measure Location (0.5-ft Removal Area)

Notes:

1. Figure presents available PCB data in the interim measure area. The maximum PCB concentration at any depth within the limits of the cover is shown for each sample location.
2. Refer to Figure 3-2a for the overall Oxford Lake Park Project Area.
3. PCB data for areas outside of the interim measure cover are not shown on this figure.
4. ft: feet
   mg/kg: milligrams per kilogram
   PCB: polychlorinated biphenyl

References:

1. Alabama Department of Environmental Management, Memorandum Re: Authorization to Increase Discharges or Modify Facility Status, December 17, 2002.
2. Roux Associates, Inc., Corrective Measures Study Oxford Lake Softball Complex Western Portion (Revision 0), October 11, 2001.
3. Roux Associates, Inc., Parking Lot Multi-Layer Cover Interim Measures Report, September 18, 2002.
4. Roux Associates, Inc., Best Management Practice Plan Construction of Soil Cap, November 14, 2002.
5. Roux Associates, Inc., Tennis Court and Parking Area Interim Measures Report, May 30, 2003.
6. Aerial imagery provided by Calhoun County, 2011.
7. Extent of geotextile placed in the outfield areas is based on a personal communication from Jerry Hopper of R.S. Williams and Associates, on July 15, 2019.

0 70 140 Feet

Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Oxford Lake Park Softball Complex: Interim Measures Excavation Depths and Geotextile Marker Layer Locations

Solutia

Figure 3-2b

City: SYR Div/Group: SWG Created By: Last Saved By: TJScott
AnnistonAL
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F3-2b_OxfordLakePark_IMAreas_B.mxd 8/27/2019 5:42:44 PM

Legend

Total PCB Aroclor

Concentration in Soil (mg/kg) (See Note 1)

- <1
- ≥1 to <5
- ≥5 to <10
- ≥10 to <50
- ≥50
- Miracle Field Infrastructure Support Project
- Interim Measure Location (0.5-ft Removal Area)

Notes:

1. Figure presents available PCB data in the interim measure area. The maximum PCB concentration at any depth within the limits of the cover is shown for each sample location.
2. Refer to Figure 3-2a for the overall Oxford Lake Park Project Area.
3. PCB data for areas outside of the interim measure cover are not shown on this figure.
4. ft: feet
   mg/kg: milligrams per kilogram
   PCB: polychlorinated biphenyl

References:

1. Alabama Department of Environmental Management, Memorandum Re: Authorization to Increase Discharges or Modify Facility Status, December 17, 2002.
2. Roux Associates, Inc., Corrective Measures Study Oxford Lake Softball Complex Western Portion (Revision 0), October 11, 2001.
3. Roux Associates, Inc., Oxford Lake Softball Complex Interim Measures Report, March 24, 2004.
4. R.S. Williams and Associates, Oxford Park Softball Complex Field Lighting and Drainage Upgrades, April 2012.
5. Solutia, RCRA Facilities Investigation Results and Interim Measures Plan for the Softball Fields at the Oxford Lake Softball Complex, Oxford, Alabama, January 10, 2001.
6. Aerial imagery provided by Calhoun County, 2011.

0 75 150 Feet

Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Oxford Lake Park: Interim Measures for Parking Lot, Southwestern Park, and Tennis Court Areas

Solutia

Figure 3-2c

City: SYR Div/Group: SWG Created By: Last Saved By: TJScott
AnnistonAL
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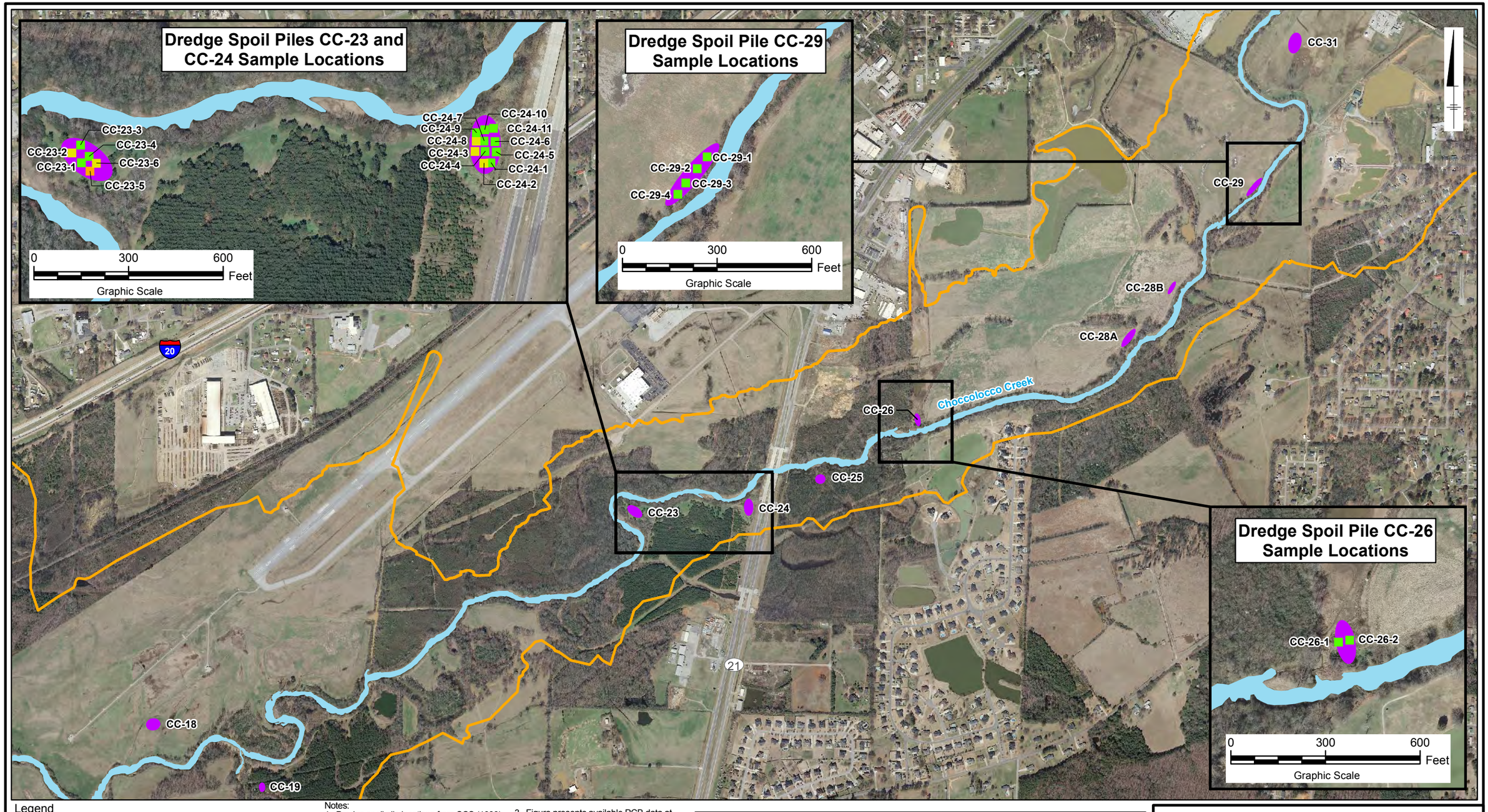


Legend

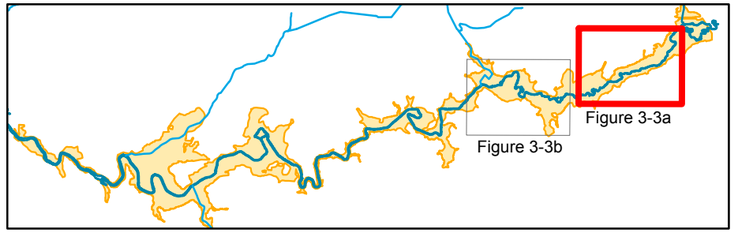
Soil Sample Location
Total PCB Aroclor Concentration (mg/kg)
- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50

OU-4 100-Year Floodplain
Choccolocco Creek
NRCS Dredge Spoil Pile
CC-18 Dredge Spoil Pile Location ID

0 1,050 2,100 Feet
Graphic Scale

Notes:
1. Dredge spoil pile locations from SCS (1989) Geomorphic Study for Choccolocco Creek Watershed to Assess Potential for Increasing Channel Capacity by Sediment Removal, August 1989, and Roux Associates Inc., Dredge Spoil Evaluation Report: Snow Creek and Choccolocco Creek Calhoun and Talladega Counties, Alabama (2012).
2. Only dredge spoil pile locations where soil samples were collected are shown in the call-out boxes.
3. Figure presents available PCB data at the dredge spoil pile locations. The maximum PCB concentration at any depth is shown for each sample location. Analytical data are presented on Table 3-4.
4. Aerial imagery provided by Calhoun and Talladega Counties.

mg/kg: milligrams per kilogram
NRCS: Natural Resources Conservation Service
PCB: polychlorinated biphenyl
OU: operable unit
SCS: Soil Conservation Service

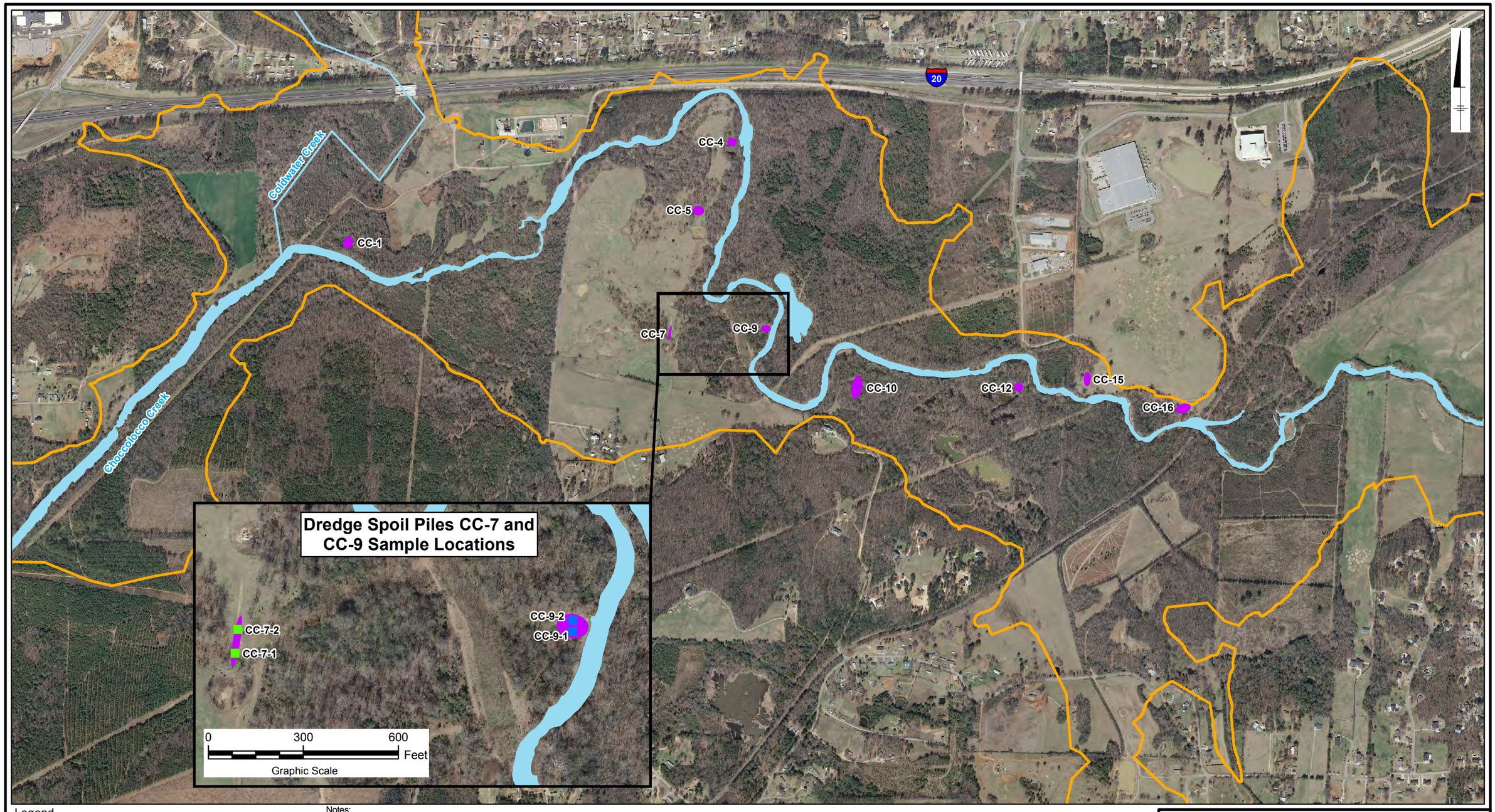


Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

NRCS Dredge Spoil Pile Locations and Total PCB Concentrations

Solutia

Figure
3-3a



Legend

Soil Sample Location
Total PCB Aroclor Concentration (mg/kg)
- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50

OU-4 100-Year Floodplain
Choccolocco Creek
NRCS Dredge Spoil Pile
CC-9 Dredge Spoil Pile Location ID

0 1,050 2,100 Feet
Graphic Scale

Notes:
1. Dredge spoil pile locations from SCS (1989) Geomorphic Study for Choccolocco Creek Watershed to Assess Potential for Increasing Channel Capacity by Sediment Removal, August 1989, and Roux Associates Inc., Dredge Spoil Evaluation Report: Snow Creek and Choccolocco Creek Calhoun and Talladega Counties, Alabama (2012).
2. Only dredge spoil pile locations where soil samples were collected are shown in the call-out boxes.
3. Figure presents available PCB data at the dredge spoil pile locations. The maximum PCB concentration at any depth is shown for each sample location. Analytical data are presented on Table 3-4.
4. Aerial imagery provided by Calhoun and Talladega Counties.

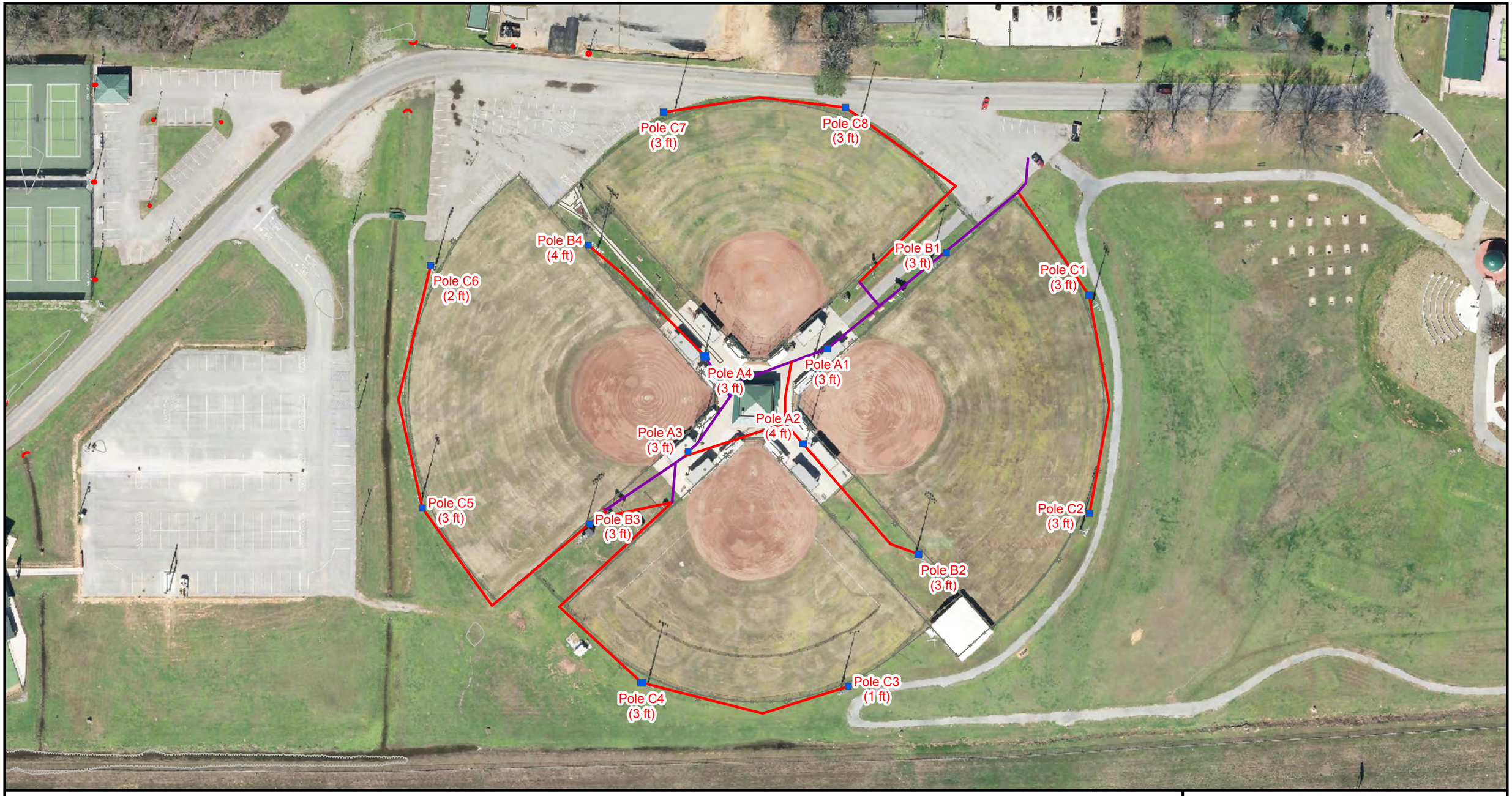
mg/kg: milligrams per kilogram
NRCS: Natural Resources Conservation Service
PCB: polychlorinated biphenyl
OU: operable unit
SCS: Soil Conservation Service

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

NRCS Dredge Spoil Pile Locations and Total PCB Concentrations

Solutia

Figure
3-3b



Legend

- 2.5 ft Electrical Excavation Depth
- 4.5 ft Electrical Excavation Depth
- Light Pole Foundation Excavation (Depth of Area Excavation)

Notes:

1. Aerial Imagery: Calhoun County 2018 - G-Squared Photogrammetry firm
2. ft : feet

N

0 100 Feet

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Oxford Lake Softball Complex: Field Lighting and Drainage Upgrades

Solutia

Figure 3-4

N:\A\Anniston\GIS\MXD\OU4 RI Figures\3-4 Oxford Lake Softball Complex.mxd 8/20/2019 1:46:08 PM

Total PCB Soil Concentrations
- < 1
- 1 - 4.99
- 5 - 9.99
- 10- 49.99
- ≥ 50

Total PCB Screening Results
- <1
- >1
- >50

Infrastructure Support Activity
- 12" Gravel Cover
- Unknown Depth
- 0-2' Excavation/Backfill
- 2-4' Excavation/Backfill
- 4-6' Excavation/Backfill
- 6-8' Excavation/Backfill
- 10'+ Excavation/Backfill

Notes:

1. Results presented in milligram per kilogram (mg/kg).
2. PCB: polychlorinated biphenyl
3. Figure presents available PCB data in depth range. Where analytical data are unavailable, screening results (immunoassay) are shown.
4. Aerial Imagery: Calhoun County 2018 - G-Squared Photogrammetry firm

N

0 75 150 Feet

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project PCB Results 0-2 feet

Solutia

Figure 3-5a

N:\A\Anniston\GIS\MXD\OU4 RI Figures\3-5 Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project.mxd 8/31/2019 5:24:11 PM

Total PCB Soil Concentrations
- < 1
- 1 - 4.99
- 5 - 9.99
- 10- 49.99
- ≥ 50

Total PCB Screening Results
- <1
- >1
- >50

Infrastructure Support Activity
- 12" Gravel Cover
- Unknown Depth
- 0-2' Excavation/Backfill
- 2-4' Excavation/Backfill
- 4-6' Excavation/Backfill
- 6-8' Excavation/Backfill
- 10'+ Excavation/Backfill

Notes:

1. Results presented in milligram per kilogram (mg/kg).
2. PCB: polychlorinated biphenyl
3. Figure presents available PCB data in depth range. Where analytical data are unavailable, screening results (immunoassay) are shown.
4. Aerial Imagery: Calhoun County 2018 - G-Squared Photogrammetry firm

N

0 75 150 Feet

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project PCB Results 2-4 feet

Solutia

Figure 3-5b

N:\A\Anniston\GIS\MXD\OU4 RI Figures\3-5 Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project.mxd 8/31/2019 5:24:11 PM

Total PCB Soil Concentrations
- < 1
- 1 - 4.99
- 5 - 9.99
- 10- 49.99
- ≥ 50

Total PCB Screening Results
- <1
- >1
- >50

Infrastructure Support Activity
- 12" Gravel Cover
- Unknown Depth
- 0-2' Excavation/Backfill
- 2-4' Excavation/Backfill
- 4-6' Excavation/Backfill
- 6-8' Excavation/Backfill
- 10'+ Excavation/Backfill

Notes:

1. Results presented in milligram per kilogram (mg/kg).
2. PCB: polychlorinated biphenyl
3. Figure presents available PCB data in depth range. Where analytical data are unavailable, screening results (immunoassay) are shown.
4. Aerial Imagery: Calhoun County 2018 - G-Squared Photogrammetry firm

N

0 75 150 Feet

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project PCB Results 4-6 feet

Solutia

Figure 3-5c

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Total PCB Soil Concentrations
- < 1
- 1 - 4.99
- 5 - 9.99
- 10- 49.99
- ≥ 50

Total PCB Screening Results
- <1
- >1
- >50

Infrastructure Support Activity
- 12" Gravel Cover
- Unknown Depth
- 0-2' Excavation/Backfill
- 2-4' Excavation/Backfill
- 4-6' Excavation/Backfill
- 6-8' Excavation/Backfill
- 10'+ Excavation/Backfill

Notes:

1. Results presented in milligram per kilogram (mg/kg).
2. PCB: polychlorinated biphenyl
3. Figure presents available PCB data in depth range. Where analytical data are unavailable, screening results (immunoassay) are shown.
4. Aerial Imagery: Calhoun County 2018 - G-Squared Photogrammetry firm

N

0 75 150 Feet

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project PCB Results 6-8 feet

Solutia

Figure 3-5d

N:\A\Anniston\GIS\MXD\OU4 RI Figures\3-5 Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project.mxd 8/31/2019 5:24:11 PM

Total PCB Soil Concentrations
- < 1
- 1 - 4.99
- 5 - 9.99
- 10- 49.99
- ≥ 50

Total PCB Screening Results
- <1
- >1
- >50

Infrastructure Support Activity
- 12" Gravel Cover
- Unknown Depth
- 0-2' Excavation/Backfill
- 2-4' Excavation/Backfill
- 4-6' Excavation/Backfill
- 6-8' Excavation/Backfill
- 10'+ Excavation/Backfill

Notes:

1. Results presented in milligram per kilogram (mg/kg).
2. PCB: polychlorinated biphenyl
3. Figure presents available PCB data in depth range. Where analytical data are unavailable, screening results (immunoassay) are shown.
4. Aerial Imagery: Calhoun County 2018 - G-Squared Photogrammetry firm

N

0 75 150 Feet

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project PCB Results 8-10 feet

Solutia

Figure 3-5e

N:\A\Anniston\GIS\MXD\OU4 RI Figures\3-5 Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project.mxd 8/31/2019 5:24:11 PM

Total PCB Soil Concentrations
- < 1
- 1 - 4.99
- 5 - 9.99
- 10- 49.99
- ≥ 50

Total PCB Screening Results
- <1
- >1
- >50

Infrastructure Support Activity
- 12" Gravel Cover
- Unknown Depth
- 0-2' Excavation/Backfill
- 2-4' Excavation/Backfill
- 4-6' Excavation/Backfill
- 6-8' Excavation/Backfill
- 10'+ Excavation/Backfill

Notes:

1. Results presented in milligram per kilogram (mg/kg).
2. PCB: polychlorinated biphenyl
3. Figure presents available PCB data in depth range. Where analytical data are unavailable, screening results (immunoassay) are shown.
4. Aerial Imagery: Calhoun County 2018 - G-Squared Photogrammetry firm

N

0 75 150 Feet

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Wastewater Treatment Plant Infrastructure Support Project PCB Results Maximum Per Location

Solutia

Figure 3-5f

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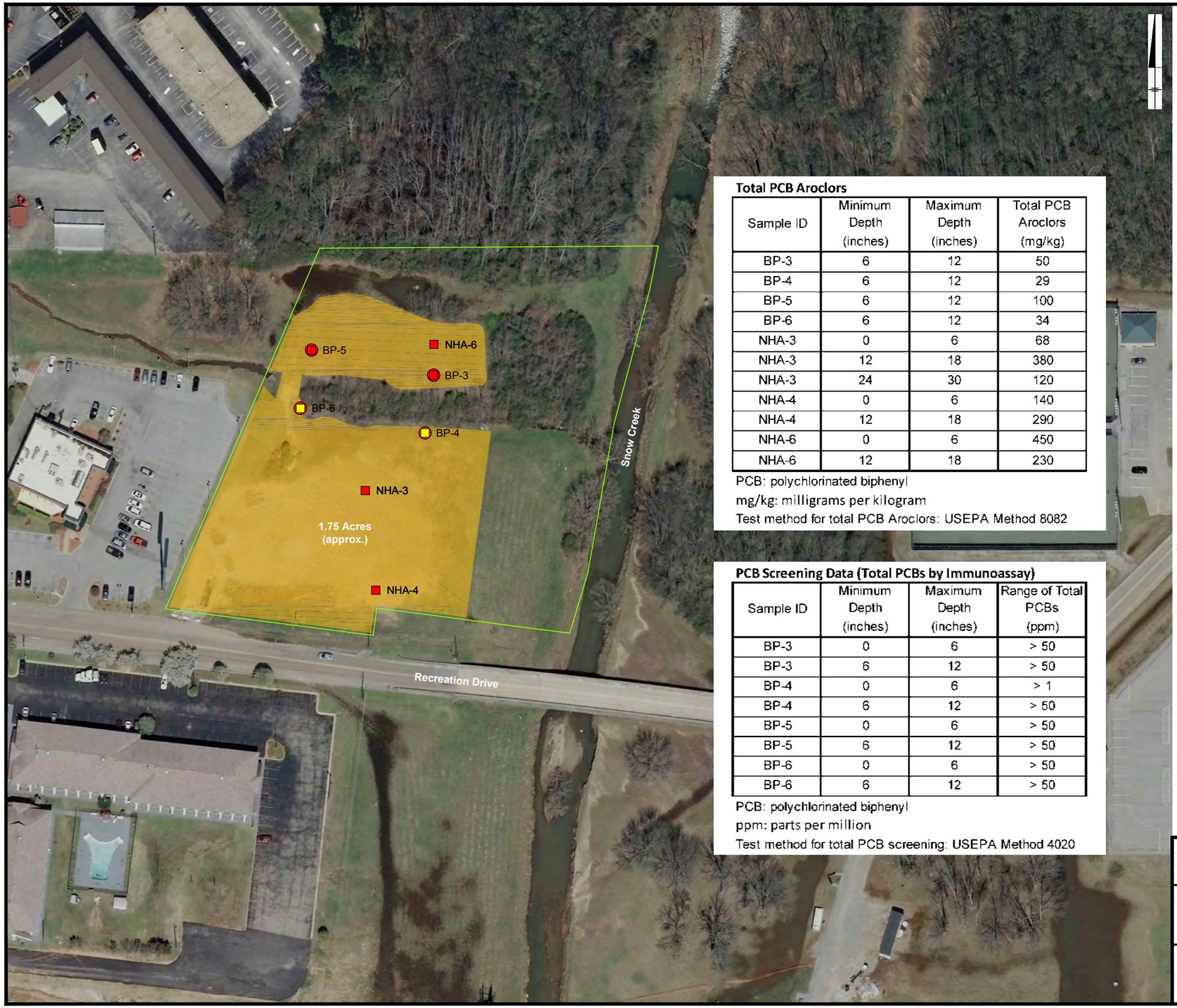


Total PCB Aroclors

Sample ID	Minimum Depth (inches)	Maximum Depth (inches)	Total PCB Aroclors (mg/kg)
BP-3	6	12	50
BP-4	6	12	29
BP-5	6	12	100
BP-6	6	12	34
NHA-3	0	6	68
NHA-3	12	18	380
NHA-3	24	30	120
NHA-4	0	6	140
NHA-4	12	18	290
NHA-6	0	6	450
NHA-6	12	18	230

PCB: polychlorinated biphenyl
mg/kg: milligrams per kilogram
Test method for total PCB Aroclors: USEPA Method 8082

PCB Screening Data (Total PCBs by Immunoassay)

Sample ID	Minimum Depth (inches)	Maximum Depth (inches)	Range of Total PCBs (ppm)
BP-3	0	6	> 50
BP-3	6	12	> 50
BP-4	0	6	> 1
BP-4	6	12	> 50
BP-5	0	6	> 50
BP-5	6	12	> 50
BP-6	0	6	> 50
BP-6	6	12	> 50

PCB: polychlorinated biphenyl
ppm: parts per million
Test method for total PCB screening: USEPA Method 4020

Legend

- Parcel Boundary
- Estimated extent of foundation improvements (See Notes 1 through 3)
- >50 mg/kg Total PCBs Aroclor
- >10 mg/kg Total PCBs Aroclor
- >50 ppm Total PCBs Screening

Notes

1. Estimated extent of foundation improvements shown have been interpreted based on historic aerial photographs and December 2012 field observations by Golder. The actual limits of the constructed cover may vary from the limits shown.

2. Figure presents available analytical and screening PCB data within the foundation improvement area. The maximum PCB concentration at any depth is shown for each sample location.

3. Data represent conditions below the foundation improvement area.

4. PCB data for areas outside of the foundation improvement area are not shown on this figure.

References

1. Aerial imagery and parcel boundary provided by Calhoun County, 2011.

2. Sampling locations obtained from Genesis Project, Inc., via email (02/04/2013).

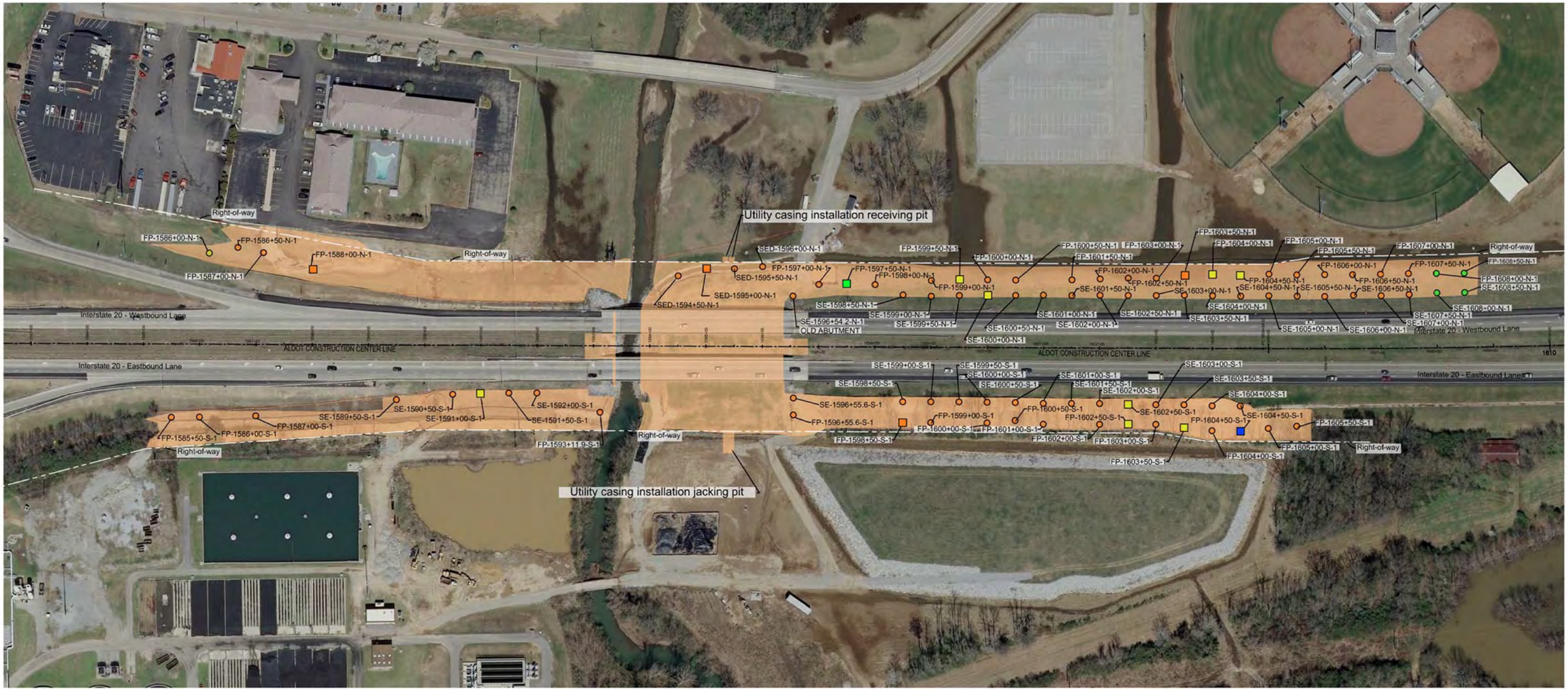
0 50 100 150
SCALE FEET

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Prime Property
Infrastructure Support Project and Total PCB Concentrations in Soil

Solutia
Ingenuity Productivity Performance

Figure
3-6



Legend:

- Infrastructure Support Area
- > 1 < 10, > 10 < 50, > 1 < 50 — Total PCB screening result in soil (immunossay) (ppm) (see Note 1)
- < 1, ≥1 - <5, ≥5 - <10, ≥10 - <50 — Total PCB Aroclor concentrations in soil (mg/kg) (see Note 1)
- Right-of-way

Notes:

1. Figure presents available PCB data in the infrastructure support area. Maximum PCB concentration at any depth for each sample location and the analytical data are presented on Table 3-6.
2. All data represent conditions below the infrastructure support area.
3. PCB data associated with soil excavated as part of the interim measure are not shown on this figure. In addition, PCB data for areas outside of the infrastructure support area are not shown on this figure.

mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl
ppm: parts per million

References:

1. Sample locations and results provided by Genesis Project, Inc., 2010 - 2013.
2. Base figure for limits of interim measures isolation covers provided by Taylor Land Surveying, Inc.
3. Aerial imagery provided by Calhoun County, 2011.

0 80 160 240
SCALE FEET

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Interstate 20 Infrastructure Support Project and Total PCB Concentrations in Soil

Solutia

Figure
3-7a

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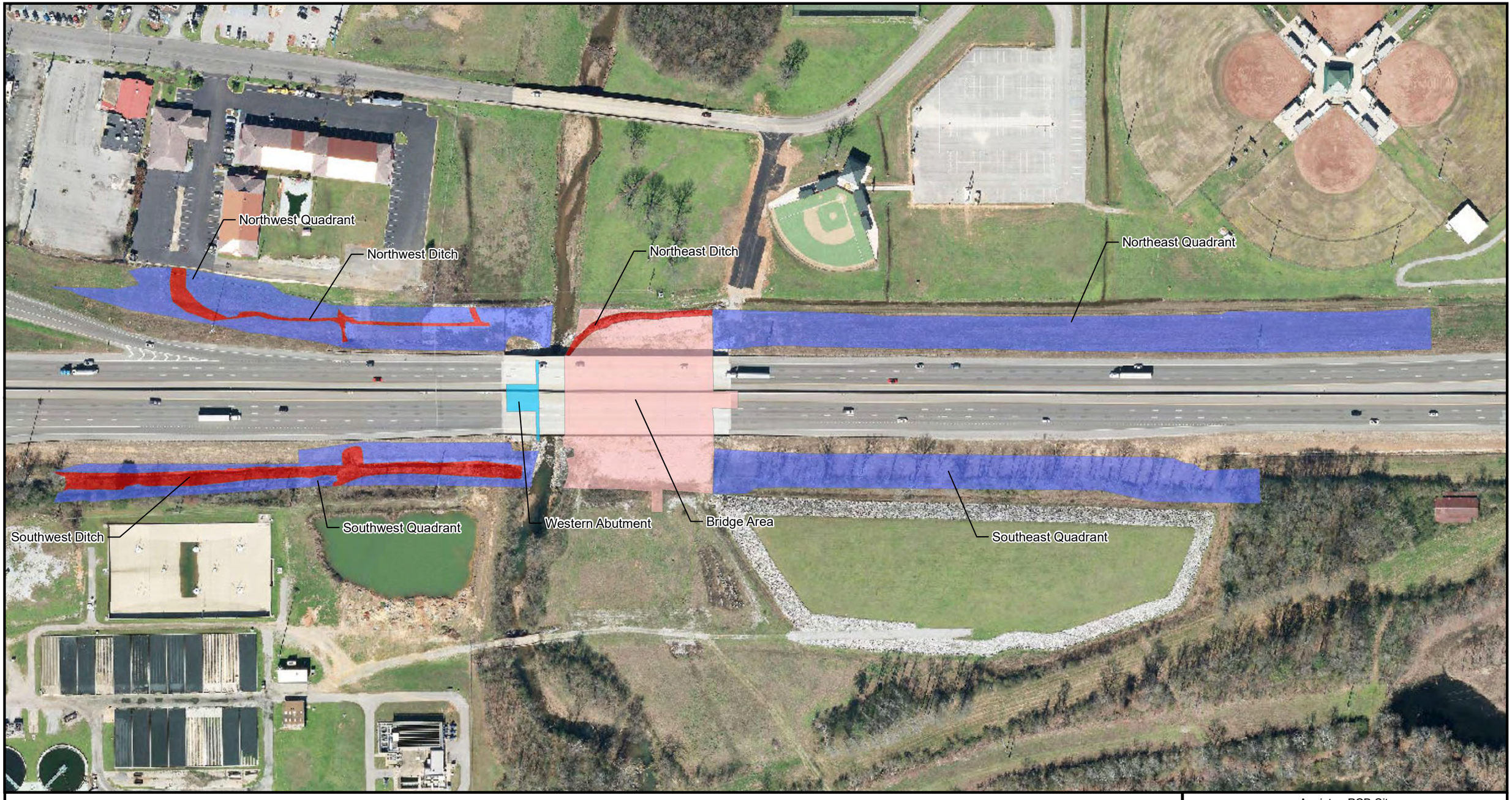

Legend

Infrastructure Support Area

- Western Abutment Area (see A)
- Quadrant Area (see B)
- Areas Under Bridge (see C)
- Ditch Area (see D)

A: Cover materials included an initial geotextile layer placed on the excavated/compacted soil surface that was overlain with a 1-foot-thick layer of clean fill, a second geotextile layer, and a final layer of riprap.

B: Cover materials included an initial geotextile layer placed on the excavated/compacted soil surface that was overlain with a minimum 1-foot-thick layer of clean fill and a vegetative layer. Portions of the Northwest Quadrant also received an additional geotextile layer that was followed with a layer of riprap to prevent erosion from localized drainage.

C: Cover materials included an initial geotextile layer placed on the excavated/compacted soil surface that was overlain with a 1-foot-thick layer of clean fill, a second geotextile layer, and a final layer of riprap.

D: Cover materials in Ditch Areas included an initial geotextile layer overlain with a layer of riprap.

Notes:
1. Aerial Imagery: Calhoun County 2018 -G Squared Photogrammetry firm
2. PCB : polychlorinated biphenyl

N

0 160 Feet

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Interstate 20 Infrastructure Support Project Cover Material Designs

Solutia

Figure 3-7b

N:\A\Anniston\GIS\MXD\OU4 RI Figures\3-7 Interstate 20 Infrastructure Support Project.mxd 8/9/2019 11:18:18 AM

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Legend

Total PCB Screening Result in Soil (Immunoassay) (ppm) (See Note 1)
- < 1
- >1, <50
- ≥ 50

Total PCB Aroclor Concentrations in Soil (mg/kg) (See Note 1)
- < 1
- ≥ 10, <50

Property Boundary

Geotextile Placed at Base of Excavation

Approximate Location of Fiber Optic Line

Approximate Location of Sanitary Sewer

Approximate Location of Storm Sewer

Approximate Extent of Soil Excavation with Off-site Disposal

Approximate Extent of Storm Sewer Piping and Cover (Geotextile and Soil) Placed Above Existing Soils

Approximate Area Covered with Asphalt Paving or Concrete as part of Site Redevelopment

FEMA 100-Year Floodplain Boundary

Notes:
1. Figure presents available PCB data in the redevelopment support area. The maximum PCB concentration at any depth within the limits of the redevelopment area is shown for each sample location. PCB data associated with soil excavated as part of the redevelopment activities are not shown. Analytical data is presented on Table 3-7.
2. Data represent conditions below covers where constructed.
3. mg/kg: milligrams per kilogram
   PCB: polychlorinated biphenyl
   ppm: parts per million

Reference:
1. Solutia, Inc., Former Holiday Inn Redevelopment Project Completion Report, November 2013.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Former Holiday Inn Redevelopment Support Removal Action and Total PCB Concentrations in Soil

Solutia

FIGURE
3-8

Total PCB Aroclors

Sample ID	Minimum Depth (feet)	Maximum Depth (feet)	Total PCB Aroclors (mg/kg)
032317-1	3	3.25	6.0
032317-2	3	3.25	17
032317-3	2	2.25	59
032317-4	4	4.25	67
032317-5	4	4.25	0.19
032317-6	4	4.25	0.12
032317-7	1.5	1.75	0.37
032317-8	1.5	1.75	1.0
OLGP-002	0	0.5	13
OLGP-002	1	1.5	0.21
OLGP-003	0	0.5	7.2
OLGP-003	1	1.5	3.6
OLGP-047	0	0.5	35
OLGP-048	0	0.5	55
OLGP-048	1	1.5	0.51
OLGP-048	2	2.5	0.12
SL-CC01-16	0	0.33	34

Test method for total PCB Aroclors: USEPA Method 8082

PCB Screening Data (Total PCBs by Immunoassay)

Sample ID	Minimum Depth (feet)	Maximum Depth (feet)	Ranges of Total PCBs (ppm)
032317-2	3	3.25	>1,<50
032317-3	2	2.25	> 50
032317-5	4	4.25	>1,<50
032317-6	4	4.25	< 1
032317-7	1.5	1.75	< 1
032317-8	1.5	1.75	>1,<50
OLGP-002	0	0.5	> 50
OLGP-002	1	1.5	> 1
OLGP-002	2.5	3	< 1
OLGP-002	3.5	4	< 1
OLGP-003	0	0.5	> 50
OLGP-003	1	1.5	> 50
OLGP-003	2.5	3	> 1
OLGP-003	3.5	4	< 1
OLGP-047	0	0.5	> 50
OLGP-047	1	1.5	< 1
OLGP-047	2	2.5	> 1
OLGP-047	3.5	4	< 1
OLGP-048	0	0.5	> 50
OLGP-048	1	1.5	> 1
OLGP-048	2	2.5	> 1
OLGP-048	3.5	4	< 1
OLWL-2	0	2	< 1

Test method for total PCB screening: USEPA Method 4020

Legend

Total PCB Aroclor (mg/kg)
- <1
- >1, <50
- >50

Total PCB Screening (ppm)
- < 1
- >1, <50
- > 50

- Power Poles
- Data Communication Connection
- Infrastructure Support Area
- Utility Related Excavation Areas
- Oil and Grease Trap

Acronyms:
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl
ppm: parts per million

Notes

1. Figure presents available analytical and screening PCB data within the infrastructure support area. The maximum PCB concentration at any depth is shown for each sample location.

2. Data represent conditions below the infrastructure support area.

3. PCB data for areas outside the infrastructure support area are not shown on this figure.

0 35 70
Feet
Graphic Scale

References

1. Aerial imagery provided by Calhoun County, 2018.

2. Sampling locations obtained from Genesis Project, Inc. via email (02/04/2013).

3. Roux Associates, Inc., Corrective Measures Study Oxford Lake Softball Complex Western Portion (Revision 0), October 11, 2001.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

City of Oxford Maintenance Garage Infrastructure Support Project

Solutia

Figure 3-9

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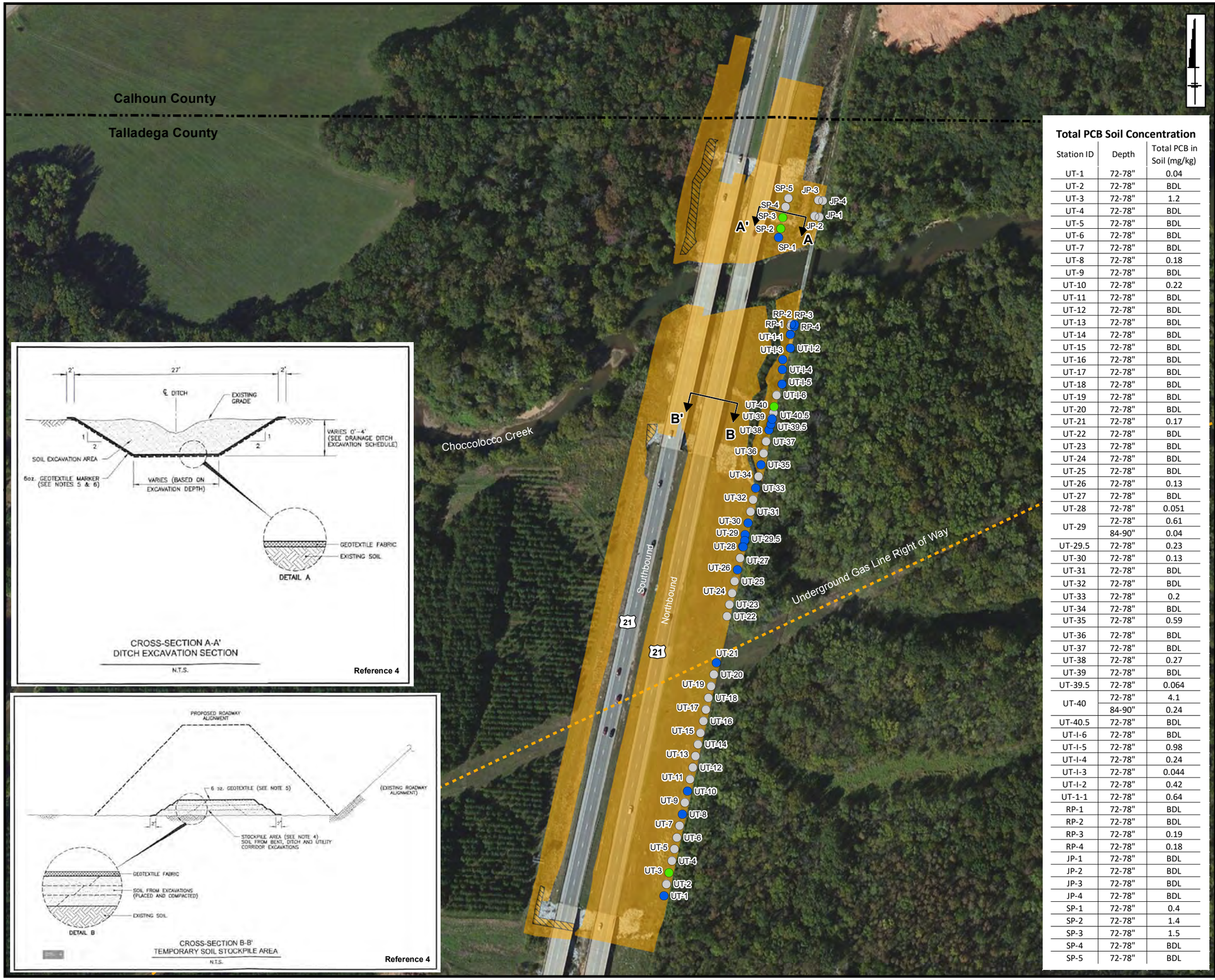


Total PCB Soil Concentration

Station ID	Depth	Total PCB in Soil (mg/kg)
UT-1	72-78"	0.04
UT-2	72-78"	BDL
UT-3	72-78"	1.2
UT-4	72-78"	BDL
UT-5	72-78"	BDL
UT-6	72-78"	BDL
UT-7	72-78"	BDL
UT-8	72-78"	0.18
UT-9	72-78"	BDL
UT-10	72-78"	0.22
UT-11	72-78"	BDL
UT-12	72-78"	BDL
UT-13	72-78"	BDL
UT-14	72-78"	BDL
UT-15	72-78"	BDL
UT-16	72-78"	BDL
UT-17	72-78"	BDL
UT-18	72-78"	BDL
UT-19	72-78"	BDL
UT-20	72-78"	BDL
UT-21	72-78"	0.17
UT-22	72-78"	BDL
UT-23	72-78"	BDL
UT-24	72-78"	BDL
UT-25	72-78"	BDL
UT-26	72-78"	0.13
UT-27	72-78"	BDL
UT-28	72-78"	0.051
UT-29	72-78"	0.61
	84-90"	0.04
UT-29.5	72-78"	0.23
UT-30	72-78"	0.13
UT-31	72-78"	BDL
UT-32	72-78"	BDL
UT-33	72-78"	0.2
UT-34	72-78"	BDL
UT-35	72-78"	0.59
UT-36	72-78"	BDL
UT-37	72-78"	BDL
UT-38	72-78"	0.27
UT-39	72-78"	BDL
UT-39.5	72-78"	0.064
UT-40	72-78"	4.1
	84-90"	0.24
UT-40.5	72-78"	BDL
UT-I-6	72-78"	BDL
UT-I-5	72-78"	0.98
UT-I-4	72-78"	0.24
UT-I-3	72-78"	0.044
UT-I-2	72-78"	0.42
UT-1-1	72-78"	0.64
RP-1	72-78"	BDL
RP-2	72-78"	BDL
RP-3	72-78"	0.19
RP-4	72-78"	0.18
JP-1	72-78"	BDL
JP-2	72-78"	BDL
JP-3	72-78"	BDL
JP-4	72-78"	BDL
SP-1	72-78"	0.4
SP-2	72-78"	1.4
SP-3	72-78"	1.5
SP-4	72-78"	BDL
SP-5	72-78"	BDL

Legend

Total PCB Soil Concentration

- Below Detection Limit
- <1
- ≤5
- >5

1-Foot Soil and Vegetative Cover (Reference 1)

Riprap Cover (Reference 1)

County Boundary

Notes

1. All excavations for roadway, bridges, utility and other components of the project were completed to achieve a PCB concentration in the bottom of excavation of less than 1mg/kg. Excavated soils containing less than 50 mg/kg were consolidated and capped within the roadway embankments as shown in Cross Section B-B'. Excavated soilds with PCB concentrations that were greater than or equal to 50 mg/kg were disposed of off-site at Waste Management's Emelle Hazardous Waste Landfill. When backfill soils were required, clean materials were used.

2. The final corrective measure covers included a geotextile marker layer over PCB-containing soils that were placed within the roadway embankments (see Cross-Section B-B'). All PCB-containing soils were then covered with a 1-foot minimum layer of clean fill materials.

3. PCB data for areas outside of the corrective measures are not shown on this figure.

BDL : below detection limit
mg/kg : milligram per kilogram
PCB : polychlorinated biphenyl

References

1. Solutia Inc. 2004. "Phase I Completion Report, Corrective Measures Implementation, USEPA I.D. No. ALD 004 019 048, Highway 21 Bridge at Choccolocco Creek, Alabama D.O.T. Project BR-0021(500), Talladega and Calhoun Counties, Alabama." July 22nd.

2. Solutia Inc. 2008. "Phase II/FInal Completion Report, Corrective Measures Implementation, USEPA I.D. No. ALD 004 019 048, Highway 21 Bridge at Choccolocco Creek, Alabama D.O.T. Project BR-0021(500), Talladega and Calhoun Counties, Alabama." March.

3. Post Construction Record Survey. Taylor Land Surveying Inc. 2007 "Limits of Soil Cover at Highway 21 Bridge at Choccolocco Creek." February 9th.

4. URS Greiner Woodward Clyde. 2000. "RFI Results and Interim Measures Plan, Alabama D.O.T. Project No: STPAA-62(15) on S.R. 21 from Cooper Lane to Existing 4-Lane at Oxford, Talladega/Calhoun Counties, Second Revision." August 9th

5. Aerial Imagery: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 100 200
Feet

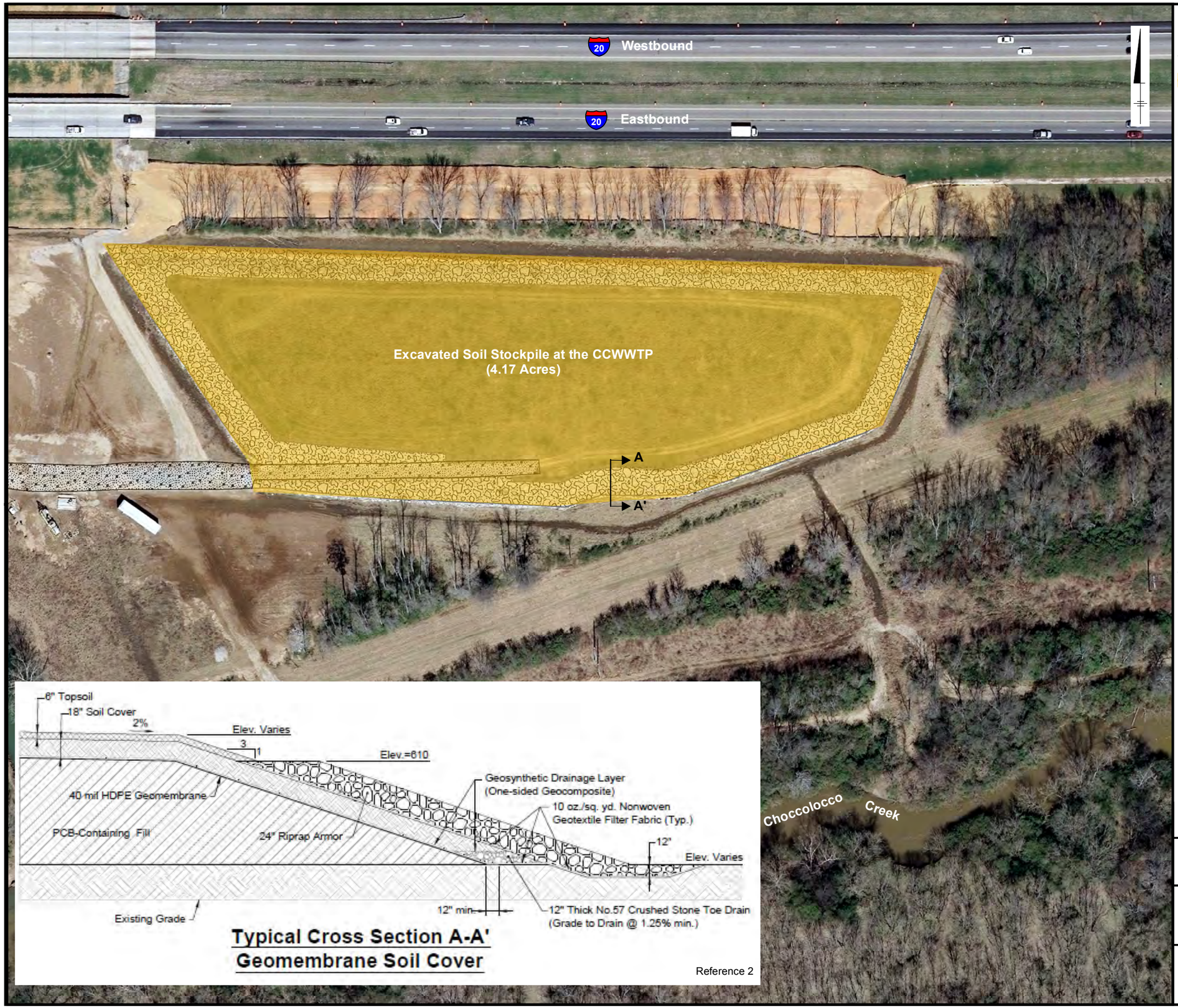
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Highway 21 Bridge at Choccolocco Creek Final Corrective Measure

Solutia

Figure
3-10

N:\A\Anniston\GIS\MXD\OU4 RI Figures\3-10 Highway 21 at Choccolocco Creek.mxd 8/22/2019 1:24:44 PM



Typical Cross Section A-A'
Geomembrane Soil Cover

Reference 2

Legend

- Geomembrane Soil Cover (Reference 1, See Typical Cross Section A-A')
- Riprap Armor
- Gravel

Notes

1. The cover system is comprised of a 40 mil high density polyethylene (HDPE) geomembrane, a geosynthetic drainage layer and is overlain with 18" of soil cover and 6" of topsoil or 24" of riprap armor as shown in Typical Cross Section A-A'.

2. PCB data for areas outside of the Corrective Measure are not shown on this figure.

CCWWTP: Choccolocco Creek Wastewater Treatment Plant
PCB: polychlorinated biphenyl

References

1. Roux Associates, Inc. 2007. "Final Corrective Measures Implementation Report." May.

2. Post Construction Record Survey by Taylor Land Surveying Inc. 2007. "Soil Management Cover at Choccolocco Creek Waste Water Treatment Plant." January.

3. Aerial imagery provided by Calhoun County, 2011.

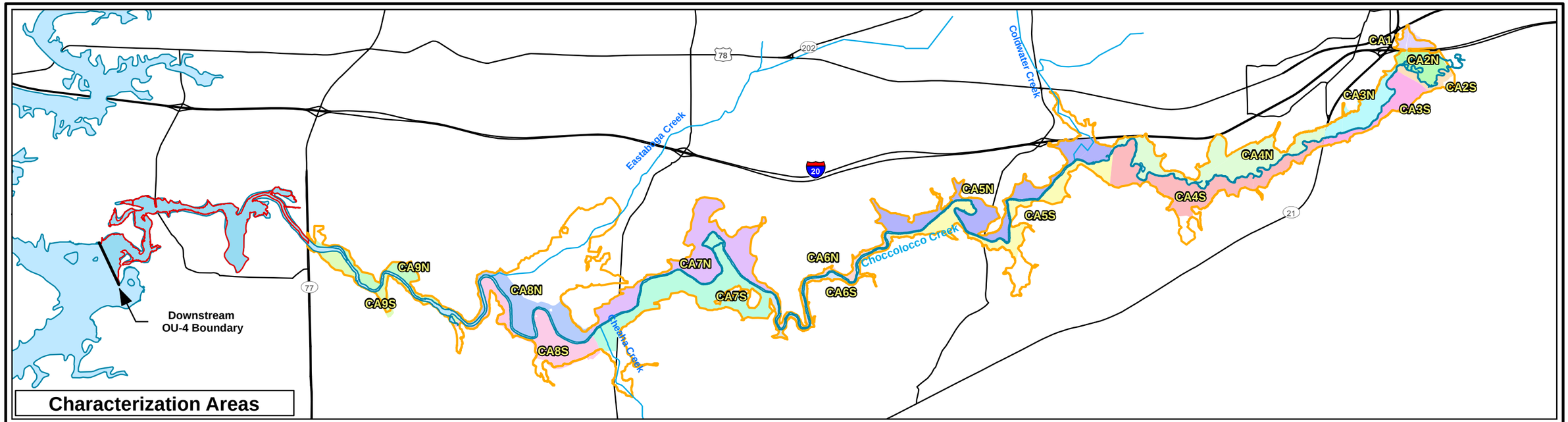
0 50 100 150
SCALE FEET

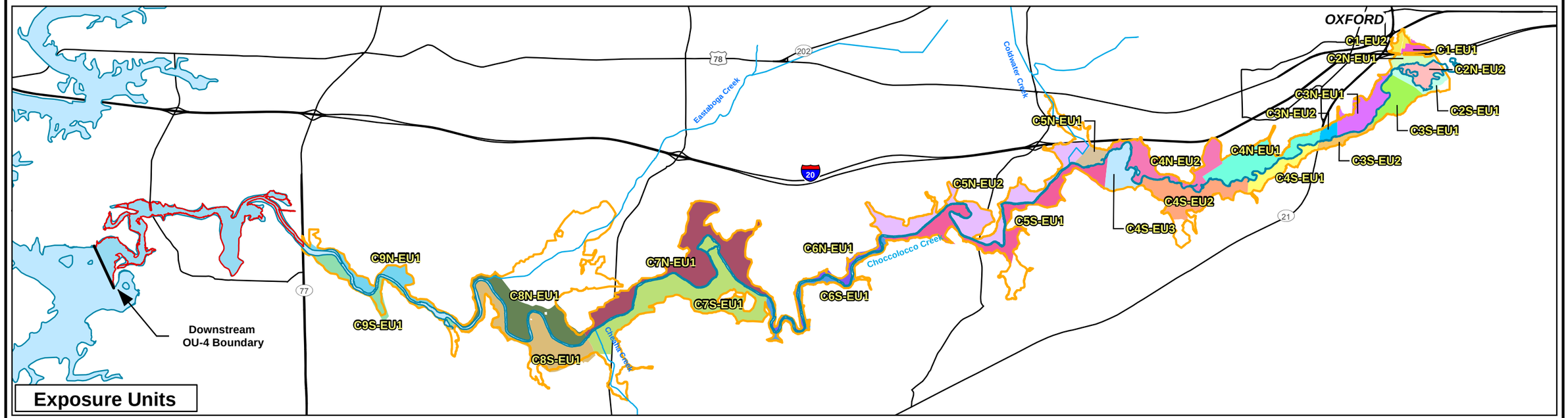
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Excavated Soil Stockpile at the CCWWTP
Final Corrective Measure

Solutia
Ingenuity. Productivity. Performance.

Figure
3-11





Legend

- C10 - Hwy 77 to Lake Logan Martin (In-Stream Sediment Only)
- OU-4 100-Year Floodplain
- Choccolocco Creek
- Streets (Local)

0 7,000 14,000 Feet

Graphic Scale

Note:
OU: operable unit

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Operable Unit 4 Characterization Areas and Exposure Units

Solutia

Figure
4-1

City: SYR Div/Group: SWG Created By: Last Saved By: TJScott
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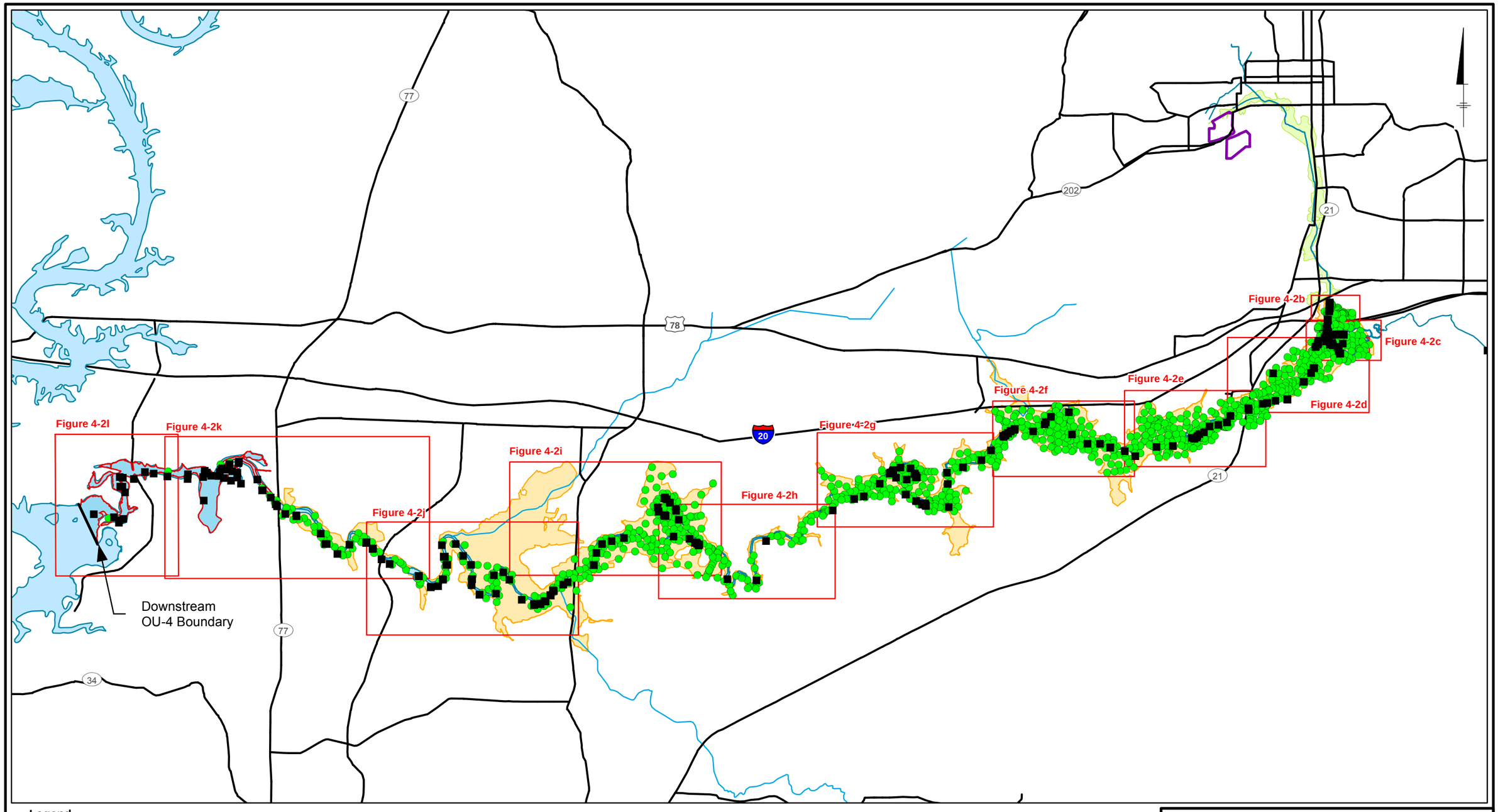

Legend

- Soil Sample Location
- Sediment Sample Location
- C10 - Hwy 77 to Lake Logan Martin (In-Stream Sediment Only)
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- CHOCCOLOCCO/SNOW CREEK

0 8,250 16,500 Feet

Graphic Scale

Notes:
1. OU: operable unit

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Key for Nonresidential Floodplain Soil and Sediment Sample Locations Figures

Solutia

Figure
4-2a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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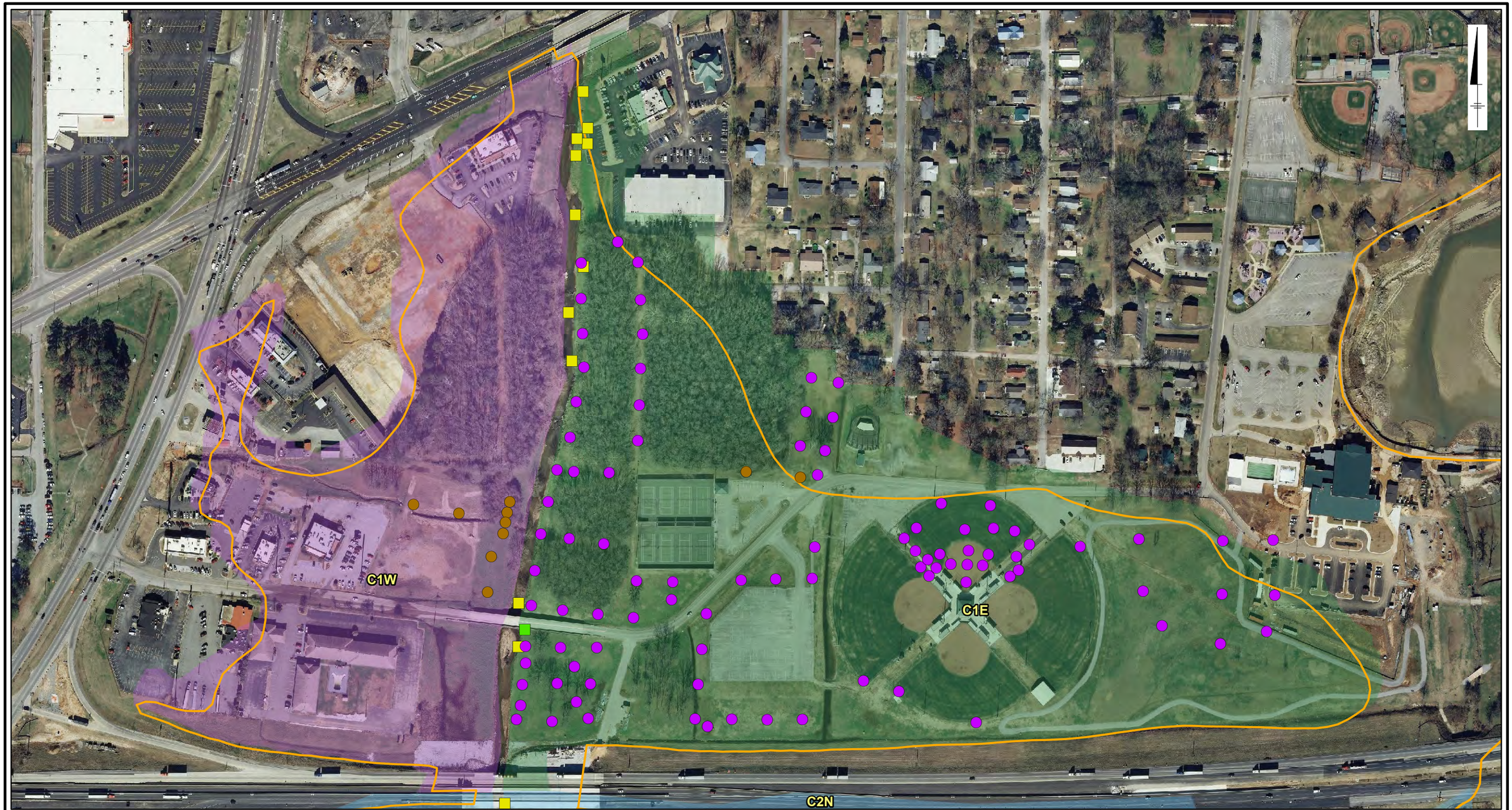

Legend

Soil Program
- Oxford Lake Park
- Other Soil Characterization Program

Sediment Program
- RI/FS Sediment
- RFI Sediment

OU-4 100-Year Floodplain

Characterization Area
- C1E
- C1W
- C2N

0 220 440 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study

2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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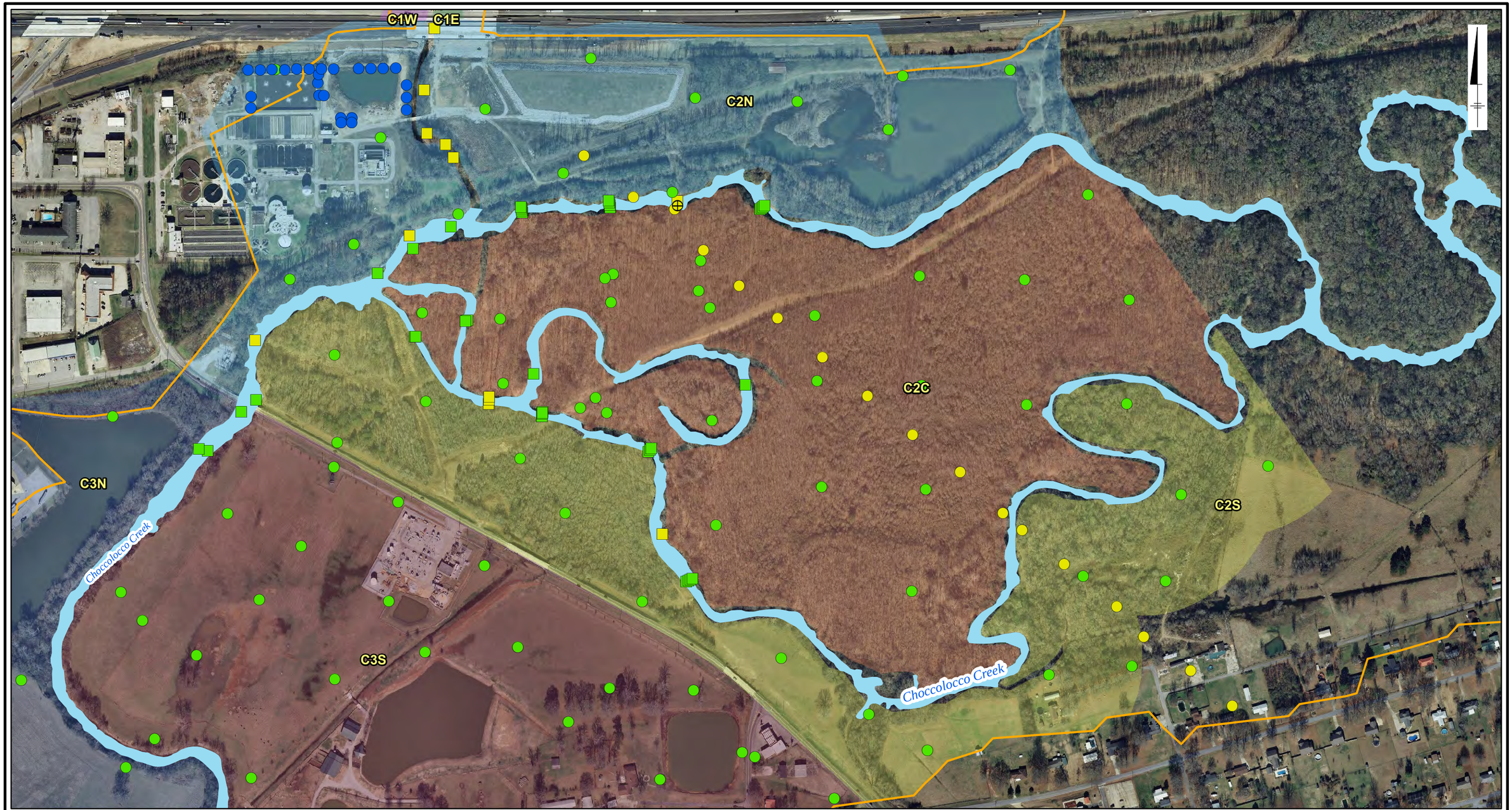

Legend

Soil Program
- RI/FS Soil
- RFI Soil
- RFI Soil -Top of Bank
- WWTP

Sediment Program
- RI/FS Sediment
- RFI Sediment
- OU-4 100-Year Floodplain

Characterization Area
- C1E
- C1W
- C2C
- C2N
- C2S
- C3N
- C3S

Choccolocco Creek

0 340 680 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
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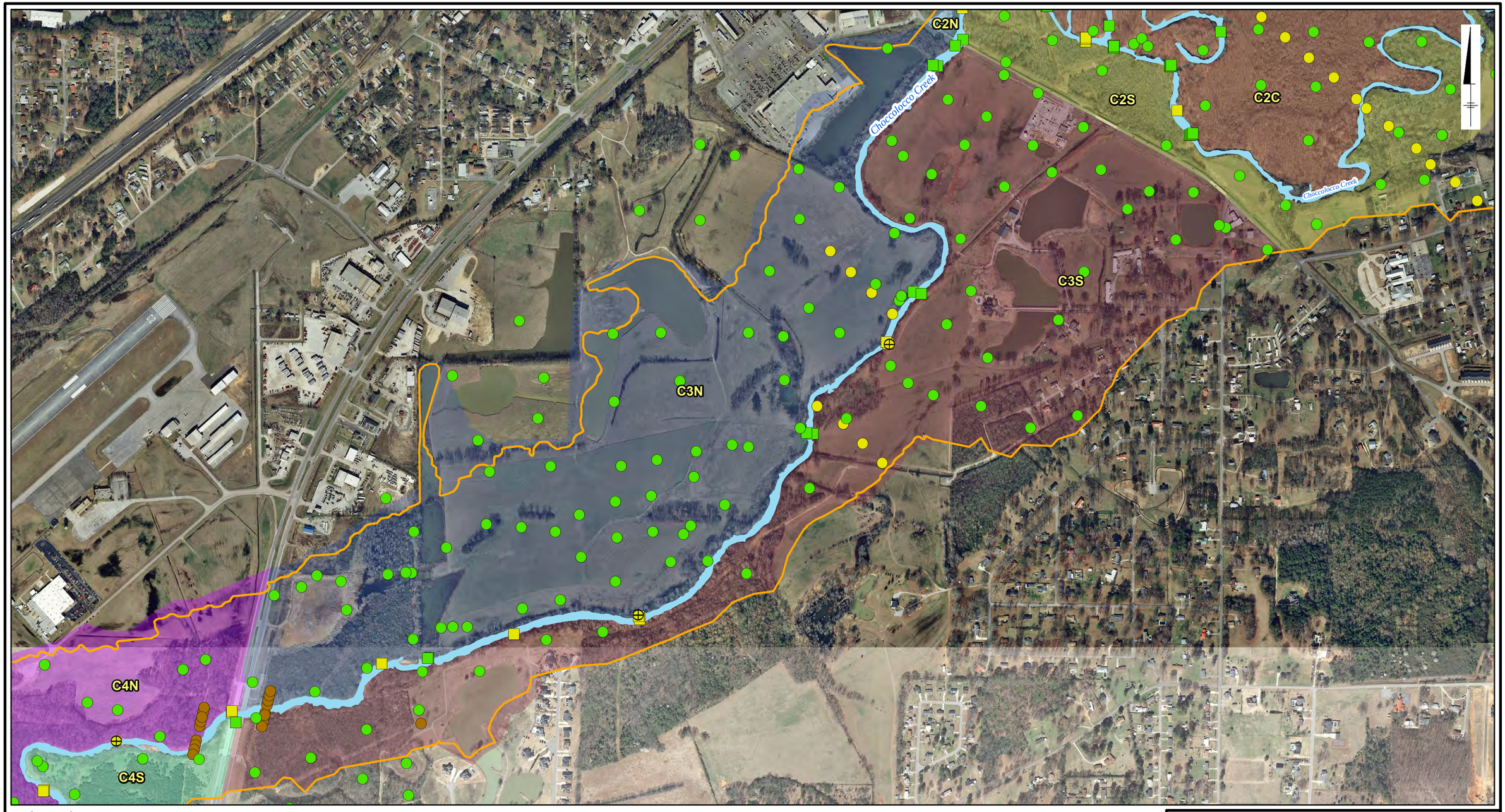

Legend

Soil Program
- RI/FS Soil
- RFI Soil
- RFI Soil -Top of Bank
- Other Soil Characterization Program

Sediment Program
- RI/FS Sediment
- RFI Sediment
- OU-4 100-Year Floodplain

Characterization Area
- C2C
- C2N
- C2S
- C3N
- C3S
- C4N
- C4S
- Choccolocco Creek

0 650 1,300 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study

2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2d

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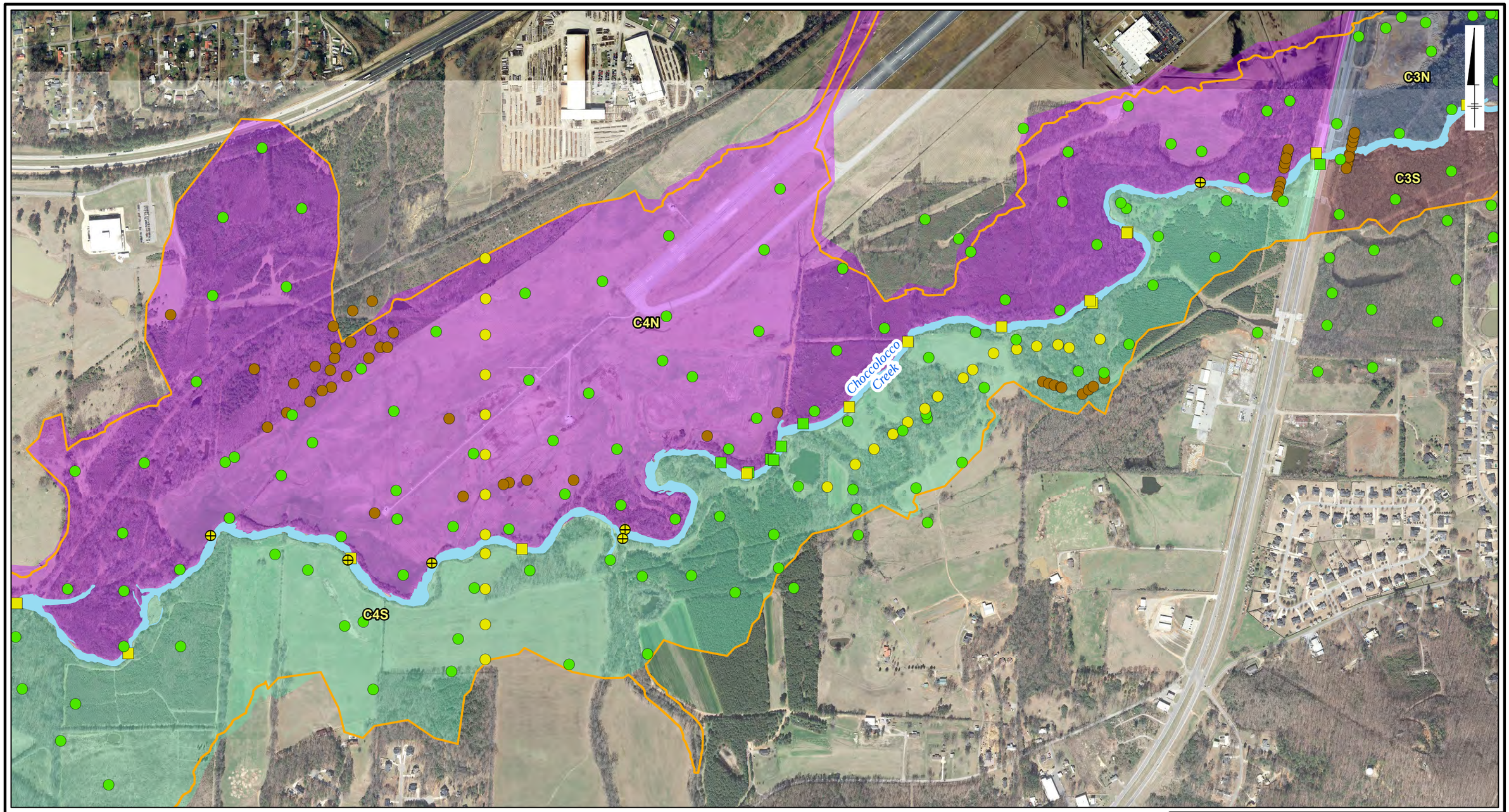

Legend

Soil Program
- RI/FS Soil
- RFI Soil
- RFI Soil -Top of Bank
- Other Soil Characterization Program

Sediment Program
- RI/FS Sediment
- RFI Sediment
- OU-4 100-Year Floodplain

Characterization Area
- C3N
- C3S
- C4N
- C4S
- Choccolocco Creek

0 650 1,300 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2e

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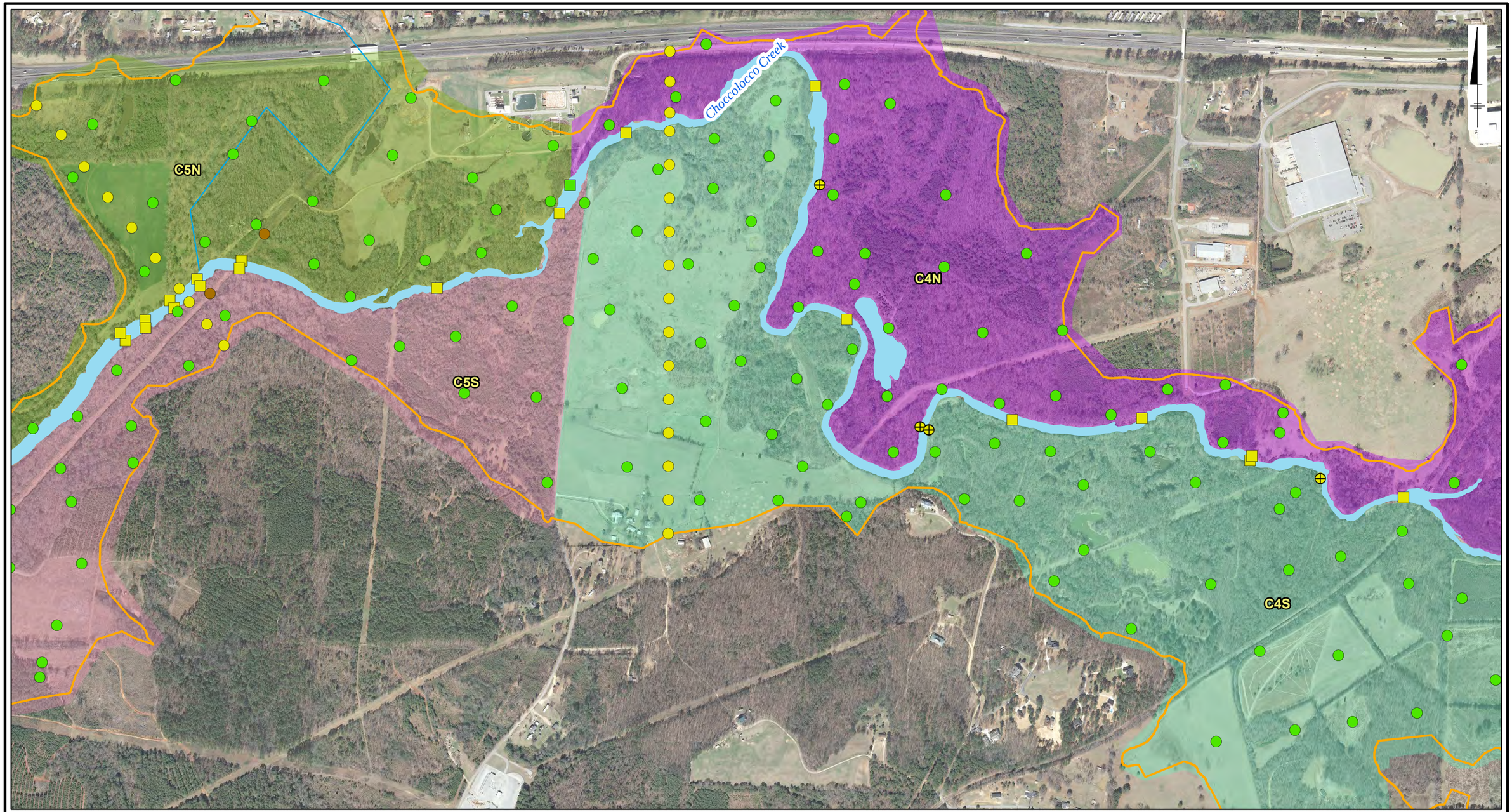

Legend

Soil Program
- RI/FS Soil
- RFI Soil
- RFI Soil -Top of Bank
- Other Soil Characterization Program

Sediment Program
- RI/FS Sediment
- RFI Sediment
- OU-4 100-Year Floodplain

Characterization Area
- C4N
- C4S
- C5N
- C5S
- Choccolocco Creek

0 650 1,300 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2f

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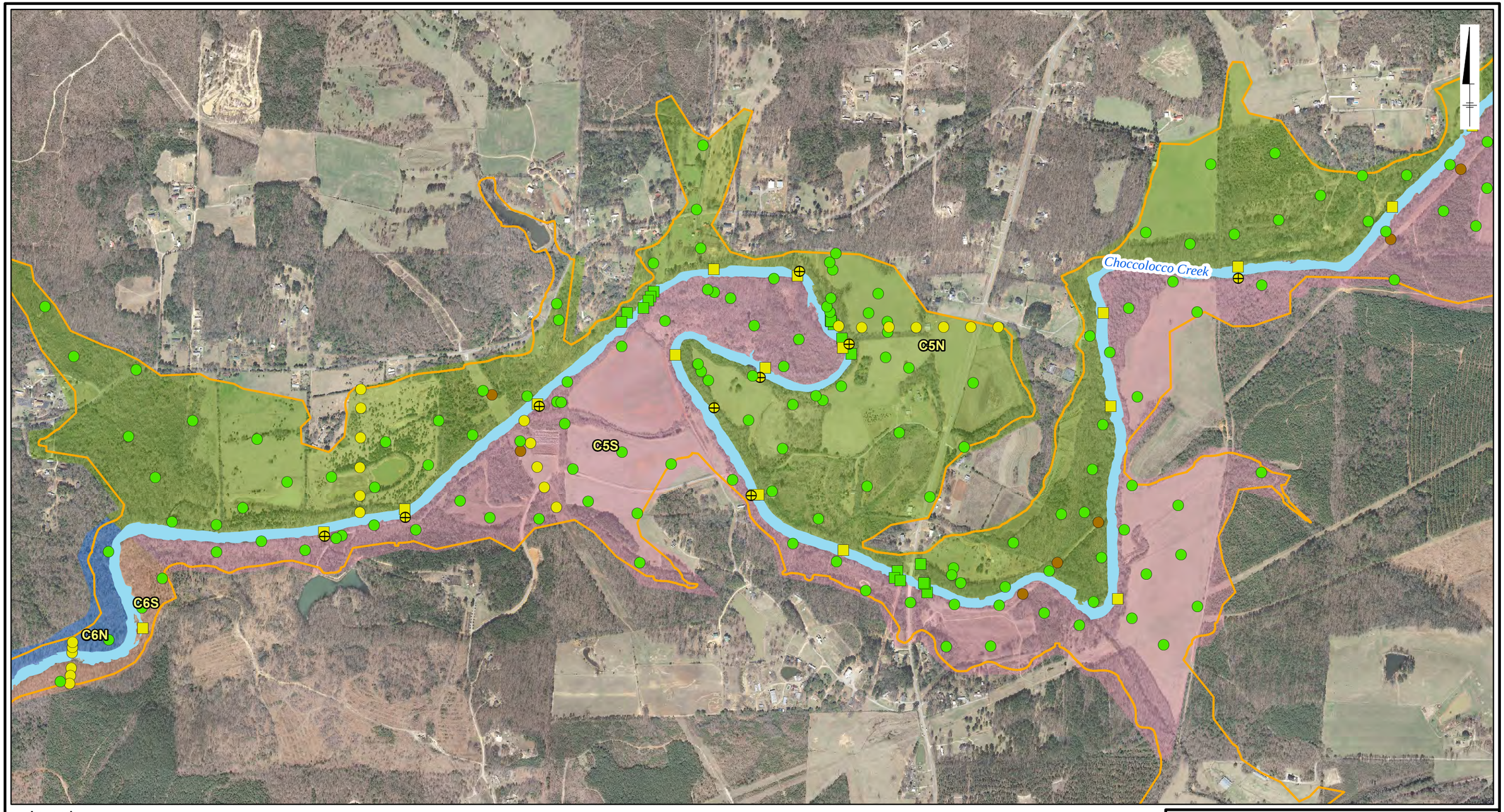

Legend

Soil Program
- RI/FS Soil
- RFI Soil
- RFI Soil -Top of Bank
- Other Soil Characterization Program

Sediment Program
- RI/FS Sediment
- RFI Sediment
- OU-4 100-Year Floodplain

Characterization Area
- C5N
- C5S
- C6N
- C6S
- Choccolocco Creek

0 810 1,620 Feet
Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2g

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C7N

C7S

C6S

Choccolocco Creek

C6N

Legend

Soil Program
- RI/FS Soil
- RFI Soil

Sediment Program
- RI/FS Sediment
- RFI Sediment

OU-4 100-Year Floodplain

Characterization Area
- C6N
- C6S
- C7N
- C7S

Choccolocco Creek

0 810 1,620 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study

2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2h

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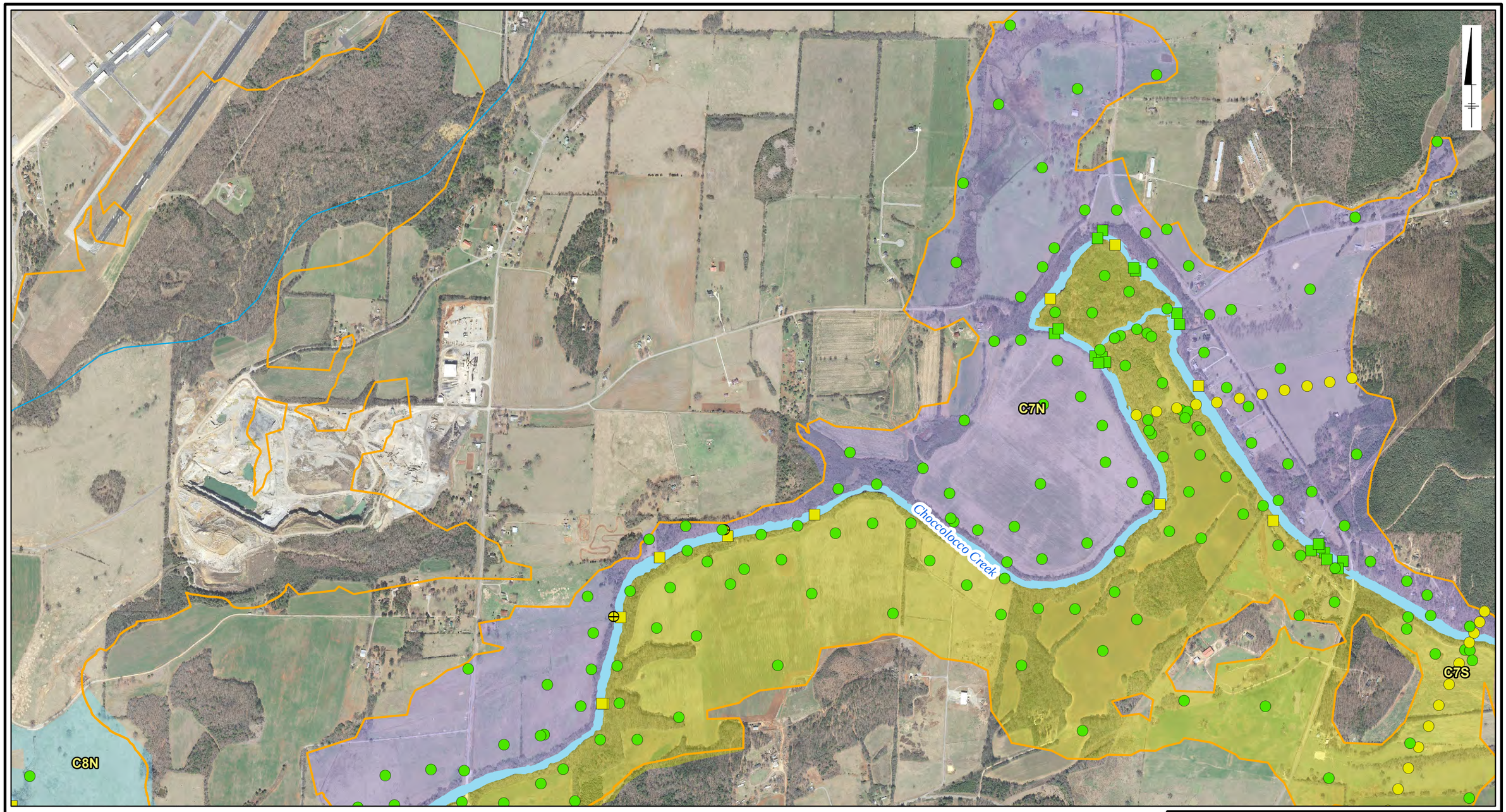

Legend

Soil Program
- RI/FS Soil
- RFI Soil
- RFI Soil -Top of Bank

Sediment Program
- RI/FS Sediment
- RFI Sediment
- OU-4 100-Year Floodplain

Characterization Area
- C6N
- C6S
- C7N
- C7S
- C8N
- Choccolocco Creek

0 970 1,940 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2i

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
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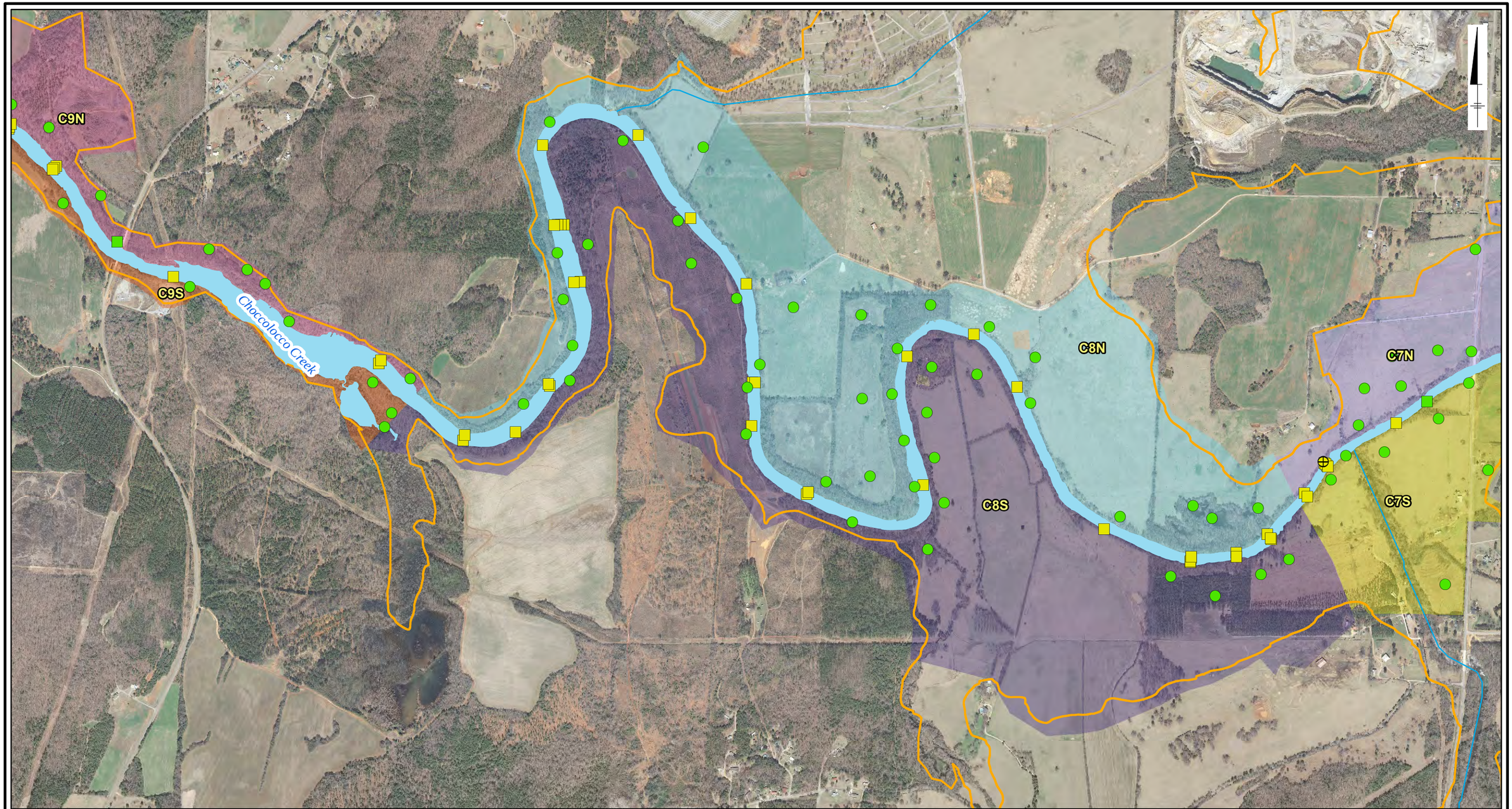

Legend

Soil Program
- RI/FS Soil
- RFI Soil -Top of Bank

Sediment Program
- RI/FS Sediment
- RFI Sediment

OU-4 100-Year Floodplain

Characterization Area
- C7N
- C7S
- C8N
- C8S
- C9N
- C9S
- Choccolocco Creek

0 970 1,940 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2j

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
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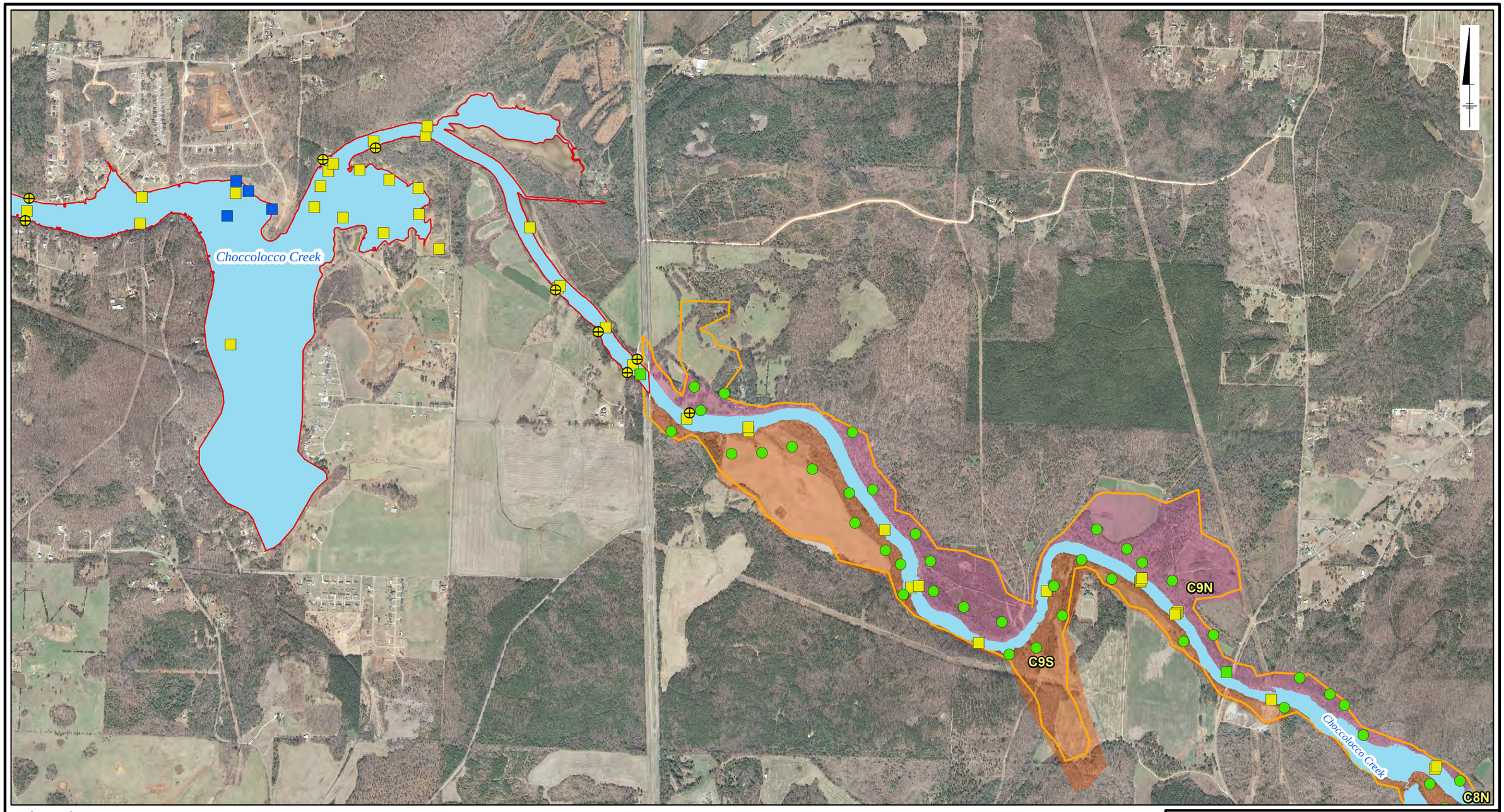

Legend

Soil Program
- RI/FS Soil
- RFI Soil -Top of Bank

Sediment Program
- RI/FS Sediment
- RFI Sediment

- Lake Pointe
- OU-4 100-Year Floodplain

Characterization Area
- C8N
- C8S
- C9N
- C9S
- C10 - Hwy 77 to Lake Logan Martin (In-Stream Sediment Only)
- Choccolocco Creek

0 1,200 2,400 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2k

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
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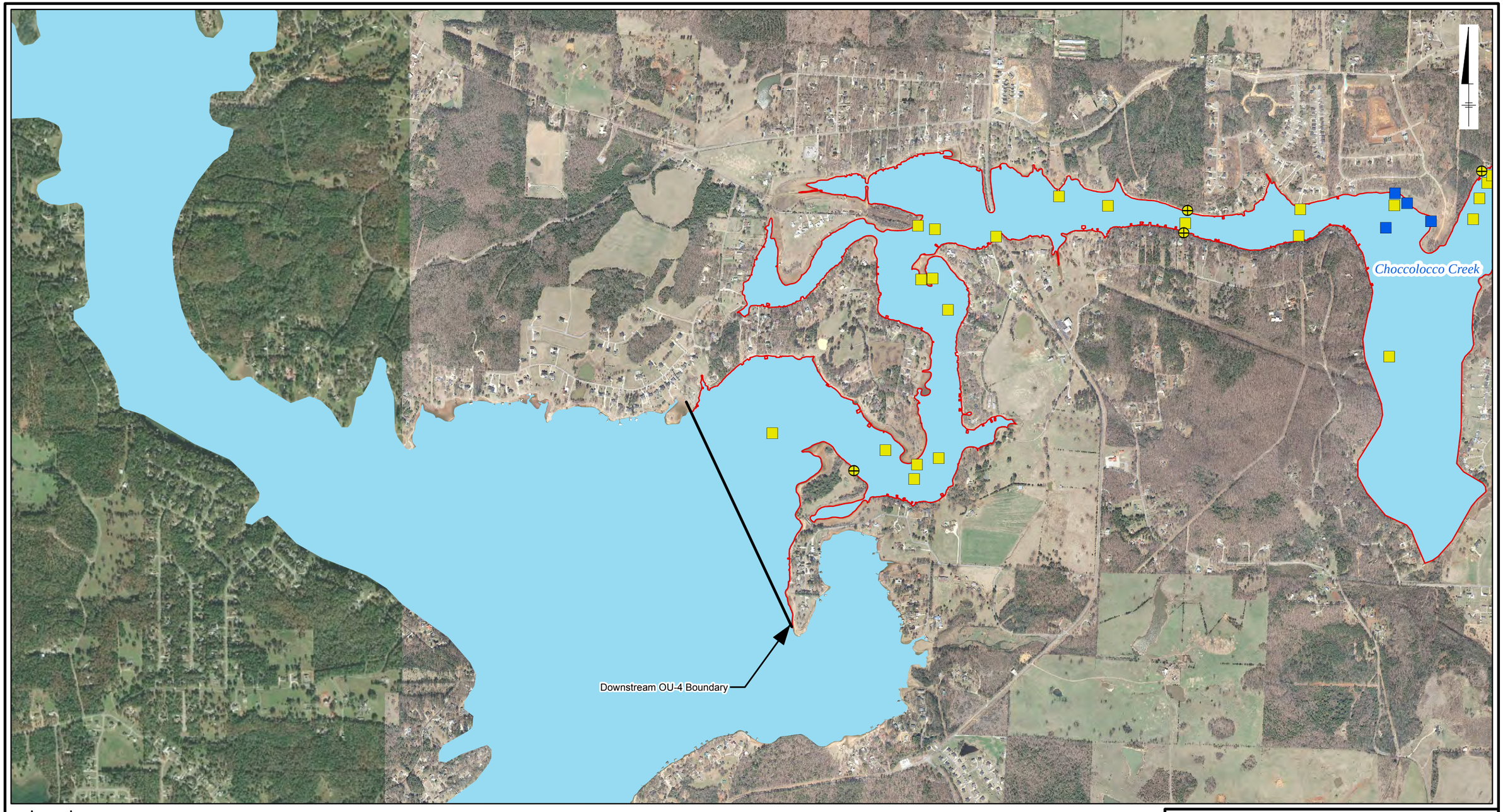

Legend

Soil Program

- RFI Soil -Top of Bank

Sediment Program

- RFI Sediment
- Lake Pointe
- C10 - Hwy 77 to Lake Logan Martin (In-Stream Sediment Only)

- Choccolocco Creek

0 1,200 2,400 Feet

Graphic Scale

Notes:
1. OU: operable unit
   RFI: RCRA Facility Investigation
   RCRA: Resource Conservation and Recovery Act
   RI/FS: Remedial Investigation / Feasibility Study
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Locations

Solutia

Figure
4-2l

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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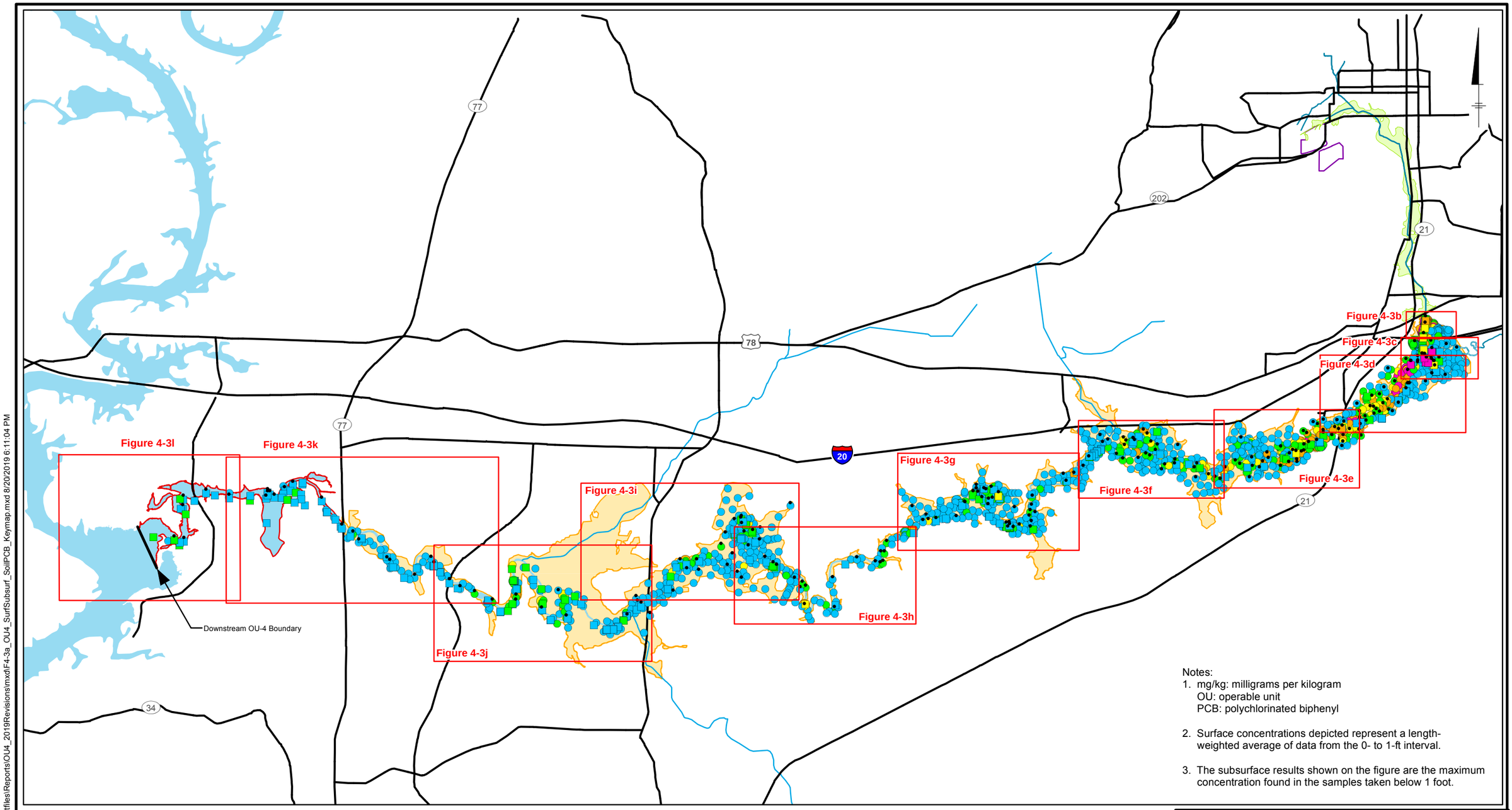

Notes:
1. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
2. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.

Legend

Soil Sample Location
Total PCB Concentration (mg/kg)
- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

Sediment Sample Location
Total PCB Concentration (mg/kg)
- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Major Roadway
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- C10 - Hwy 77 to Lake Logan Martin (In-Stream Sediment Only)

0 7,750 15,500 Feet
Graphic Scale

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Key for Nonresidential Floodplain Soil and Sediment Sample Results Figures

Solutia

Figure
4-3a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
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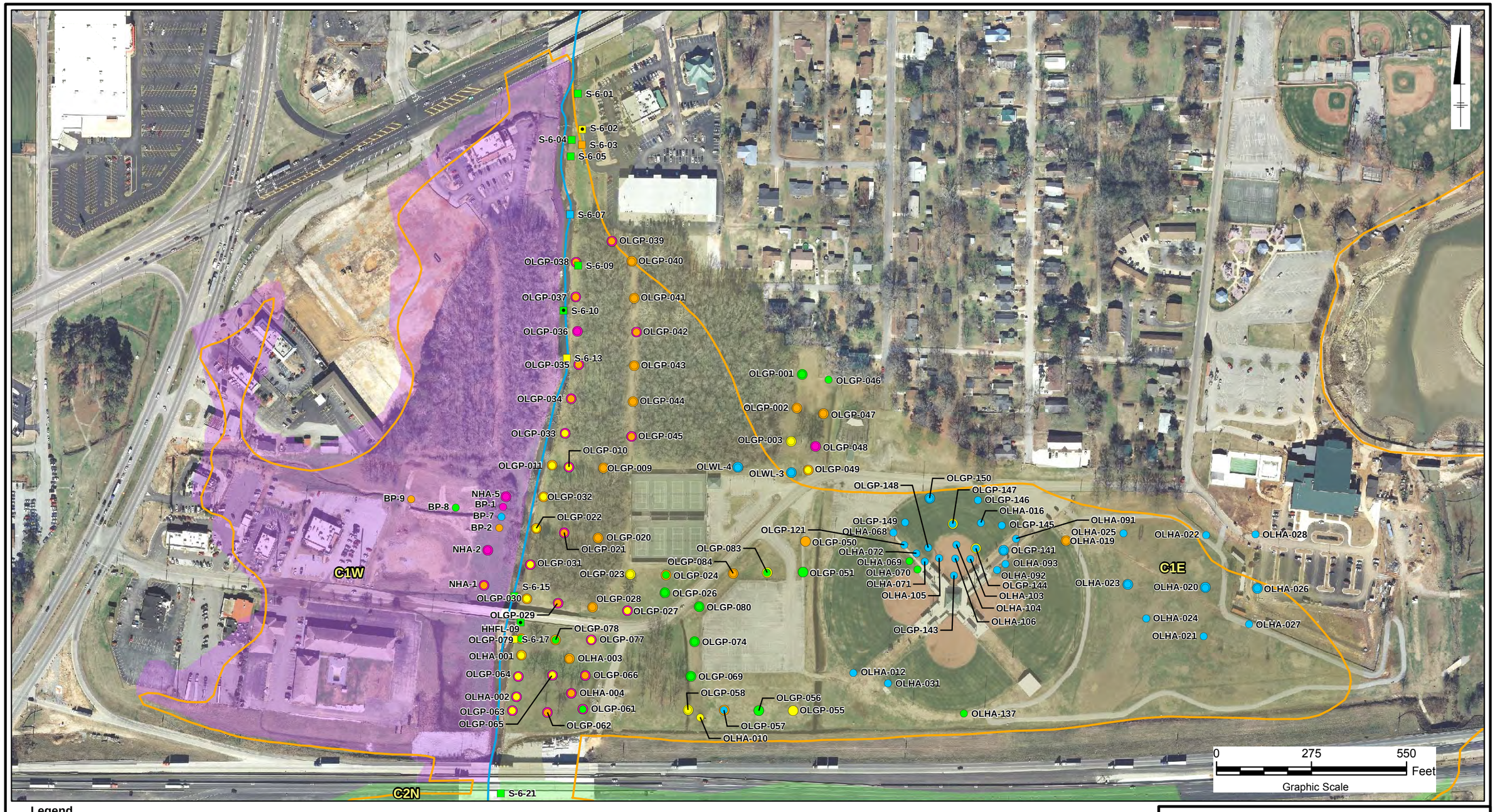


Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Snow Creek Centerline
- OU-4 100-Year Floodplain

Characterization Area

- C1E
- C1W
- C2N

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:

1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

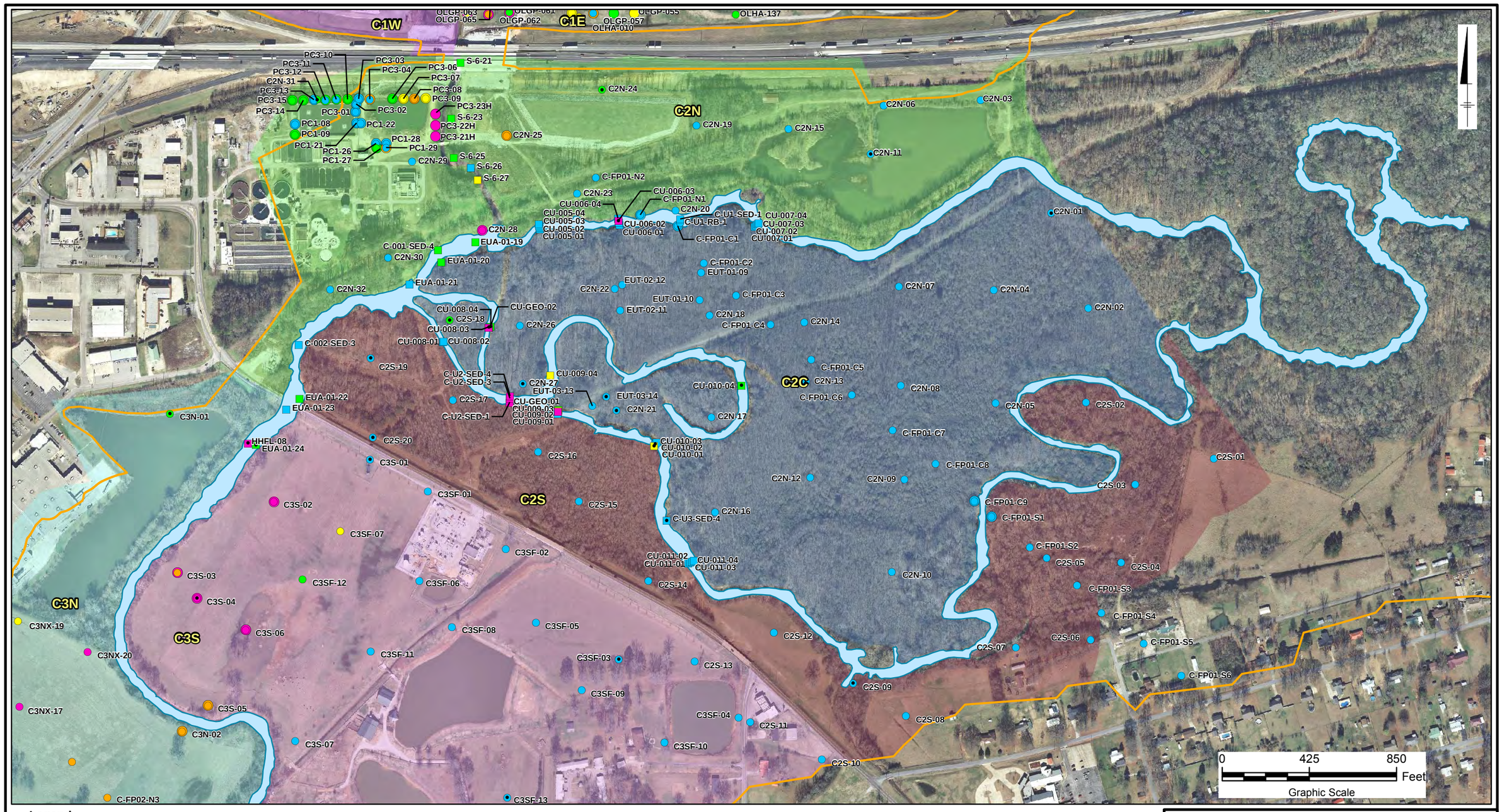
Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F4-3b_OU4_SurfSubsurf_SoilPCB.mxd 8/20/2019 6:13:44 PM



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Anniston Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F4-3c_OU4_SurfSubsurf_SoilPCB.mxd 8/20/2019 6:15:46 PM

Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Characterization Area

- C1W
- C2C
- C2N
- C2S
- C3N
- C3S

Notes:
1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

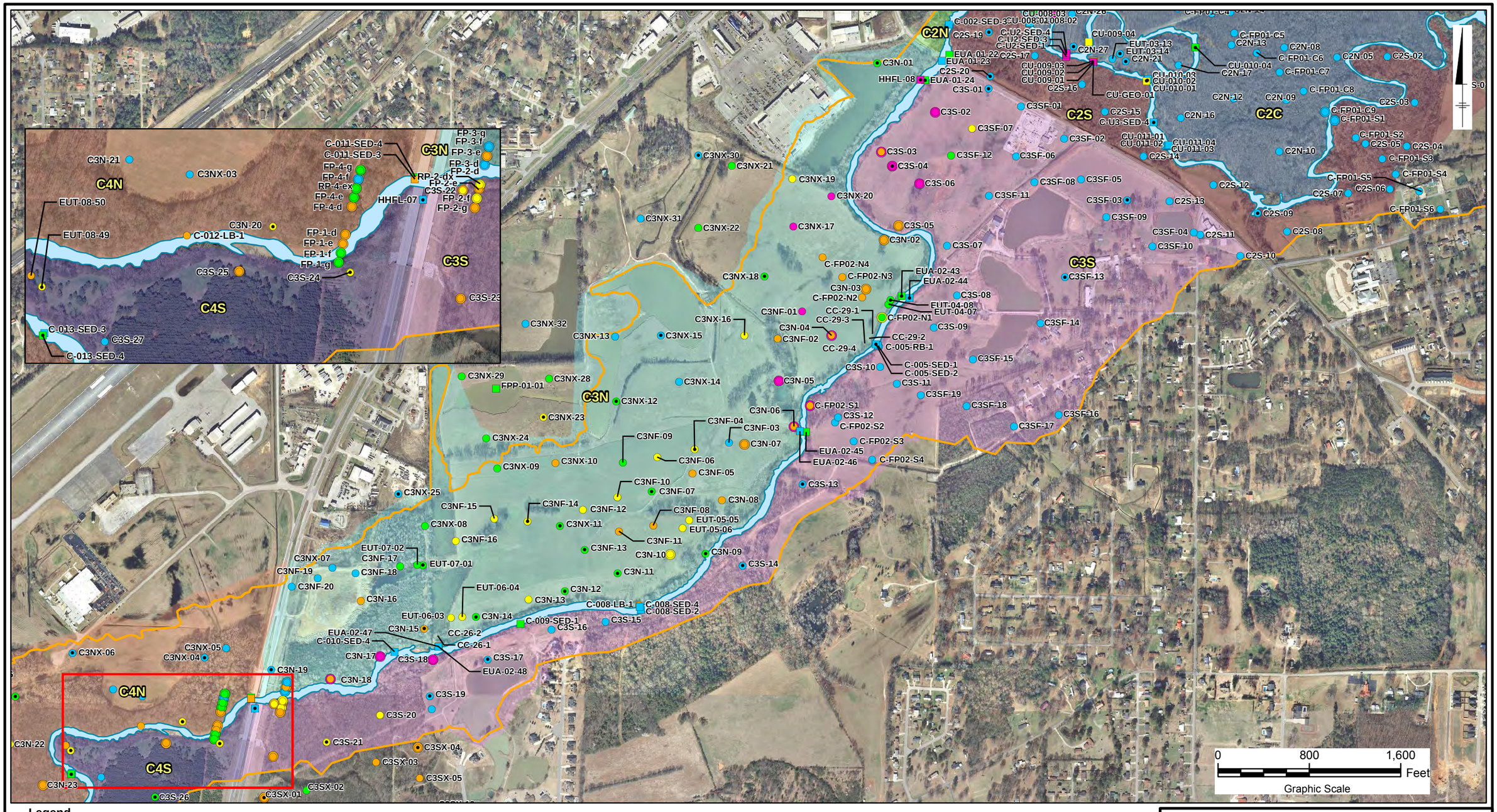
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3c



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Anniston
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Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Characterization Area

- C2C
- C2N
- C2S
- C3N
- C3S
- C4N
- C4S

Notes:
1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

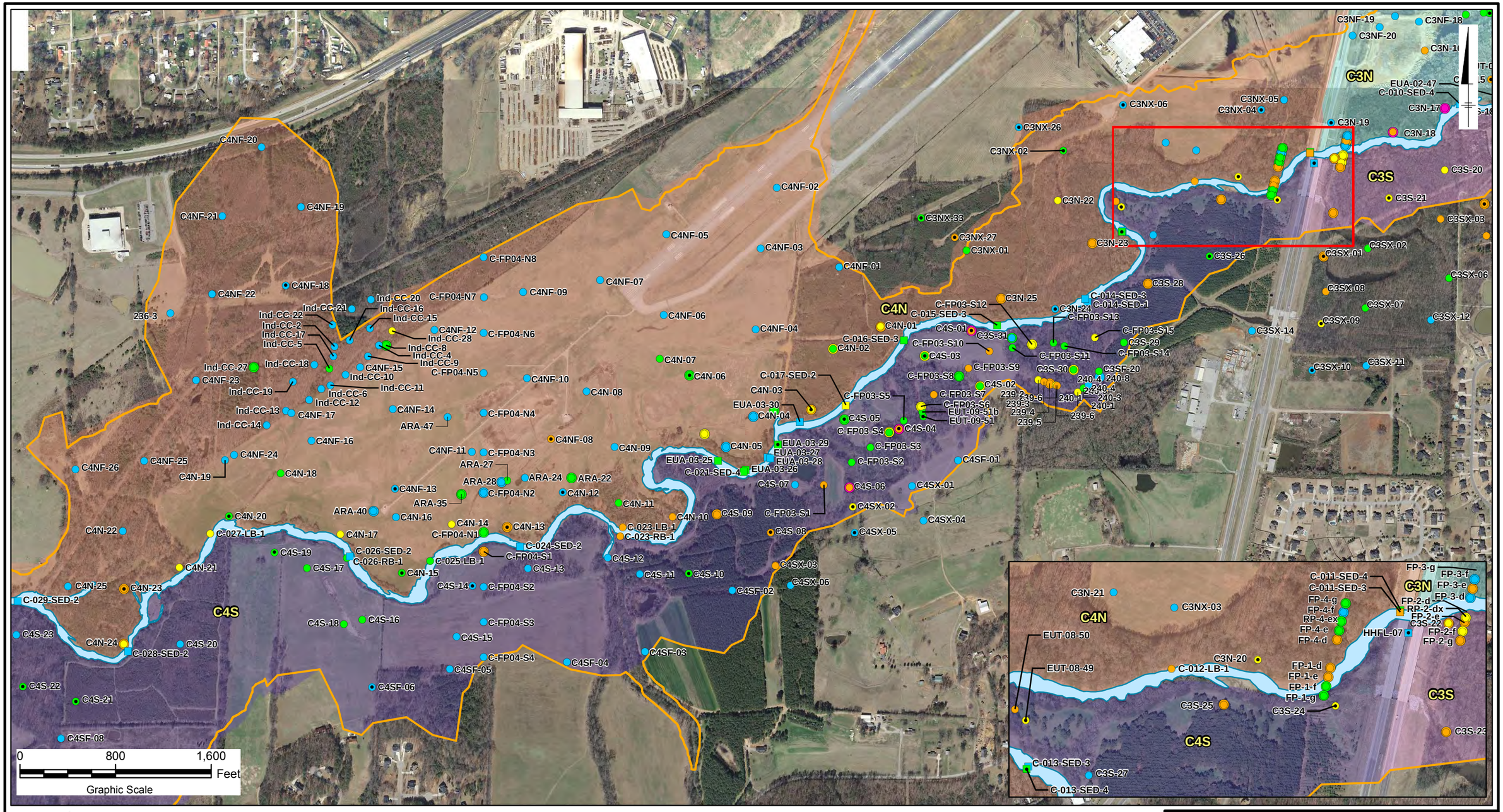
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3d



Legend

Sediment Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

- *Samples Analyzed for Constituents Other Than PCBs or Mercury*
- Choccolocco Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Characterization Area

- C3N
- C3S
- C4N
- C4S

Notes:

1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3e

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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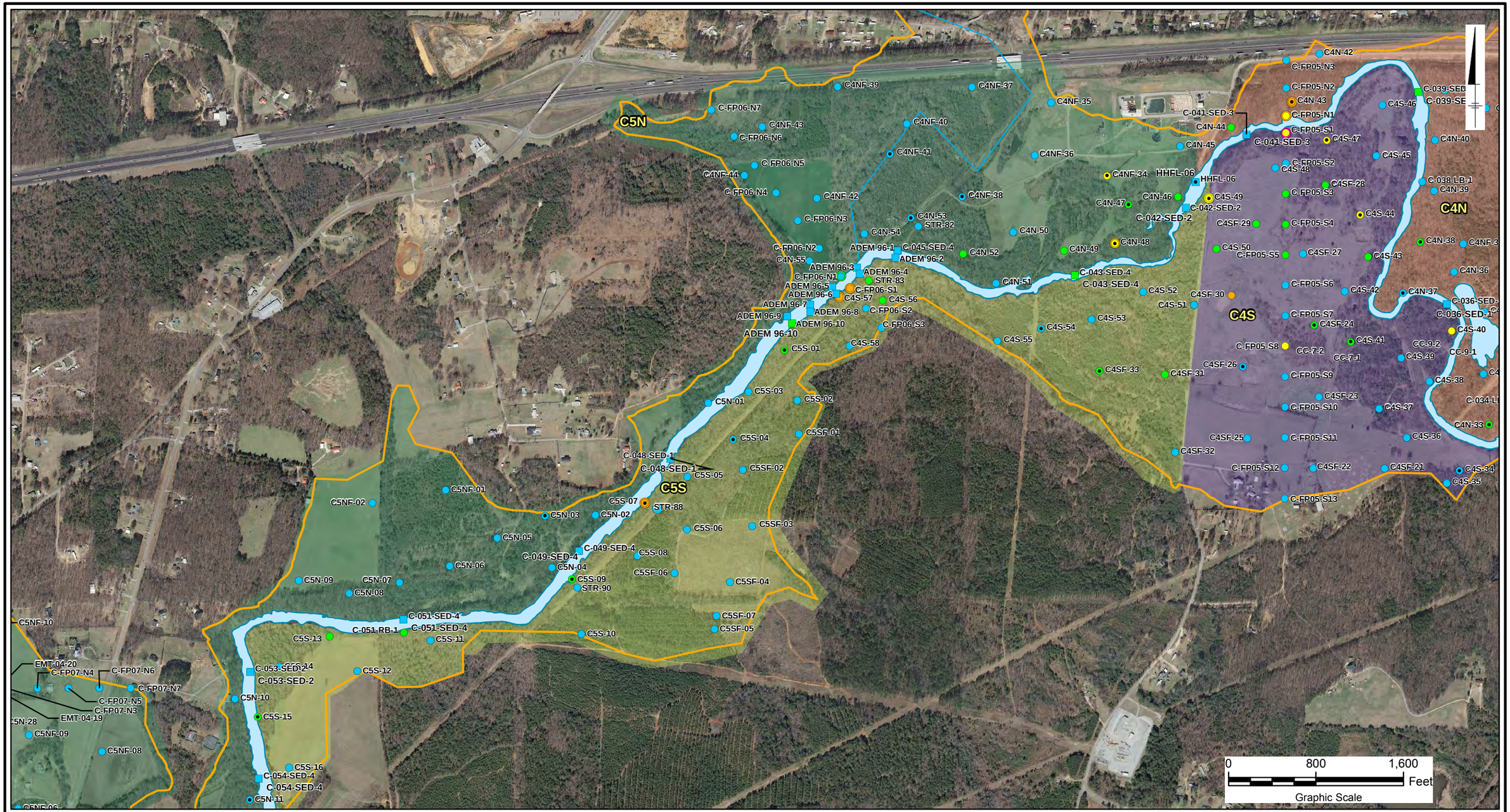

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Anniston
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Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain

Characterization Area

- C4N
- C4S
- C5N
- C5S

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:

1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

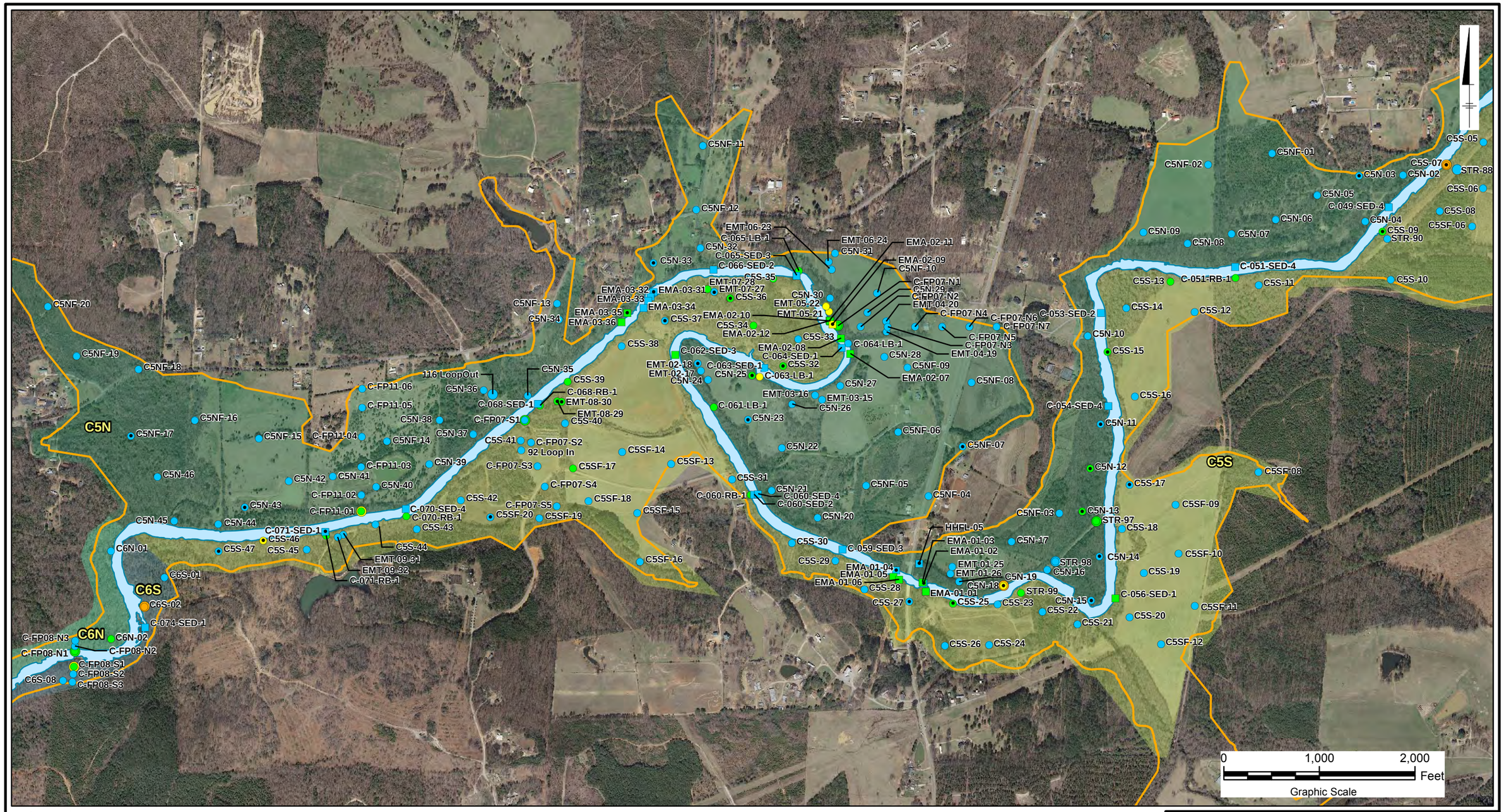
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3f



Legend

Soil Sample Location
Total PCB Concentration (mg/kg)
- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

Sediment Sample Location
Total PCB Concentration (mg/kg)
- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain

Characterization Area
- C5N
- C5S
- C6N
- C6S

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3g

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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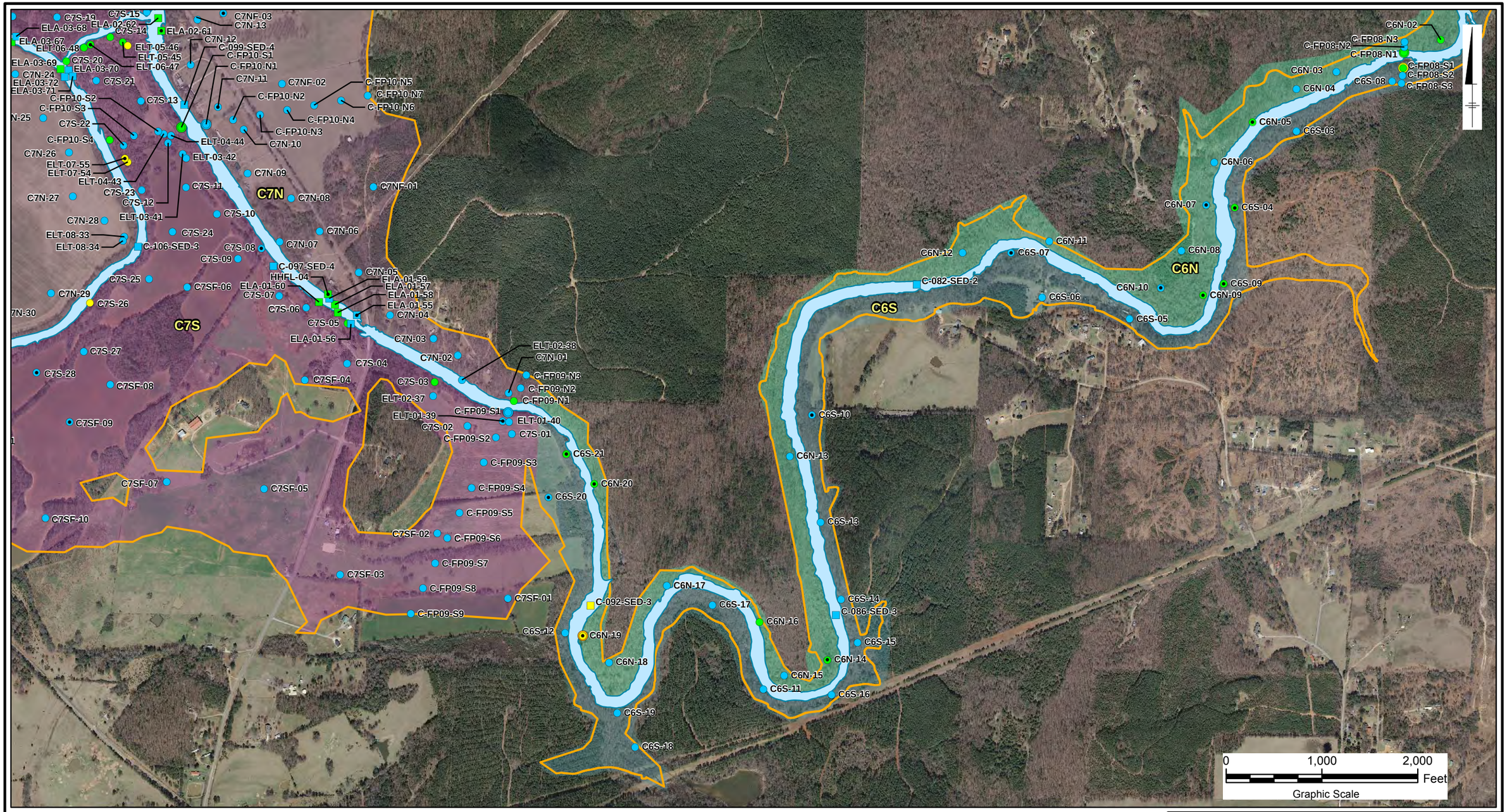

Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain

Characterization Area

- C6N
- C6S
- C7N
- C7S

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:

1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3h

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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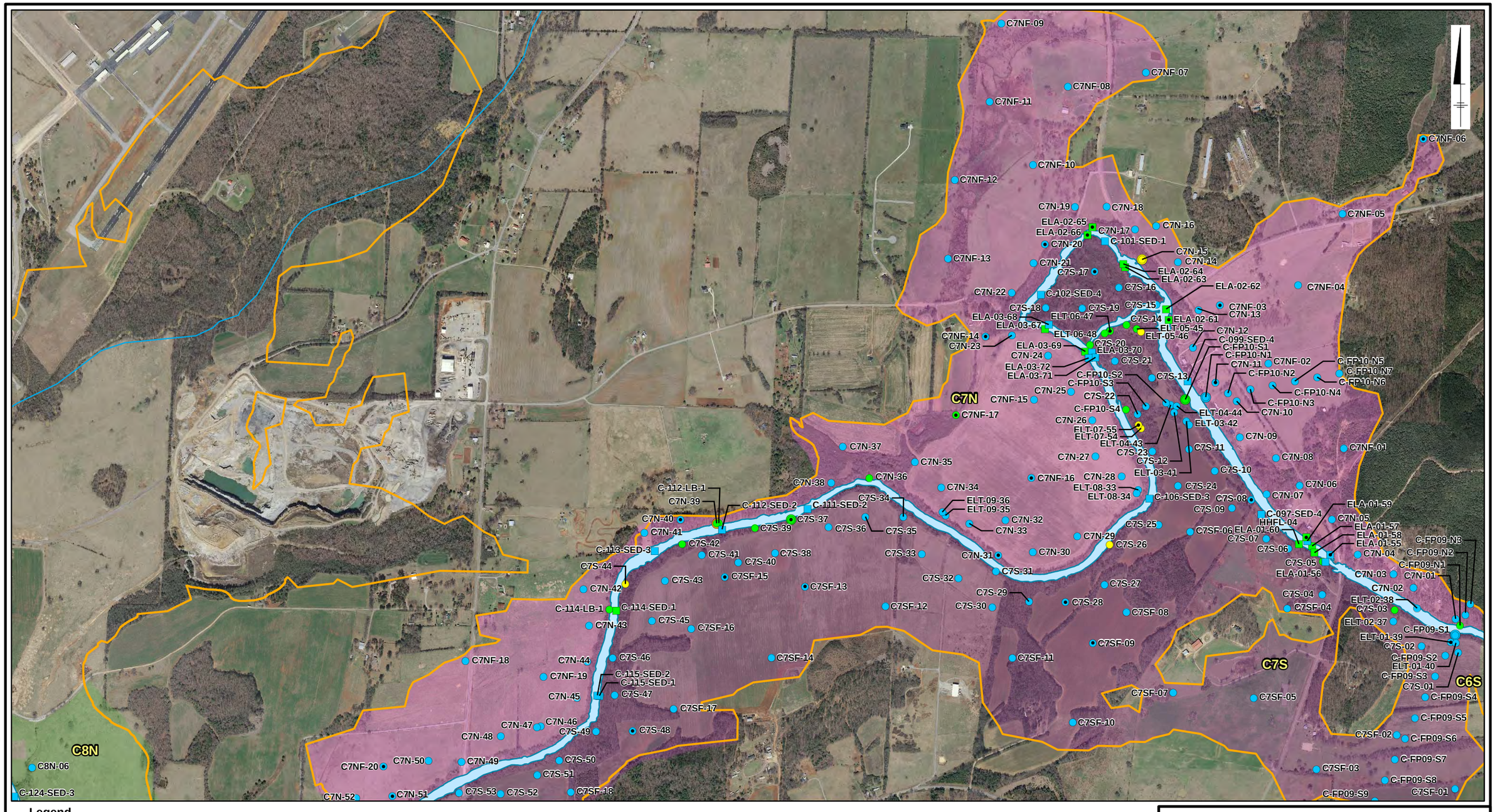

Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain

Characterization Area

- C7N
- C7S
- C8N

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 1,200 2,400 Feet

Graphic Scale

Notes:

1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3i

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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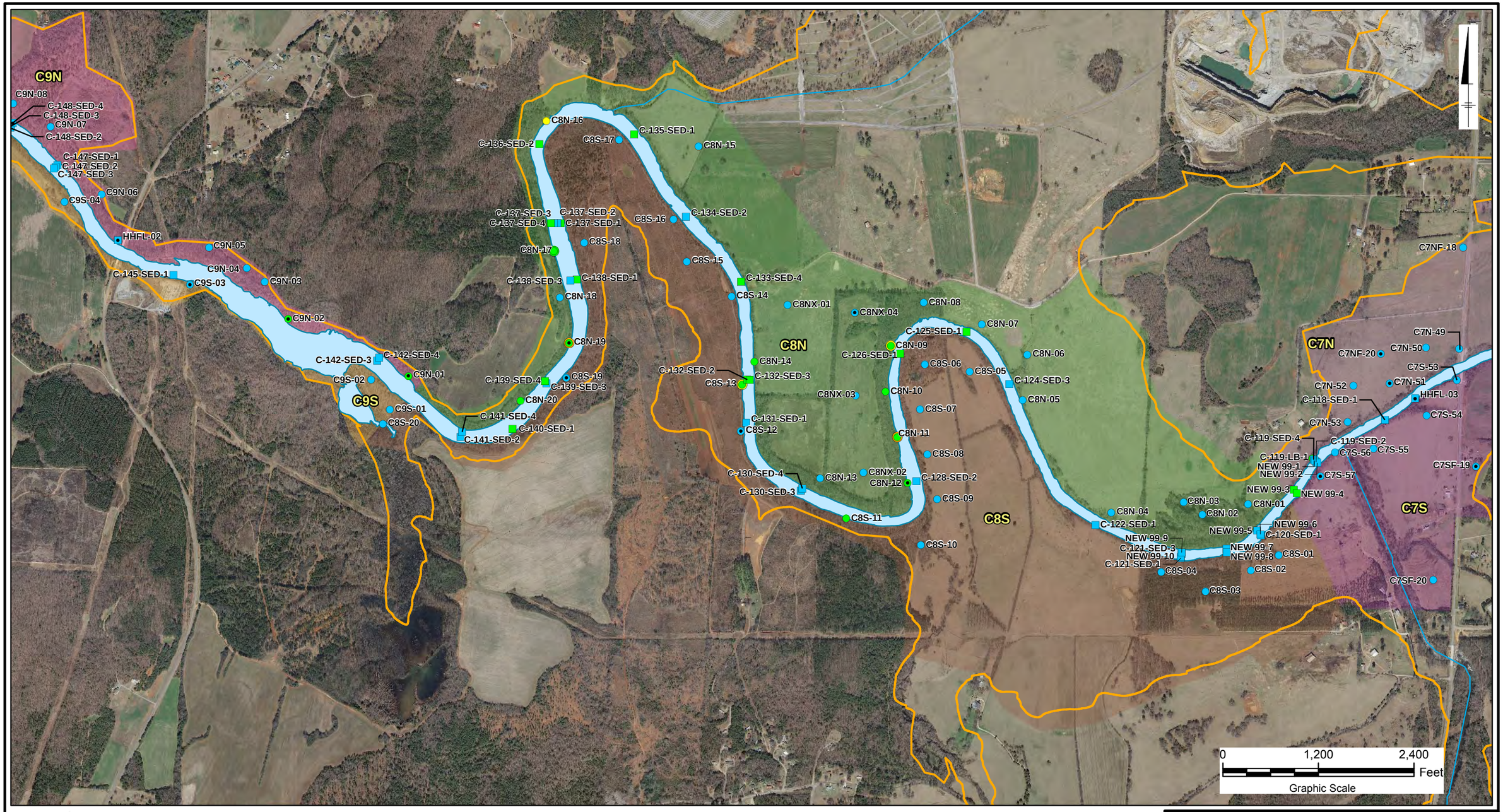

Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain

Characterization Area

- C7N
- C7S
- C8N
- C8S
- C9N
- C9S

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:

1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3j

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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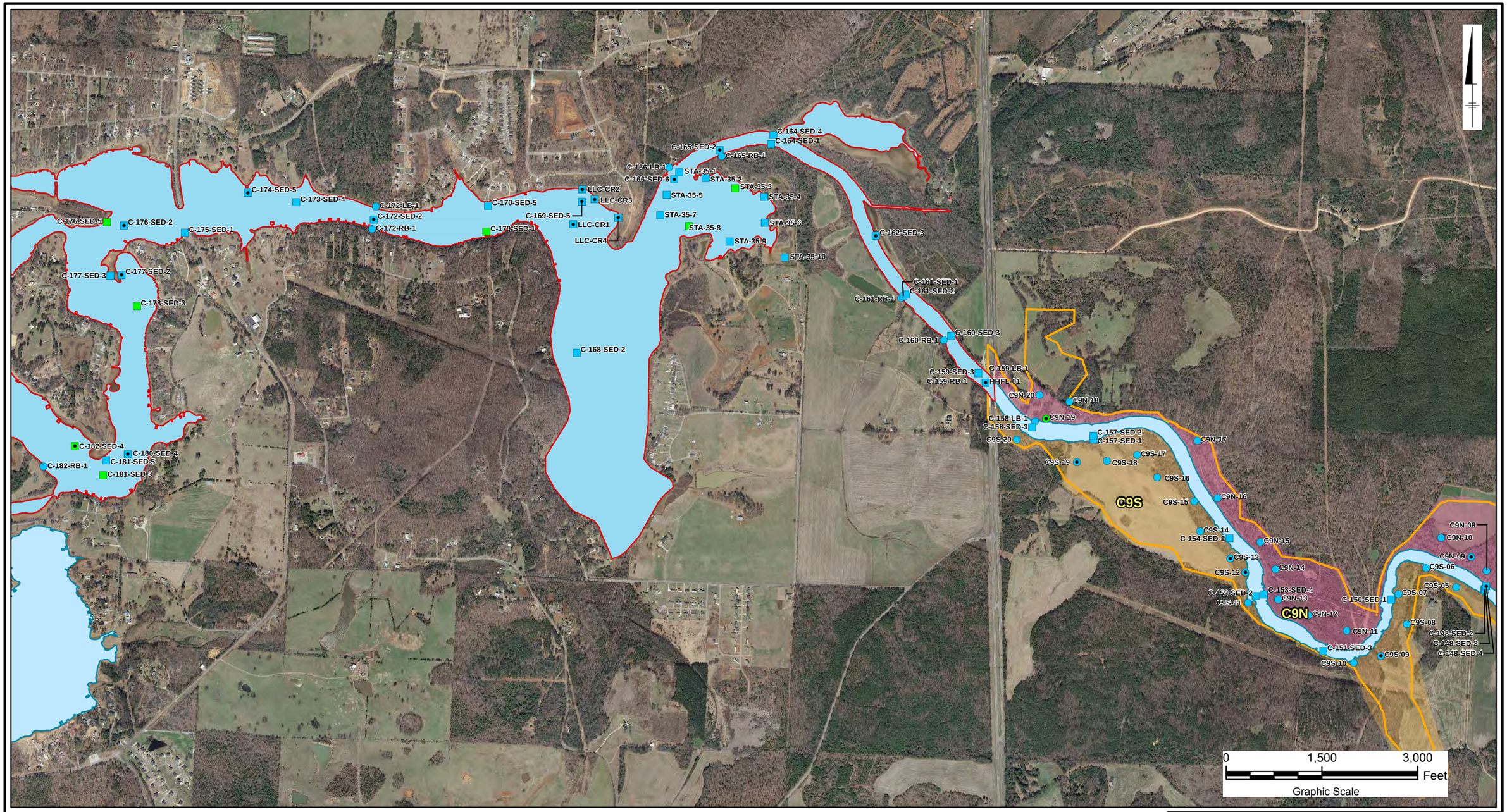

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Anniston
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Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain

Characterization Area

- C9N
- C9S
- C10 - Hwy 77 to Lake Logan Martin (In-Stream Sediment Only)

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:

1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

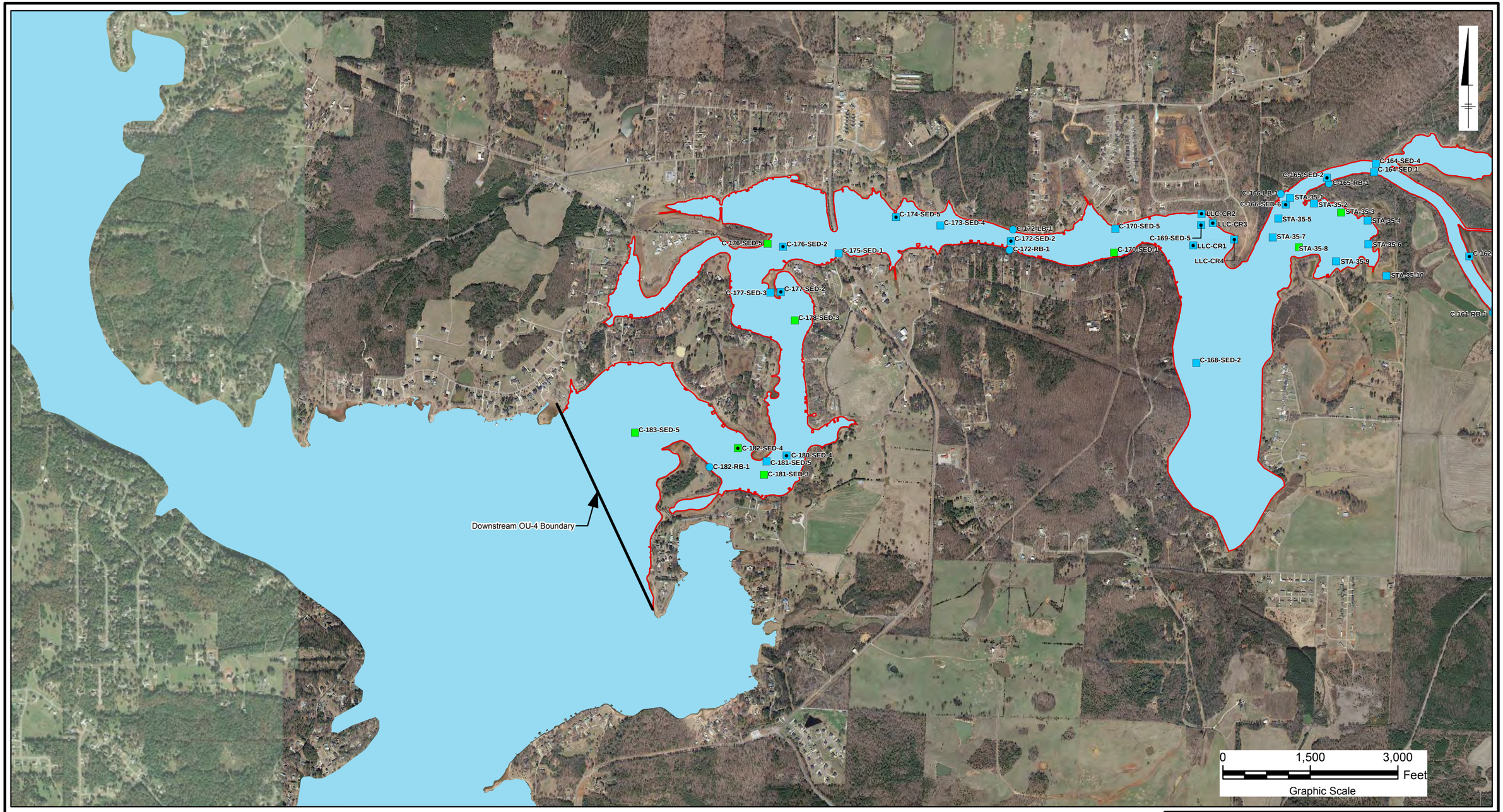
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3k



Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- <1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥50

Sediment Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- Choccolocco Creek
- OU-4 100-Year Floodplain
- C10 - Hwy 77 to Lake Logan Martin (In-Stream Sediment Only)

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:

1. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
2. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Nonresidential Floodplain Soil and Sediment Sample Results

Solutia

Figure
4-3I

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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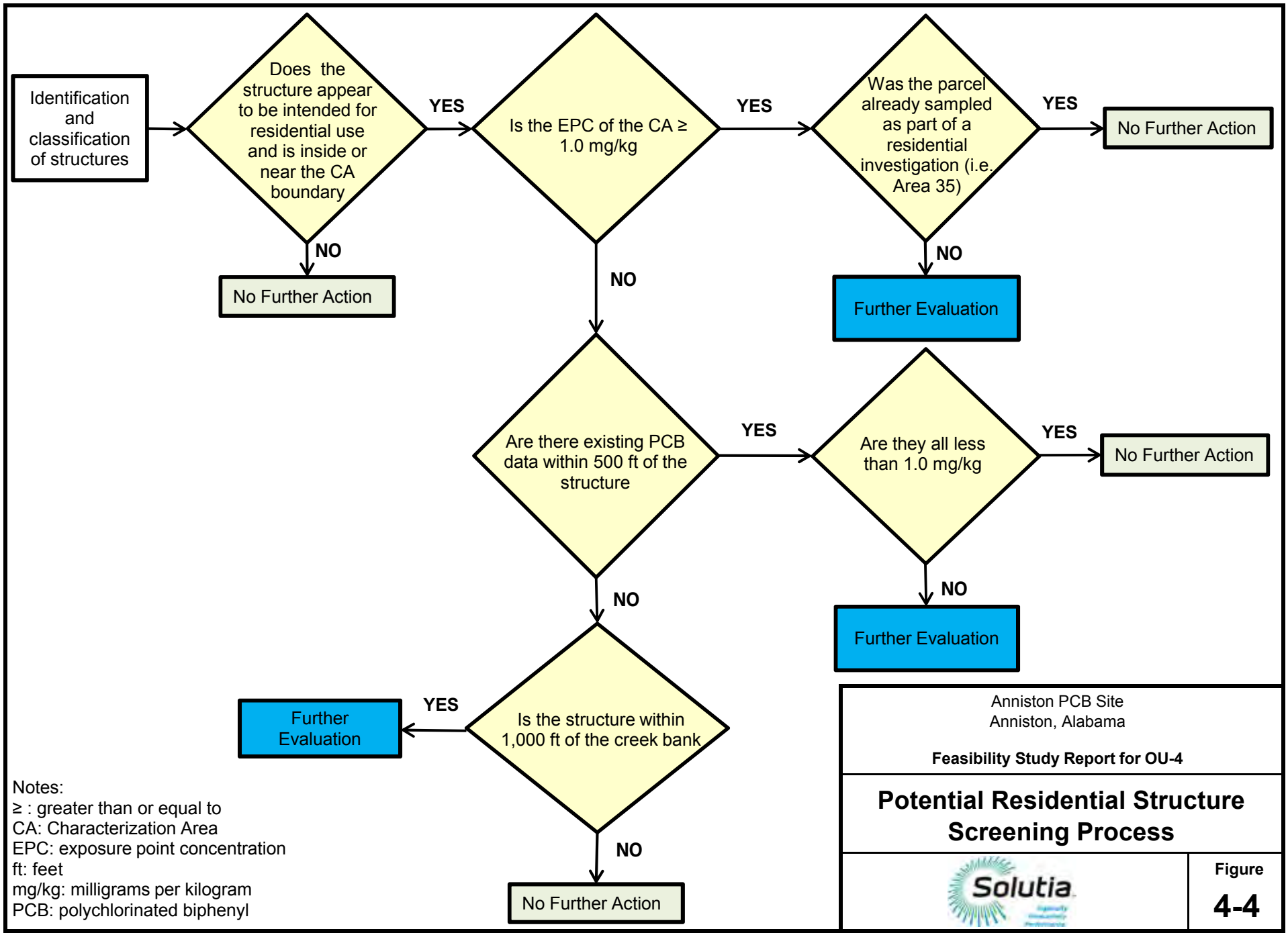


Notes:
≥ : greater than or equal to
CA: Characterization Area
EPC: exposure point concentration
ft: feet
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

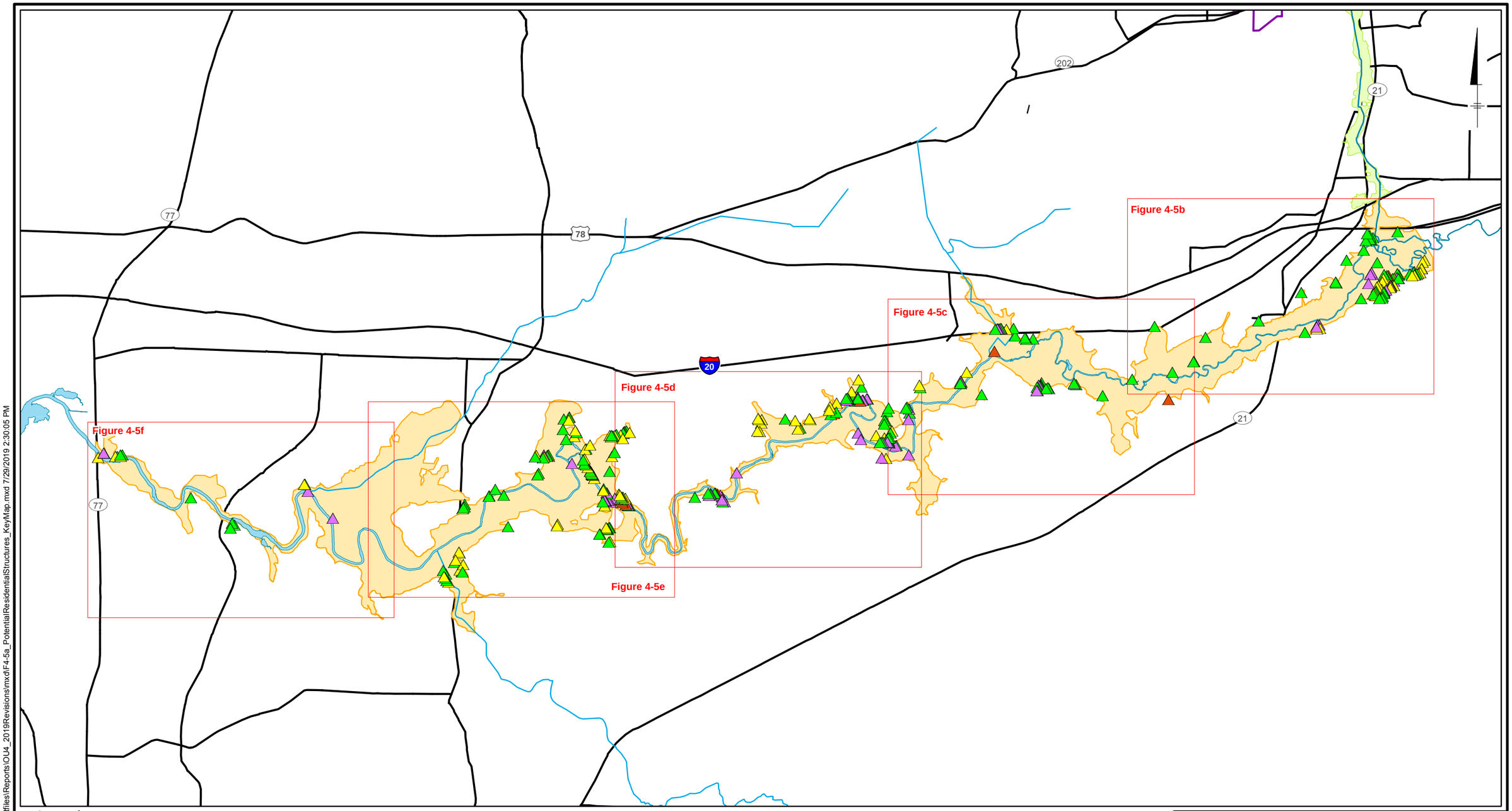
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Potential Residential Structure Screening Process

Solutia

Figure
4-4



Legend

- No Further Action - Nonresidential; Nonresidential Structure
- Potential Residential Structure
- Potential Residential Structure Where a Removal Action Was Not Required
- Potential Residential Structure Where a Removal Action Was Required
- OU-3 Boundary
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- Choccolocco Creek

0 6,500 13,000 Feet

Graphic Scale

Notes:
1. OU: operable unit

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Key for Potential Residential Structures Figures

Solutia

Figure 4-5a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALM\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F4-5a_PotentialResidentialStructures_KeyMap.mxd 7/29/2019 2:30:05 PM

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Anniston
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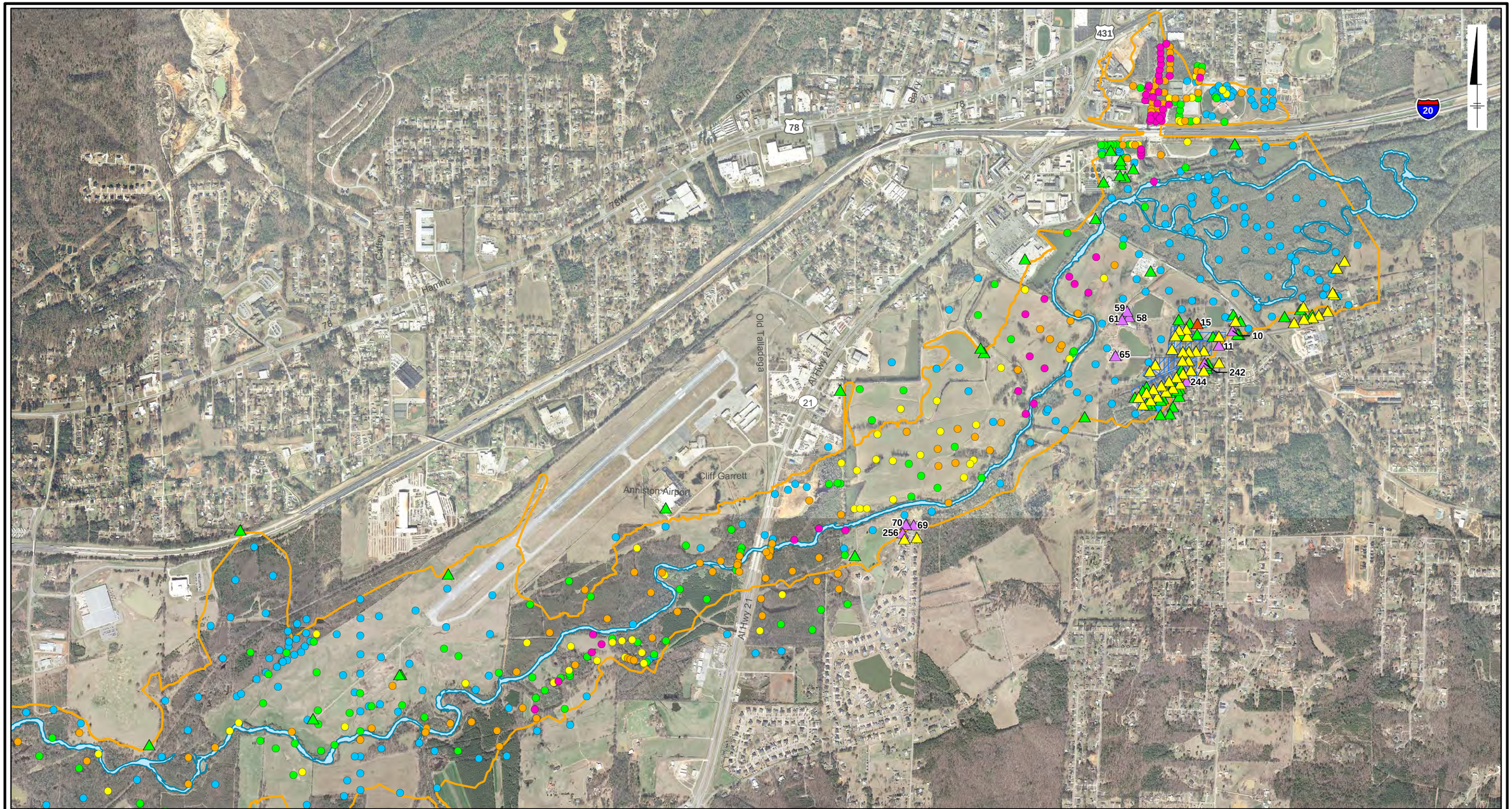


Legend

- No Further Action - Nonresidential
- Potential Residential Structure
- Potential Residential Structure Where a Removal Action Was Not Required
- Potential Residential Structure Where a Removal Action Was Required
- Choccolocco Creek
- OU-4 100-Year Floodplain
- Residential Parcel Sampled as Part of Area

Maximum Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

270—Structure ID

0 1,500 3,000 Feet

Graphic Scale

Notes:

1. Maximum Total PCB Concentration represents the maximum PCB value reported for samples from all depths sampled at that location.
2. Structure IDs are shown for potential residential structures identified for further evaluation only.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

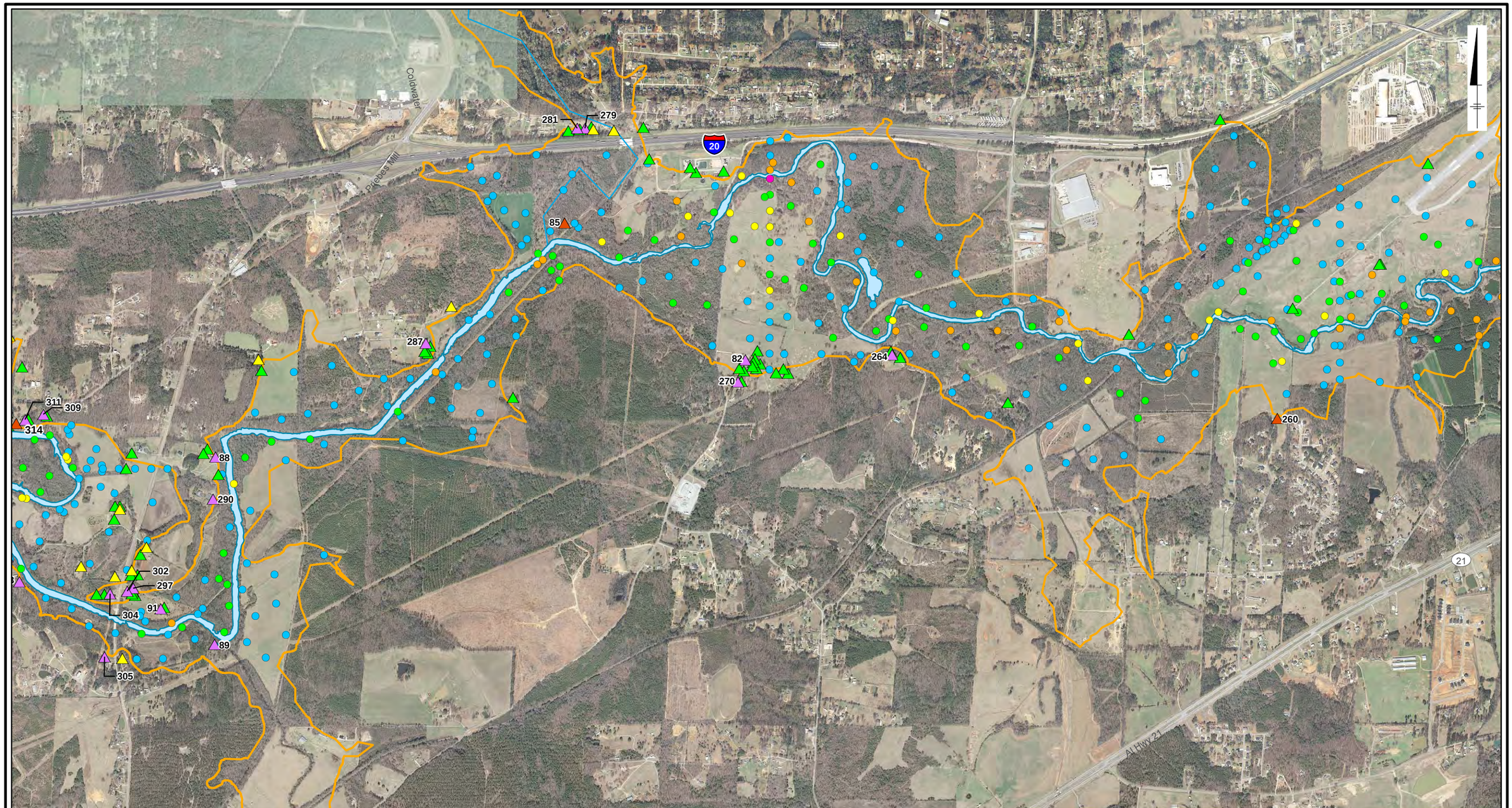
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Potential Residential Structures In and Near OU-4

Solutia

Figure 4-5b



Legend

- No Further Action - Nonresidential
- Potential Residential Structure
- Potential Residential Structure Where a Removal Action Was Not Required
- Potential Residential Structure Where a Removal Action Was Required
- Choccolocco Creek
- OU-4 100-Year Floodplain

Maximum Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

270—Structure ID

0 1,500 3,000 Feet

Graphic Scale

Notes:

1. Maximum Total PCB Concentration represents the maximum PCB value reported for samples from all depths sampled at that location.
2. Structure IDs are shown for potential residential structures identified for further evaluation only.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

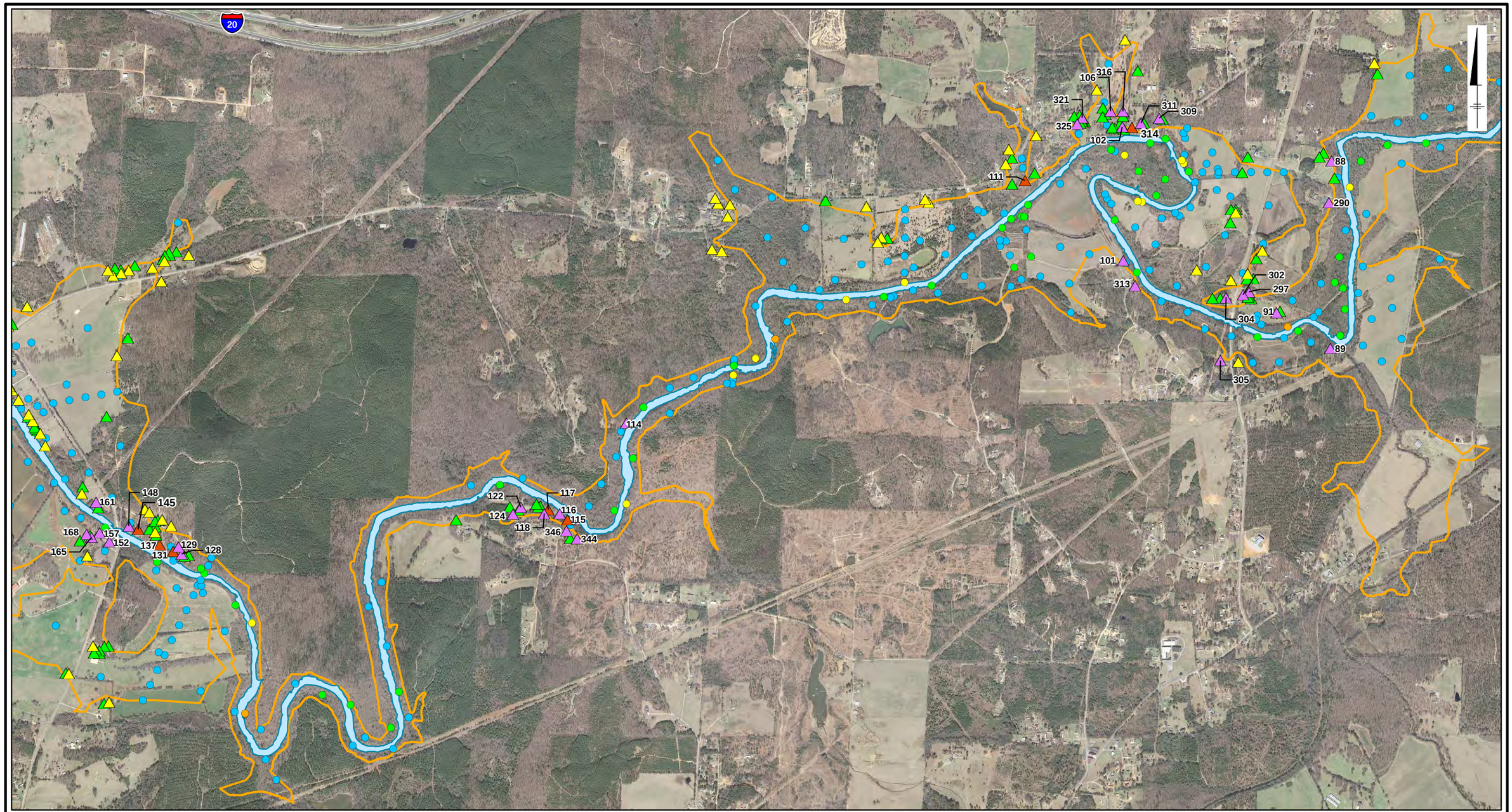
Feasibility Study Report for OU-4

Potential Residential Structures In and Near OU-4

Solutia

Figure
4-5c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\Anniston\ALLMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F4-5b_PotentialResidentialStructures_MapBook.mxd 8/20/2019 8:17:51 PM



Legend

- No Further Action - Nonresidential
- Potential Residential Structure
- Potential Residential Structure Where a Removal Action Was Not Required
- Potential Residential Structure Where a Removal Action Was Required
- Choccolocco Creek
- OU-4 100-Year Floodplain

Maximum Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

270—Structure ID

0 1,500 3,000 Feet

Graphic Scale

Notes:

1. Maximum Total PCB Concentration represents the maximum PCB value reported for samples from all depths sampled at that location.
2. Structure IDs are shown for potential residential structures identified for further evaluation only.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.
5. Residential removal did not occur for the property associated with Location 117.

Anniston PCB Site
Anniston, Alabama

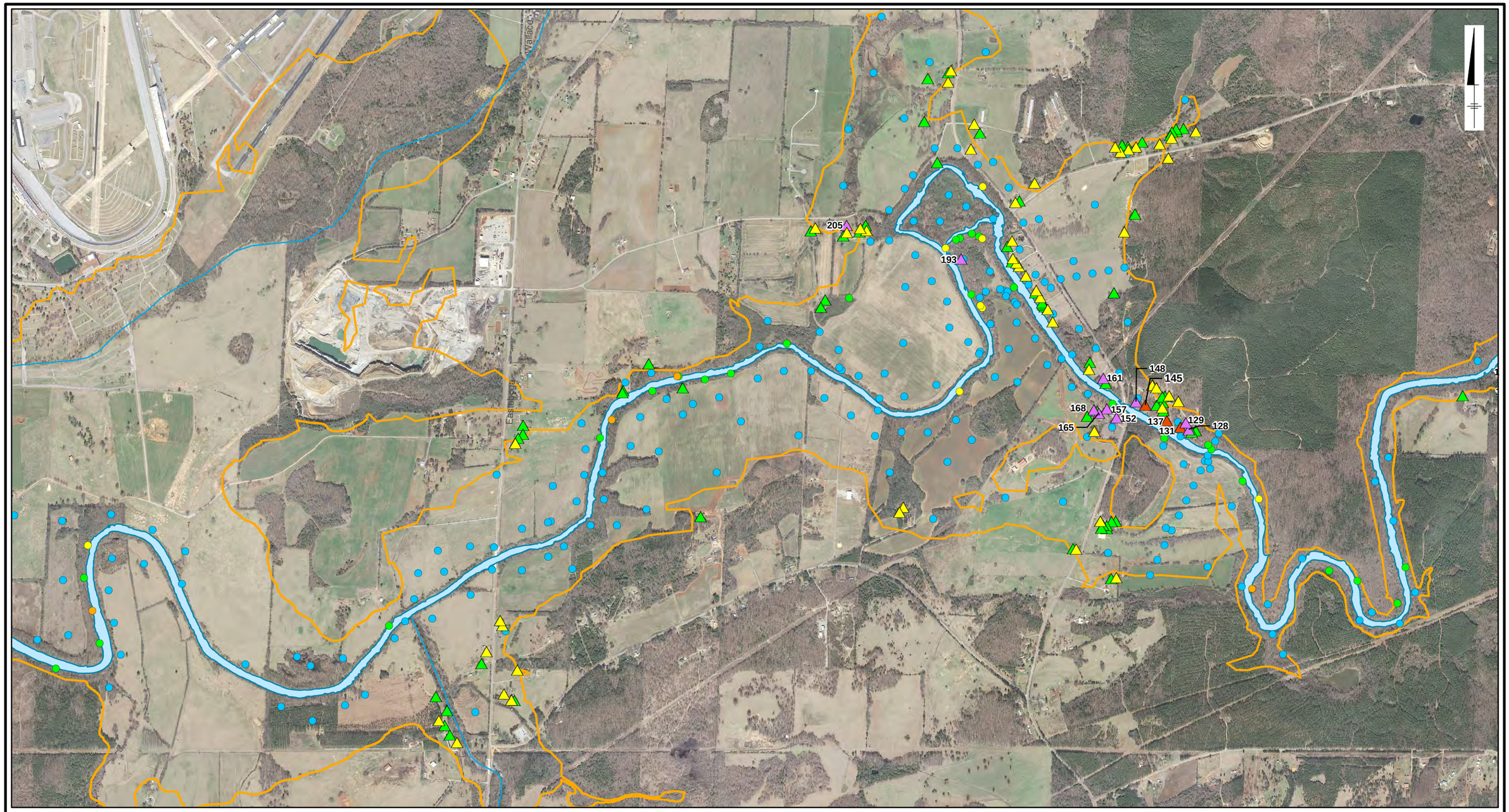
Feasibility Study Report for OU-4

Potential Residential Structures In and Near OU-4

Solutia

Figure
4-5d

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F4-5b_PotentialResidentialStructures_MapBook.mxd 8/20/2019 8:17:51 PM



Legend

- No Further Action - Nonresidential
- Potential Residential Structure
- Potential Residential Structure Where a Removal Action Was Not Required
- Potential Residential Structure Where a Removal Action Was Required
- Choccolocco Creek
- OU-4 100-Year Floodplain

Maximum Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

270—Structure ID

0 1,500 3,000 Feet

Graphic Scale

Notes:

1. Maximum Total PCB Concentration represents the maximum PCB value reported for samples from all depths sampled at that location.
2. Structure IDs are shown for potential residential structures identified for further evaluation only.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

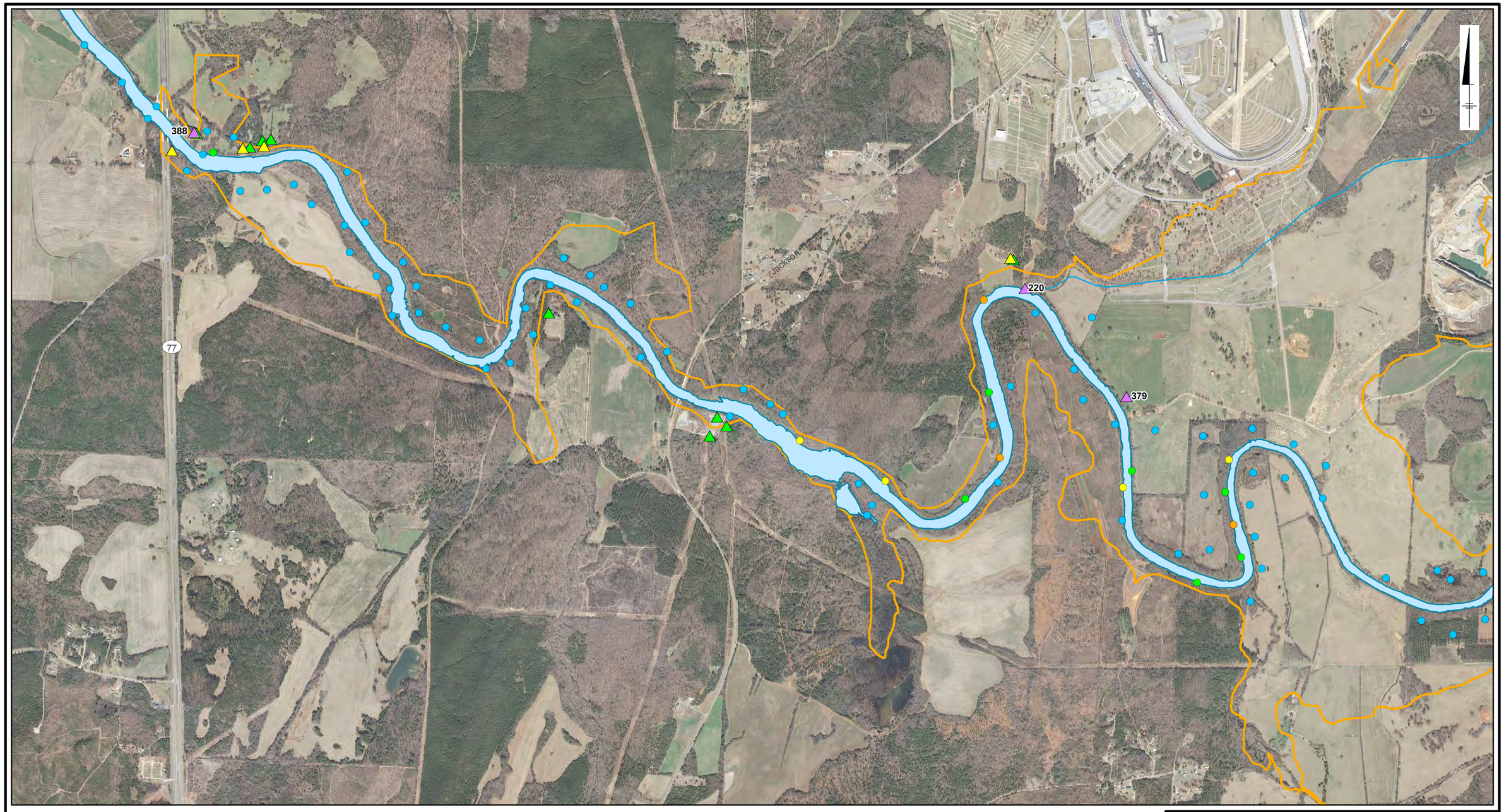
Feasibility Study Report for OU-4

Potential Residential Structures In and Near OU-4

Solutia

Figure **4-5e**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F4-5b_PotentialResidentialStructures_MapBook.mxd 8/20/2019 8:17:51 PM



Legend

- No Further Action - Nonresidential
- Potential Residential Structure
- Potential Residential Structure Where a Removal Action Was Not Required
- Potential Residential Structure Where a Removal Action Was Required
- Choccolocco Creek
- OU-4 100-Year Floodplain

Maximum Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - <50
- ≥ 50

270—Structure ID

0 1,500 3,000 Feet

Graphic Scale

Notes:

1. Maximum Total PCB Concentration represents the maximum PCB value reported for samples from all depths sampled at that location.
2. Structure IDs are shown for potential residential structures identified for further evaluation only.
3. mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
4. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama

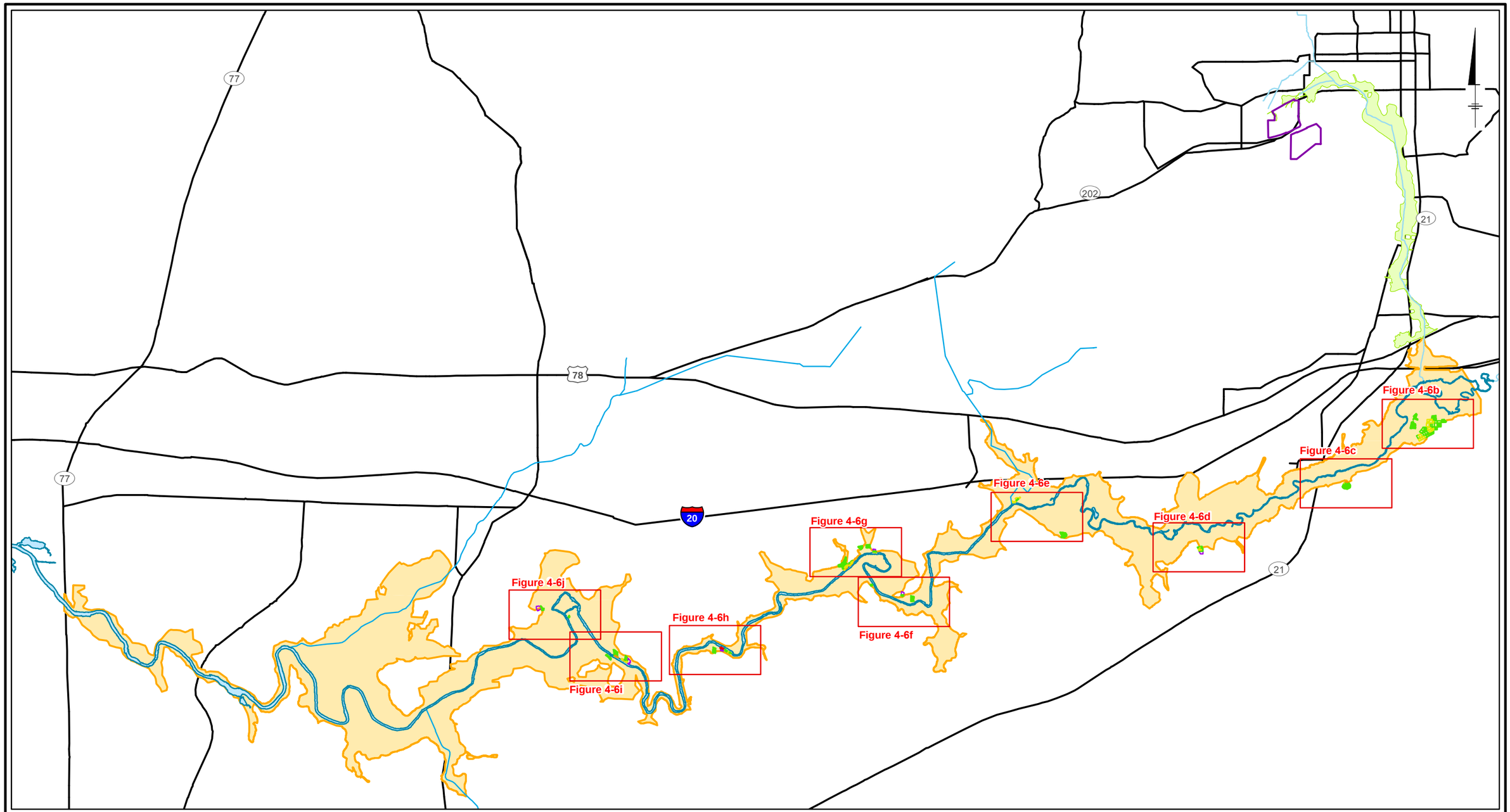
Feasibility Study Report for OU-4

Potential Residential Structures In and Near OU-4

Solutia

Figure 4-5f

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\Anniston\AL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F4-5b_PotentialResidentialStructures_MapBook.mxd 8/20/2019 8:17:51 PM



Legend

- Residential Use Area - Not Sampled
- Sampled and PCB results <1 mg/kg
- Sampled and Remediated
- Sampled and Remediated with Residuals Left at Depth
- Sampled with PCB ≥ 1 mg/kg Access for Removal Denied
- OU-3 Boundary
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- Choccolocco Creek

0 6,500 13,000 Feet

Graphic Scale

Notes:
1. OU: operable unit
   mg/kg: milligrams per kilogram
   PCB: polychlorinated biphenyls

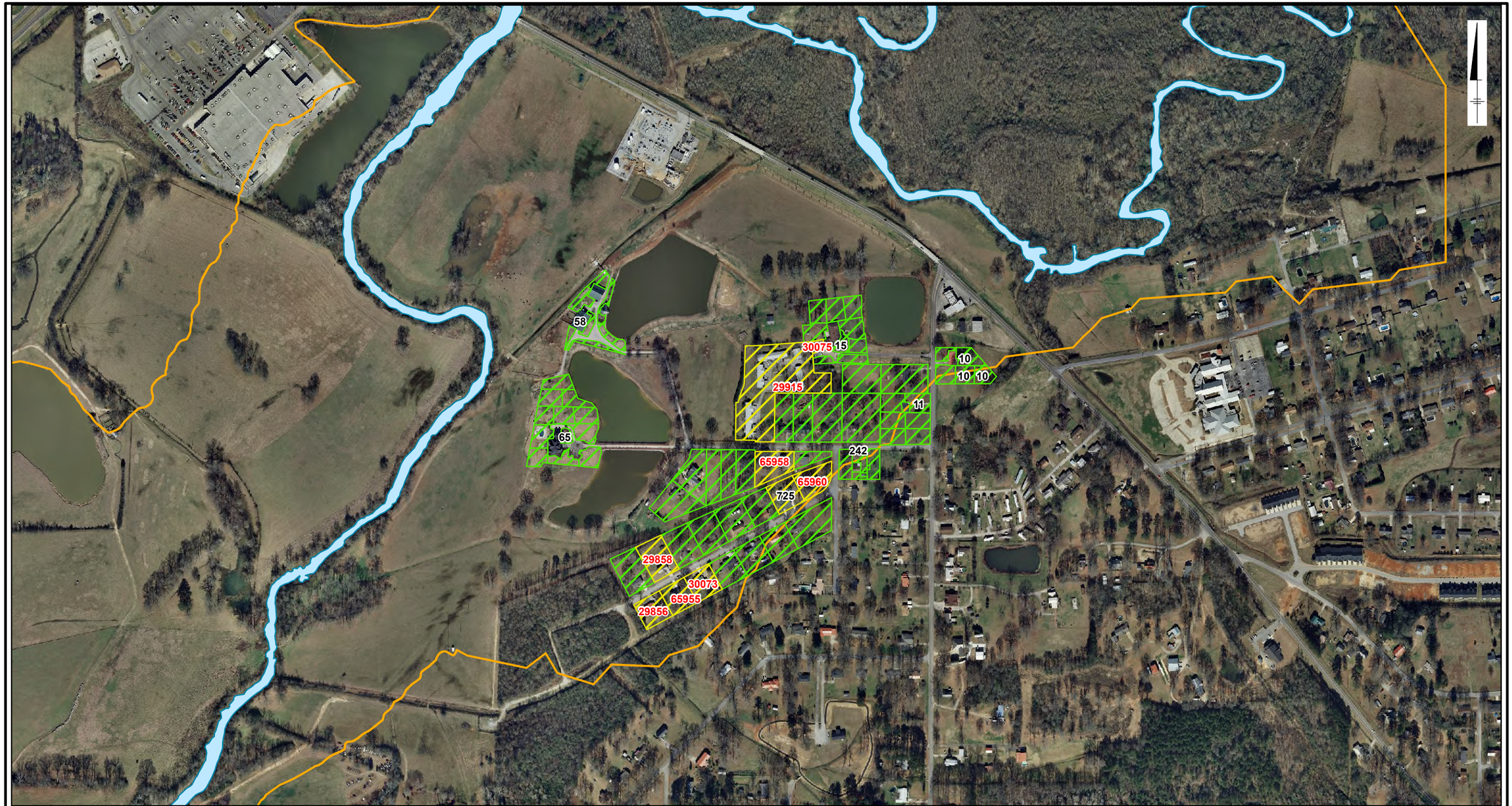
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Key for OU-4 Residential Removals

Solutia

Figure
4-6a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: tjscott
Anniston
Z:\GISProjects_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\F3-1a_ResidentialUseAreas_KeyMap.mxd 12/18/2019 9:55:43 AM



Legend

- Sampled and PCB results <1 mg/kg
- Sampled and Remediated
- Choccolocco Creek
- OU-4 100-Year Floodplain

68 Structure ID
30075 PPIN numbers in red font

0 400 800 Feet
Graphic Scale

Notes:

1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyl
   PPIN: property parcel identification number

2. Aerial imagery provided by Calhoun and Talladega Counties.

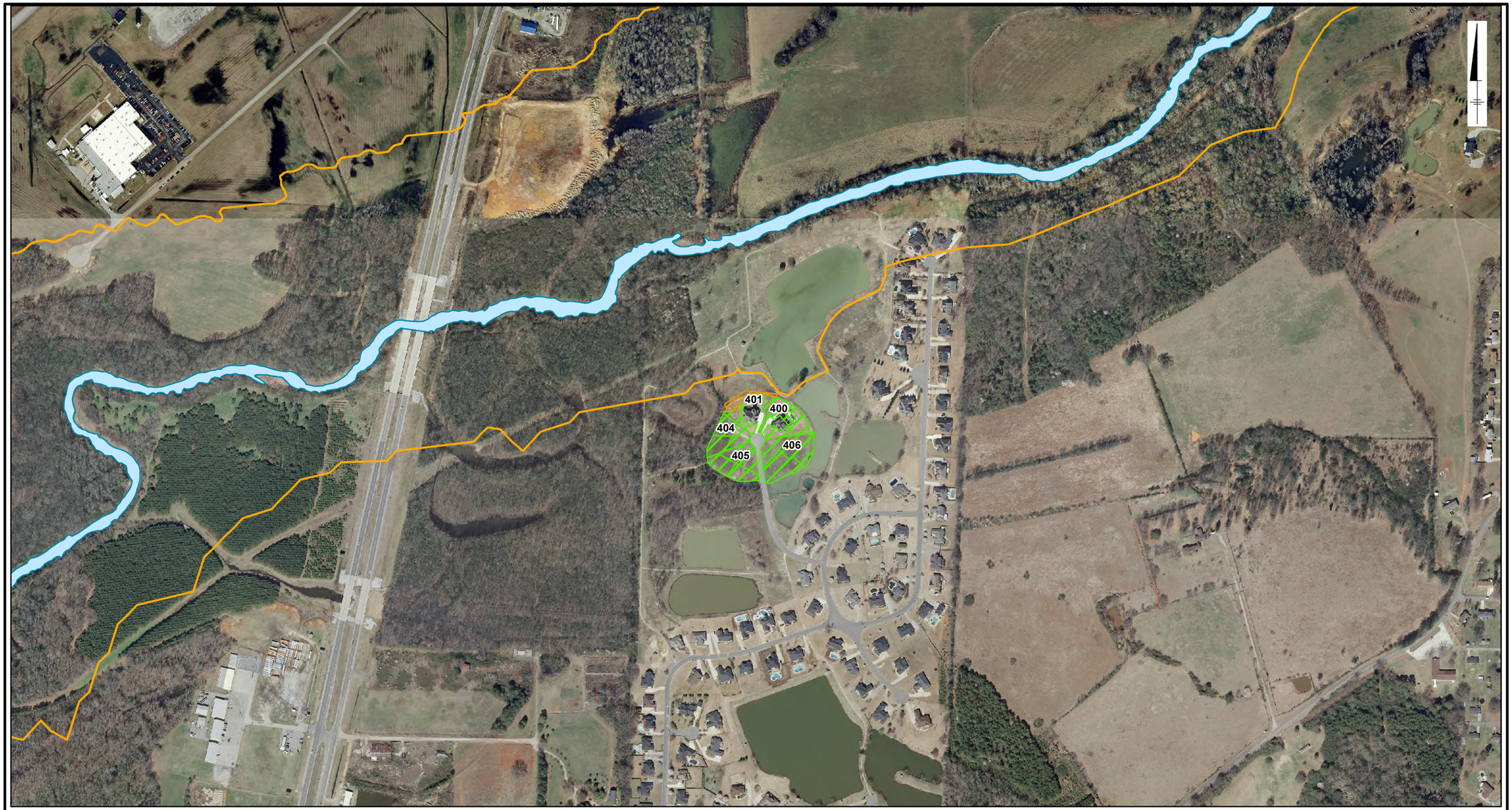
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia Ingenuity Productivity Performance

Figure 4-6b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
T:_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\2023\F4-6_ResidentialUseAreas_OU4_Removal.mxd 4/18/2023 3:18:42 PM



Legend

- Sampled and PCB results <1 mg/kg
- Sampled and Remediated with Residuals Left at Depth
- Choccolocco Creek
- OU-4 100-Year Floodplain

68 — Structure ID

0 400 800 Feet

Graphic Scale

Notes:
1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyls

2. Aerial imagery provided by Calhoun and Talladega Counties.

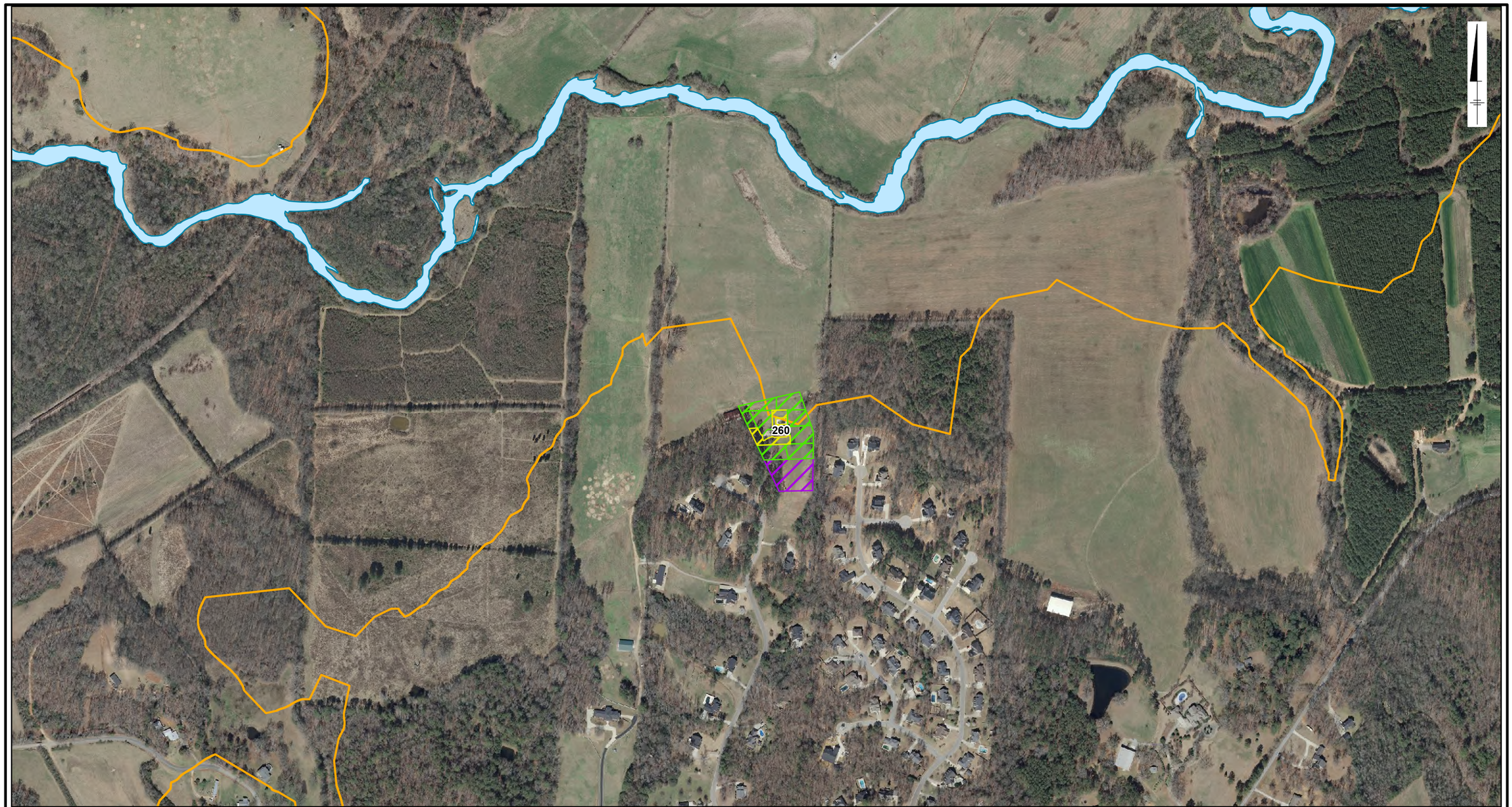
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia Ingenuity Productivity Performance

Figure 4-6c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
T:_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\2023\F4-6_ResidentialUseAreas_OU4_Removal.mxd 4/18/2023 3:18:42 PM



Legend

- Residential Use Area - Not Sampled
- Sampled and PCB results <1 mg/kg
- Sampled and Remediated
- Choccolocco Creek
- OU-4 100-Year Floodplain

68 — Structure ID

0 400 800 Feet

Graphic Scale

Notes:
1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyls

2. Aerial imagery provided by Calhoun and Talladega Counties.

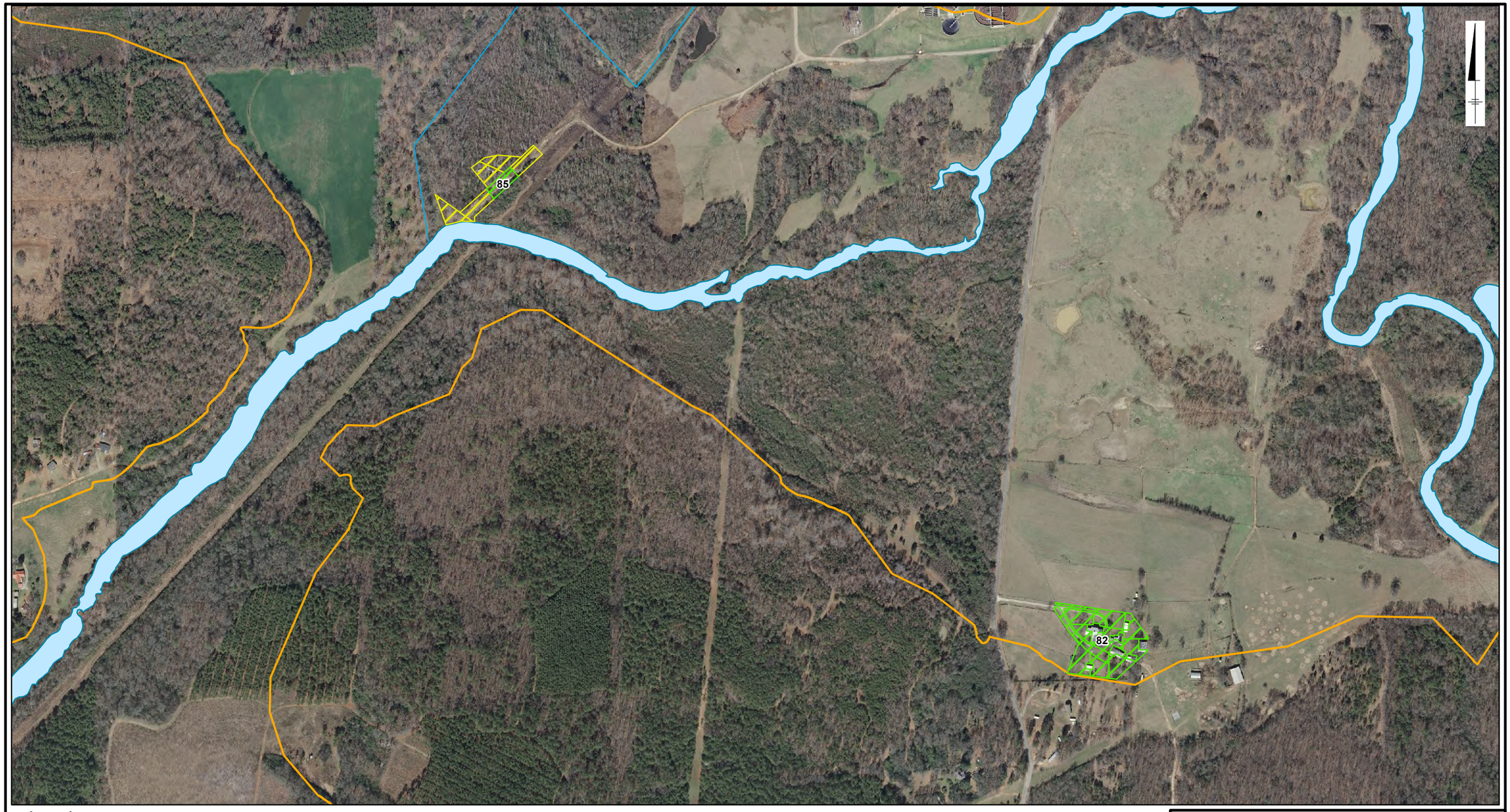
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia Ingenuity Productivity Performance

Figure 4-6d

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
T:_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\2023\F4-6_ResidentialUseAreas_OU4_Removal.mxd 4/18/2023 3:18:42 PM



Legend

- Sampled and PCB results <1 mg/kg
- Sampled and Remediated
- Choccolocco Creek
- OU-4 100-Year Floodplain

68 — Structure ID

0 400 800 Feet

Graphic Scale

Notes:
1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyls

2. Aerial imagery provided by Calhoun and Talladega Counties.

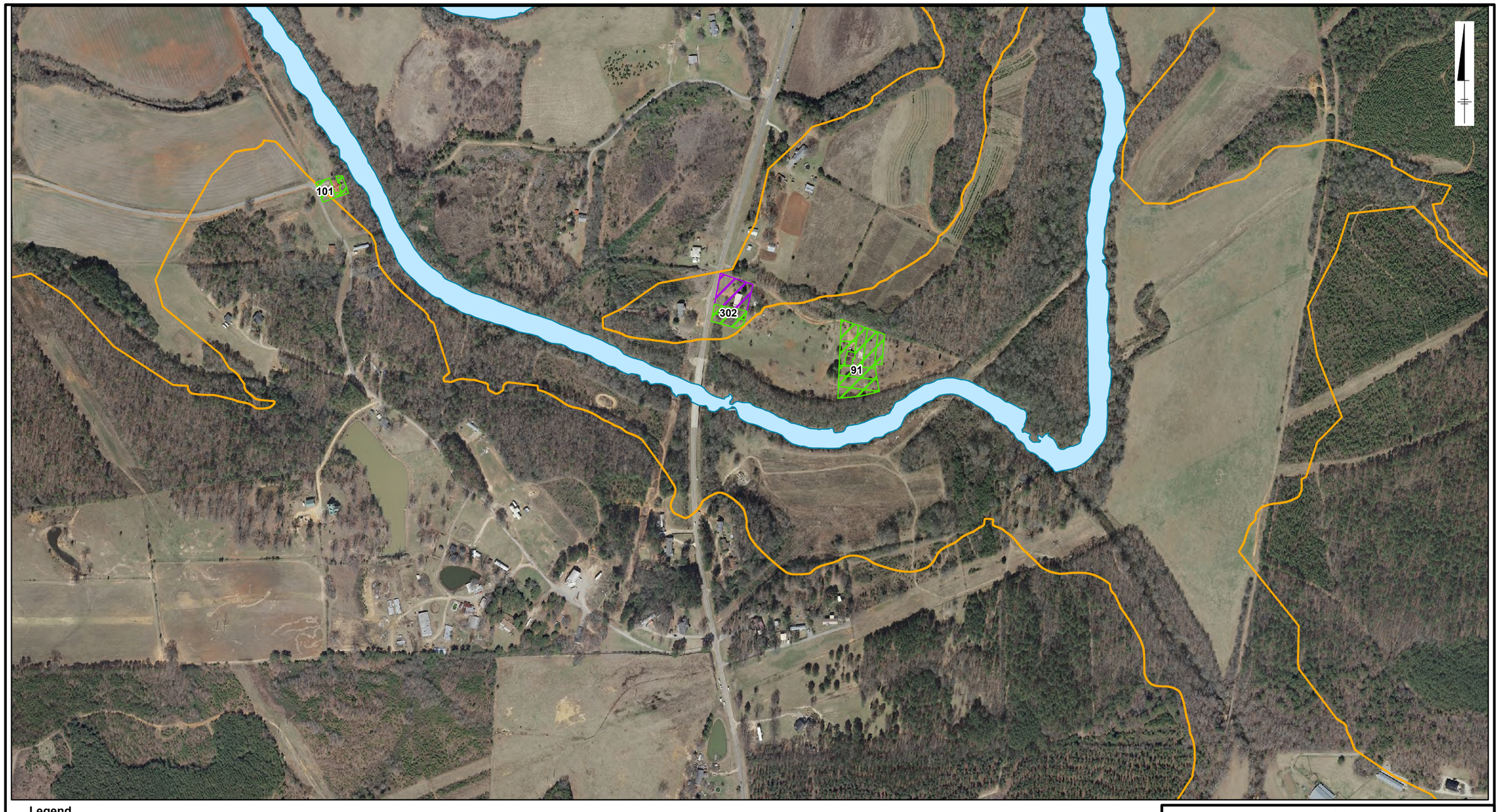
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia Ingenuity Productivity Performance

Figure 4-6e

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
T:_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\2023\F4-6_ResidentialUseAreas_OU4_Removal.mxd 4/18/2023 3:18:42 PM



Legend

- Residential Use Area - Not Sampled
- Sampled and PCB results <1 mg/kg
- Choccolocco Creek
- OU-4 100-Year Floodplain

68 — Structure ID

0 400 800 Feet

Graphic Scale

Notes:
1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.

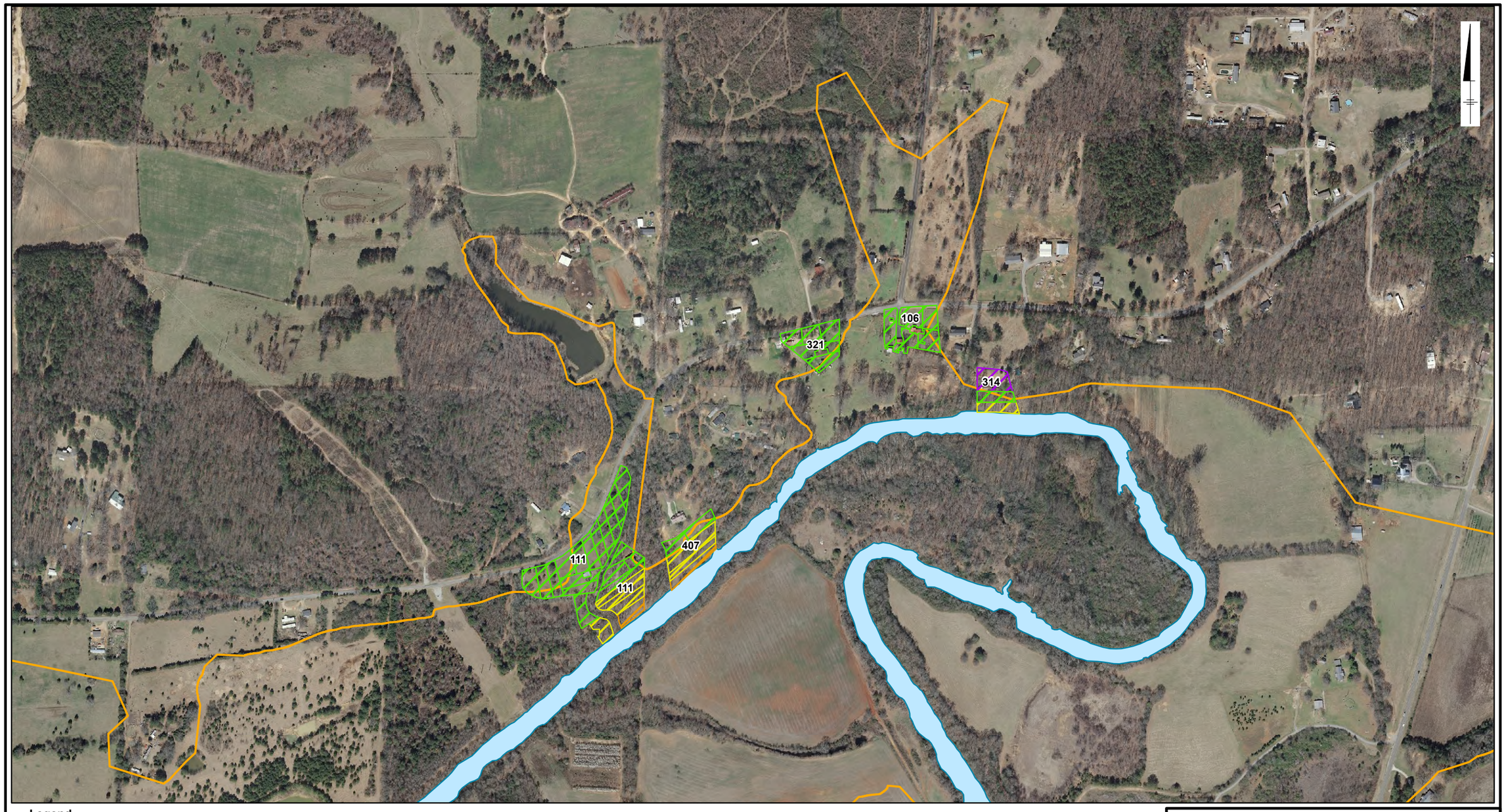
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia Ingenuity Productivity Performance

Figure 4-6f

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
T:_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\2023\F4-6_ResidentialUseAreas_OU4_Removal.mxd 4/18/2023 3:18:42 PM



Legend

- Residential Use Area - Not Sampled
- Sampled and PCB results <1 mg/kg
- Sampled and Remediated
- Sampled and Remediated with Residuals Left at Depth
- Choccolocco Creek
- OU-4 100-Year Floodplain
- **68** — Structure ID

0 400 800 Feet

Graphic Scale

Notes:
1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyls

2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia. Ingenuity Productivity Performance

Figure **4-6g**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
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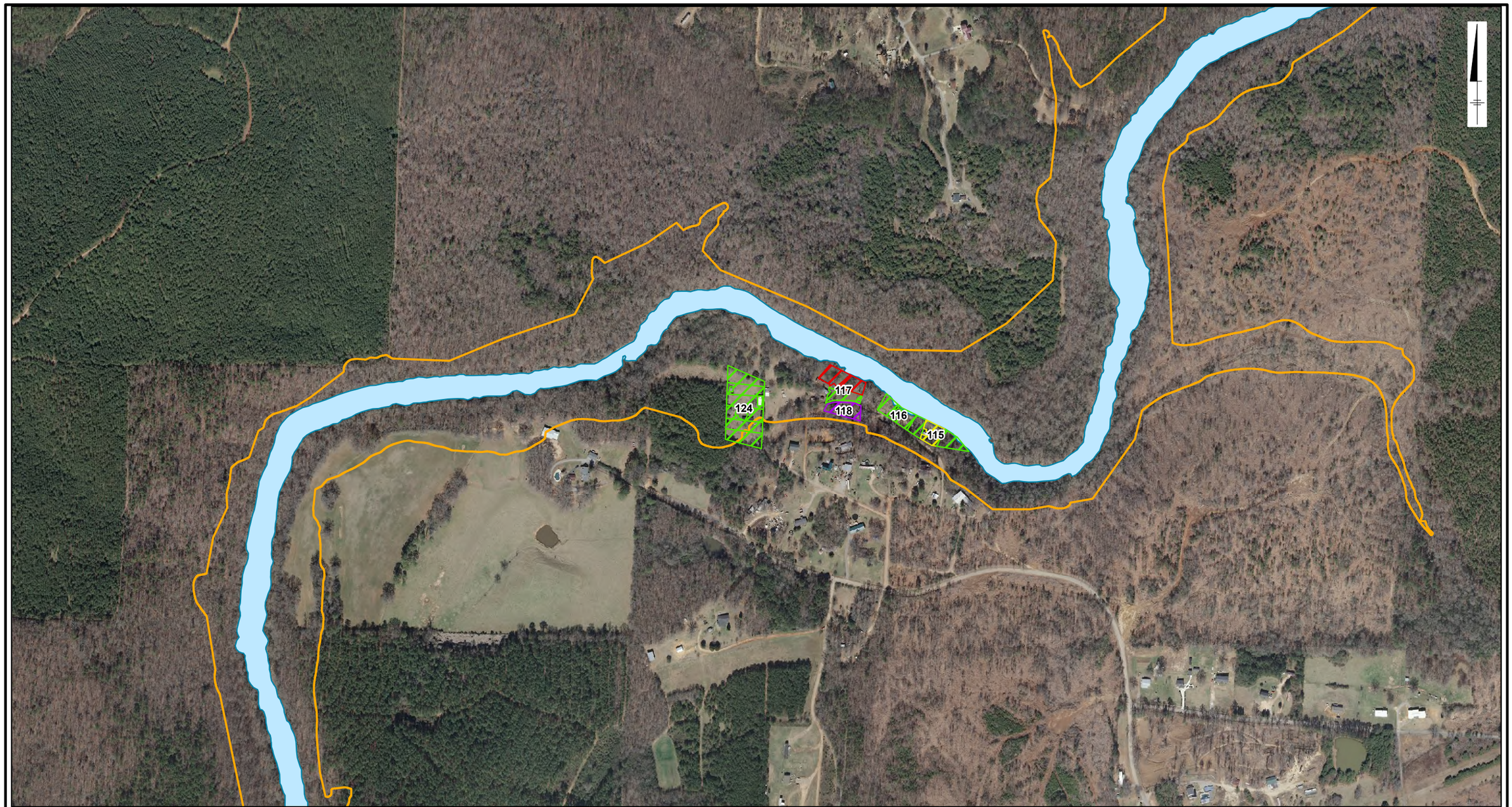


Legend

- Residential Use Area - Not Sampled
- Sampled and PCB results <1 mg/kg
- Sampled and Remediated
- Sampled with PCB ≥1 mg/kg Access for Removal Denied
- Choccolocco Creek
- OU-4 100-Year Floodplain
- **68** — Structure ID

0 400 800 Feet

Graphic Scale

Notes:
1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyls

2. Aerial imagery provided by Calhoun and Talladega Counties.

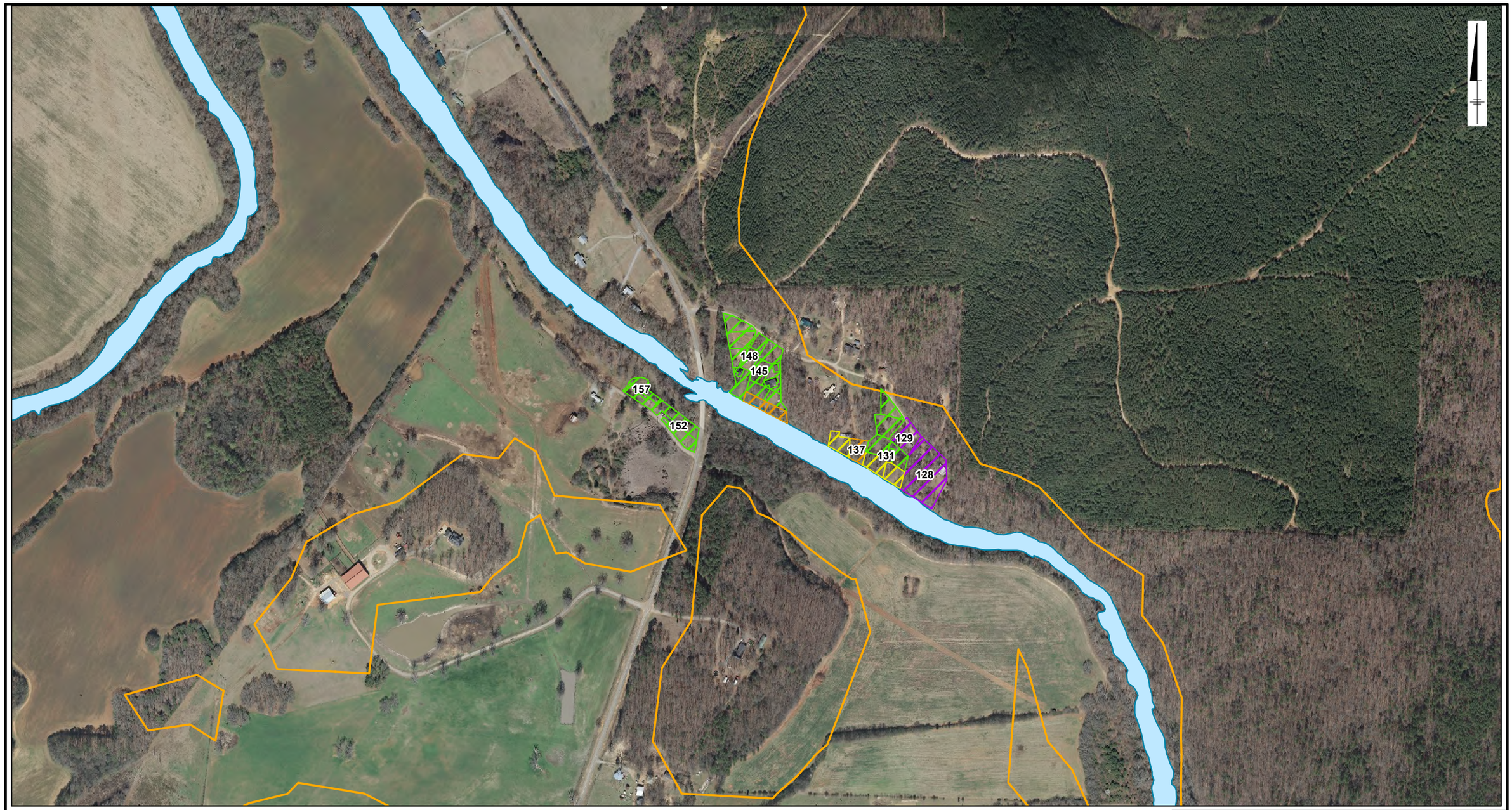
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia Ingenuity Productivity Performance

Figure 4-6h

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
T:_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\2023\F4-6_ResidentialUseAreas_OU4_Removal.mxd 4/18/2023 3:18:42 PM



Legend

- Residential Use Area - Not Sampled
- Sampled and PCB results <1 mg/kg
- Sampled and Remediated
- Sampled and Remediated with Residuals Left at Depth
- Choccolocco Creek
- OU-4 100-Year Floodplain
- **68** — Structure ID

0 400 800 Feet

Graphic Scale

Notes:

1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia
Ingenuity Productivity Performance

Figure 4-6i

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
T:_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\2023\F4-6_ResidentialUseAreas_OU4_Removal.mxd 4/18/2023 3:18:42 PM

Legend

- Residential Use Area - Not Sampled
- Sampled and PCB results <1 mg/kg
- Choccolocco Creek
- OU-4 100-Year Floodplain

68 — Structure ID

0 400 800 Feet

Graphic Scale

Notes:
1. OU: operable unit
   mg/kg: milligram per kilogram
   PCB: polychlorinated biphenyls

2. Aerial imagery provided by Calhoun and Talladega Counties.

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Residential Removal

Solutia Ingenuity Productivity Performance

Figure 4-6j

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: ldrum
Anniston
T:_ENV\Anniston_PCB_site\GIS\ArcMap_MXD\OU4_2019Revisions\mxd\2023\F4-6_ResidentialUseAreas_OU4_Removal.mxd 4/18/2023 3:18:42 PM

Legend

- Snow Creek Centerline
- Sediment Deposit
- OU-4 100-Year Floodplain

6-25: Sediment Deposit ID (See Table 4-9 and Table 4-10)

0 225 450 Feet

Graphic Scale

Notes:
1. OU: operable unit
2. Aerial imagery provided by Calhoun County.

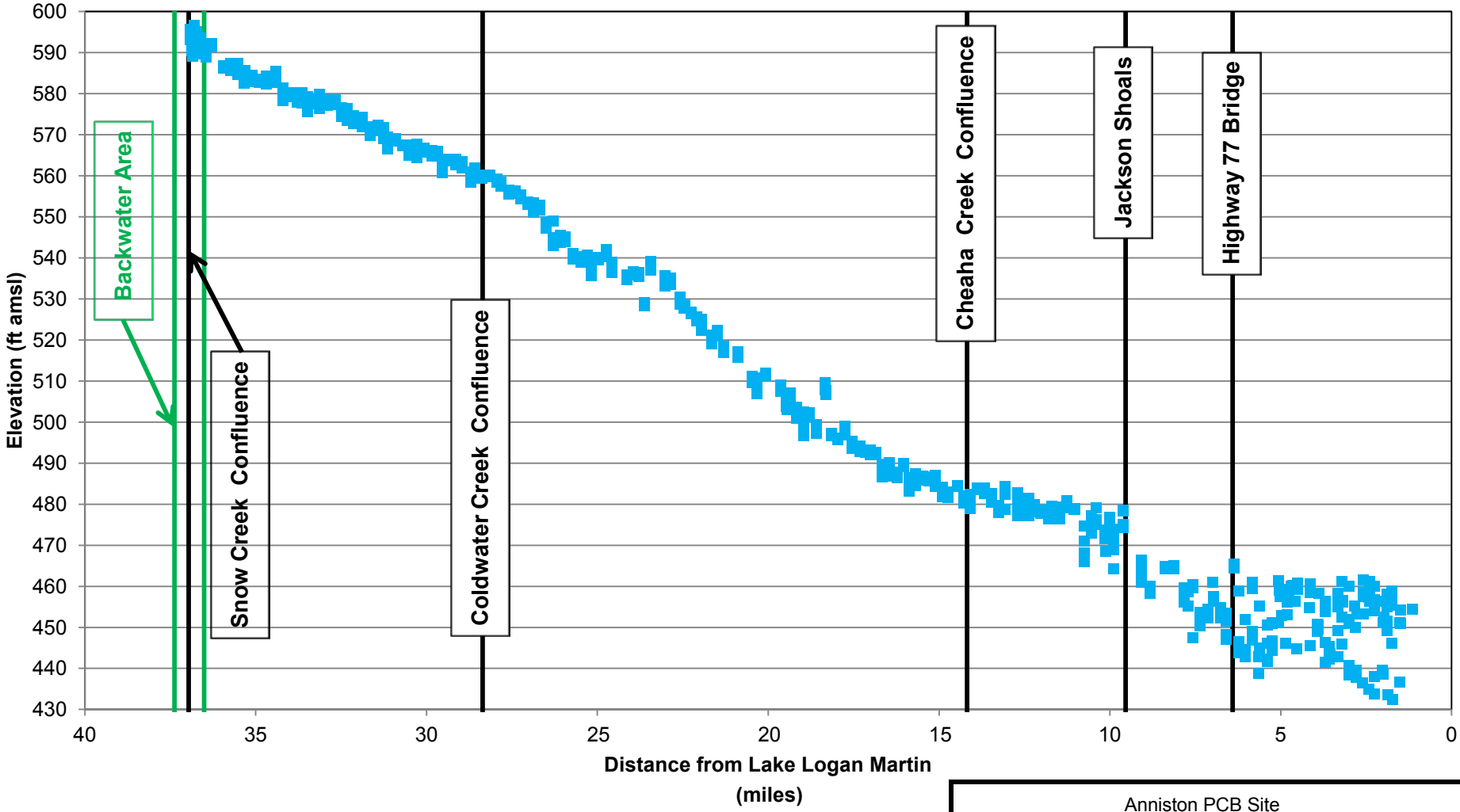
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Snow Creek Sediment Deposit Mapping

Solutia

Figure
4-7



Notes:
1. Data presented are based on probing data from 769 locations.
2. Green markers indicate stability areas of interest; black markers indicate landmarks/areas of interest.

ft amsl: feet above mean sea level

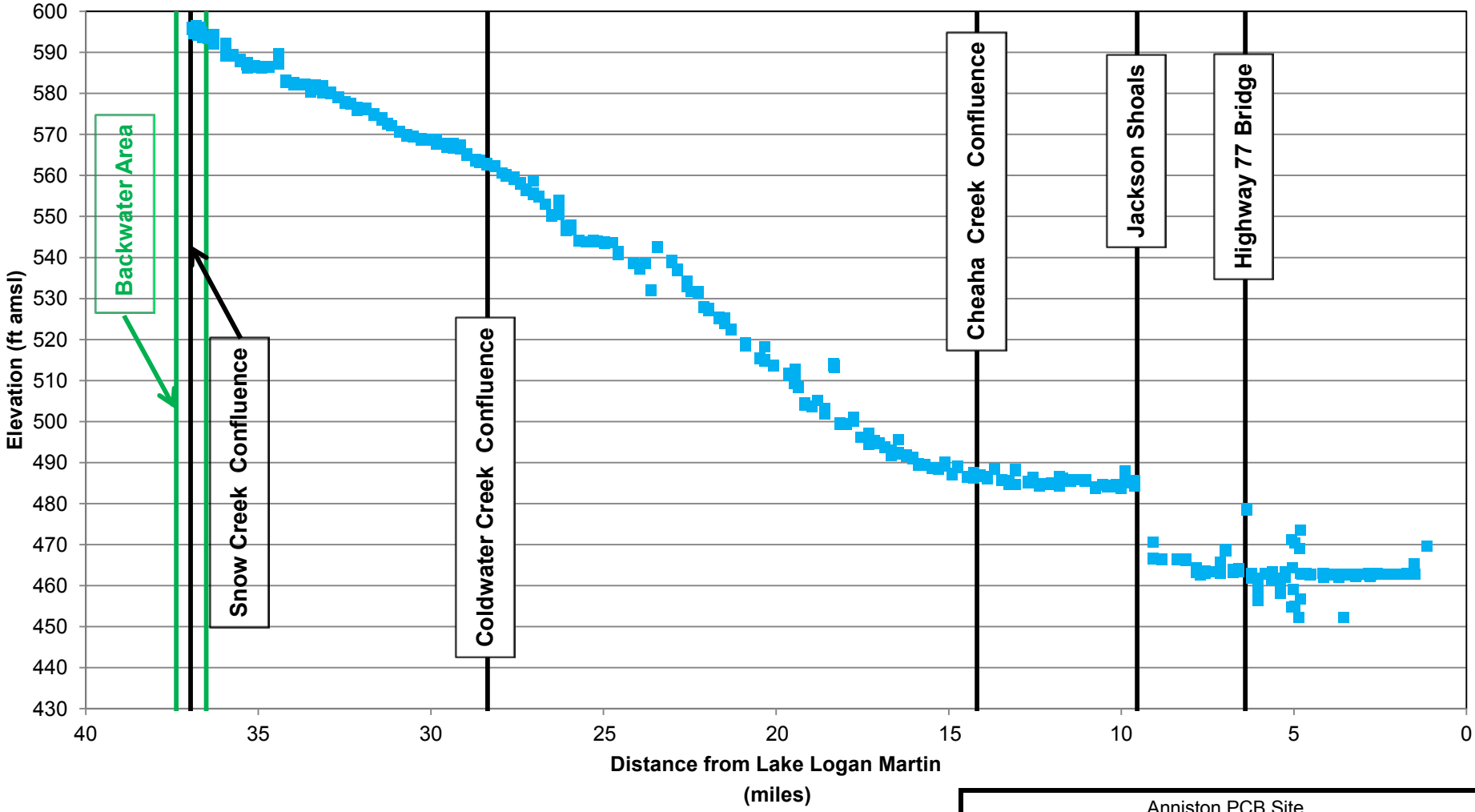
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Creek Bed Elevation for Choccolocco Creek with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-8



Notes:
1. Data presented are based on probing data from 769 locations.
2. Green markers indicate stability areas of interest; black markers indicate landmarks/areas of interest.

ft amsl: feet above mean sea level

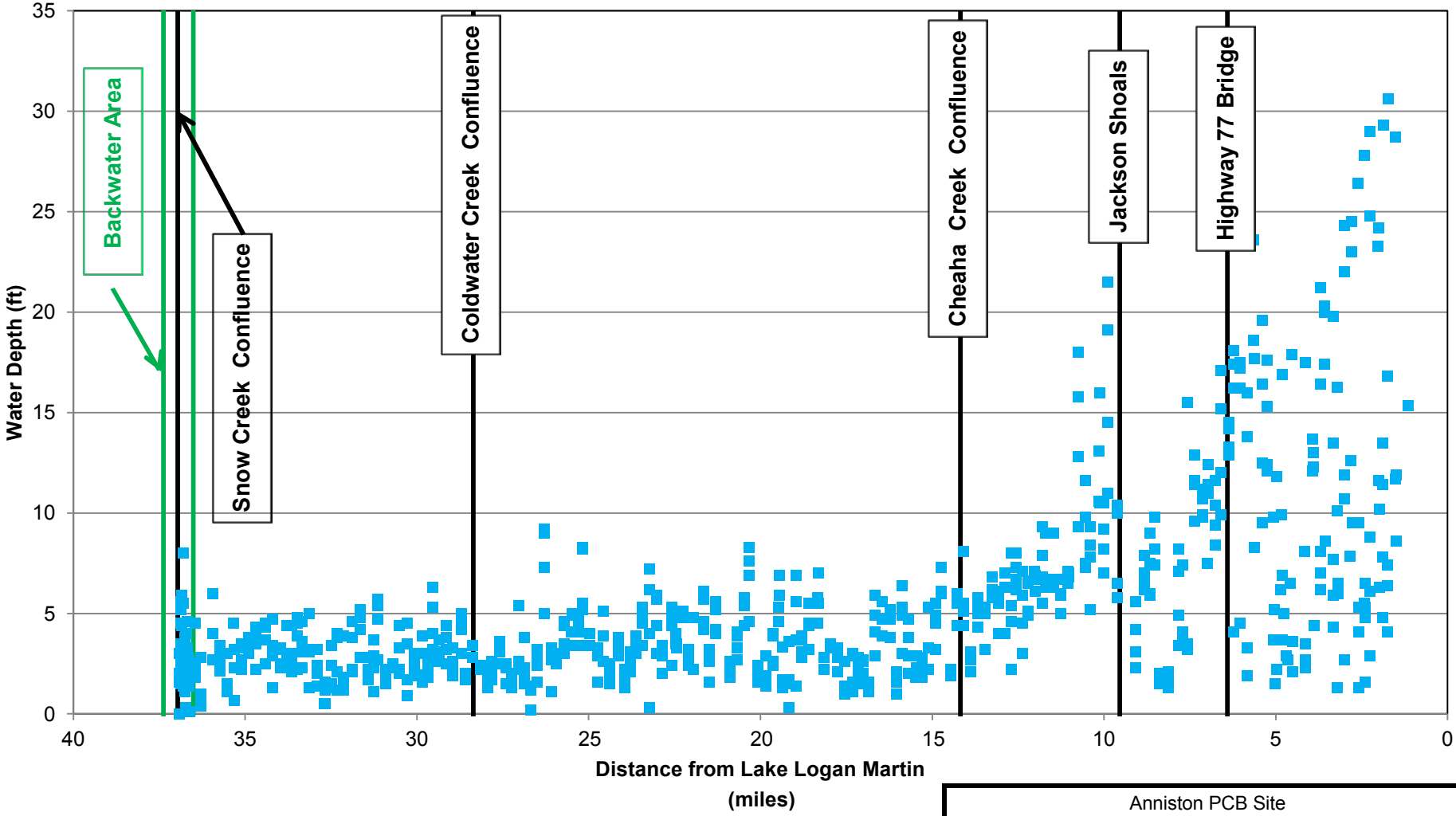
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Water Surface Elevation in Choccolocco Creek with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-9



Notes:
1. Data presented are based on probing data from 769 locations.
2. Green markers indicate stability areas of interest; black markers indicate landmarks/areas of interest.

ft: feet

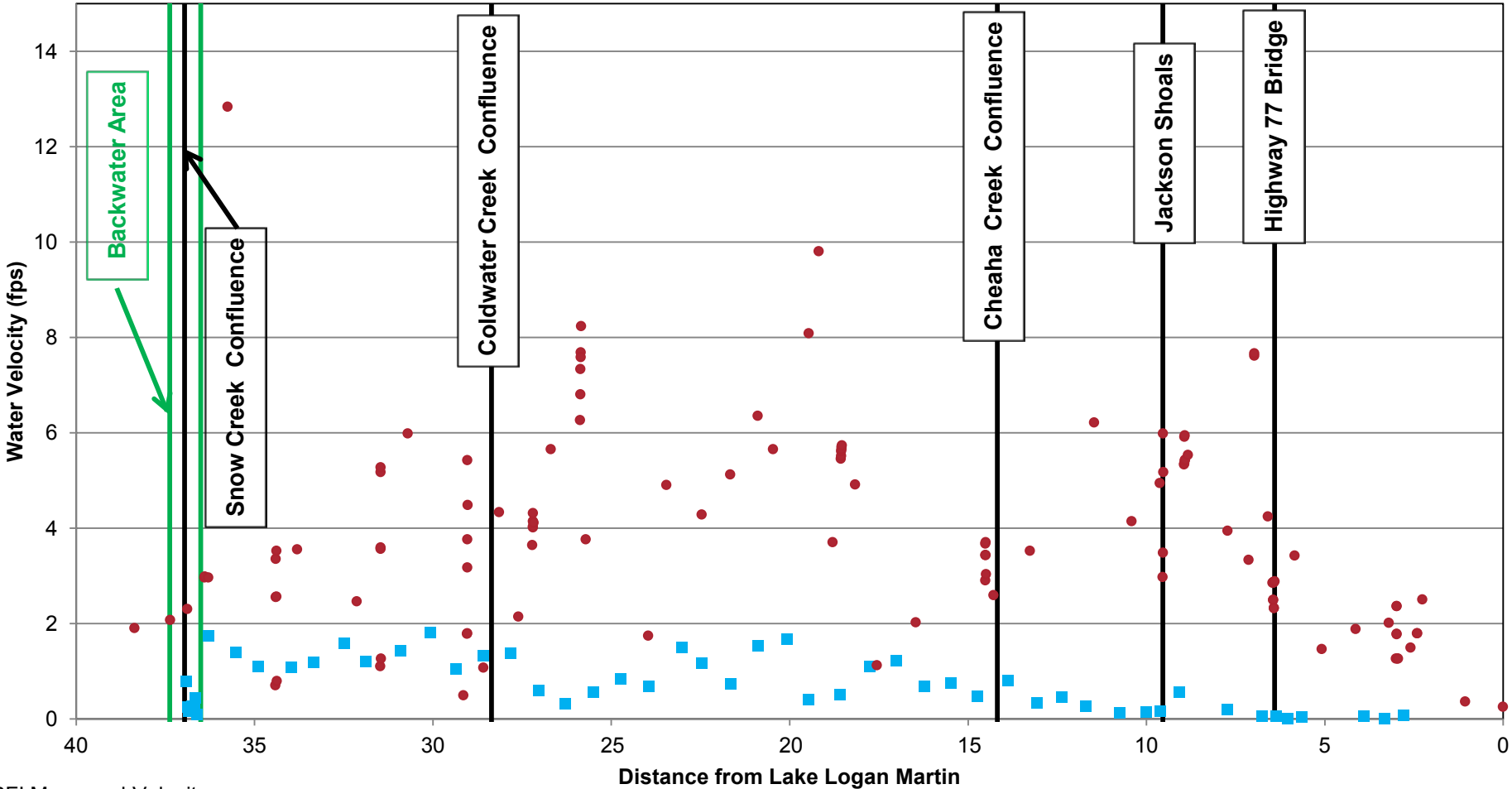
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Water Depth in Choccolocco Creek with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-10



RFI Measured Velocity

HEC-RAS 2-Year Flow Event

Notes:
1. Measured data collected during Off-Site RFI base-flow conditions.
2. Model results based on the Off-Site RFI HEC-RAS model for a 2-year flow event.
3. Green markers indicate stability areas of interest; black markers indicate landmarks/areas of interest.

fps: feet per second
HEC-RAS: Hydraulic Engineering Centers River Analysis System
RFI: Resource Conservation and Recovery Act (RCRA) Facility Investigation

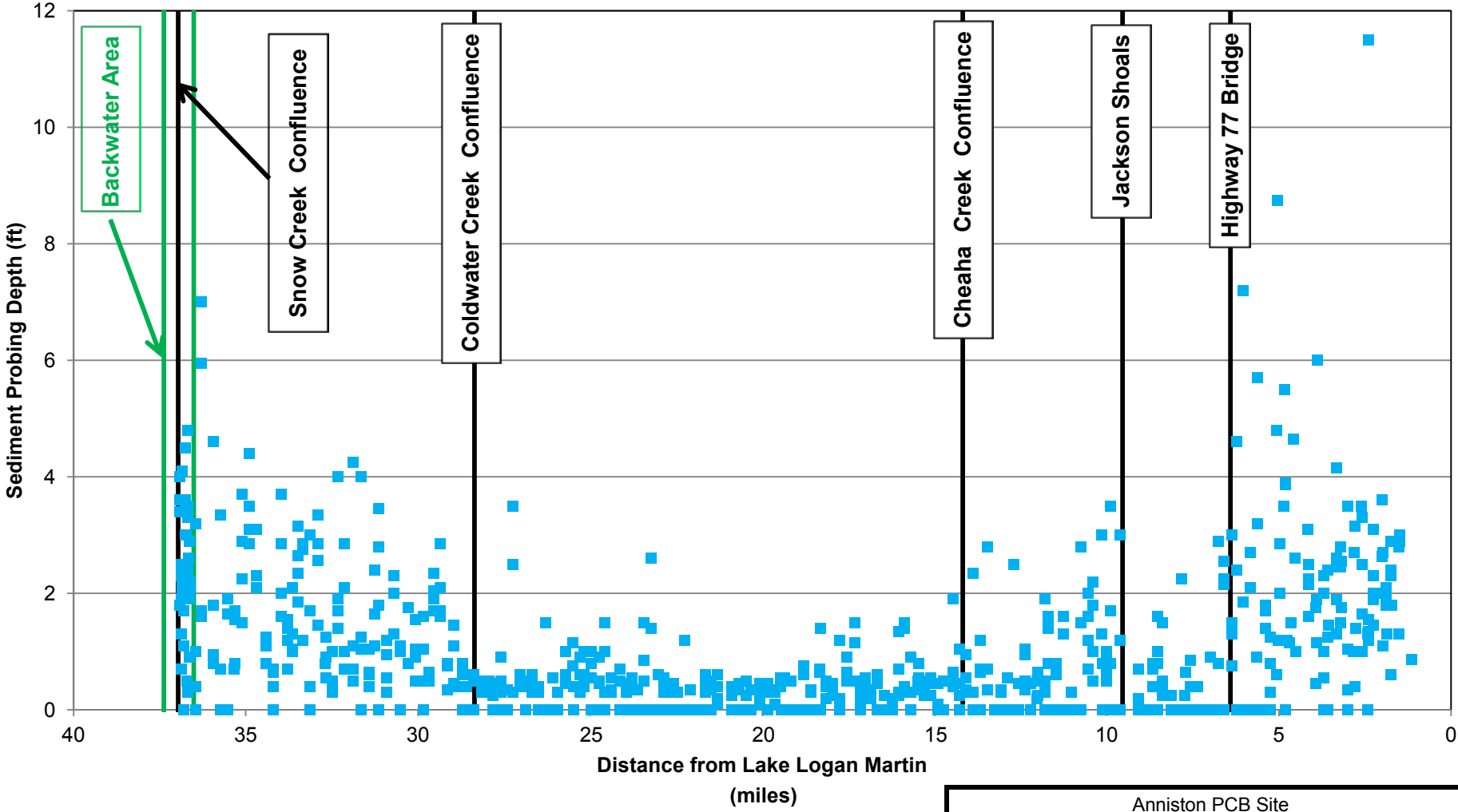
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Water Velocity in Choccolocco Creek with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-11



Notes:
1. Data presented are based on probing data from 769 locations.
2. Green markers indicate stability areas of interest; black markers indicate landmarks/areas of interest.

ft: feet

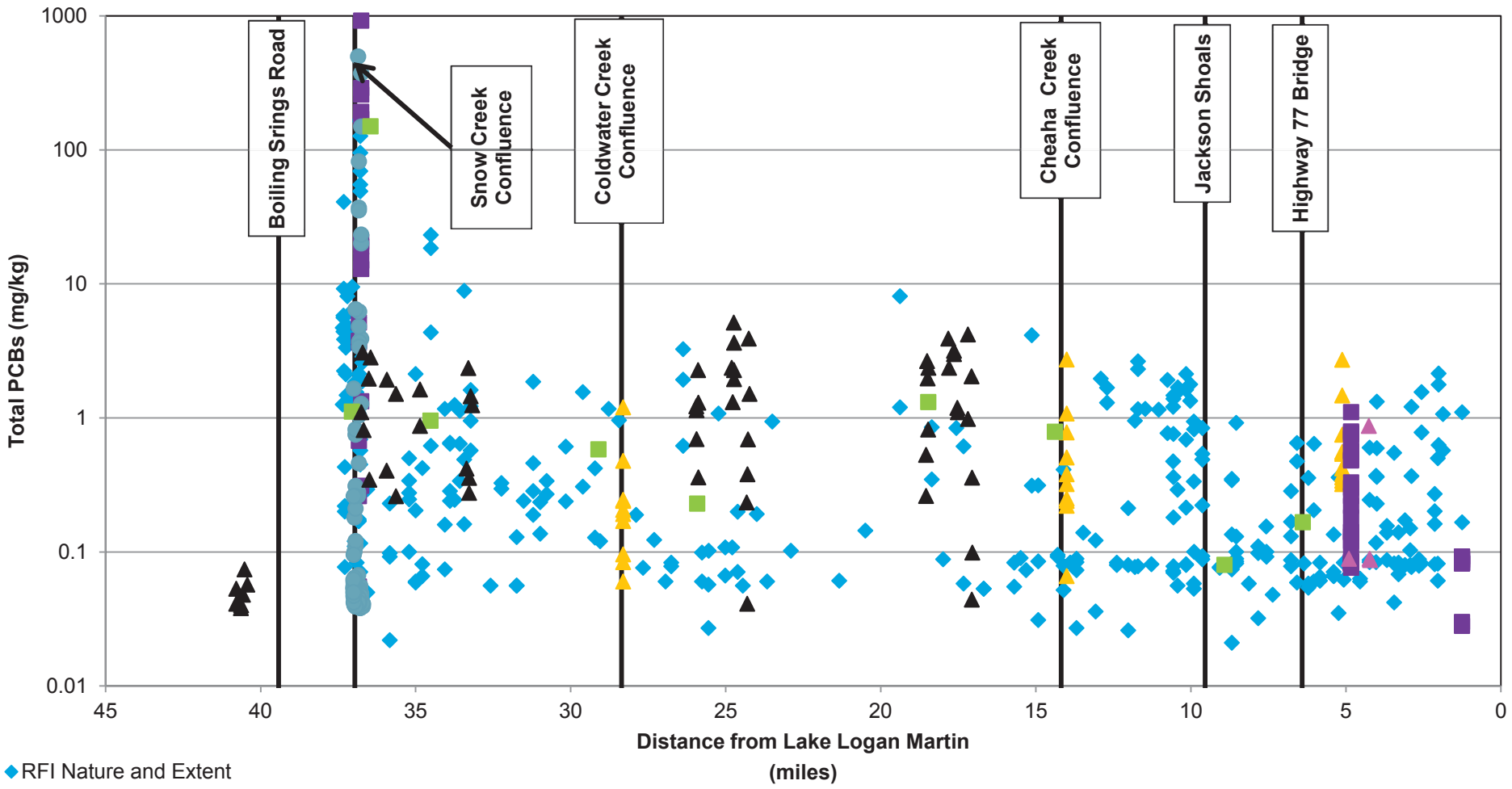
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Probing Depth in Choccolocco Creek Sediment with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-12



- RFI Nature and Extent
- RFI Fish Tissue Sampling Locations
- Geochronological
- RI/FS Nature and Extent
- RI/FS Fish Tissue Collection Locations
- RI/FS Ecological Program
- Lake Pointe

Notes:

mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

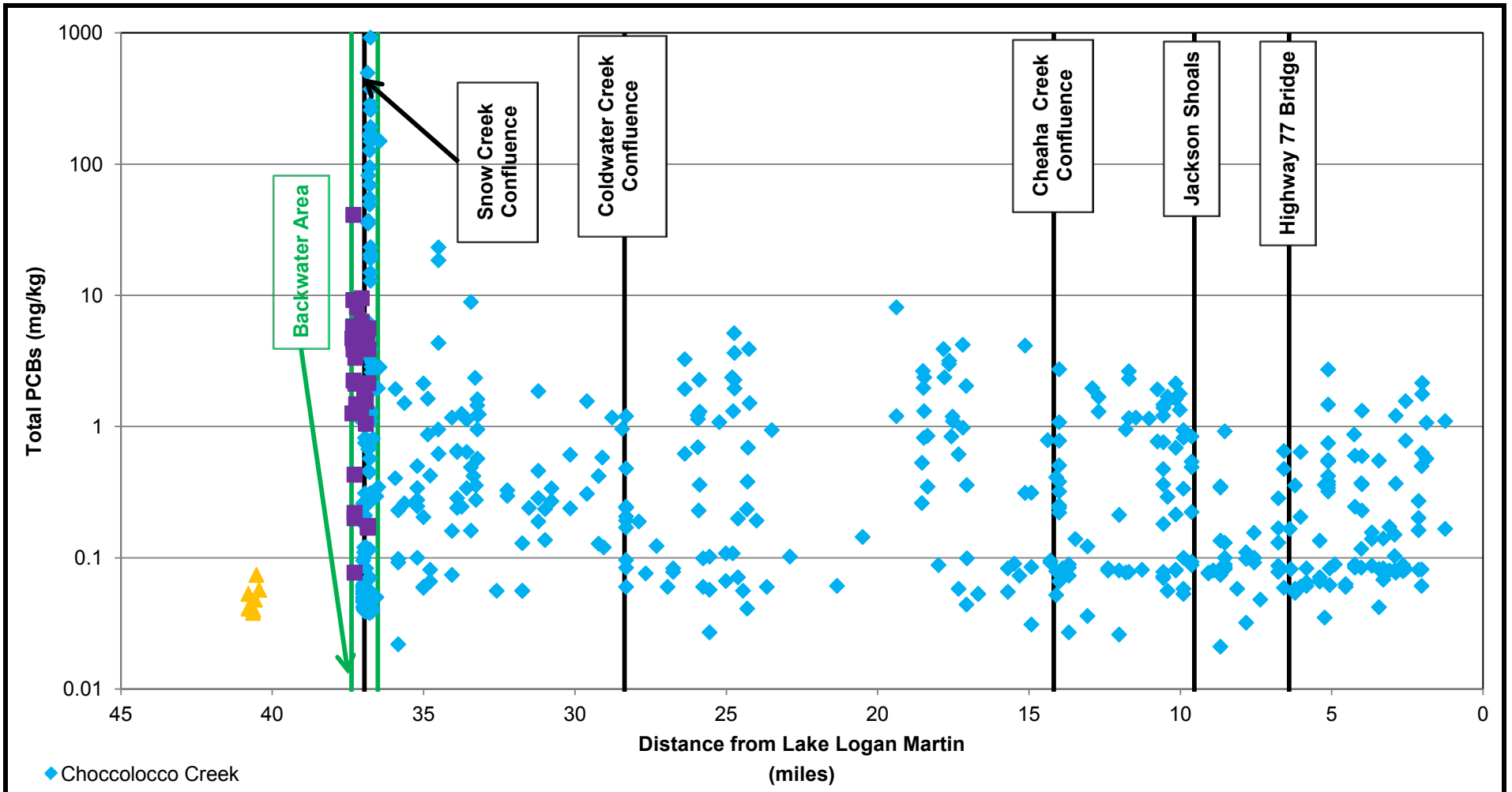
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCB Concentrations in Sediment with Distance from Lake Logan Martin by Collection Program

Solutia
Ingenuity Productivity Performance

Figure 4-13



Notes:
Green markers indicate stability areas of interest; black markers indicate landmarks/areas of interest.

mg/kg: milligrams per kilogram

PCB: polychlorinated biphenyl

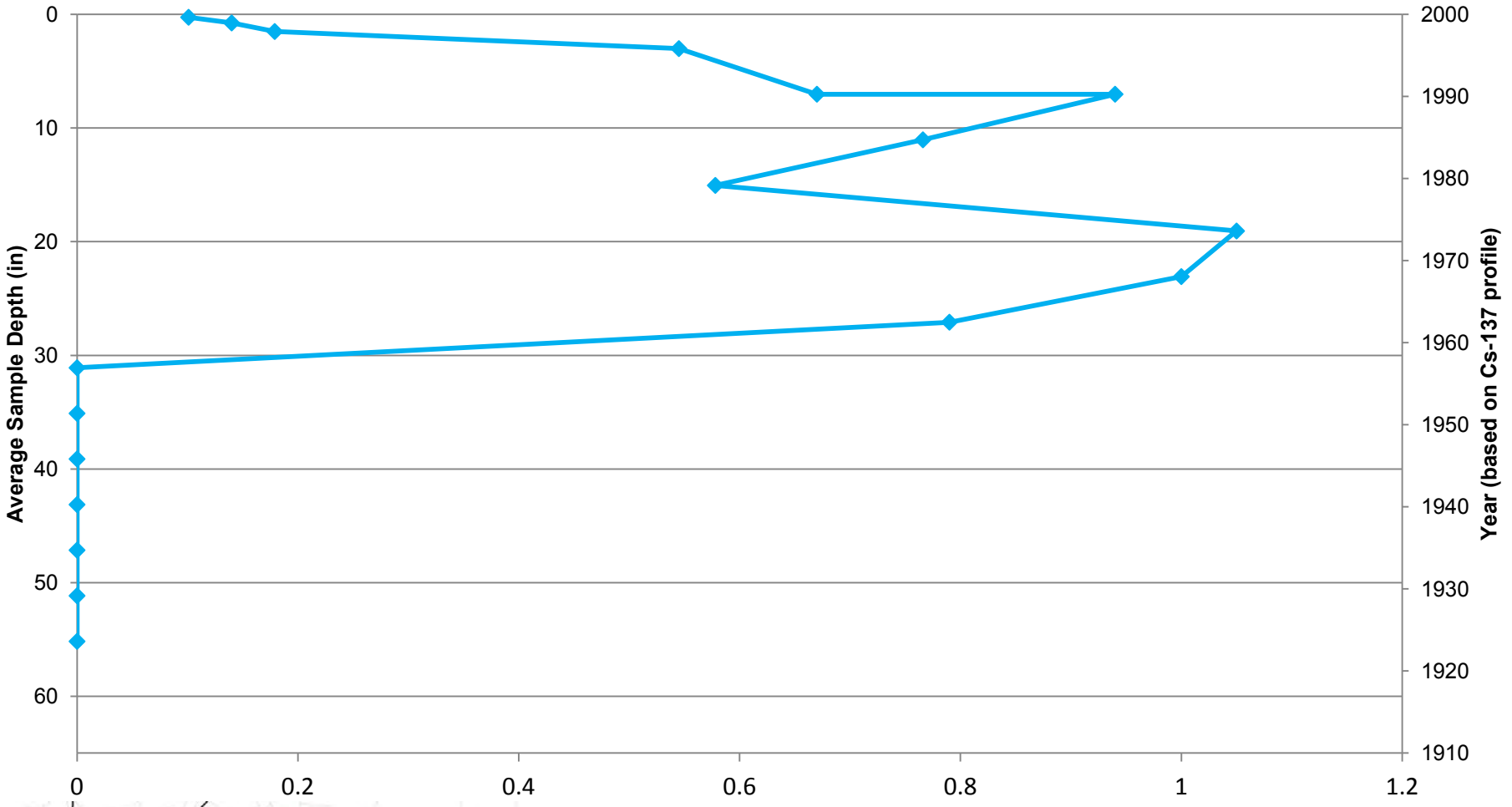
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCB Concentrations in Sediment with Distance from Lake Logan Martin by General Area

Solutia
Ingenuity Productivity Performance

Figure 4-14



Notes:
Dates based on cesium-137 (Cs-137) profile.
First detectable Cs-137 reported between 26- and 28-inch sample depth, which corresponds to the 1954 horizon.

Cs-137: cesium-137
in: inches
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

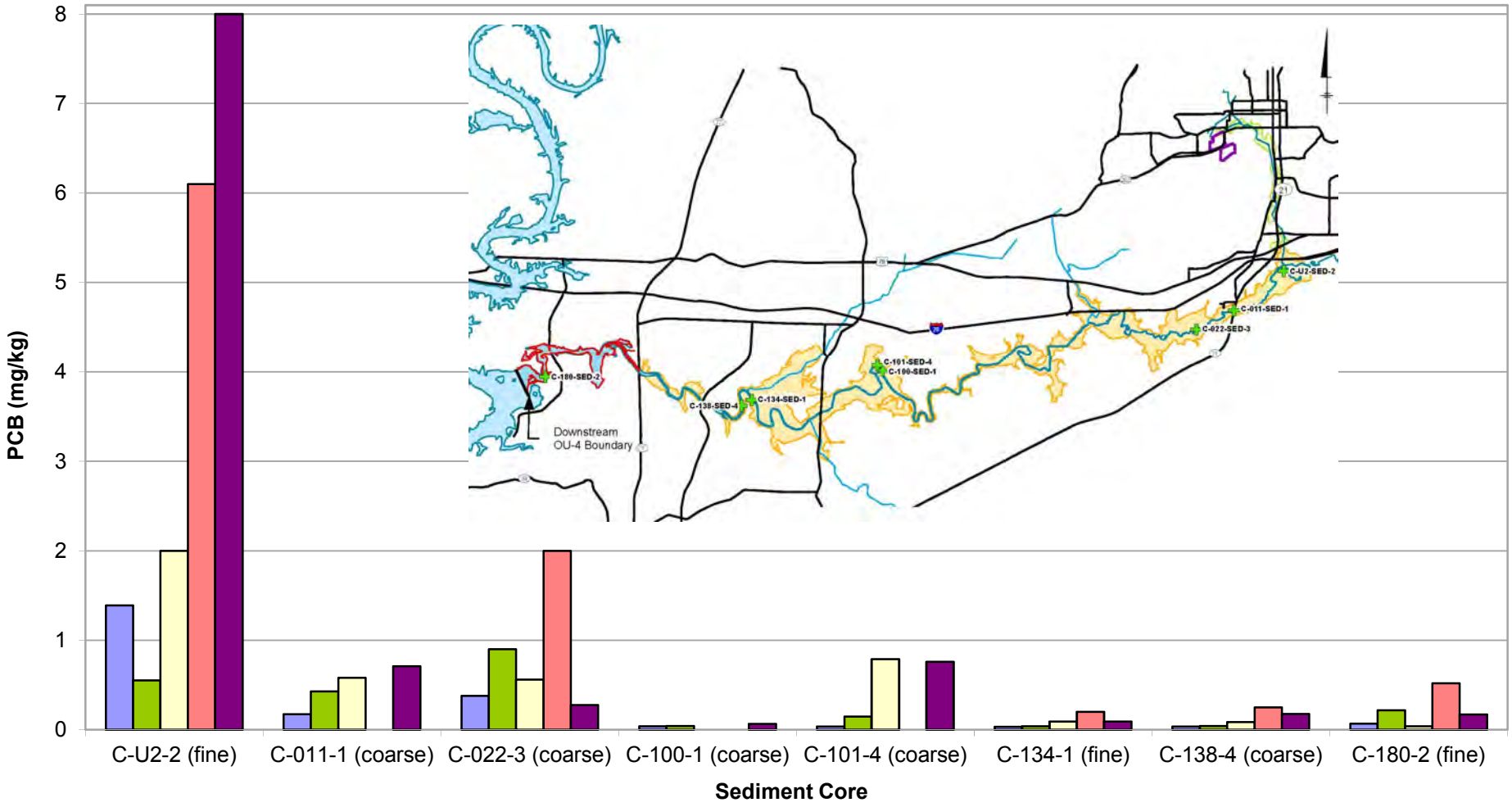
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Geochronological Profile/Embayment Area Sediment PCB: MLM-GEO-7

Solutia
Ingenuity Productivity Performance

Figure 4-15



mg/kg: milligrams per kilogram
mm: millimeter
PCB: polychlorinated biphenyl

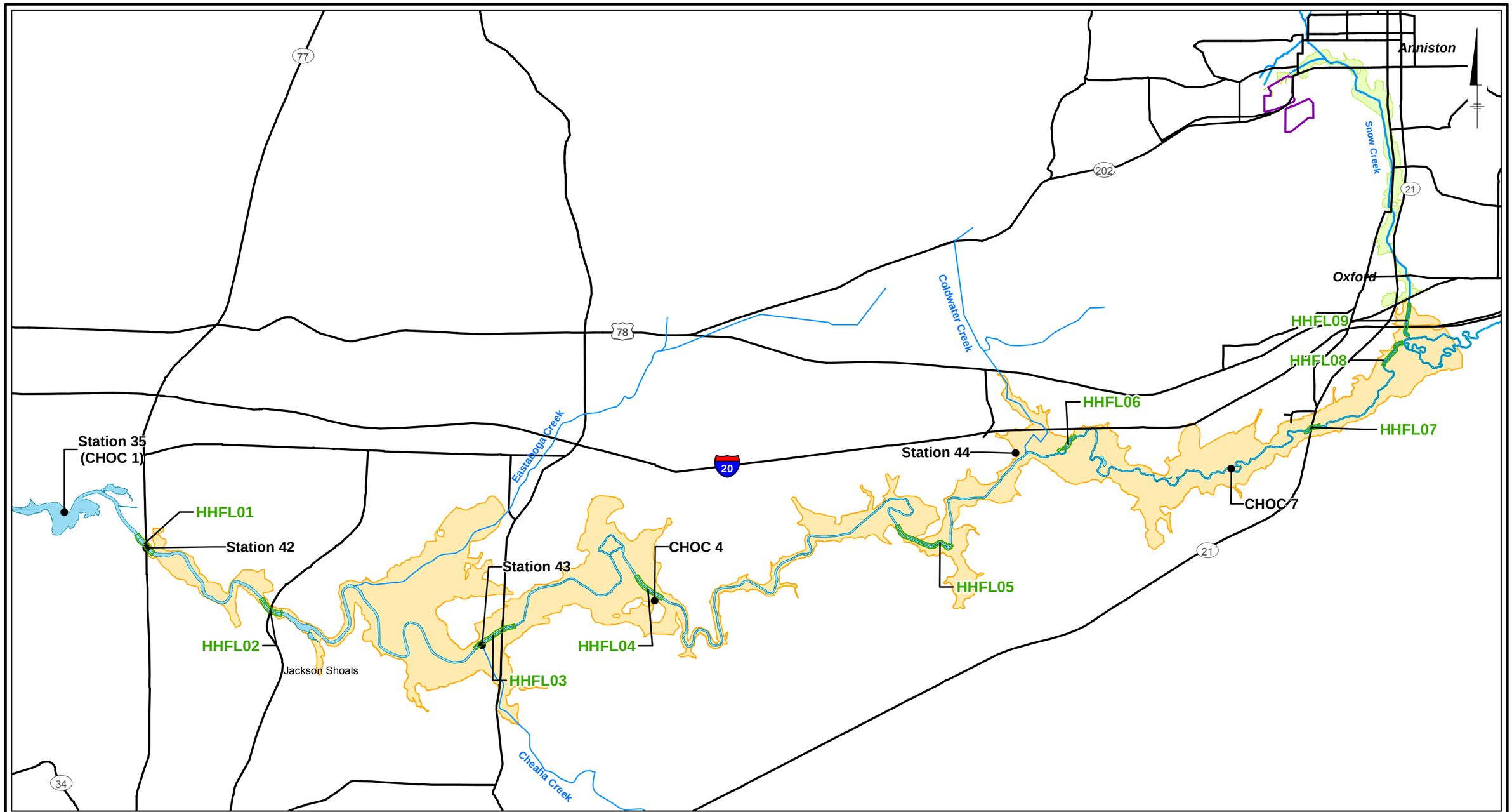
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB Concentration by Wet-Sieve Size Fractions in Choccolocco Creek

Solutia
Ingenuity Productivity Performance

Figure
4-16



Legend

- Historical Fish Sampling Location
- Major Roads
- Human Health Risk Assessment Fish Sampling Area (HHFL)
- Choccolocco Creek
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- OU-3 Boundary

0 7,500 15,000 Feet

Graphic Scale

Notes:
1. Sample Location CHOC10 (ADEM) is not shown on this figure and is located approximately 4 miles upstream of the site on Choccolocco Creek.

2. CERCLA Program Sample Locations (HHFL01 through HHFL09)
ADEM Program Sample Locations (CHOC1, CHOC4, CHOC7, and Station 35)
RCRA Program Sample Locations (Station 43, Station 44, and Station 35)
Bryne Sample Locations (Station 42, Station 43, Station 44, and Station 35)

3. OU: operable unit
RCRA: Resource Conservation and Recovery Act
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
ADEM: Alabama Department of Environmental Management

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Anniston, Alabama

Feasibility Study Report for OU-4

Fish Sampling Locations

Solutia

Figure
4-17

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: TJScott
Anniston
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SE-U1-1

SE-U2-1

SE-U3-1

SE-U4-1

Legend

- Sediment Trap Location
- Creek
- OU-4 100-Year Floodplain

0 750 1,500 Feet

Graphic Scale

Notes:
1. OU: operable unit
2. Aerial imagery provided by Calhoun County.

Anniston PCB Site
Anniston, Alabama

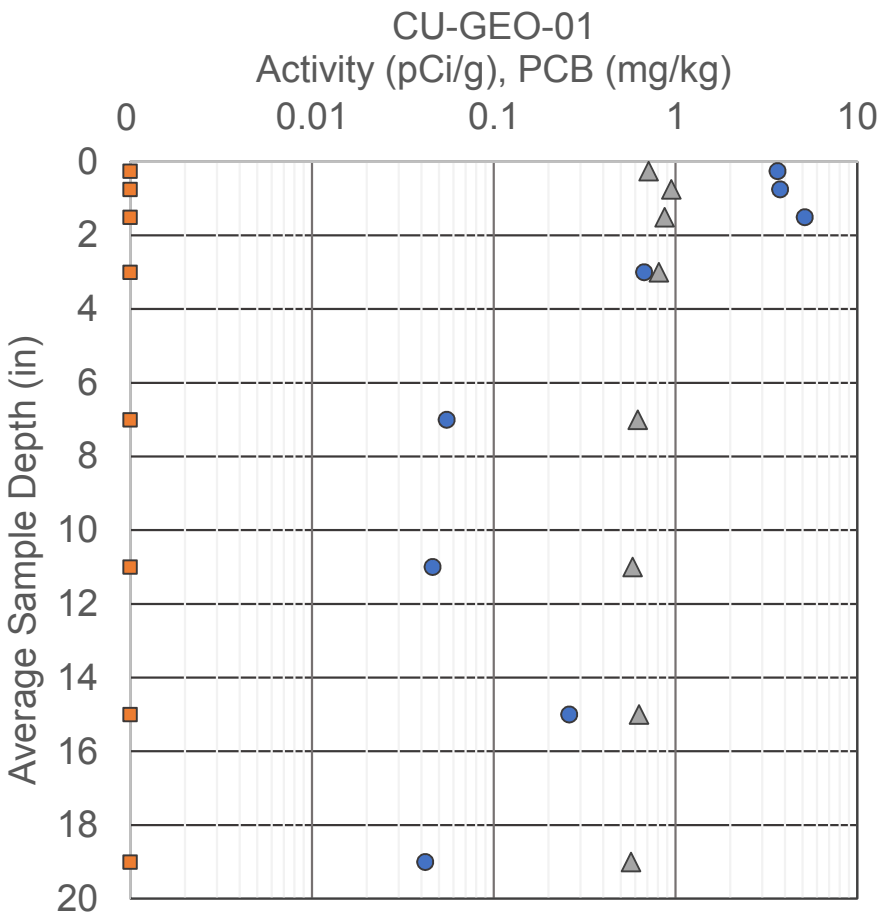
Feasibility Study Report for OU-4

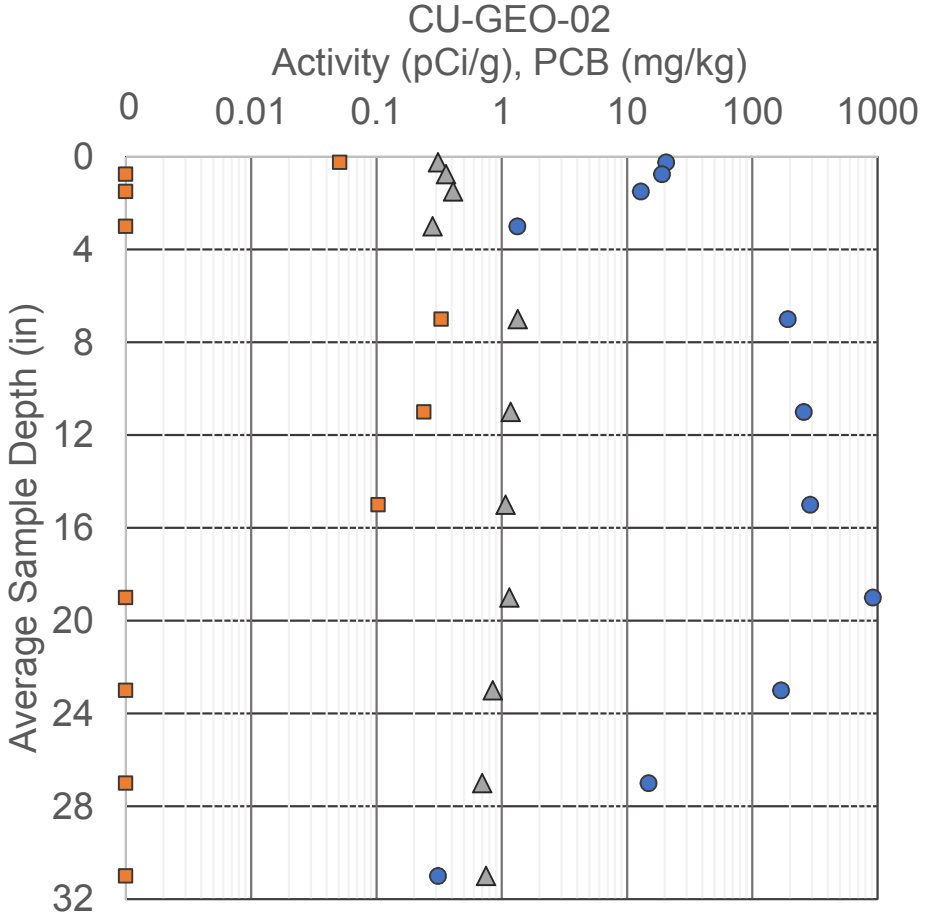
Sediment Trap Locations

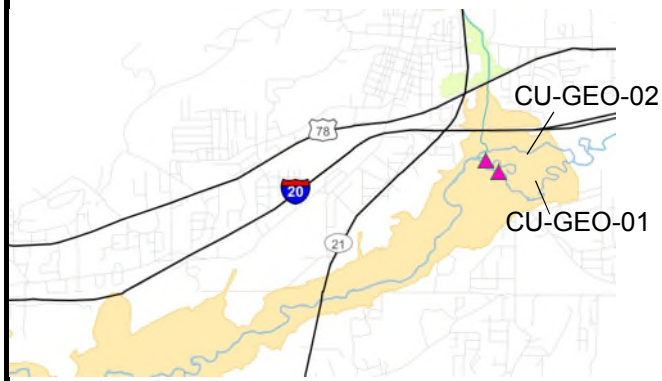
Solutia

Figure
4-18

8/22/2019
\\arcadis-us\officedata\Fairport-NY\Projects\Anniston\OU-4 RI 2019\CU geochron Figs 20190812Figure 4-19a







Total PCBs (mg/kg)

Cs-137 (pCi/g)

Pb-210 (pCi/g)

Notes:
Cs-137: cesium-137
in: inches
mg/kg: milligrams per kilogram
Pb-210: lead-210
PCB: polychlorinated biphenyl
pCi/g: picocuries per gram

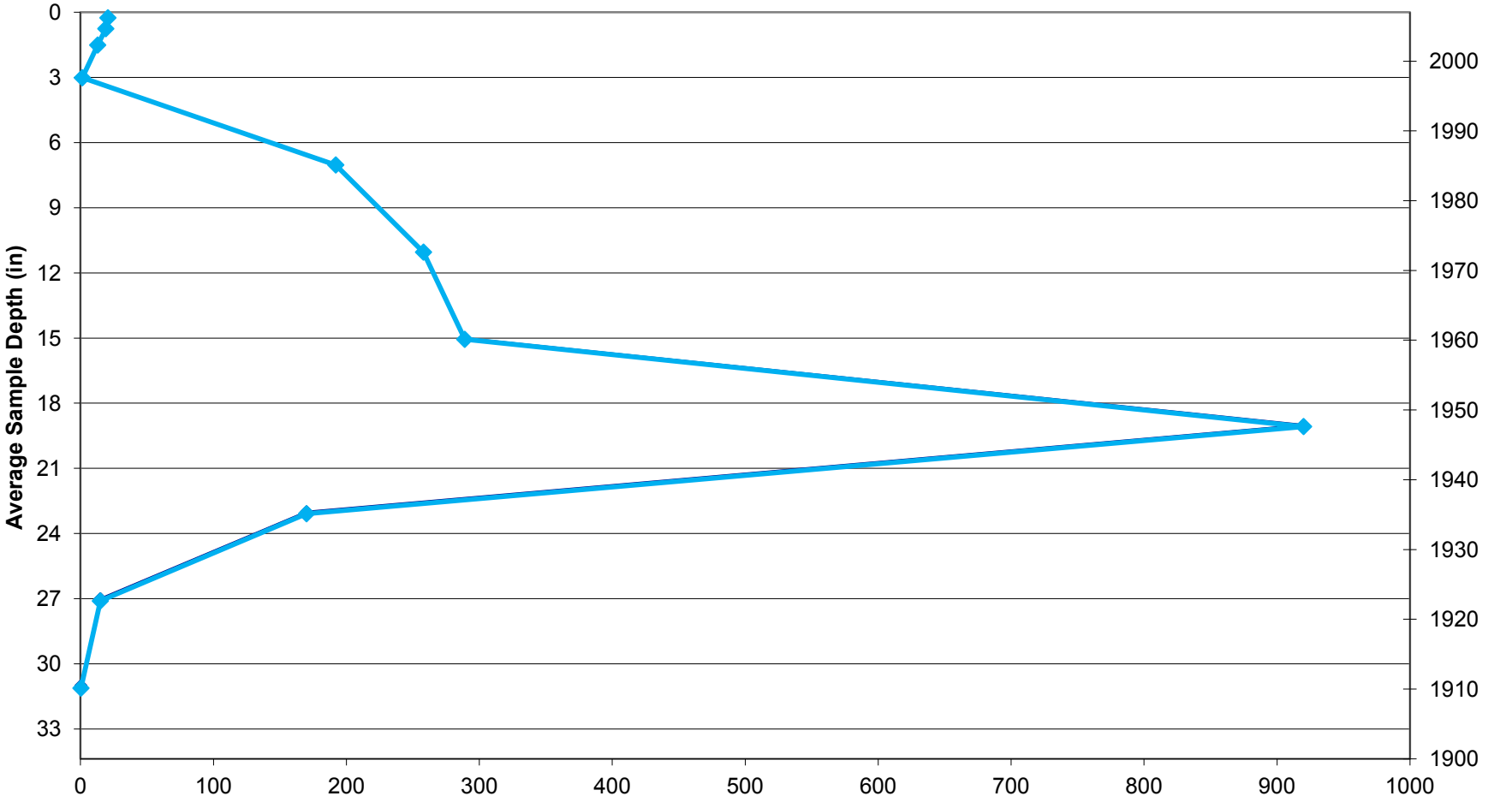
Anniston PCB Site
Anniston, Alabama

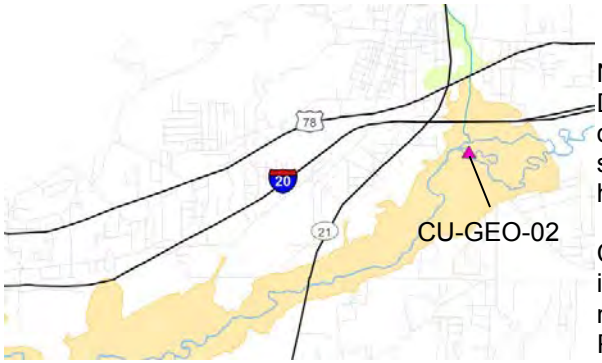
Feasibility Study Report for OU-4

Geochronological Sample Results
CU-GEO-01, CU-GEO-02

Solutia
Ingenuity Productivity Performance

Figure
4-19





Notes:
Dates based on cesium-137 (Cs-137) profile. First detectable Cs-137 reported between 15- and 19-inch sample depth, which corresponds to the 1954 horizon.

Cs-137: cesium-137
in: inches
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

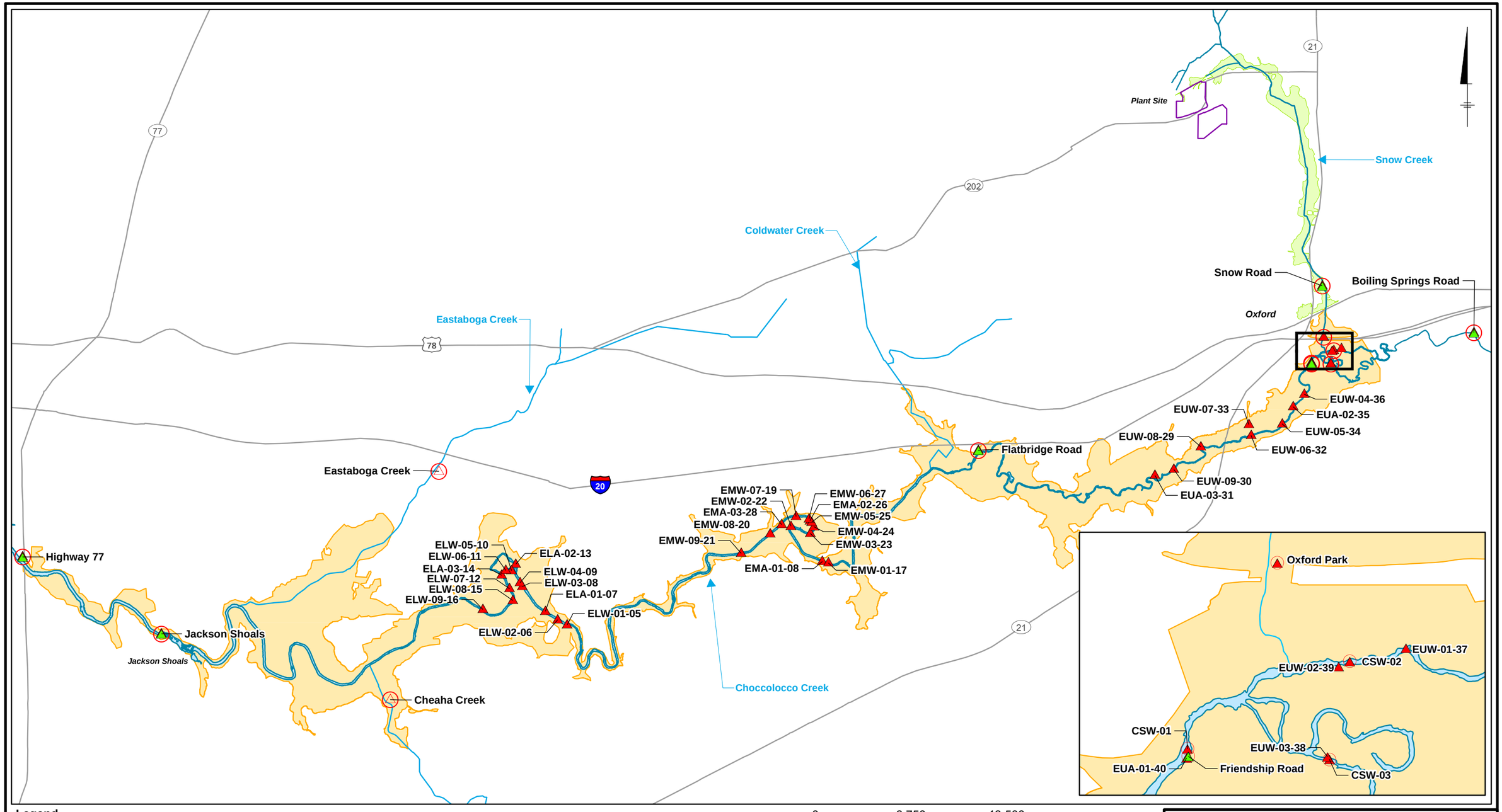
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Geochronological Profile for CU-GEO-02

Solutia
Ingenuity Productivity Performance

Figure 4-20



Legend

- Suspended Sediment PCB Sampling
- No Surface Water PCB Sampling
- Surface Water PCB Sampling
- Surface Water Flow Rate Measured
- Choccolocco Creek
- OU-3 Boundary
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain

0 6,750 13,500 Feet

Graphic Scale

Notes:
1. OU: operable unit
   PCB: polychlorinated biphenyl

Anniston PCB Site
Anniston, Alabama

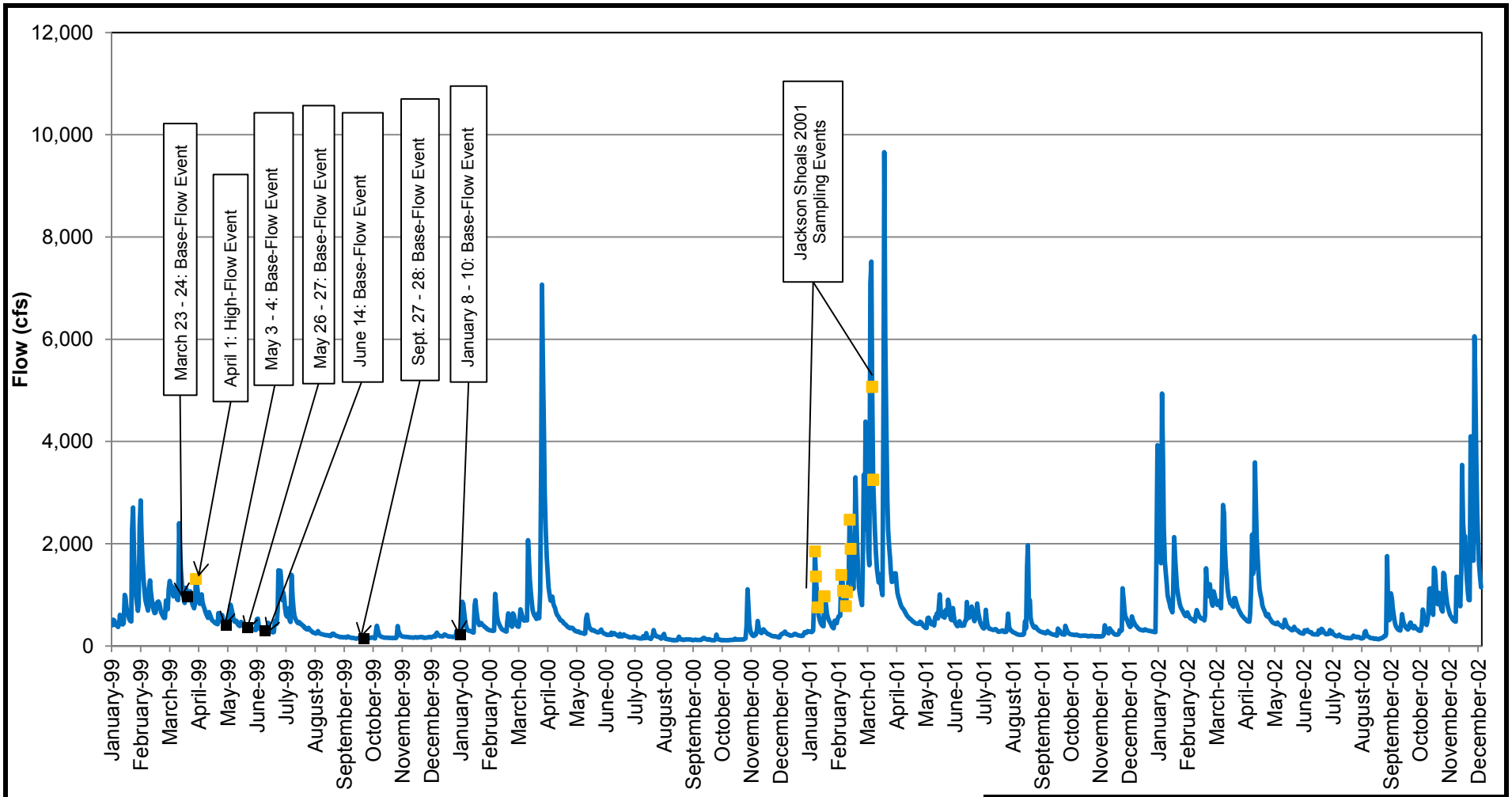
Feasibility Study Report for OU-4

Surface Water Sampling Locations

Solutia

Figure
4-21

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\Anniston\ALLMXDs_Printfiles\Reports\OU4_2019Revisions\mxdF4-20_SurfaceWaterSamplingProgram_v2.mxd 7/29/2019 12:50:58 PM



Notes:
Flow data was obtained from USGS Gage 02404400.

cfs: cubic feet per second
USGS: U.S. Geological Survey

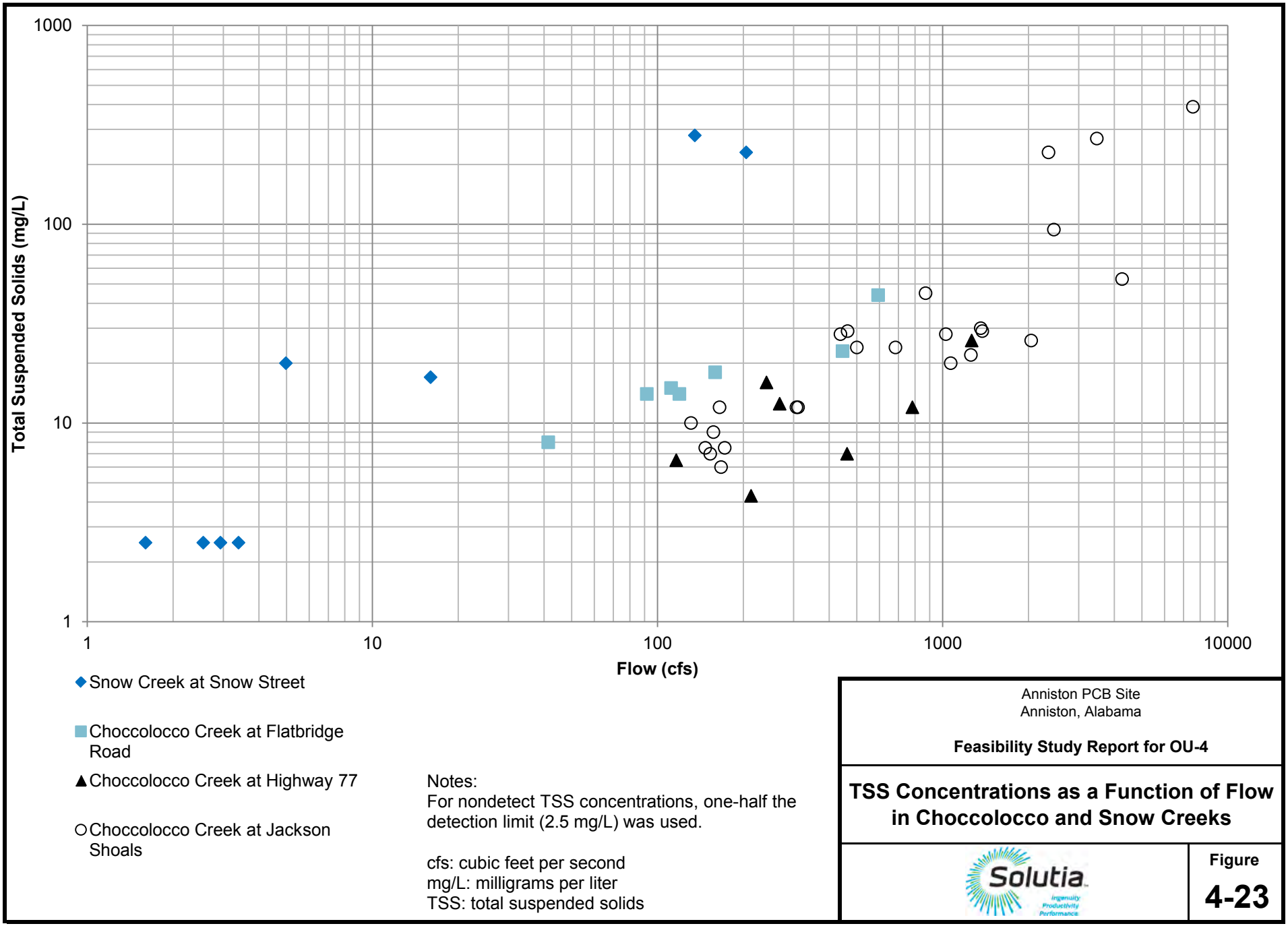
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Base- and High-Flow Sampling Events near Jackson Shoals January 1, 1999 - December 31, 2002

Solutia

Figure
4-22



Notes:
For nondetect TSS concentrations, one-half the detection limit (2.5 mg/L) was used.

cfs: cubic feet per second
mg/L: milligrams per liter
TSS: total suspended solids

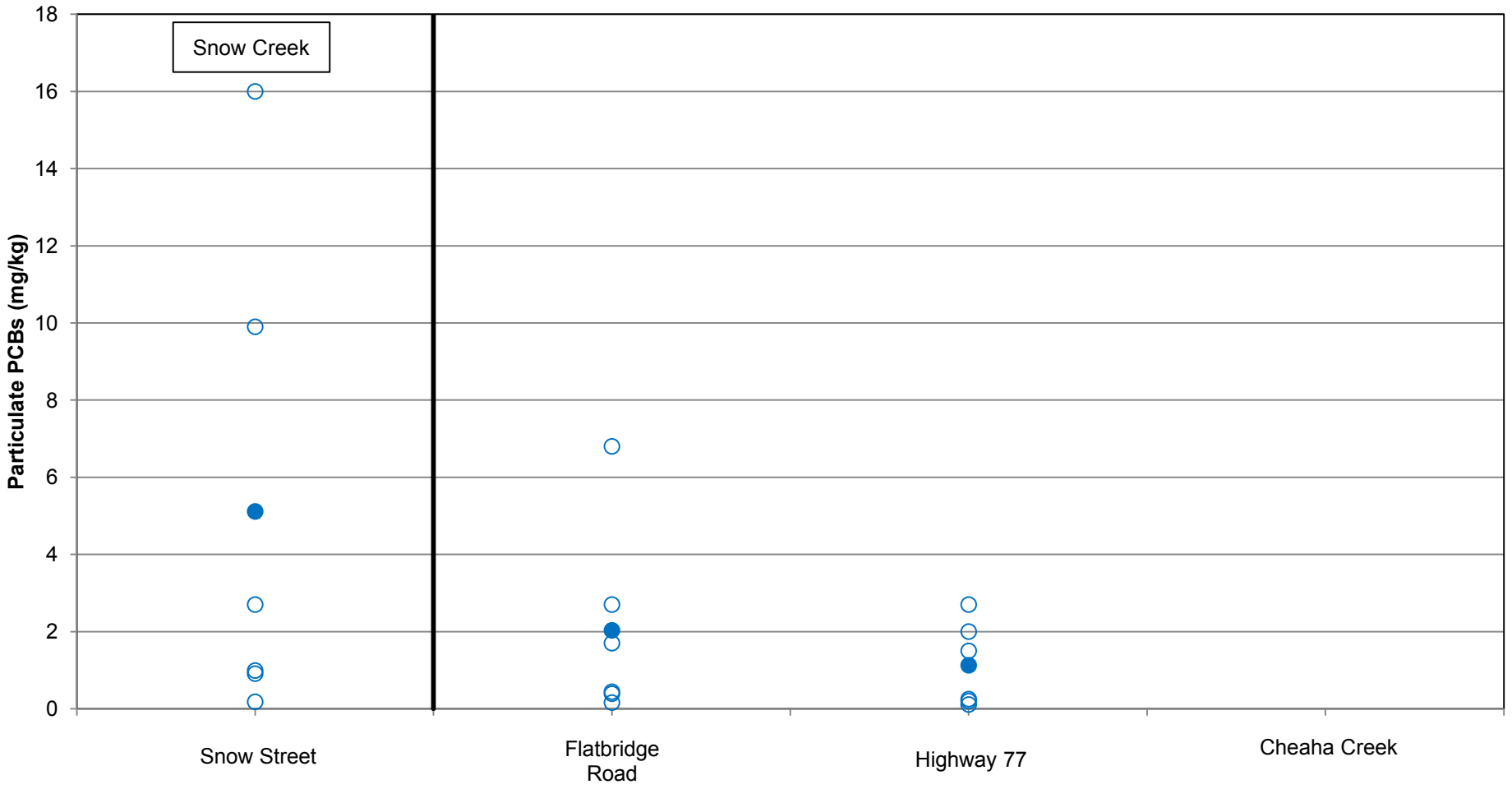
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

TSS Concentrations as a Function of Flow in Choccolocco and Snow Creeks

Solutia

Figure
4-23



mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

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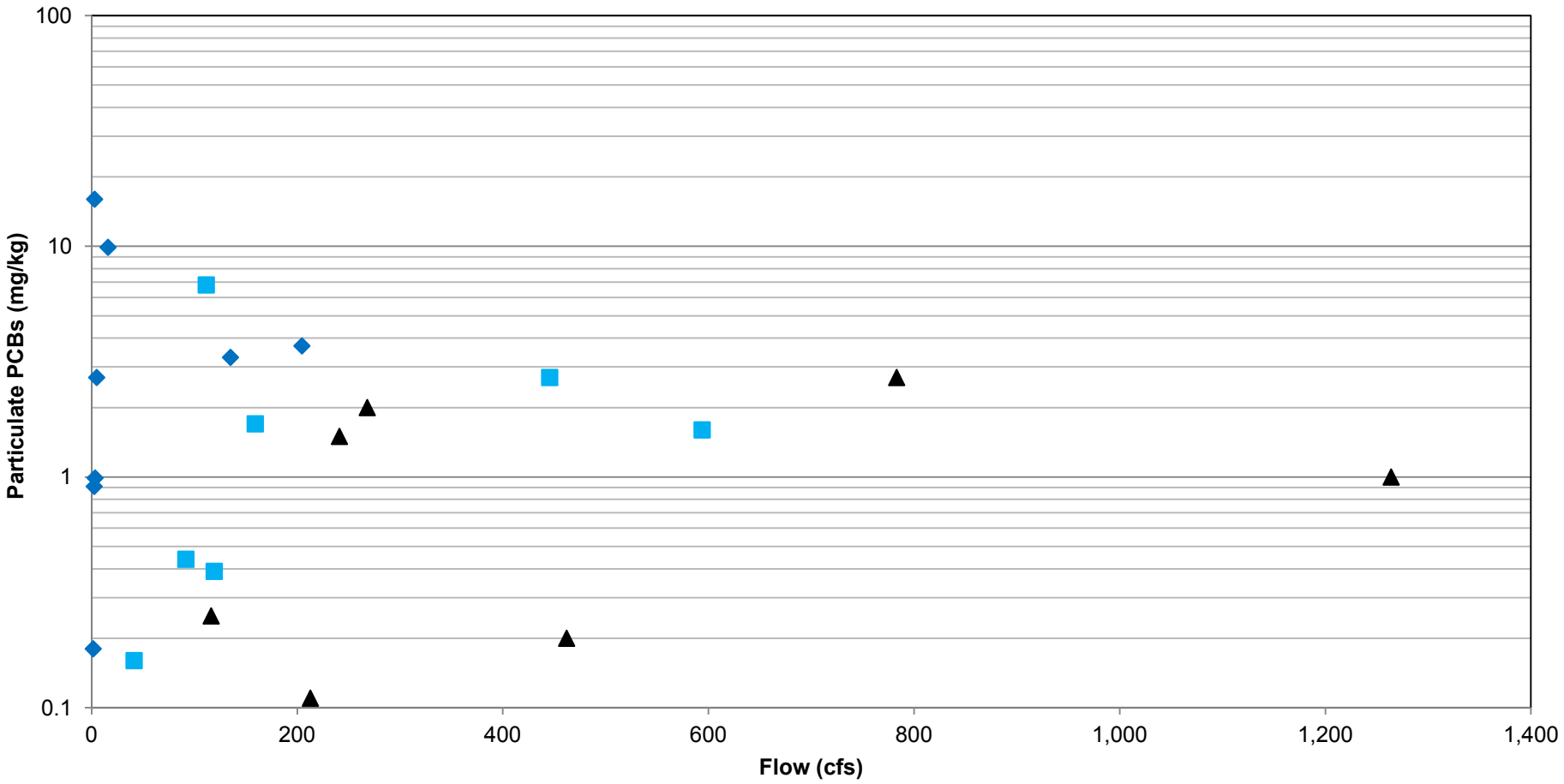
Feasibility Study Report for OU-4

Base-Flow Water Column Sampling Particulate PCB Results

Solutia

Figure
4-24



cfs: cubic feet per second
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

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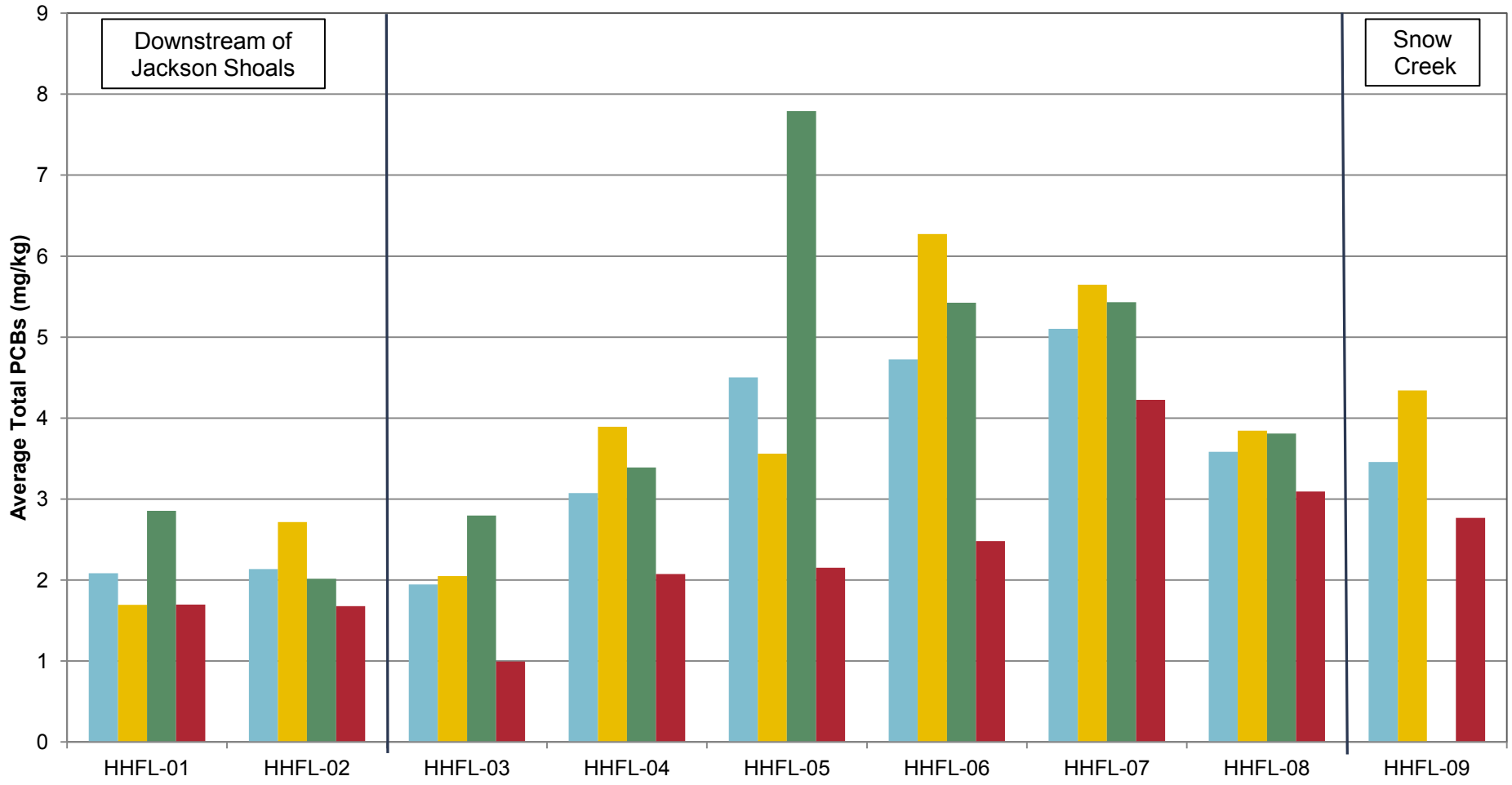
Anniston, Alabama

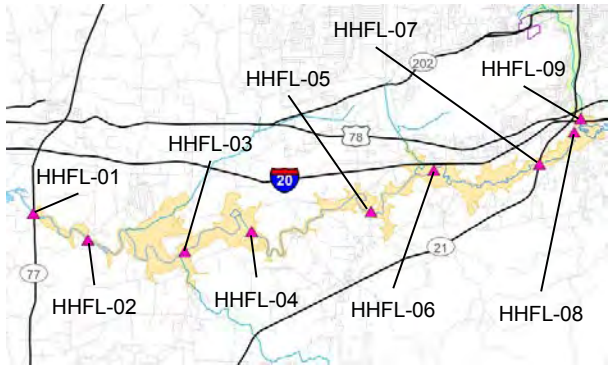
Feasibility Study Report for OU-4

Particulate PCB Concentrations as a Function of Flow in Choccolocco and Snow Creeks

Solutia

Figure
4-25





Notes:
These data represent adult fish fillet samples collected in 2008.

PCB concentrations are reported on wet weight basis.

mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

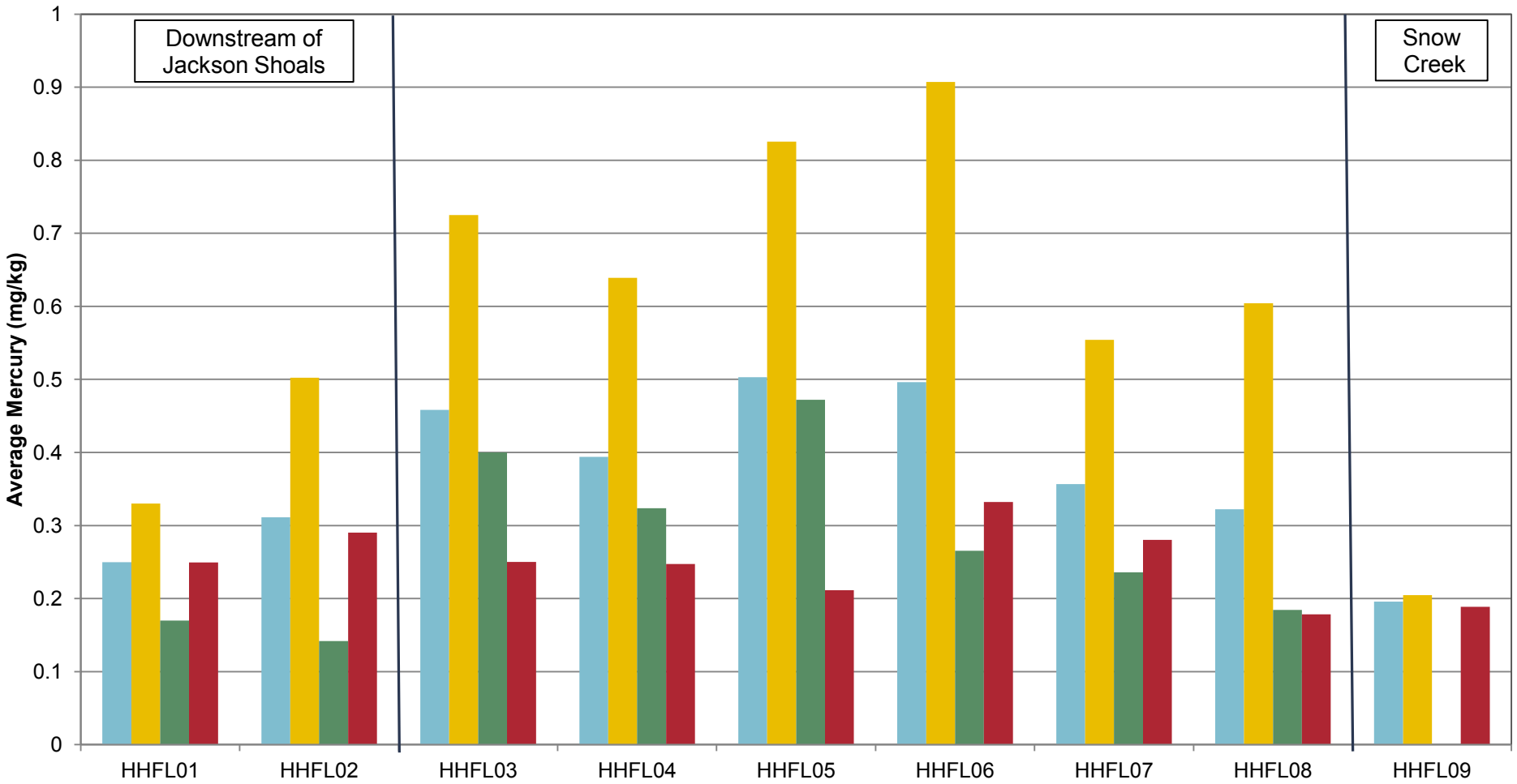
Anniston PCB Site
Anniston, Alabama

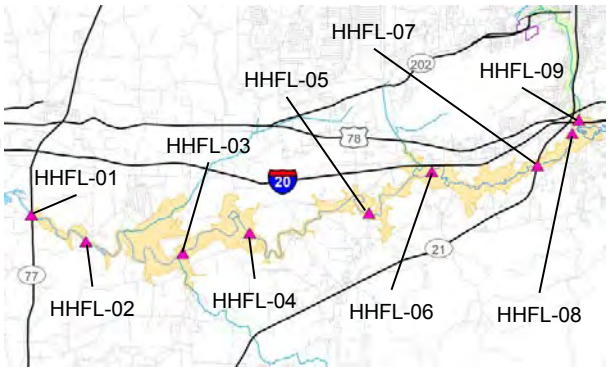
Feasibility Study Report for OU-4

Average Fish PCB Concentrations by Location and Species Group

Solutia
Ingenuity Productivity Performance

Figure
4-26





Notes:
These data represent adult fish fillet samples collected in 2008.

Mercury concentrations are reported on wet weight basis.

mg/kg: milligrams per kilogram

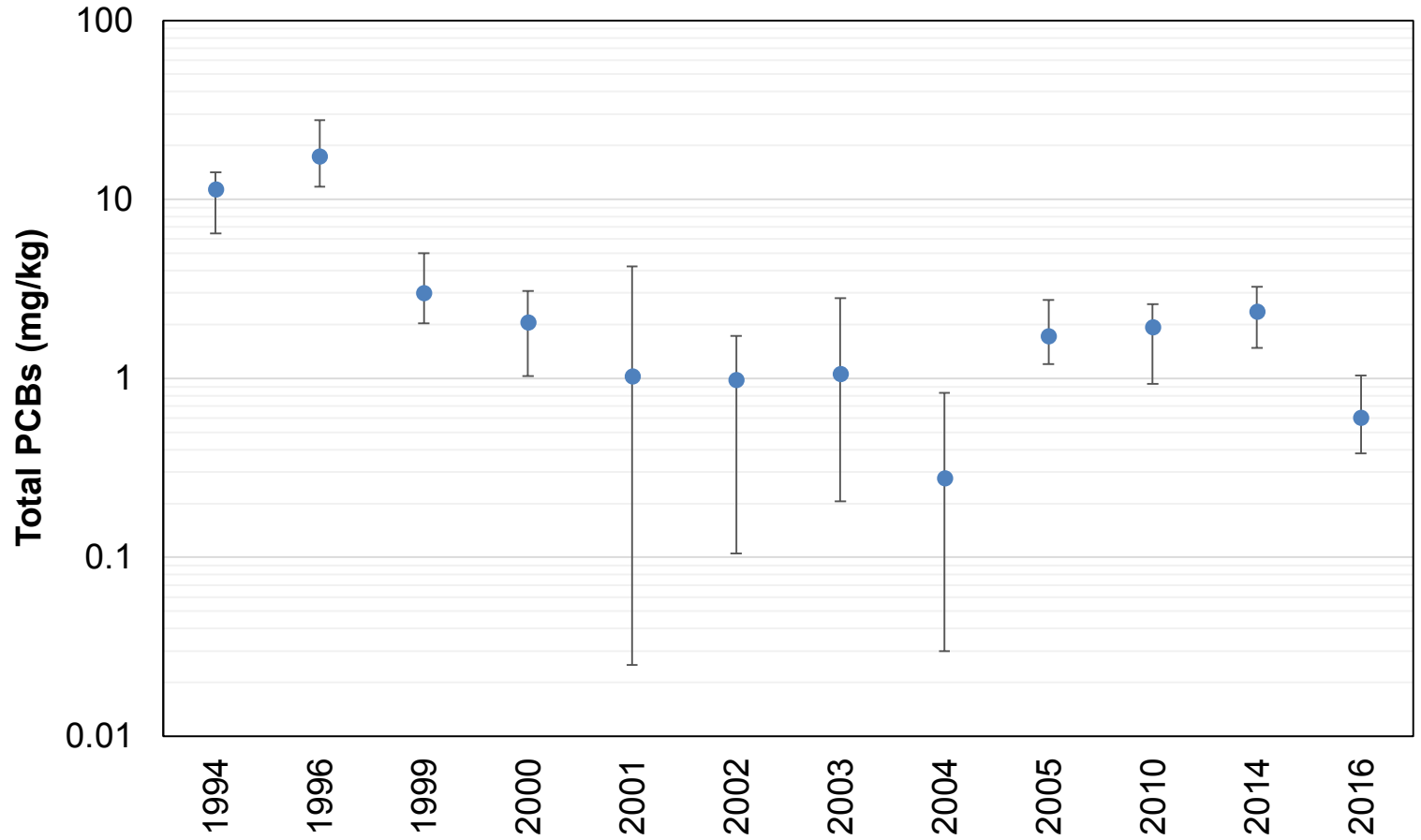
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Average Fish Mercury Concentrations by Location and Species Group

Solutia
Ingenuity Productivity Performance

Figure
4-27



Notes:
1. The graphic presents the range and average PCB concentrations for the year and bass species indicated at STA-35.
2. These data represent adult fish fillet samples.

mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

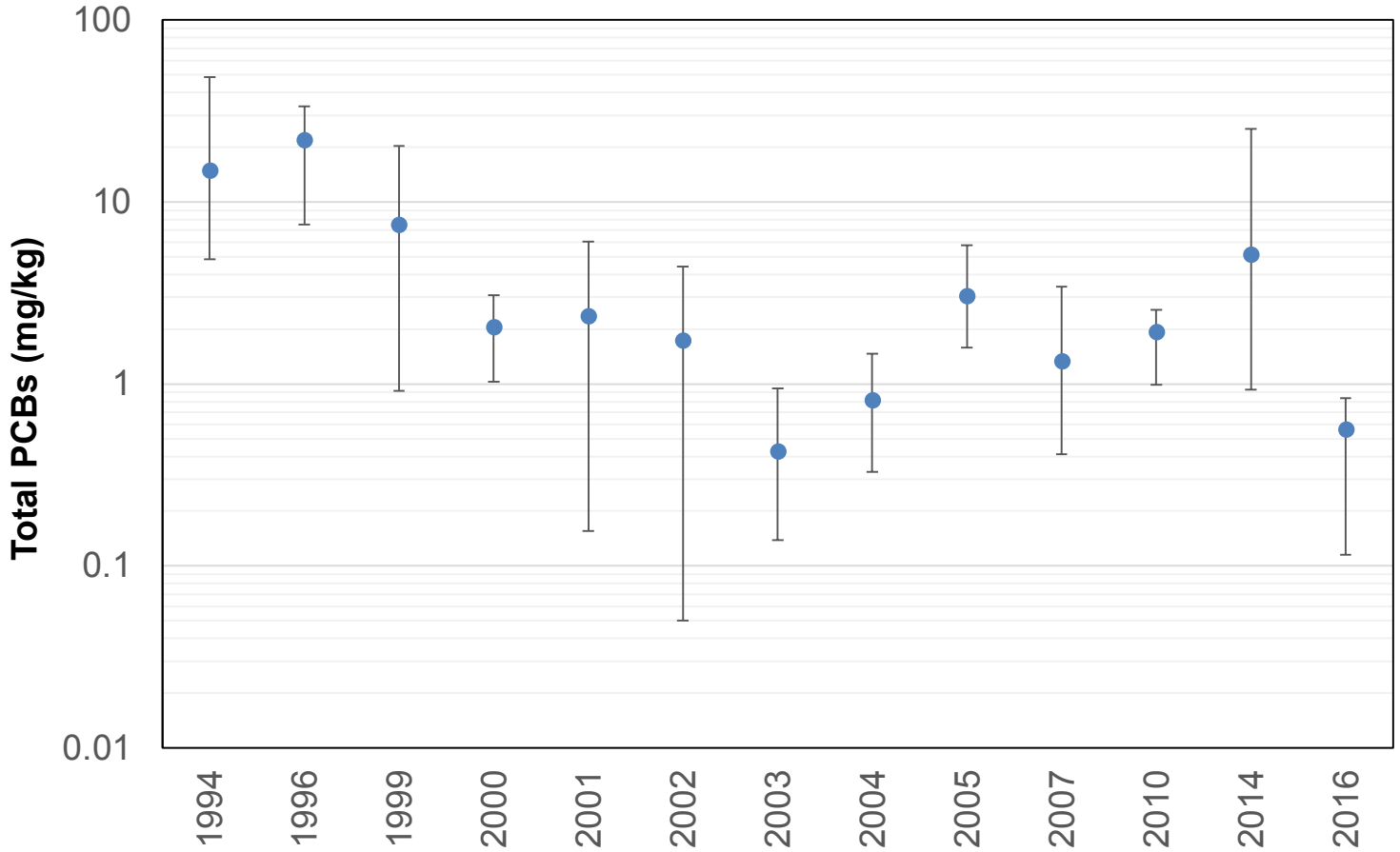
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Fish Tissue PCB Concentrations from 1994 to 2016: Bass

Solutia
Ingenuity Productivity Performance

Figure
4-28a



Notes:
1. The graphic presents the range and average PCB concentrations for the year and catfish species indicated at STA-35.
2. These data represent adult fish fillet samples.

mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

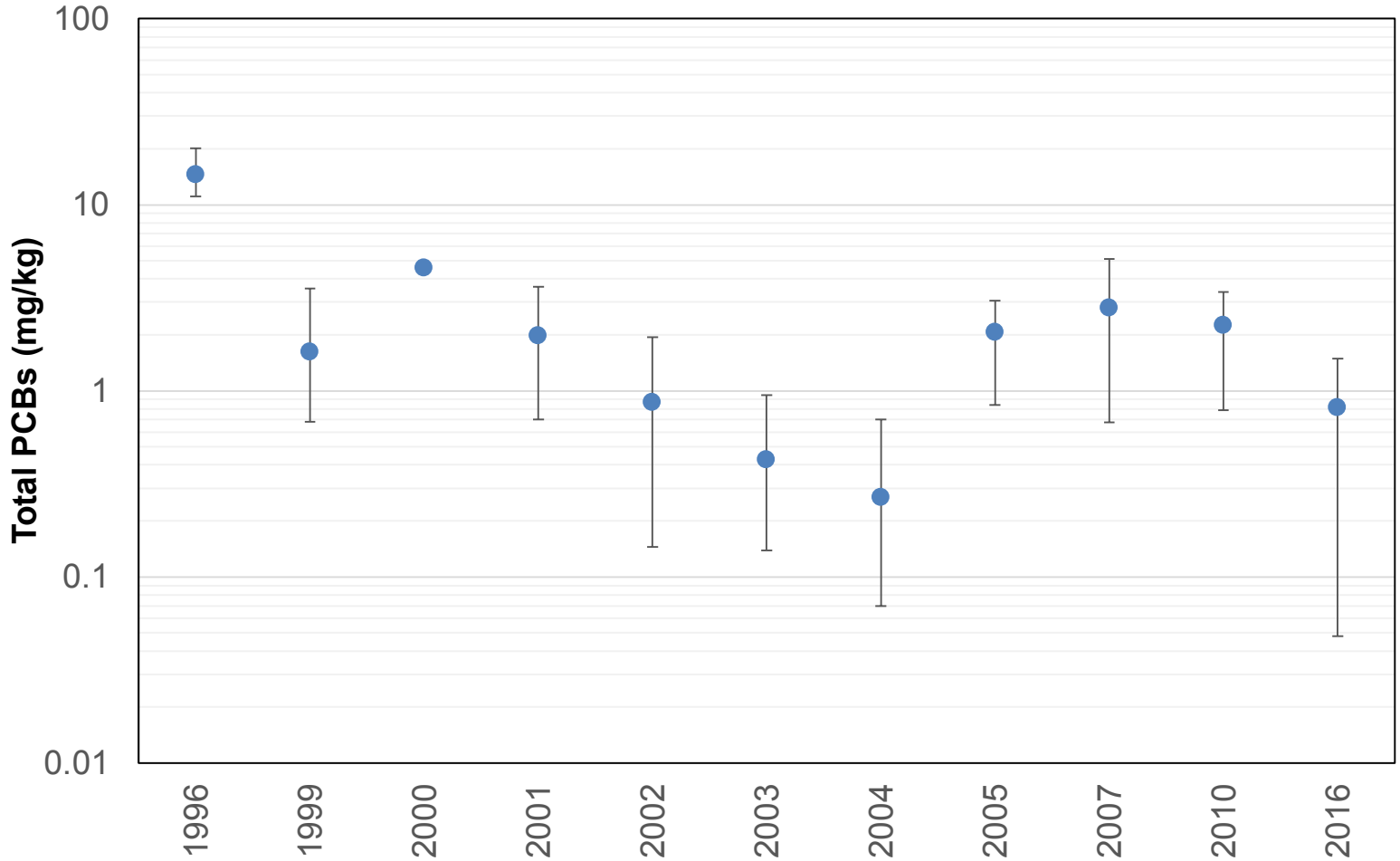
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Fish Tissue PCB Concentrations from 1994 to 2016: Catfish

Solutia
Ingenuity Productivity Performance

Figure
4-28b



Notes:
1. The graphic presents the range and average PCB concentrations for the year and panfish species indicated at STA-35.
2. These data represent adult fish fillet samples.

mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

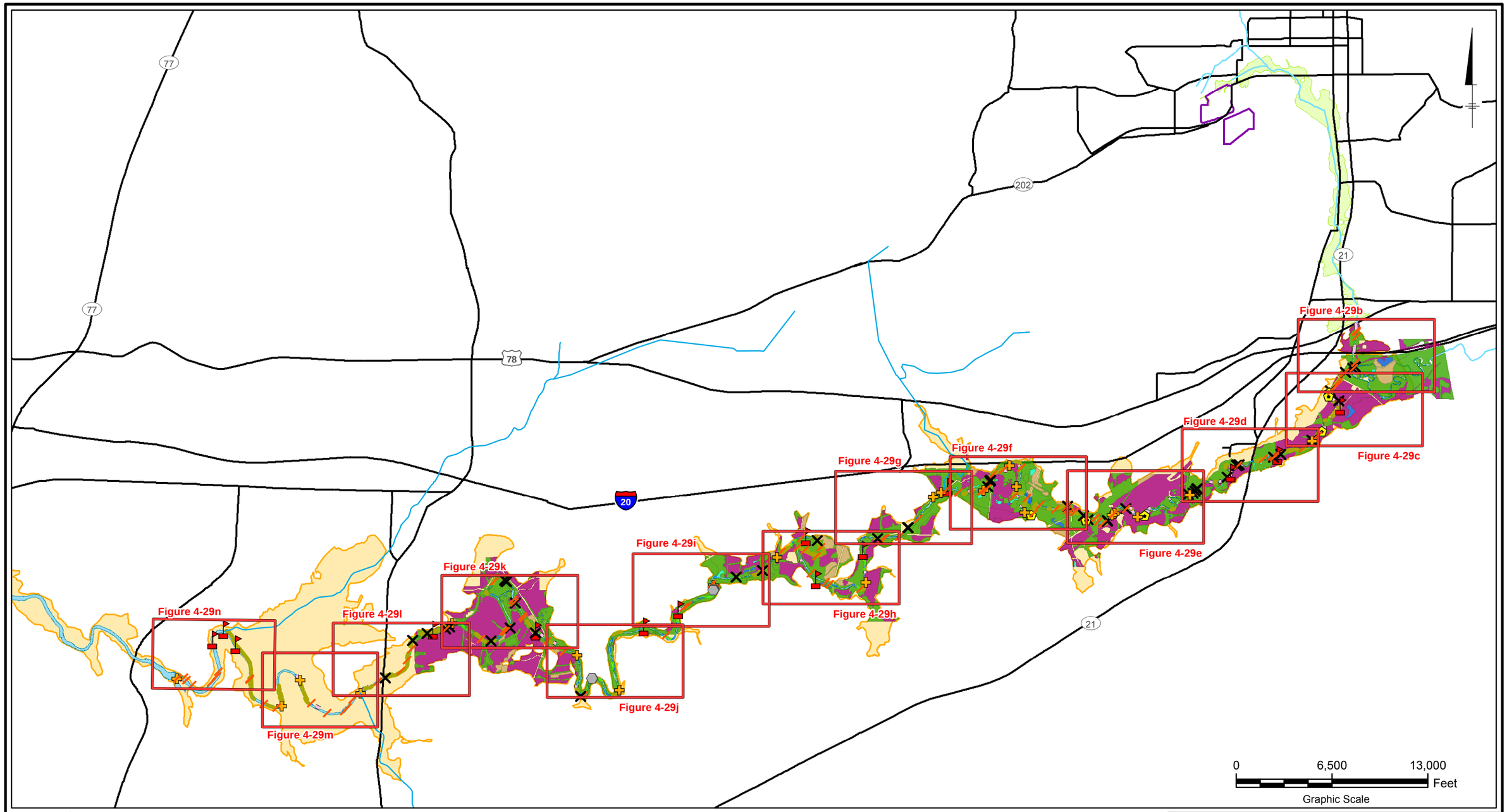
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Fish Tissue PCB Concentrations from 1994 to 2016: Panfish

Solutia
Ingenuity Productivity Performance

Figure
4-28c



Legend

- Human Use Area
- Riprap
- Deadfall
- Tributary Confluence
- Snag
- Boulder
- Bank Erosion
- Open Area
- Major Road
- OU-3 Boundary
- OU-1/OU-2 Floodplain
- OU-4 100-Year Floodplain
- Creek
- Deposition - Bank Area
- Submerged Aquatic Vegetation
- Deposition - Island
- Riffle
- Open Water
- Forested Floodplain
- Maintained Field
- Successional Field
- Wetland

Notes:
1. OU: operable unit

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Key for Floodplain and Riparian Habitat Figures

Solutia

Figure
4-29a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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Notes:
1. BW: backwater
   Dep: depositional
   EAV: emergent aquatic vegetation
   FF: forested floodplain
   LAA: lower assessment area
   MAA: middle assessment area
   MF: maintained field
   OU: operable unit
   Ri: riffle
   R: run
   SF: successional field
   UAA: upper assessment area
2. Wildlife includes mammals, birds, reptiles and amphibians.
3. Aerial imagery provided by Calhoun and Talladega Counties.

0 600 1,200 Feet
Graphic Scale

Legend

- Approximate Bayne Study Habitat Assessment Area
- Approximate 1999 Habitat Assessment Area
- 2001/2002 Floodplain Transect
- Bank Erosion
- Open Area
- Human Use Area
- Riprap
- Deadfall
- Tributary Confluence
- Snag
- Boulder
- Deposition - Bank Area
- Emergent Aquatic Vegetation
- Deposition - Island
- Riffle

2001/2002 Habitat Survey

- Open Water
- Wetland
- Forested Floodplain
  - A. Inner Forest. Canopy dense, continuous, and closed. Understory and/or herbaceous sparse or absent.
  - B. Inner Forest. Canopy sparse, narrow, or open. Understory and/or herbaceous layer common; sometimes dense.
  - C. Forest Edge of Fields. Canopy sparse narrow or open. Understory well developed. Includes fencelines.
  - D. Forest Edge of Creek Bank. Canopy sparse narrow or open. Understory well developed.
- Successional Field
  - Early - Herbacous plants dominant with little or no scrub/shrub layer.
  - Mid-Late - Scrub/shrub layer well represented; intermixed herb layer; some larger saplings present in islands or singular.
- Maintained Field
  - A. Dominant land use is as landscaped property, right-of-way, and/or mowed lawn.
  - B. Dominant land use is for agriculture/silviculture/hay; no grazing.
  - C. Dominant land use is for grazing by livestock or horses.
- 2006/2007 Fish Survey Location
- 2006/2007 Mollusk Survey Location
- 2006/2007 Benthic Macroinvertebrate Survey Location
- 2006/2007 Wildlife[2] and Vegetation Survey Transect
- 2006/2007 Small Mammal and Soil Macroinvertebrate Survey Location
- Choccolocco Creek
- OU-4 100-Year Floodplain

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

Solutia

Figure
4-29b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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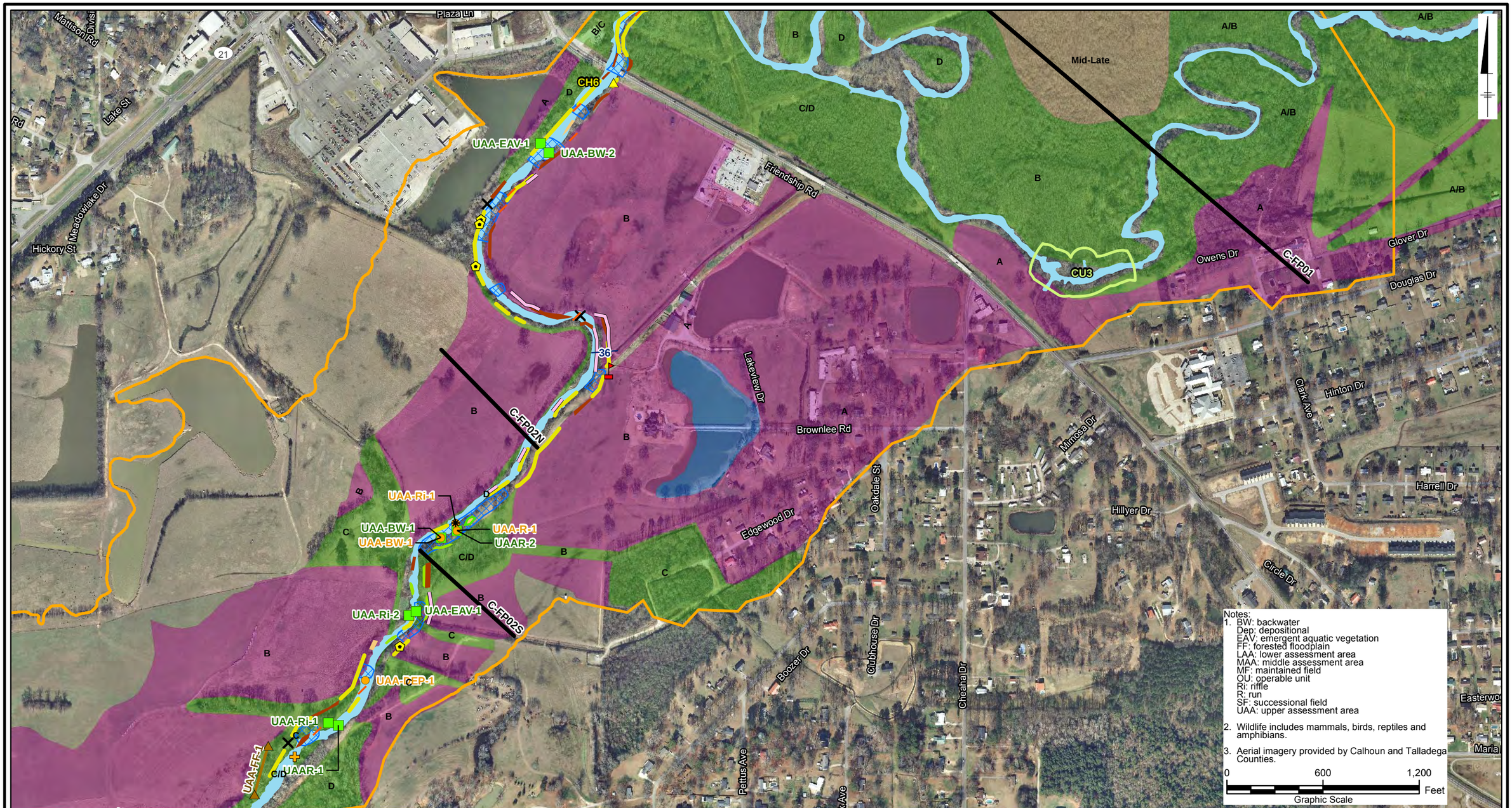

Legend

- Approximate Bayne Study Habitat Assessment Area
- Approximate 1999 Habitat Assessment Area
- 2001/2002 Floodplain Transect
- Bank Erosion
- Open Area
- Human Use Area
- Riprap
- Deadfall
- Tributary Confluence
- Snag
- Boulder
- Deposition - Bank Area
- Emergent Aquatic Vegetation
- Deposition - Island
- Riffle

2001/2002 Habitat Survey

- Open Water
- Wetland
- Forested Floodplain
  - A. Inner Forest. Canopy dense, continuous, and closed. Understory and/or herbaceous sparse or absent.
  - B. Inner Forest. Canopy sparse, narrow, or open. Understory and/or herbaceous layer common; sometimes dense.
  - C. Forest Edge of Fields. Canopy sparse narrow or open. Understory well developed. Includes fencelines.
  - D. Forest Edge of Creek Bank. Canopy sparse narrow or open. Understory well developed.
- Successional Field
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  - Mid-Late - Scrub/shrub layer well represented; intermixed herb layer; some larger saplings present in islands or singular.
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  - A. Dominant land use is as landscaped property, right-of-way, and/or mowed lawn.
  - B. Dominant land use is for agriculture/silviculture/hay; no grazing.
  - C. Dominant land use is for grazing by livestock or horses.
- 2006/2007 Fish Survey Location
- 2006/2007 Mollusk Survey Location
- 2006/2007 Benthic Macroinvertebrate Survey Location
- 2006/2007 Wildlife[2] and Vegetation Survey Transect
- 2006/2007 Small Mammal and Soil Macroinvertebrate Survey Location
- Choccolocco Creek
- OU-4 100-Year Floodplain

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

Solutia

Figure
4-29c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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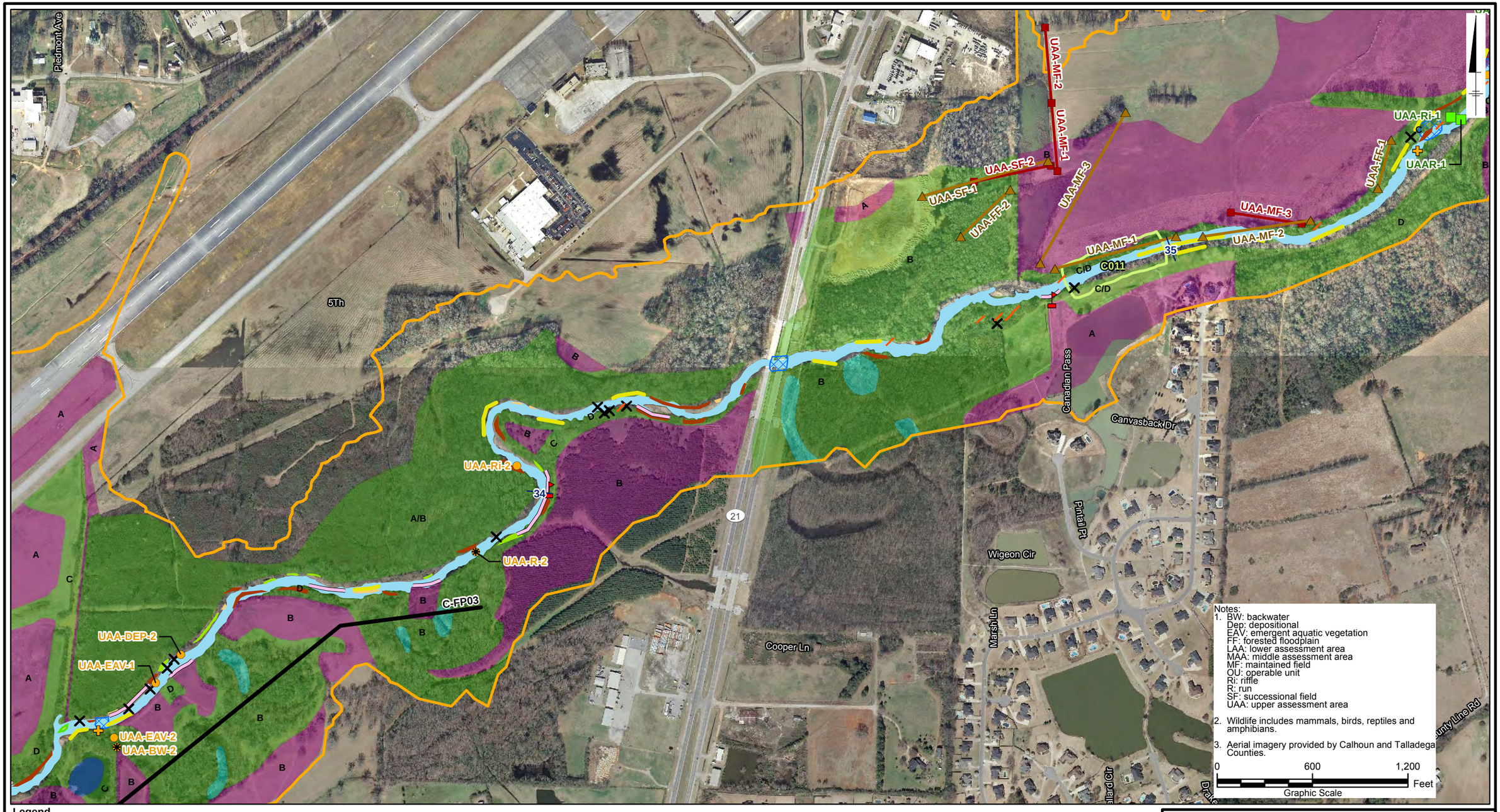

Notes:
1. BW: backwater
   Dep: depositional
   EAV: emergent aquatic vegetation
   FF: forested floodplain
   LAA: lower assessment area
   MAA: middle assessment area
   MF: maintained field
   OU: operable unit
   RI: riffle
   R: run
   SF: successional field
   UAA: upper assessment area
2. Wildlife includes mammals, birds, reptiles and amphibians.
3. Aerial imagery provided by Calhoun and Talladega Counties.

0 600 1,200 Feet
Graphic Scale

Legend

- Approximate Bayne Study Habitat Assessment Area
- Approximate 1999 Habitat Assessment Area
- 2001/2002 Floodplain Transect
- Bank Erosion
- Open Area
- Human Use Area
- Riprap
- Deadfall
- Tributary Confluence
- Snag
- Boulder
- Deposition - Bank Area
- Emergent Aquatic Vegetation
- Deposition - Island
- Riffle

2001/2002 Habitat Survey

- Open Water
- Wetland

Forested Floodplain

- A. Inner Forest. Canopy dense, continuous, and closed. Understory and/or herbaceous sparse or absent.
- B. Inner Forest. Canopy sparse, narrow, or open. Understory and/or herbaceous layer common; sometimes dense.
- C. Forest Edge of Fields. Canopy sparse narrow or open. Understory well developed. Includes fencelines.
- D. Forest Edge of Creek Bank. Canopy sparse narrow or open. Understory well developed.

- Successional Field
  - Early - Herbacous plants dominant with little or no scrub/shrub layer.
  - Mid-Late - Scrub/shrub layer well represented; intermixed herb layer; some larger saplings present in islands or singular.
- Maintained Field
  - A. Dominant land use is as landscaped property, right-of-way, and/or mowed lawn.
  - B. Dominant land use is for agriculture/silviculture/hay; no grazing.
  - C. Dominant land use is for grazing by livestock or horses.

- 2006/2007 Fish Survey Location
- 2006/2007 Mollusk Survey Location
- 2006/2007 Benthic Macroinvertebrate Survey Location
- 2006/2007 Wildlife[2] and Vegetation Survey Transect
- 2006/2007 Small Mammal and Soil Macroinvertebrate Survey Location
- Choccolocco Creek
- OU-4 100-Year Floodplain

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

Solutia

Figure
4-29d

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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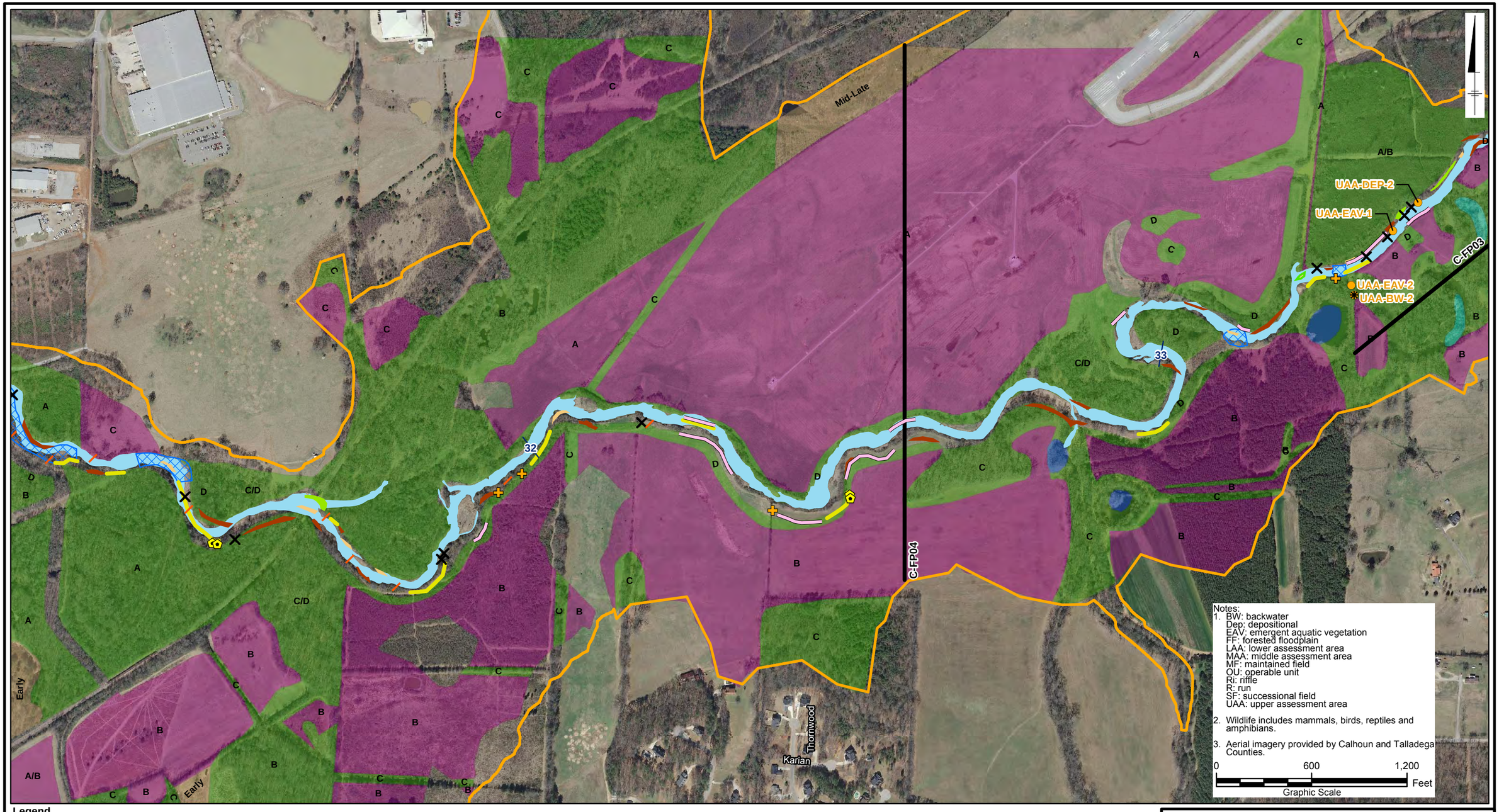

Legend

- Approximate Bayne Study Habitat Assessment Area
- Approximate 1999 Habitat Assessment Area
- 2001/2002 Floodplain Transect
- Bank Erosion
- Open Area
- Human Use Area
- Riprap
- Deadfall
- Tributary Confluence
- Snag
- Boulder
- Deposition - Bank Area
- Emergent Aquatic Vegetation
- Deposition - Island
- Riffle

2001/2002 Habitat Survey

- Open Water
- Wetland

Forested Floodplain

A. Inner Forest. Canopy dense, continuous, and closed. Understory and/or herbaceous sparse or absent.

B. Inner Forest. Canopy sparse, narrow, or open. Understory and/or herbaceous layer common; sometimes dense.

C. Forest Edge of Fields. Canopy sparse narrow or open. Understory well developed. Includes fencelines.

D. Forest Edge of Creek Bank. Canopy sparse narrow or open. Understory well developed.

- Successional Field
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- Choccolocco Creek
- OU-4 100-Year Floodplain

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

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Figure
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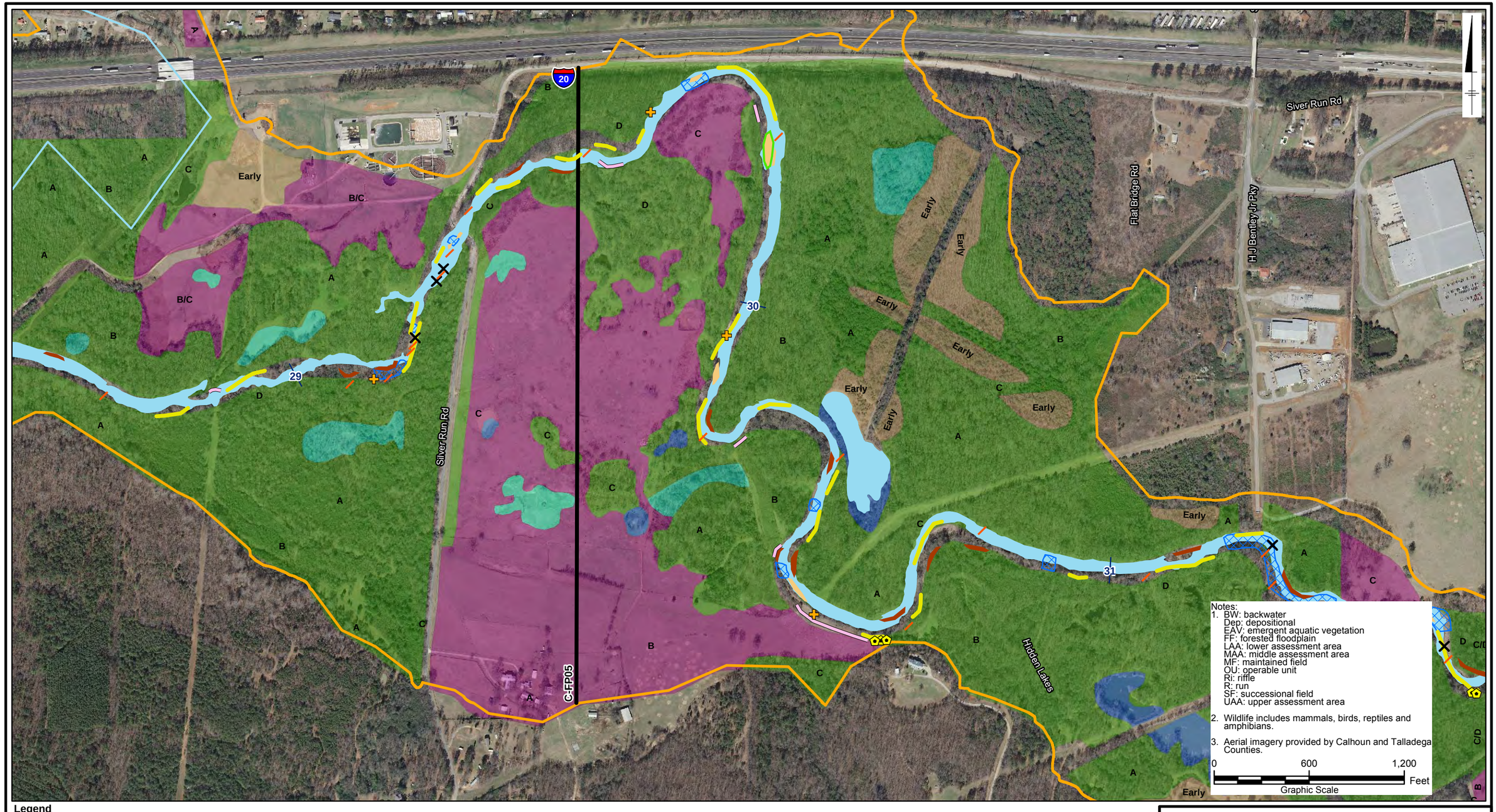

Legend

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- 2001/2002 Floodplain Transect
- Bank Erosion
- Open Area
- Human Use Area
- Riprap
- Deadfall
- Tributary Confluence
- Snag
- Boulder
- Deposition - Bank Area
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- Deposition - Island
- Riffle

2001/2002 Habitat Survey

- Open Water
- Wetland

Forested Floodplain

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Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

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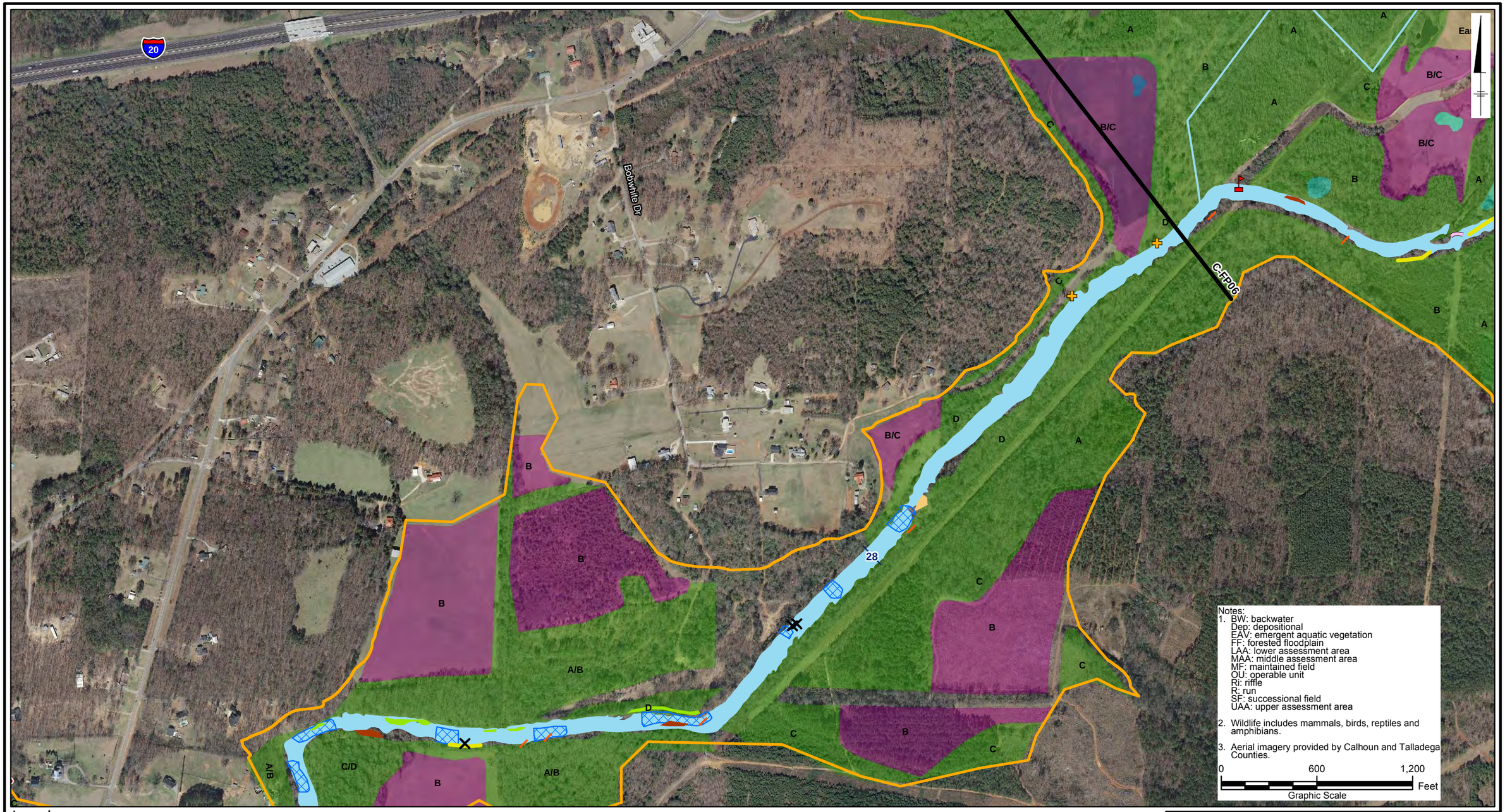

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Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

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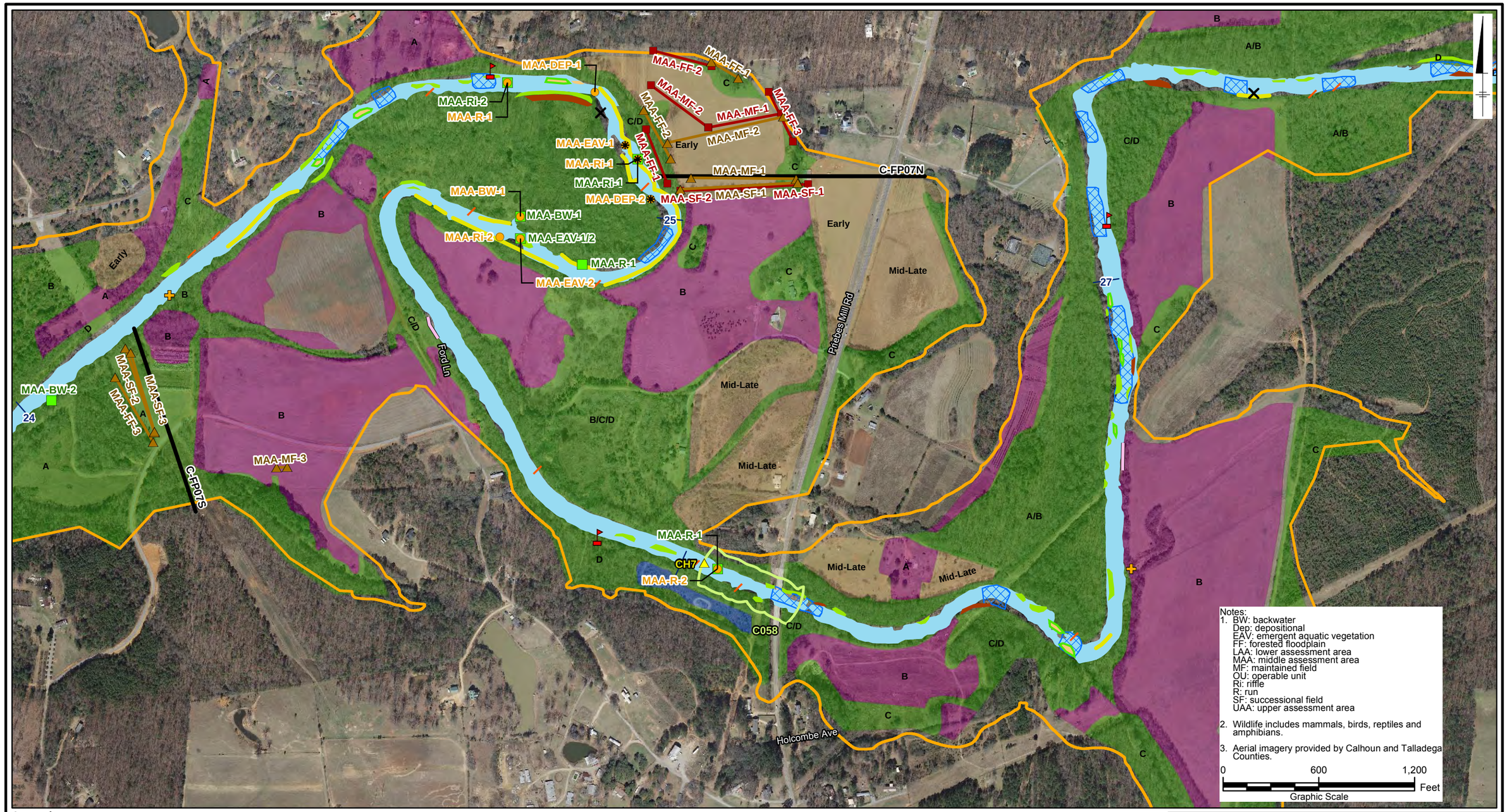

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Anniston PCB Site
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Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

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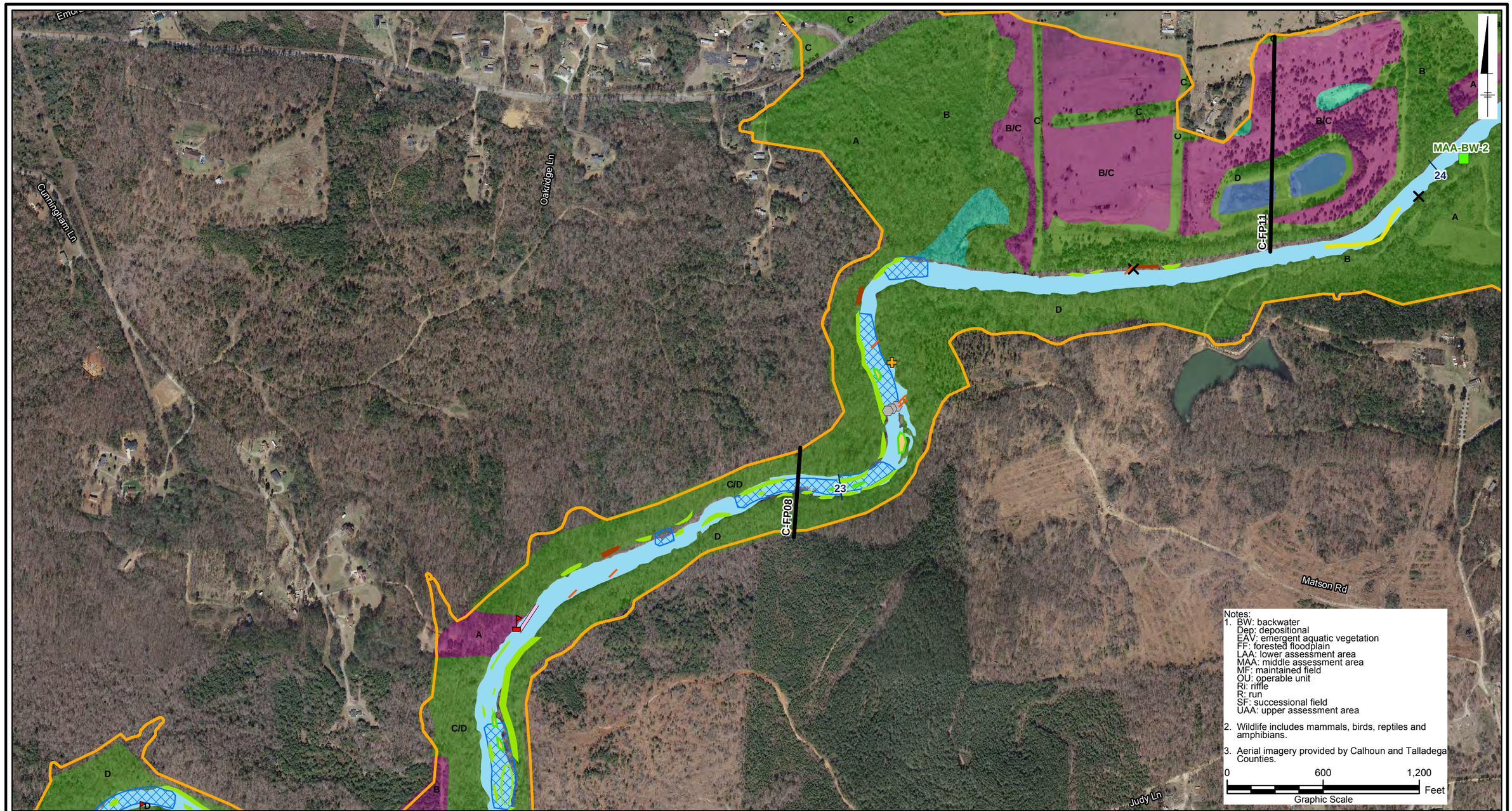

Notes:
1. BW: backwater
   Dep: depositional
   EAV: emergent aquatic vegetation
   FF: forested floodplain
   LAA: lower assessment area
   MAA: middle assessment area
   MF: maintained field
   OU: operable unit
   Ri: riffle
   R: run
   SF: successional field
   UAA: upper assessment area
2. Wildlife includes mammals, birds, reptiles and amphibians.
3. Aerial imagery provided by Calhoun and Talladega Counties.

0 600 1,200 Feet
Graphic Scale

Legend

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Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

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Figure
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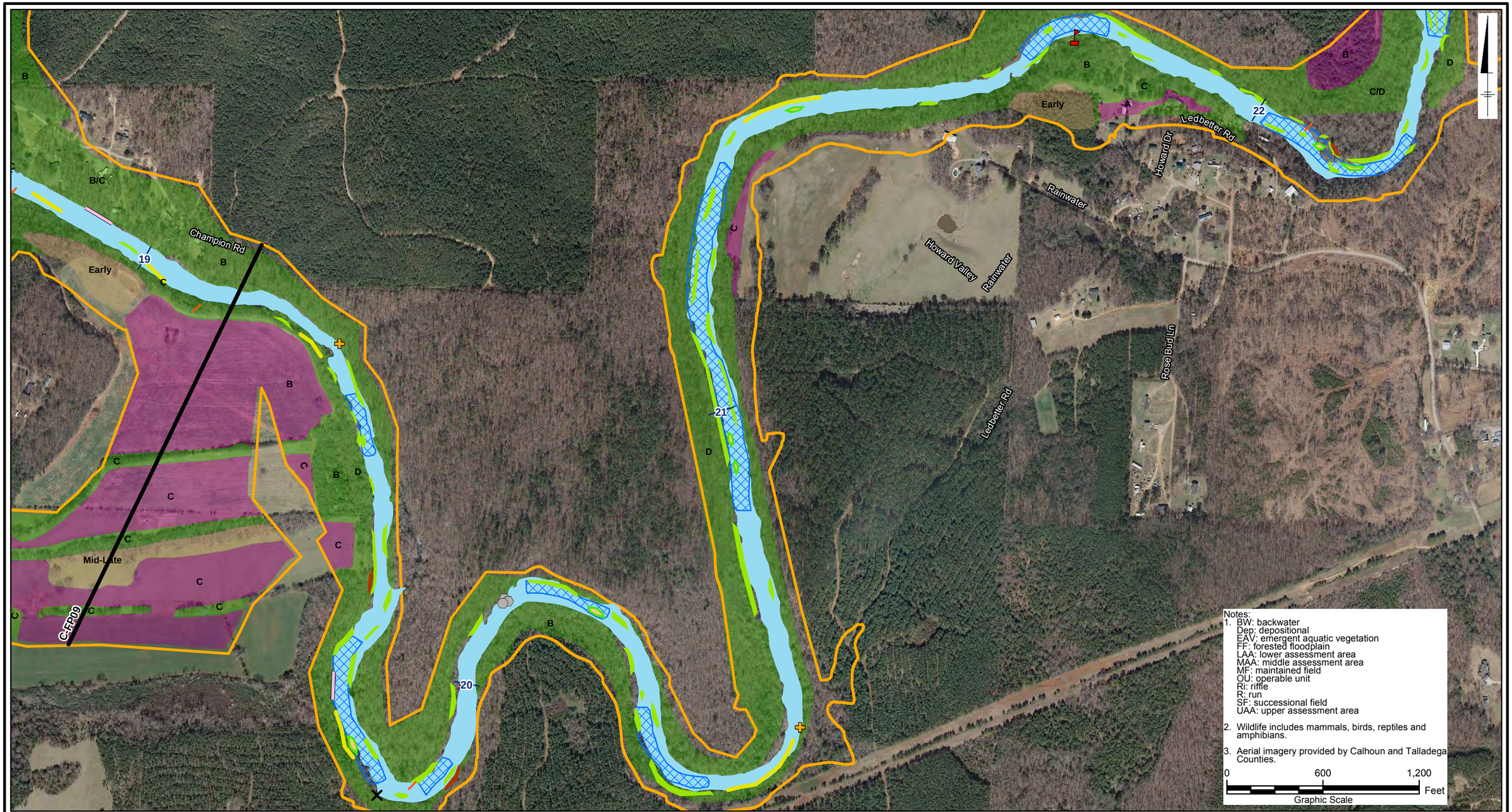

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Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

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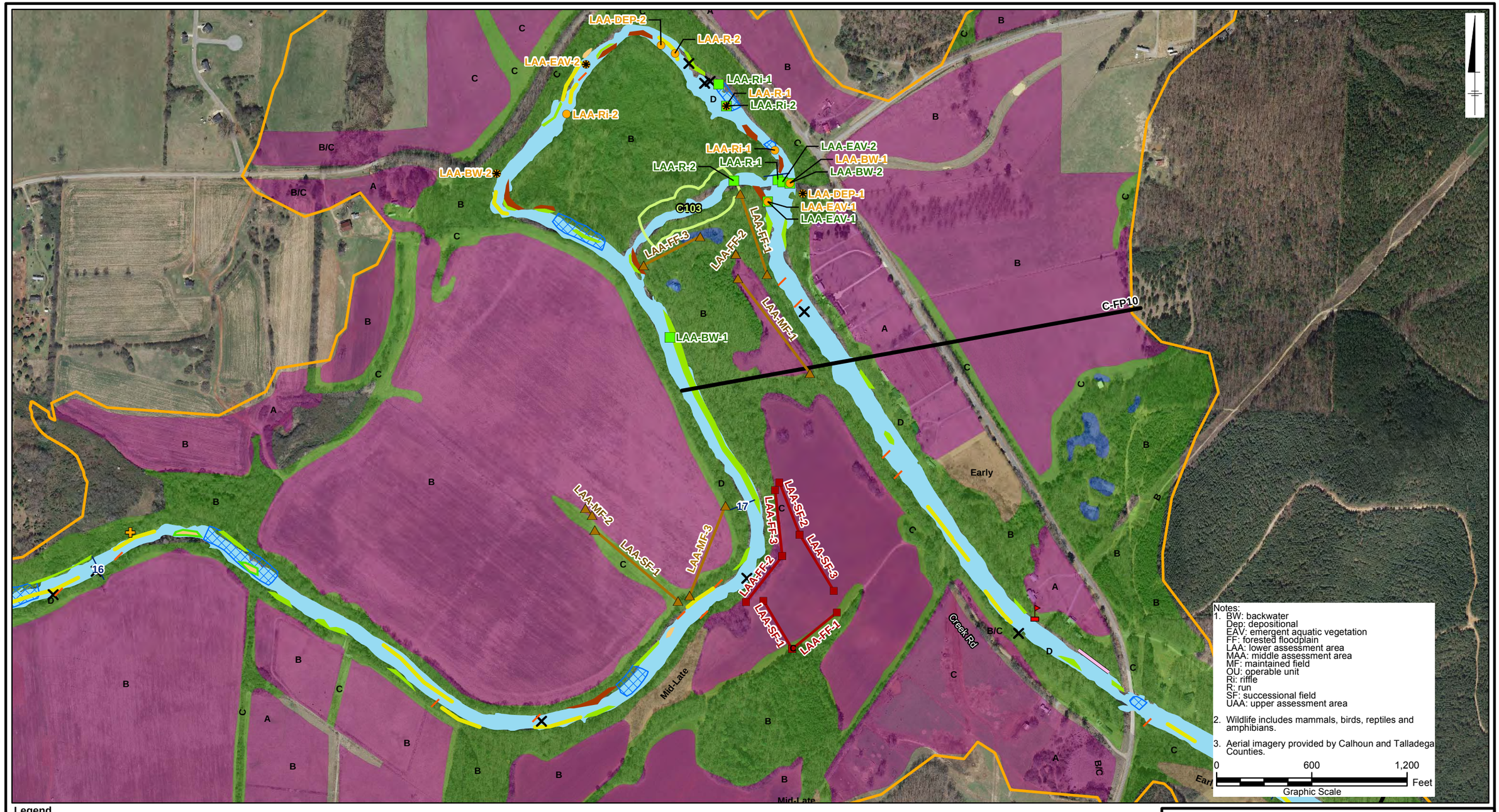

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Feasibility Study Report for OU-4

OU-4 Floodplain and Riparian Habitat

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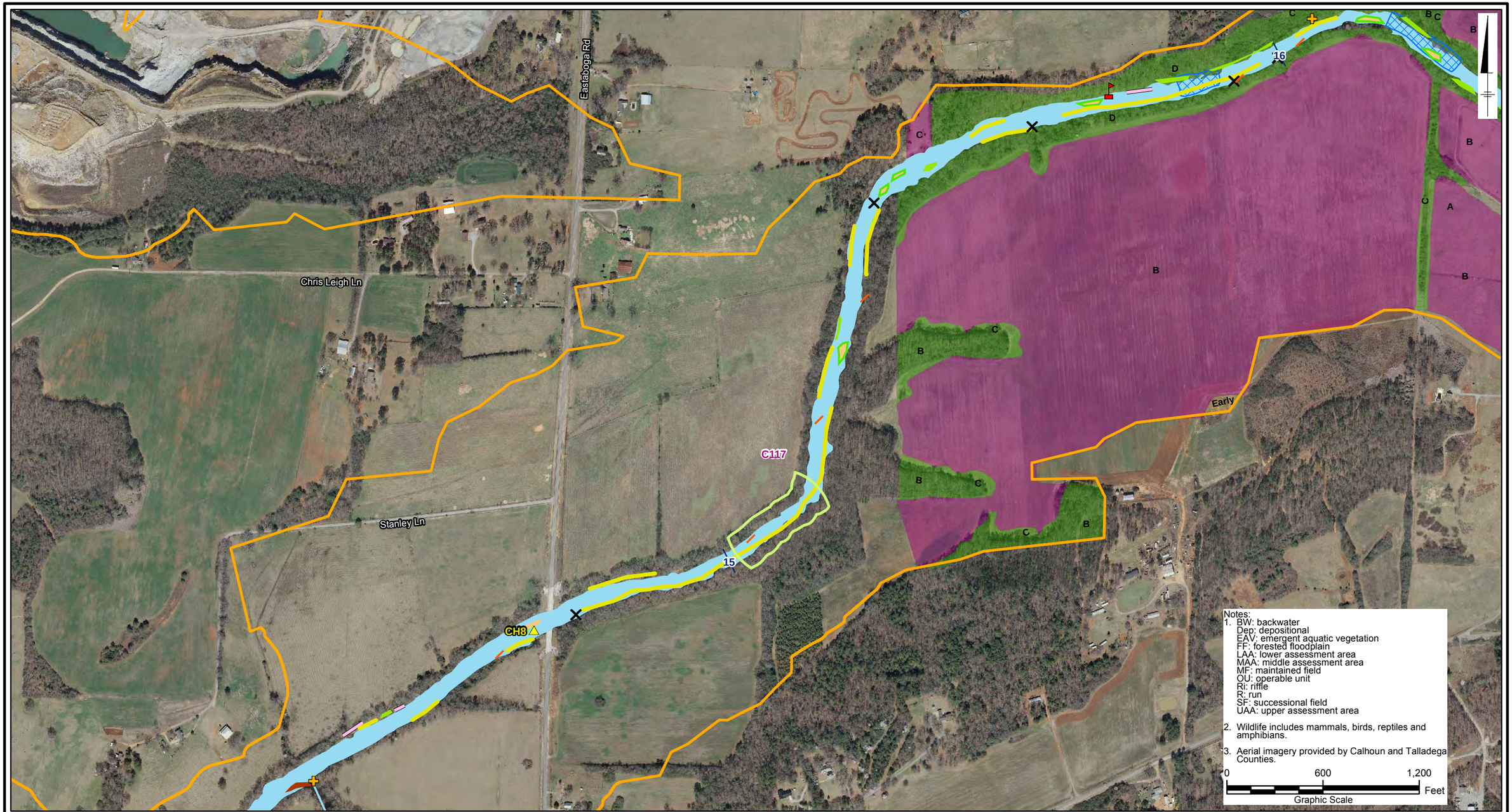

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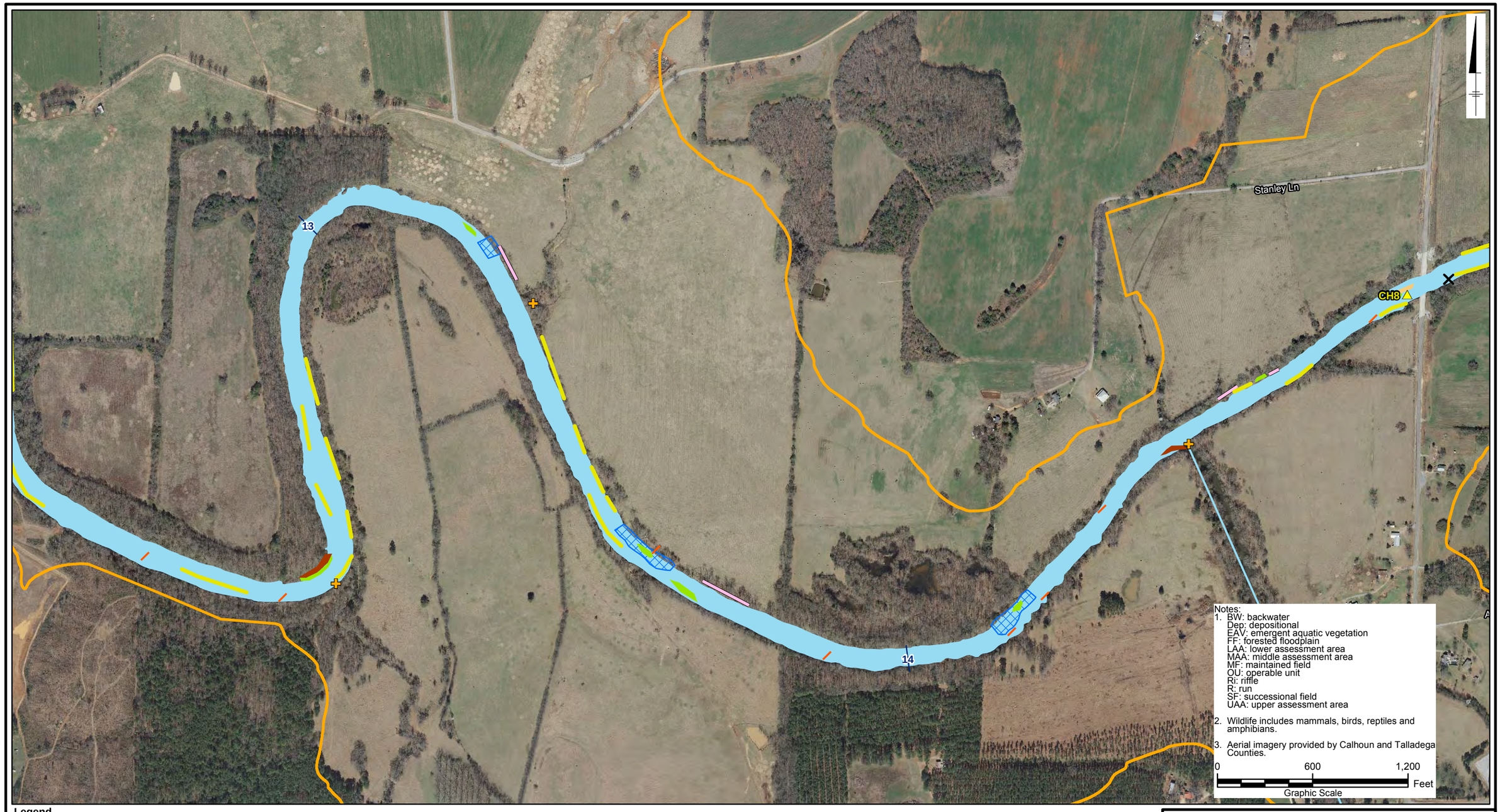

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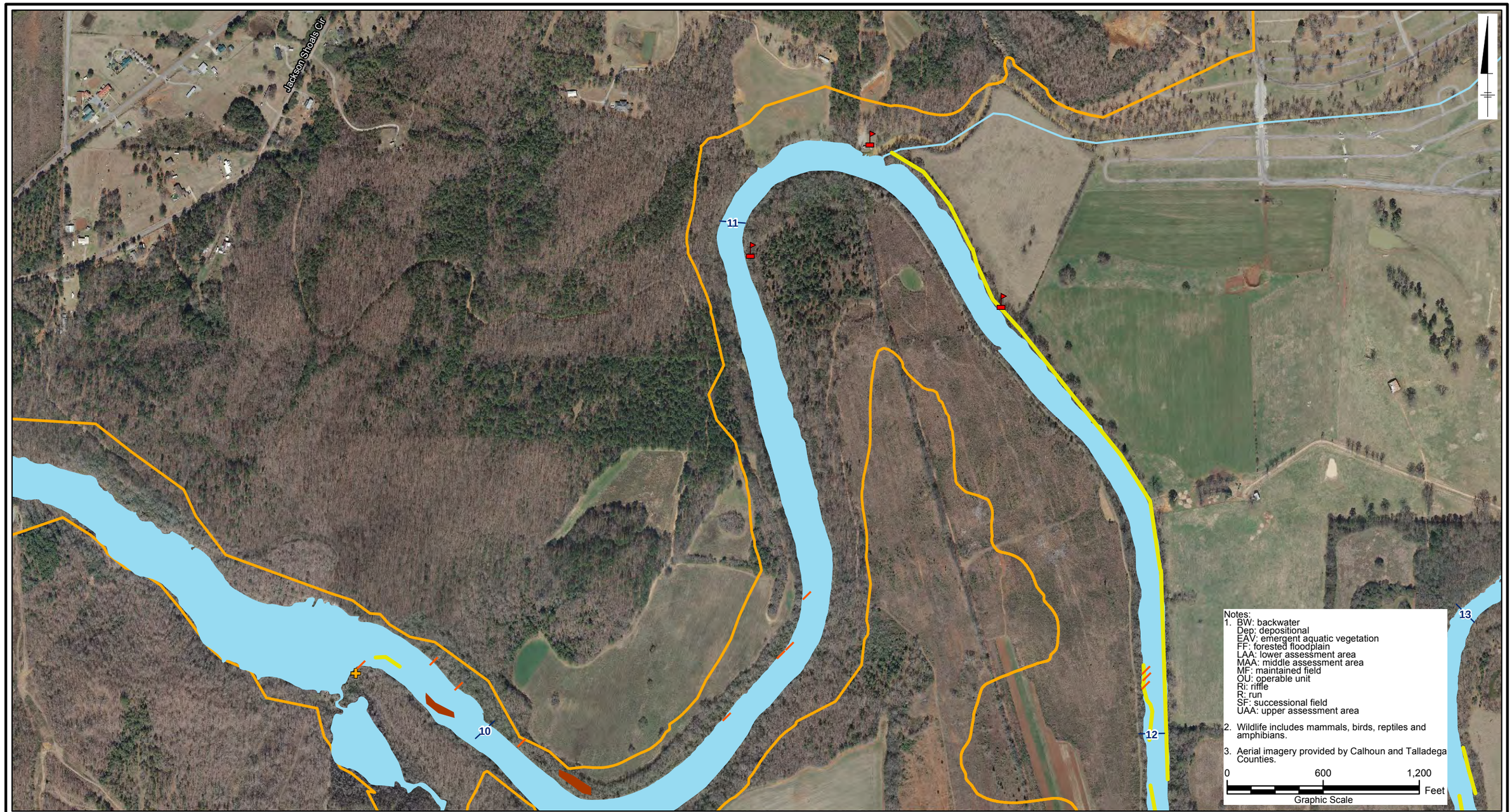

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Feasibility Study Report for OU-4

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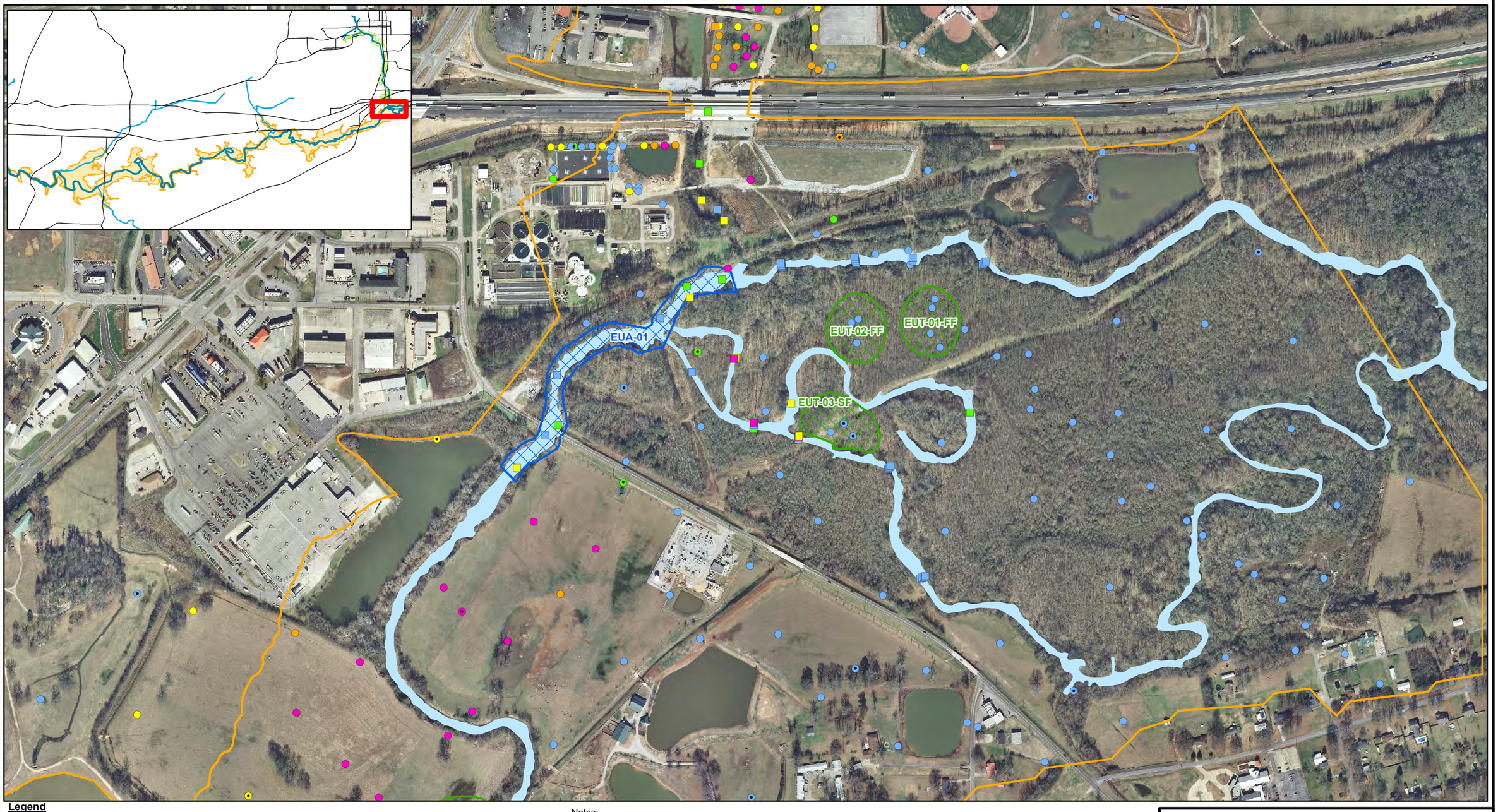

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Samples Analyzed for Constituents Other than PCBs
- Creek
- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
4. Aerial imagery provided by Calhoun and Talladega Counties.

Acronyms:
BSA: biological sampling area
FF: forested floodplain
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SF: successional field

0 500 1,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Biological Sample Areas and Locations
Upper Assessment Area
EUA-01, EUT-01, EUT-02, and EUT-03

Solutia

Figure
4-30a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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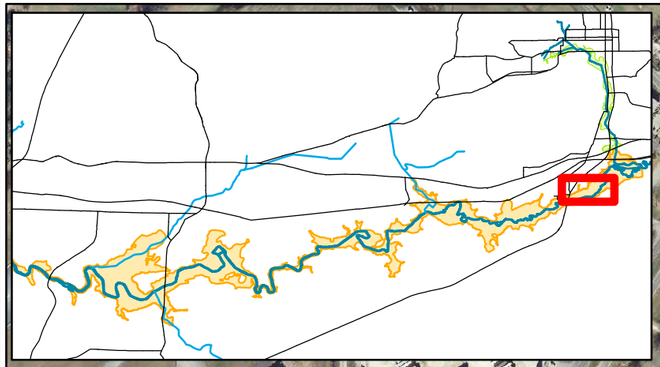

EUT-04-MF

EUT-05-MF

EUT-07-SF

EUT-06-MF

EUA-02

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Samples Analyzed for Constituents Other than PCBs
- Creek
- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
4. Aerial imagery provided by Calhoun and Talladega Counties.

Acronyms:
BSA: biological sampling area
MF: maintained field
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SF: successional field

0 500 1,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Biological Sample Areas and Locations
Upper Assessment Area
EUA-02, EUT-04, EUT-05, EUT-06, and EUT-07

Solutia

Figure
4-30b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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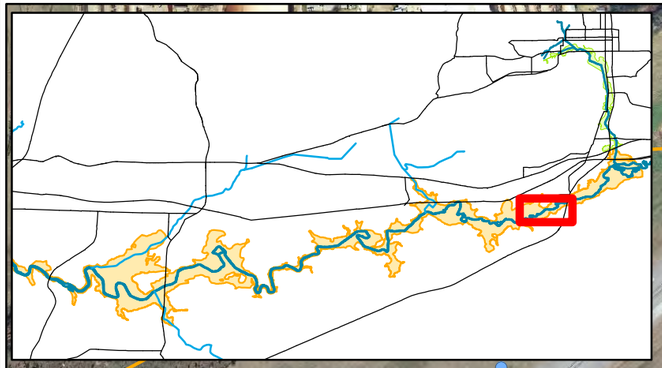

EUT-08-SF

EUT-09-FF

EUA-03

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Samples Analyzed for Constituents Other than PCBs
- Creek
- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
4. Aerial imagery provided by Calhoun and Talladega Counties.

Acronyms:
BSA: biological sampling area
FF: forested floodplain
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SF: successional field

0 500 1,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Biological Sample Areas and Locations
Upper Assessment Area
EUA-03, EUT-08, and EUT-09

Solutia

Figure
4-30c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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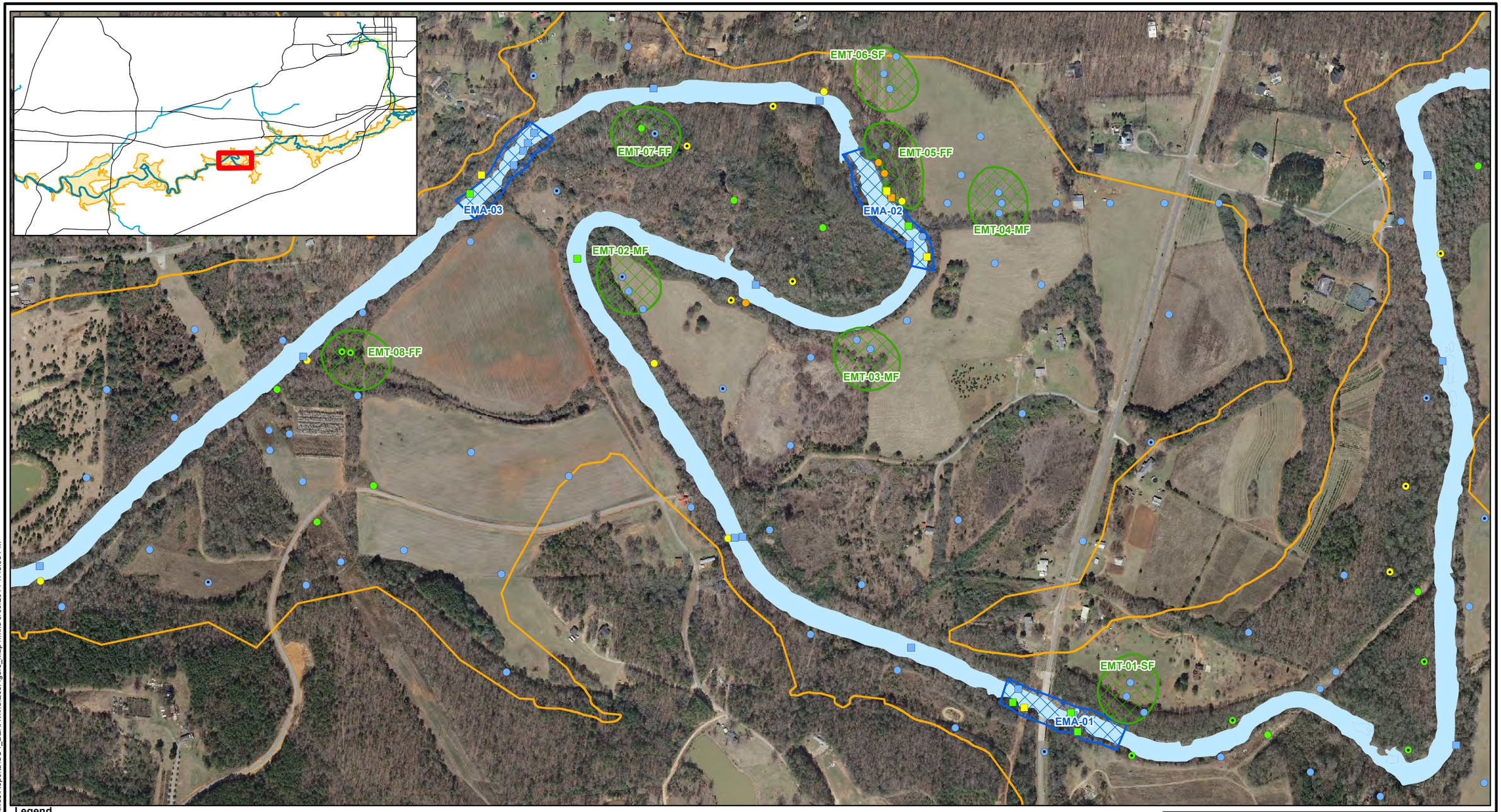

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Samples Analyzed for Constituents Other than PCBs
- Creek
- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
4. Aerial imagery provided by Calhoun and Talladega Counties.

Acronyms:
BSA: biological sampling area
FF: forested floodplain
MF: maintained field
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SF: successional field

0 500 1,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Biological Sample Areas and Locations
Middle Assessment Area
EMA-01, EMA-02, EMA-03, EMT-01, EMT-02, EMT-03, EMT-04, EMT-05, EMT-06, EMT-07, and EMT-08

Solutia

Figure
4-30d

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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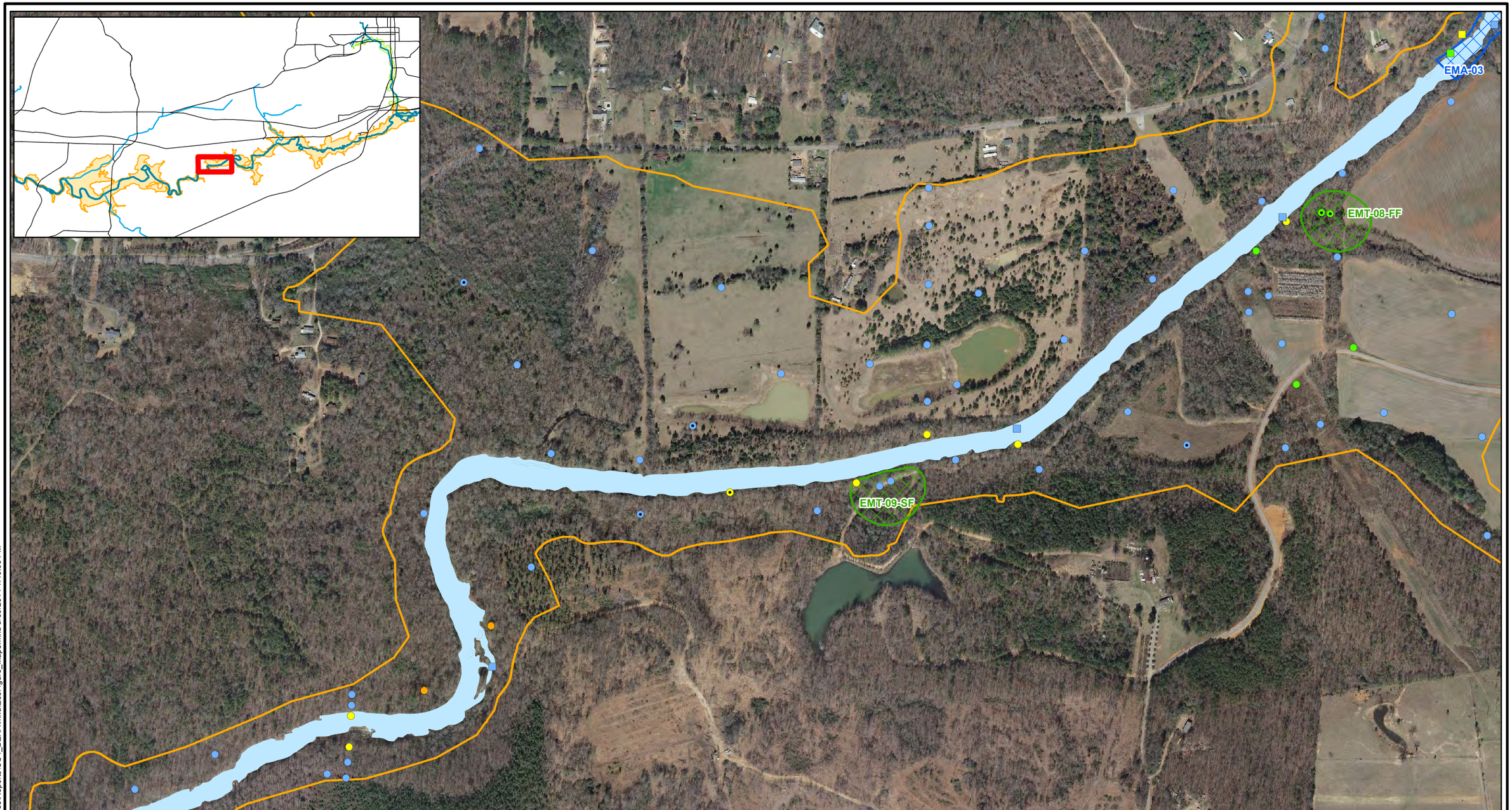

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Samples Analyzed for Constituents Other than PCBs
- Creek
- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
4. Aerial imagery provided by Calhoun and Talladega Counties.

Acronyms:
BSA: biological sampling area
FF: forested floodplain
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SF: successional forest

0 500 1,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Biological Sample Areas and Locations
Middle Assessment Area
EMT-09, EMA-03, and EMT-08

Solutia

Figure
4-30e

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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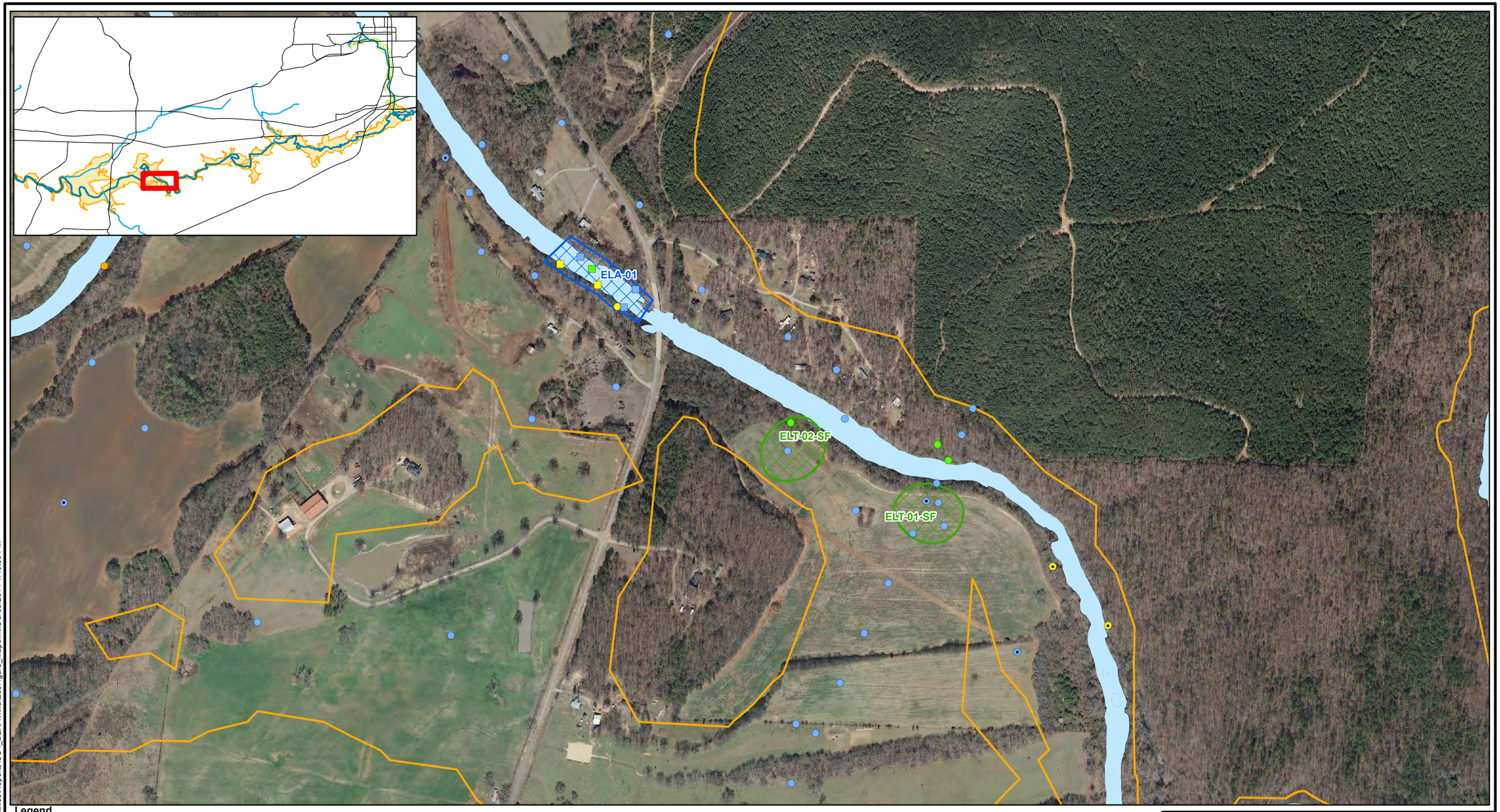

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Samples Analyzed for Constituents Other than PCBs
- Creek
- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
4. Aerial imagery provided by Calhoun and Talladega Counties.

Acronyms:
BSA: biological sampling area
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SF: successional field

0 500 1,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Biological Sample Areas and Locations
Lower Assessment Area
ELA-01, ELT-01, and ELT-02

Solutia

Figure
4-30f

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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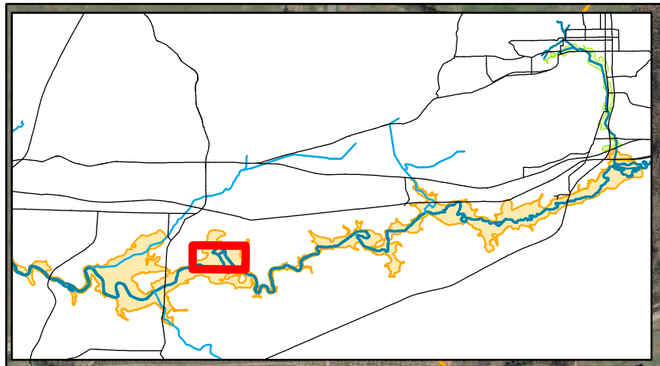

ELA-02
ELA-03
ELT-06-47
ELT-06-FF
ELT-05-FF
ELT-04-SF
C-FP10-S1
ELT-07-FF
ELT-03-MF
ELT-08-MF
ELT-08-33
ELT-09-MF

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Samples Analyzed for Constituents Other than PCBs
- Creek
- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
4. Aerial imagery provided by Calhoun and Talladega Counties.

Acronyms:
BSA: biological sampling area
FF: forested floodplain
MF: maintained field
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SF: successional field

0 500 1,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Biological Sample Areas and Locations
Lower Assessment Area
ELA-02, ELA-03, ELT-03, ELT-04, ELT-05, ELT-06, ELT-07, ELT-08, and ELT-09

Solutia

Figure
4-30g

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
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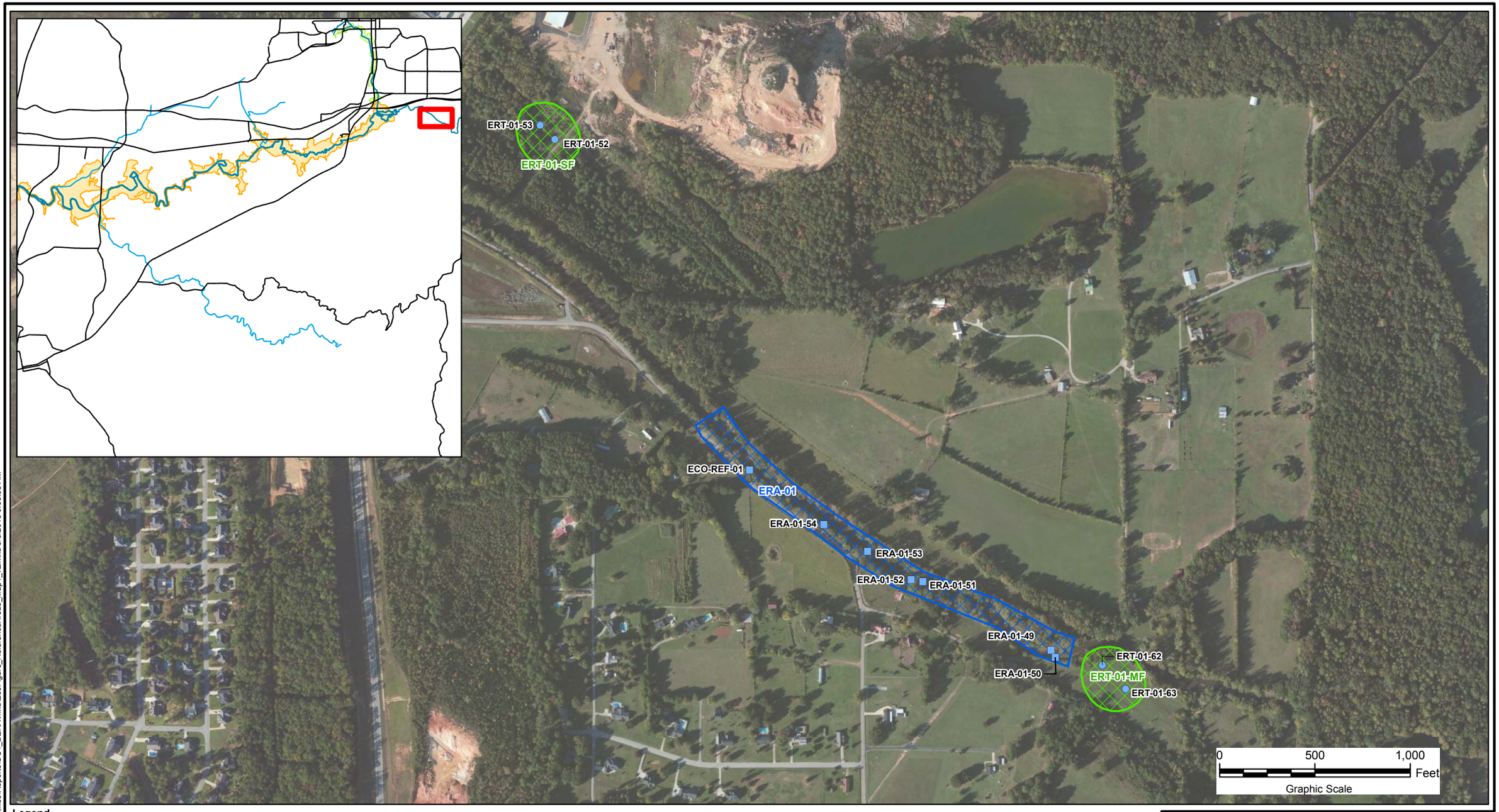

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
3. Imagery provided by NAIP imagery service licensed through ESRI product software.

Acronyms:
BSA: biological sampling area
in: inches
MF: maintained field
mg/kg: milligrams per kilogram
SF: successional field

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report or OU-4

Biological Sample Areas and Locations
Reference Area 1
ERA-01 and ERT-01

Solutia

Figure
4-30h

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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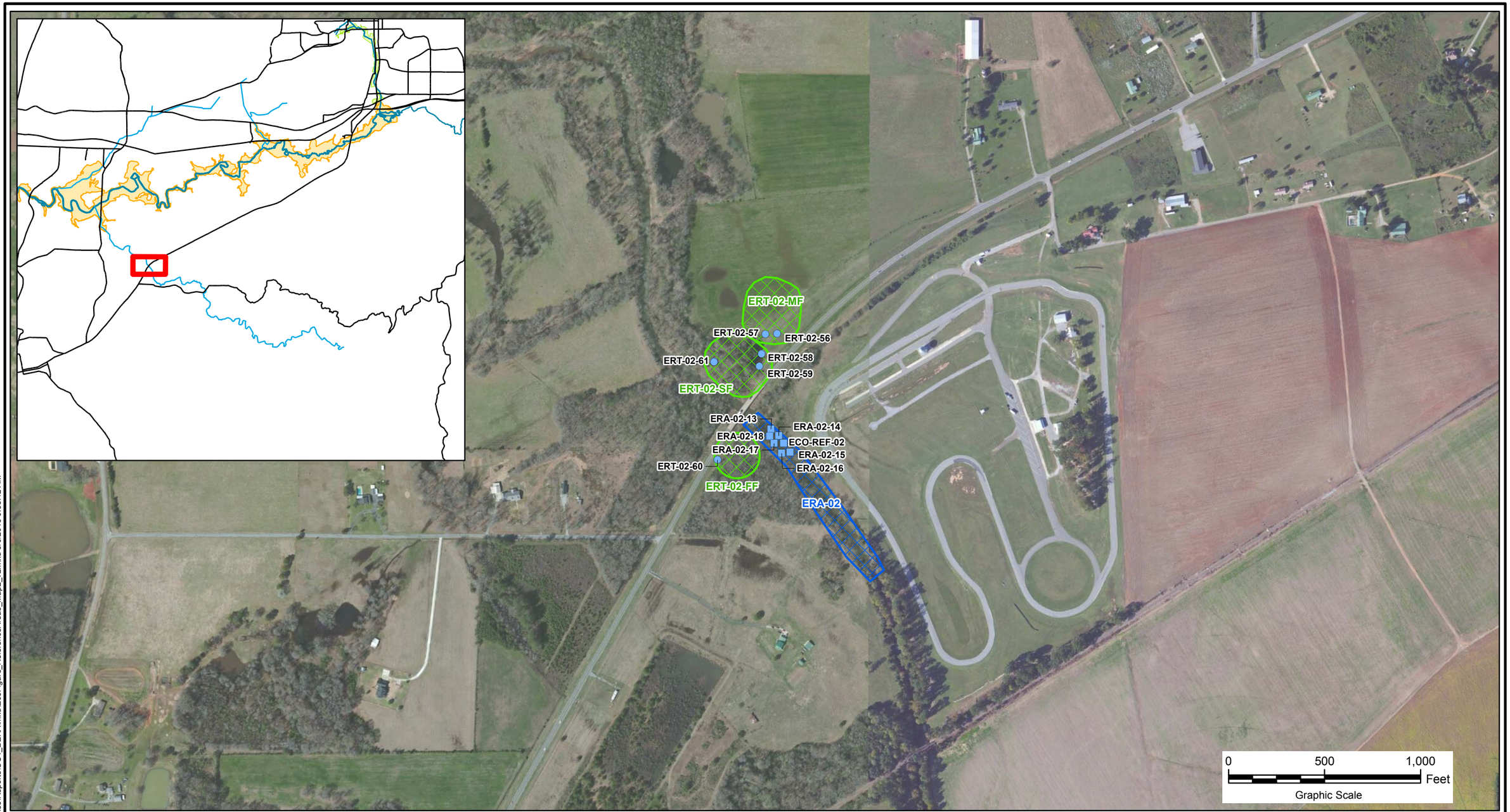

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.

3. Imagery provided by NAIP imagery service licensed through ESRI product software.

Acronyms:
BSA: biological sampling area
FF: forested floodplain
in: inches
MF: maintained field
mg/kg: milligrams per kilogram
OU: operable unit
SF: successional field

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Biological Sample Areas and Locations
Reference Area 2
ERA-02 and ERT-02

Solutia

Figure
4-30i

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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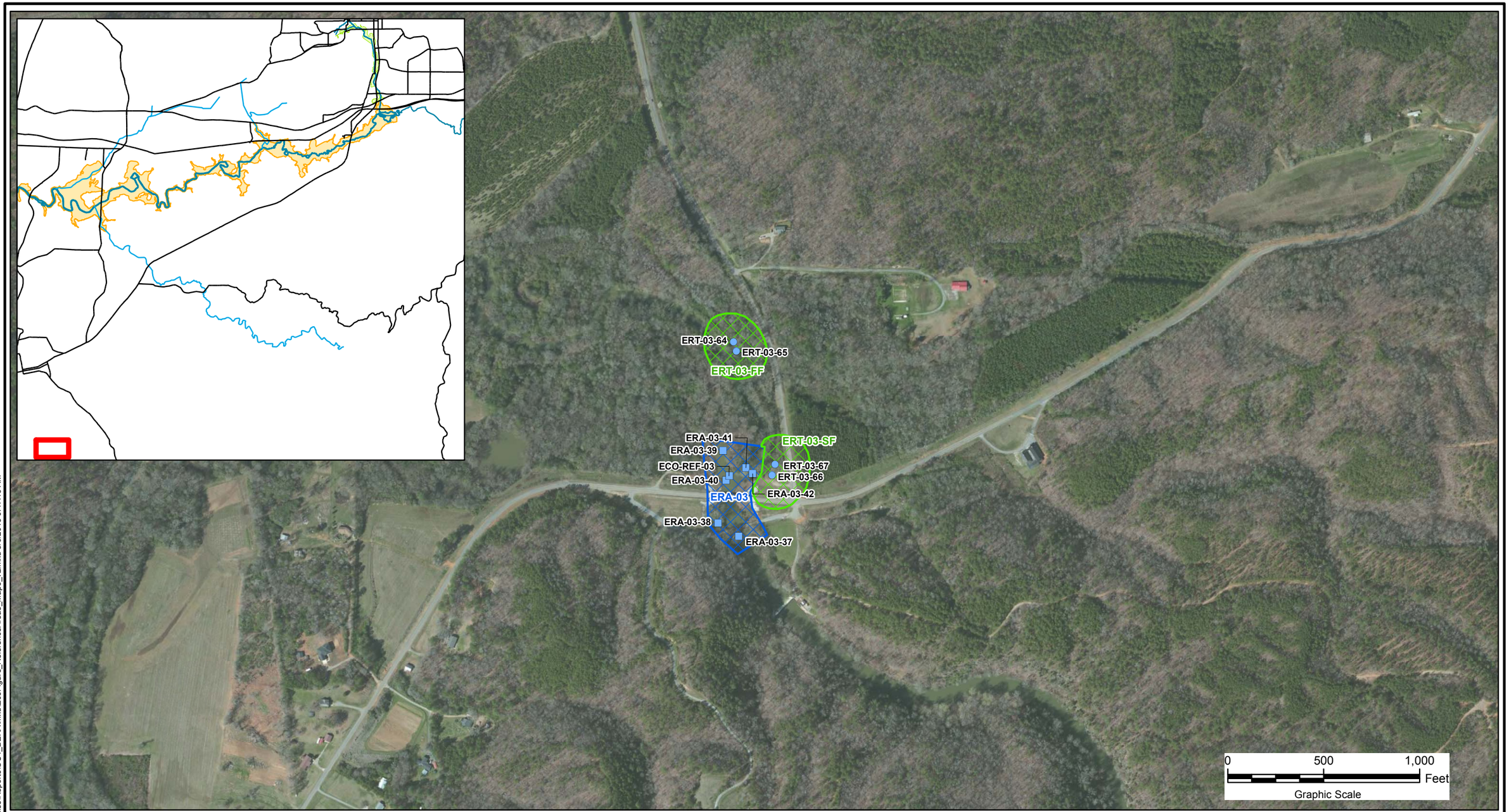

Legend

Surface[1] Sediment Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Surface[2] Soil Sample Location
PCB Result (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

- Approximate Area of Aquatic BSA - OU-4 Phase 2 Ecological Sampling[3]
- Approximate Area of Terrestrial BSA - OU-4 Phase 2 Ecological Sampling[3]

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Paired biota and soil or sediment data collected in the BSA areas.
3. Imagery provided by NAIP imagery service licensed through ESRI product software.

Acronyms:
BSA: biological sampling area
FF: forested floodplain
in: inches
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SF: successional field

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

**Biological Sample Areas and Locations
Reference Area 3
ERA-03 and ERT-03**

Solutia

**Figure
4-30j**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: kives
Anniston
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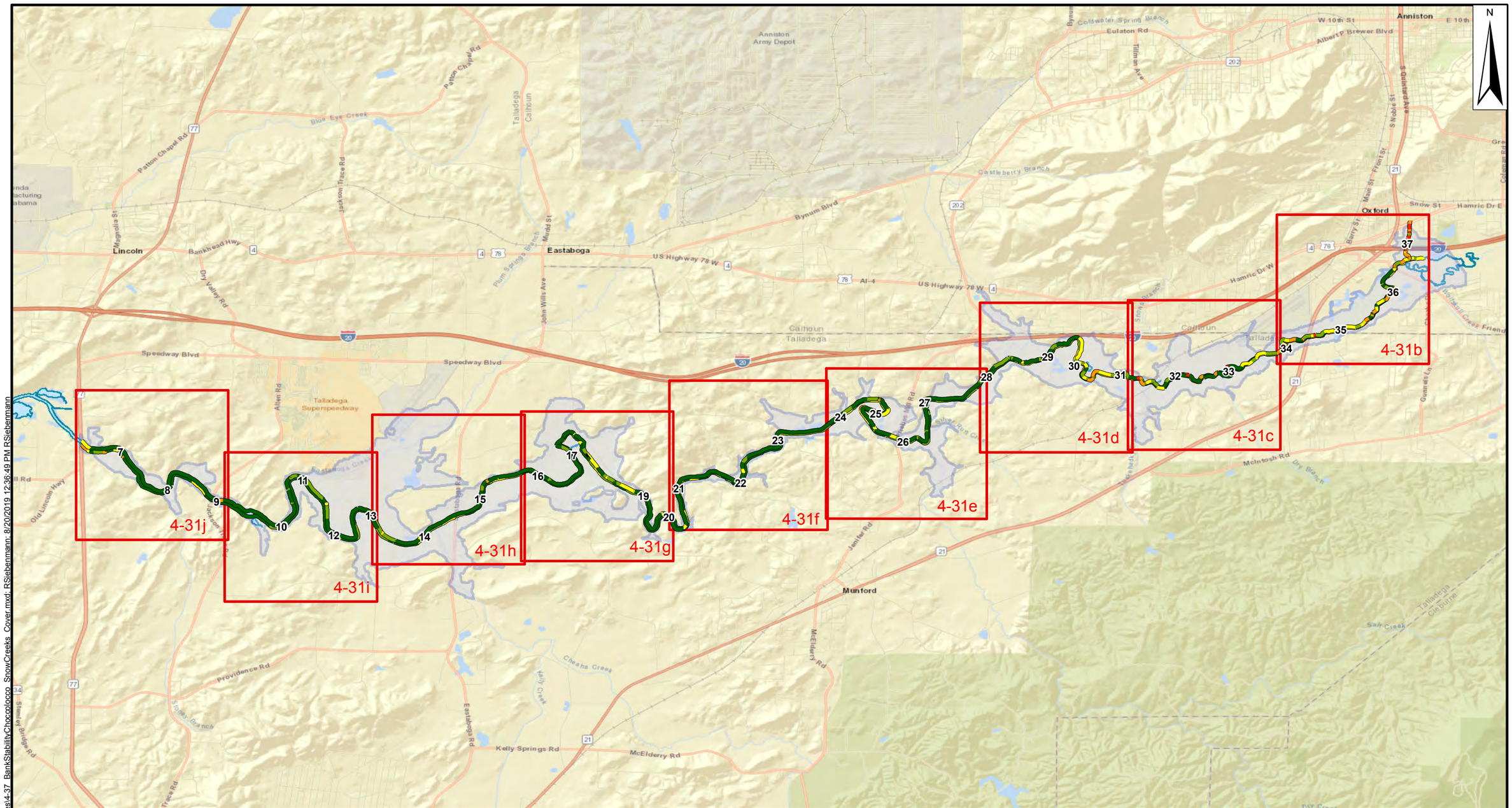

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Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 4,000 8,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community.

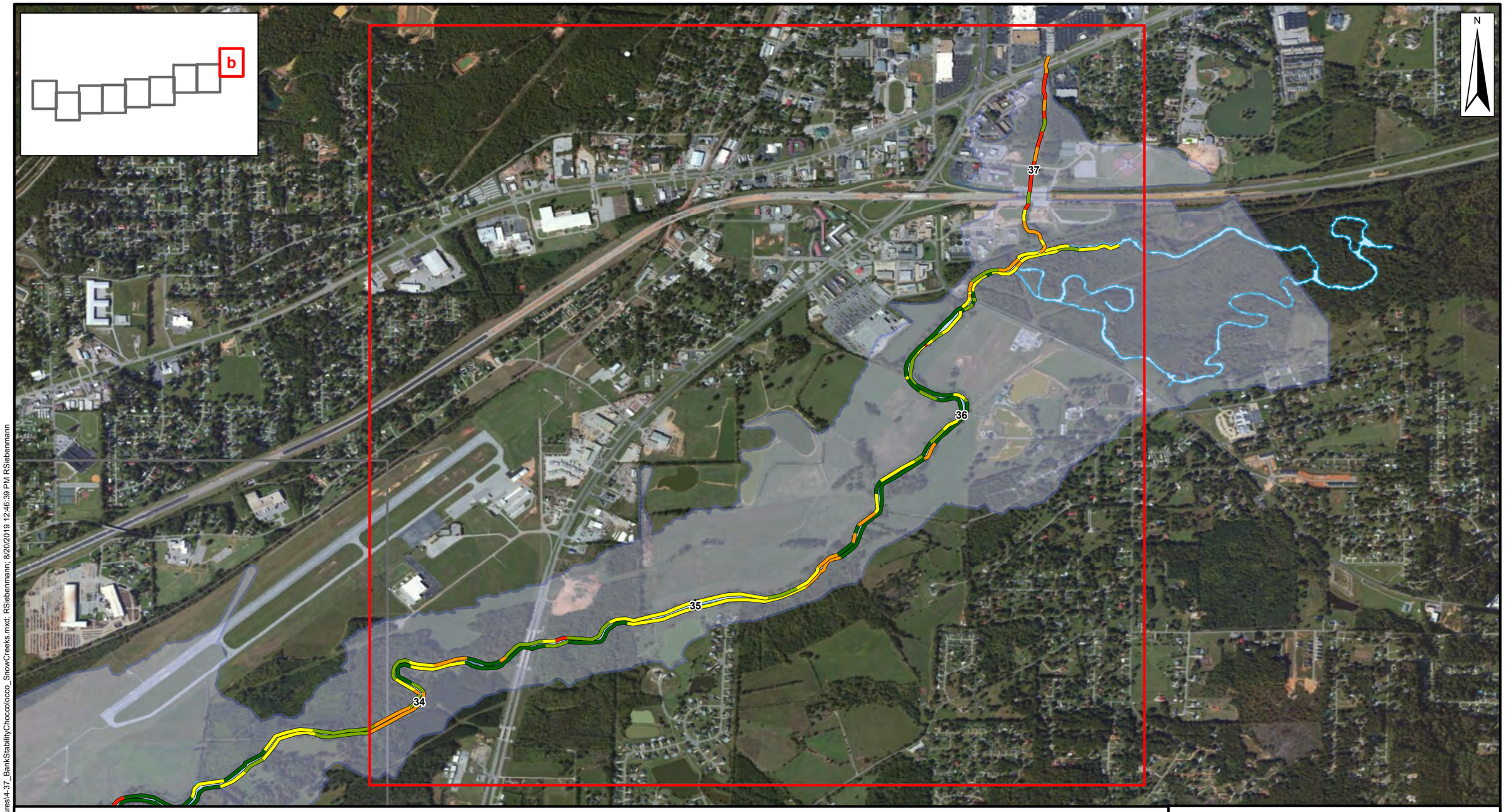
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31a



Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31b

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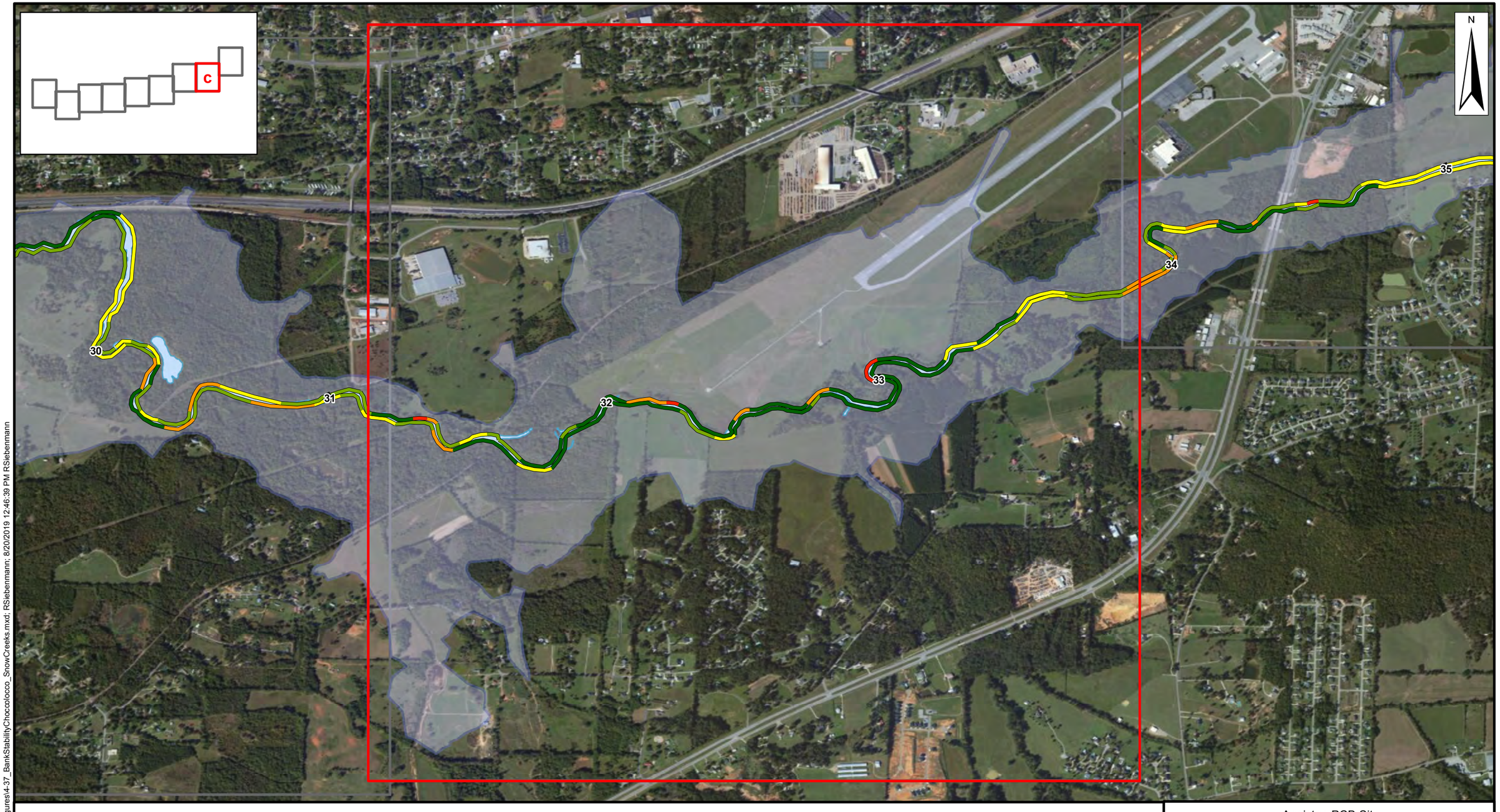


Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

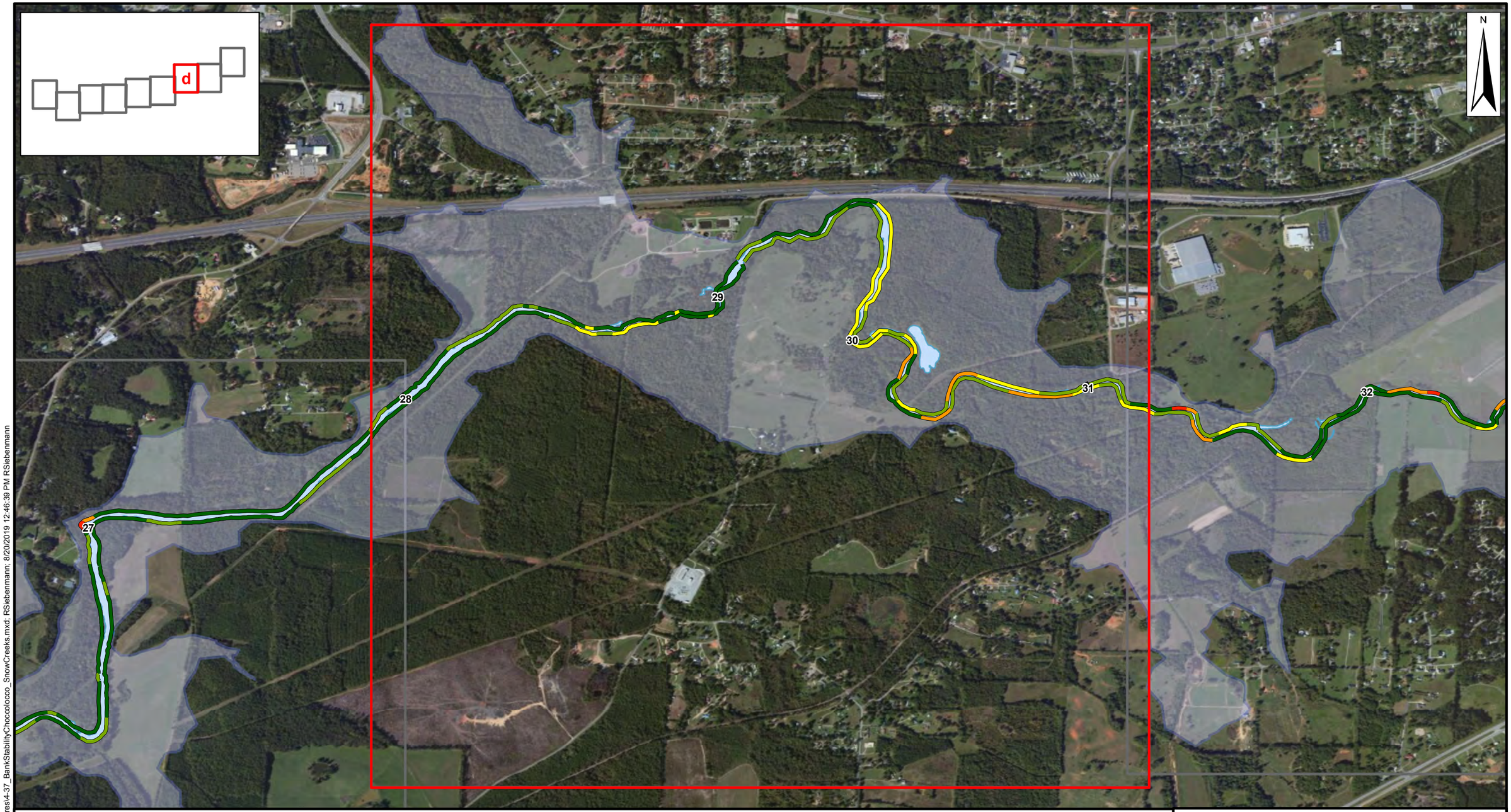
Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31c

\\aro-01fil\:\AtAnniston\GIS\MXD\OU4 RI Figures\4-37_BankStabilityChoccolocco_SnowCreeks.mxd; RSiebenmann; 8/20/2019 12:46:39 PM RSiebenmann



Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

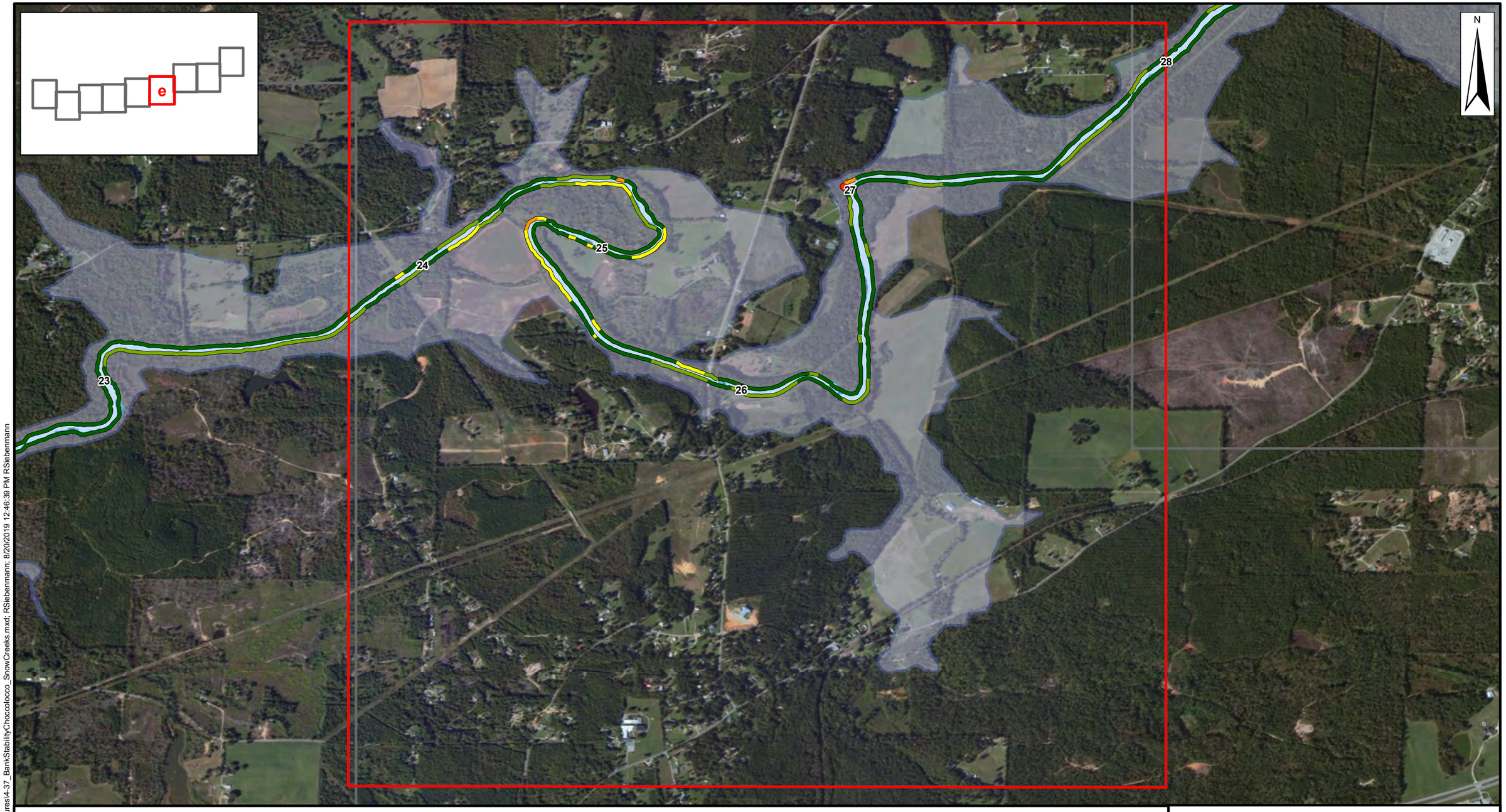
Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31d

\\aro-011N:\AtAnniston\GIS\MXD\OU4 RI Figures\4-37_BankStabilityChoccolocco_SnowCreeks.mxd; RSiebenmann; 8/20/2019 12:46:39 PM RSiebenmann



Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

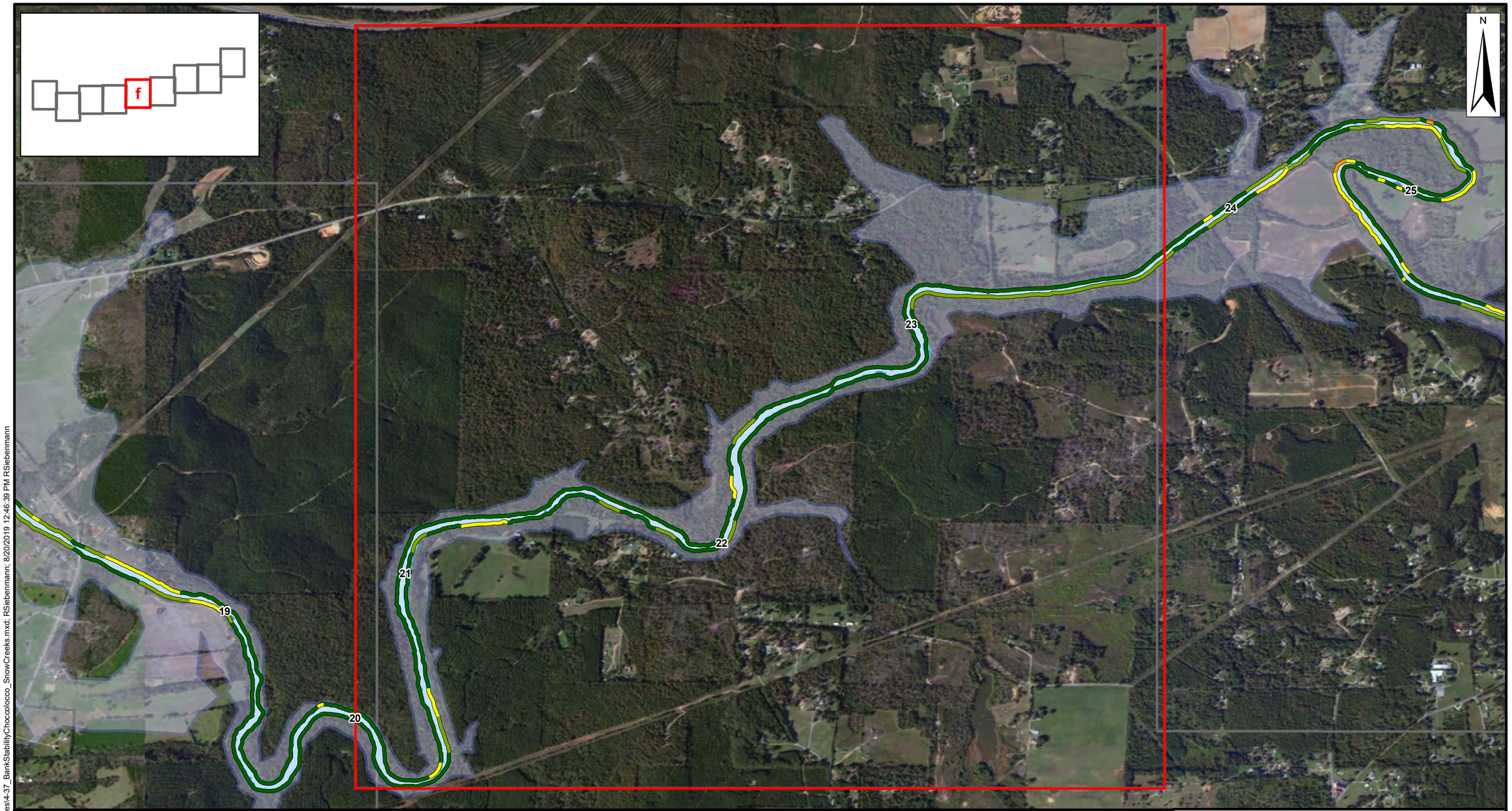
Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31e

\\aro-01\N:\AAnniston\GIS\MXD\OU4 RI Figures\4-37_BankStabilityChoccolocco_SnowCreeks.mxd; RSiebenmann; 8/20/2019 12:46:39 PM RSiebenmann



Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31f

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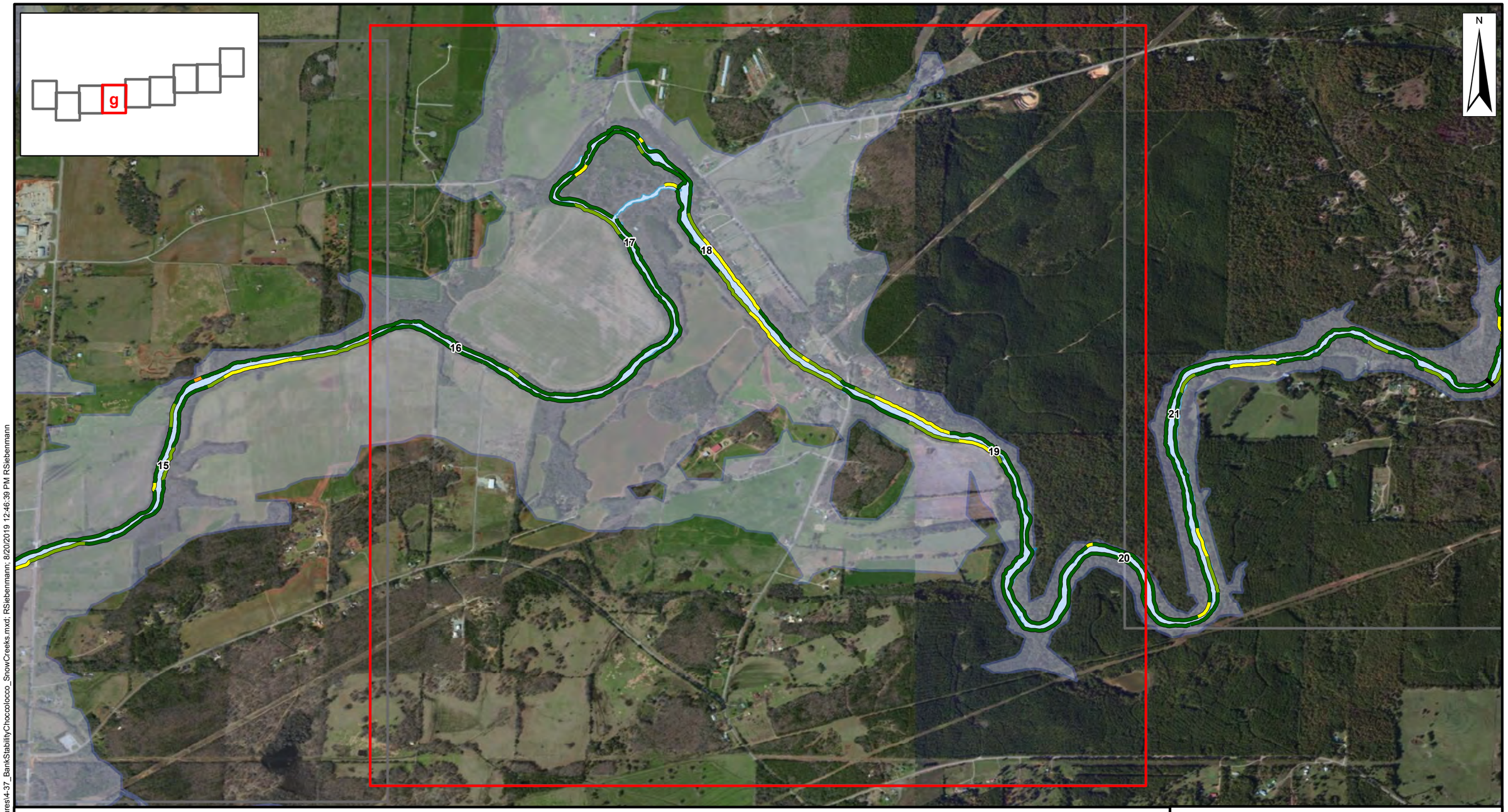


Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

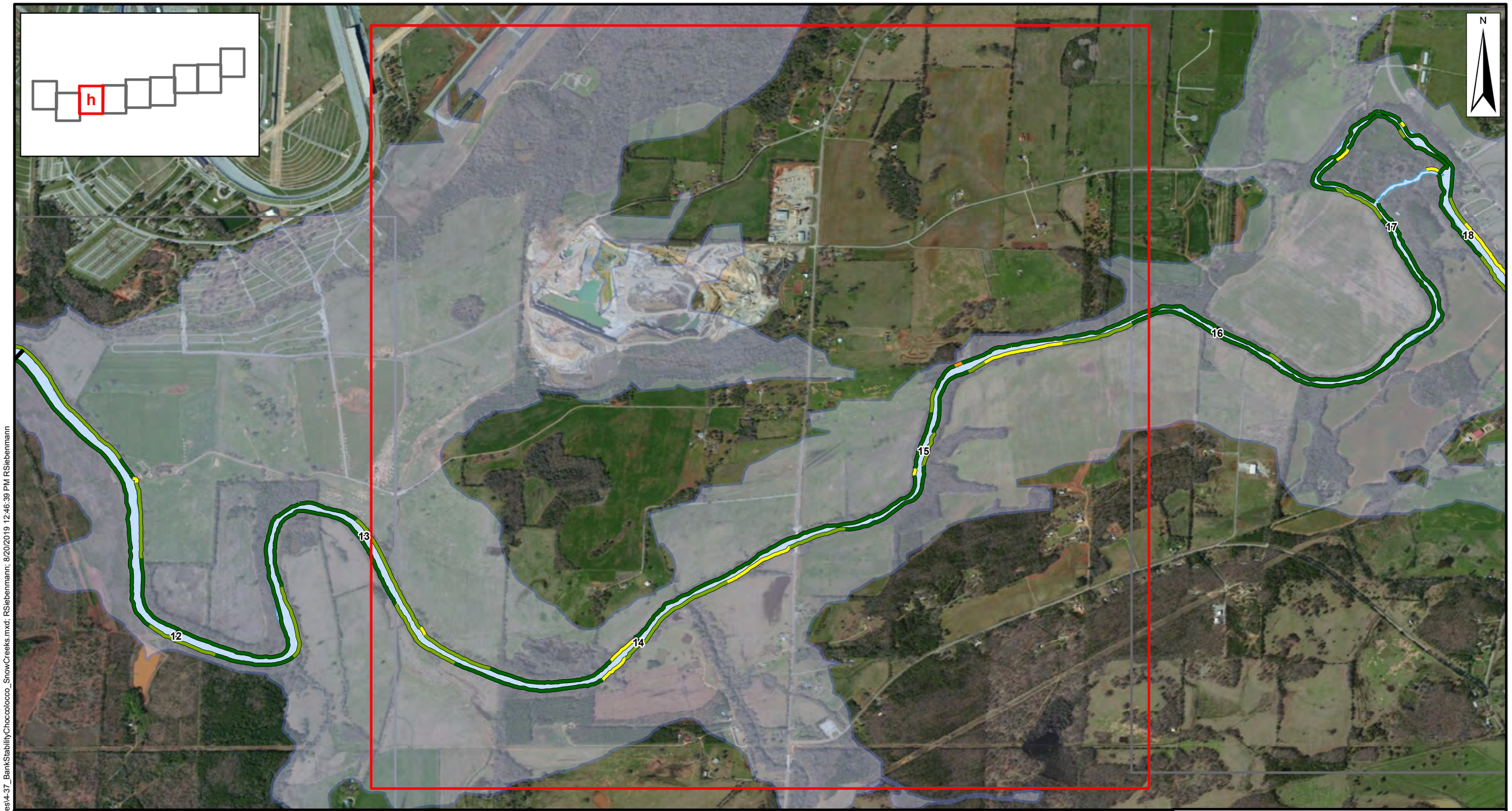
Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31g

\\aro-01fs\AA\Anniston\GIS\MXD\OU4 RI Figures\4-37_BankStabilityChoccolocco_SnowCreeks.mxd; RSiebenmann; 8/20/2019 12:46:39 PM RSiebenmann



Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31h

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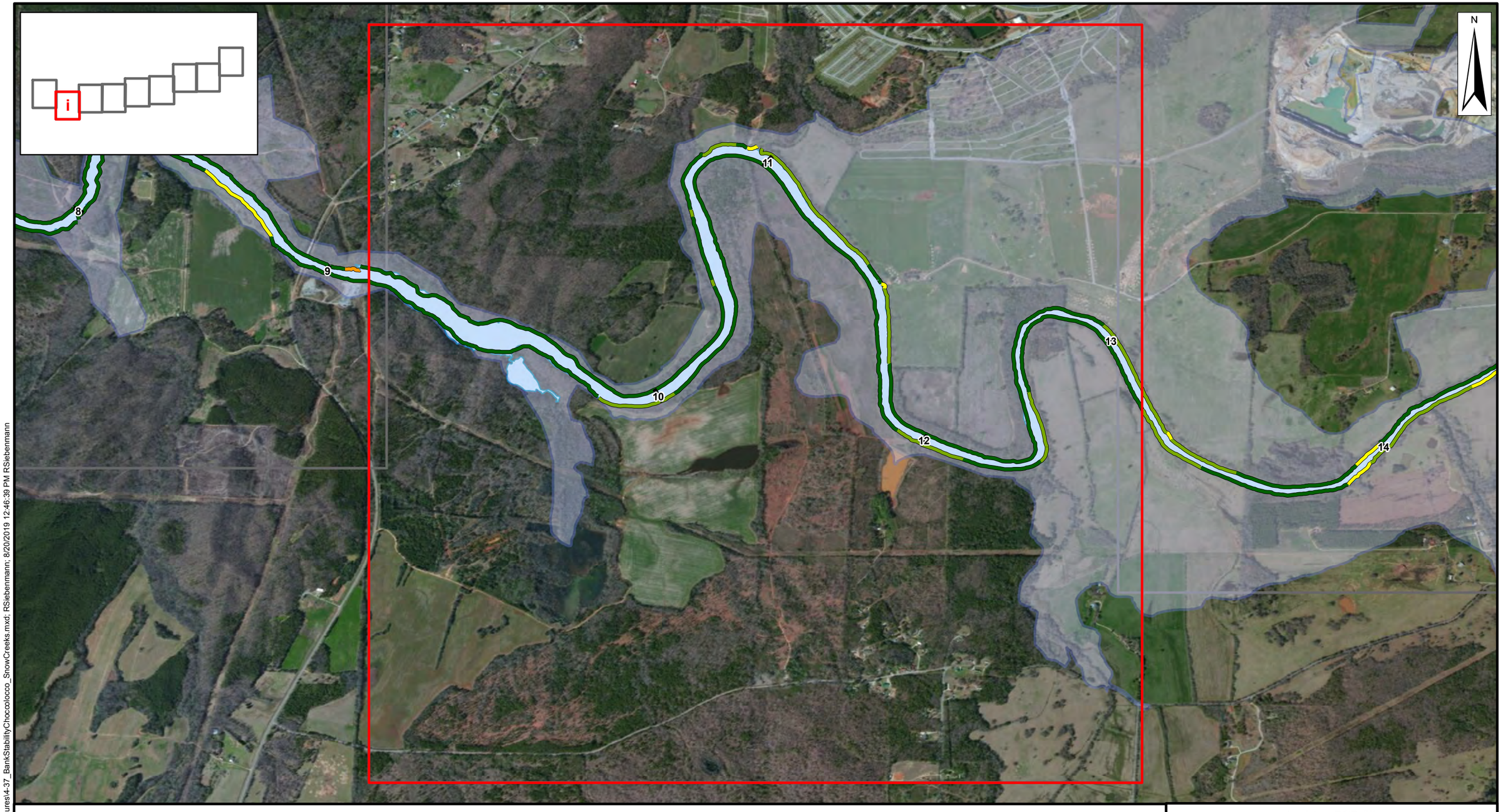


Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

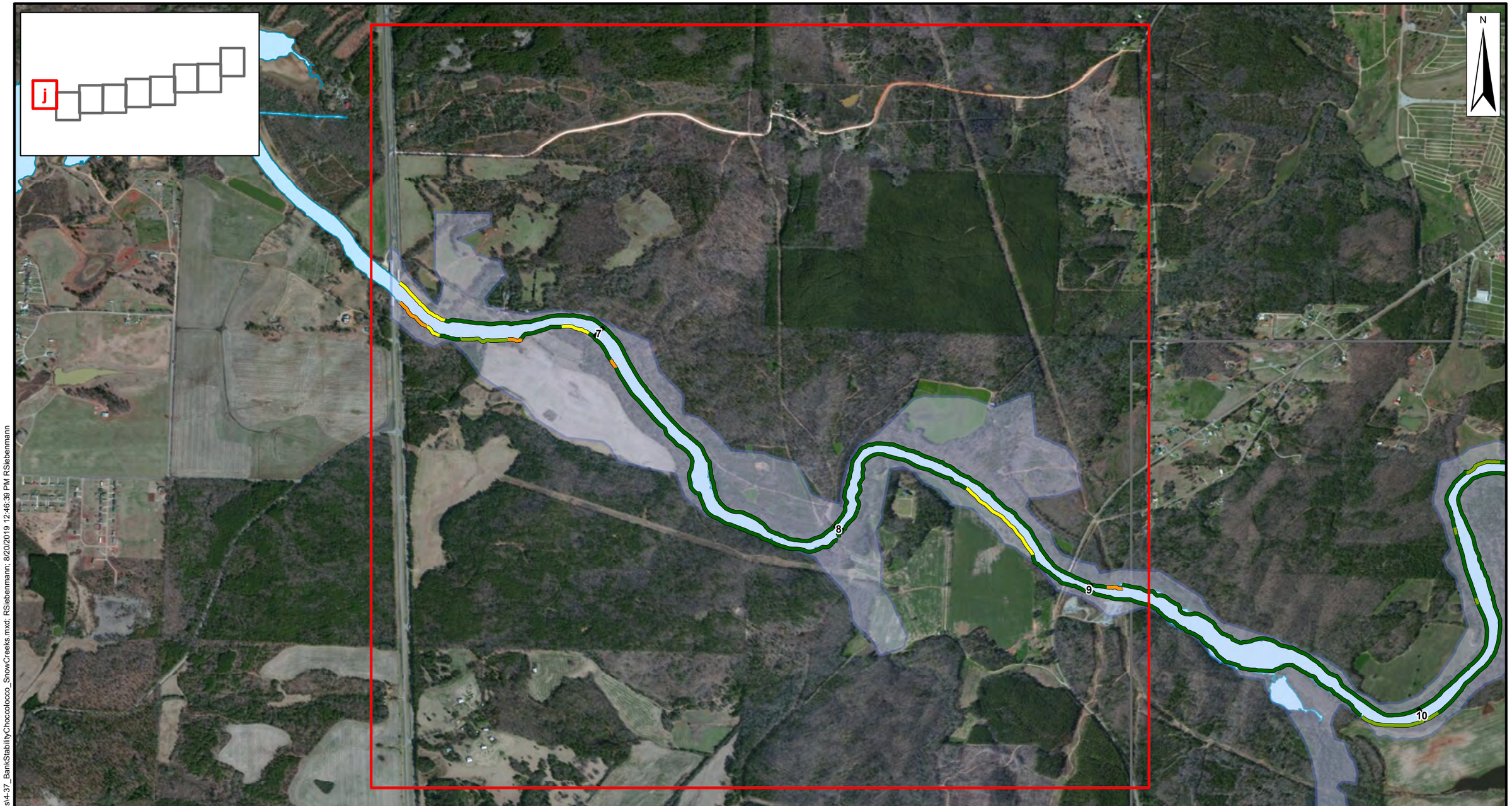
Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure
4-31i

\\aro-011N:\AA\Anniston\GIS\MXD\OU4 RI Figures\4-37_BankStabilityChoccolocco_SnowCreeks.mxd; RSiebenmann; 8/20/2019 12:46:39 PM RSiebenmann



Legend

Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU4 100-Year Floodplain
- 35 River Mile Station

0 1,000 2,000 Feet

Notes:
1. Bank stability surveys conducted in 2011, 2012, and 2015.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site
Anniston, Alabama

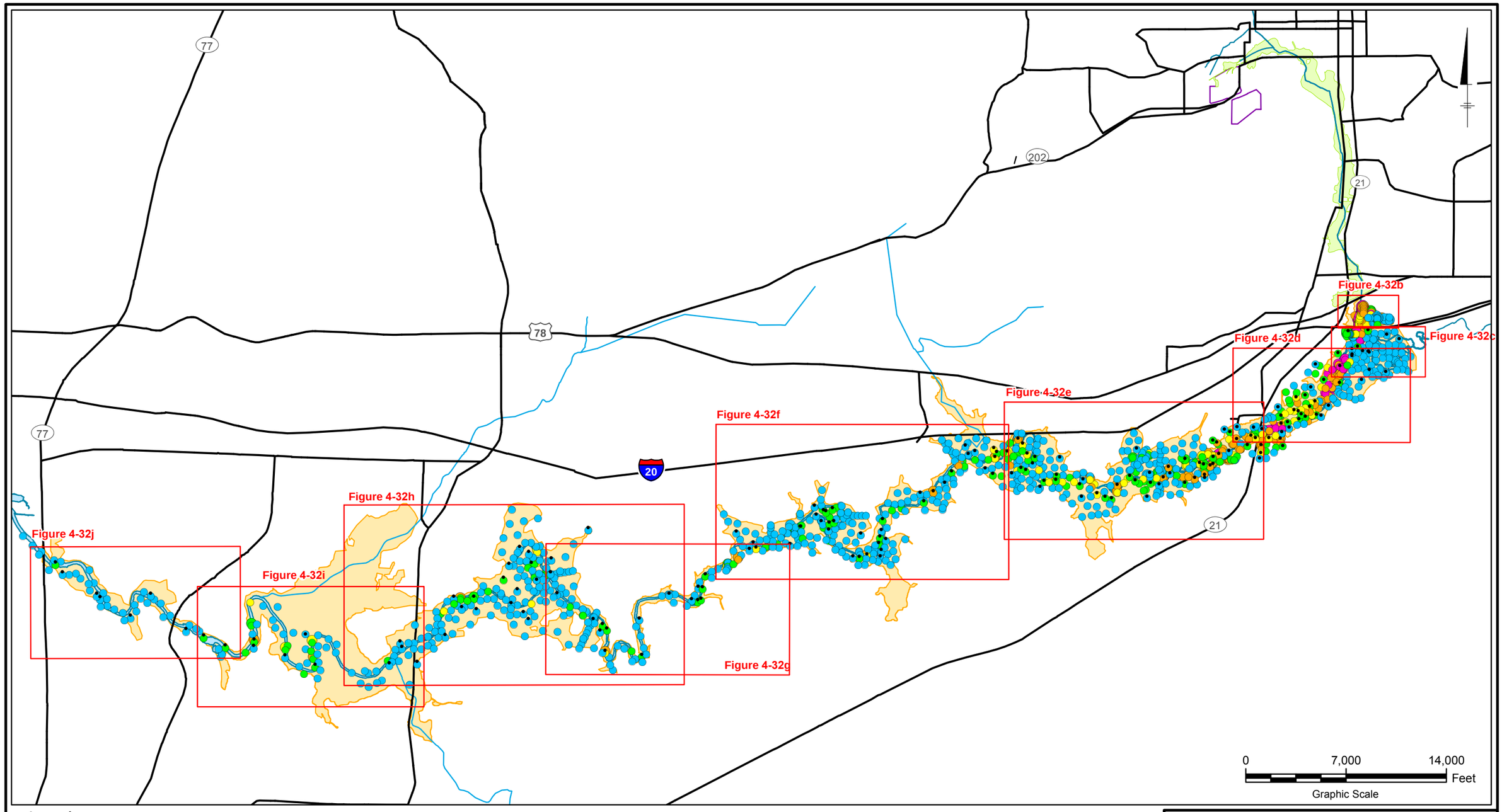
Feasibility Study Report for OU-4

Creek Bank Stability Survey Results

Solutia

Figure 4-31j

\\aro-01\N:\A\Anniston\GIS\MXD\OU4 RI Figures\4-37_BankStabilityChoccolocco_SnowCreeks.mxd; RSiebenmann; 8/20/2019 12:46:39 PM RSiebenmann



Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain
- OU-3 Boundary

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:

1. mg/kg: milligrams per kilogram
   PCB: polychlorinated biphenyl
   OU: operable unit
2. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.

Anniston PCB Site
Anniston, Alabama

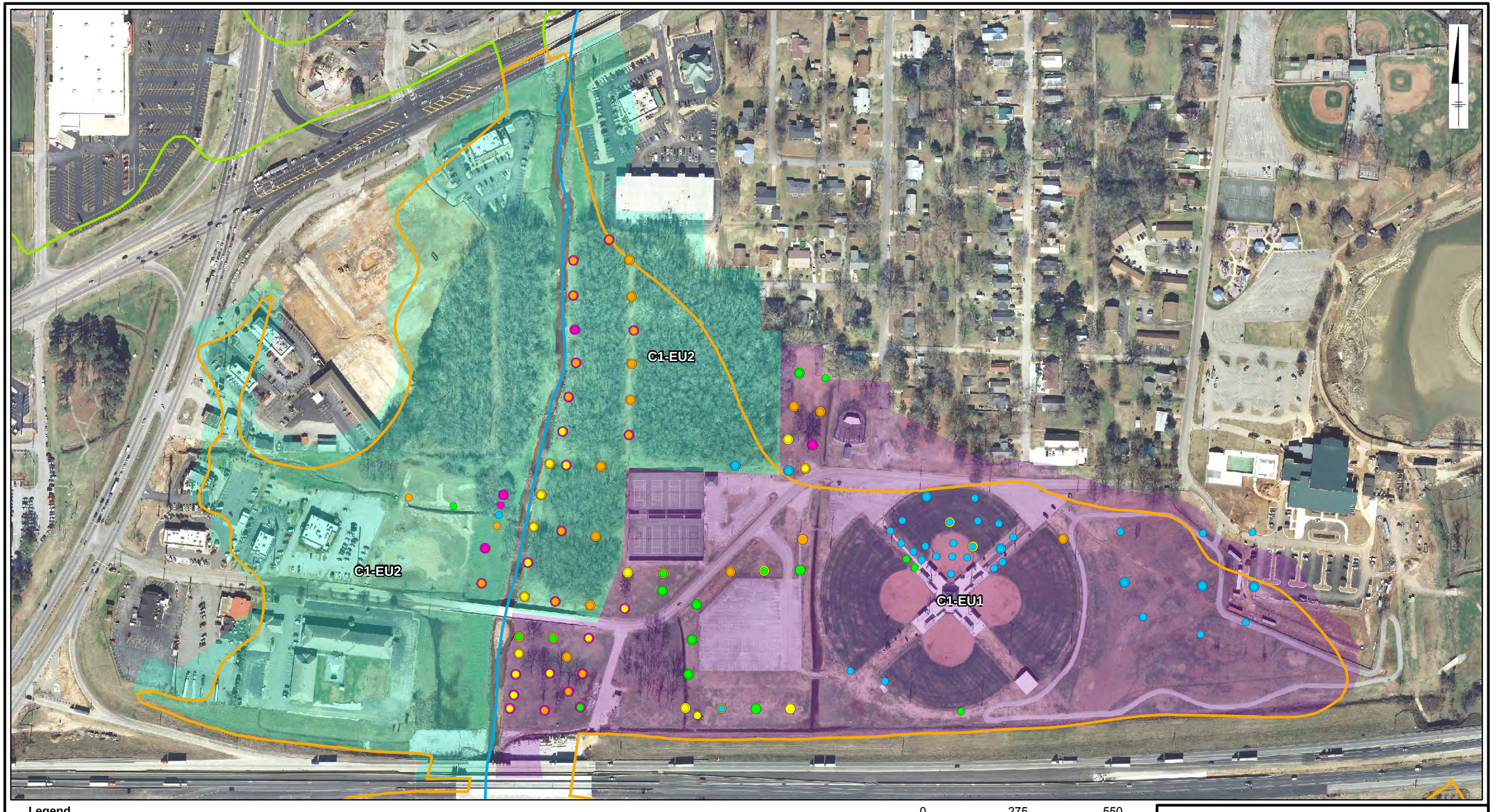
Feasibility Study Report for OU-4

Key for PCB Soil Results by Exposure Unit

Solutia

Figure
4-32a

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F5-1a_OU4_KeyMap_EUPCB.mxd 8/20/2019 8:42:47 PM



Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Snow Creek Centerline
- C1-EU1
- C1-EU2
- OU-4 100-Year Floodplain
- OU-1/OU-2 Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 275 550 Feet

Graphic Scale

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

Anniston PCB Site
Anniston, Alabama

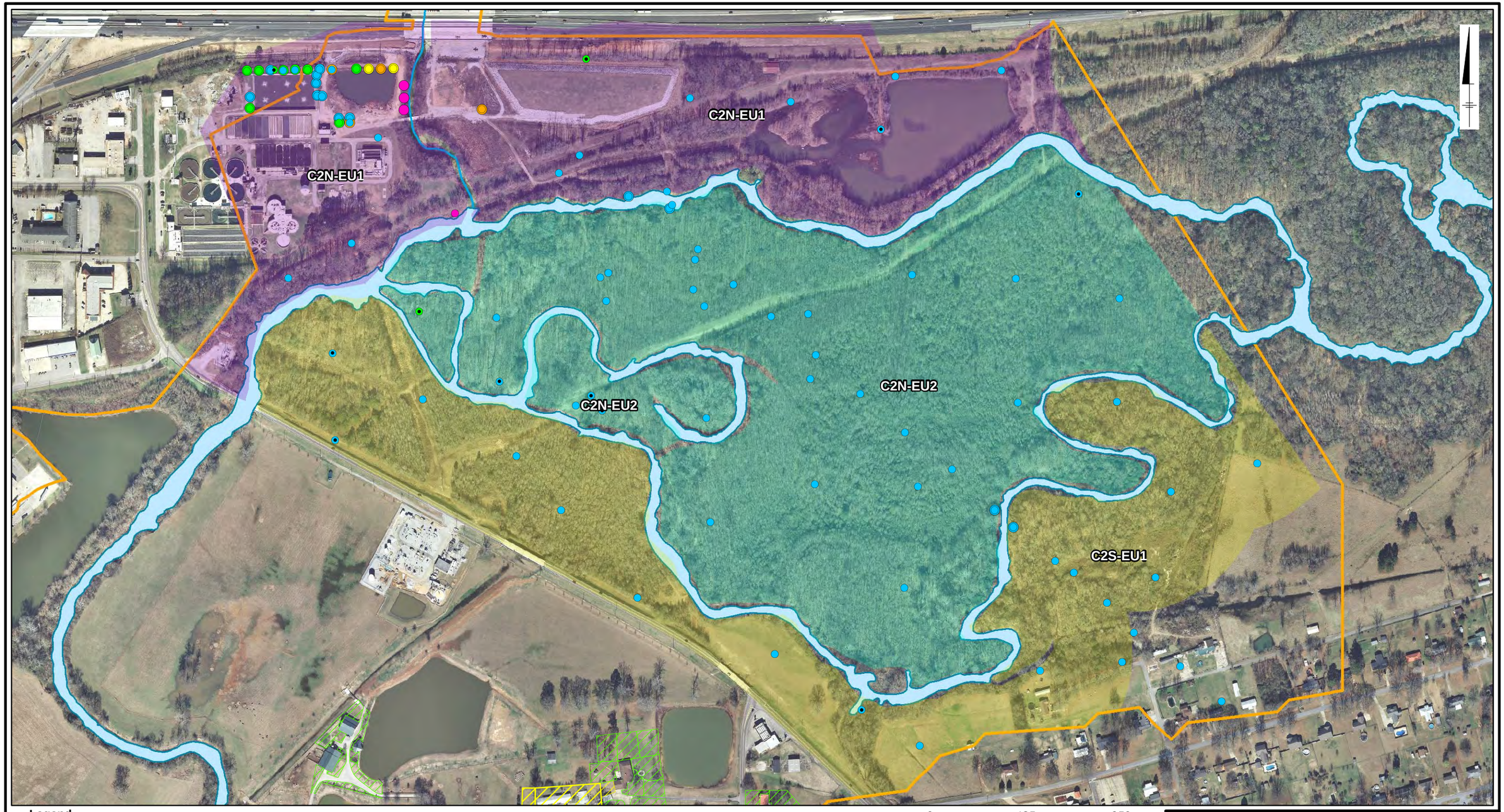
Feasibility Study Report for OU-4

PCB Soil Results for C1-EU1 and C1-EU2

Solutia

Figure
4-32b

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F5-1b_OU4_C1_SurfSubsurf_SoilPCB.mxd 8/20/2019 8:47:13 PM



Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury

Residential Parcels Sampled

- Removal Complete
- Residential <1 (mg/kg)

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

- Snow Creek Centerline
- C2N-EU1
- C2N-EU2
- C2S-EU1
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 425 850 Feet

Graphic Scale

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

Anniston PCB Site
Anniston, Alabama

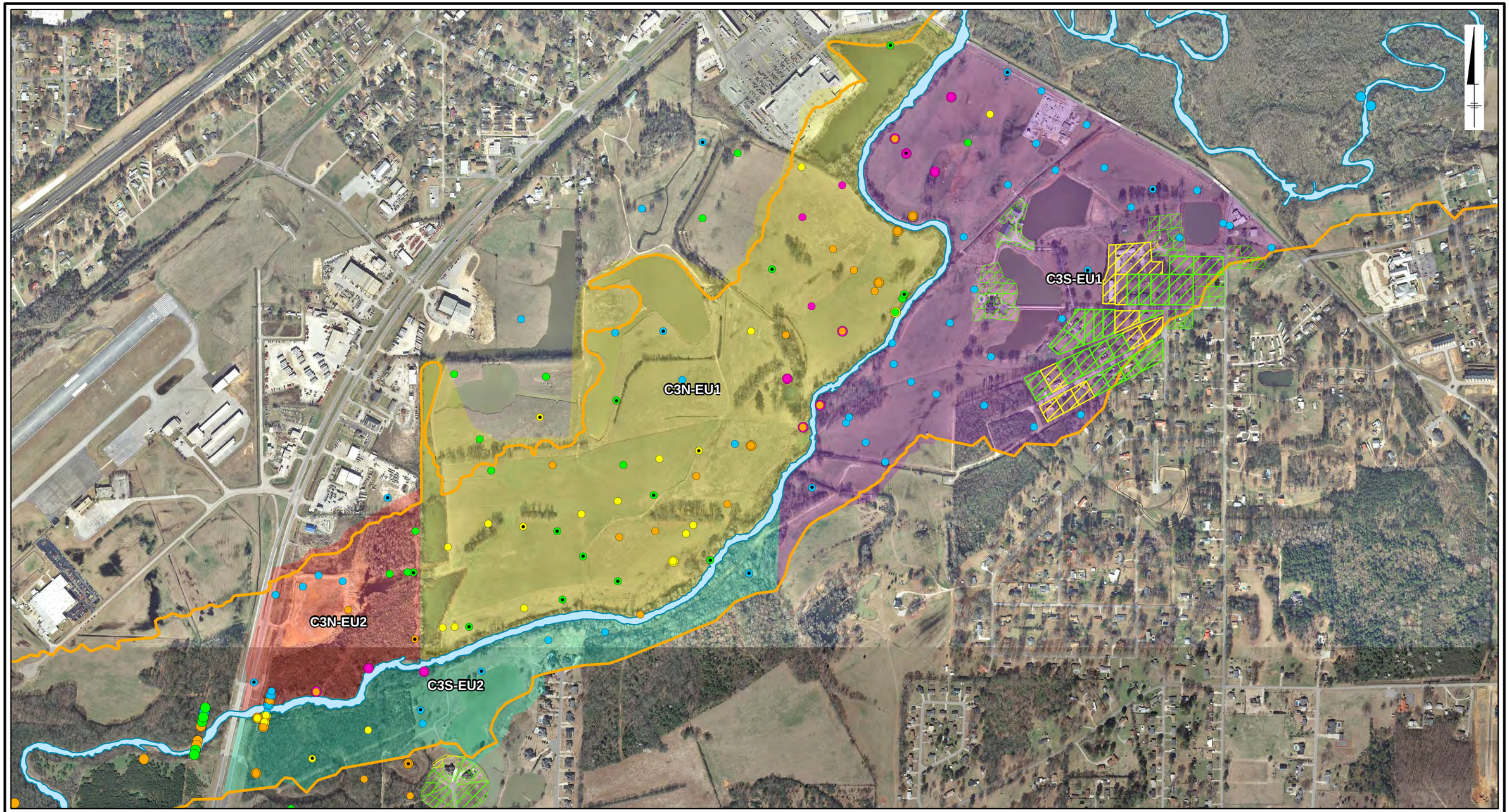
Feasibility Study Report for OU-4

PCB Soil Results for C2N-EU1, C2N -EU2, and C2S-EU1

Solutia

Figure
4-32c

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\Anniston\ALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F5-1c_OU4_C2_SurfSubsurf_SoilPCB.mxd 8/20/2019 8:48:59 PM



Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- C3S-EU1
- C3S-EU2
- C3N-EU1
- C3N-EU2

Residential Parcels Sampled

- Removal Complete
- Residential <1 (mg/kg)
- Choccolocco Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 800 1,600 Feet

Graphic Scale

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB Soil Results for C3N-EU1, C3N-EU2, C3S-EU1, and C3S-EU2

Solutia

Figure
4-32d

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F5-1d_OU4_C3_SurfSubsurf_SoilPCB.mxd 8/20/2019 8:50:15 PM

C4N-EU2

C4N-EU1

C4S-EU1

C4S-EU3

C4S-EU2

Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury

Residential Parcels Sampled

- Removal Complete
- Residential <1 (mg/kg)

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

- C4N-EU1
- C4S-EU1
- C4S-EU2
- C4N-EU2
- C4S-EU3
- Choccolocco Creek
- OU-4 100-Year Floodplain

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

0 1,175 2,350 Feet

Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB Soil Results for C4N-EU1, C4N-EU2, C4S-EU1, C4S-EU2, and C4S-EU3

Solutia

Figure
4-32e

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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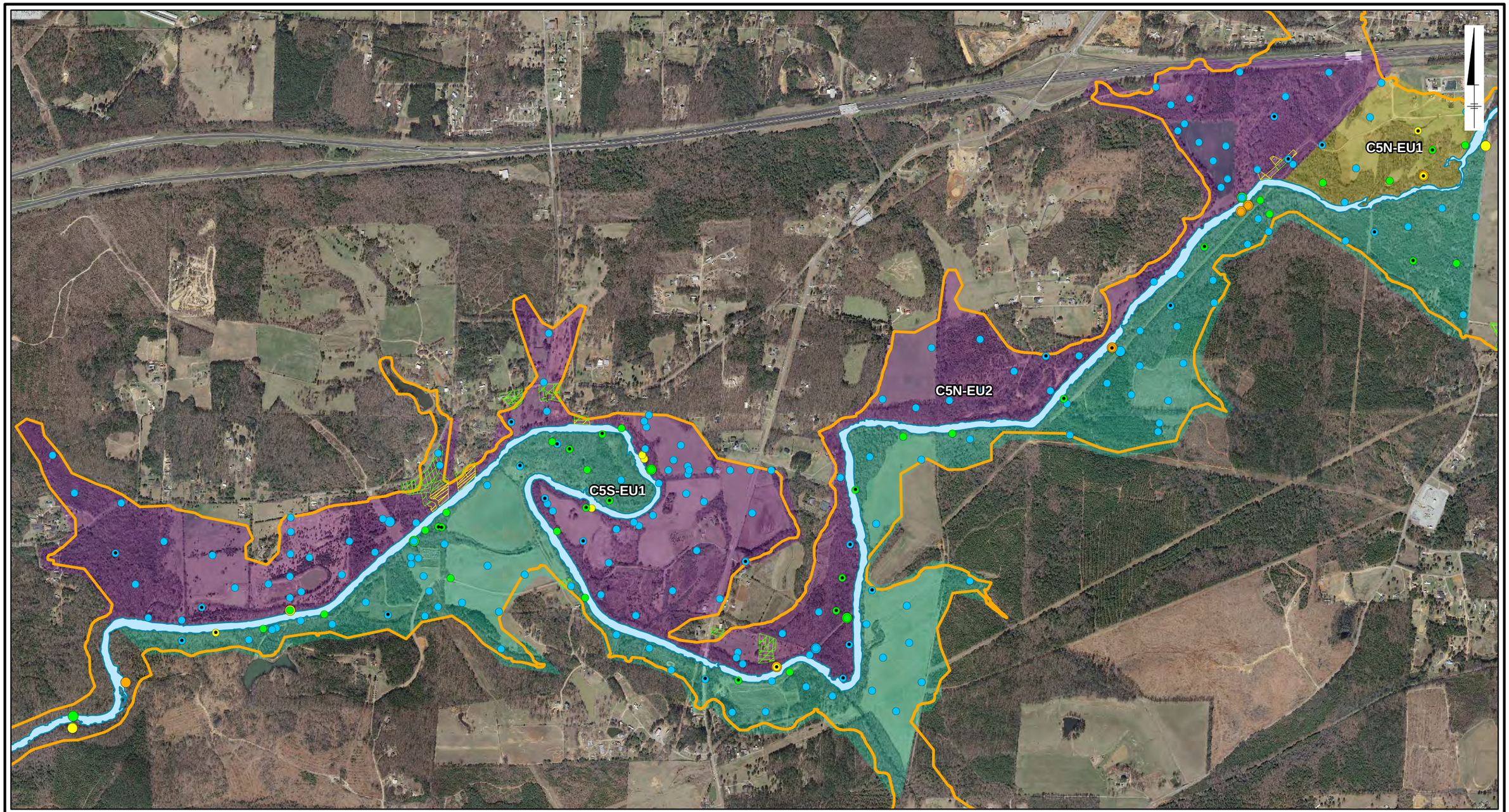

Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury

Residential Parcels Sampled

- Removal Complete
- Residential <1 (mg/kg)

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

- C5N-EU1
- C5N-EU2
- C5S-EU1
- Choccolocco Creek
- OU-4 100-Year Floodplain

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

0 1,325 2,650 Feet

Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB Soil Results for C5N-EU1, C5N-EU2, and C5S-EU1

Solutia

Figure
4-32f

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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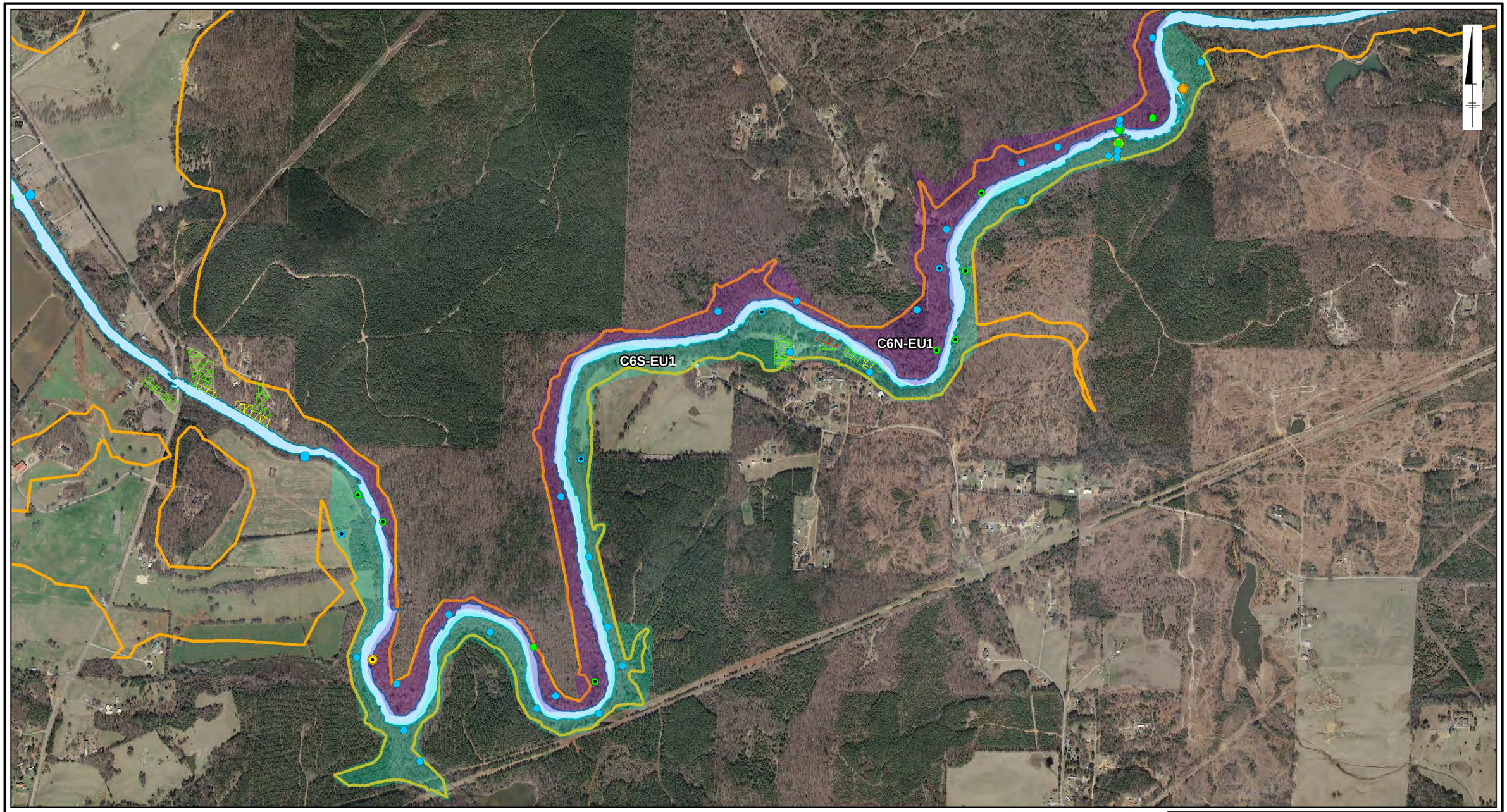

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Anniston
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Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury

Residential Parcels Sampled

- Removal Complete
- Residential <1 (mg/kg)
- Residential >1 (mg/kg)

- C6N-EU1
- C6S-EU1
- Choccolocco Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

0 1,100 2,200 Feet

Graphic Scale

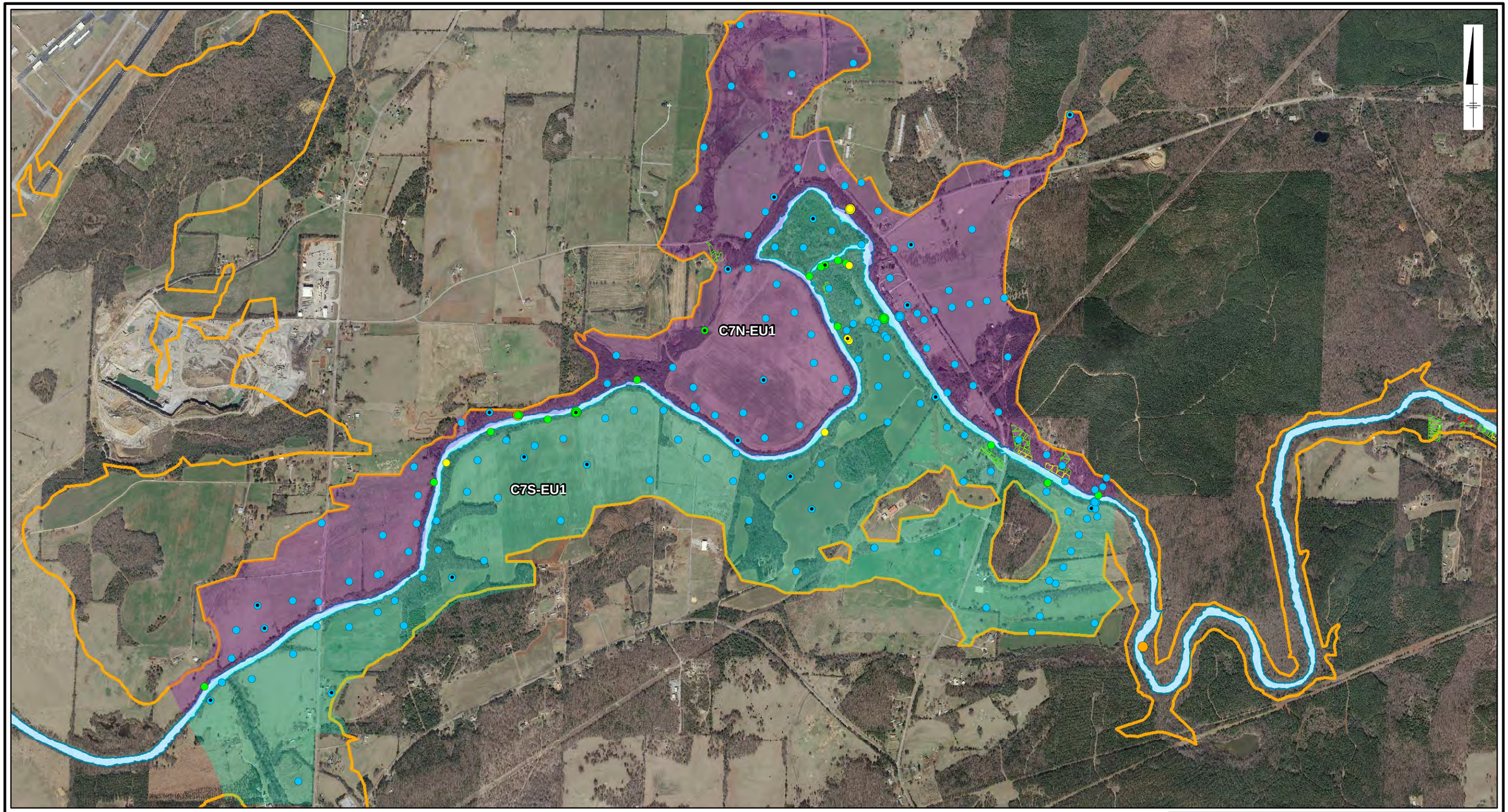
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB Soil Results for C6N-EU1 and C6S-EU1

Solutia

Figure
4-32g



Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury

Residential Parcels Sampled

- Removal Complete
- Residential <1 (mg/kg)
- Residential >1 (mg/kg)

- C7N-EU1
- C7S-EU1
- Choccolocco Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

0 1,550 3,100 Feet

Graphic Scale

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB Soil Results for C7N-EU1 and C7S-EU1

Solutia

Figure
4-32h

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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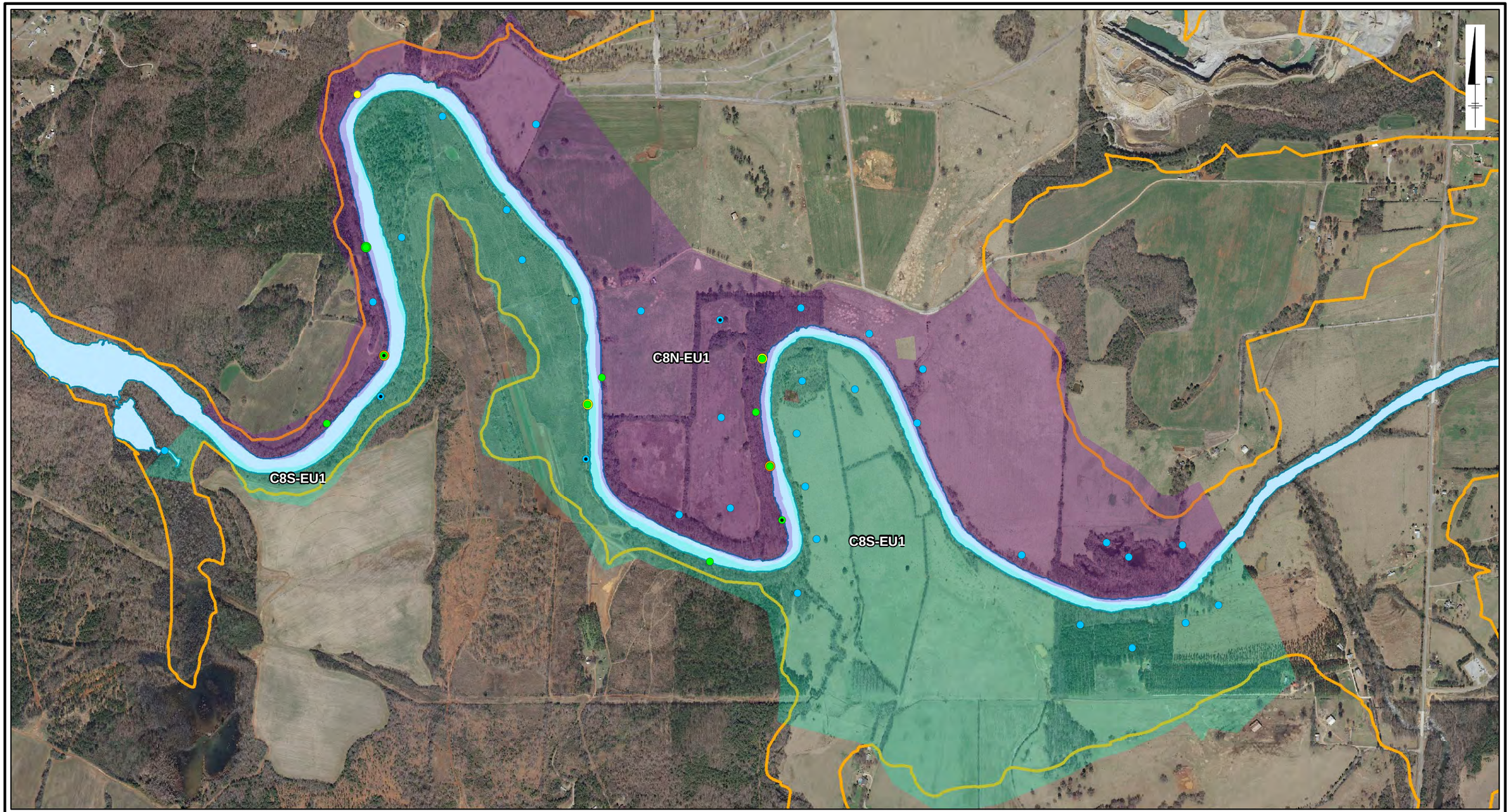


Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- C8N-EU1
- C8S-EU1
- Choccolocco Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 1,025 2,050 Feet

Graphic Scale

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB Soil Results for C8N-EU1 and C8S-EU1

Solutia

Figure
4-32i

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALI\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F5-1i_OU4_C8_SurfSubsurf_SoilPCB.mxd 8/20/2019 8:58:00 PM

C9N-EU1

C9S-EU1

Legend

Soil Sample Location

Total PCB Concentration (mg/kg)

- < 1
- ≥1 - <5
- ≥5 - <10
- ≥10 - < 50
- ≥ 50

- Samples Analyzed for Constituents Other Than PCBs or Mercury
- C9N-EU1
- C9S-EU1
- Choccolocco Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 950 1,900 Feet

Graphic Scale

Notes:
1. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyls
2. Aerial imagery provided by Calhoun and Talladega Counties.
3. The subsurface results shown on the figure are the maximum concentration found in the samples taken below 1 foot.
4. Surface concentrations depicted represent a length-weighted average of data from the 0- to 1-ft interval.

Anniston PCB Site
Anniston, Alabama

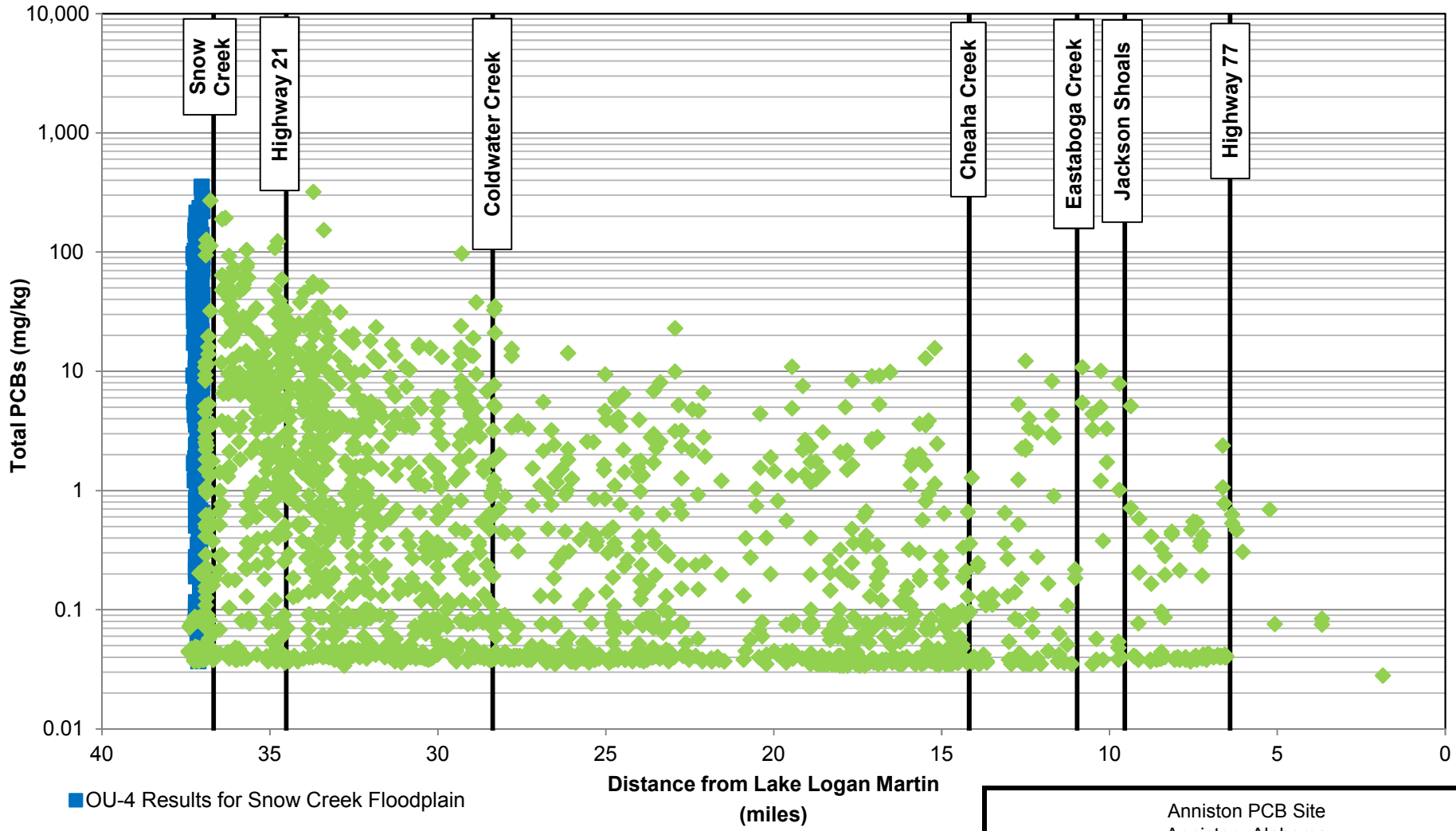
Feasibility Study Report for OU-4

PCB Soil Results for C9N-EU1 and C9S-EU1

Solutia

Figure
4-32j

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\Anniston\ALM\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F5-1j_OU4_C9_SurfSubsurf_SoilPCB.mxd 8/20/2019 8:59:37 PM



mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

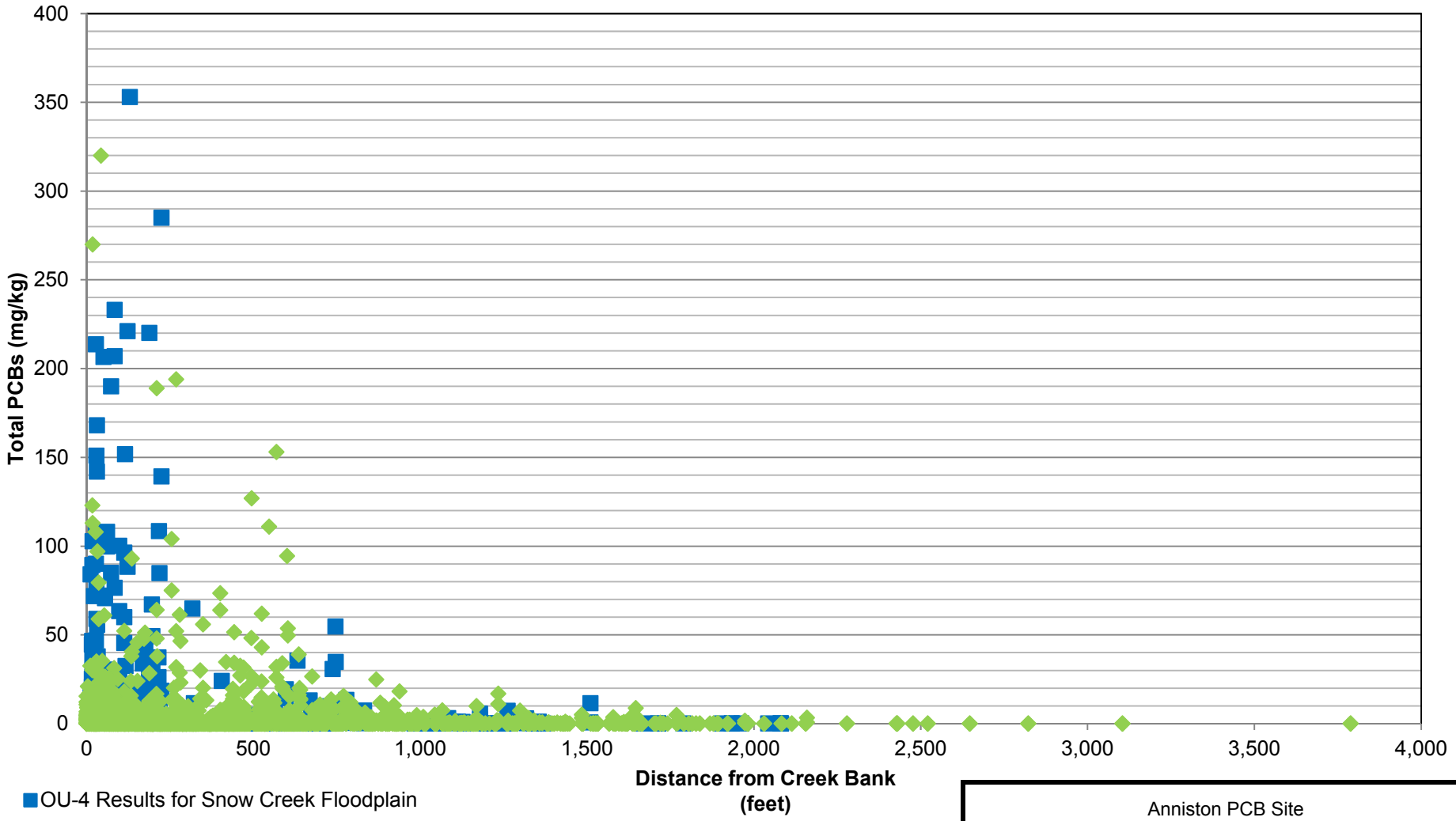
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCB Concentrations in OU-4 Soil with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-33



mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

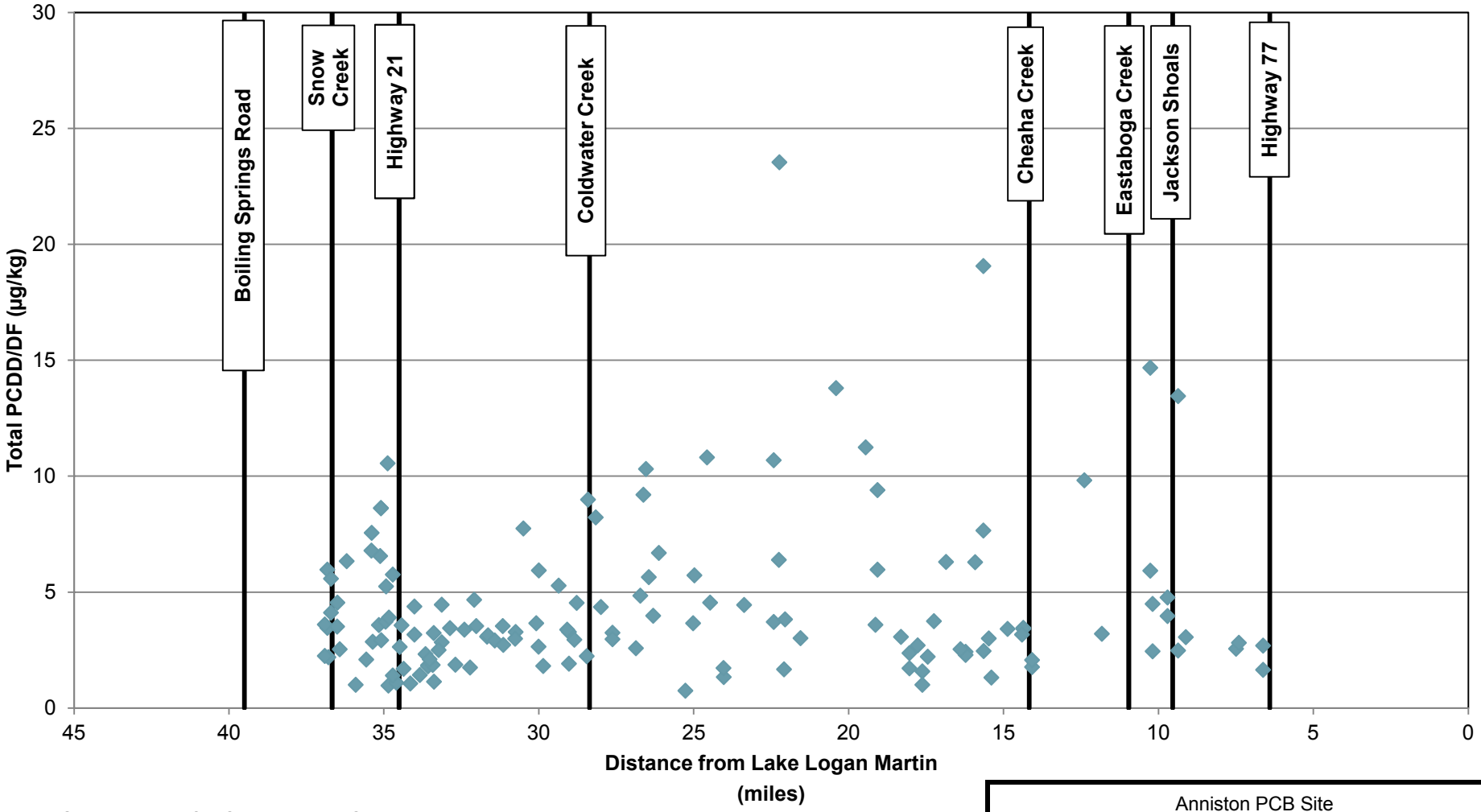
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCB Concentrations in OU-4 Soil with Distance from Creek Bank

Solutia
Ingenuity Productivity Performance

Figure
4-34



µg/kg: micrograms per kilogram
OU: operable unit
PCDD/DF: polychlorinated dibenzo-p-dioxin/dibenzofuran

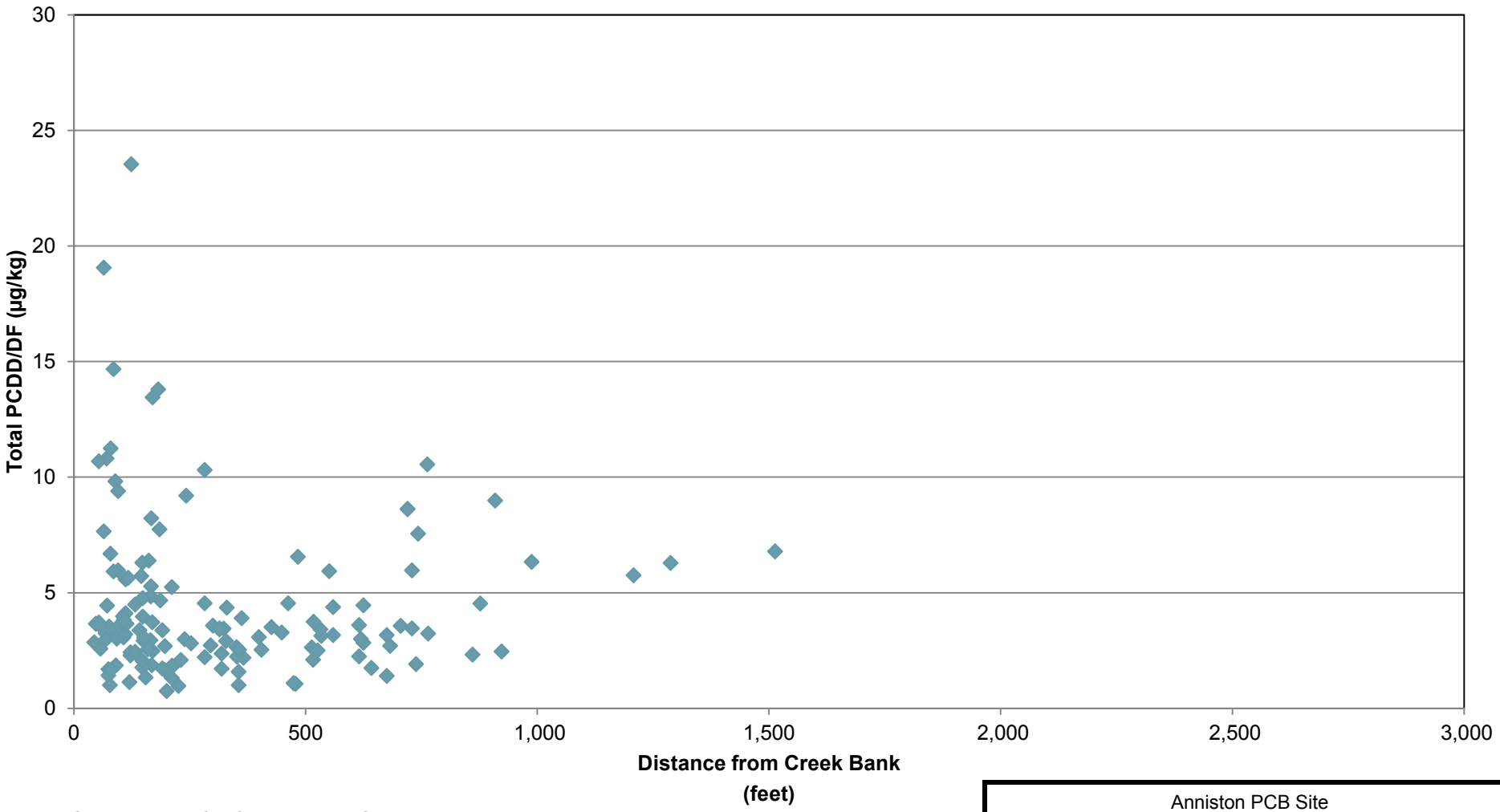
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCDD/DF Concentrations in Soil with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-35



µg/kg: micrograms per kilogram
OU: operable unit
PCDD/DF: polychlorinated dibenzo-p-dioxin/dibenzofuran

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCDD/DF Concentrations in Soil with Distance from Creek Bank

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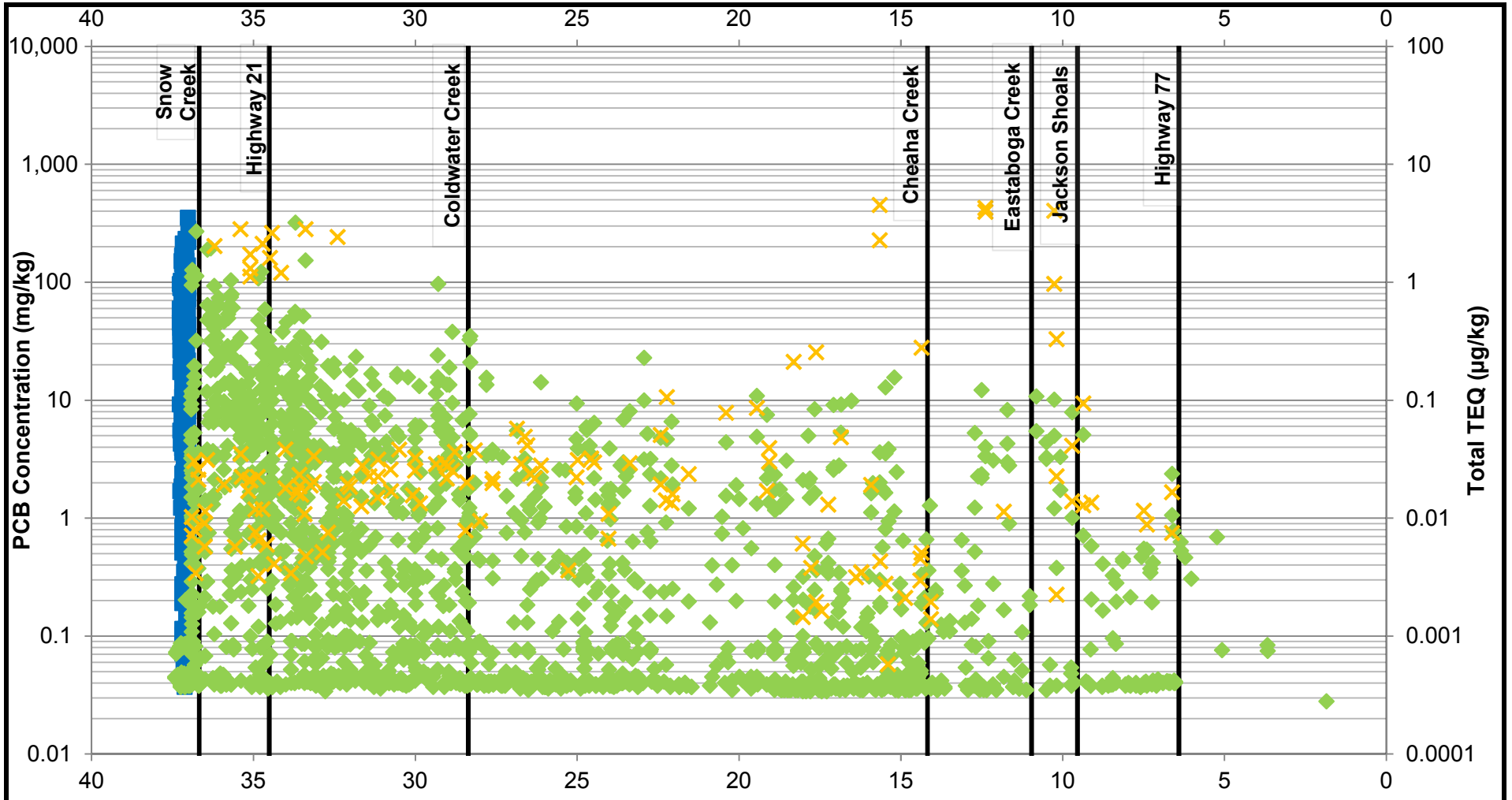
Ingenuity Productivity Performance

Figure
4-36

8/19/2019
\\arcadis-us\officedata\Fairport-NY\Projects\Anniston\OU-4 RI 2019\Soil_PCB_Hg_TEQ_Distance_by_Area_20190819Fig 5b TEQ Dist ND=0



- OU-4 PCB Results for Snow Creek Floodplain
- OU-4 PCB Results for Choccolocco Creek Floodplain
- OU-4 Total TEQ (ND = 0 µg/kg)

Notes:
µg/kg: micrograms per kilogram
mg/kg: milligrams per kilogram
ND: nondetect
PCB: polychlorinated biphenyl
Total TEQ: sum of dioxin-like PCB congeners and dioxin/furan toxicity equivalents (mammal)

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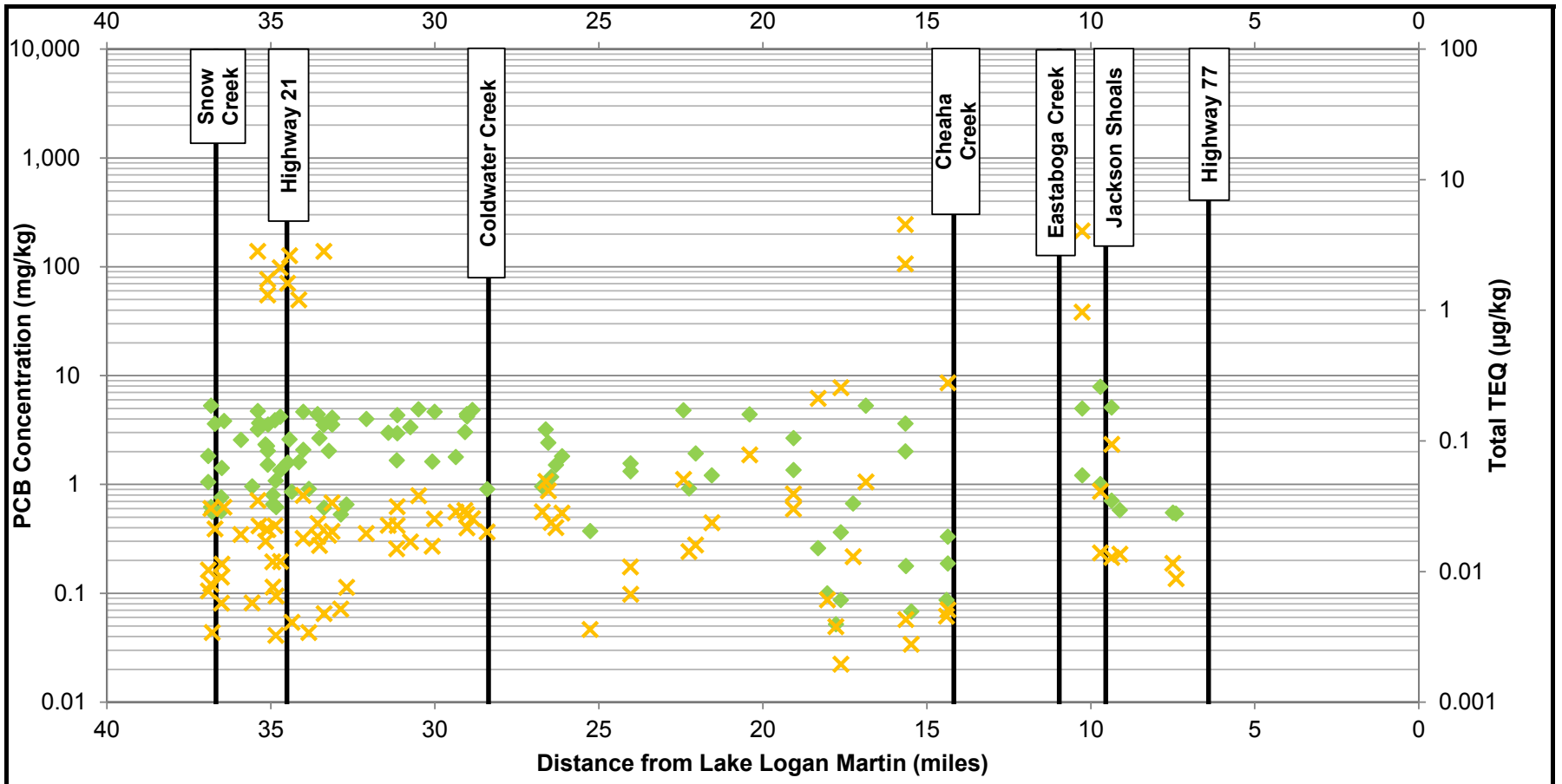
Anniston, Alabama

Feasibility Study Report for OU-4

PCB and TEQ Concentrations in OU-4 Soil with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure
4-37a



◆ OU-4 PCB Results for Choccolocco Creek Floodplain

× OU-4 Total TEQ (ND = 0 µg/kg) Results

Notes:
1. PCB and TEQ results for Choccolocco Creek and Snow Creek floodplain soil samples collected from the same sample location and interval are shown.
µg/kg: micrograms per kilogram
mg/kg: milligrams per kilogram
ND: nondetect
PCB: polychlorinated biphenyl
RL: reporting limit
Total TEQ: sum of dioxin-like PCB congeners and dioxin/furan toxicity equivalents (mammal)

Anniston PCB Site
Anniston, Alabama

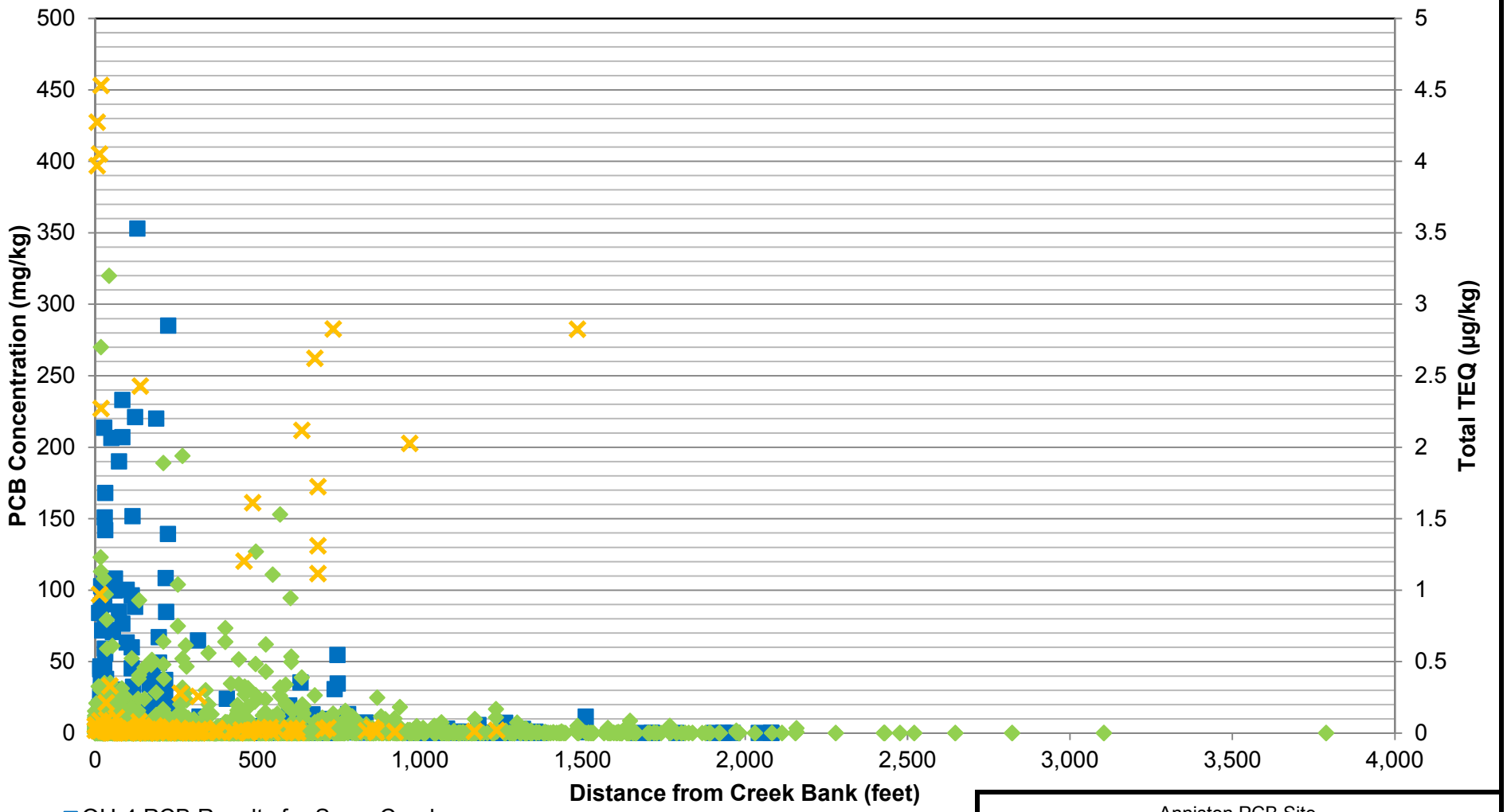
Feasibility Study Report for OU-4

Paired Total PCB and Total TEQ Concentrations by Sample Location and Interval in OU-4 Soil with Distance from Lake Logan Martin

Solutia

Figure
4-37b

8/19/2019
\\arcadis-us\officedata\Fairport-NY\Projects\Anniston\OU-4 RI 2019\Soil_PCB_Hg_TEQ_Distance_by_Area_20190819Fig 6b TEQ bank ND=0



Notes:
µg/kg: micrograms per kilogram
mg/kg: milligrams per kilogram
ND: nondetect
PCB: polychlorinated biphenyl
Total TEQ: sum of dioxin-like PCB congeners and dioxin/furan toxicity equivalents (mammal)

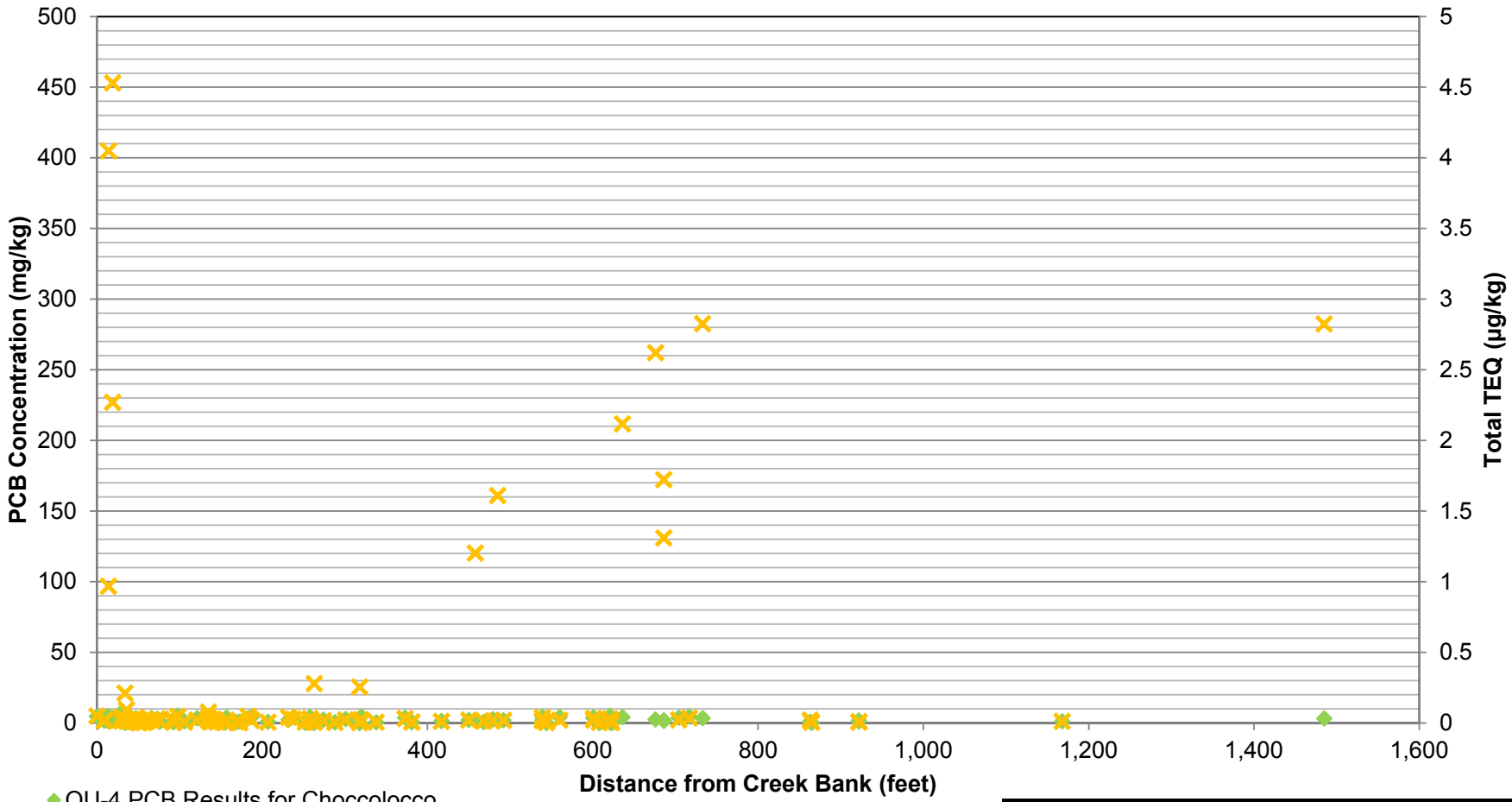
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB and TEQ Concentrations in OU-4 Soil with Distance from Creek Bank

Solutia
Ingenuity Productivity Performance

Figure
4-38a



Notes:
1. PCB and TEQ results for Choccolocco Creek and Snow Creek floodplain soil samples collected from the same sample location and interval are shown.
µg/kg: micrograms per kilogram
mg/kg: milligrams per kilogram
ND: nondetect
PCB: polychlorinated biphenyl
RL: reporting limit
Total TEQ: sum of dioxin-like PCB congeners and dioxin/furan toxicity equivalents (mammal)

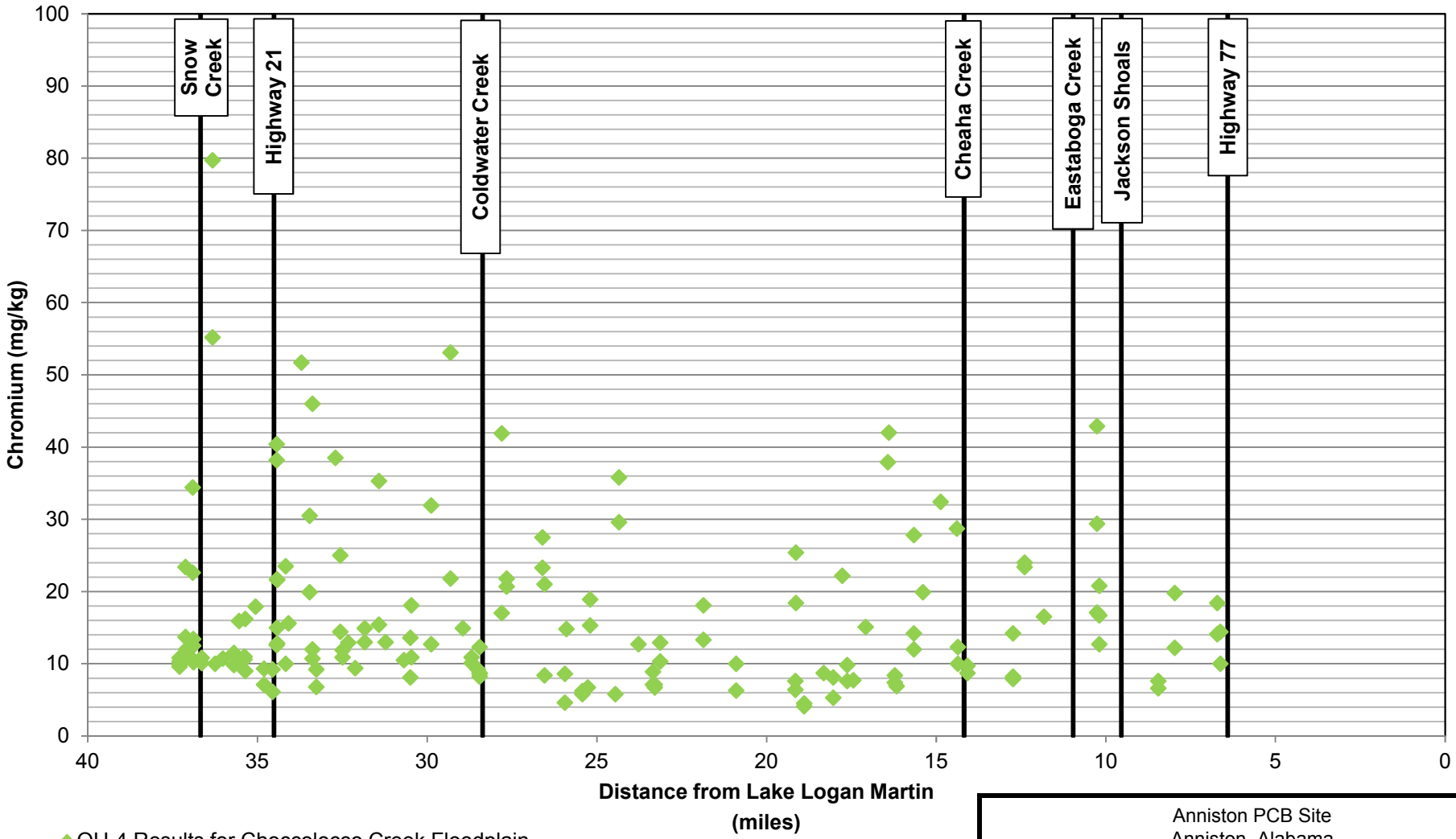
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Paired Total PCB and Total TEQ Concentrations by Sample Location and Interval in OU-4 Soil with Distance from Creek Bank

Solutia

Figure
4-38b



mg/kg: milligrams per kilogram
OU: operable unit

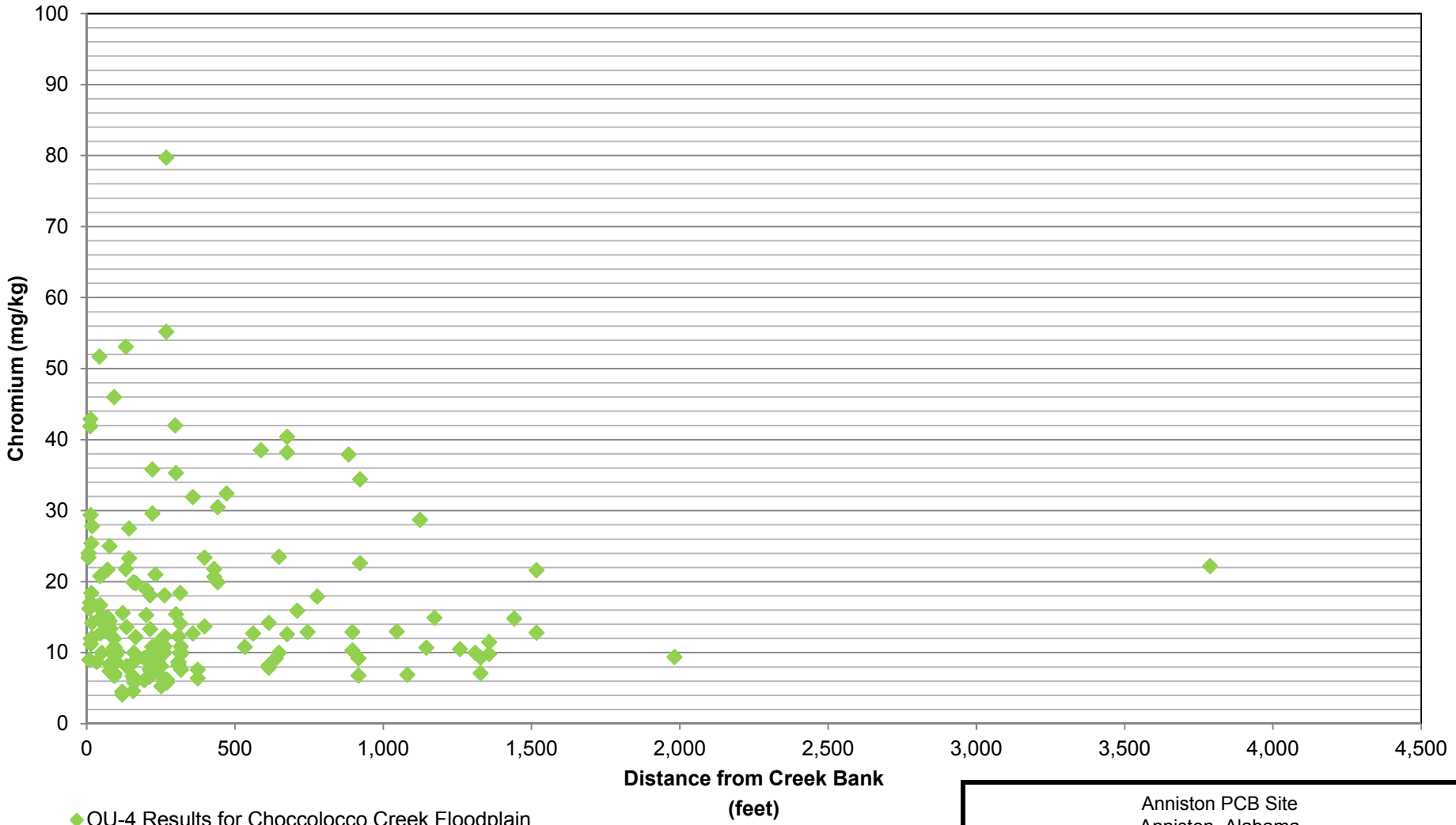
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Chromium Concentrations in OU-4 Soil with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-39



mg/kg: milligrams per kilogram
OU: operable unit

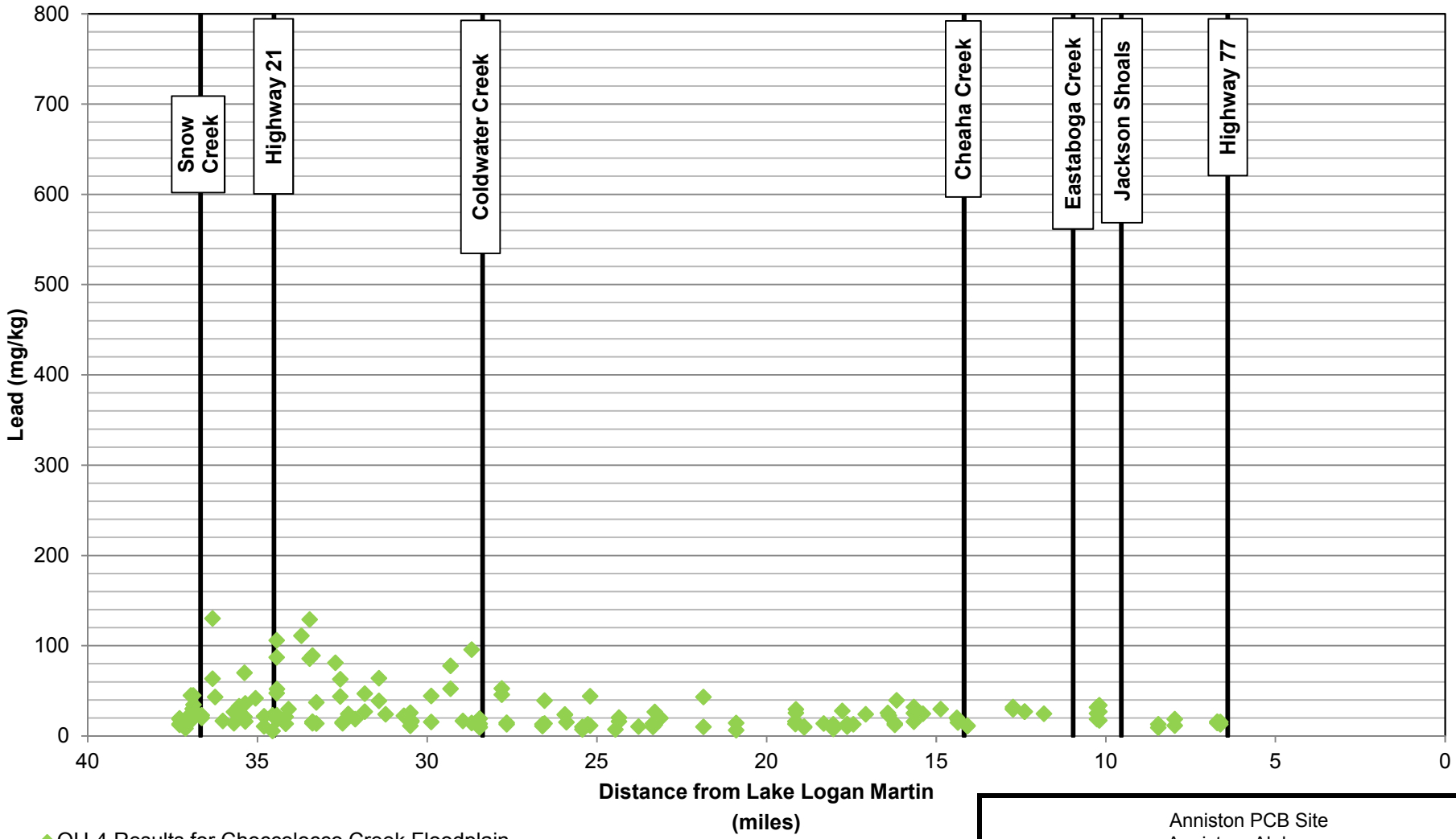
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Chromium Concentrations in OU-4 Soil with Distance from Creek Bank

Solutia
Ingenuity Productivity Performance

Figure
4-40



mg/kg: milligrams per kilogram
OU: operable unit

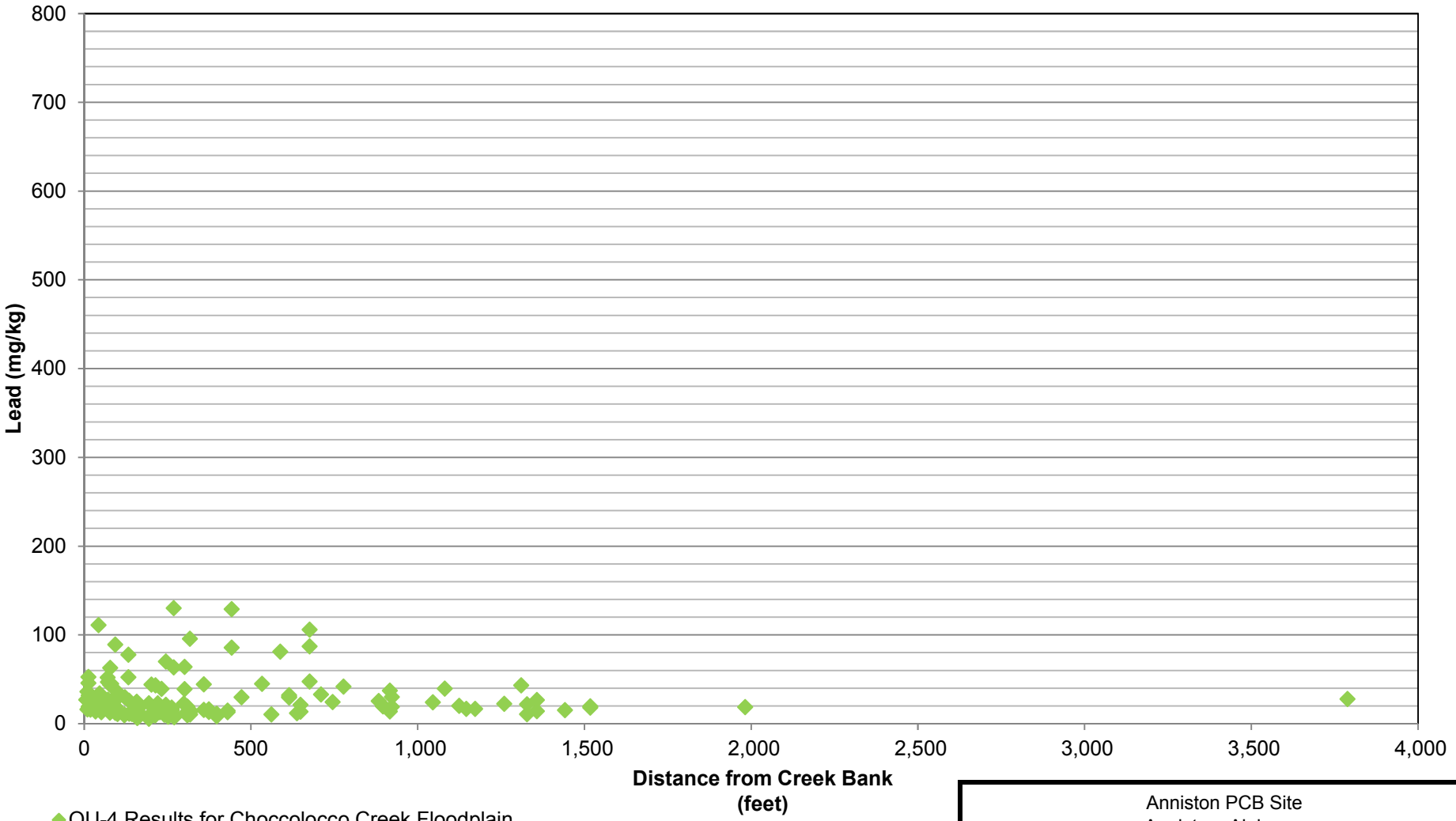
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Lead Concentrations in OU-4 Soil with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-41



mg/kg: milligrams per kilogram
OU: operable unit

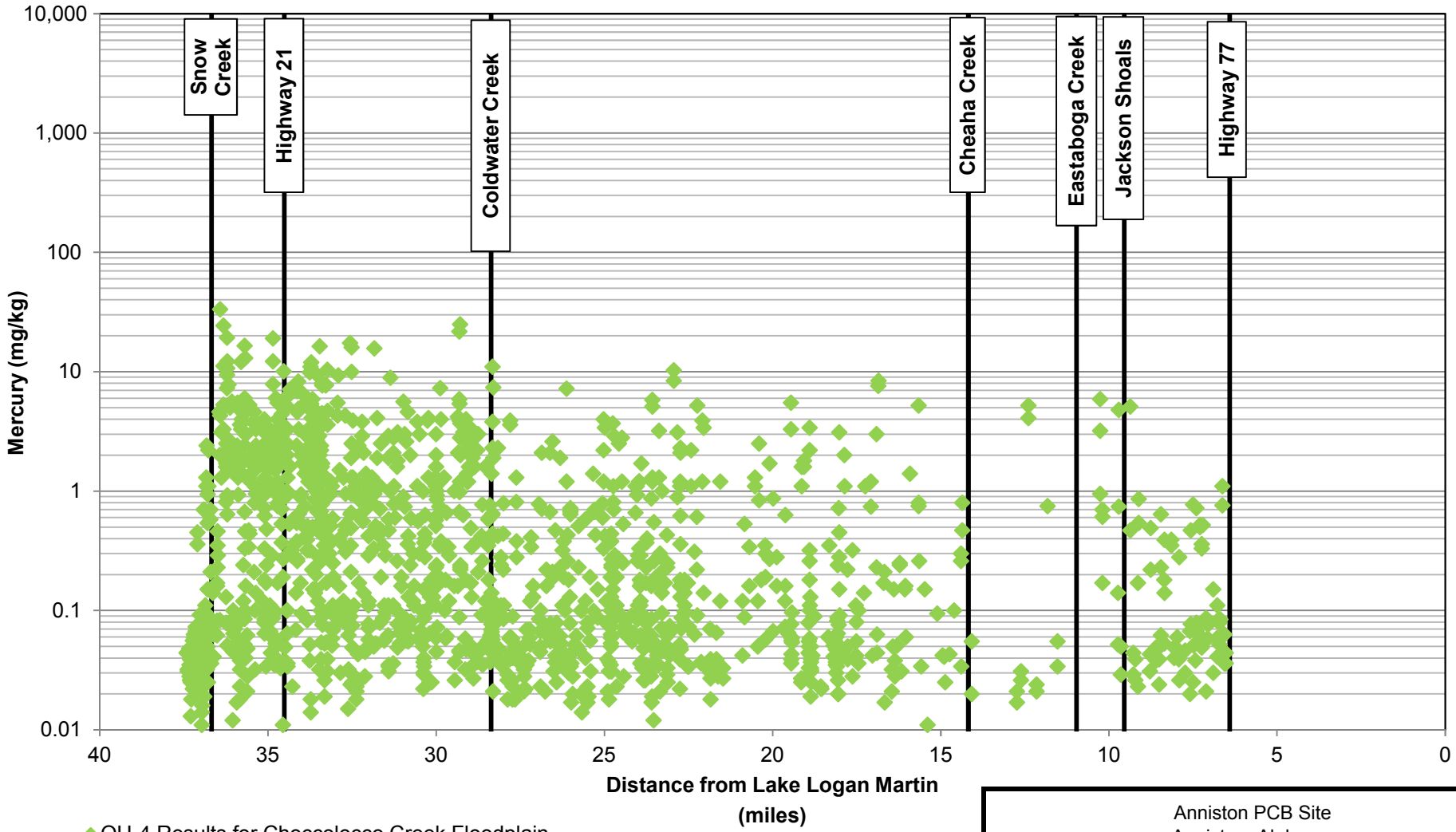
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Lead Concentrations in OU-4 Soil with Distance from Creek Bank

Solutia
Ingenuity Productivity Performance

Figure
4-42



mg/kg: milligrams per kilogram
OU: operable unit

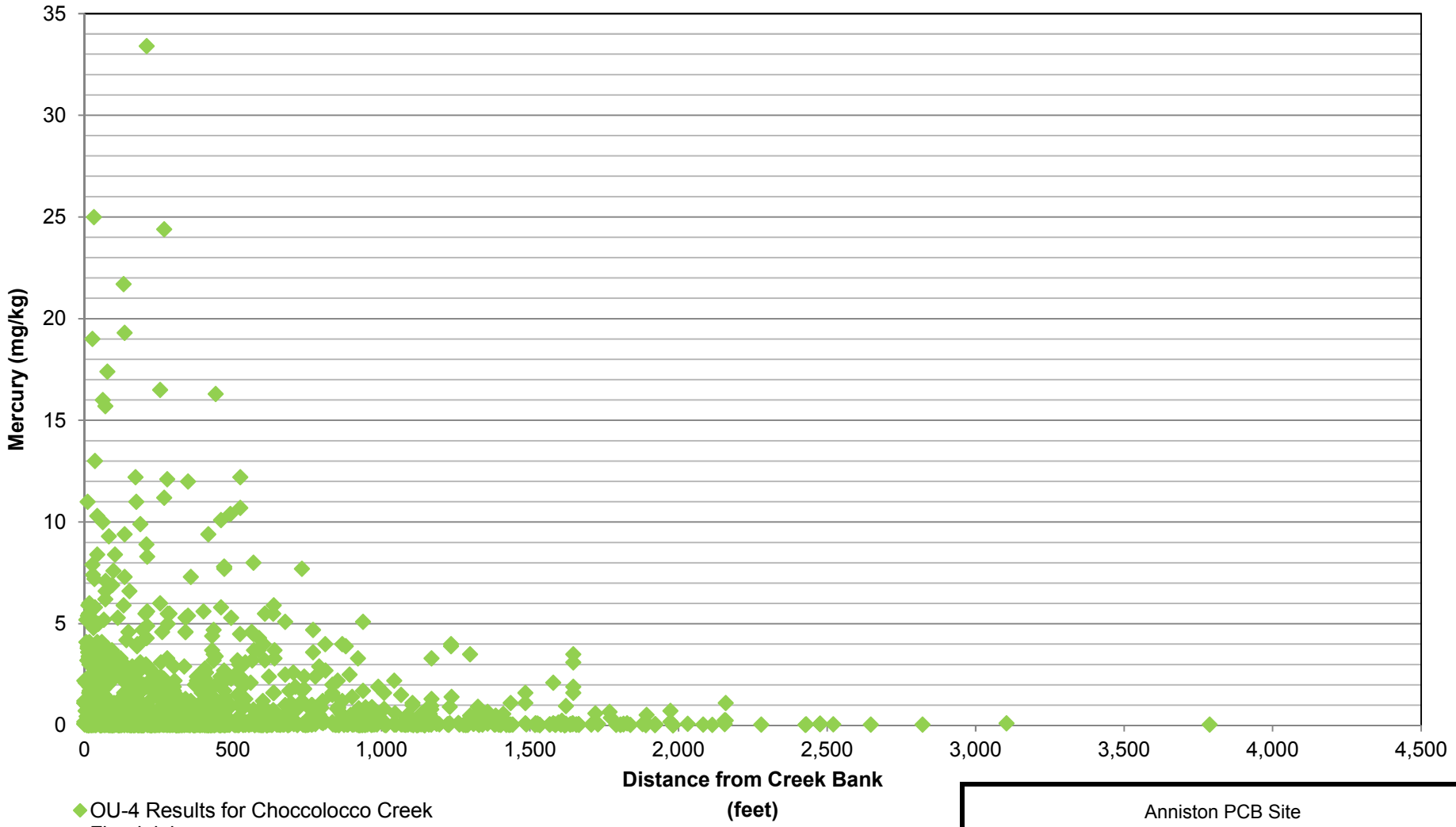
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Mercury Concentrations in OU-4 Soil with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure
4-43



mg/kg: milligrams per kilogram
OU: operable unit

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Mercury Concentrations in OU-4 Soil with Distance from Creek Bank

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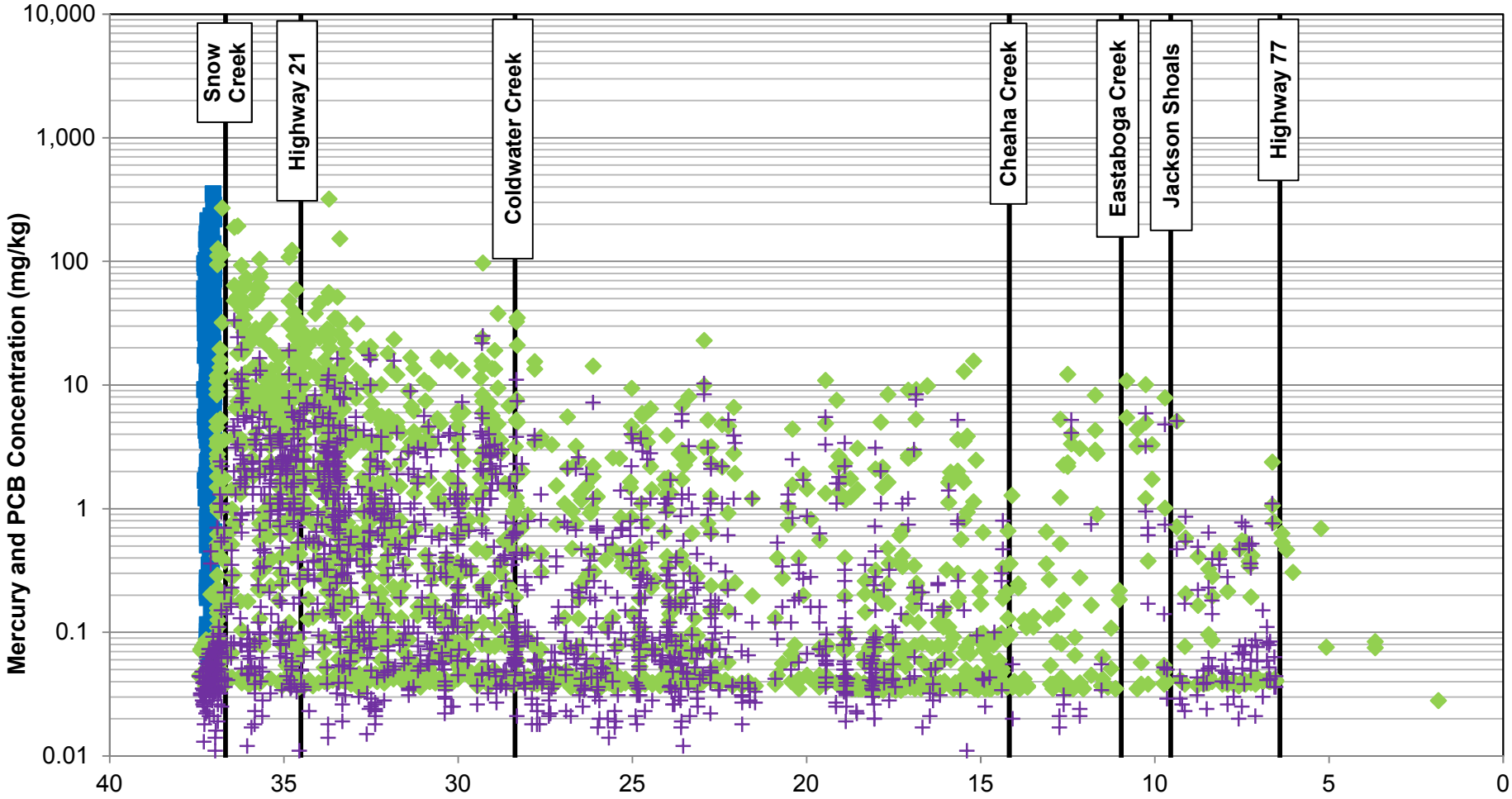
Ingenuity Productivity Performance

Figure

4-44

8/19/2019
\\arcadis-us\officedata\Fairport-NY\Projects\Anniston\OU-4 RI 2019\Soil_PCB_Hg_TEQ_Distance_by_Area_20190819Fig 2 Hg Dist



- OU-4 PCB Results for Snow Creek Floodplain
- OU-4 PCB Results for Choccolocco Creek Floodplain
- OU-4 Mercury Results

Notes:
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

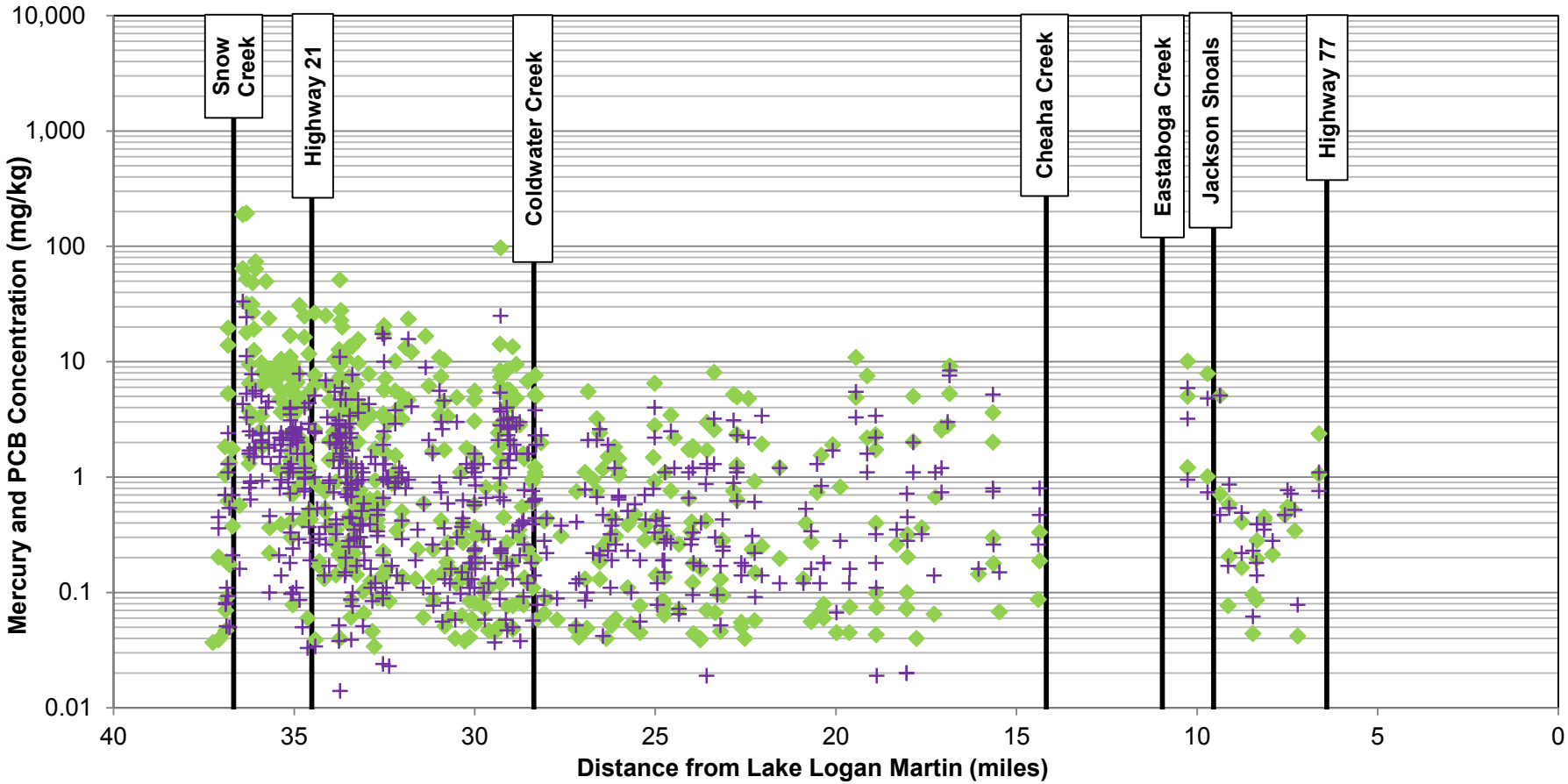
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB and Mercury Concentrations in OU-4 Soil with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure
4-45a



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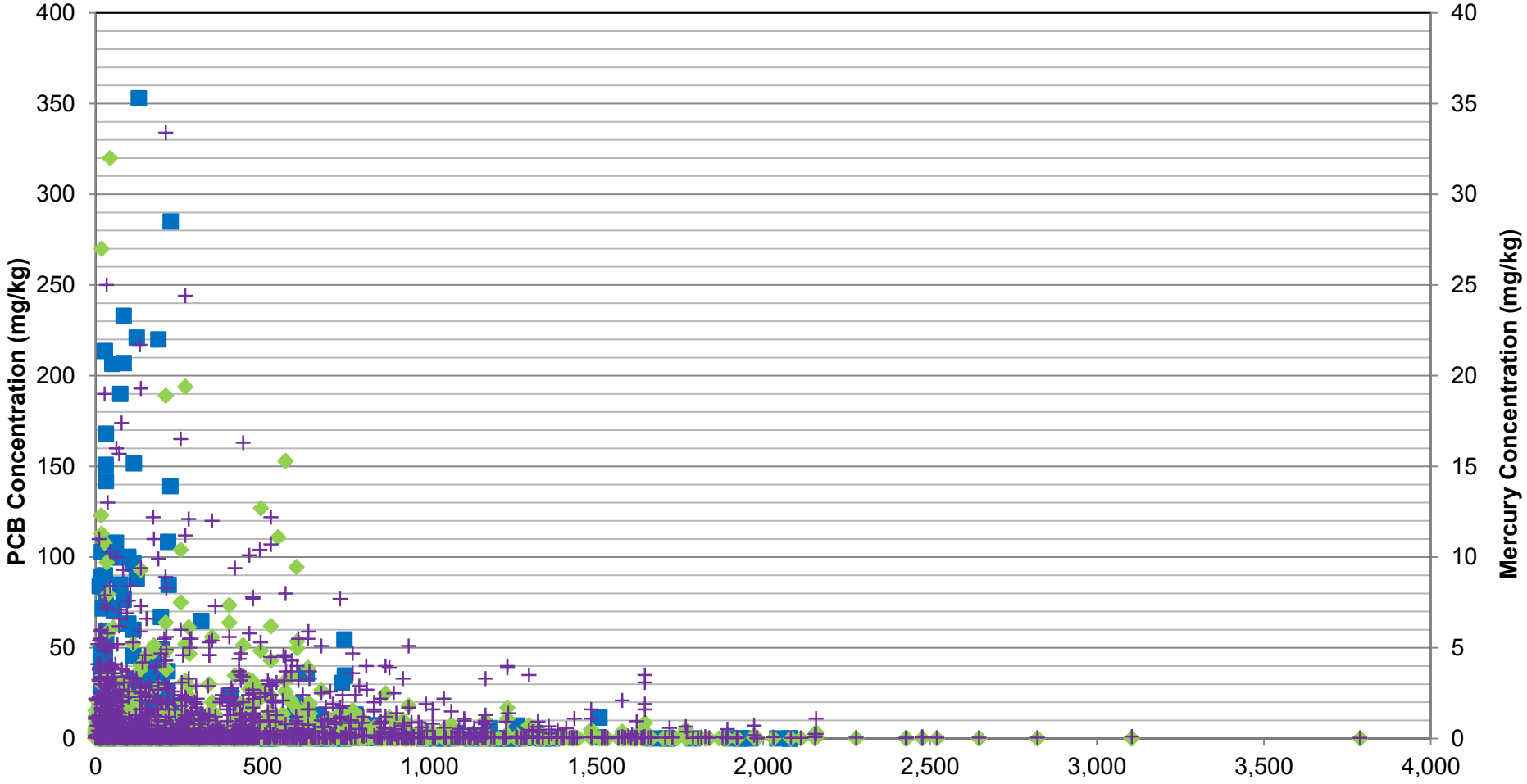
Feasibility Study Report for OU-4

Paired Total PCB and Mercury Concentrations by Sample Location and Interval in OU-4 Soil with Distance from Lake Logan Martin

Solutia

Figure
4-45b

Notes:
1. PCB and mercury results for Choccolocco Creek and Snow Creek floodplain soil samples collected from the same sample location and interval are shown.
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl



Notes:
mg/kg: milligrams per kilogram
ft: feet
PCB: polychlorinated biphenyl

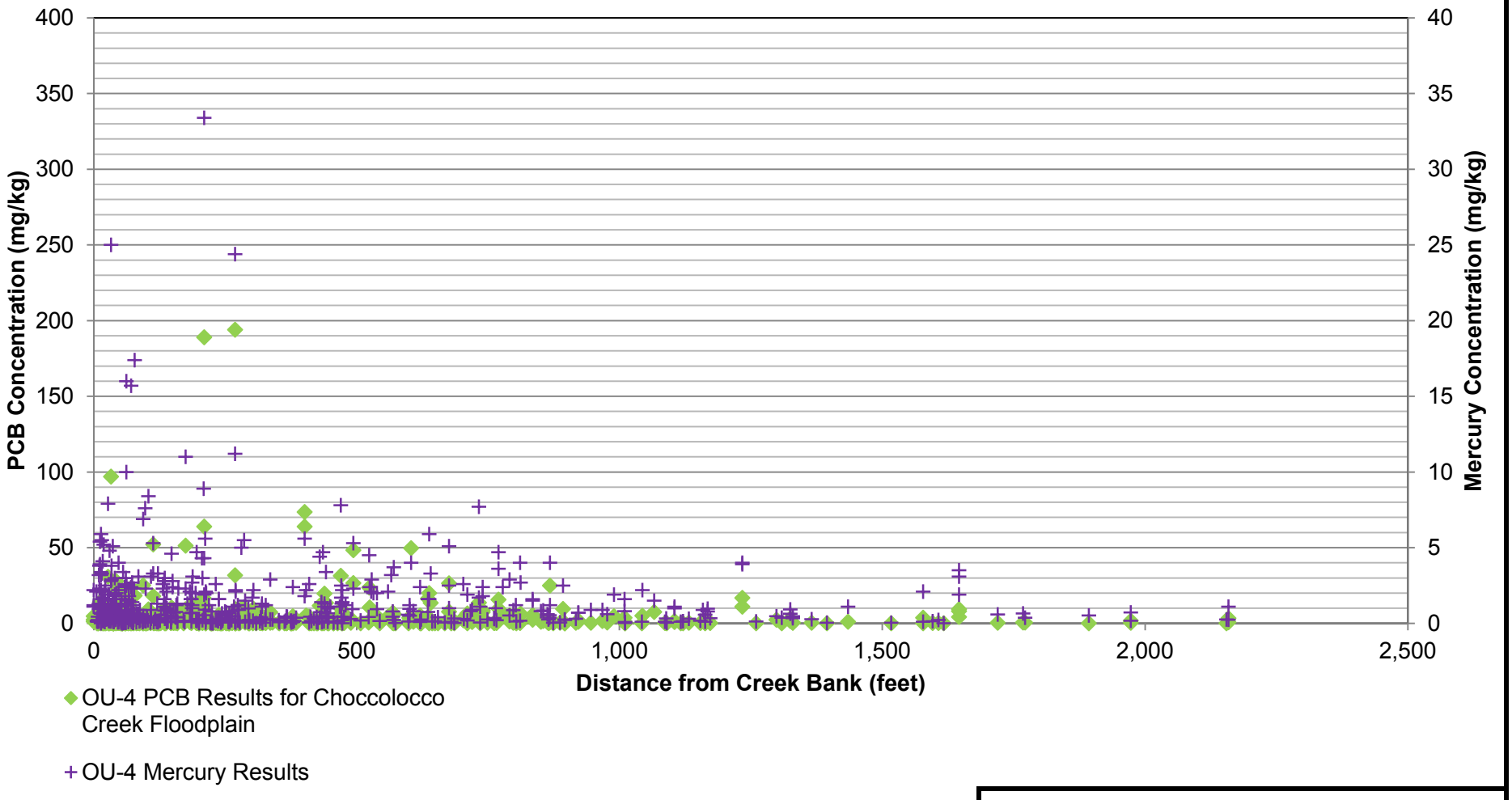
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB and Mercury Concentrations in OU-4 Soil with Distance from Creek Bank

Solutia
Ingenuity Productivity Performance

Figure
4-46a



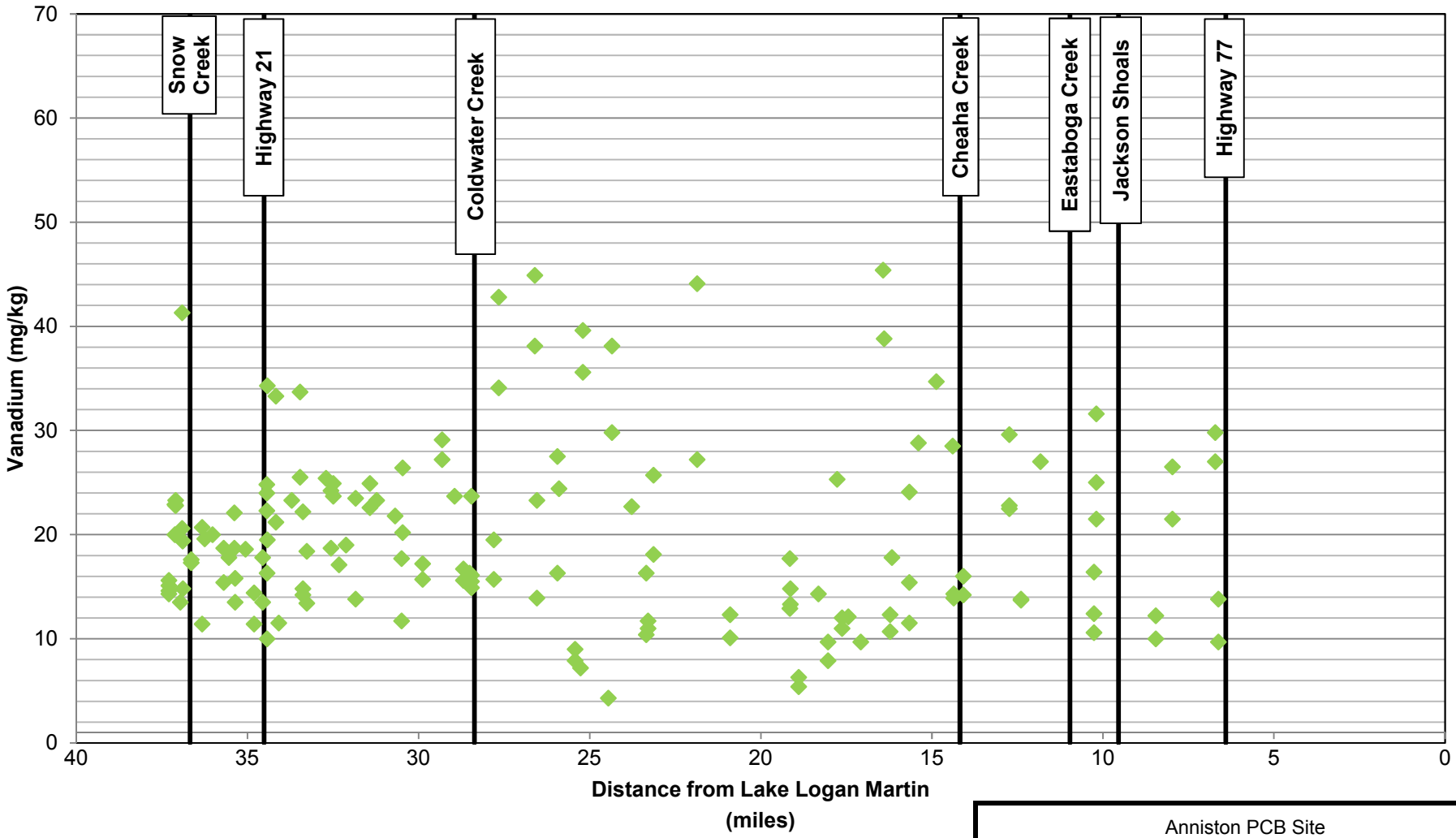
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Paired Total PCB and Mercury Concentrations by Sample Location and Interval in OU-4 Soil with Distance from Creek Bank

Solutia

Figure
4-46b

Notes:
1. PCB and mercury results for Choccolocco Creek and Snow Creek floodplain soil samples collected from the same sample location and interval are shown.
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl



mg/kg: milligrams per kilogram
OU: operable unit

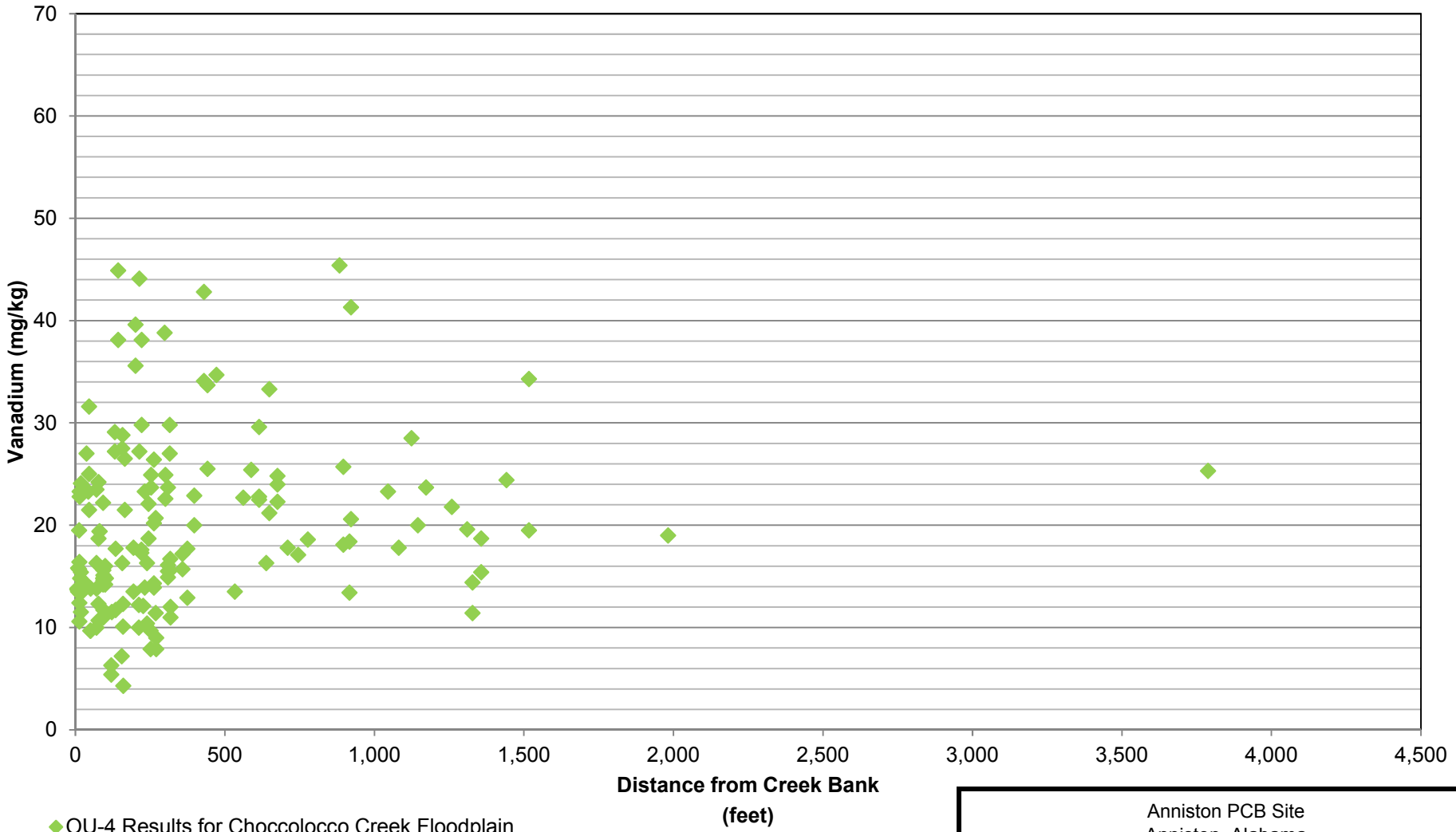
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Vanadium Concentrations in OU-4 Soil with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure
4-47



mg/kg: milligrams per kilogram
OU: operable unit

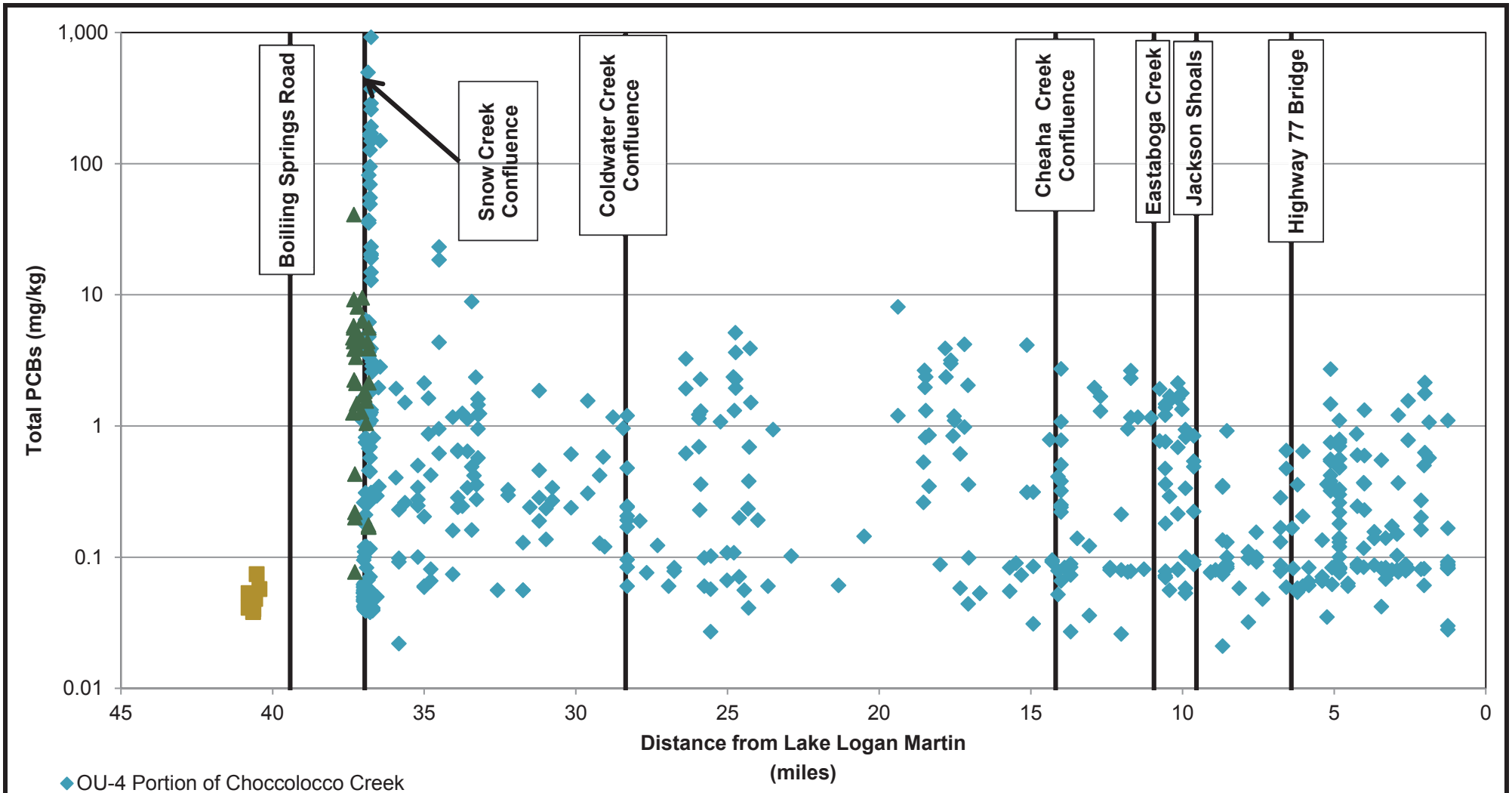
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Vanadium Concentrations in OU-4 Soil with Distance from Creek Bank

Solutia
Ingenuity Productivity Performance

Figure
4-48



mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

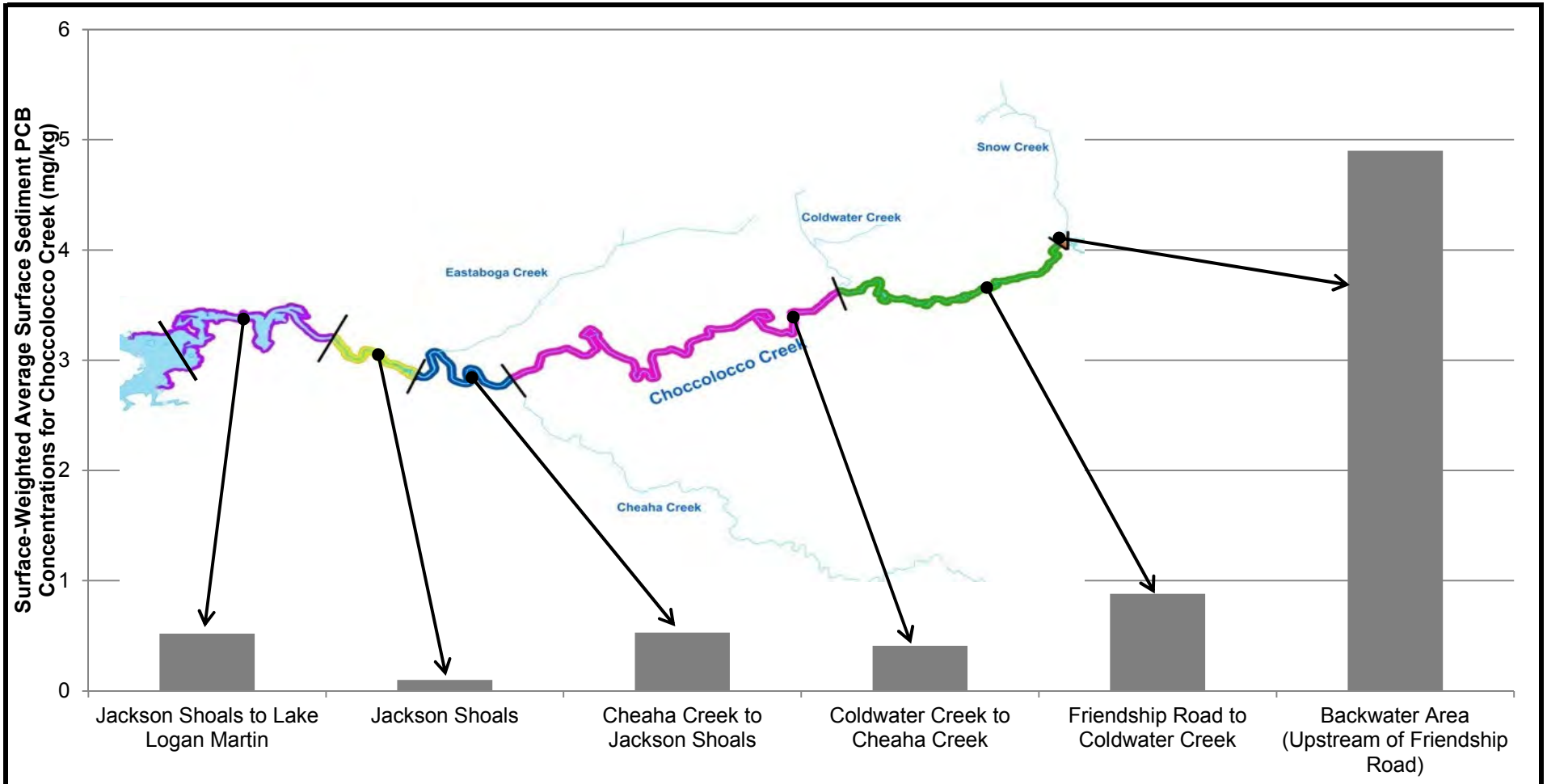
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCB Concentrations in Sediment with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-49



mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Surface-Weighted Average Surface Sediment Concentrations for Choccolocco Creek

Solutia
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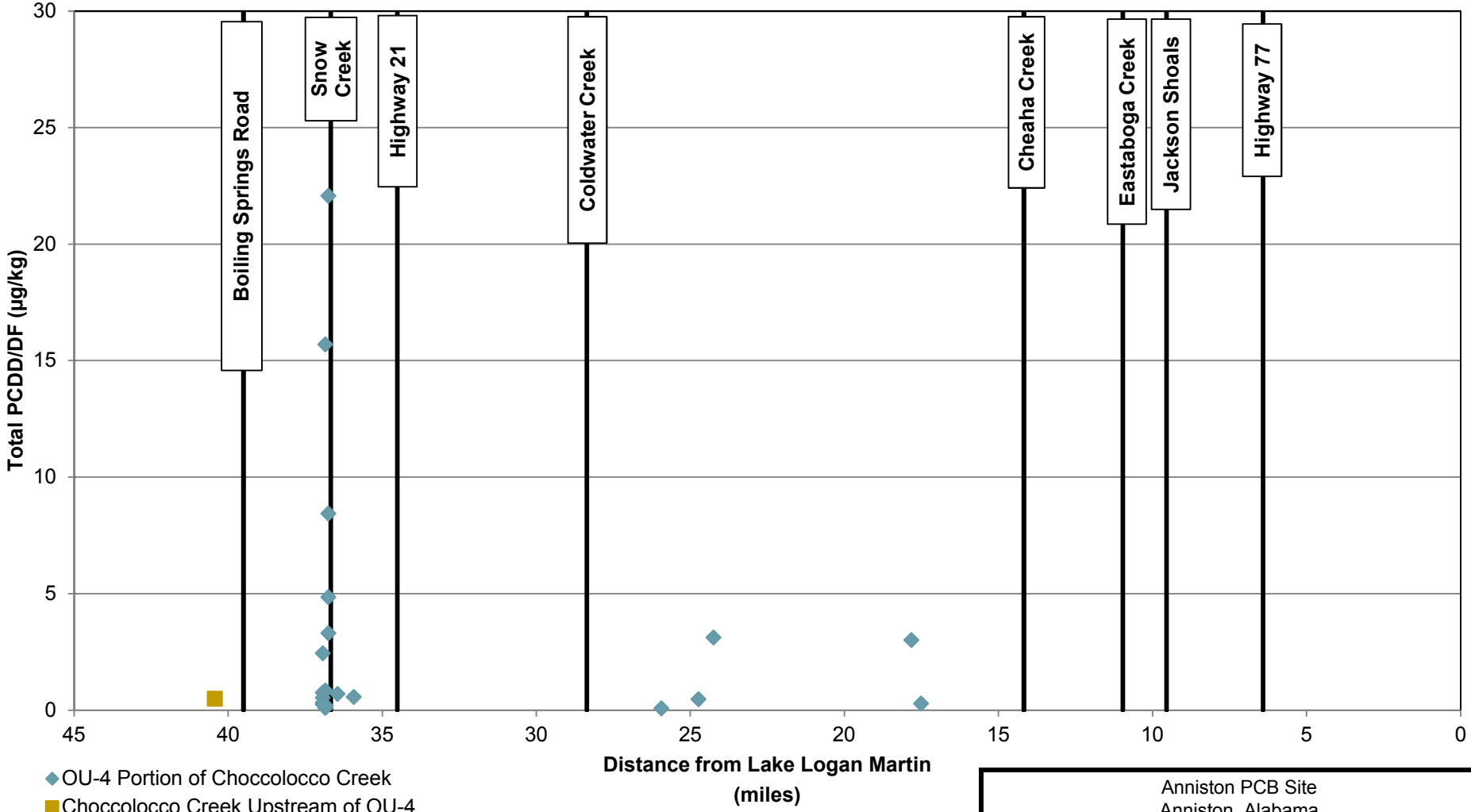
Figure

4-50



µg/kg: micrograms per kilogram
OU: operable unit
PCDD/DF: polychlorinated dibenzo-p-dioxin/dibenzofuran

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCDD/DF Concentrations in Choccolocco Creek Sediment with Distance from Lake Logan Martin

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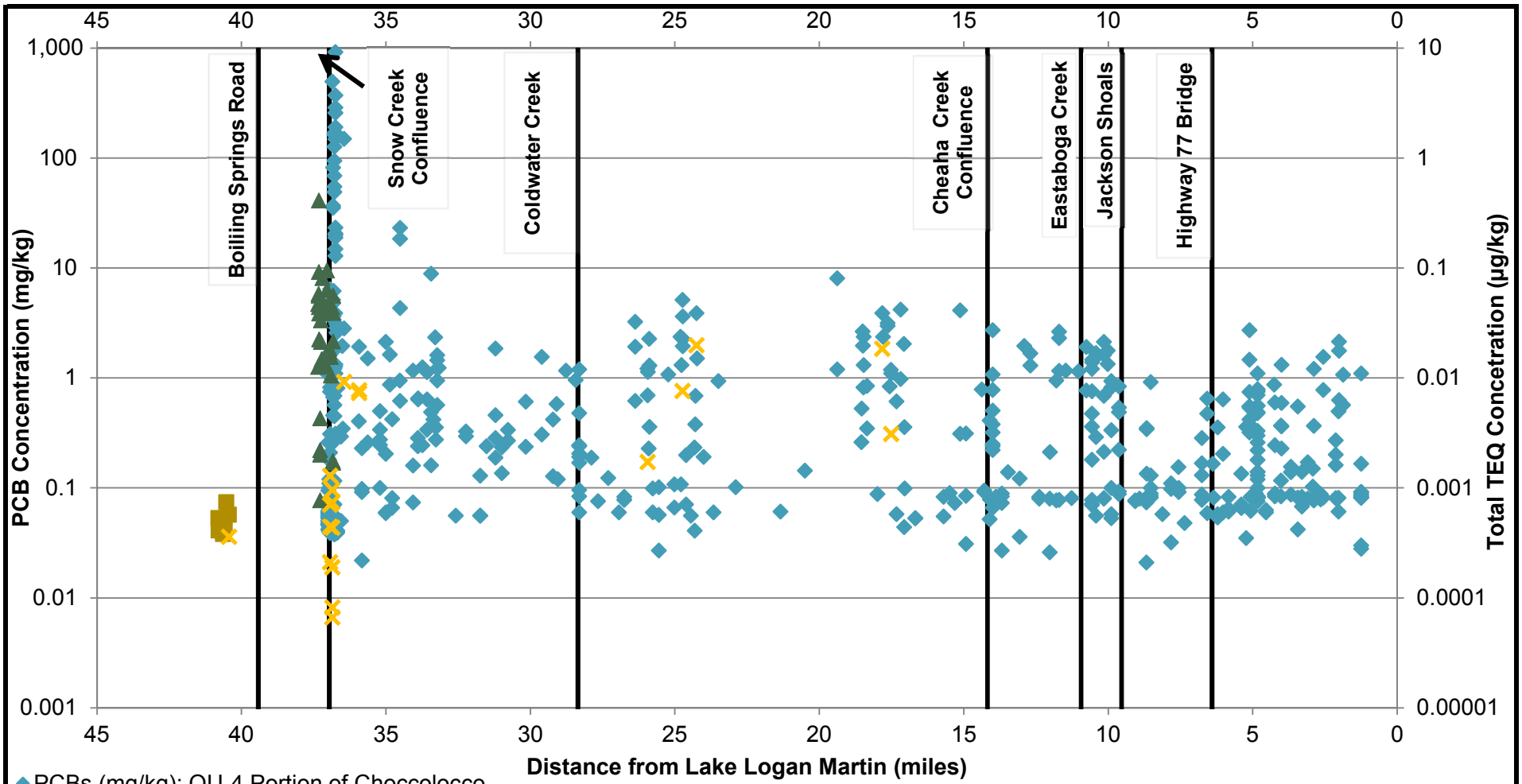
Figure 4-51

8/19/2019
\\arcadis-us\officedata\Fairport-NY\Projects\Anniston\OU-4 RI 2019\Sed_PCB_Hg_TEQDistance_by_Area_20190819Figure 4b_TEQ ND0



- PCBs (mg/kg): OU-4 Portion of Choccolocco Creek
- PCBs (mg/kg): Choccolocco Creek Upstream of OU-4
- PCBs (mg/kg): OU-4 Portion of Snow Creek
- Total TEQ ND = 0 (µg/kg)

Notes:
µg/kg: milligrams per kilogram
mg/kg: milligrams per kilogram
ND: nondetect
PCB: polychlorinated biphenyl
Total TEQ: sum of dioxin-like PCB congeners and dioxin/furan toxicity equivalents (mammal)

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Anniston, Alabama

Feasibility Study Report for OU-4

PCB and TEQ Concentrations in Choccolocco Creek Sediment with Distance from Lake Logan Martin

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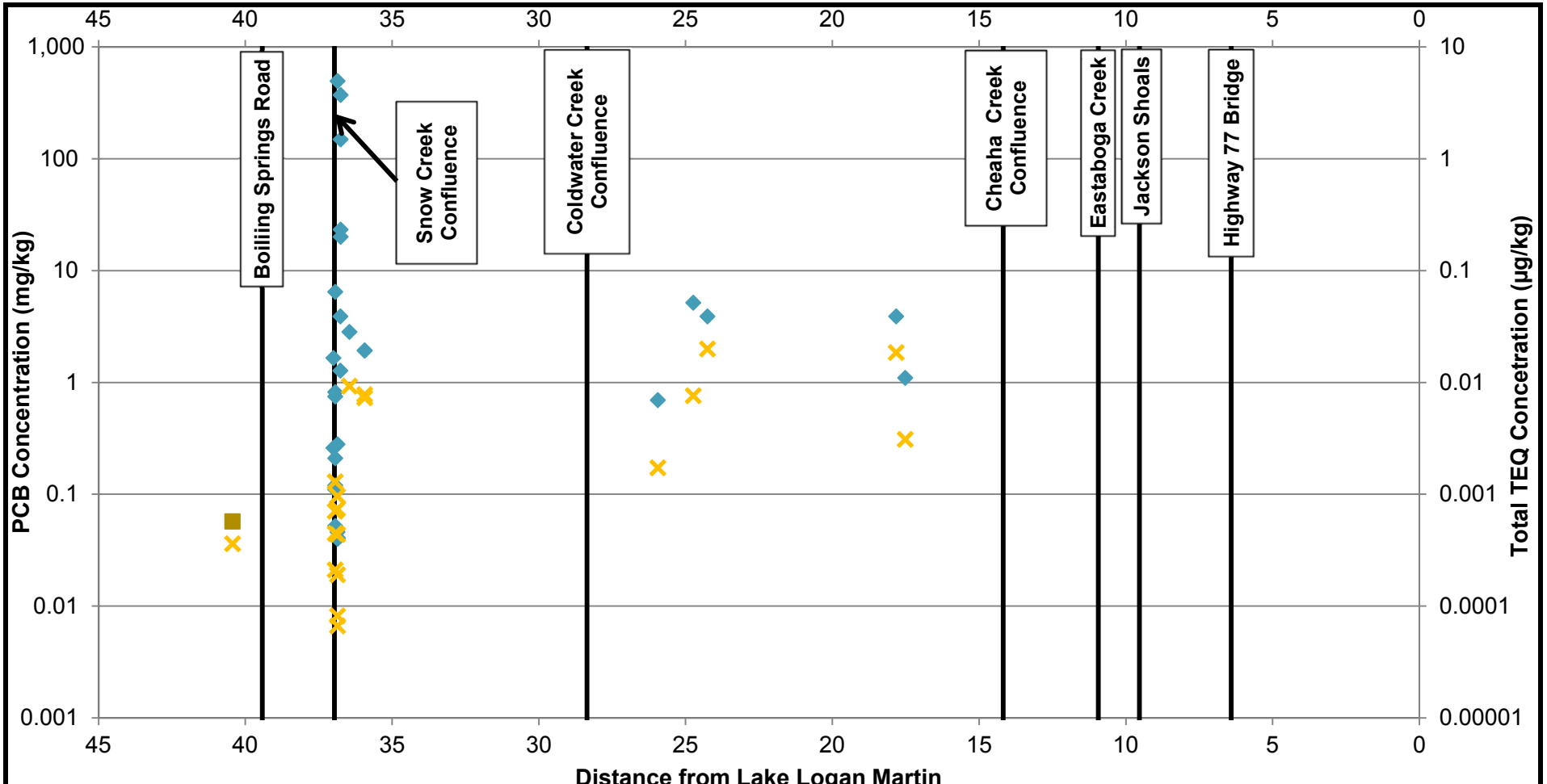
Ingenuity Productivity Performance

Figure
4-52a



◆ PCBs (mg/kg): OU-4 Portion of Choccolocco Creek

■ PCBs (mg/kg): Choccolocco Creek Upstream of OU-4

× Total TEQ ND = 0 (ug/kg): OU-4 Results

Notes:
1. PCB and Total TEQ results for OU-4 sediment samples collected from the same sample location and interval are shown.
µg/kg: micrograms per kilogram
mg/kg: milligrams per kilogram
mi: miles
ND: nondetect
PCB: polychlorinated biphenyl
Total TEQ: sum of dioxin-like PCB congeners

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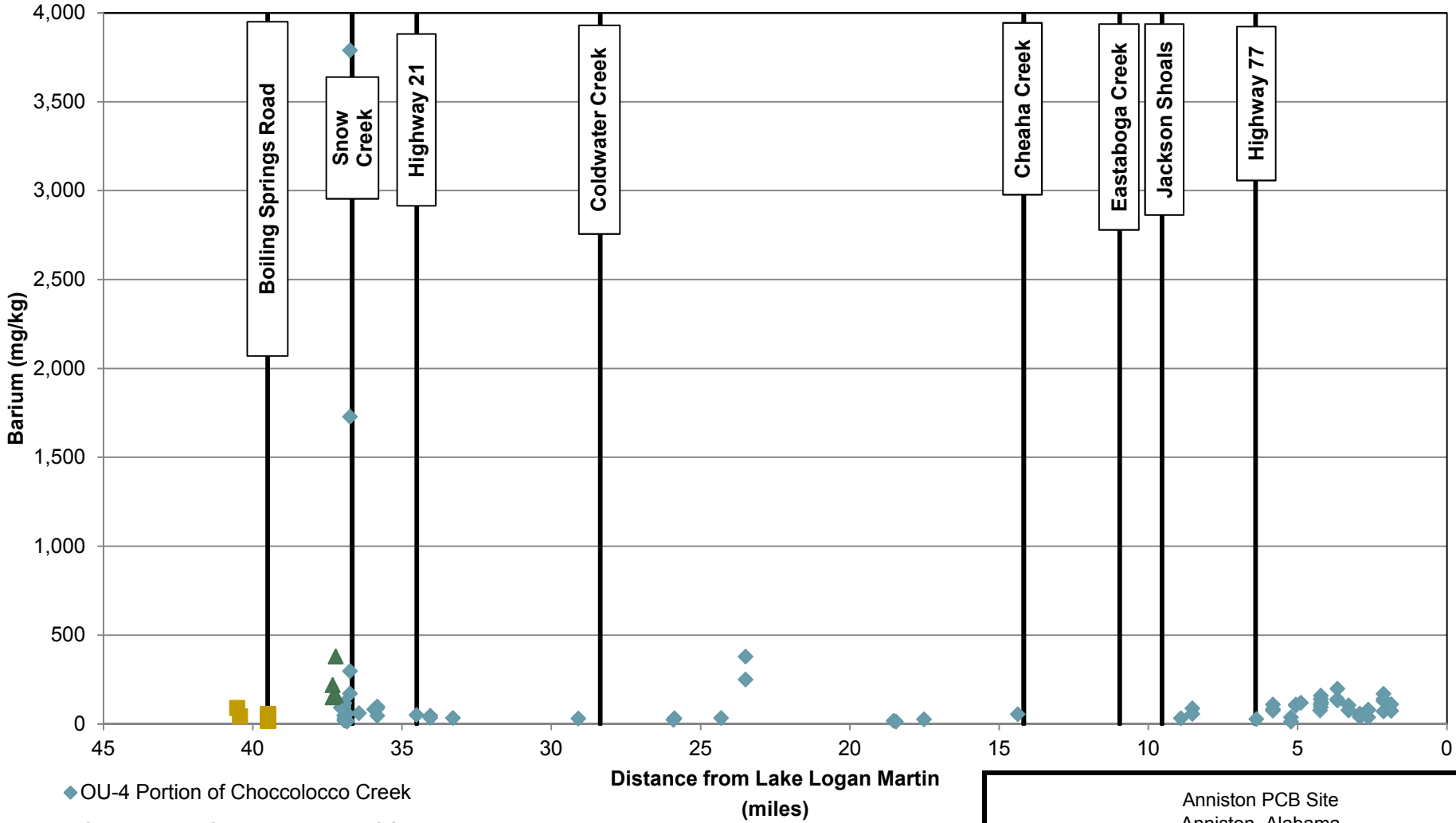
Feasibility Study Report for OU-4

Paired Total PCB and Total TEQ Concentrations in Choccoloco Creek Sediment with Distance from Lake Logan

Solutia™ Ingenuity Productivity Performance

Figure
4-52b



mg/kg: milligrams per kilogram
OU: operable unit

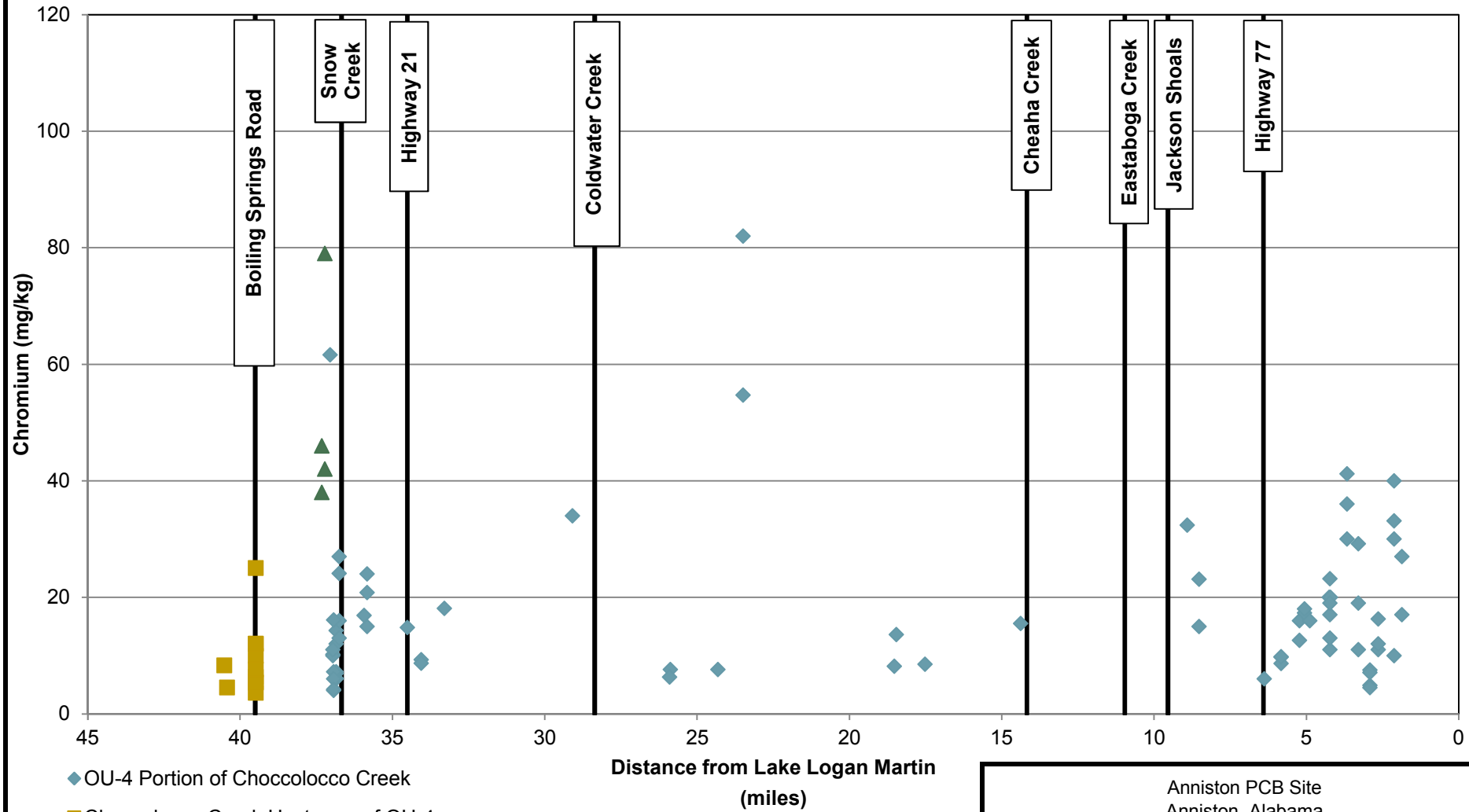
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Barium Concentrations in Sediment with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure
4-53



mg/kg: milligrams per kilogram
OU: operable unit

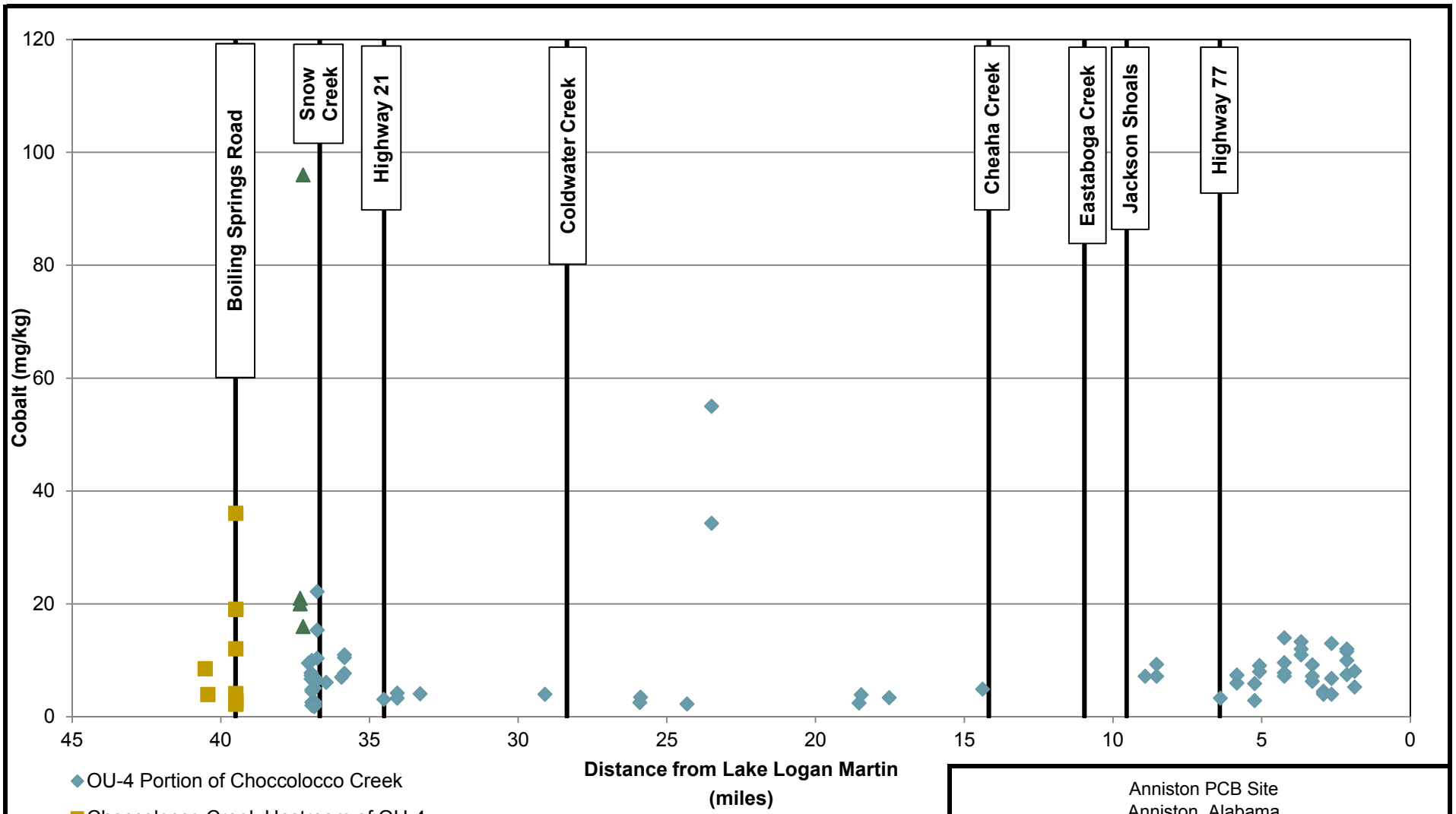
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Chromium Concentrations in Sediment with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-54



mg/kg: milligrams per kilogram
OU: operable unit

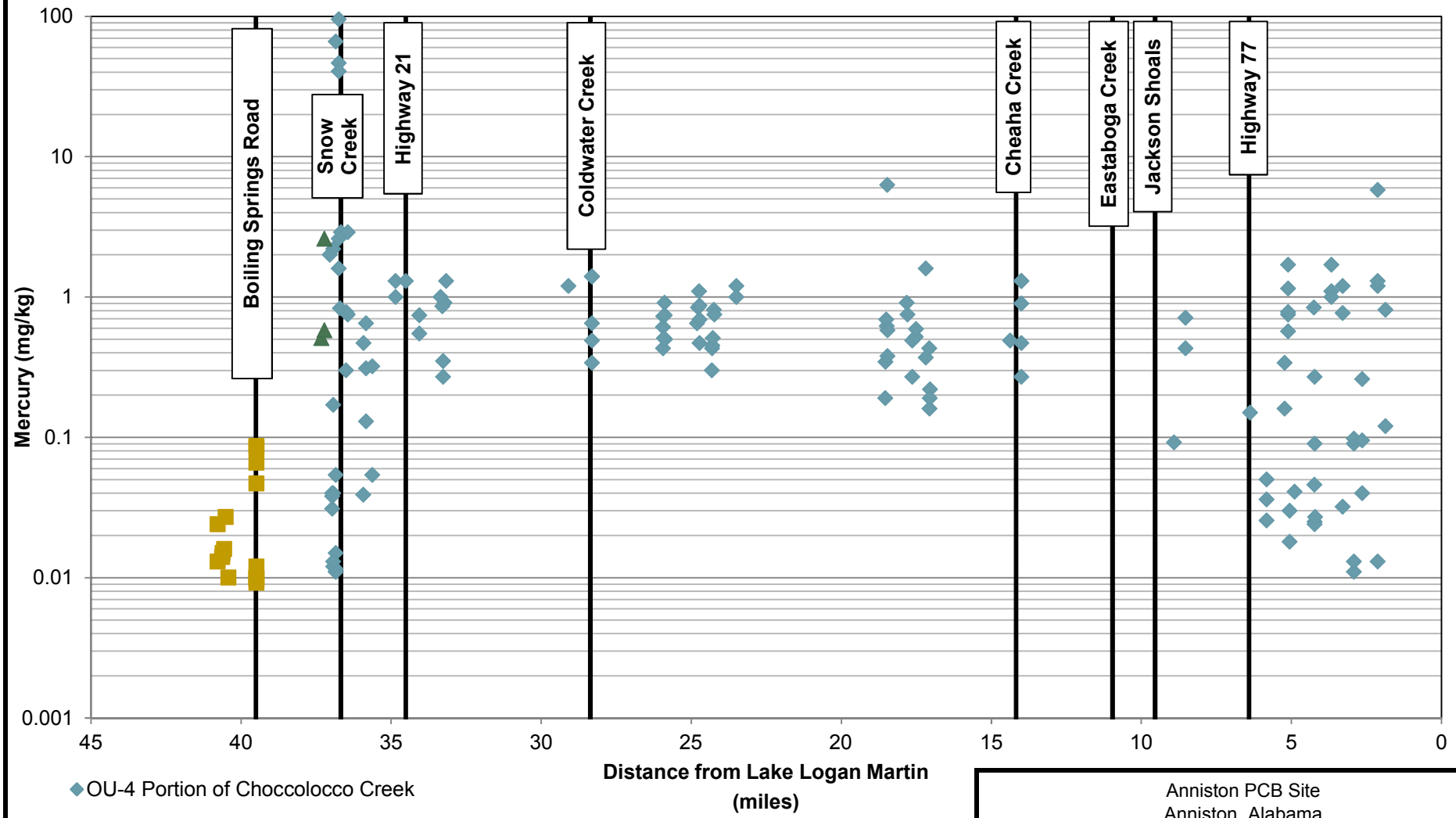
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Cobalt Concentrations in Sediment with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-55



mg/kg: milligrams per kilogram
OU: operable unit

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

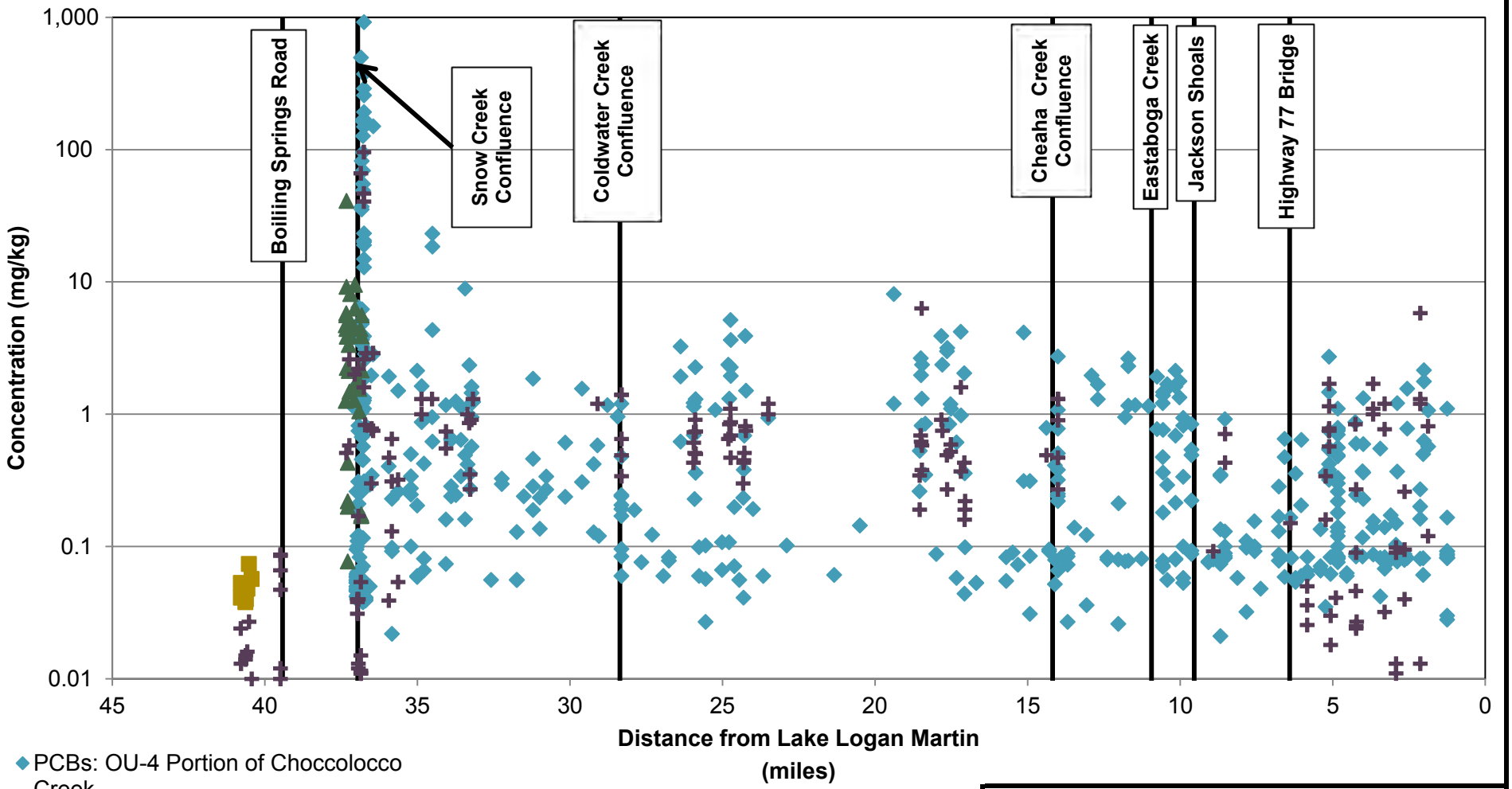
Mercury Concentrations in Sediment with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure

4-56

5/7/2019
C:\Users\mshivell\Documents\anniston\OU-4\OU-4 RI 2019\Sed_PCB_Hg_TEQDistance_by_Area_20190506.xlsxFigure 1_Hg



Notes:
mg/kg: milligrams per kilogram
mi: miles
PCB: polychlorinated biphenyl

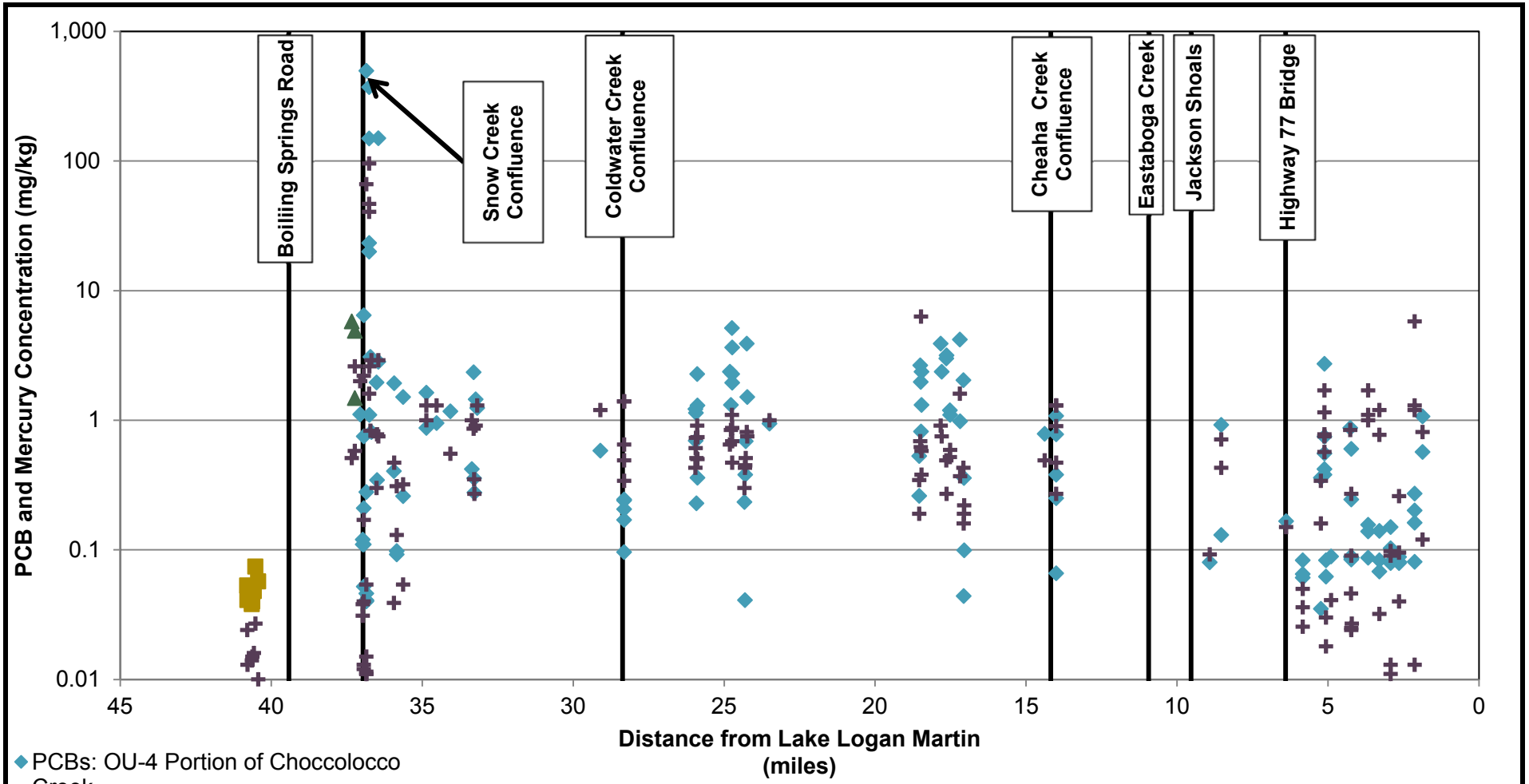
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Total PCB and Mercury Concentrations in Sediment with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure
4-57a



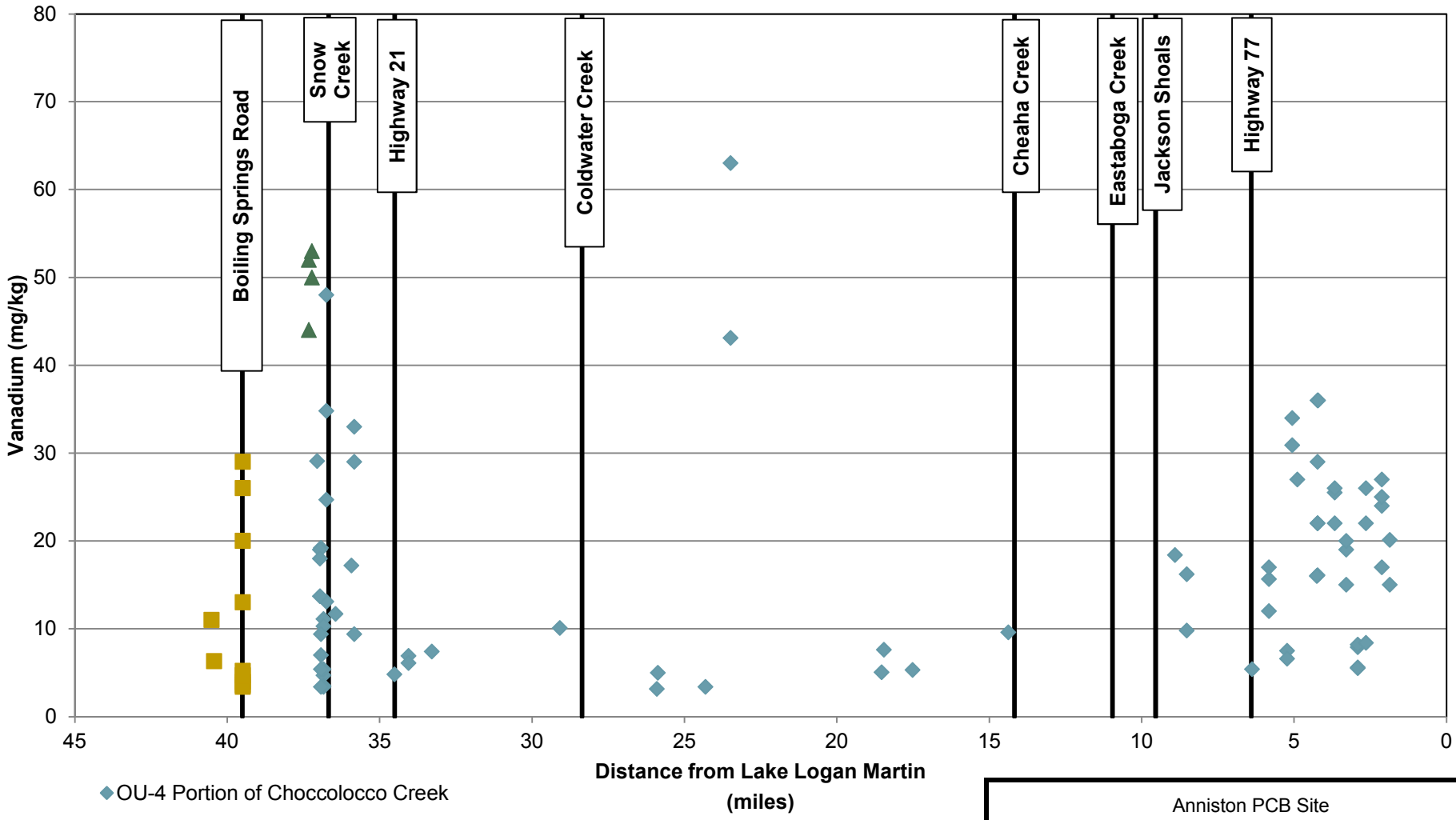
Notes:
1. PCB and mercury results for OU-4 sediment samples collected from the same sample location and interval are shown.
mg/kg: milligrams per kilogram
mi: miles
PCB: polychlorinated biphenyl

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Paired Total PCB and Mercury Concentrations in Sediment Matched by Location and Sample Depth with Distance from Lake Logan Martin

Solutia Ingenuity Productivity Performance

Figure 4-57b



mg/kg: milligrams per kilogram
OU: operable unit

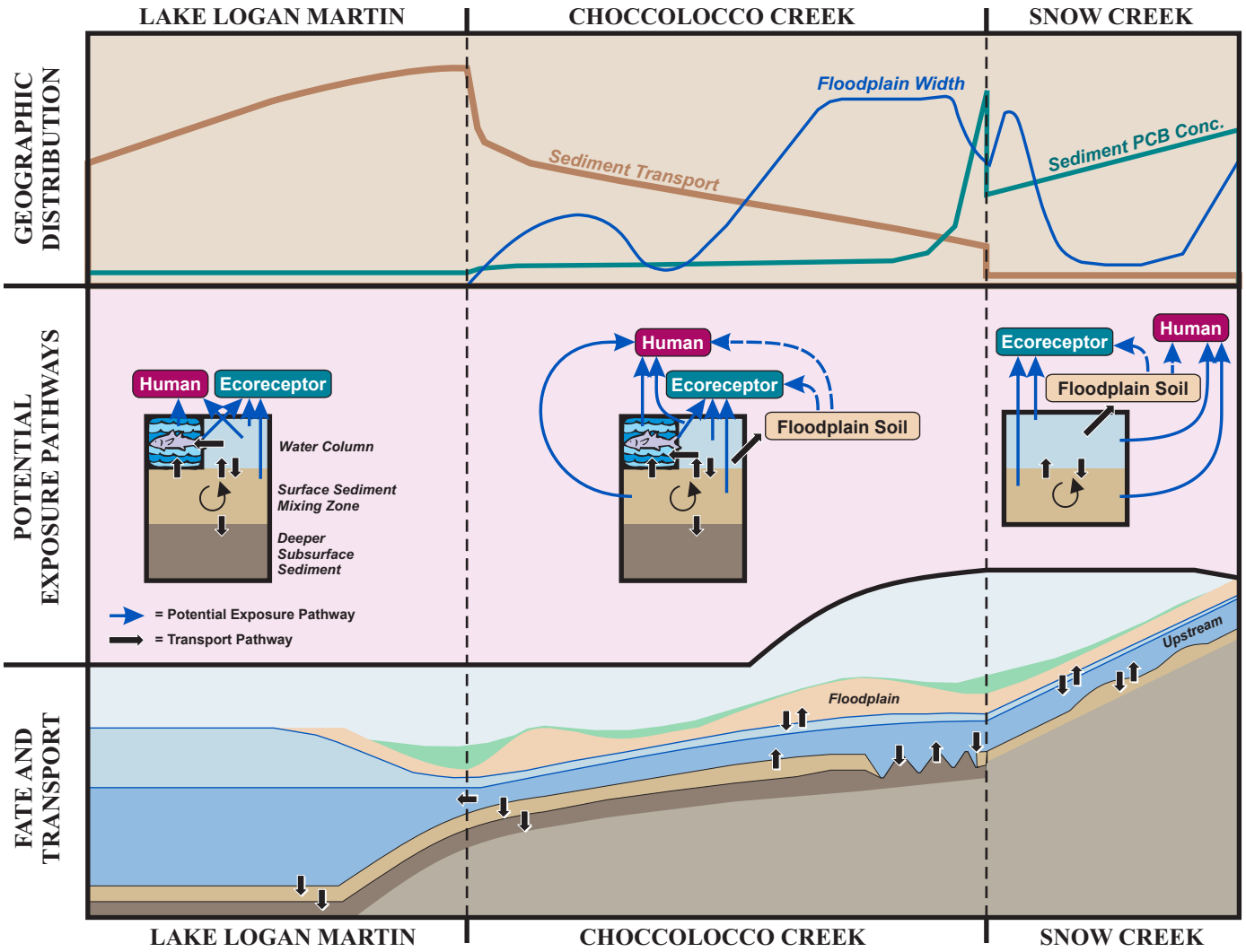
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Vanadium Concentrations in Sediment with Distance from Lake Logan Martin

Solutia
Ingenuity Productivity Performance

Figure 4-58



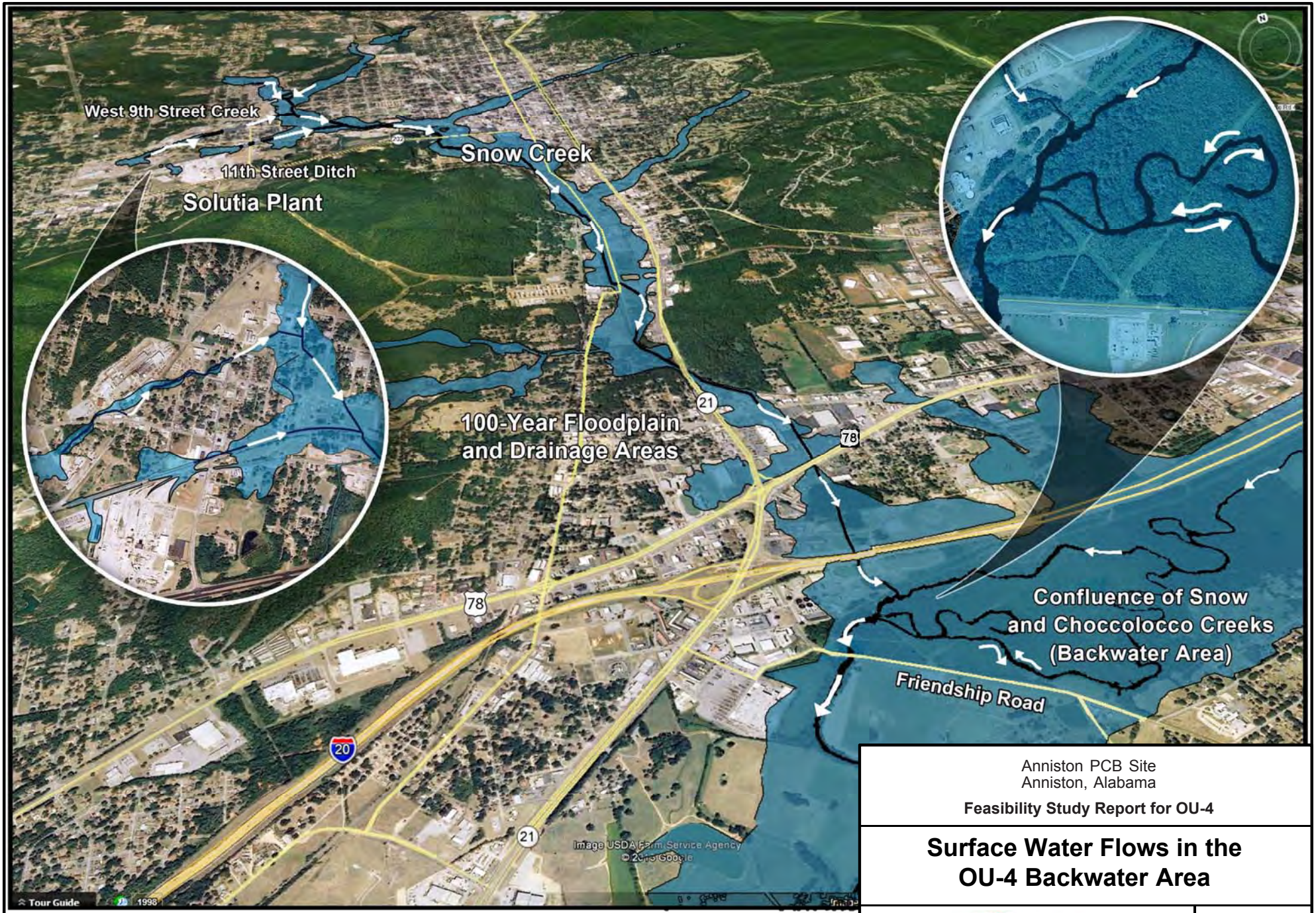
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Conceptual Site Model

Solutia
Ingenuity Productivity Performance

Figure
4-59



Anniston PCB Site
Anniston, Alabama

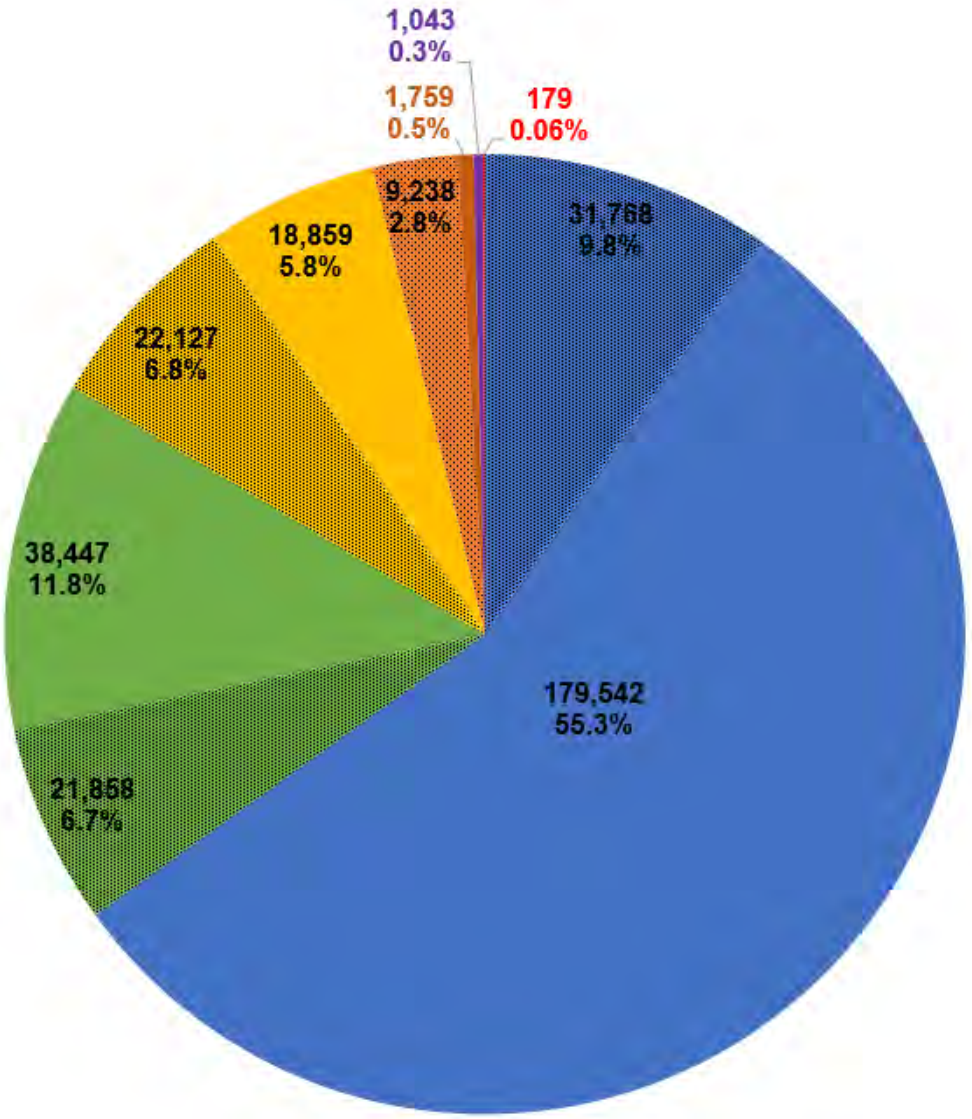
Feasibility Study Report for OU-4

Surface Water Flows in the OU-4 Backwater Area

Imagery Source: Google Earth
Imagery Date: 7/31/2011

Solutia

Figure
4-60



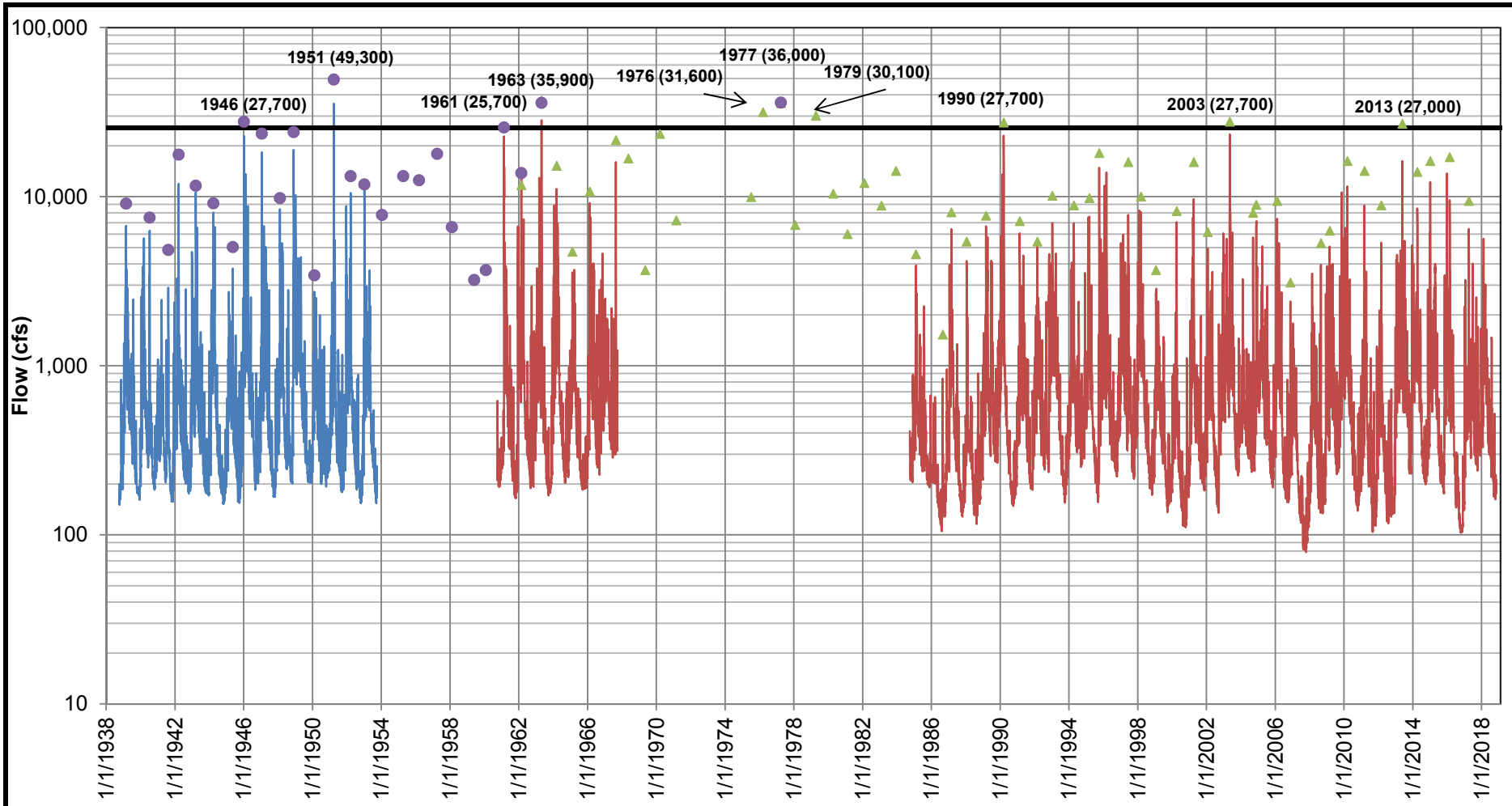
Linear feet of creek bank and percent of total upstream and downstream of river mile 29.5.

Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Summary of Creek Bank Stability Relative to River Mile 29.5 of Choccolocco Creek

Solutia

Figure
4-61



Daily Flow at Lincoln
Daily Flow at Jackson Shoals
Peak Flows at Jackson Shoals
Peak Flows at Lincoln
10-Year Flow (25,500 cfs)

Event	Flow (cfs)
2-year	10,500
10-year	25,500
25-year	40,000
50-year	52,000
100-year	55,000

Note:
Flow data from USGS gauge numbers 2404400 and 2404500.

cfs: cubic feet per second

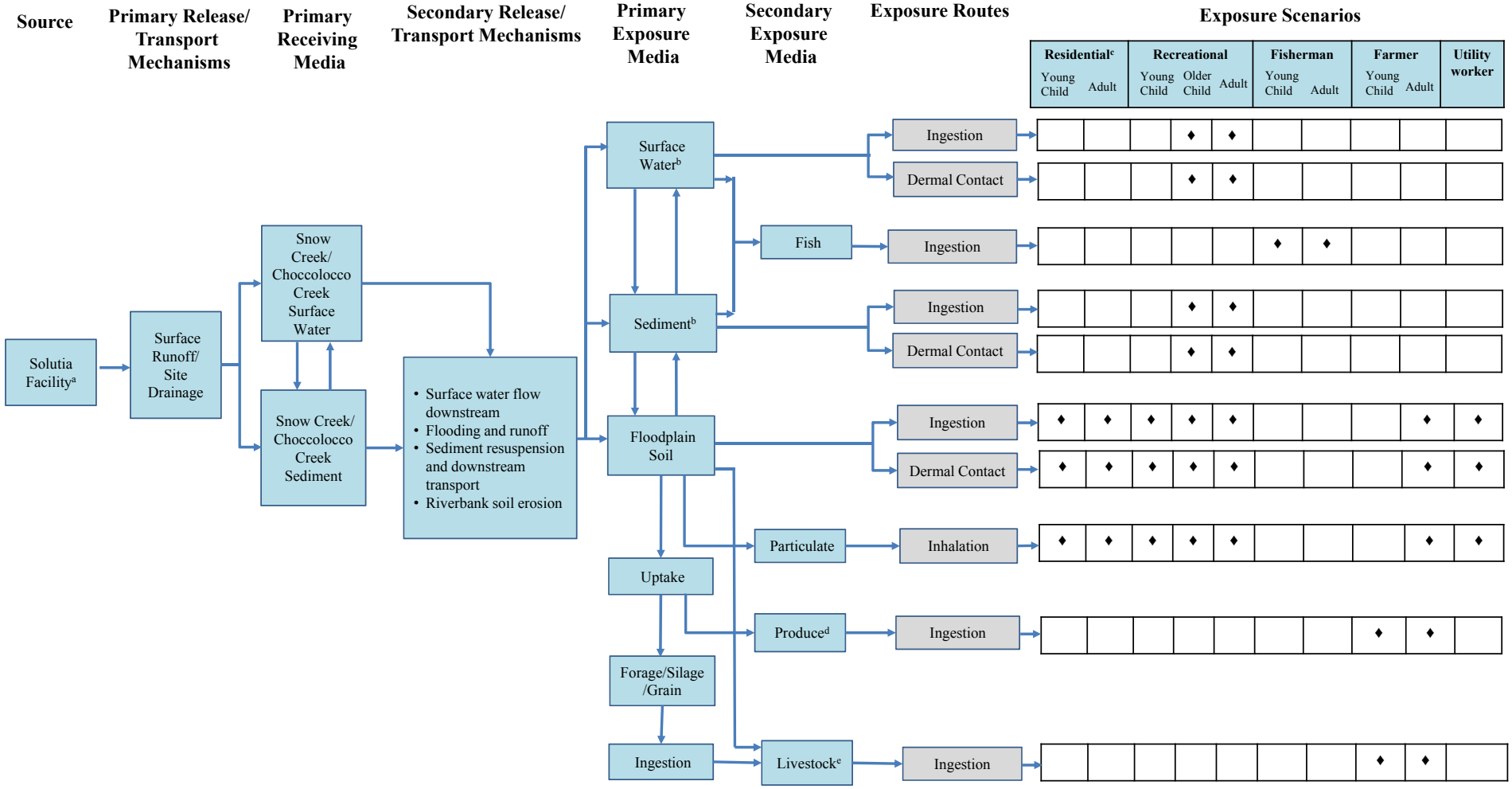
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Summary of Flow in Choccolocco Creek at or near Jackson Shoals

Solutia

Figure
4-62



♦ signifies a complete exposure pathway

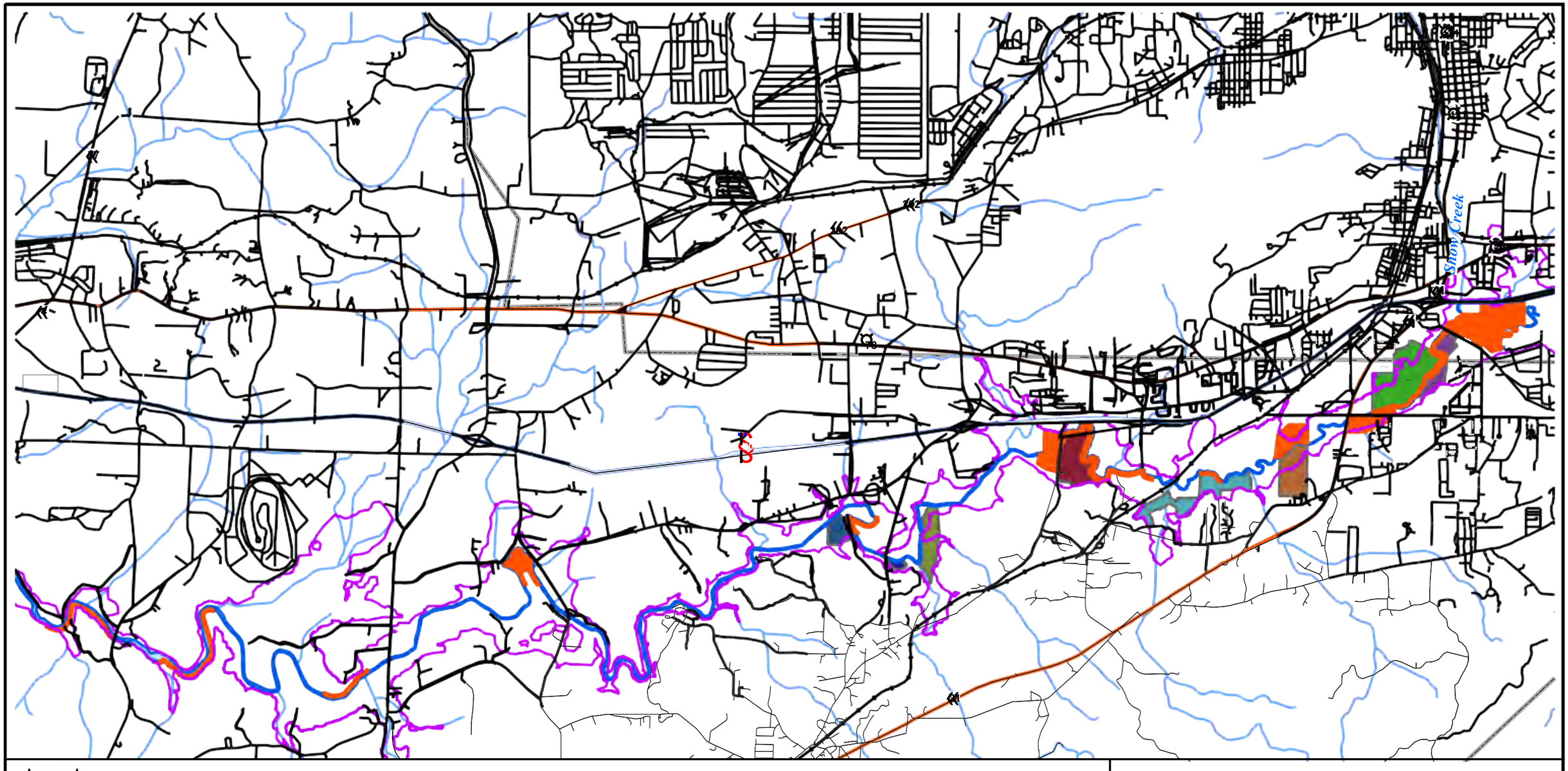
a. Includes all facility-related sources
b. Contaminant concentrations in surface water are qualitatively evaluated by comparing to risk-based concentrations. Consistent with USEPA Region 4 guidance, sediment under water will not be evaluated.
c. PCB concentrations (95%UCLs) at residentially used areas were compared to the 1 mg/kg remedial level. Areas with concentrations greater than 1 mg/kg will be evaluated further in future remedial decisions.
d. Includes aboveground and belowground produce.
e. Includes beef (current and future) and dairy products, chickens, and eggs (future only).

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

Conceptual Site Model for HHRA

Solutia

Figure 5-1



Legend

- 100-yr. Floodplain
- Ag Use Restriction

Ag Exposure Units (EUs)

- Ag EU1
- Ag EU2
- Ag EU3
- Ag EU4
- Ag EU5
- Ag EU6
- Ag EU7
- Ag EU8

Notes:
Ag: agriculture
yr: year

3,000 0 3,000 6,000 9,000

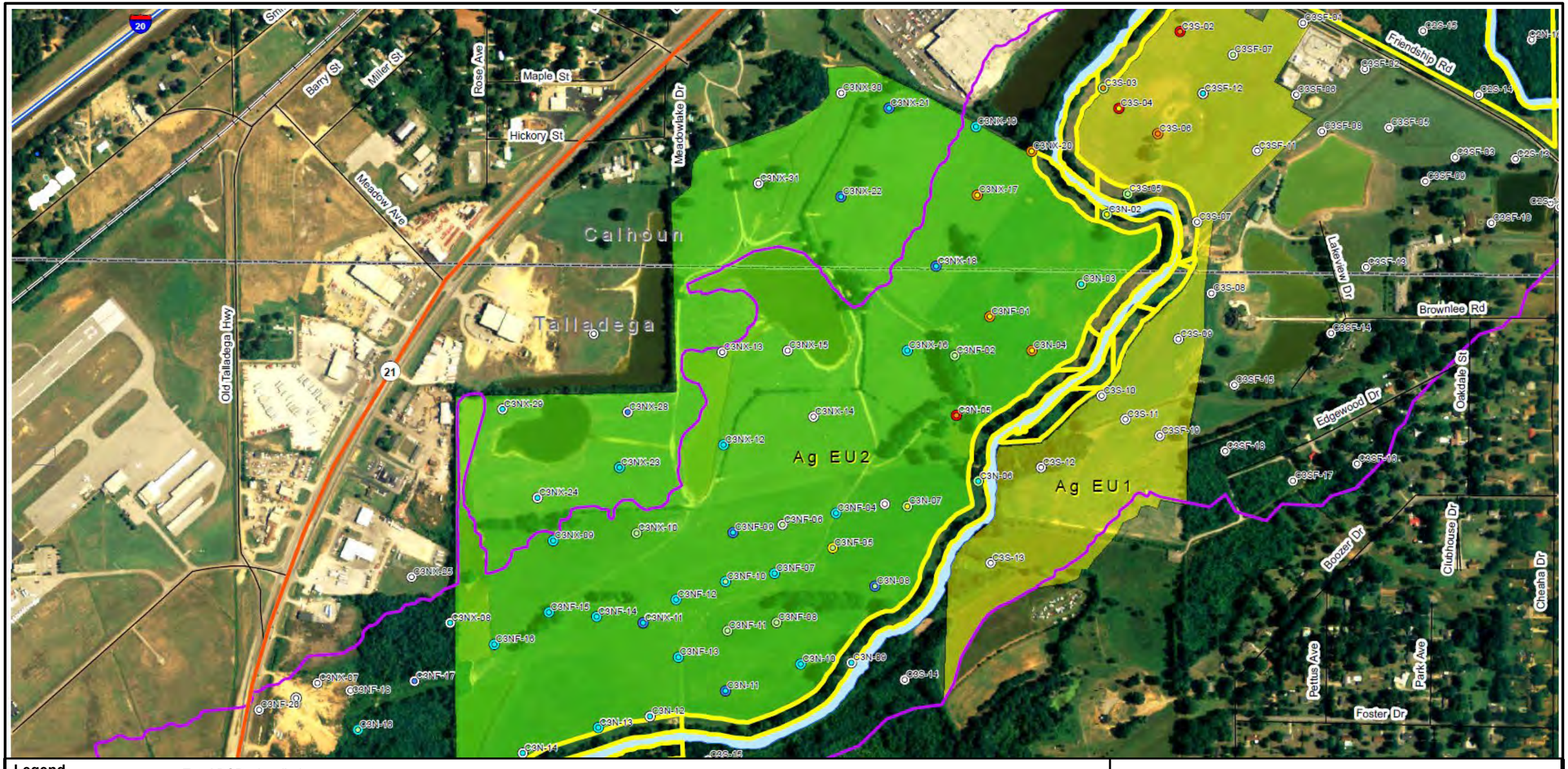
Scale in Feet

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Use Restriction and Agriculture Exposure Units

Solutia

Figure
5-2



Legend

Soil Depth Interval
- 0-6 Inches
- 6-12 Inches

100-yr. Floodplain

Use Restriction

Ag Exposure Units (EUs)
- Ag EU1
- Ag EU2

Total PCBs (mg/kg)
- < 1
- 1 - 2
- 2 -10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

Notes:
Ag: agriculture
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl
yr: year

300 0 300 600 900

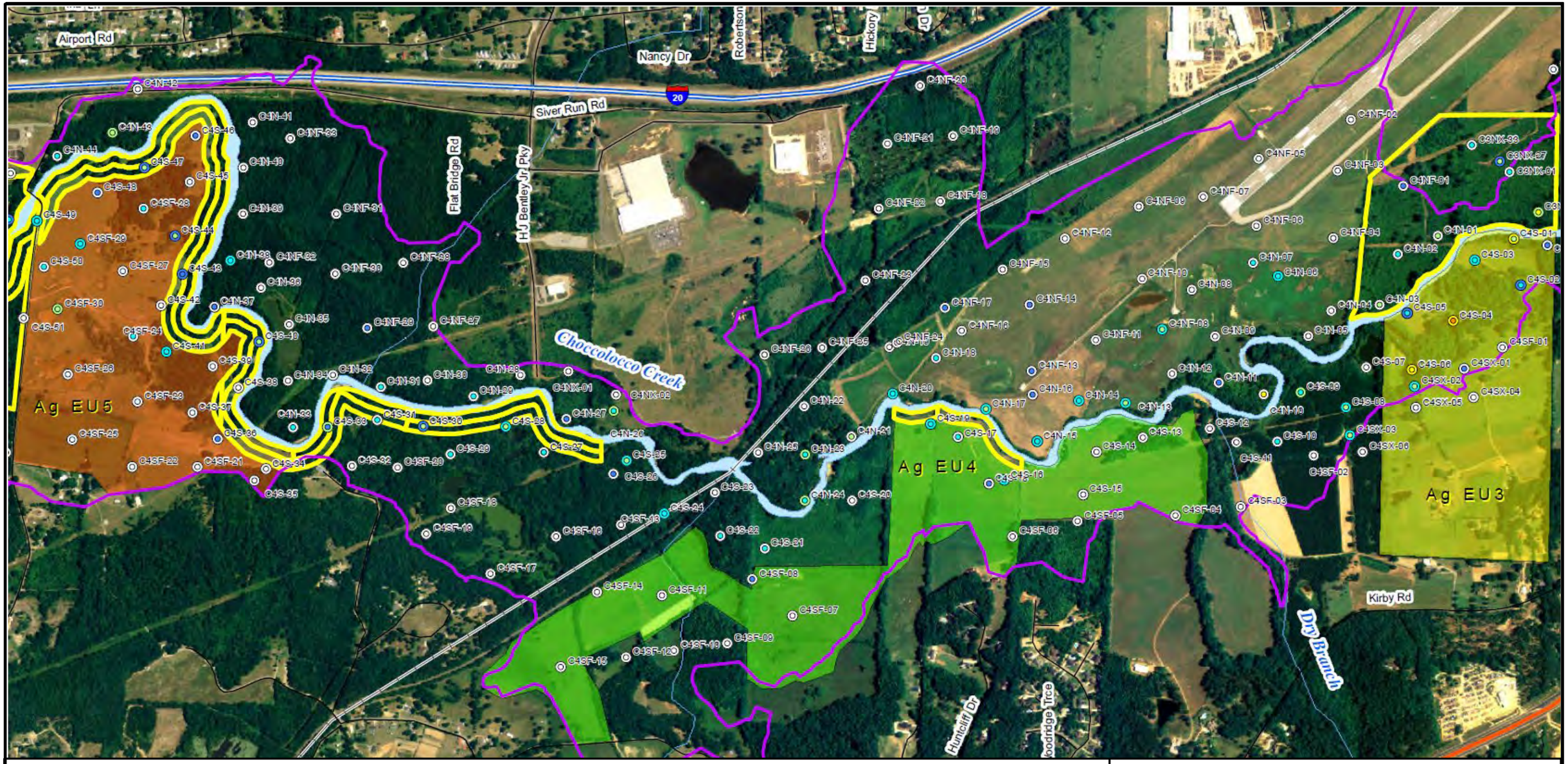
Scale in Feet

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Agriculture Exposure Units: EU1 and EU2

Solutia

Figure
5-3



Legend

Soil Depth Interval
- 0-6 Inches
- 6-12 Inches

100-yr. Floodplain

Use Restriction

Ag Exposure Units (EUs)
- Ag EU3
- Ag EU4
- Ag EU5

Total PCBs (mg/kg)
- < 1
- 1 - 2
- 2 -10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

Notes:
Ag: agriculture
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl
yr: year

500 0 500 1,000 1,500
Scale in Feet

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Agriculture Exposure Units: EU3, EU4, and EU5

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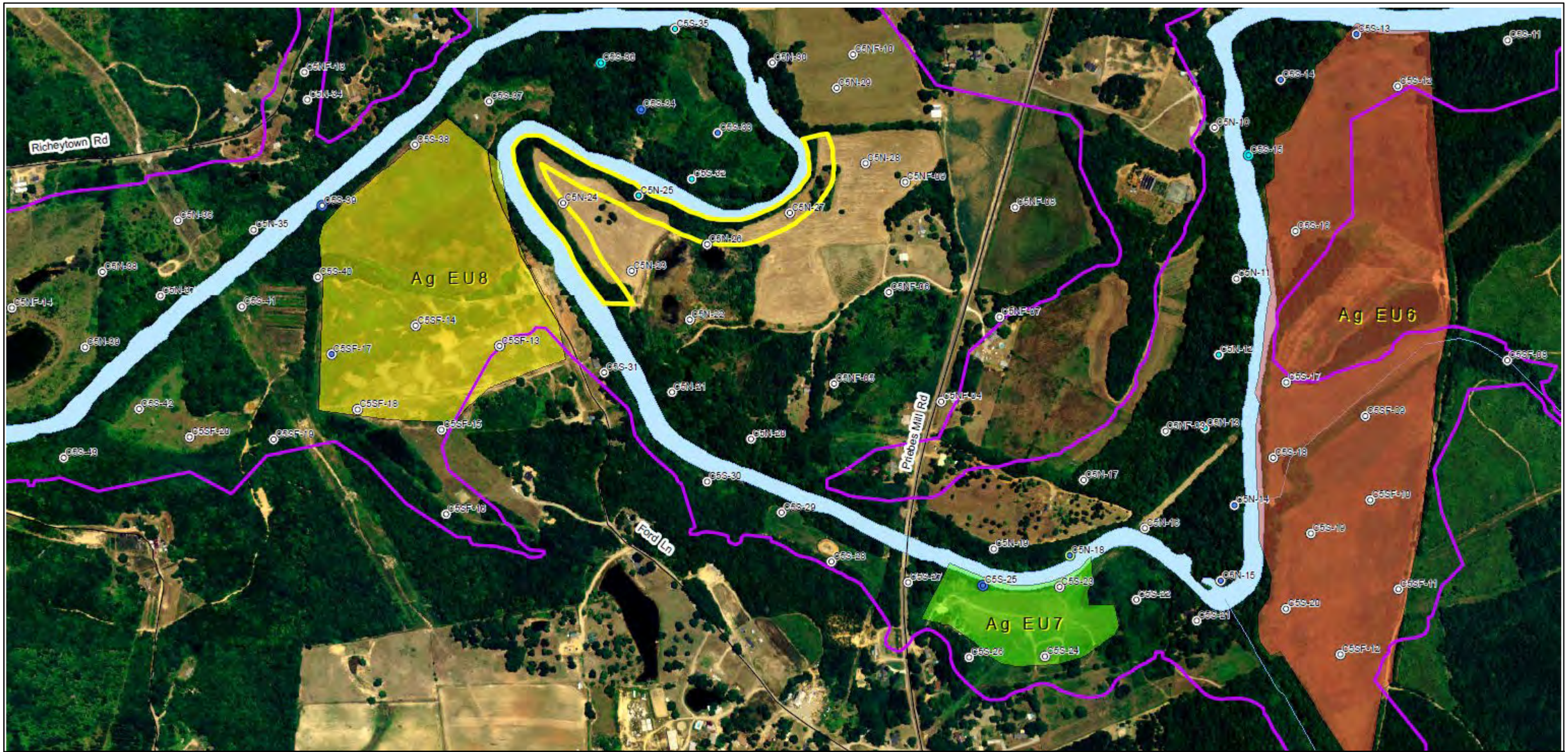
Figure
5-4



Legend

Soil Depth Interval
- 0-6 Inches
- 6-12 Inches

100-yr. Floodplain

Use Restriction

Ag Exposure Units (EUs)
- Ag EU6
- Ag EU7
- Ag EU8

Total PCBs (mg/kg)
- < 1
- 1 - 2
- 2 -10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

Notes:
Ag: agriculture
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl
yr: year

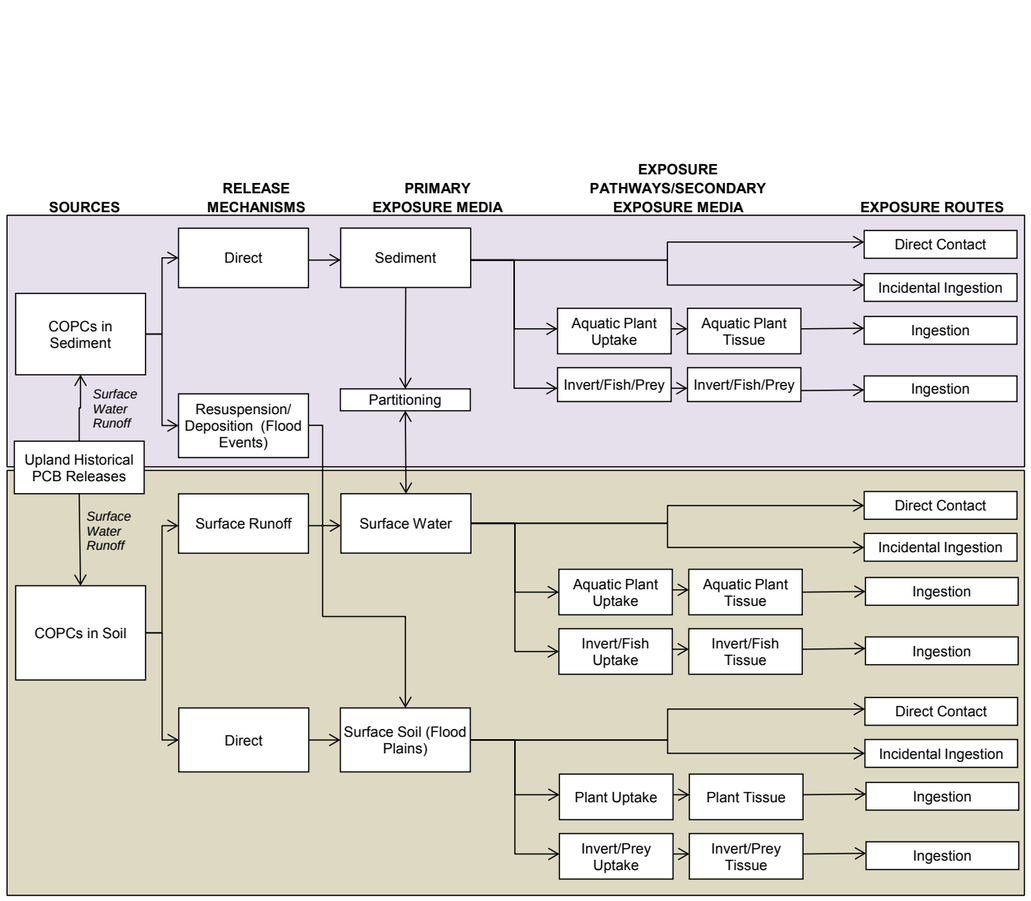
300 0 300 600 900
Scale in Feet

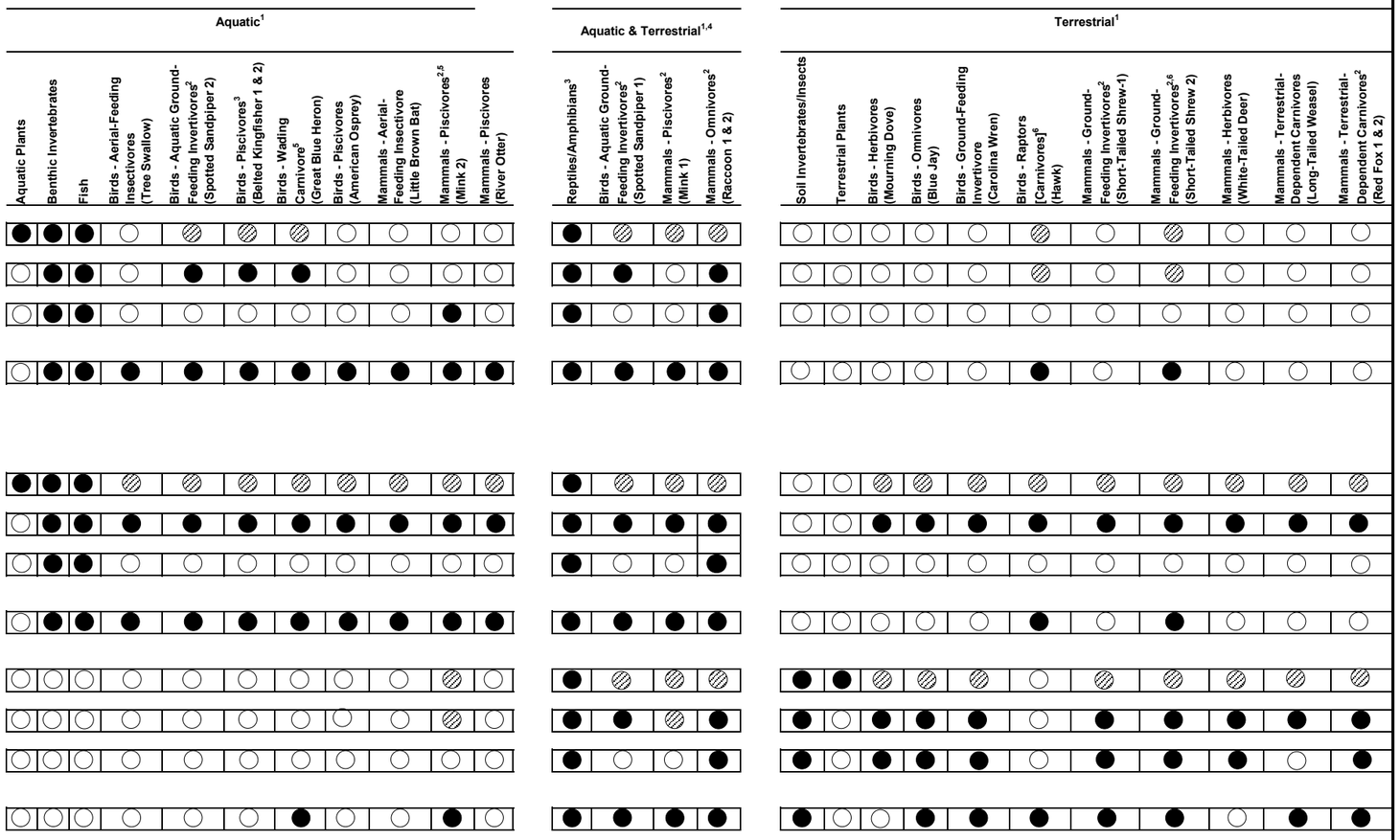
Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Agriculture Exposure Units: EU6, EU7, and EU8

Solutia

Figure
5-5





Notes:

COPCs: Constituents of Potential Concern

○ Exposure pathway considered *de minimus* . Not quantitatively evaluated.

▨ Pathway complete but expected to be minimal relative to the identified primary complete pathways. Not quantitatively evaluated.

● High potential for complete exposure pathway. Primary pathway quantitatively evaluated.

1. Representative species listed in parentheses.
2. Multiple scenarios evaluated (See Tables 8-13b and 8-14b for different exposure scenarios).
3. Complete pathways identified but due to lack of toxicity values, potential risks could not be quantified.
4. These receptors may be exposed to both aquatic and terrestrial media and/or prey.
5. Receptor is primarily aquatic but has a small percentage of terrestrial prey (mammals/birds) as part of its diet composition.
6. Receptor is primarily terrestrial but has a small percentage of aquatic prey (amphibians/reptiles) as part of its diet composition.

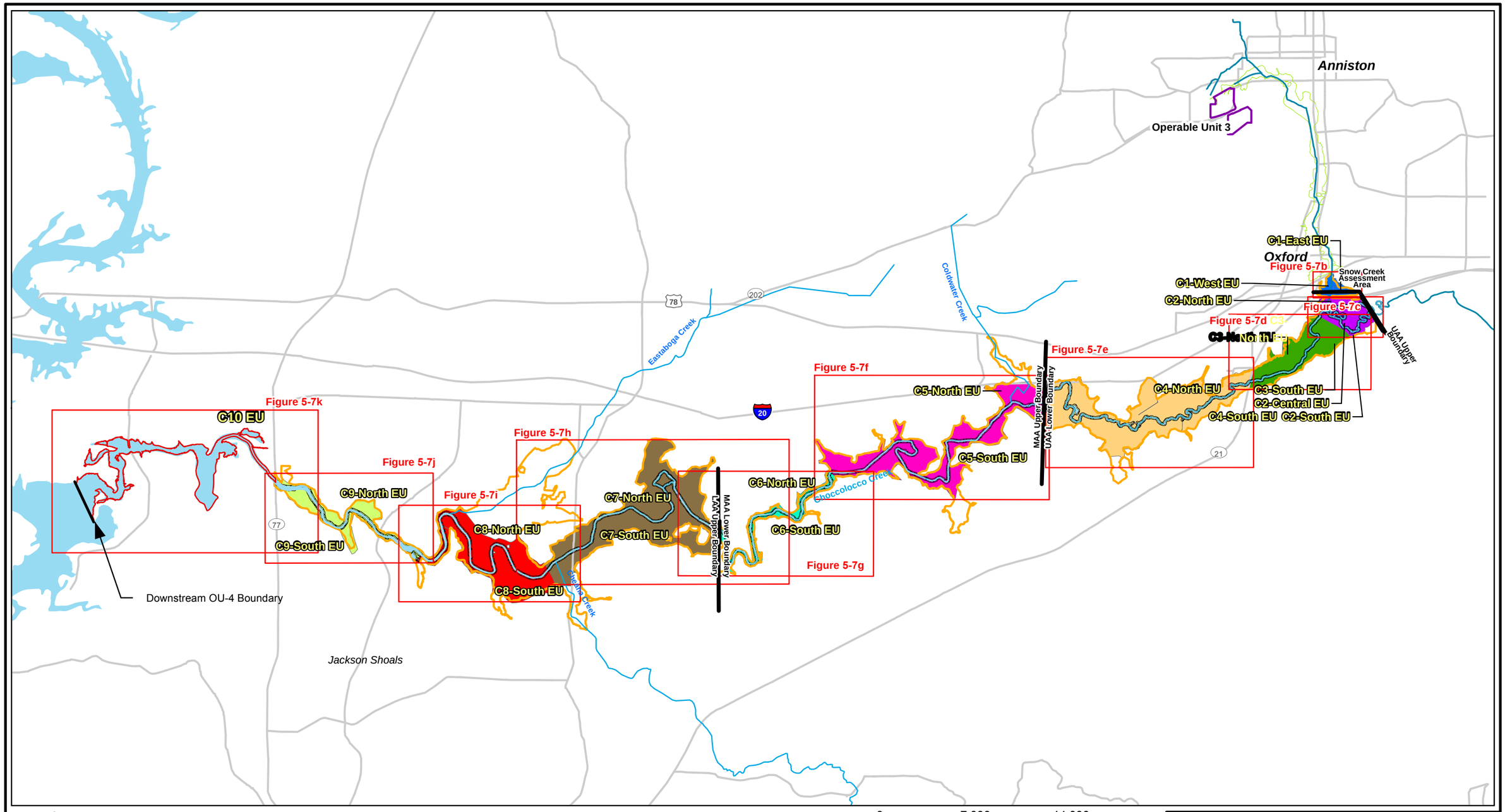
Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

Conceptual Site Model for the BERA

Solutia

Figure 5-6



Legend

- Assessment Area Boundary
- Major Roadway
- OU-3 Boundary
- OU-1/OU-2 Downgradient Floodplain
- OU-4 100-Year Floodplain
- Choccolocco Creek
- Riparian Corridor

Reaches

- C1- Snow Creek - Hwy 78 to Choccolocco Creek
- C2 - Backwater Area
- C3 - Friendship Rd to Hwy 21
- C4 - Hwy 21 to Silver Run Rd
- C5 - Silver Run Rd to Mitchell Matson Rd
- C6 - Mitchell Matson Rd to 2000 ft upstream of Curry Sta Rd
- C7 - Upstream of Curry St Rd to Eastaboga Cr
- C8 - Eastaboga Cr to Jackson Shoals Dam
- C9 - Jackson Shoals to Hwy 77
- C10 - Hwy 77 to Lake Logan Martin (In-Stream Sediment Only)

0 7,000 14,000 Feet

Graphic Scale

Notes:
1. EUs were identified for in-stream sediment (C1 through C10) and riparian/floodplain soil (C2 through C9).
2. Cr: creek
   EU: exposure unit
   ft: feet
   Hwy: highway
   OU: operable unit
   Rd: road
   Sta: station

Anniston PCB Site
Anniston, Alabama

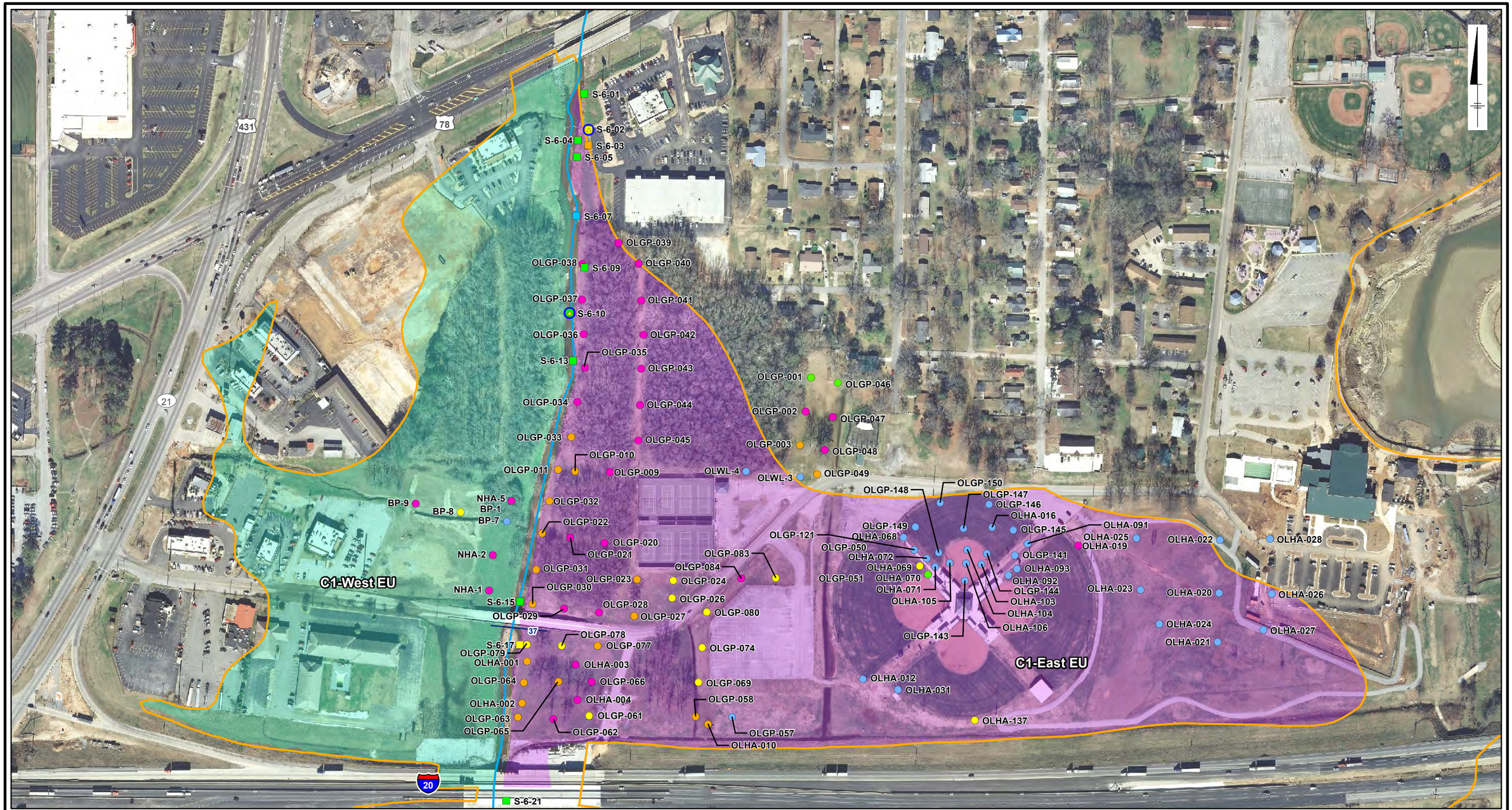
Feasibility Study Report for OU-4

Key for PCB and Mercury Concentrations by Exposure Unit

Solutia

Figure 5-7a

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: TJScott
AnnistonAL
Q:\Anniston_PCB_site\Anniston\ALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F8-2a_OU4_SedSoilPCB_KEYMAP_v2.mxd 7/29/2019 3:28:50 PM



Legend

Surface[1] Sediment Sample Location — Total PCB Concentration (mg/kg)	Surface[2] Soil Sample Location — Total PCB Concentration (mg/kg)	Sample Location — Average Mercury Concentration (mg/kg)
< 1	< 1	0 - 0.05
1.00 - 4.99	1.00- 1.99	0.05 - 0.2
5.00 - 9.99	2.00 - 4.99	0.2 - 1
10.00 - 49.99	5.00 - 9.99	1 - 5
	≥ 10	> 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- 37 River Mile
- Snow Creek Centerline
- C1-East EU
- C1-West EU
- OU-4 100-Year Floodplain

0 275 550 Feet

Graphic Scale

Notes:

1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C1-East EU and C1-West EU

Solutia

Figure **5-7b**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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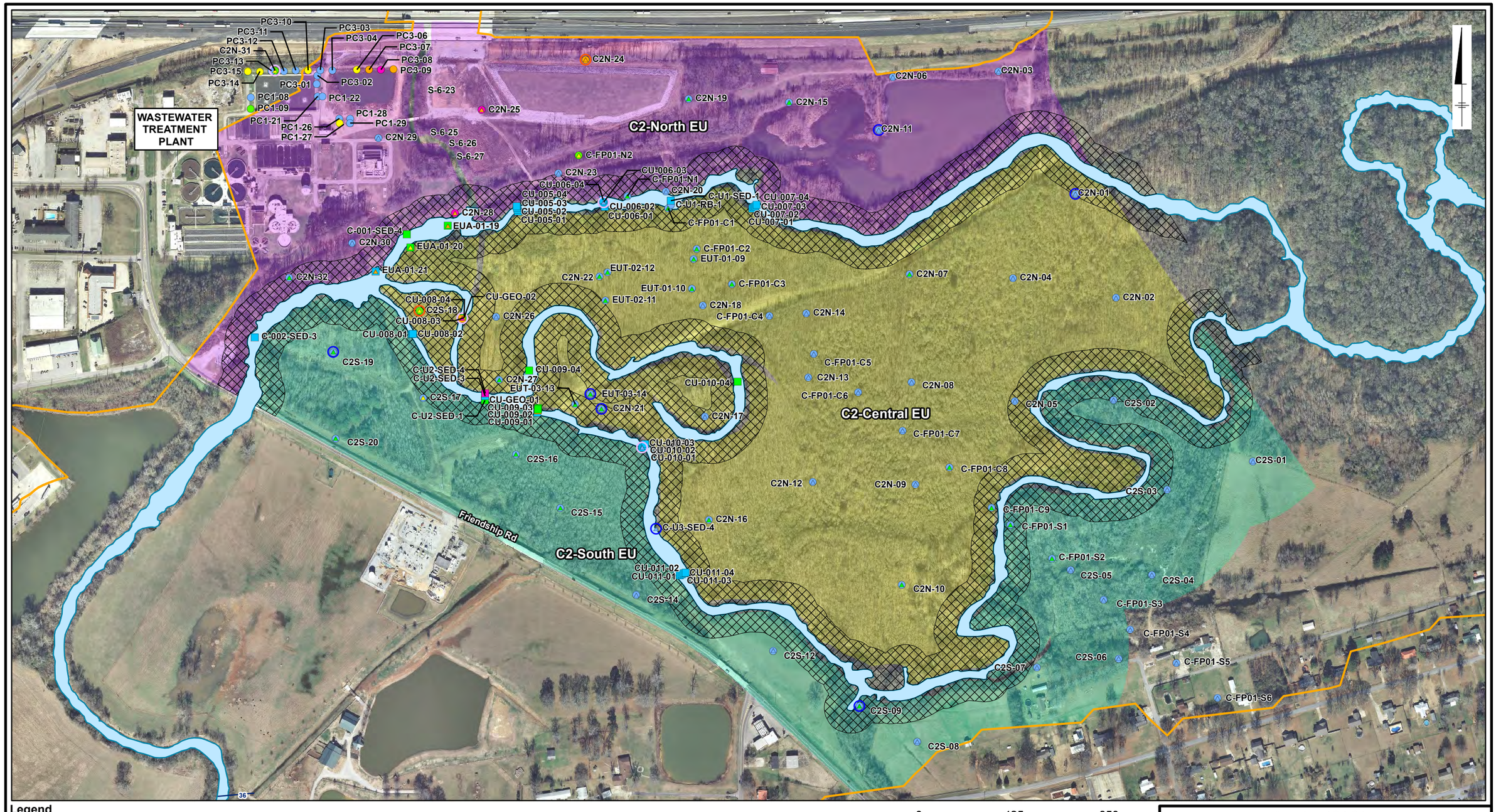

Legend

Surface[1] Sediment Sample Location Total PCB Concentration (mg/kg)	Surface[2] Soil Sample Location Total PCB Concentration (mg/kg)	Sample Location Average Mercury Concentration (mg/kg)
< 1	< 1	0 - 0.05
1.00 - 4.99	1.00- 1.99	0.05 - 0.2
5.00 - 9.99	2.00 - 4.99	0.2 - 1
10.00 - 49.99	5.00 - 9.99	1 - 5
≥ 50	≥ 10	> 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- 36 River Mile
- Riparian
- C2-North EU
- C2-Central EU
- C2-South EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 425 850 Feet

Graphic Scale

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C2-North EU, C2-Central EU, and C2-South EU

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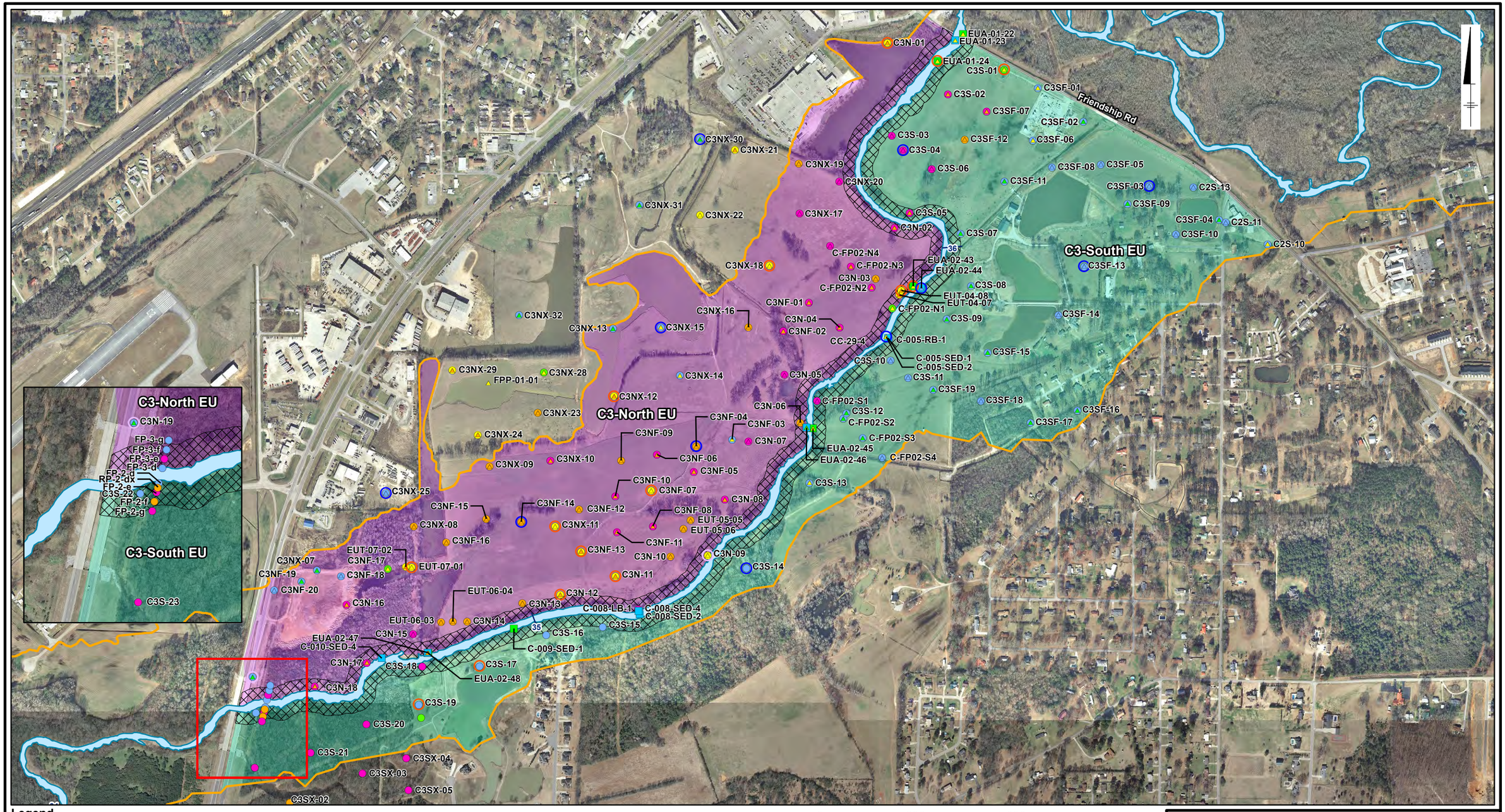
Figure **5-7c**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F8-2c_OU4_SedSoilPCB.mxd 8/21/2019 11:07:01 AM



Legend

Surface[1] Sediment Sample Location Total PCB Concentration (mg/kg)	Surface[2] Soil Sample Location Total PCB Concentration (mg/kg)	Sample Location Average Mercury Concentration (mg/kg)
< 1	< 1	0 - 0.05
1.00 - 4.99	1.00- 1.99	0.05 - 0.2
5.00 - 9.99	2.00 - 4.99	0.2 - 1
10.00 - 49.99	5.00 - 9.99	1 - 5
≥ 50	≥ 10	> 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- —35— River Mile
- Riparian
- C3-North EU
- C3-South EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 800 1,600 Feet

Graphic Scale

Notes:

1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

Anniston PCB Site
Anniston, Alabama

Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C3-North EU and C3-South EU

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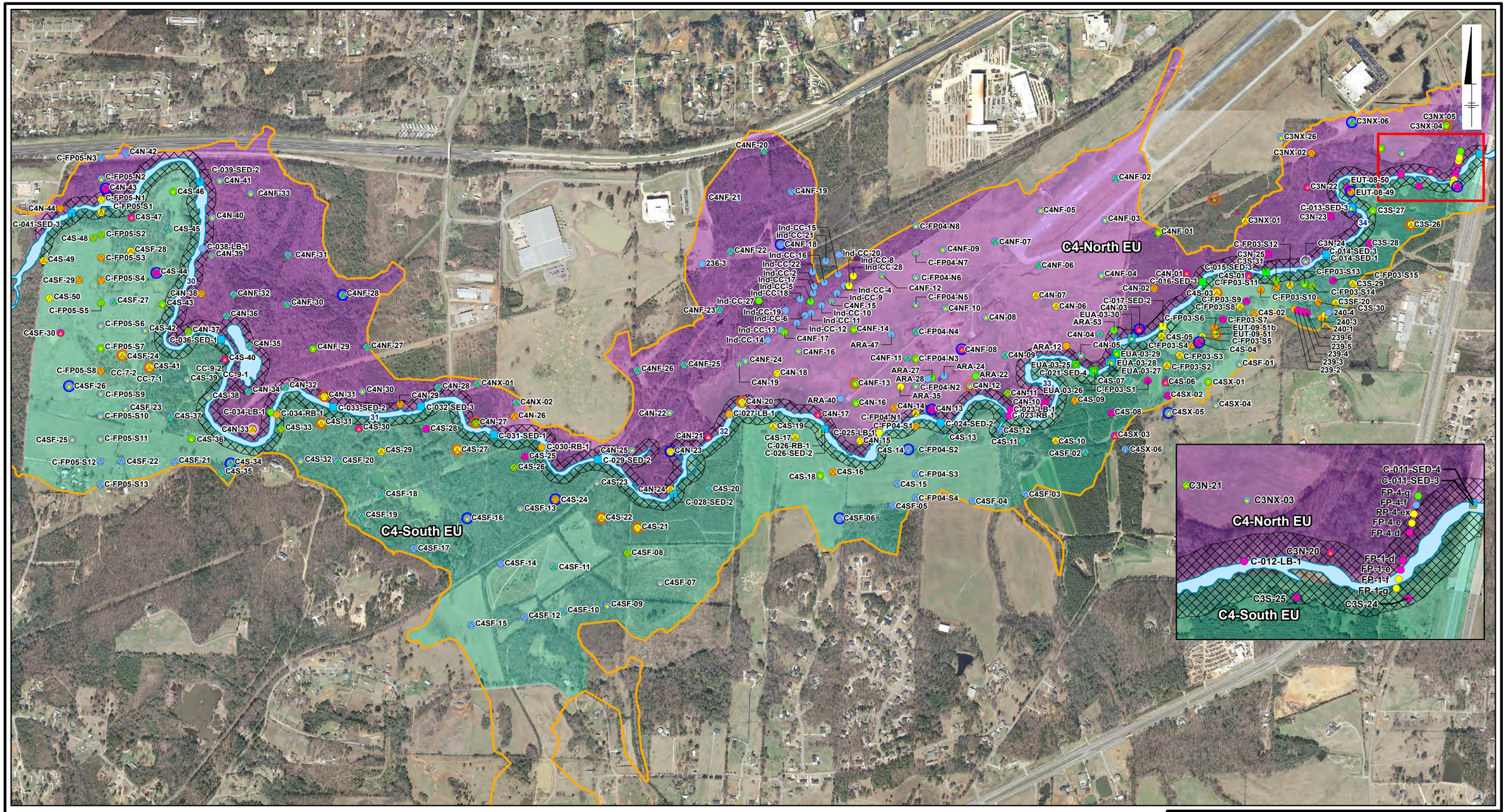
Figure **5-7d**

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALM\XDs_Printfiles\Reports\OU4_2019Revisions\mxd\F8-2d_OU4_SedSoilPCB.mxd 8/21/2019 11:08:42 AM



Legend

Surface[1] Sediment Sample Location Total PCB Concentration (mg/kg)	Surface[2] Soil Sample Location Total PCB Concentration (mg/kg)	Sample Location Average Mercury Concentration (mg/kg)
< 1	< 1	0 - 0.05
1.00 - 4.99	1.00- 1.99	0.05 - 0.2
5.00 - 9.99	2.00 - 4.99	0.2 - 1
10.00 - 49.99	5.00 - 9.99	1 - 5
≥ 50	≥ 10	> 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- —32— River Mile
- Riparian
- C4-North EU
- C4-South EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 1,175 2,350 Feet

Graphic Scale

Notes:

1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

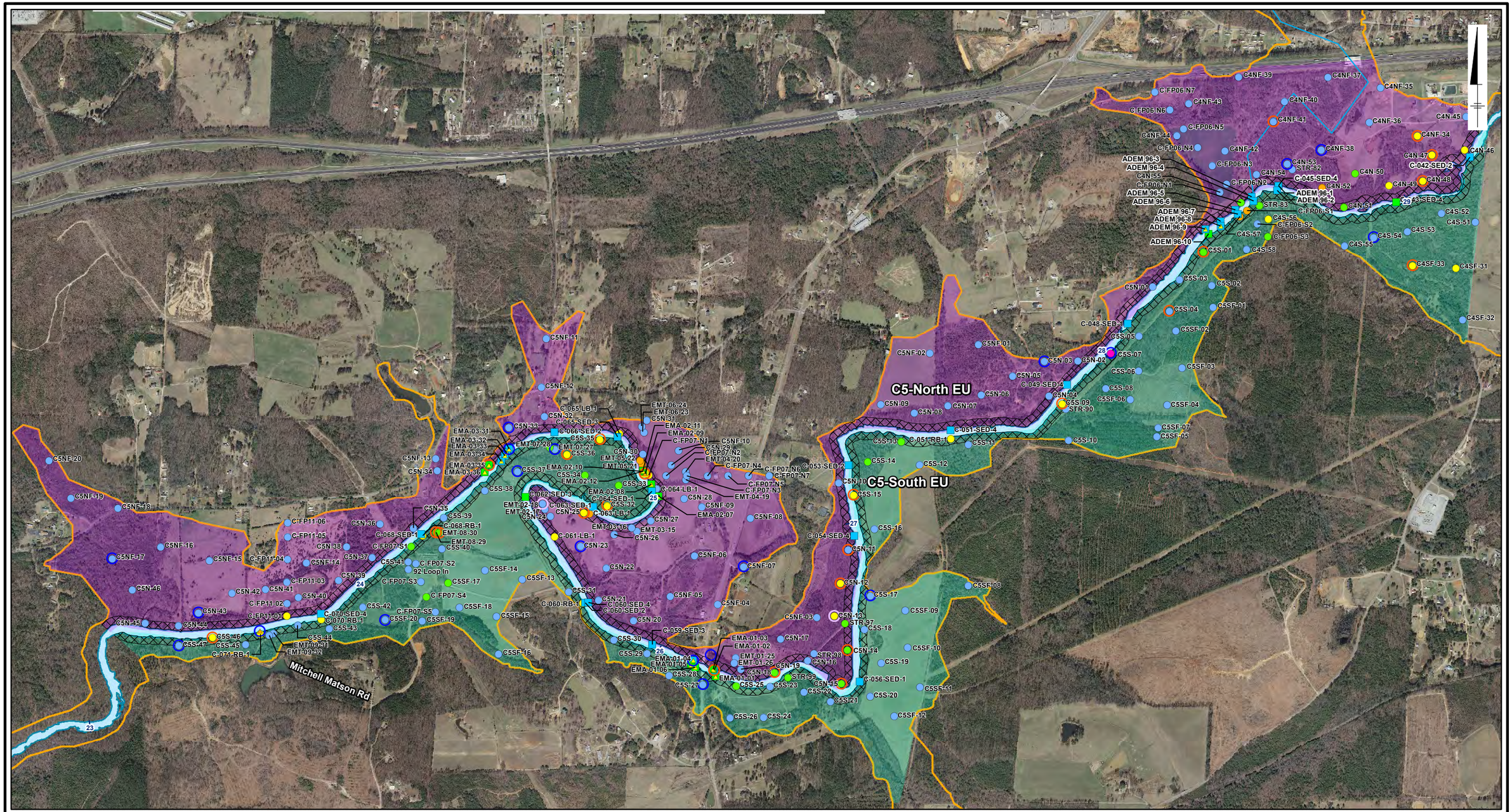
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C4-North EU and C4-South EU

Solutia

Figure
5-7e

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonAL\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F8-2a_OU4_SedSoilPCB.mxd 8/21/2019 11:16:35 AM



Legend

Surface[1] Sediment Sample Location Total PCB Concentration (mg/kg)	Surface[2] Soil Sample Location Total PCB Concentration (mg/kg)	Sample Location Average Mercury Concentration (mg/kg)
< 1	< 1	0 - 0.05
1.00 - 4.99	1.00- 1.99	0.05 - 0.2
5.00 - 9.99	2.00 - 4.99	0.2 - 1
10.00 - 49.99	5.00 - 9.99	1 - 5
≥ 50	≥ 10	> 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- –27– River Mile
- Riparian
- C5-North EU
- C5-South EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 1,325 2,650 Feet

Graphic Scale

Notes:

1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

Anniston PCB Site
Anniston, Alabama

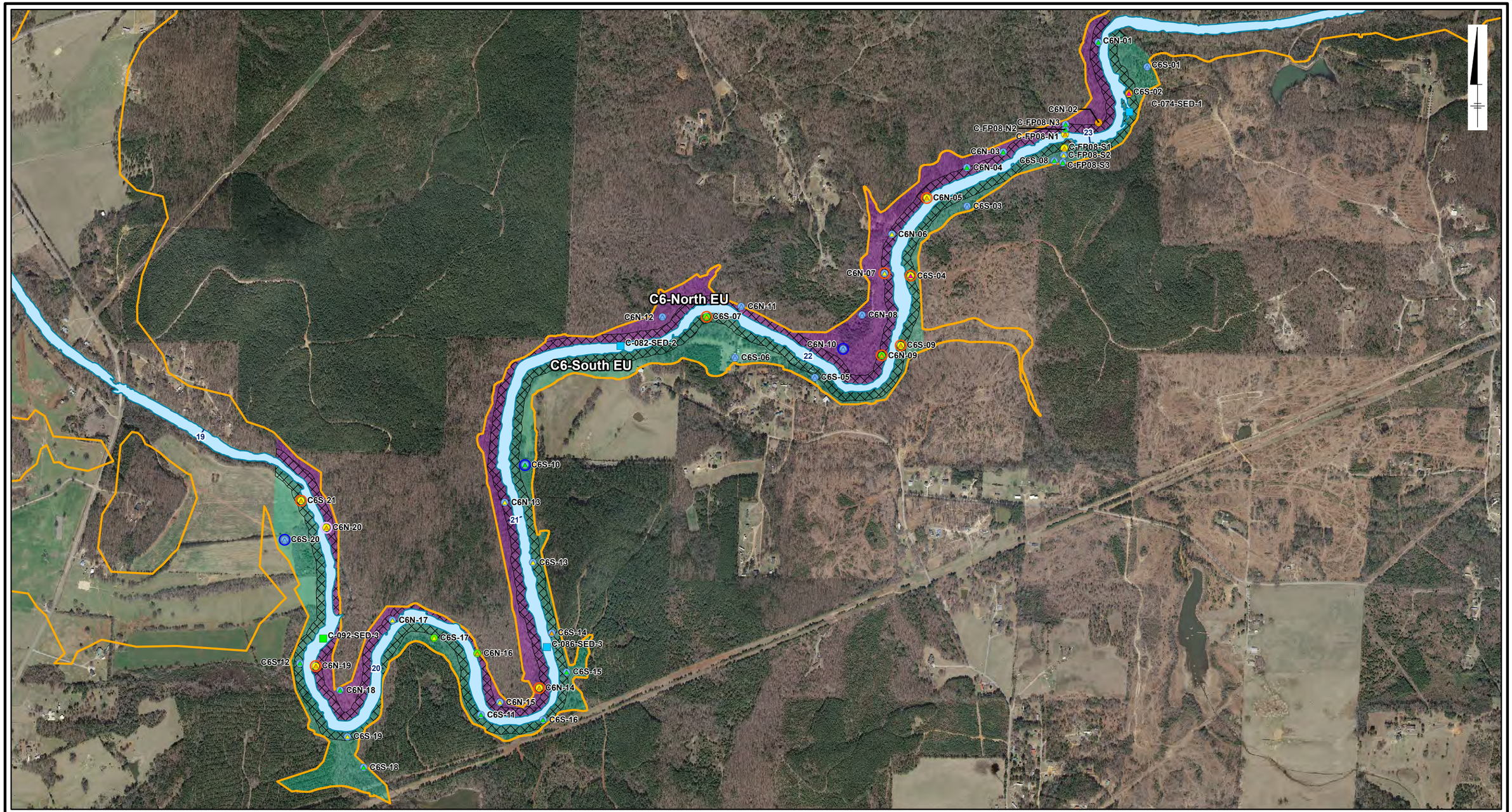
Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C5-North EU and C5-South EU

Solutia

Figure
5-7f

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\FB-2f_OU4_SedSoilPCB.mxd 8/21/2019 11:19:14 AM



Legend

Surface[1] Sediment Sample Location
Total PCB Concentration (mg/kg)
- < 1
- 1.00 - 4.99
- 5.00 - 9.99
- 10.00 - 49.99
- ≥ 50

Surface[2] Soil Sample Location
Total PCB Concentration (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Sample Location
Average Mercury Concentration (mg/kg)
- 0 - 0.05
- 0.05 - 0.2
- 0.2 - 1
- 1 - 5
- > 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- 20 River Mile
- Riparian
- C6-North EU
- C6-South EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 1,100 2,200 Feet
Graphic Scale

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

Anniston PCB Site
Anniston, Alabama

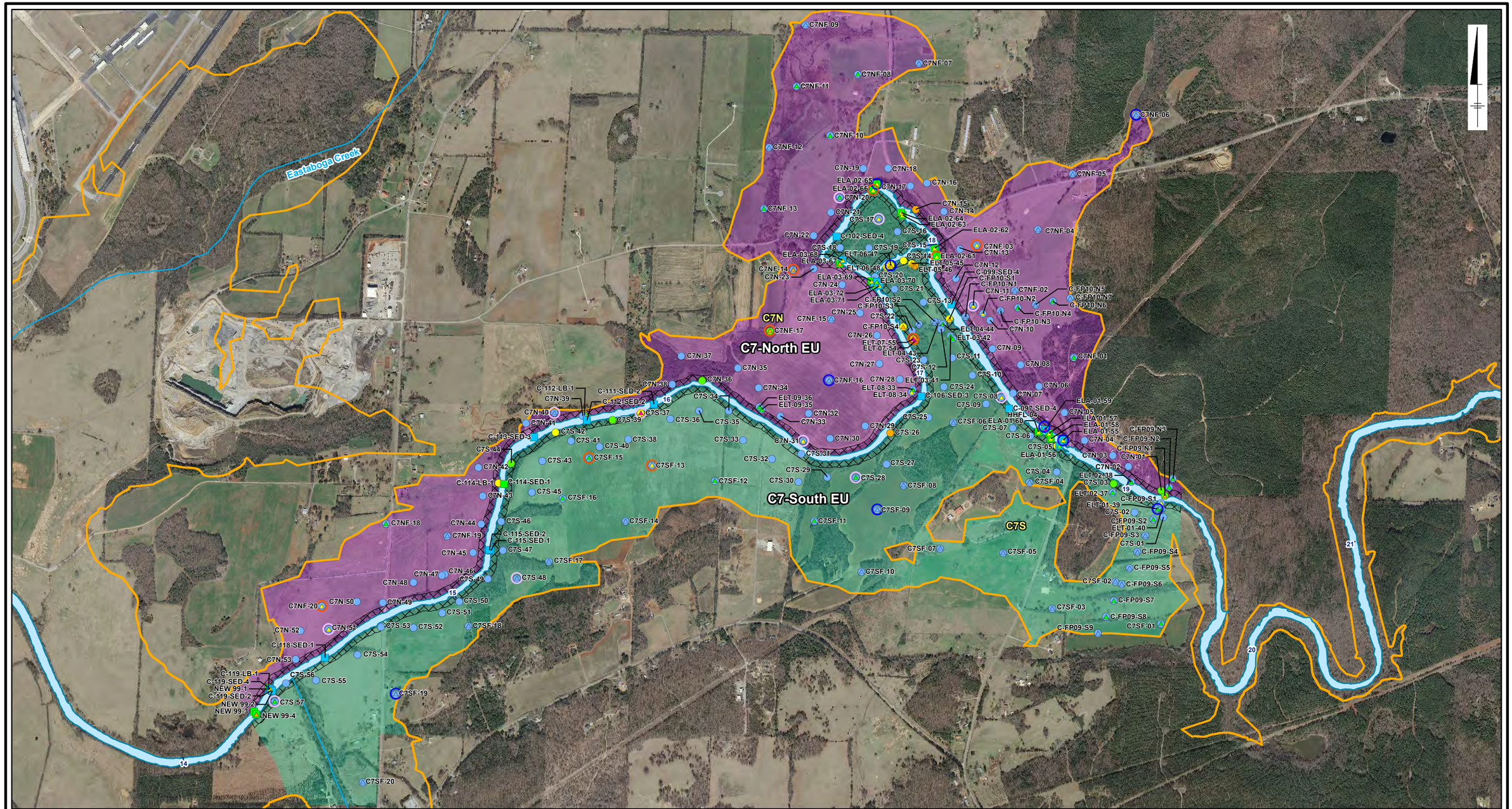
Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C6-North EU and C6-South EU

Solutia

Figure
5-7g

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F8-2g_OU4_SedSoilPCB.mxd 8/21/2019 11:23:41 AM



Legend

Surface[1] Sediment Sample Location
Total PCB Concentration (mg/kg)
- < 1
- 1.00 - 4.99
- 5.00 - 9.99
- 10.00 - 49.99
- ≥ 50

Surface[2] Soil Sample Location
Total PCB Concentration (mg/kg)
- < 1
- 1.00- 1.99
- 2.00 - 4.99
- 5.00 - 9.99
- ≥ 10

Sample Location
Average Mercury Concentration (mg/kg)
- 0 - 0.05
- 0.05 - 0.2
- 0.2 - 1
- 1 - 5
- > 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- 14 River Mile
- Riparian
- C7-North EU
- C7-South EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 1,550 3,100 Feet
Graphic Scale

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C7-North EU and C7-South EU

Solutia. Ingenuity Productivity Performance

Figure
5-7h

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
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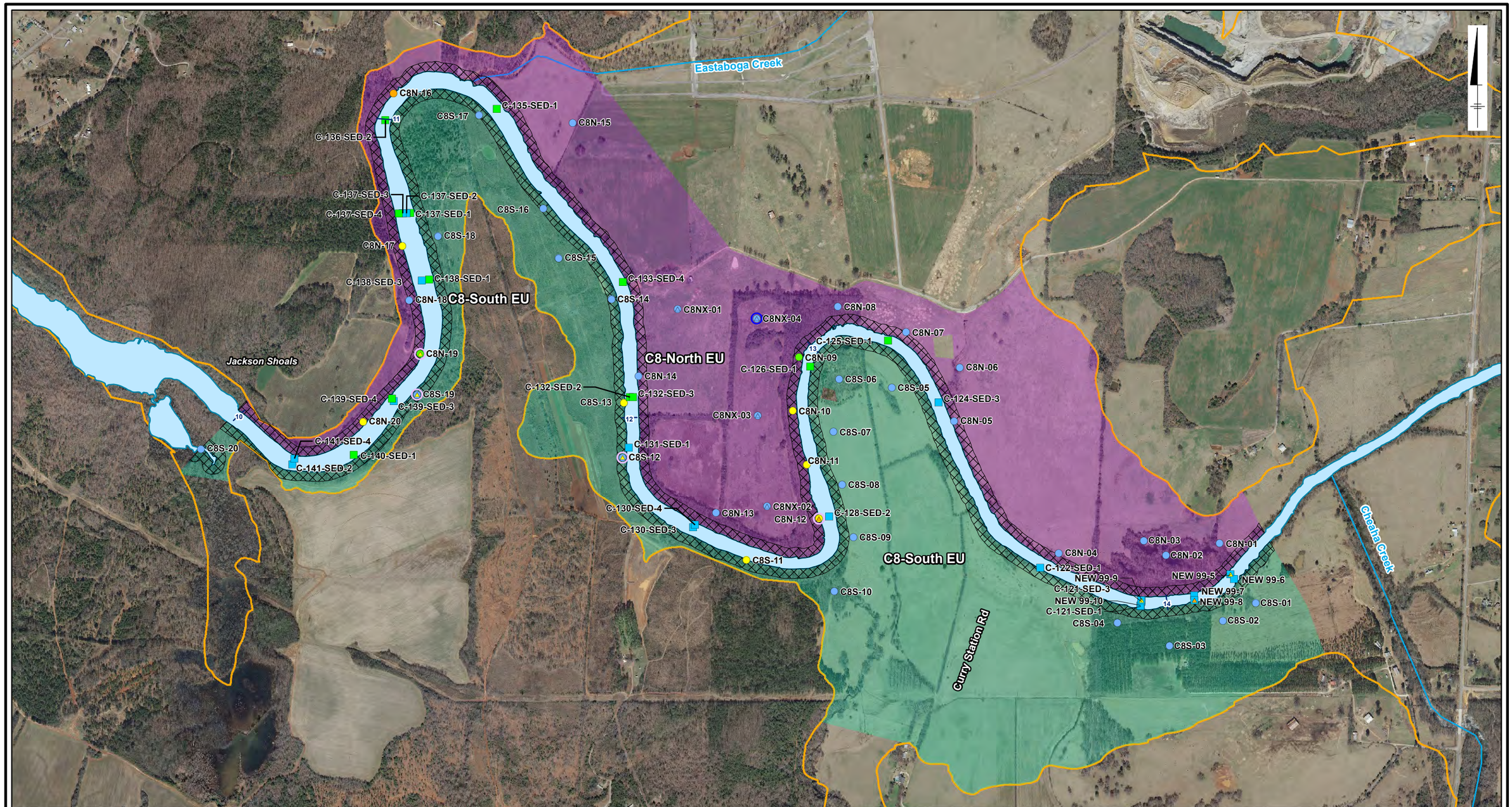


Legend

Surface[1] Sediment Sample Location Total PCB Concentration (mg/kg)	Surface[2] Soil Sample Location Total PCB Concentration (mg/kg)	Sample Location Average Mercury Concentration (mg/kg)
< 1	< 1	0 - 0.05
1.00 - 4.99	1.00- 1.99	0.05 - 0.2
5.00 - 9.99	2.00 - 4.99	0.2 - 1
10.00 - 49.99	5.00 - 9.99	1 - 5
≥ 50	≥ 10	> 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- River Mile
- Riparian
- C8-North EU
- C8-South EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 1,025 2,050 Feet

Graphic Scale

Notes:

1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

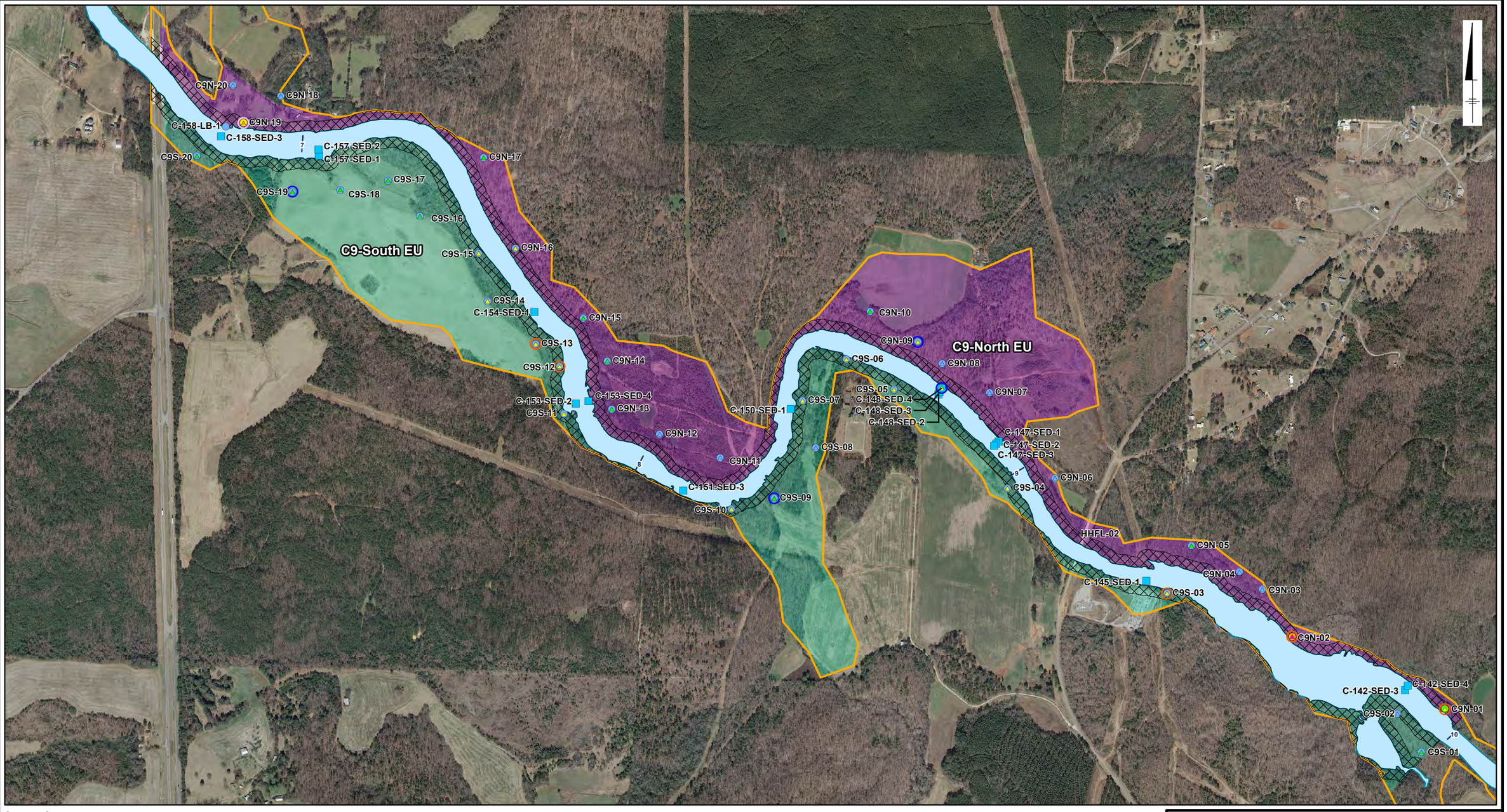
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C8-North EU and C8-South EU

Solutia

Figure
5-7i

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston Q:\Anniston_PCB_site\AnnistonALMXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F8-2i_OU4_SedSoilPCB.mxd 8/21/2019 11:31:32 AM



Legend

Surface[1] Sediment Sample Location Total PCB Concentration (mg/kg)	Surface[2] Soil Sample Location Total PCB Concentration (mg/kg)	Sample Location Average Mercury Concentration (mg/kg)
< 1	< 1	0 - 0.05
1.00 - 4.99	1.00- 1.99	0.05 - 0.2
5.00 - 9.99	2.00 - 4.99	0.2 - 1
10.00 - 49.99	5.00 - 9.99	1 - 5
≥ 50	≥ 10	> 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- River Mile
- Riparian
- C9-North EU
- C9-South EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 950 1,900 Feet

Graphic Scale

Notes:

1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
   mg/kg: milligrams per kilogram
   OU: operable unit
   PCB: polychlorinated biphenyl
   PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

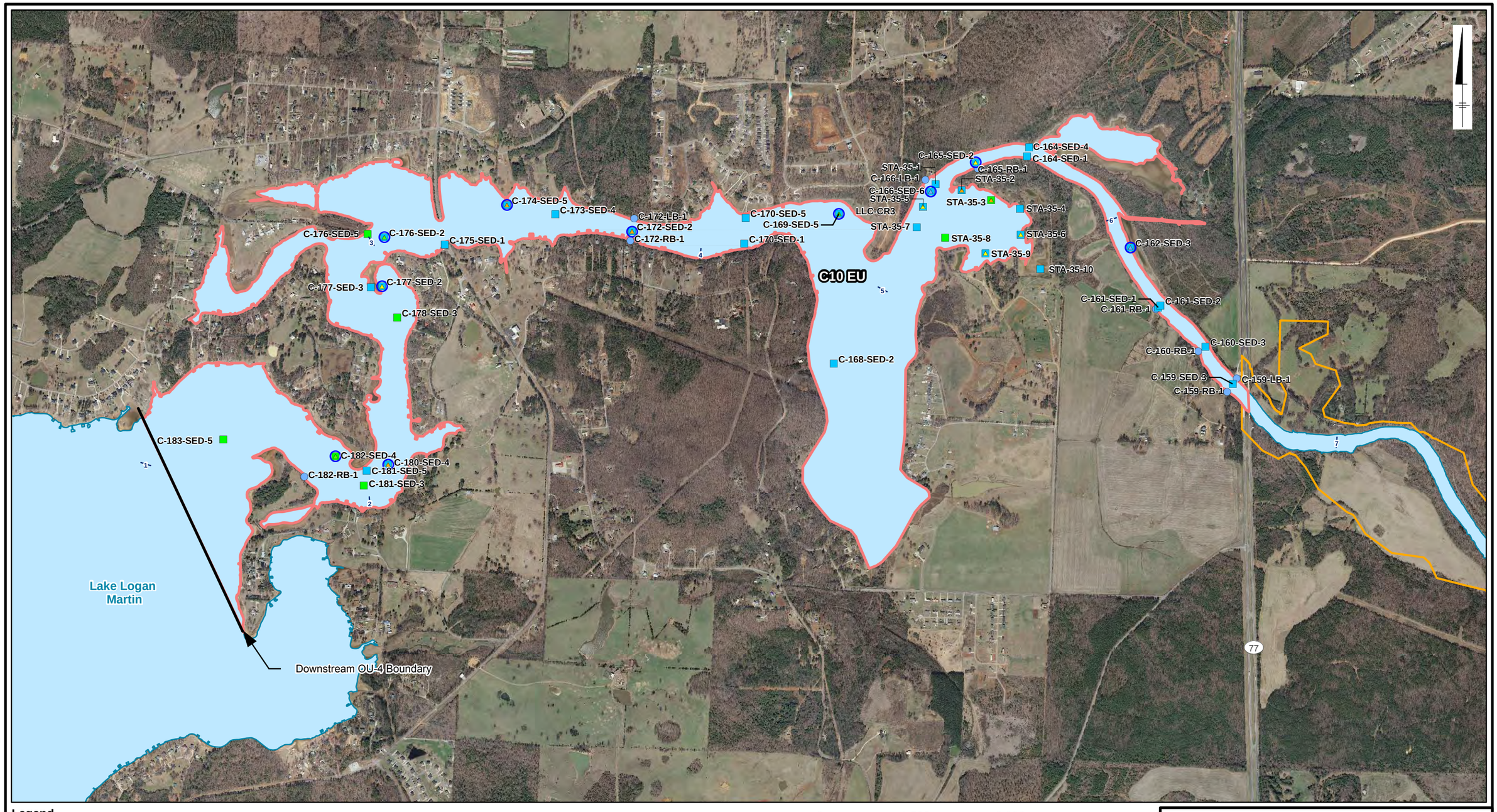
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

PCB and Mercury Concentrations for C9-North EU and C9-South EU

Solutia

Figure
5-7j

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\AnnistonALM\XDs_Printfiles\Reports\OU4_2019Revisions\mxd\F8-2j_OU4_SedSoilPCB.mxd 8/21/2019 11:34:56 AM



Legend

Surface[1] Sediment Sample Location	Surface[2] Soil Sample Location	Sample Location
Total PCB Concentration (mg/kg)	Total PCB Concentration (mg/kg)	Average Mercury Concentration (mg/kg)
< 1	< 1	<0.05
≥1 - <5	≥1 - <2	≥0.05 - <0.2
≥5 - <10	≥2 - <5	≥0.2 - <1
≥10 - <50	≥5 - <10	≥1 - <5
≥ 50	≥ 10	> 5

- Non-Mercury Metals Sampled
- PCDD/DF Sampled
- Non-Mercury Metals and PCDD/DF Sampled
- River Mile
- C10 EU
- Choccolocco Creek
- OU-4 100-Year Floodplain

0 1,500 3,000 Feet

Graphic Scale

Notes:
1. Surface sediments were collected primarily from the 0- to 2-inch interval (63% of samples) and the 0- to 6-inch interval (26% of samples). A limited number of samples (11%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 6 inches.
2. Surface soils were collected primarily from the 0- to 6-inch interval (93% of samples). A limited number of samples (7%) were collected from various intervals with a top depth of 0 inches and a bottom depth of not more than 24 inches.
3. Aerial imagery provided by Calhoun and Talladega Counties.
4. EU: exposure unit
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PCDD/DF: polychlorinated dibenzodioxins/dibenzofurans

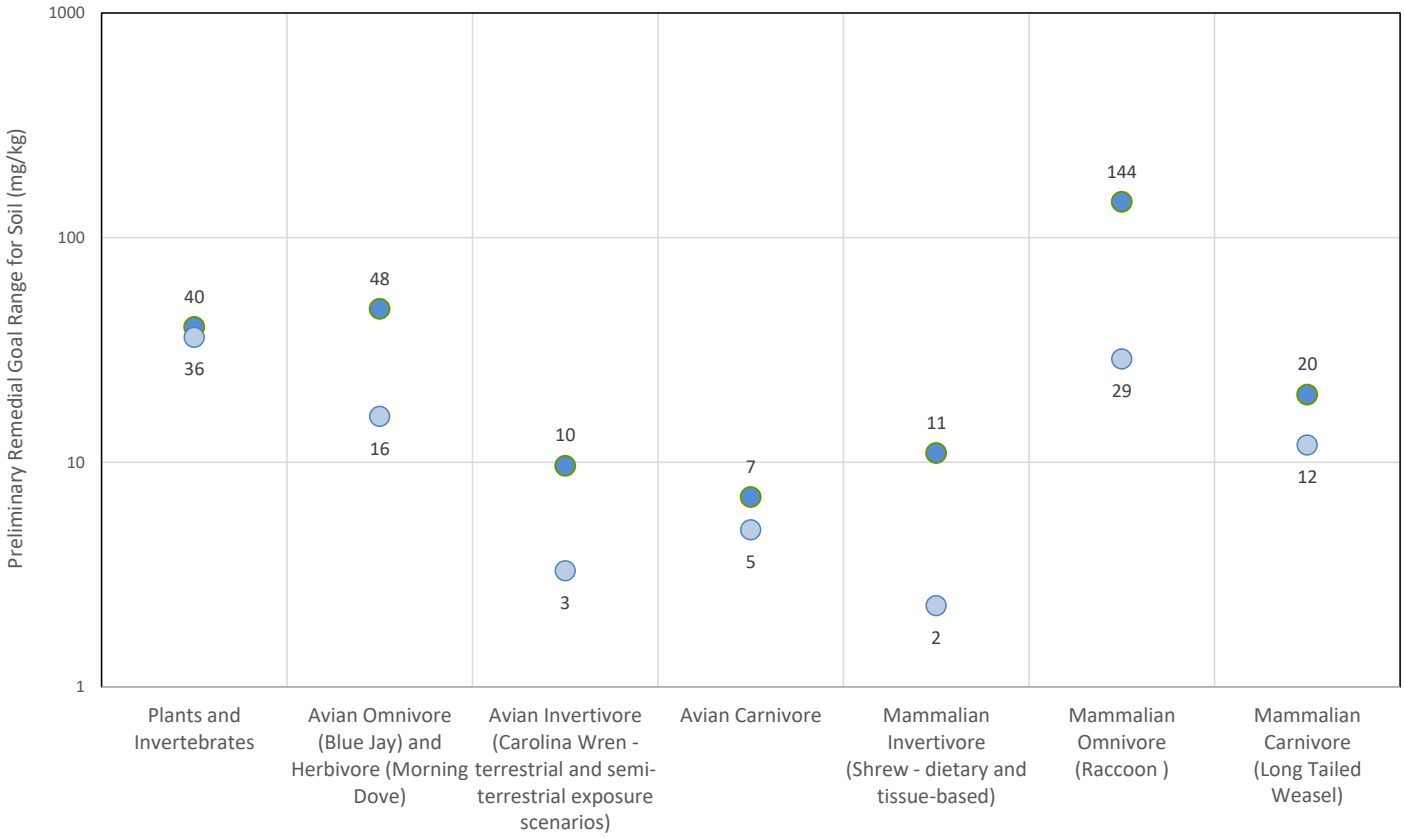
Anniston PCB Site
Anniston, Alabama
Feasibility Study Report for OU-4

PCB and Mercury Concentrations C10 EU

Solutia

Figure
5-7k

City: SYR Div/Group: SWG Created By: K.Ives Last Saved By: TJScott
Anniston
Q:\Anniston_PCB_site\Anniston\ALM\MXDs_Printfiles\Reports\OU4_2019Revisions\mxd\F8-2k_OU4_SedSoilPCB_C10_v2.mxd 8/20/2019 9:04:31 PM



1. Light blue dots represent the low end of the range and darker dots represent the high end of the range for each receptor group.

mg/kg: milligrams per kilograms

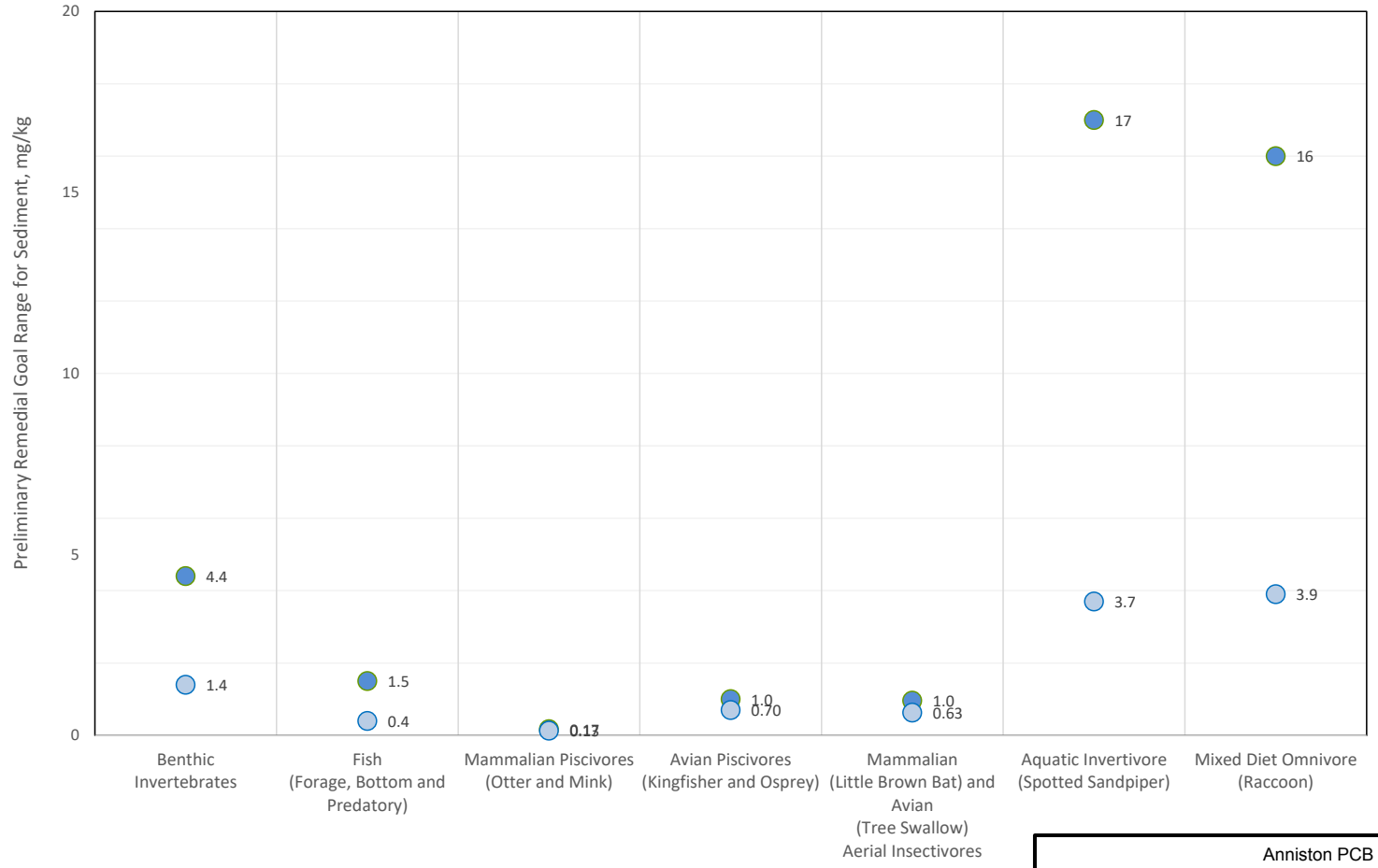
PRG: preliminary remediation goal

Anniston PCB Site,
Anniston, Alabama

Feasibility Study Report for OU-4

Terrestrial PRG Range for Soil

Figure
6-1



1. Light blue dots represent the low end of the range and darker dots represent the high end of the range for each receptor group.

mg/kg: milligrams per kilogram

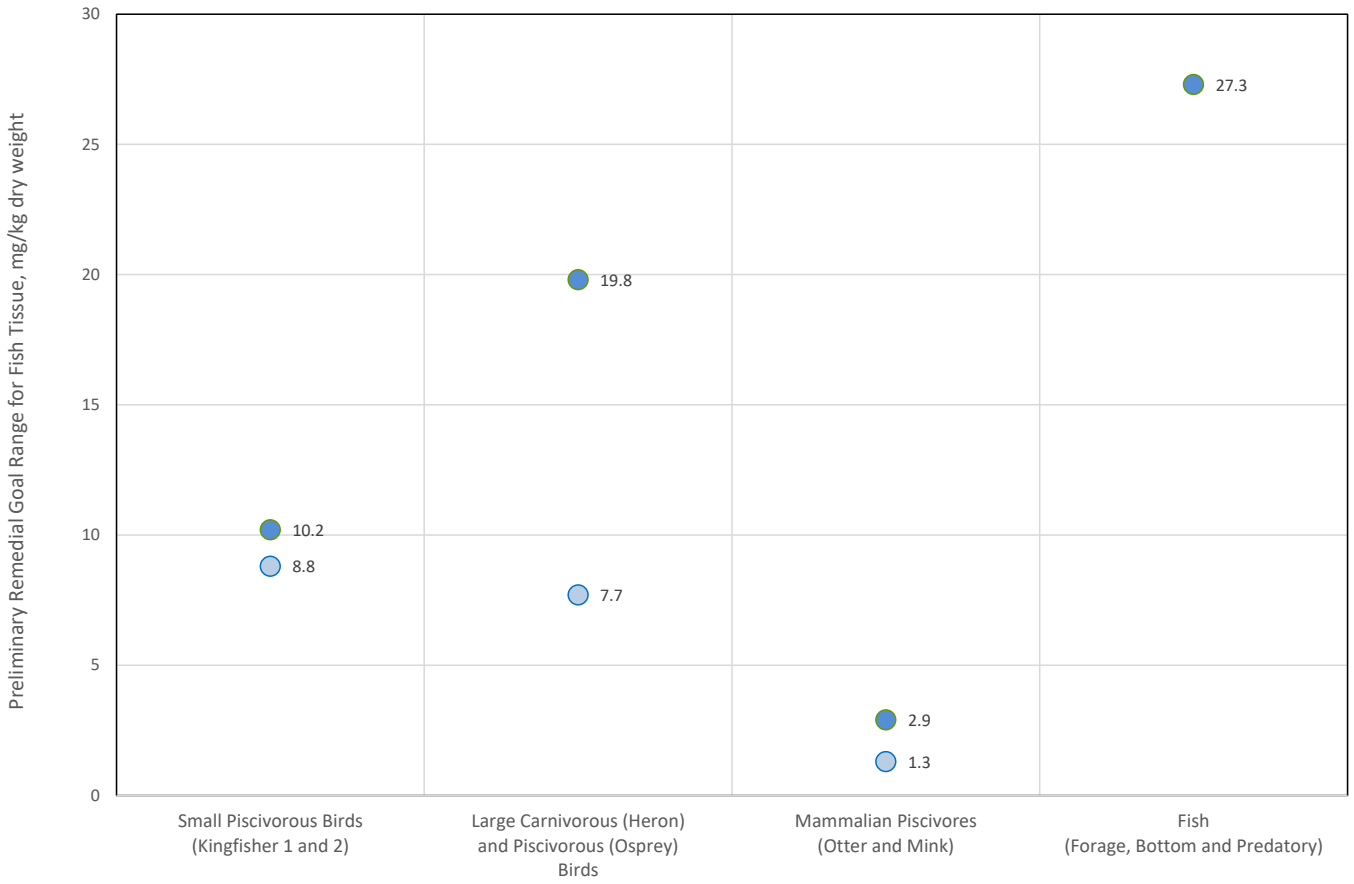
PRG: preliminary remediation goal

Anniston PCB Site,
Anniston, Alabama

Feasibility Study Report for OU-4

Ecological PRG Range for Sediment

Figure
6-2



1. Light blue dots represent the low end of the range and darker dots represent the high end of the range for each receptor group.

mg/kg: milligrams per kilogram

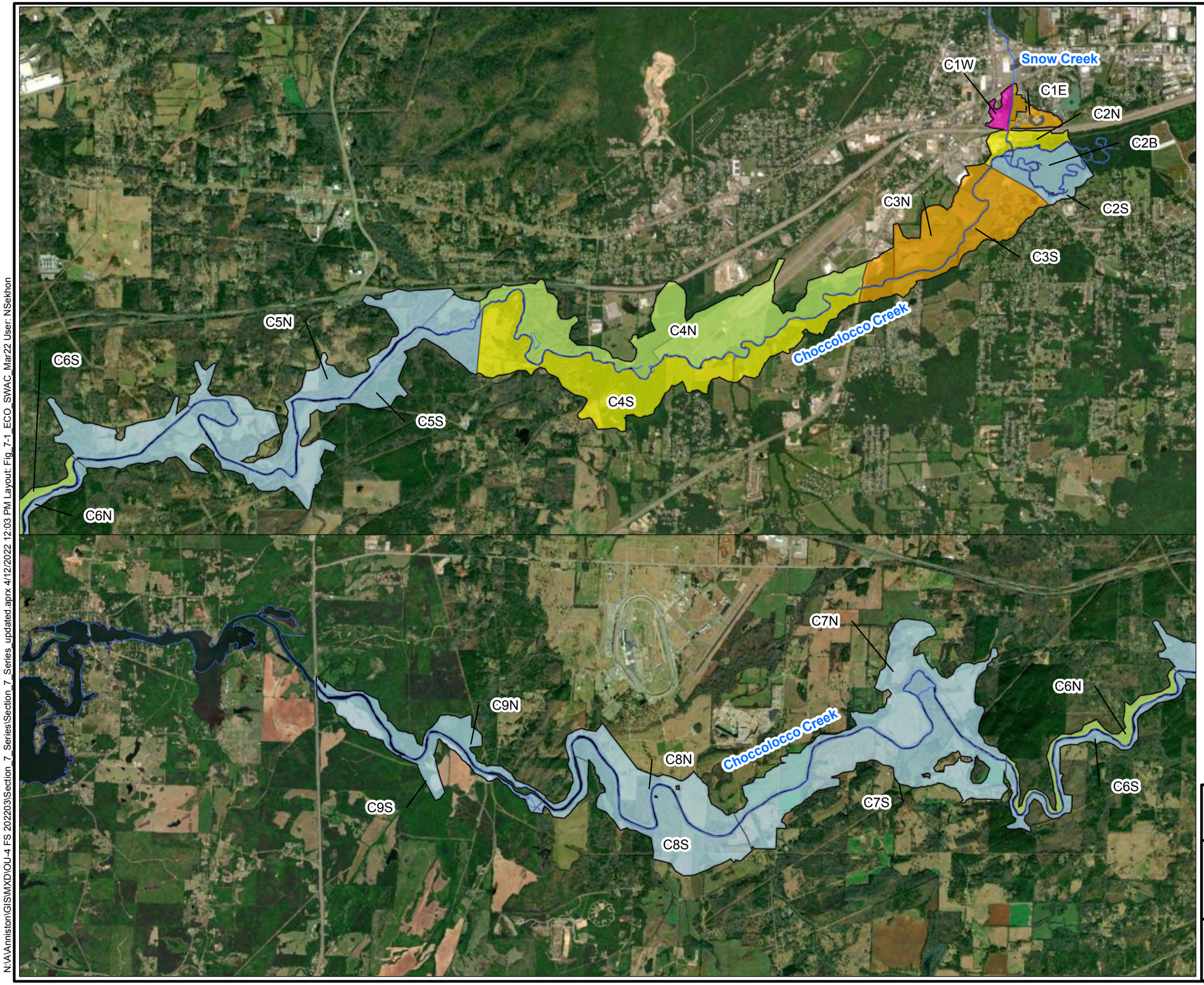
PRG: preliminary remediation goal

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Ecological PRG Range for Whole-Body Fish Tissue

Solutia

Figure
6-3



Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Characterization Area

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration

0 1 2 Miles

Graphic Scale

Anniston PCB Site, Anniston, Alabama

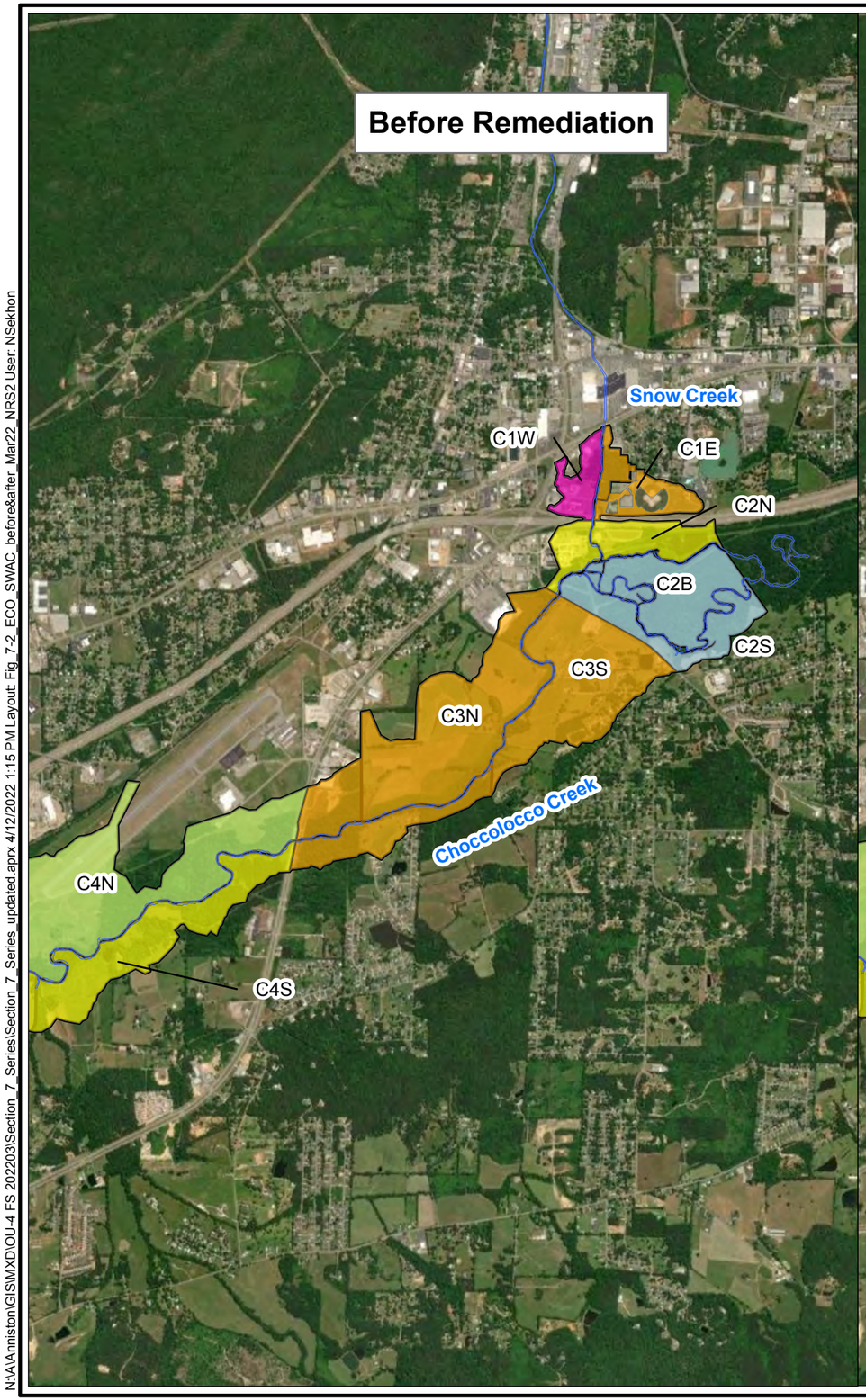
Feasibility Study Report for OU-4

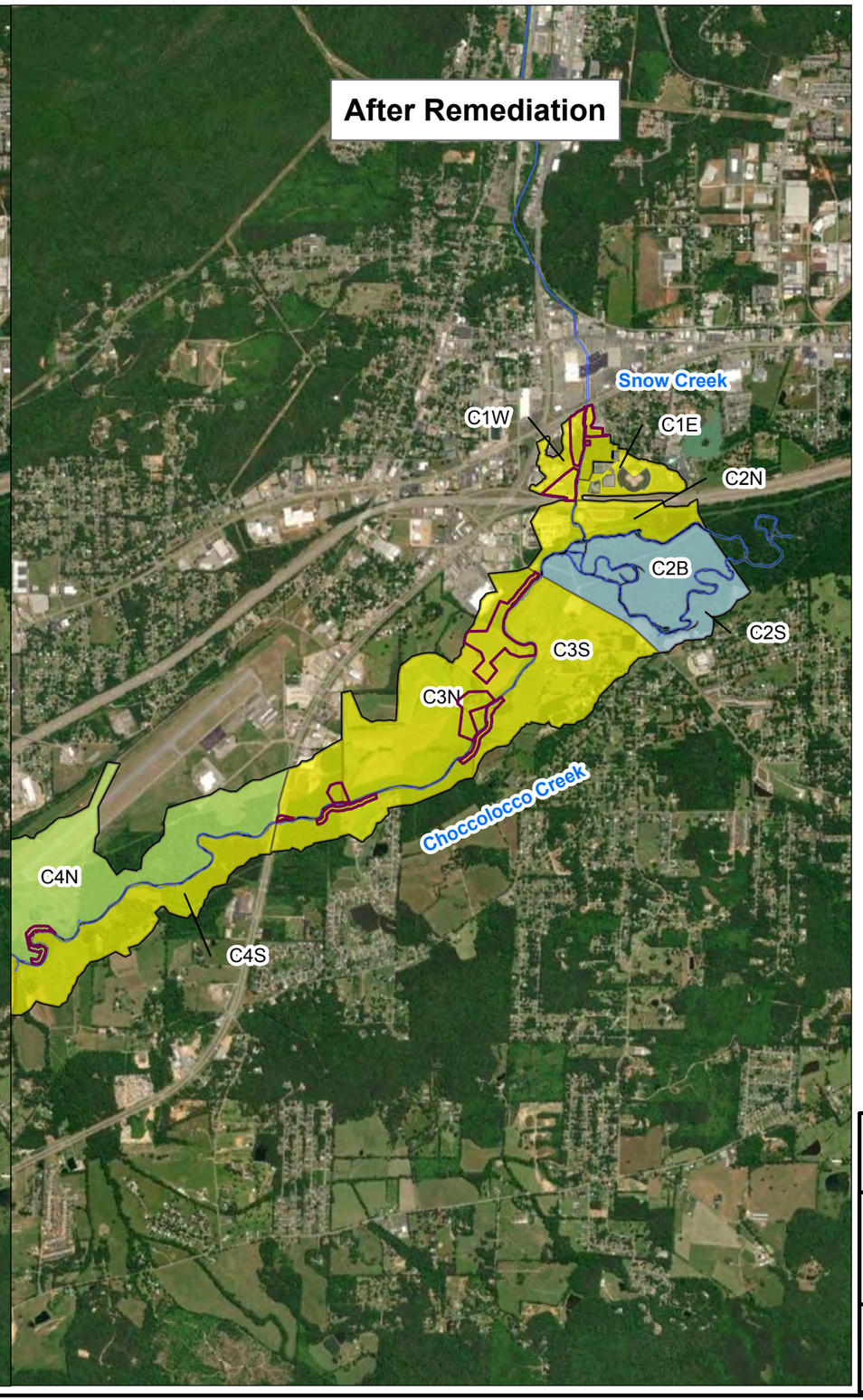
Pre-Remediation Mean SWAC PCB Concentrations in Nonresidential Soil for Ecological Exposure Conditions (0–0.5 ft bgs)

Solutia

Figure 7-1

N:\AAnniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated.aprx 4/12/2022 12:03 PM Layout: Fig_7-1_ECO_SWAC_Mar22 User: NSekhon





Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Characterization Area
- Target Remediation Areas

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
1. Alternative NRS-2 includes the removal of soil from the 0-0.5-ft horizon to achieve a post-removal PCB SWAC of 6 mg/kg to reduce ecological risks.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration

0 1 2 Miles

Graphic Scale

Anniston PCB Site, Anniston, Alabama

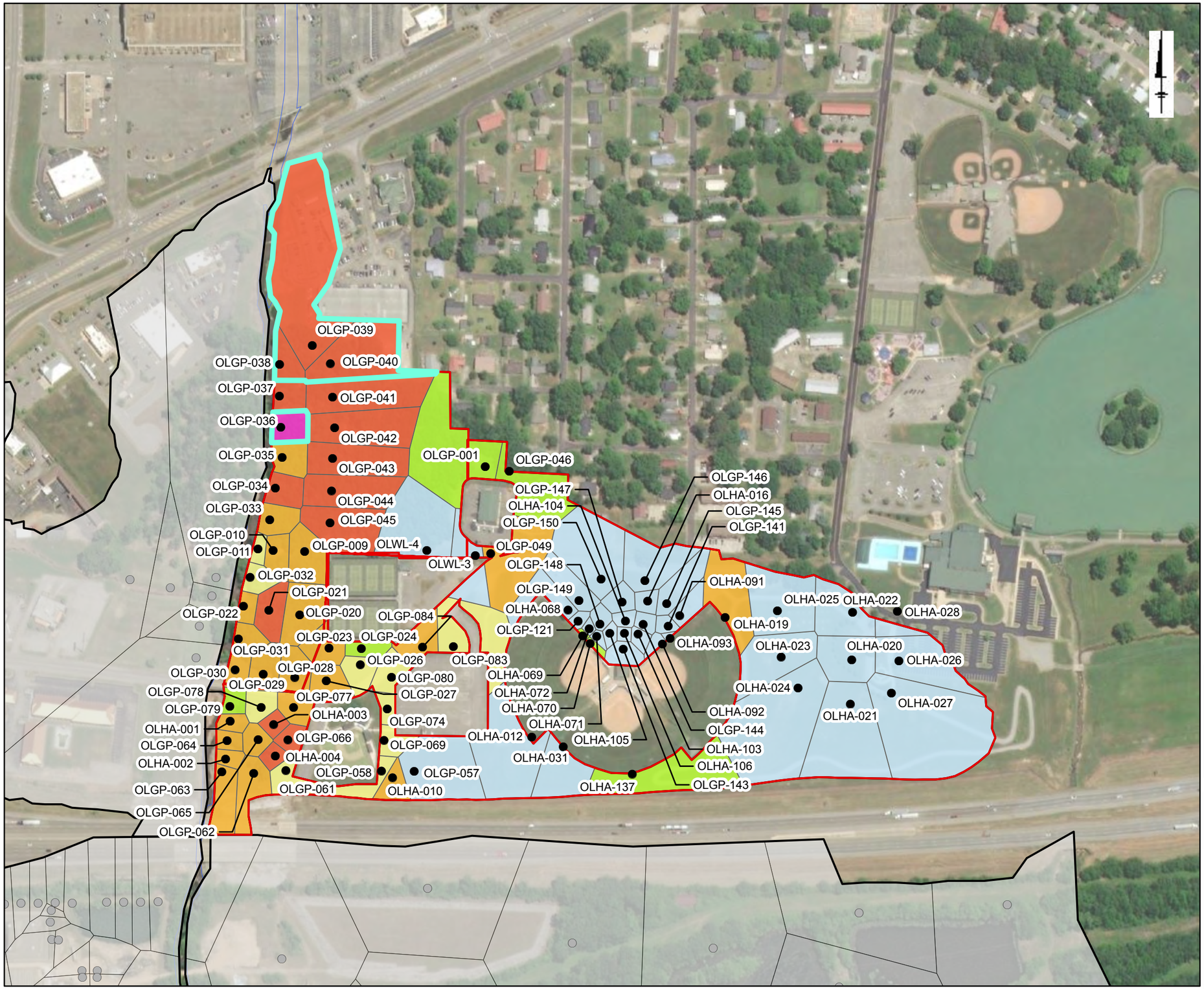
Feasibility Study Report for OU-4

Mean SWAC PCB Concentrations in Nonresidential Floodplain Soil for Ecological EUs (0-0.5 ft bgs): NRS-2

Solutia

Figure 7-2a

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated.aprx 4/12/2022 1:15 PM Layout: Fig_7-2_ECO_SWAC_before&after_Mar22_NRS2 User: NSekhon



Legend

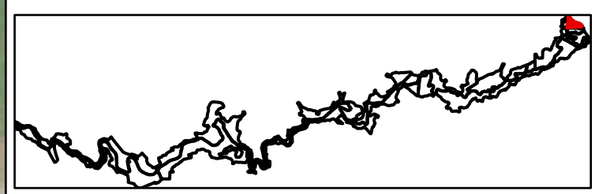
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

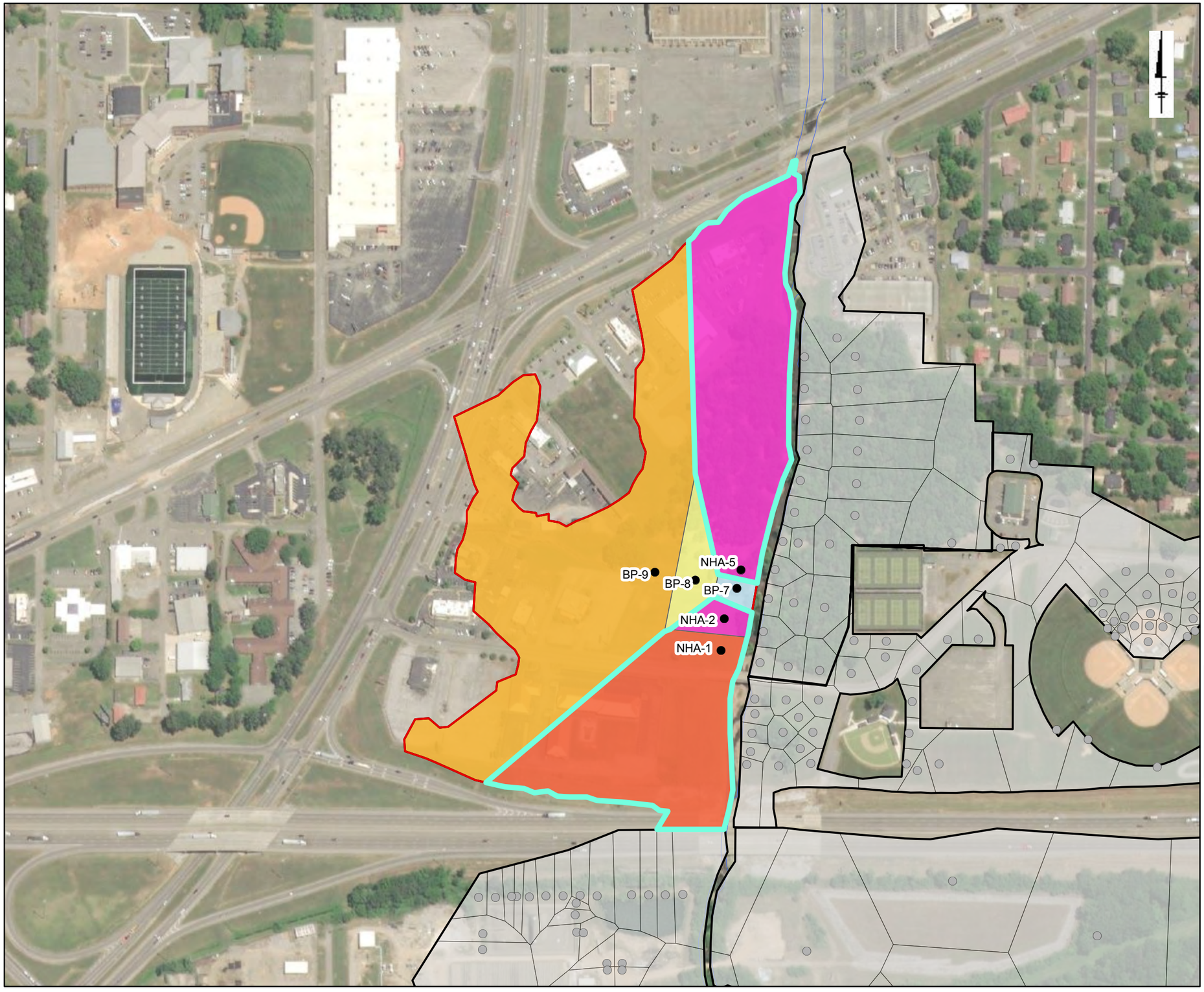
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C1E

Solutia

Figure 7-2b

N:\AA Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

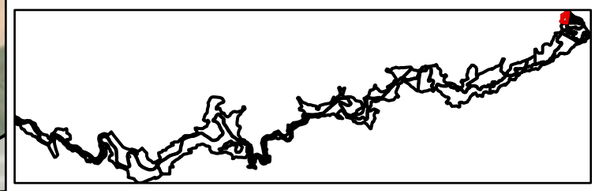
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

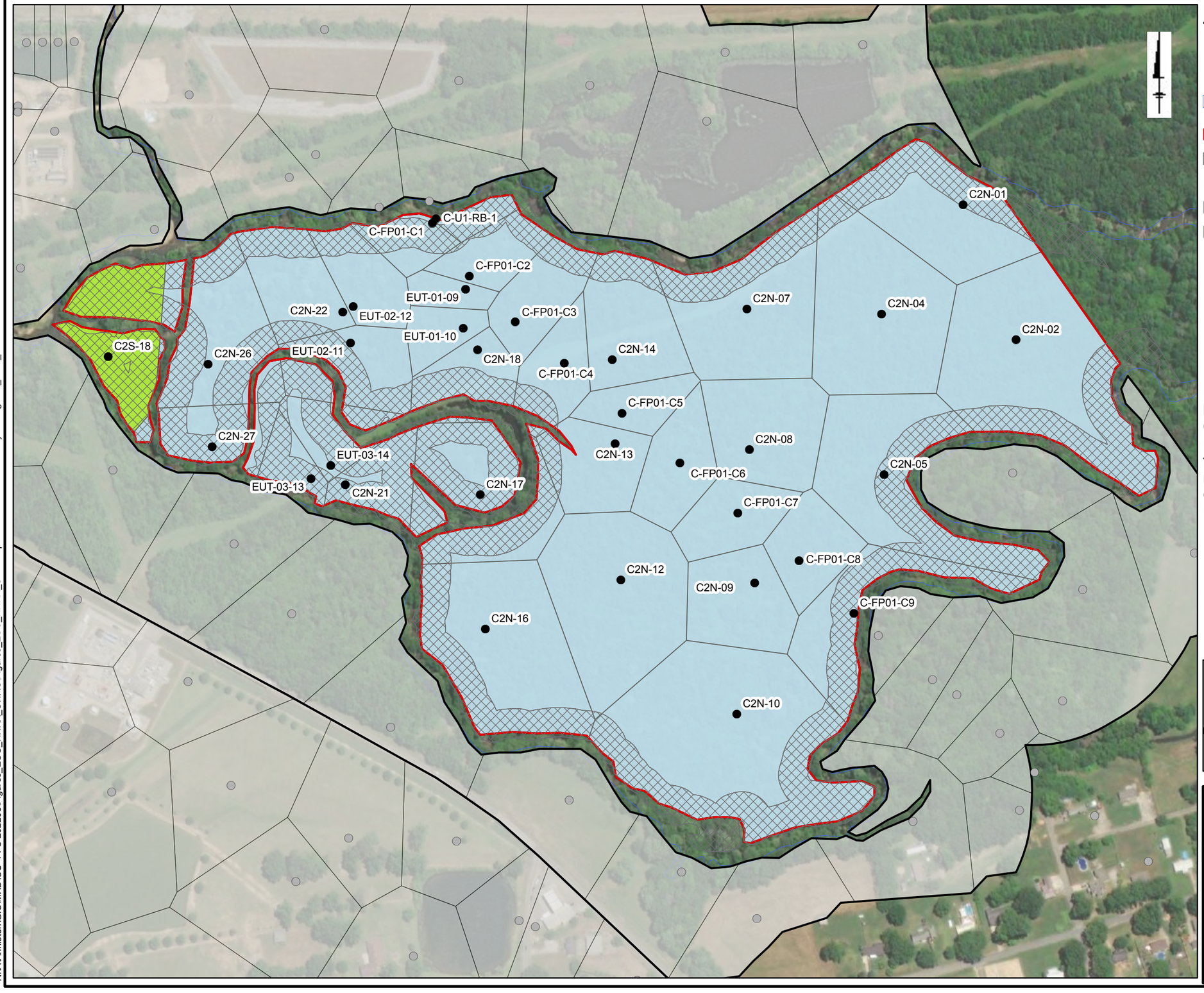
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C1W

Solutia

Figure 7-2c

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

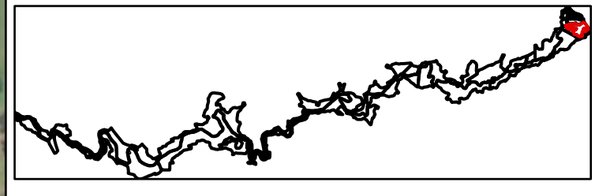
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 375 750
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

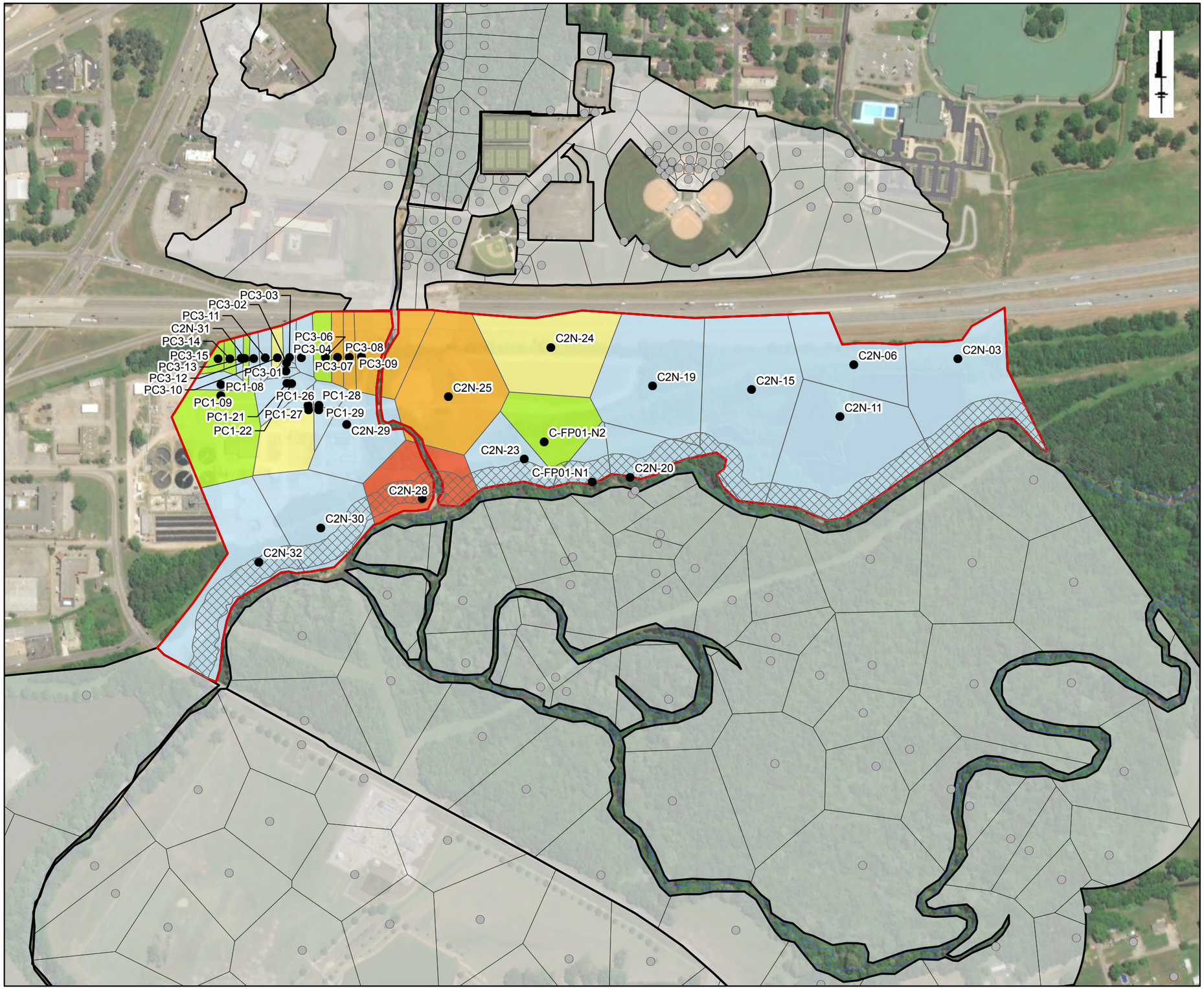
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C2B

Solutia

Figure 7-2d

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

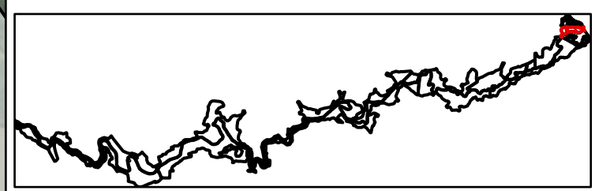
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

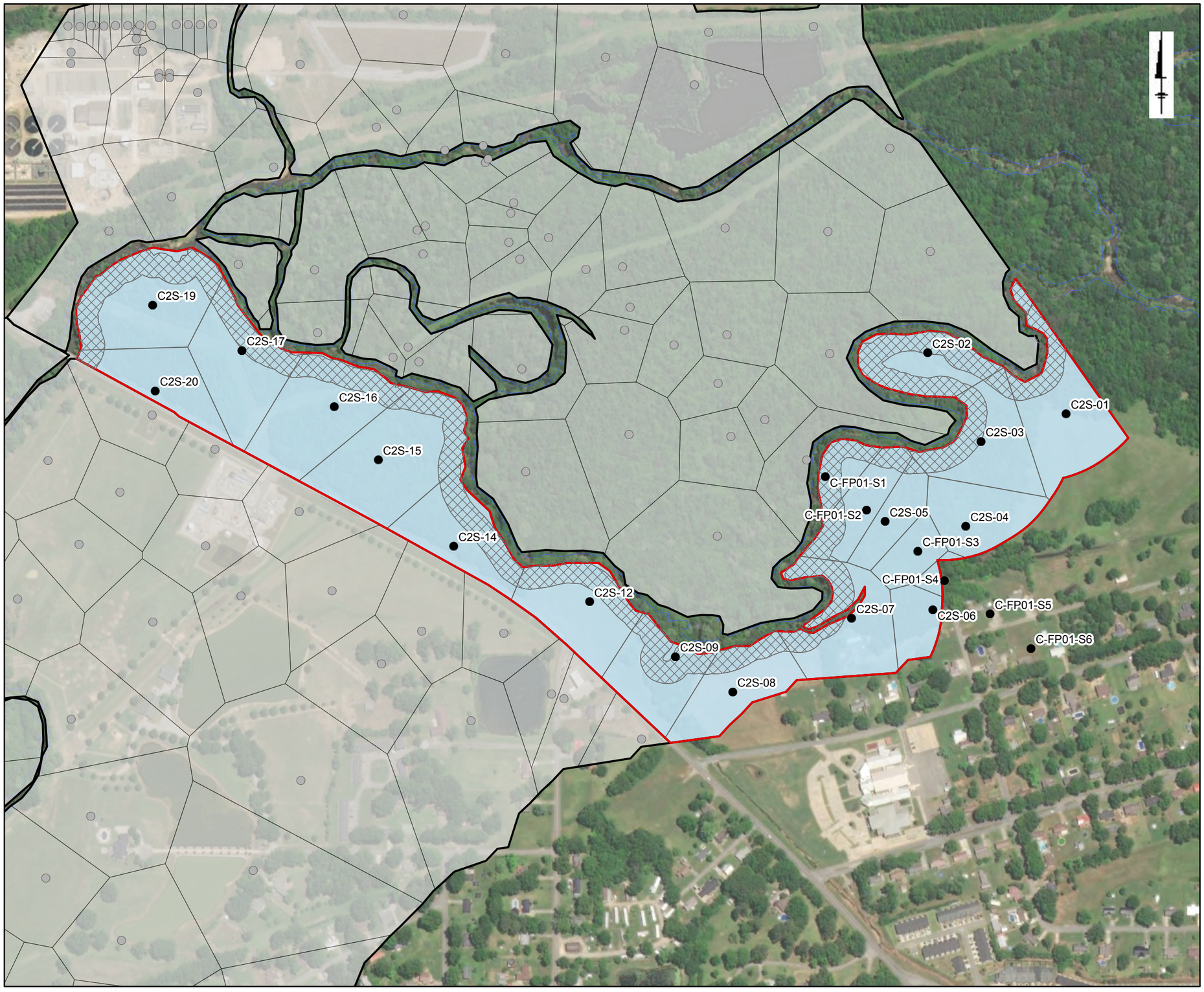
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C2N

Solutia

Figure 7-2e

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

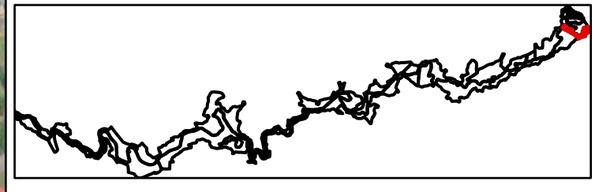
PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet

Graphic Scale



Anniston PCB Site, Anniston, Alabama

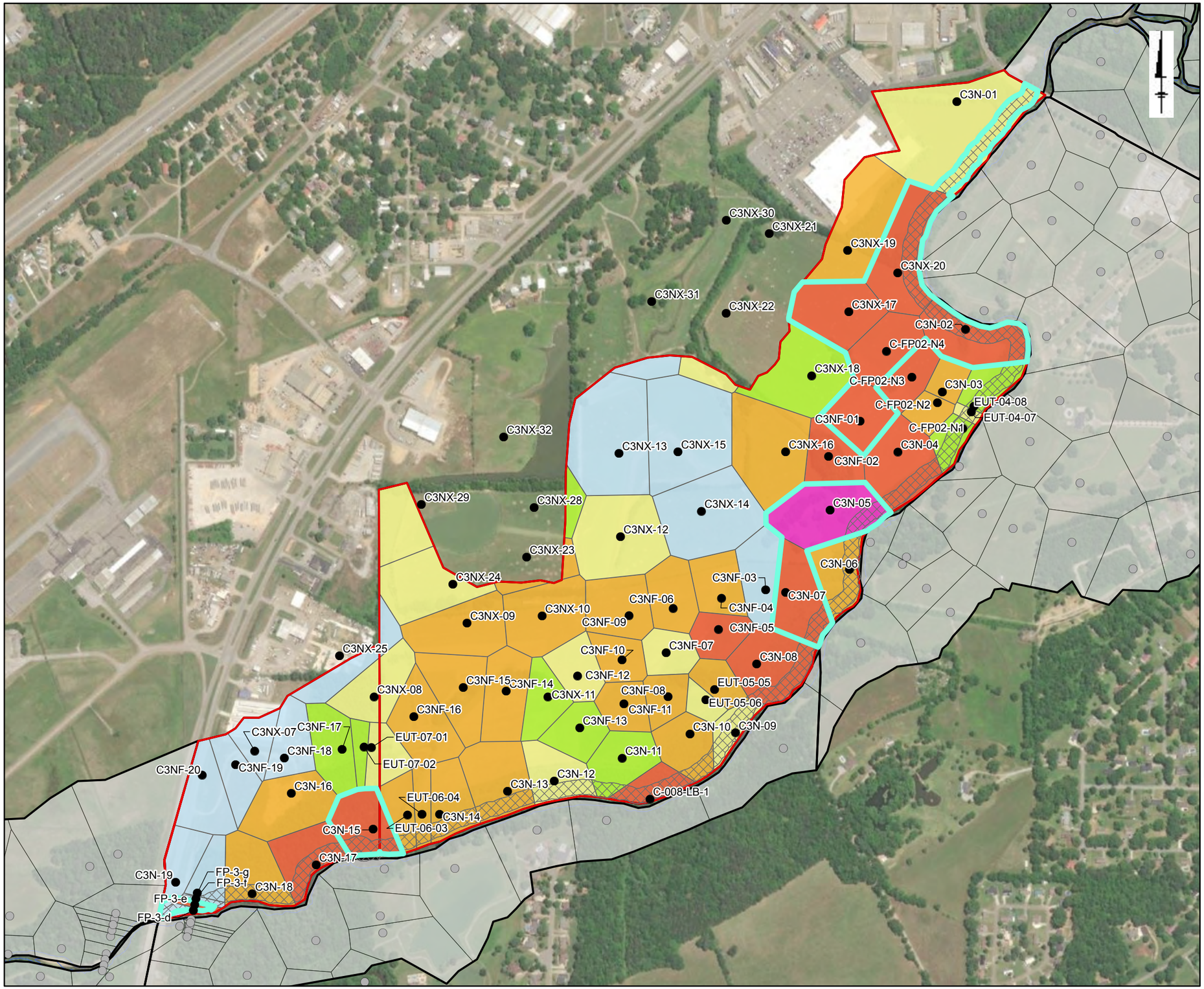
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C2S

Solutia

Figure 7-2f

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

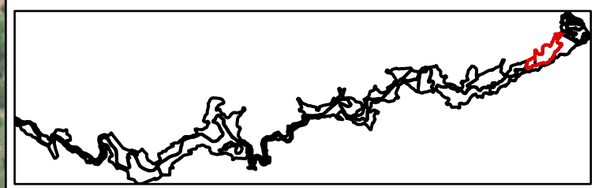
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 750 1,500 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

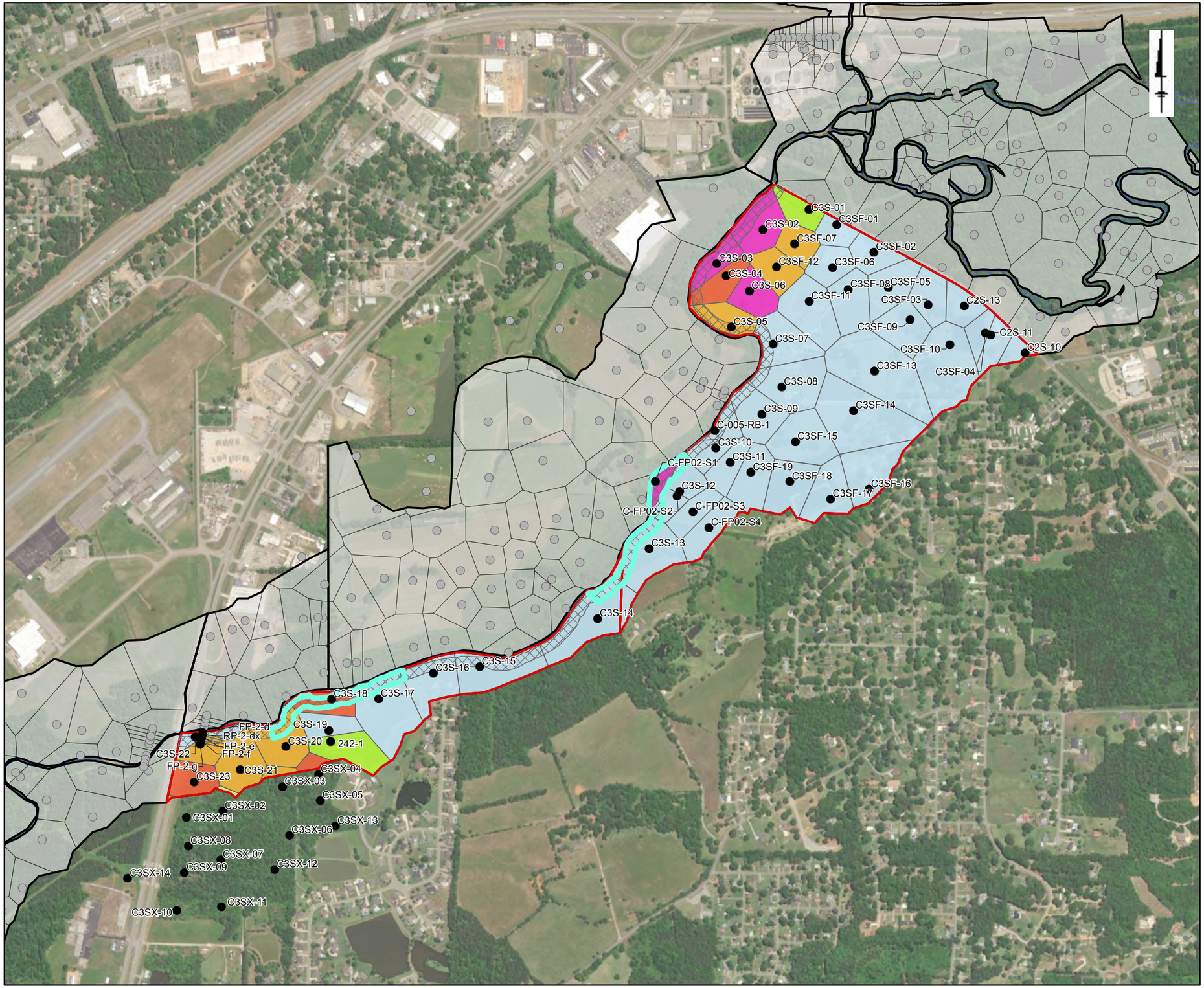
Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C3N

Solutia

Figure 7-2g

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

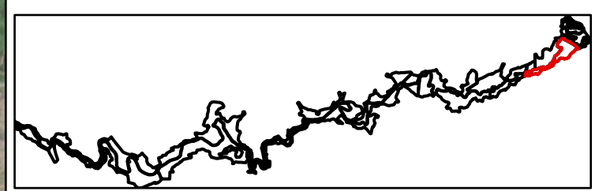
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



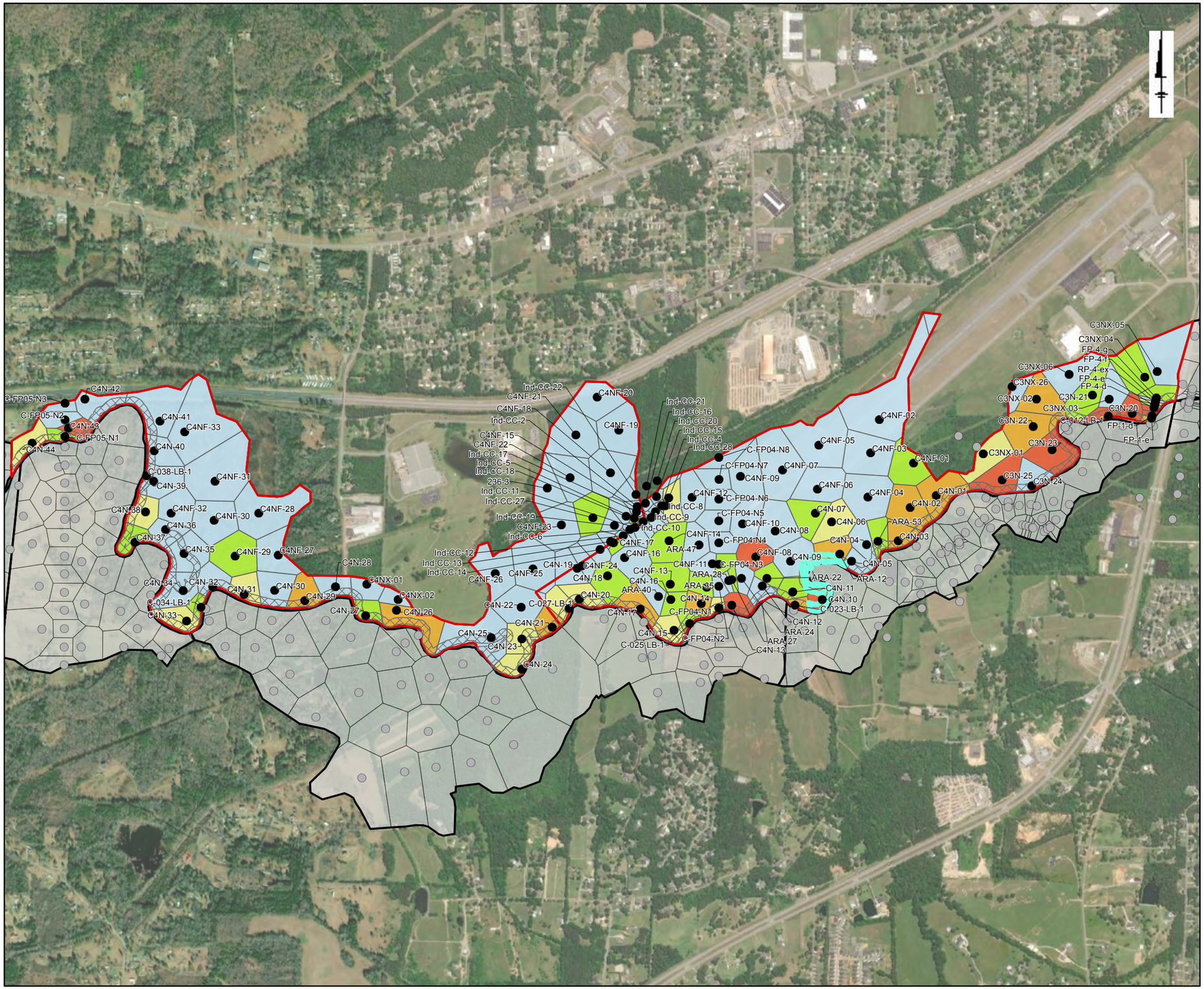
Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C3S

Solutia

Figure 7-2h



Legend

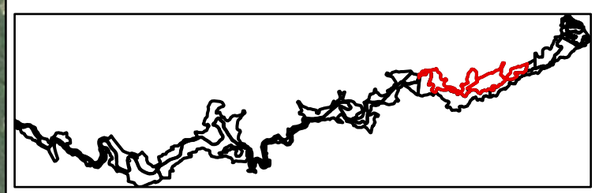
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C4N

Solutia

Figure 7-2i

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon

Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

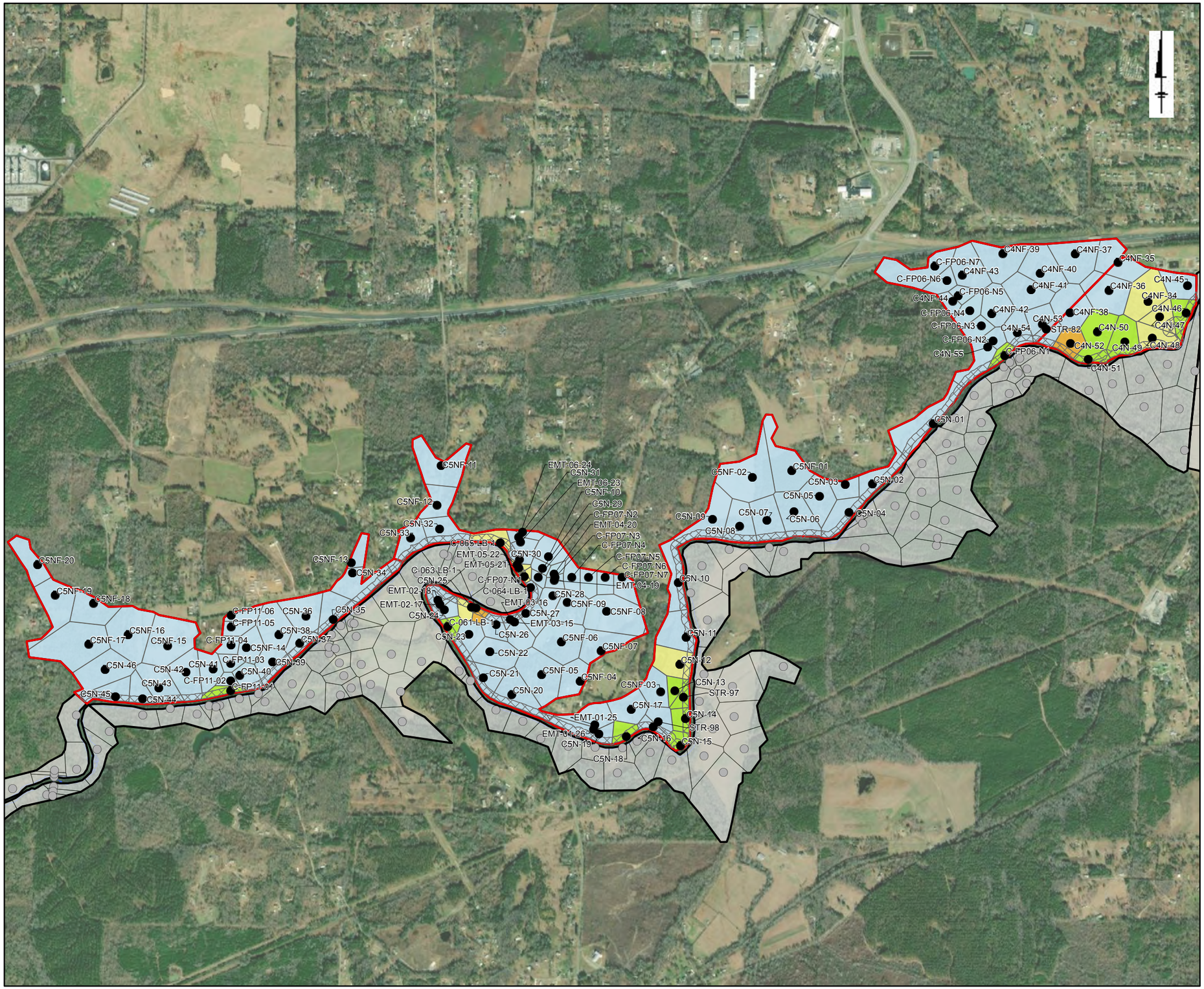
Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C4S

Solutia

Figure 7-2j

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

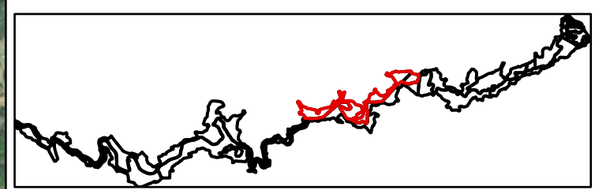
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



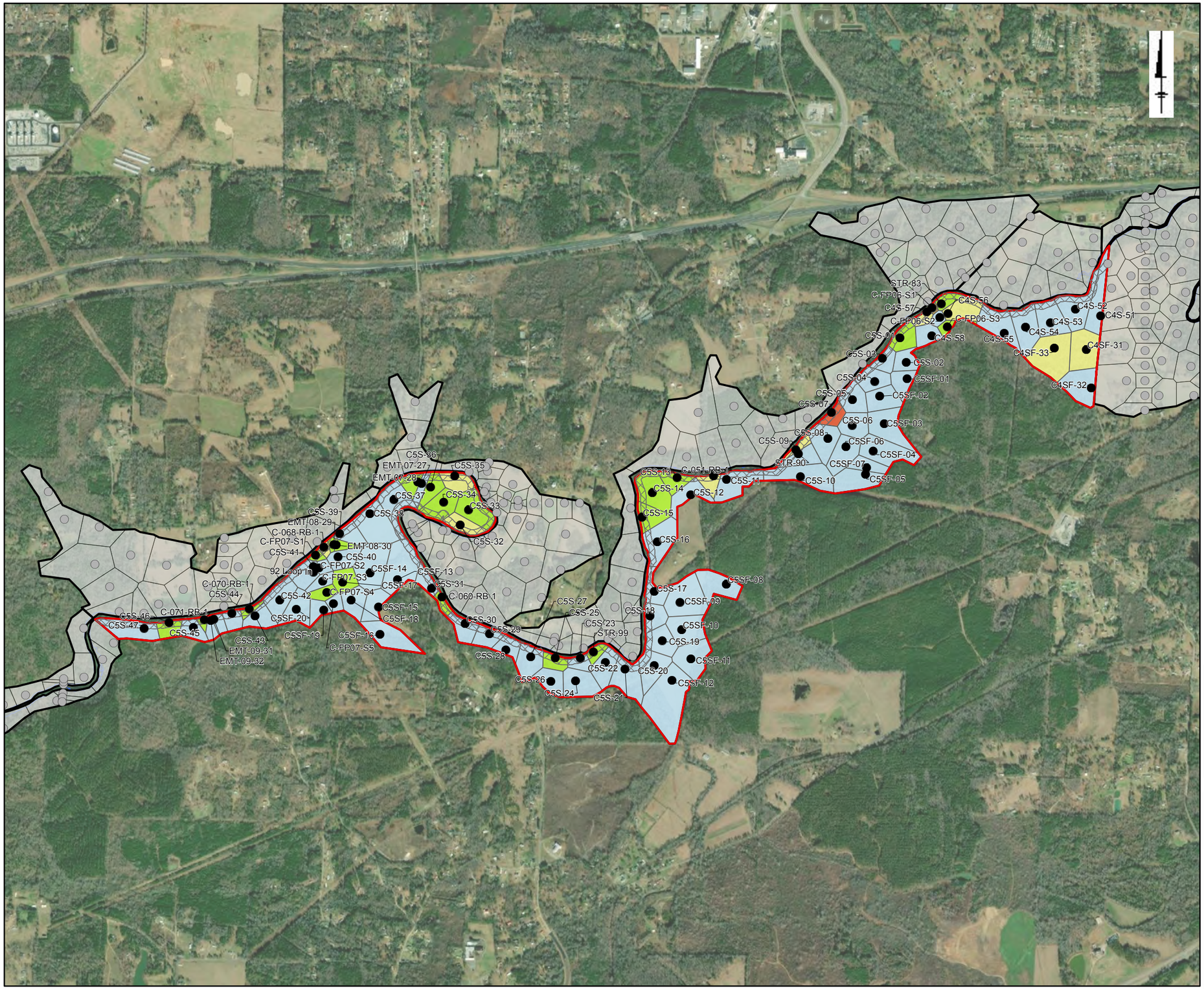
Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C5N

Solutia

Figure 7-2k



Legend

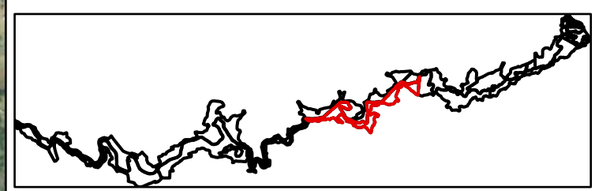
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 2,000 4,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

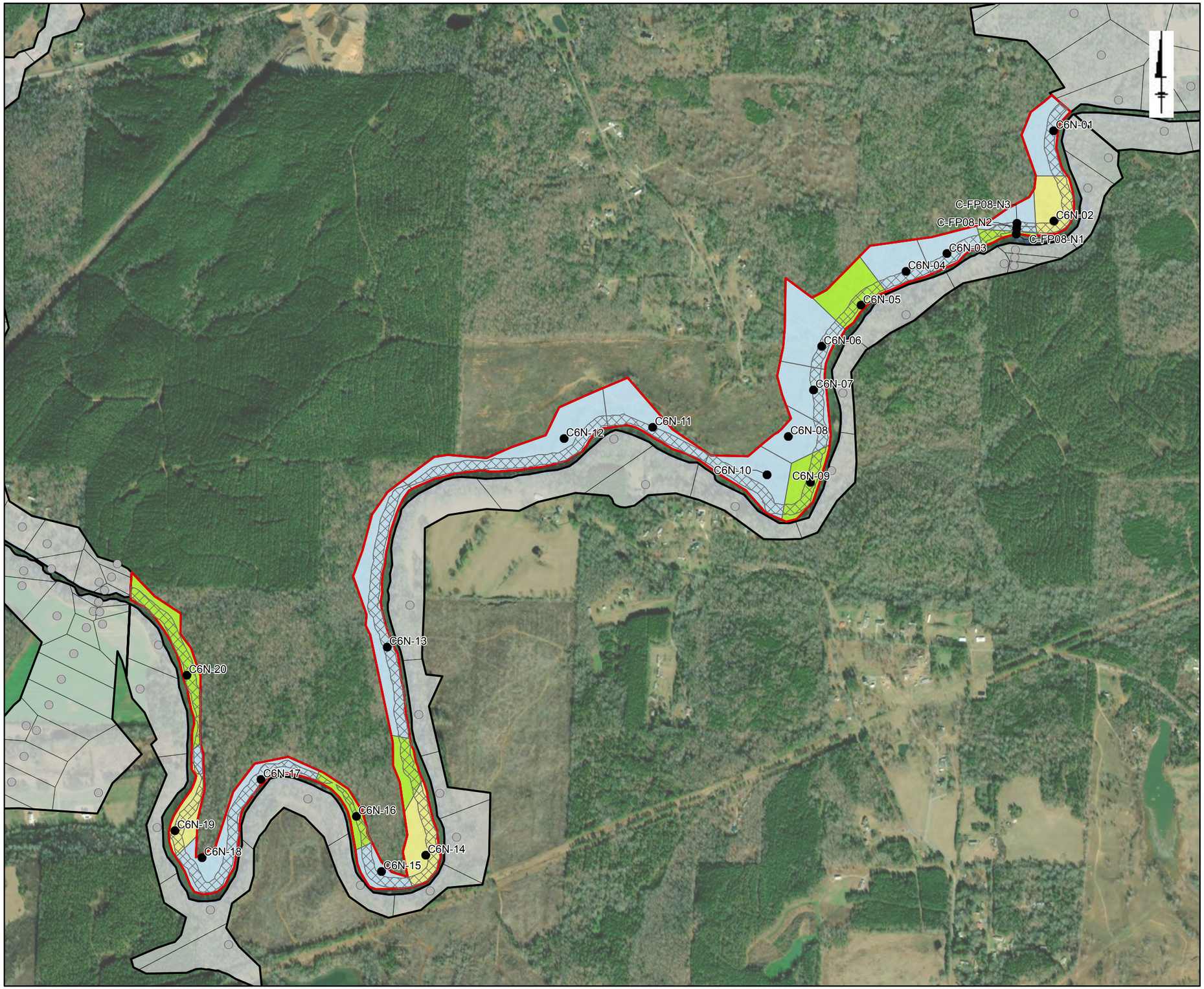
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C5S

Solutia

Figure 7-2l

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

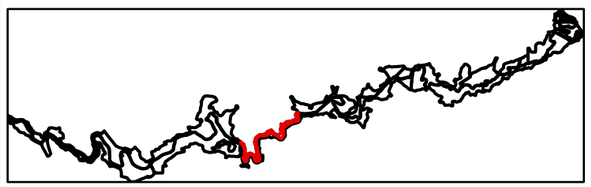
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

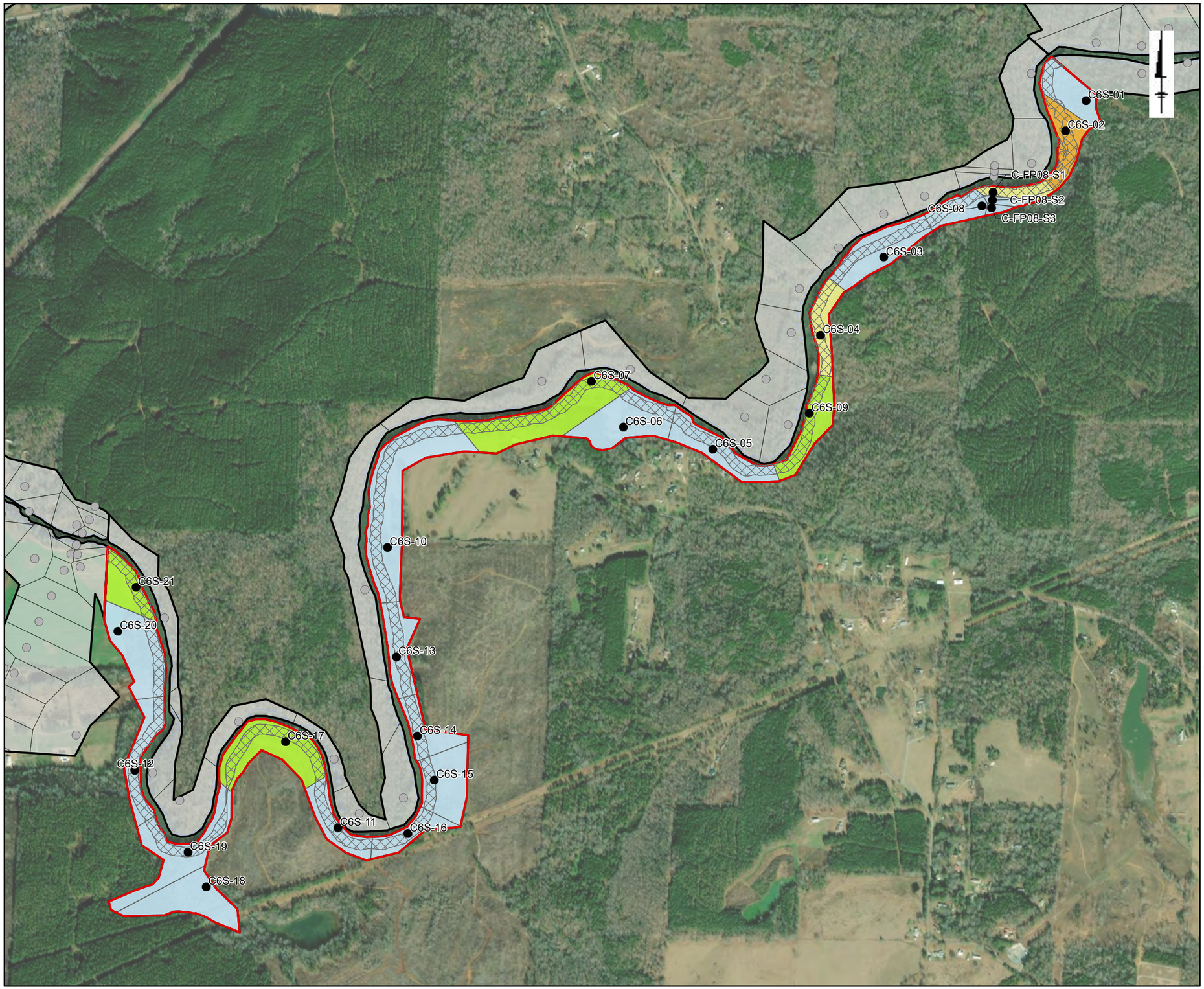
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C6N

Solutia

Figure 7-2m

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

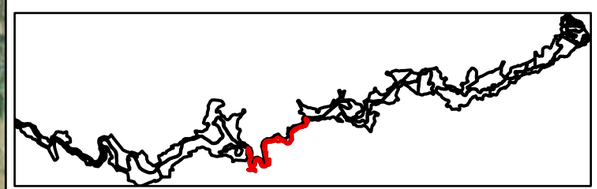
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

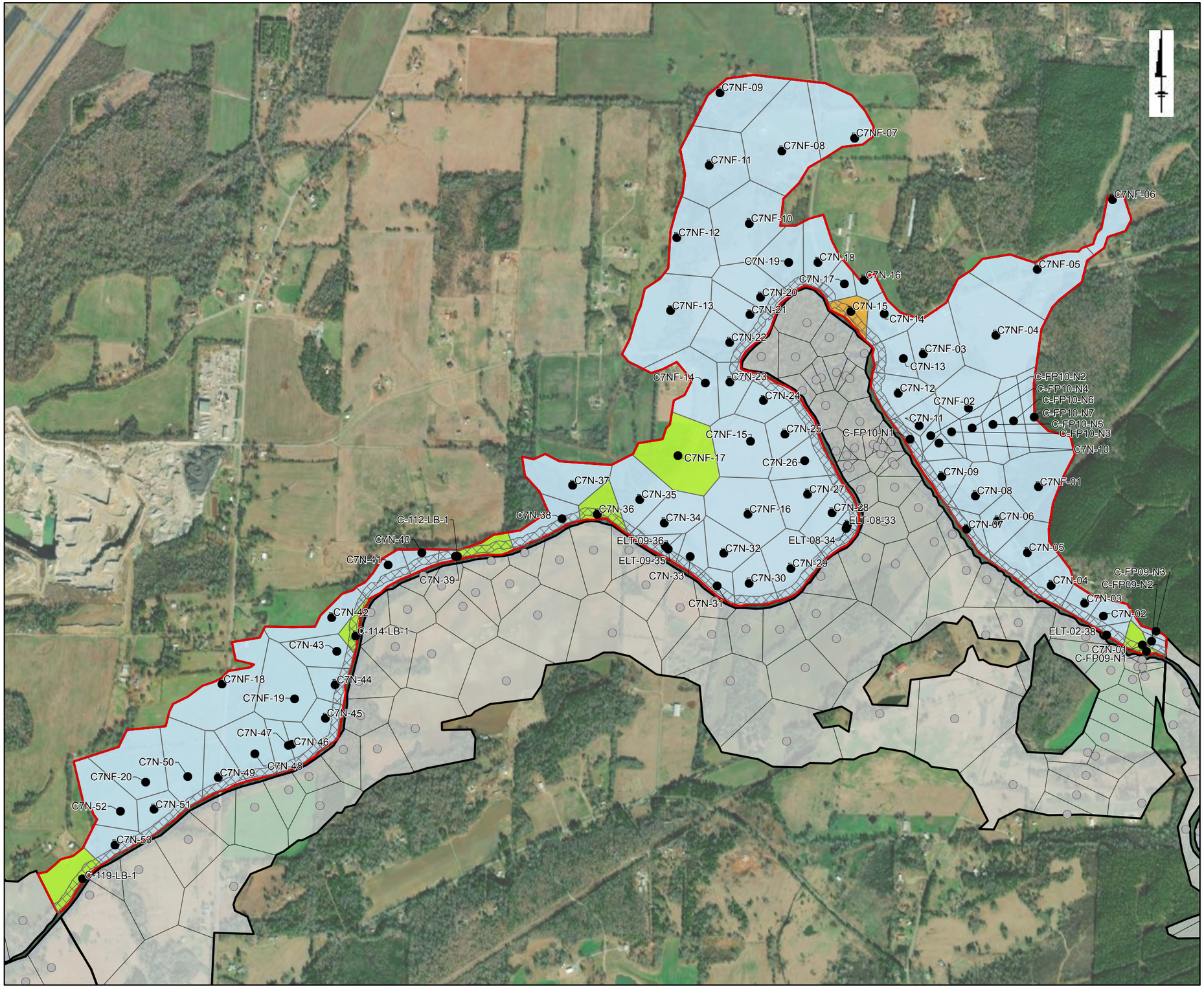
Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C6S

Solutia

Figure 7-2n

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

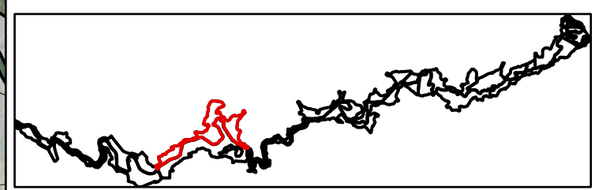
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



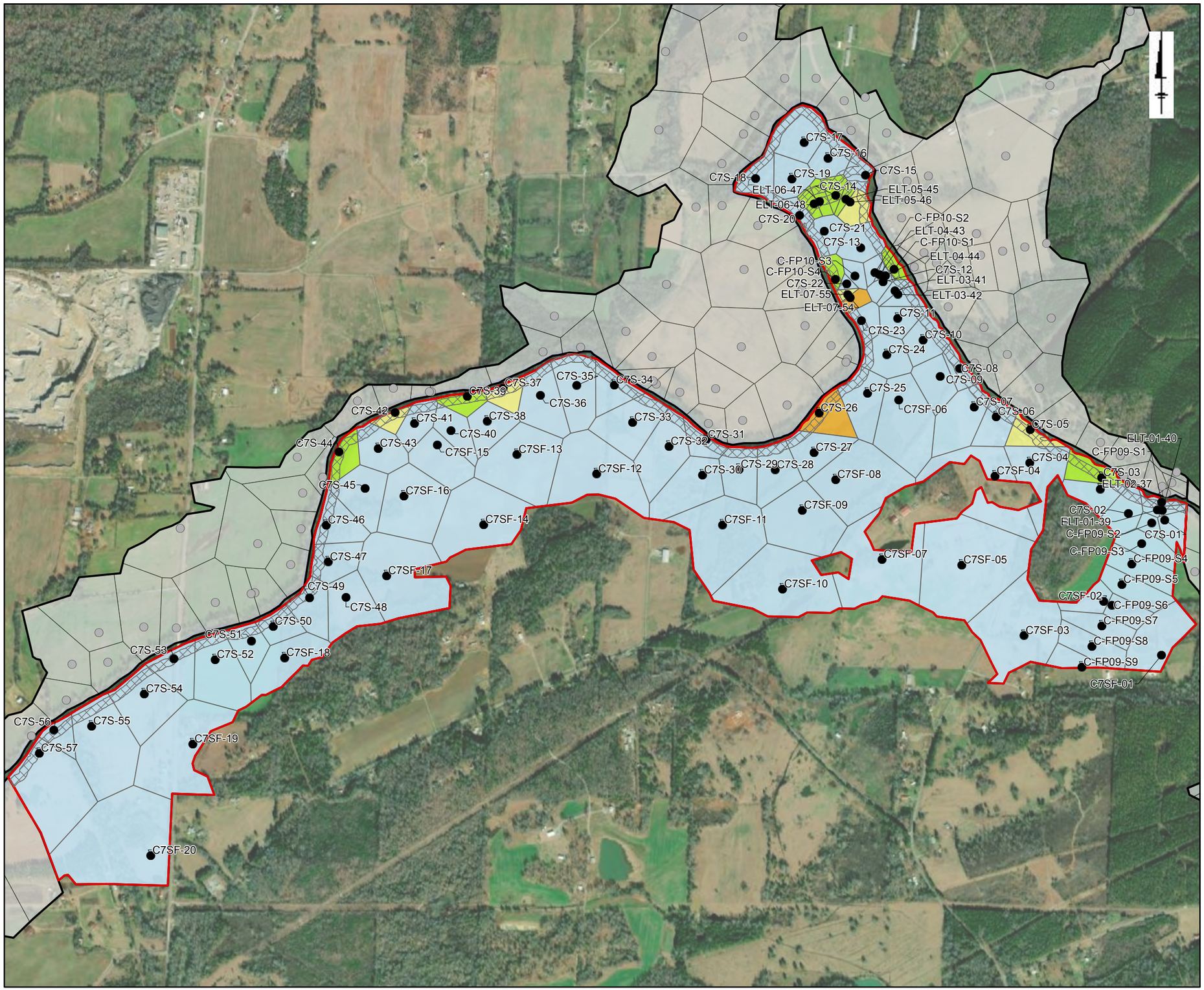
Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C7N

Solutia

Figure 7-2o



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

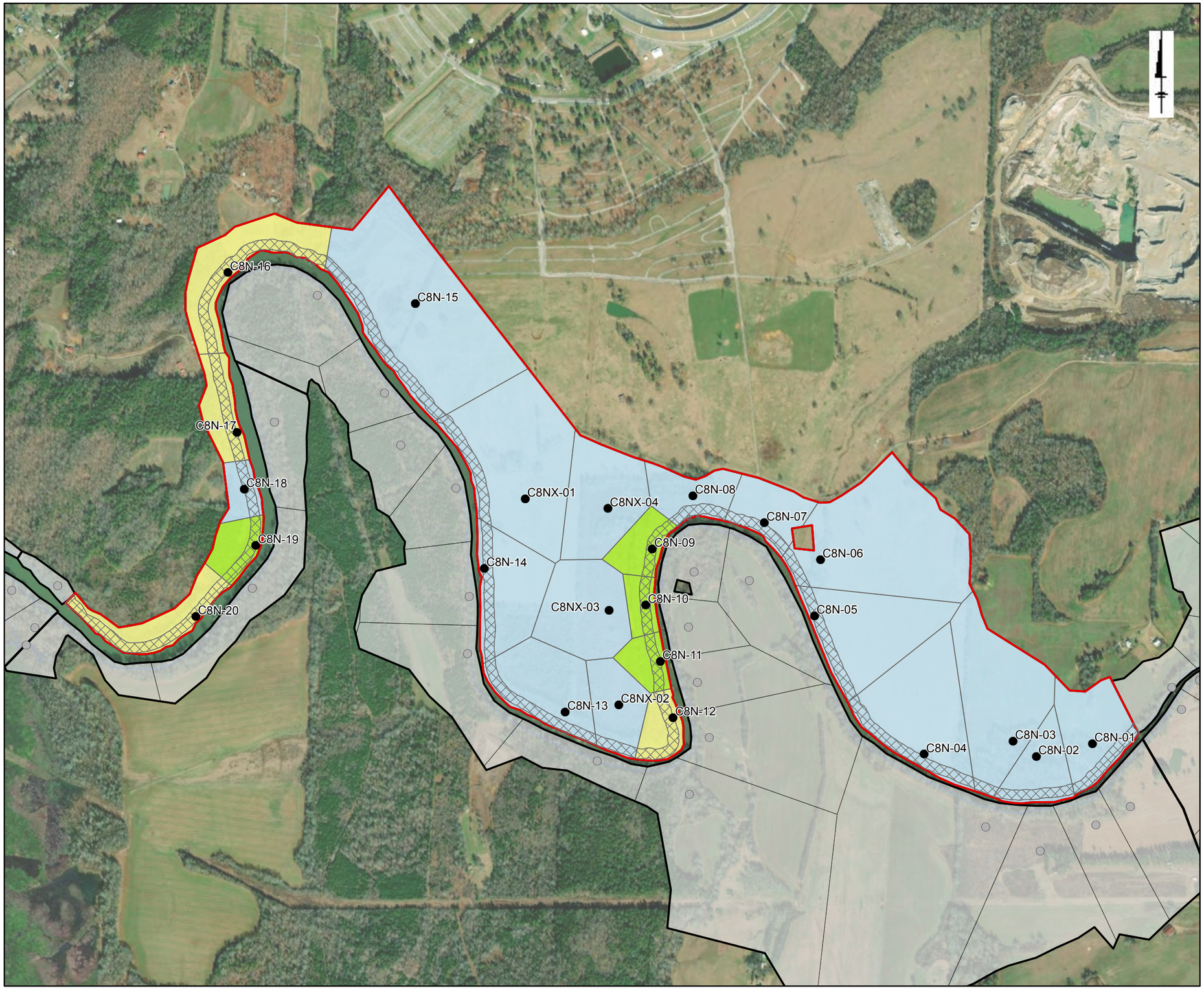
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C7S

Solutia

Figure 7-2p

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

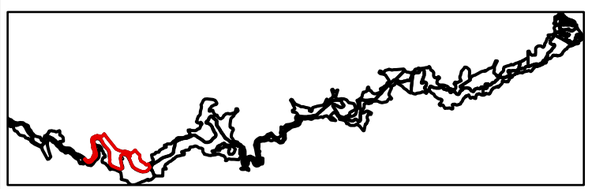
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

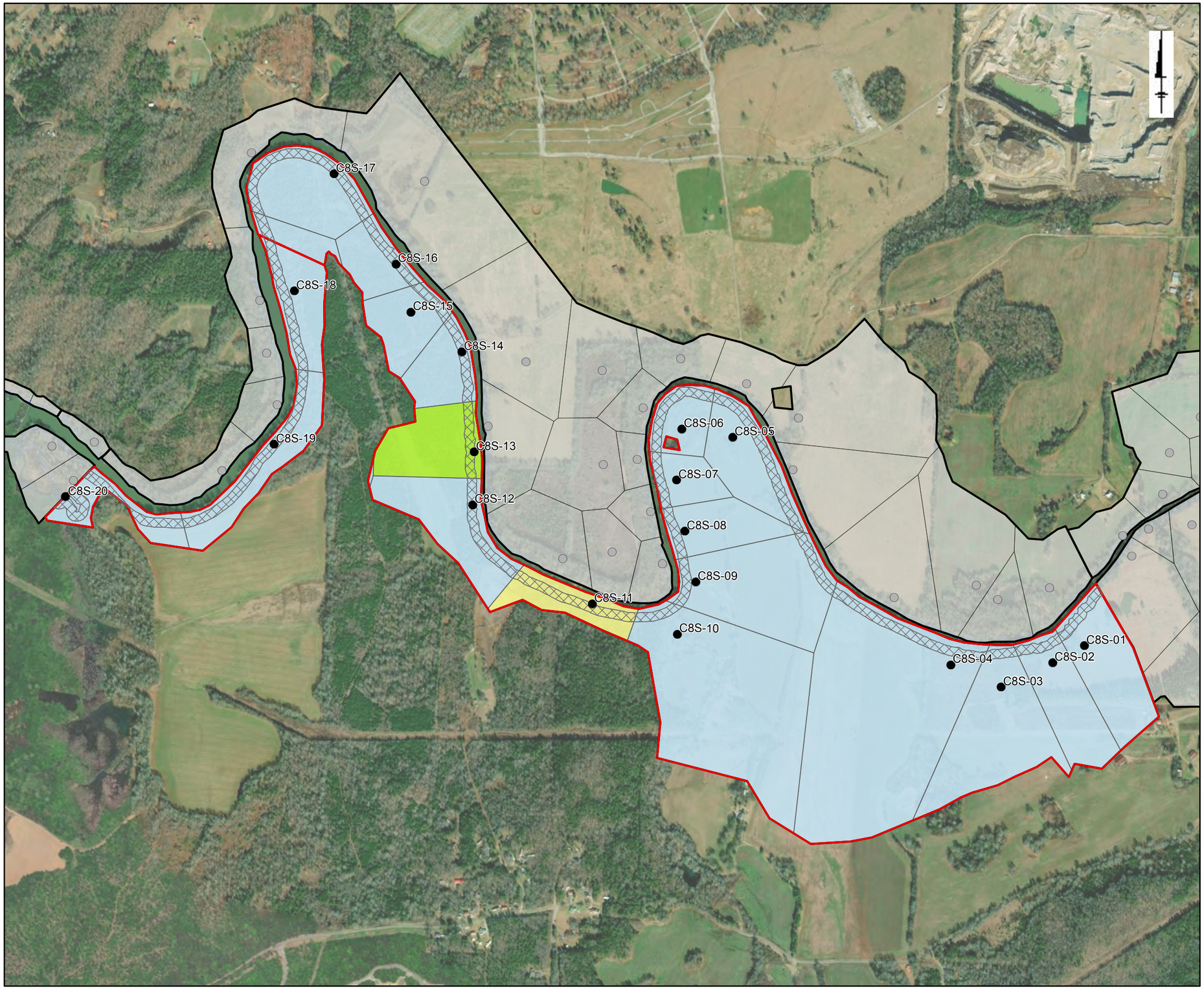
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C8N

Solutia

Figure 7-2q

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

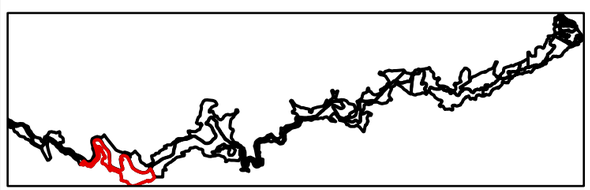
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

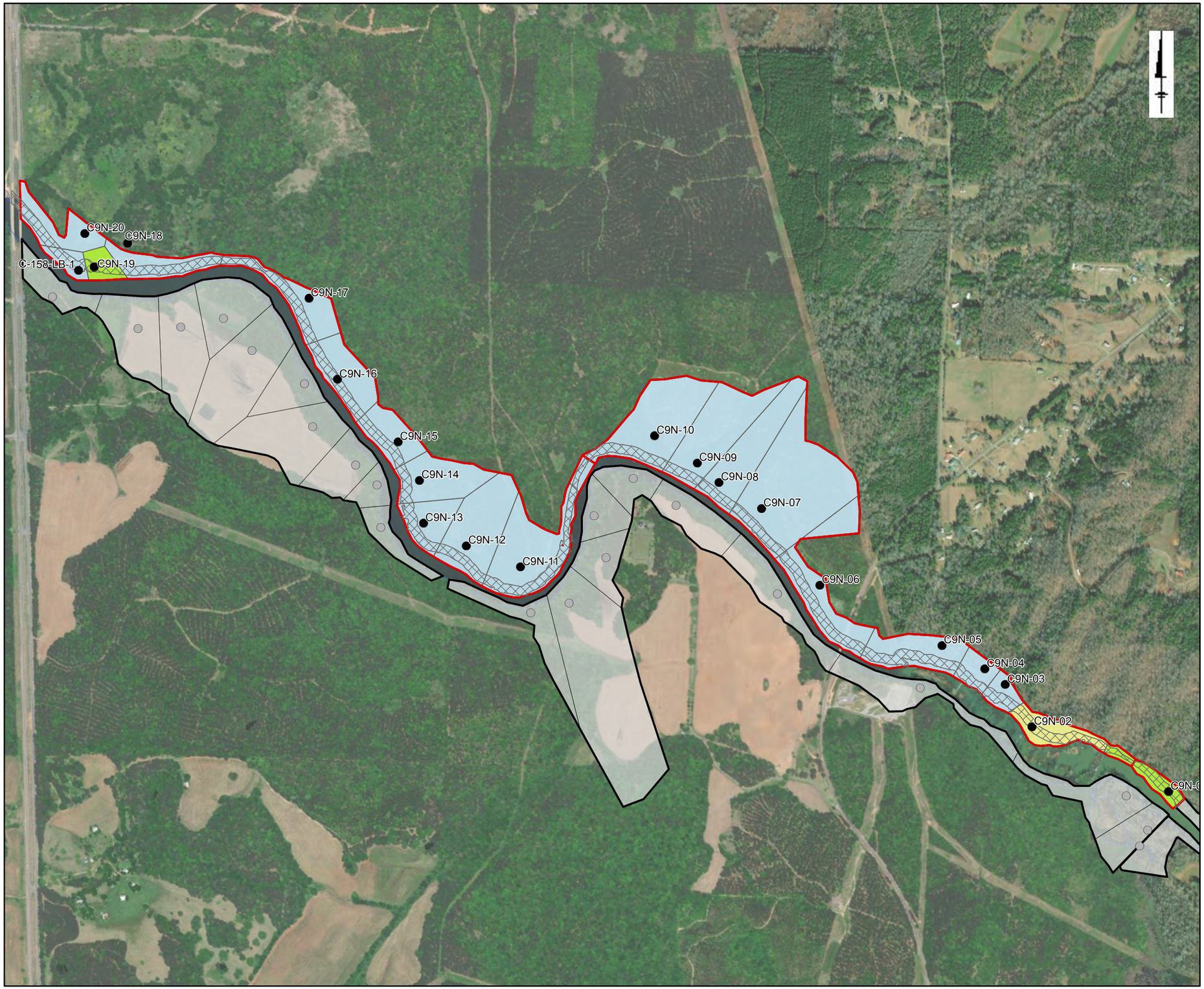
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C8S

Solutia

Figure 7-2r

N:\AAnniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

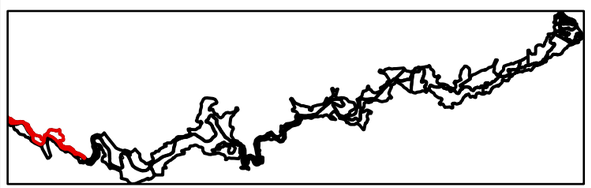
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

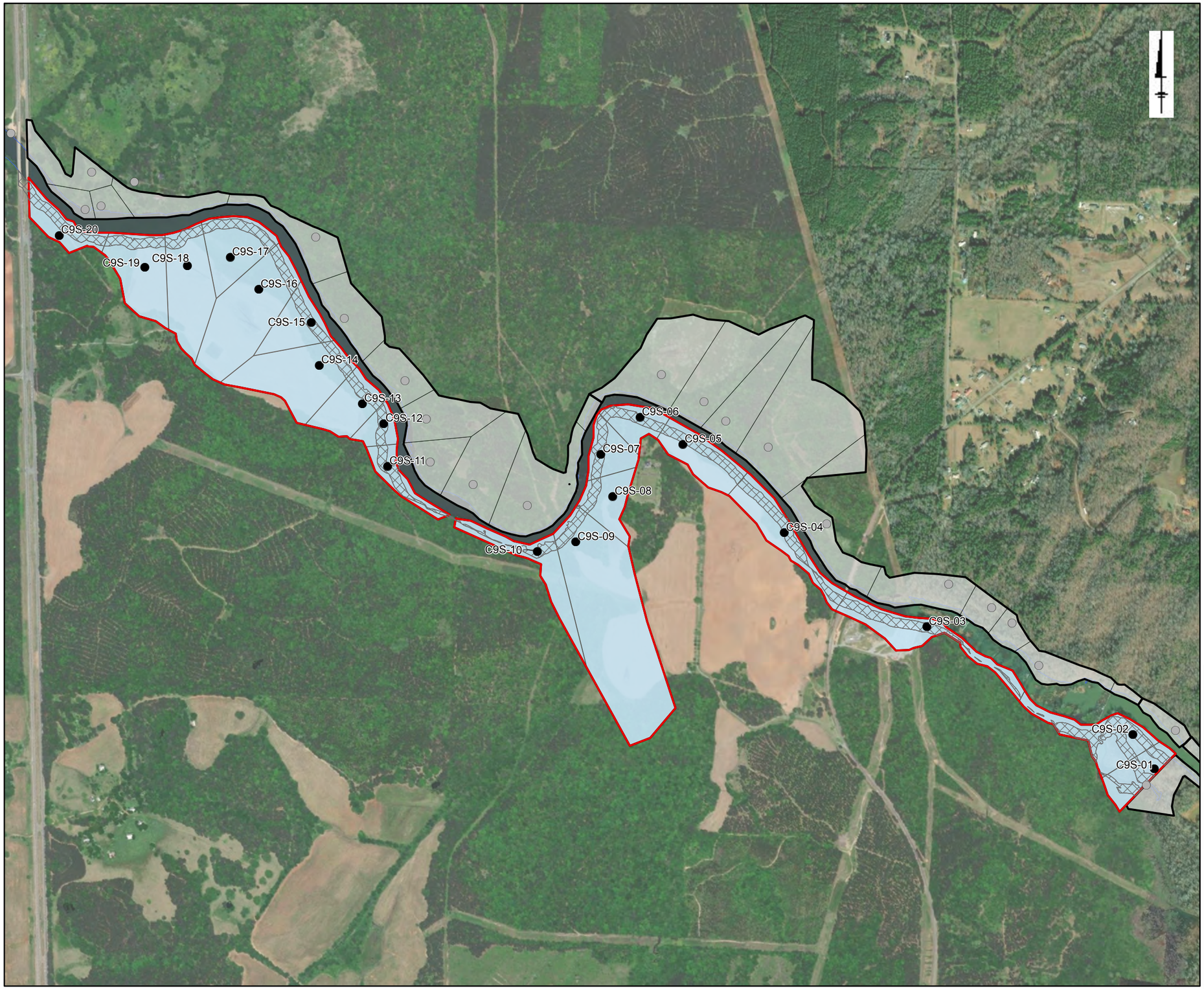
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C9N

Solutia

Figure 7-2s

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon



Legend

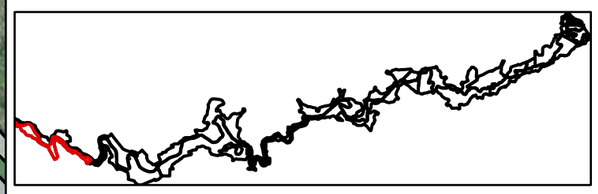
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

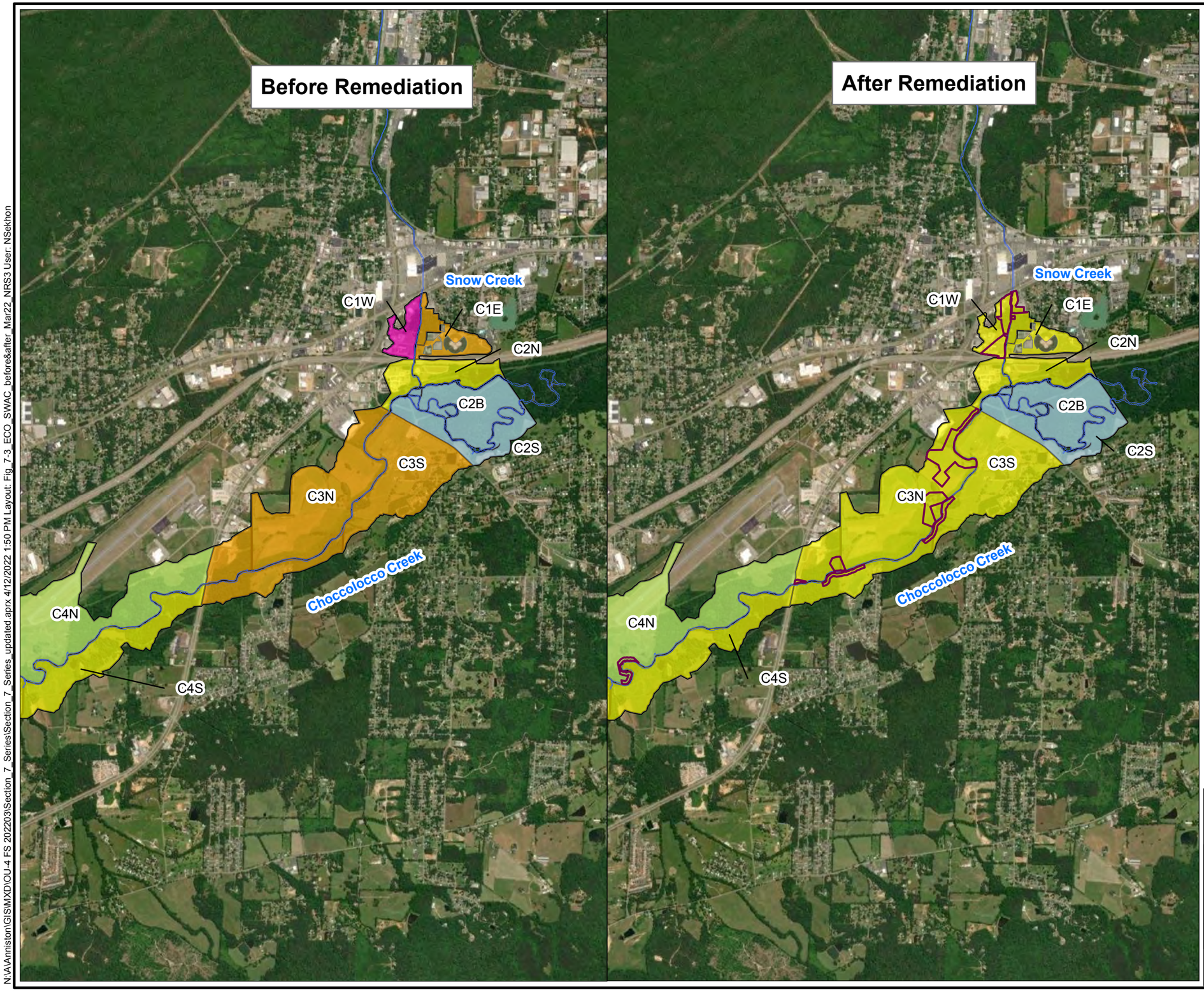
Remedial Footprint of NRS-2 for Ecological Exposure Conditions (0-0.5 ft bgs): C9S

Solutia

Figure 7-2t

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 1:19 PM Layout: Figures_ECO_NRS2 User: NSekhon

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated aprx 4/12/2022 1:50 PM Layout: Fig_7-3_ECO_SWAC_before&after_Mar22_NRS3 User: NSekhon



Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Characterization Area
- Target Remediation Areas

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
1. Alternative NRS-3 includes the removal of soil from the 0-0.5-ft horizon to achieve a post-removal PCB SWAC of 6 mg/kg to reduce ecological risks, and removal of soil from the 0-1-ft horizon in C1-EU2 and C1-EU1 with PCB concentrations ≥ 50 mg/kg to streamline long-term soil management support.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration

0 1 2 Miles

Graphic Scale

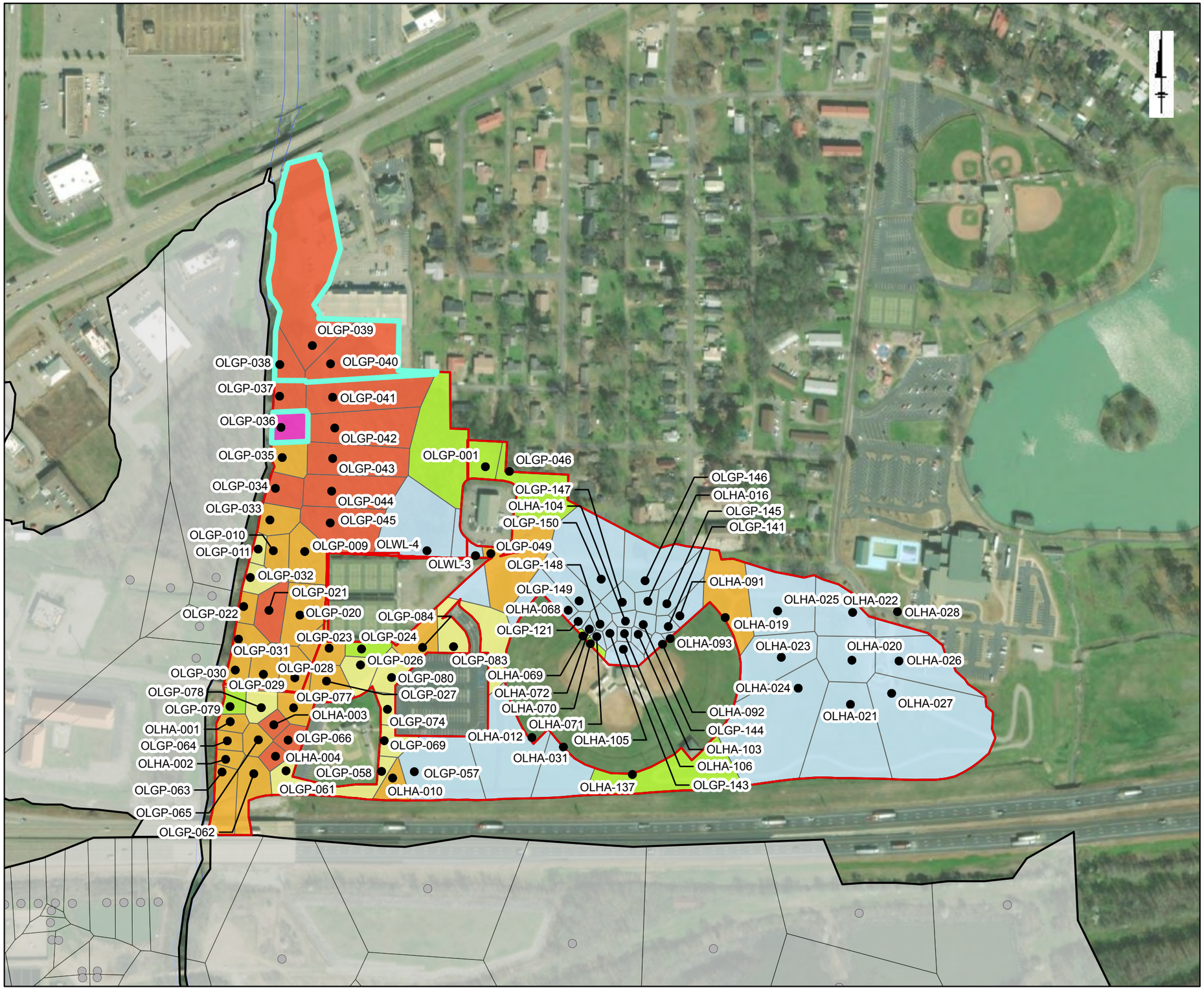
Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Mean SWAC PCB Concentrations in Nonresidential Floodplain Soil for Ecological EUs (0-0.5 ft bgs): NRS-3

Solutia

Figure 7-3a



Legend

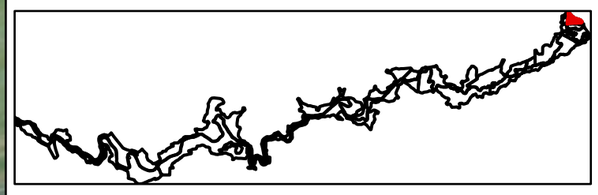
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

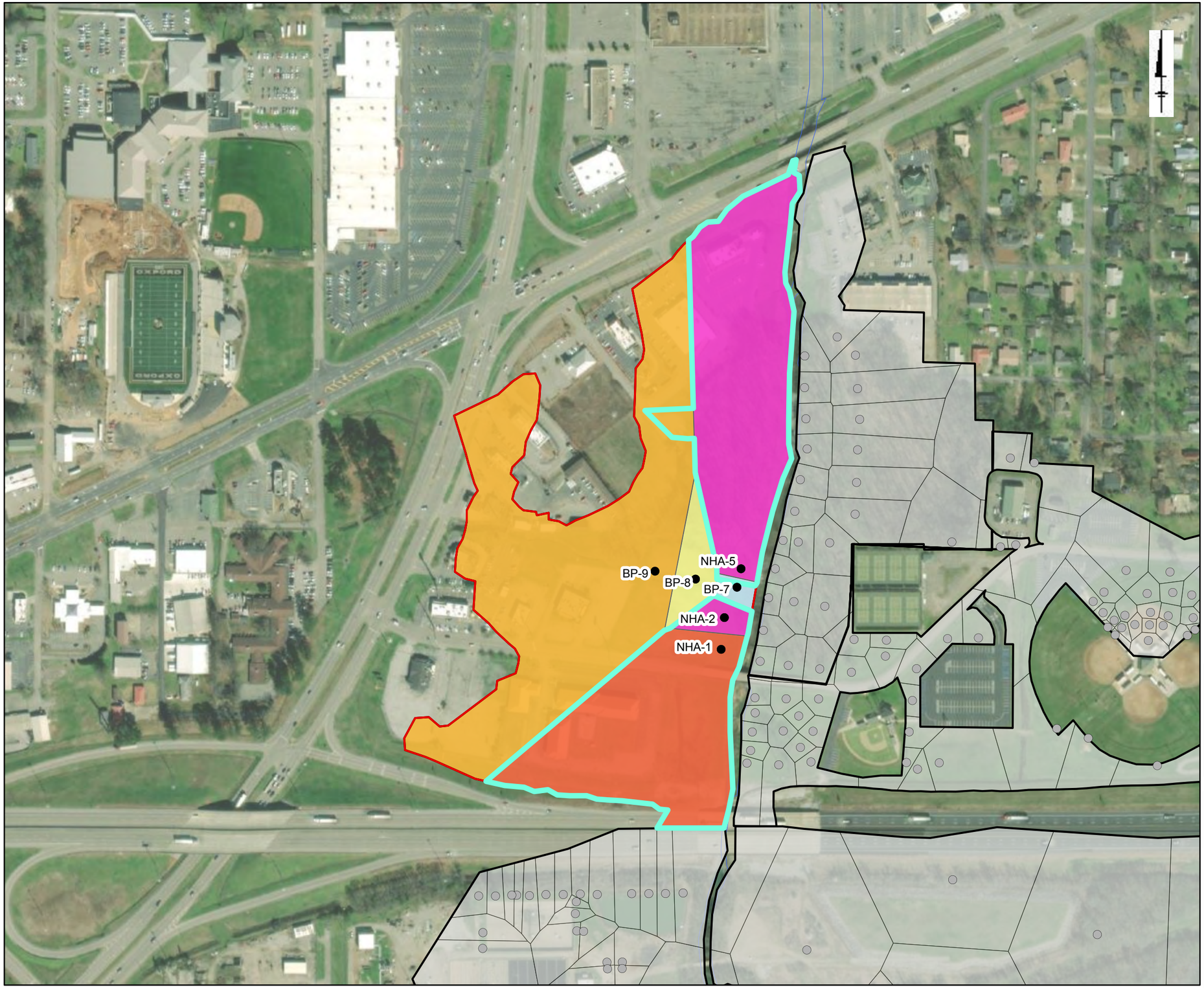
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C1E

Solutia

Figure 7-3b

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.apx 4/5/2023 5:12 PM



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700
Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

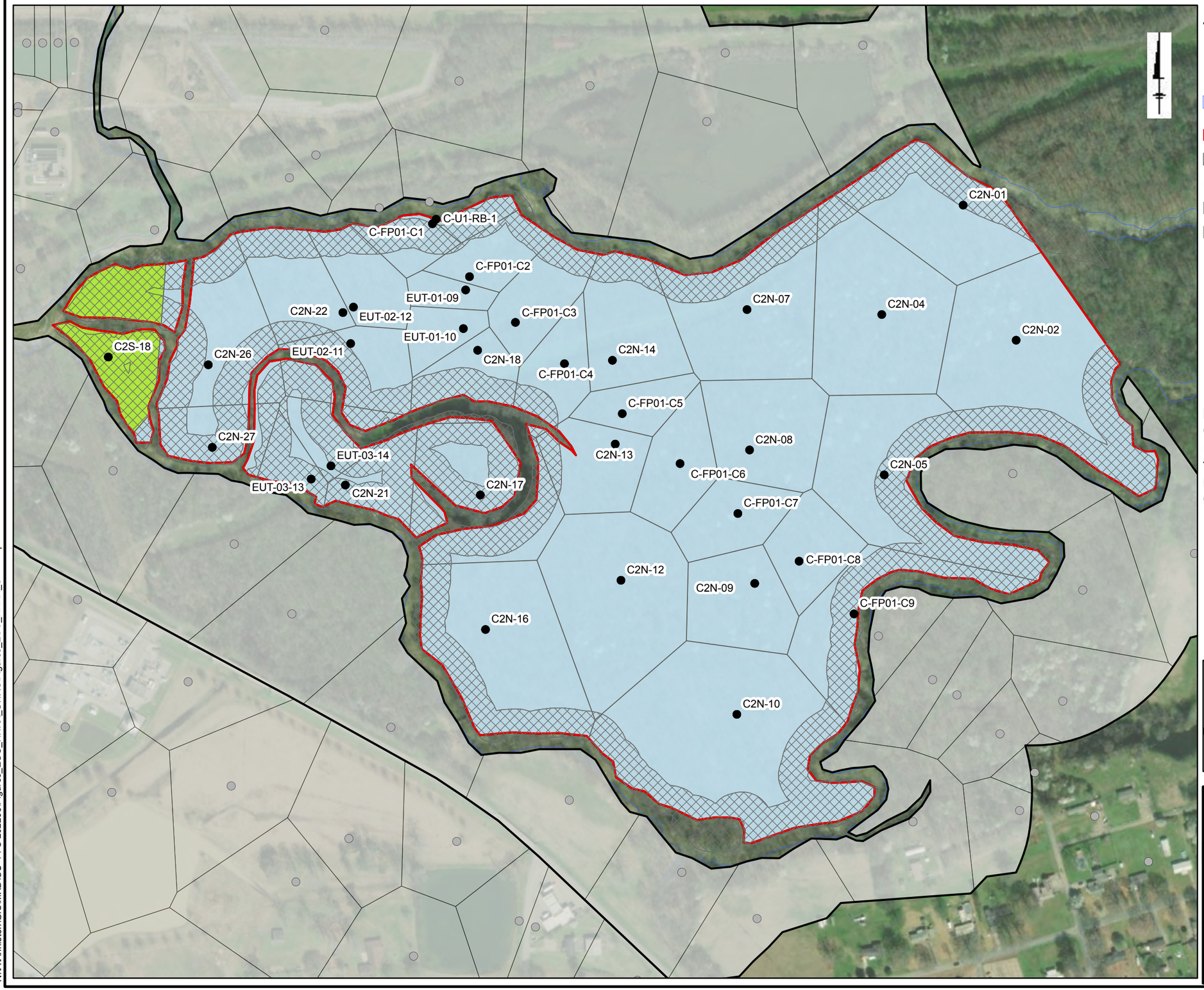
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C1W

Solutia

Figure 7-3c

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

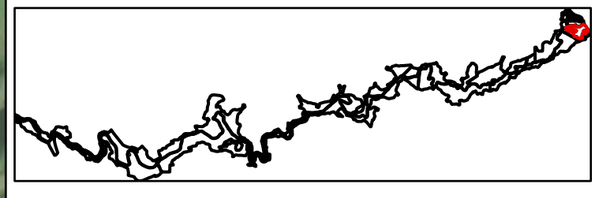
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 375 750 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

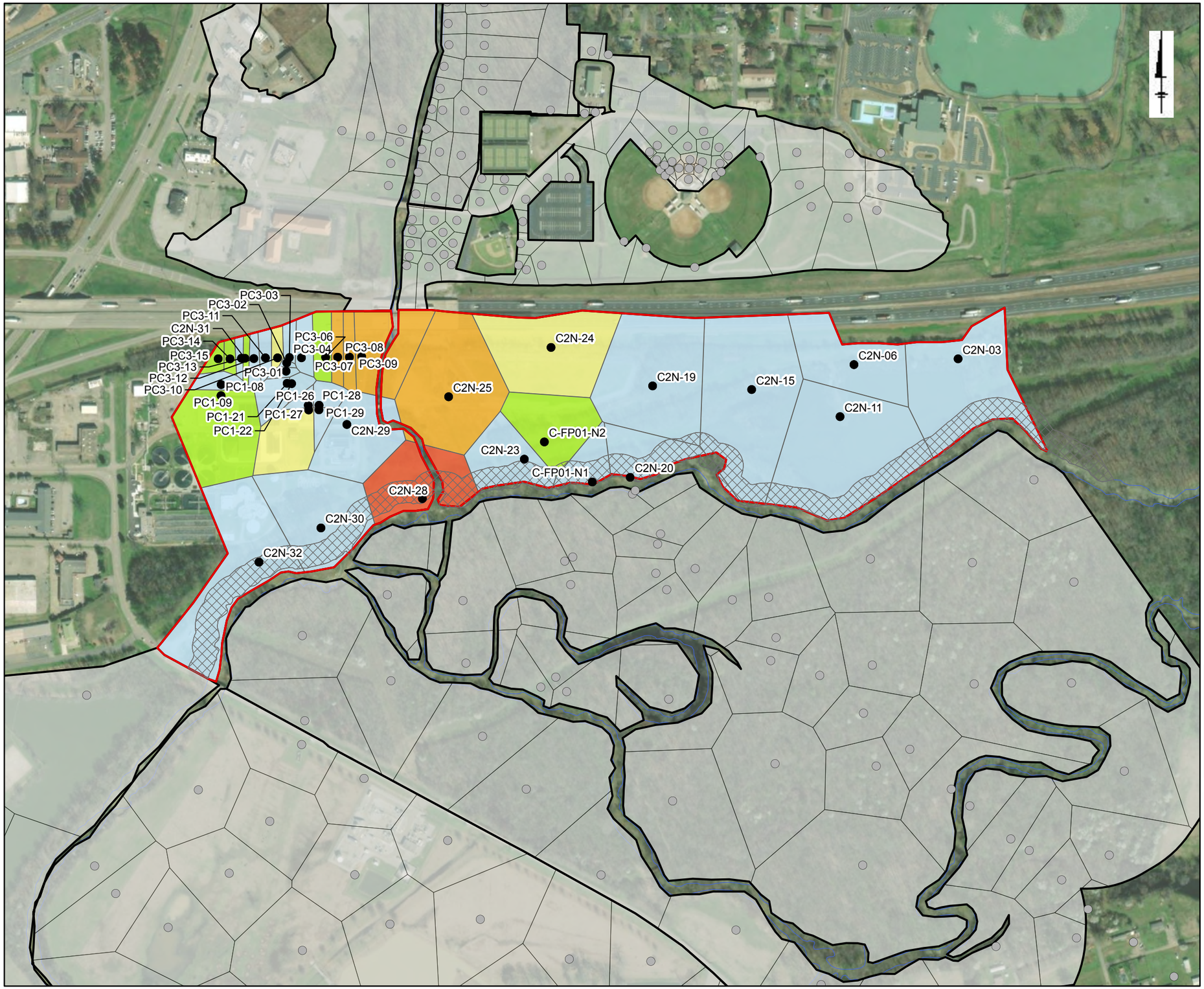
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C2B

Solutia

Figure 7-3d

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

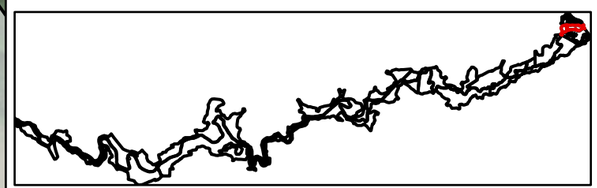
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet
Graphic Scale



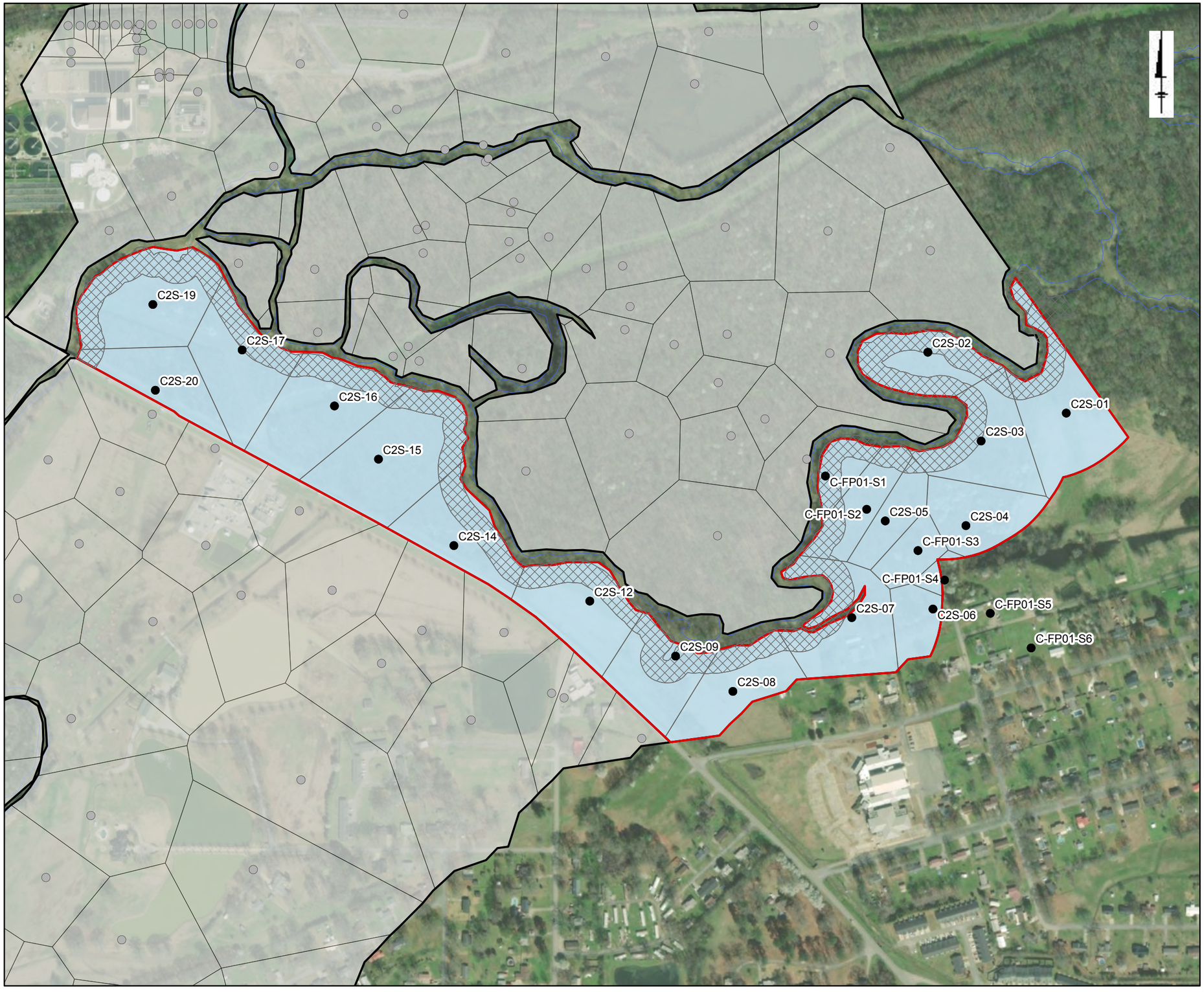
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C2N

Solutia

Figure 7-3e

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

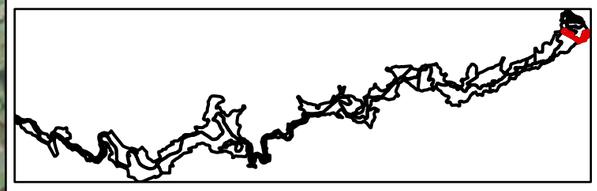
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C2S

Solutia

Figure 7-3f

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM

C3N-01
C3NX-30
C3NX-21
C3NX-19
C3NX-20
C3NX-31
C3NX-22
C3NX-17
C3N-02
C-FP02-N4
C3NX-18
C-FP02-N3
C3N-03
C-FP02-N2
EUT-04-08
EUT-04-07
C3NF-01
C-FP02-N1
C3NX-32
C3NX-13
C3NX-15
C3NX-16
C3N-04
C3NF-02
C3NX-29
C3NX-28
C3NX-14
C3N-05
C3NX-12
C3NX-23
C3N-06
C3NX-24
C3NF-03
C3N-07
C3NF-04
C3NX-09
C3NX-10
C3NF-06
C3NF-09
C3NF-05
C3NX-25
C3NF-07
C3NF-10
C3N-08
C3NF-12
C3NF-15
C3NF-14
C3NX-11
C3NF-08
EUT-05-05
C3NX-08
C3NF-16
C3NF-11
EUT-05-06
C3NF-13
C3NX-07
C3NF-17
EUT-07-01
C3N-10
C3N-09
C3NF-18
C3N-11
C3NF-20
C3NF-19
EUT-07-02
C3N-16
C3N-12
C3N-13
C-008-LB-1
EUT-06-04
C3N-14
C3N-15
EUT-06-03
C3N-17
C3N-19
FP-3-g
FP-3-i
C3N-18
FP-3-e
FP-3-d

Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 750 1,500 Feet
Graphic Scale

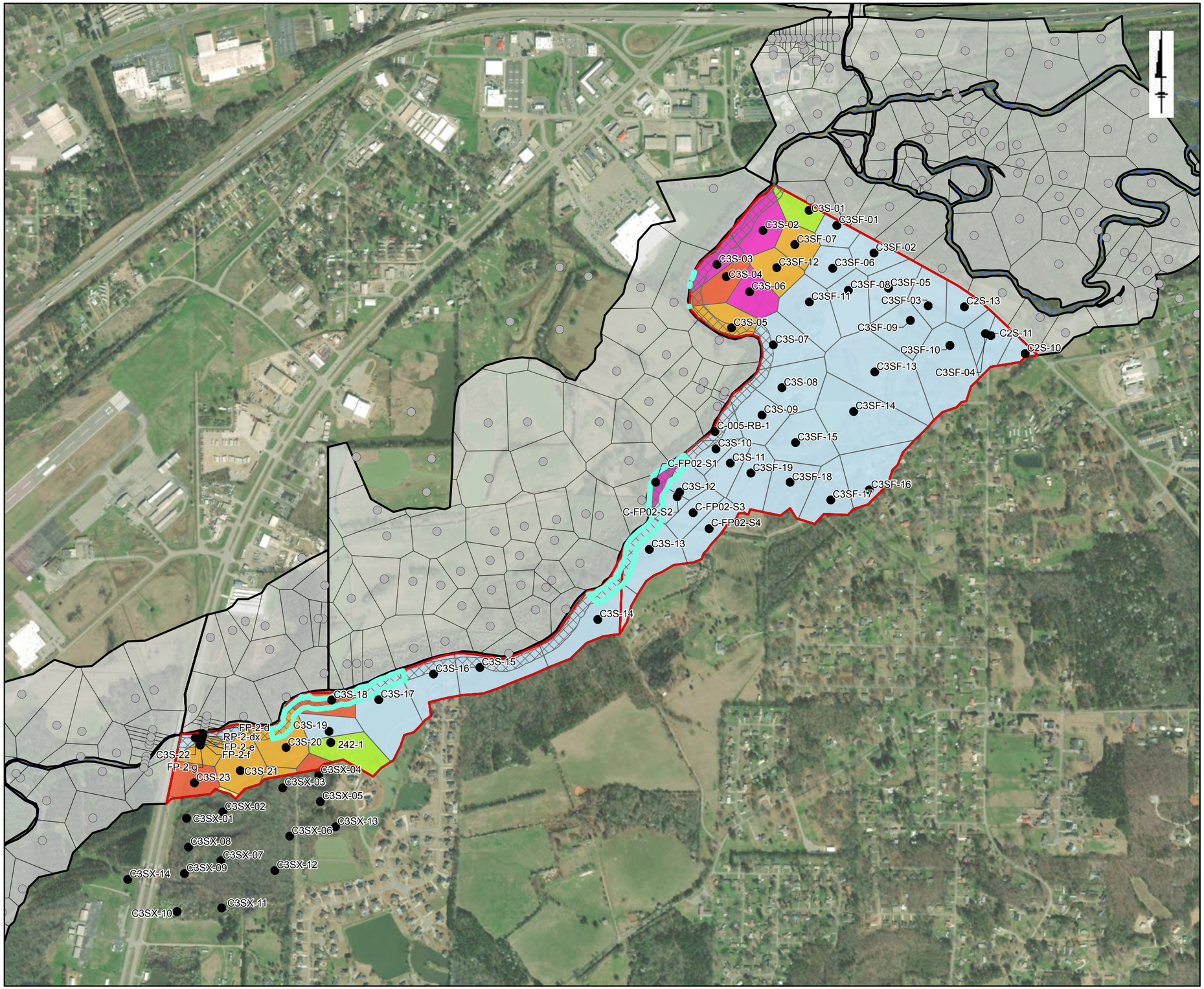
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C3N

Solutia

Figure 7-3g

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

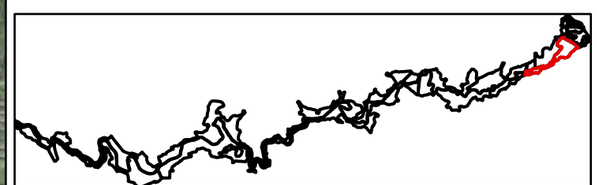
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C3S

Solutia

Figure 7-3h

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM

Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C4N

Solutia

Figure 7-3i

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM

Legend

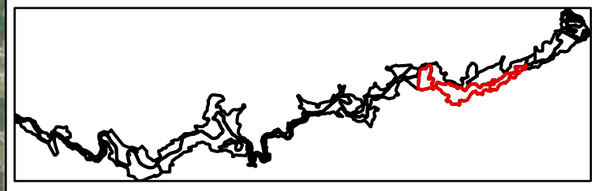
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



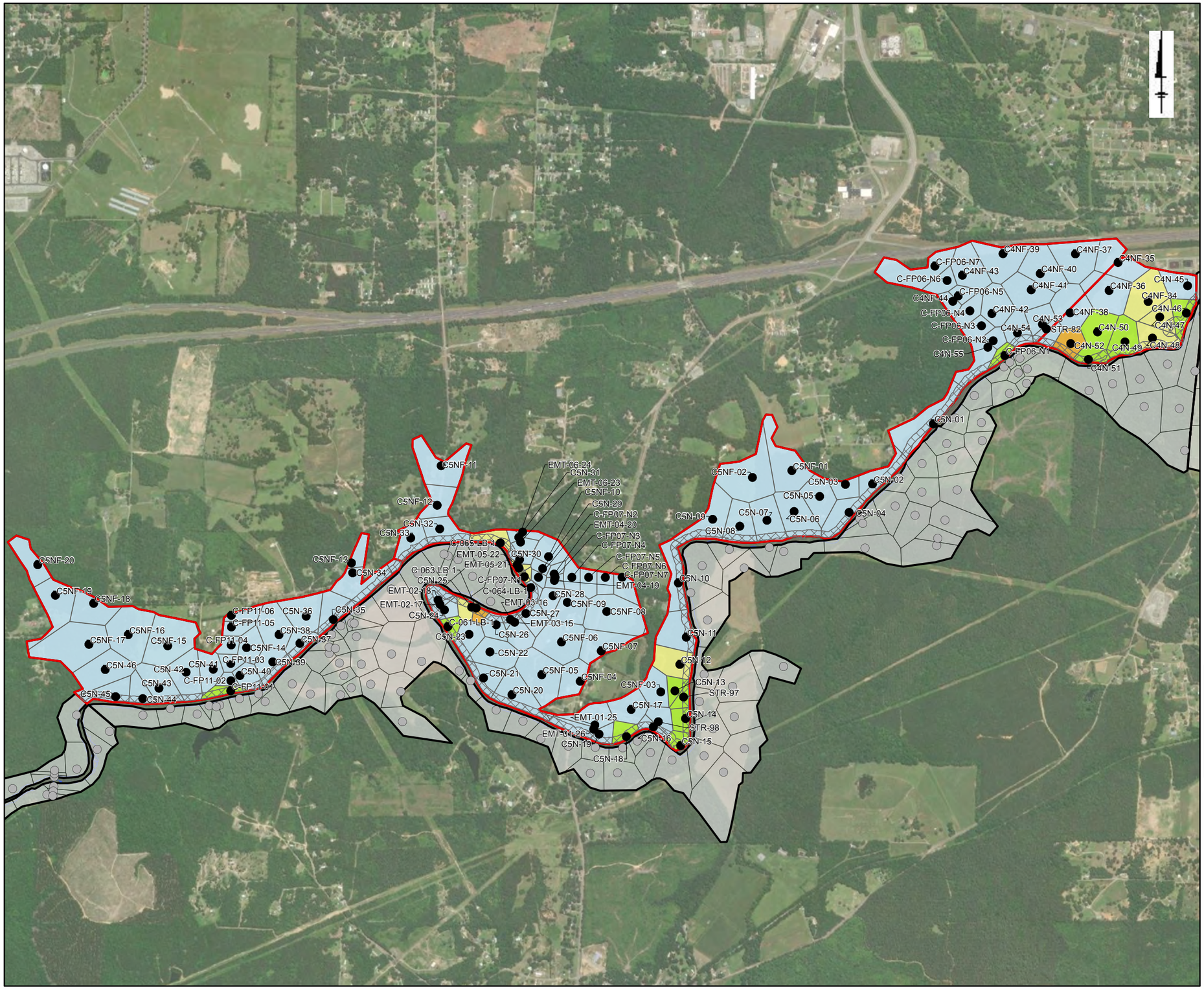
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C4S

Solutia

Figure 7-3j

N:\AlAnniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

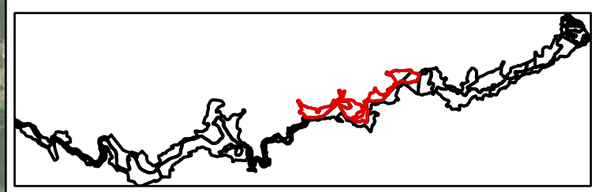
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

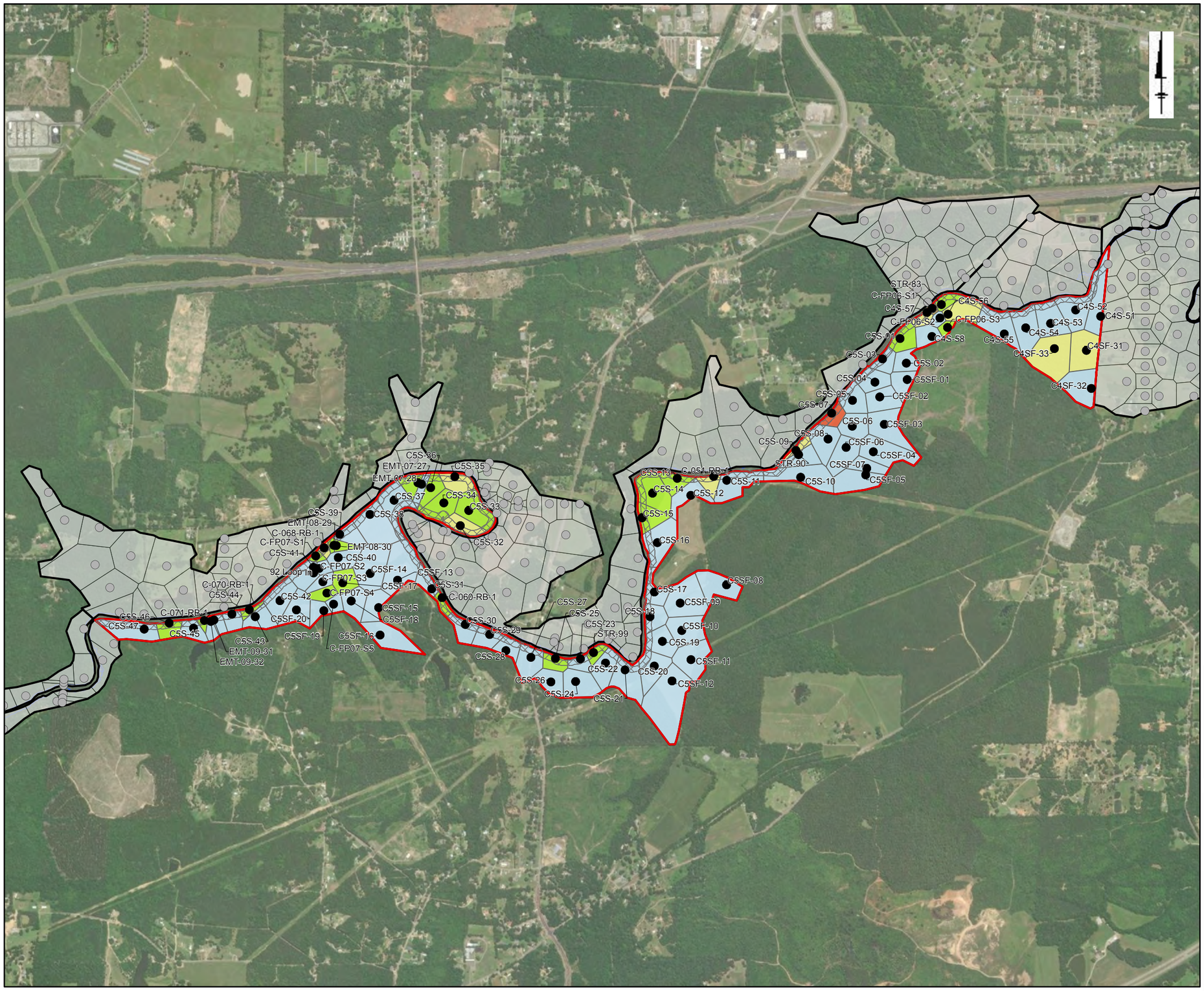
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C5N

Solutia

Figure 7-3k

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

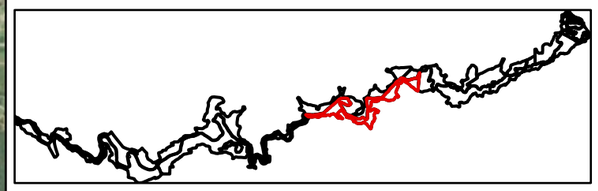
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 2,000 4,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

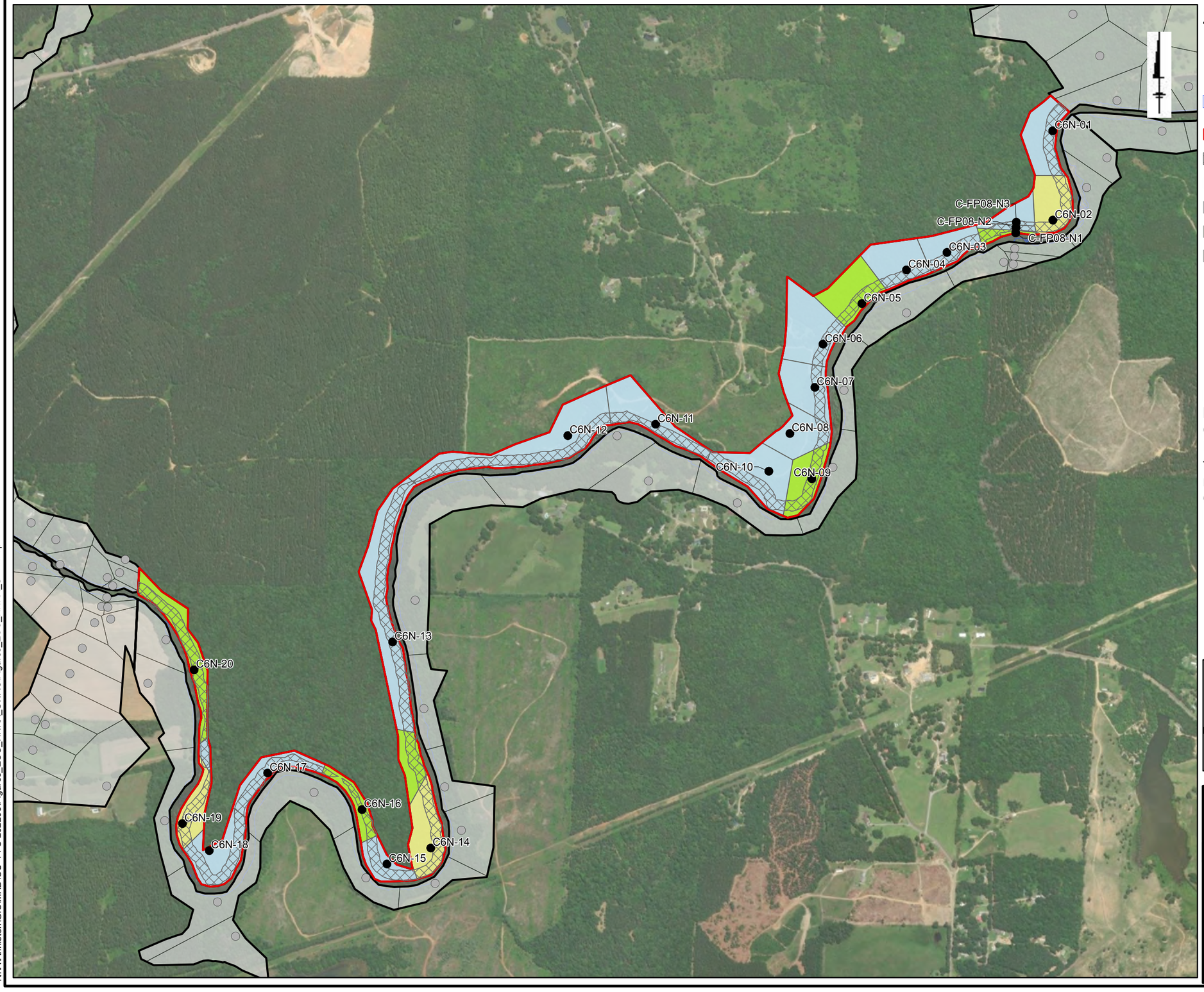
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C5S

Solutia

Figure 7-3l

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

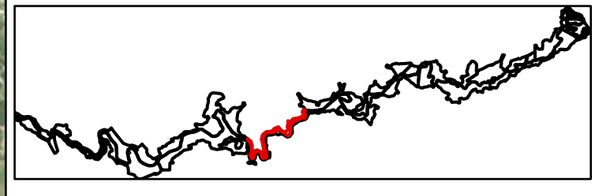
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



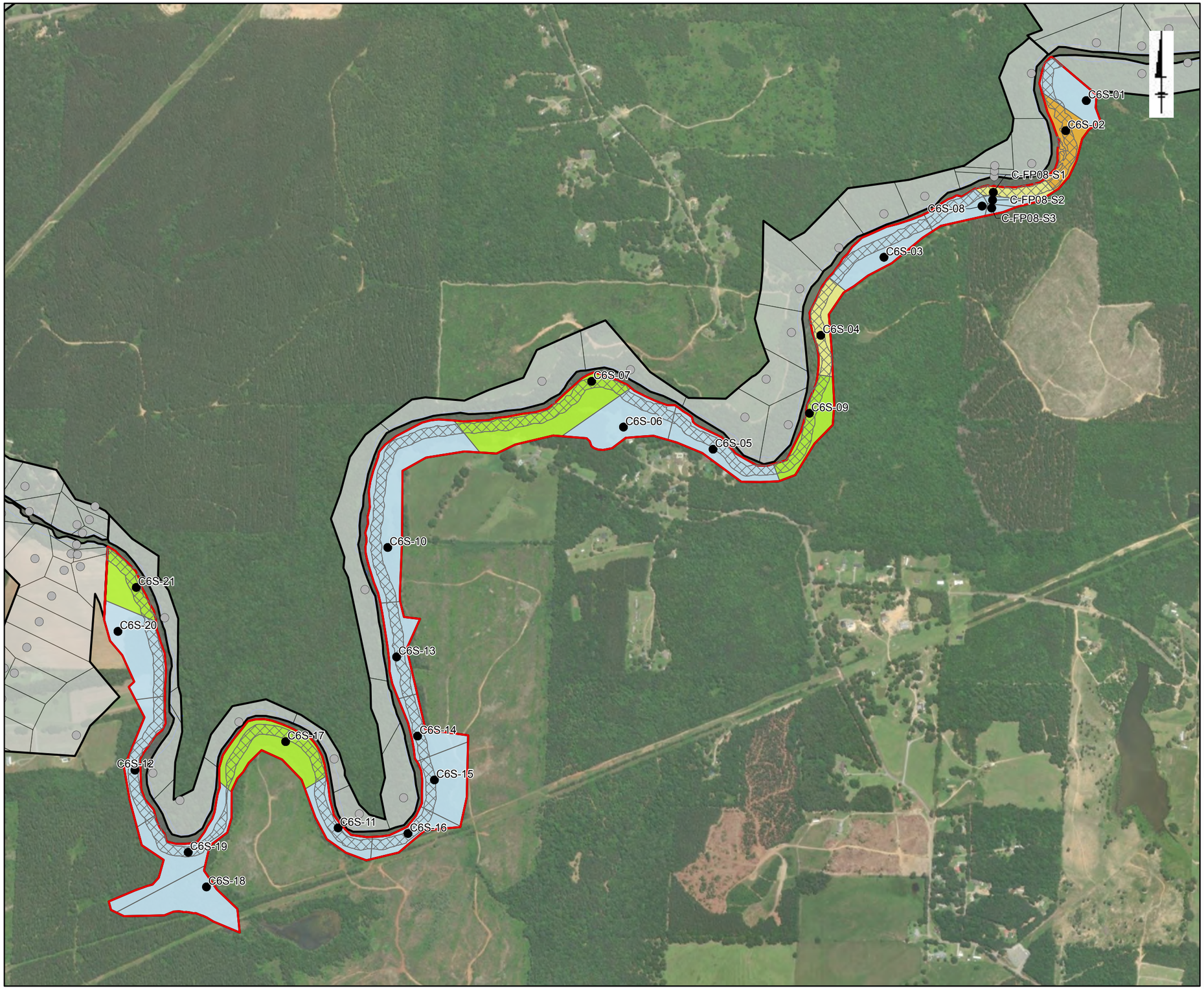
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C6N

Solutia

Figure 7-3m

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

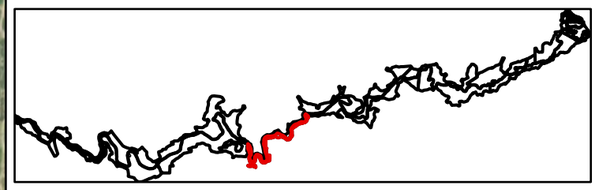
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

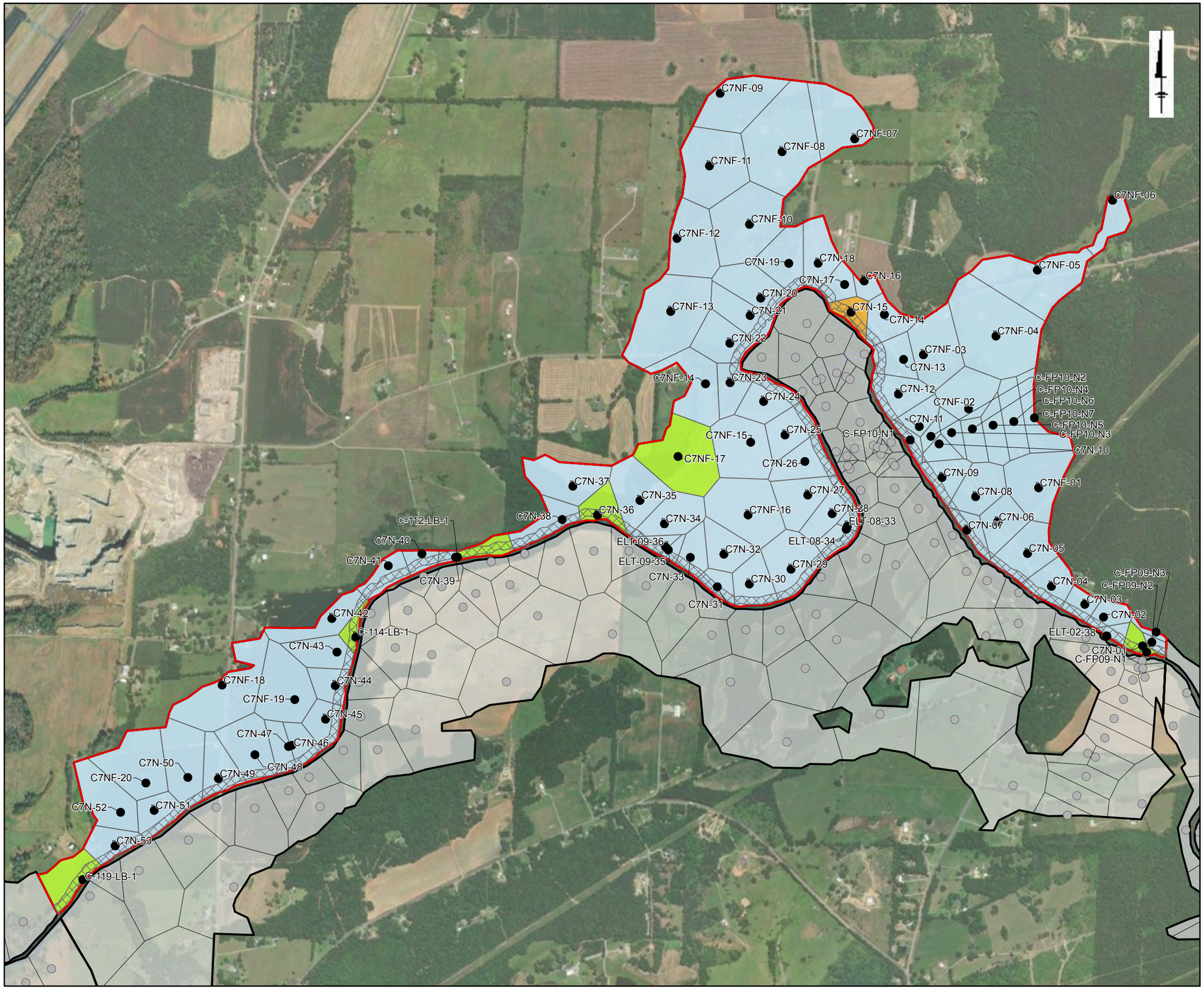
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C6S

Solutia

Figure 7-3n

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale

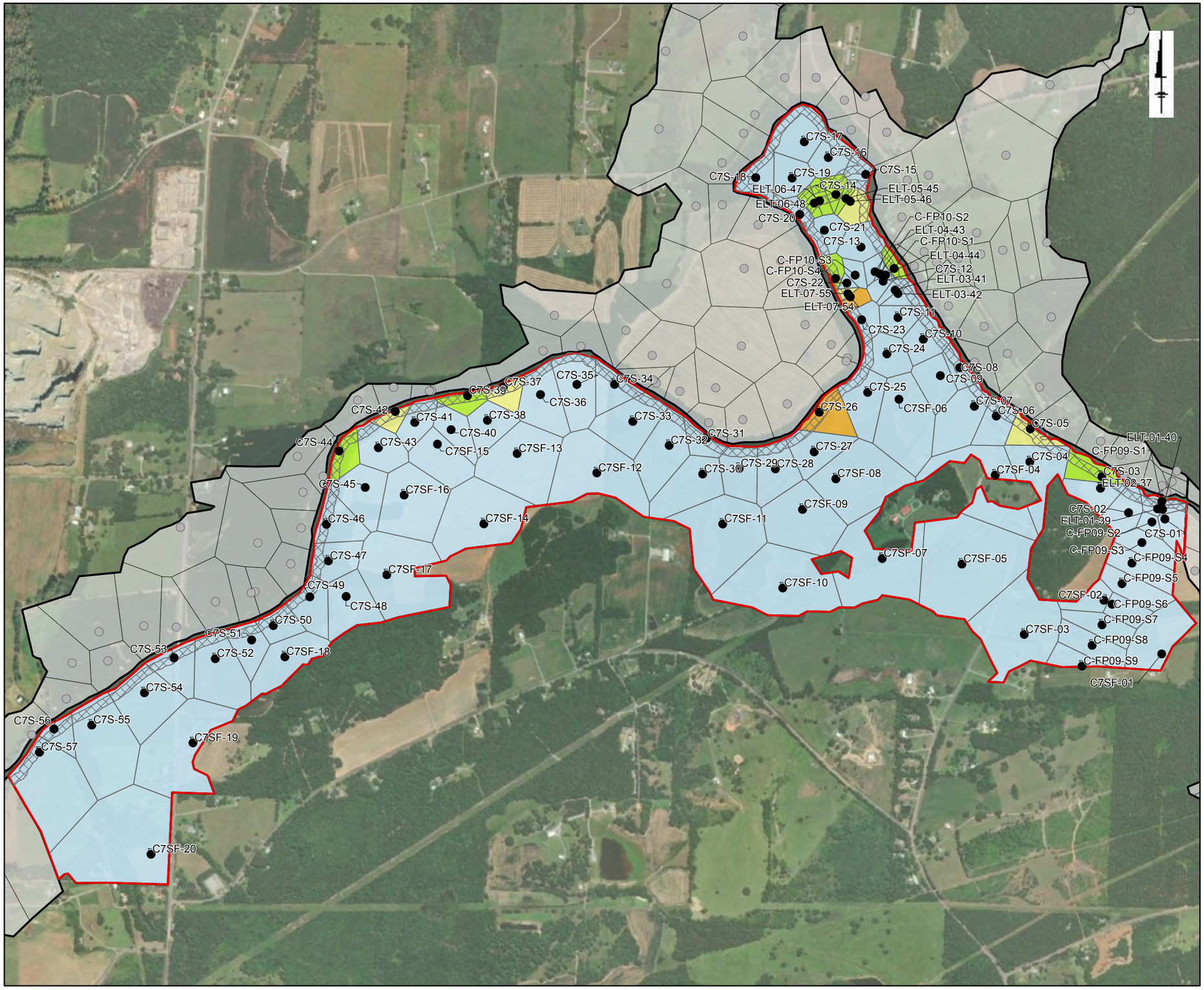
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C7N

Solutia

Figure 7-3o

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

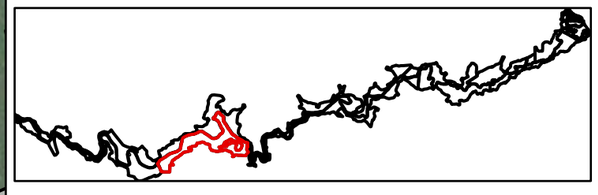
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



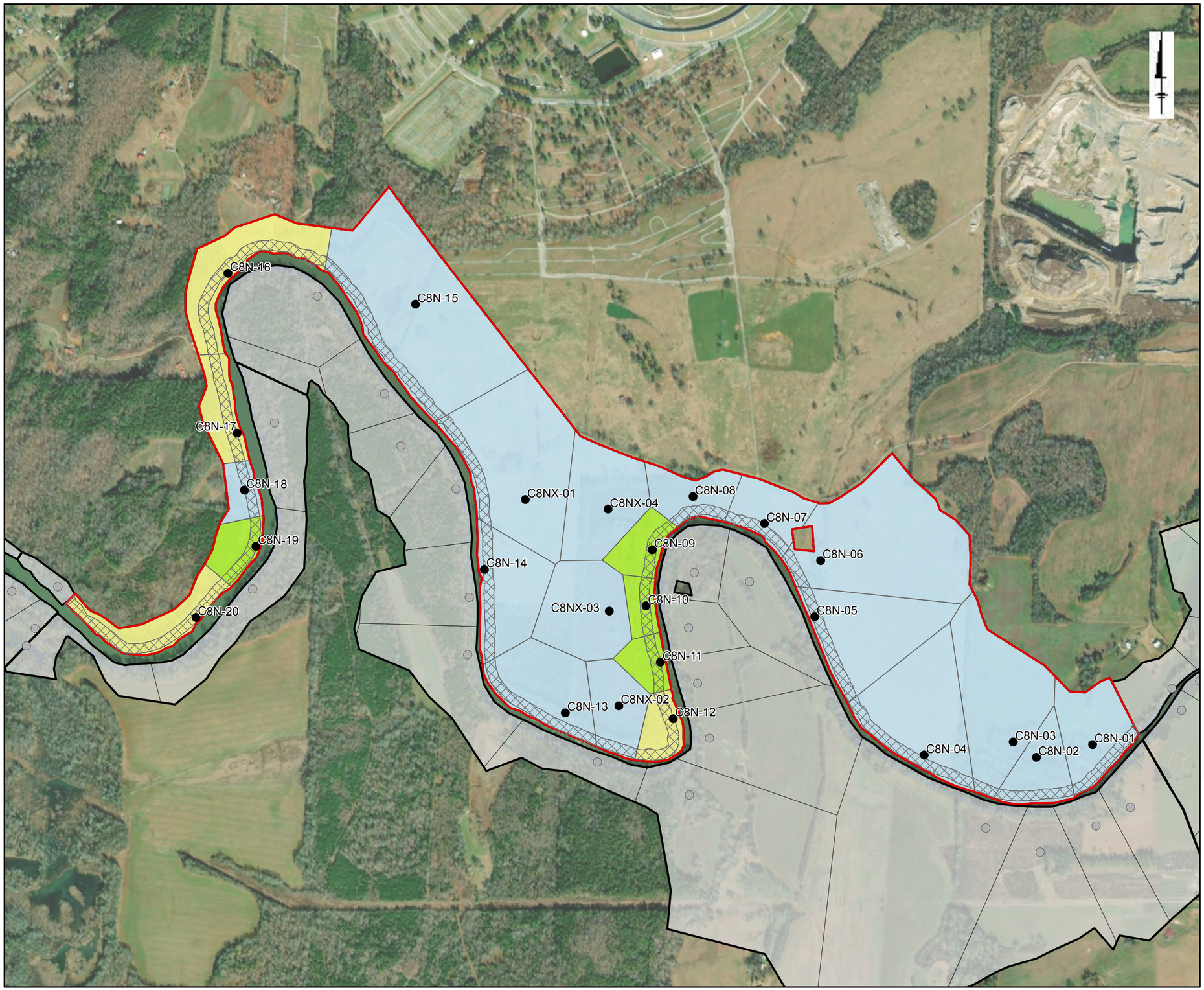
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C7S

Solutia

Figure 7-3p

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

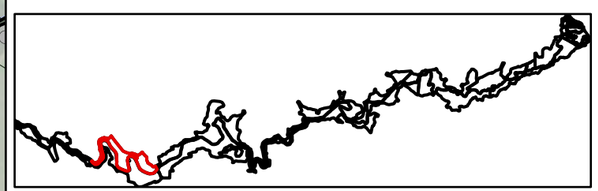
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

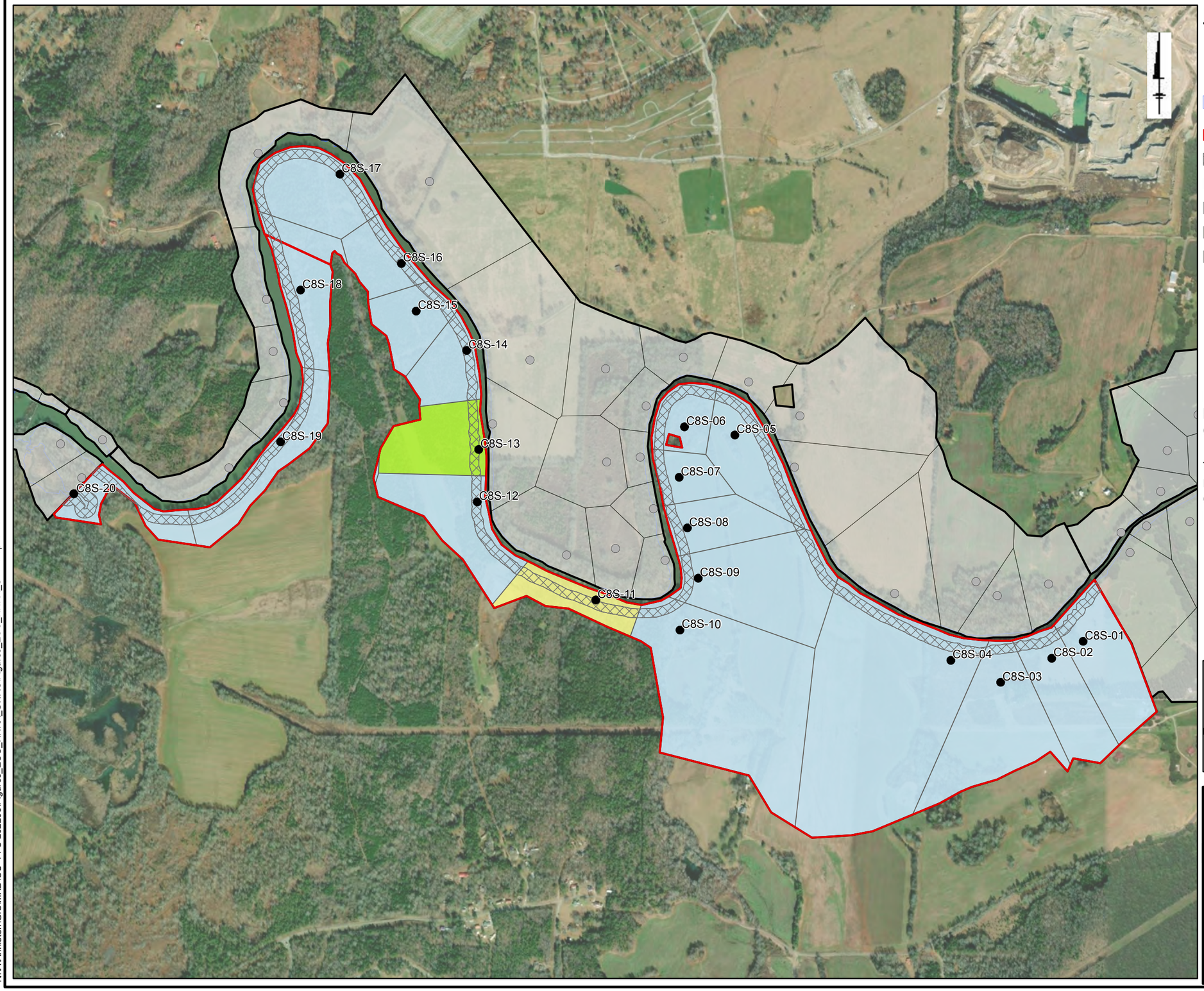
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C8N

Solutia

Figure 7-3q

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

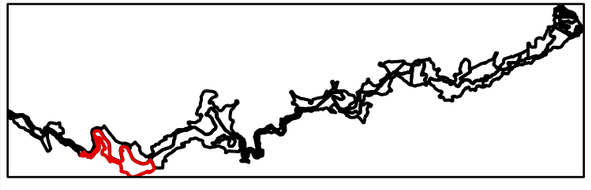
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



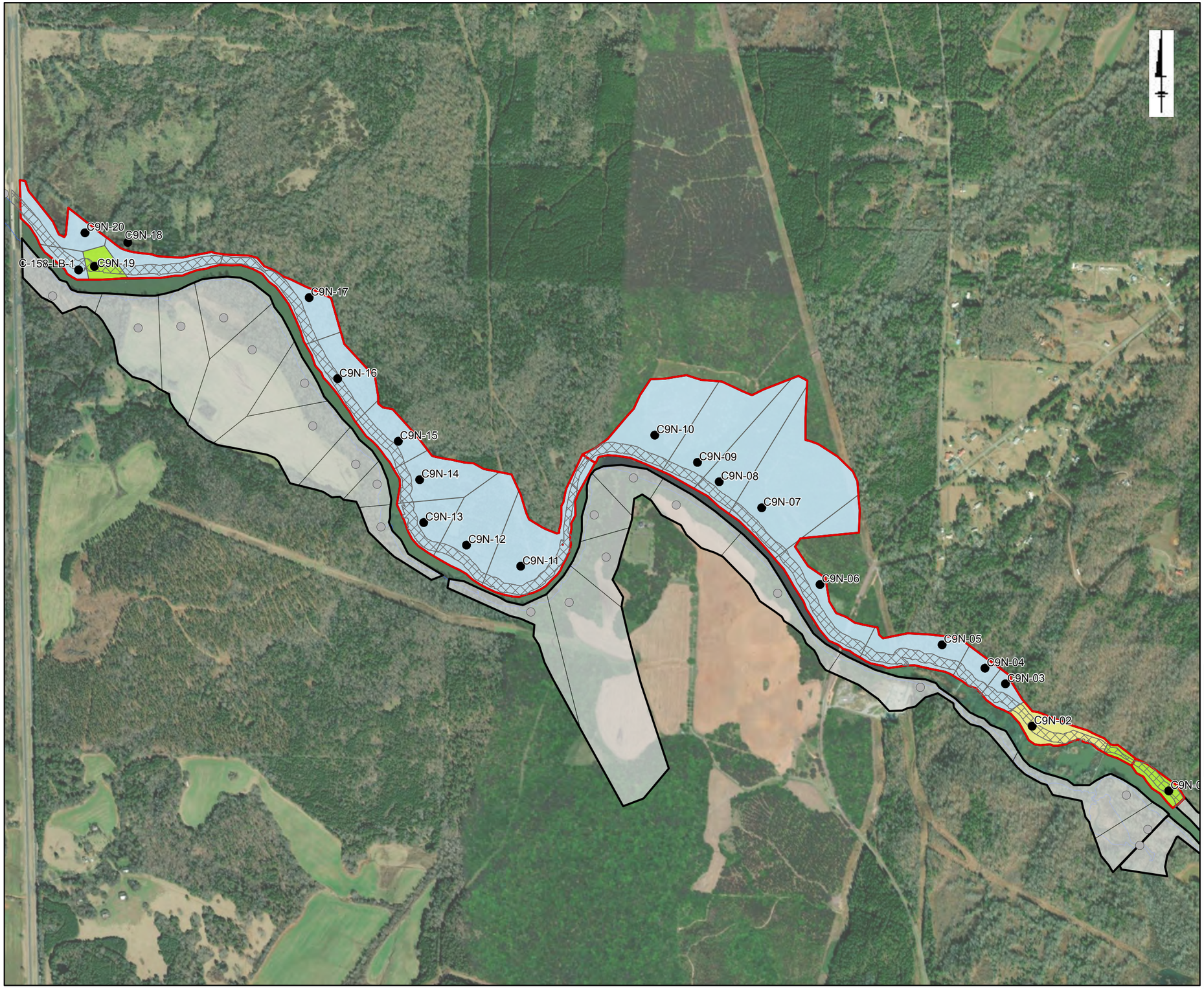
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C8S

Solutia

Figure 7-3r

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

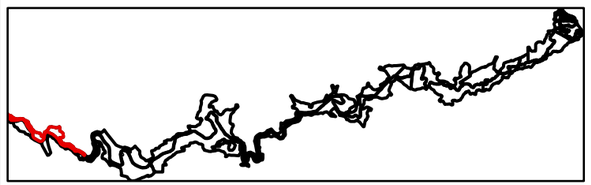
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

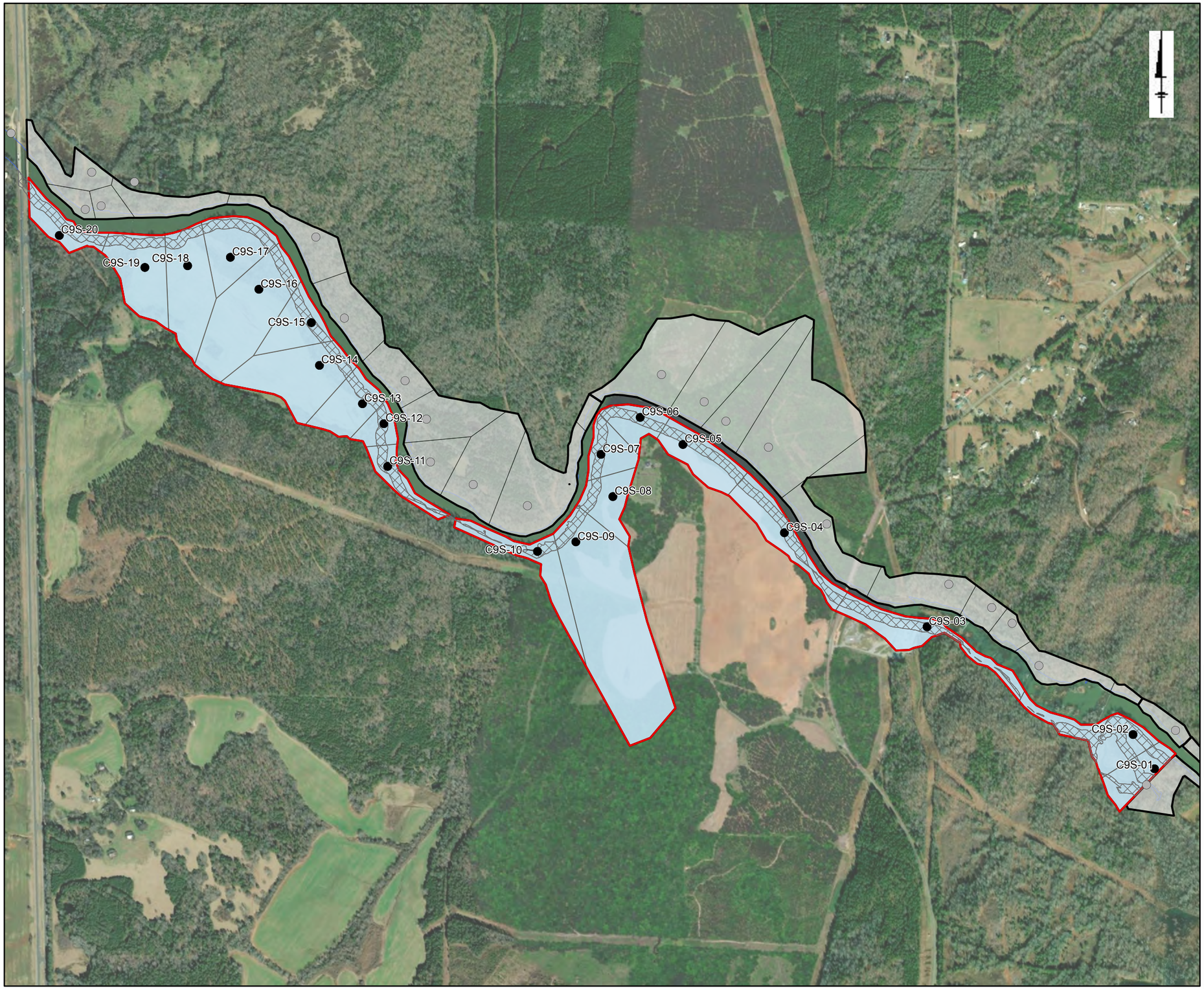
Feasibility Study Report for OU-4

Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C9N

Solutia

Figure 7-3s

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

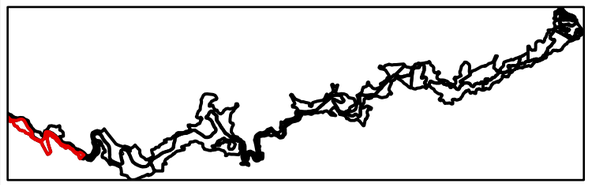
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

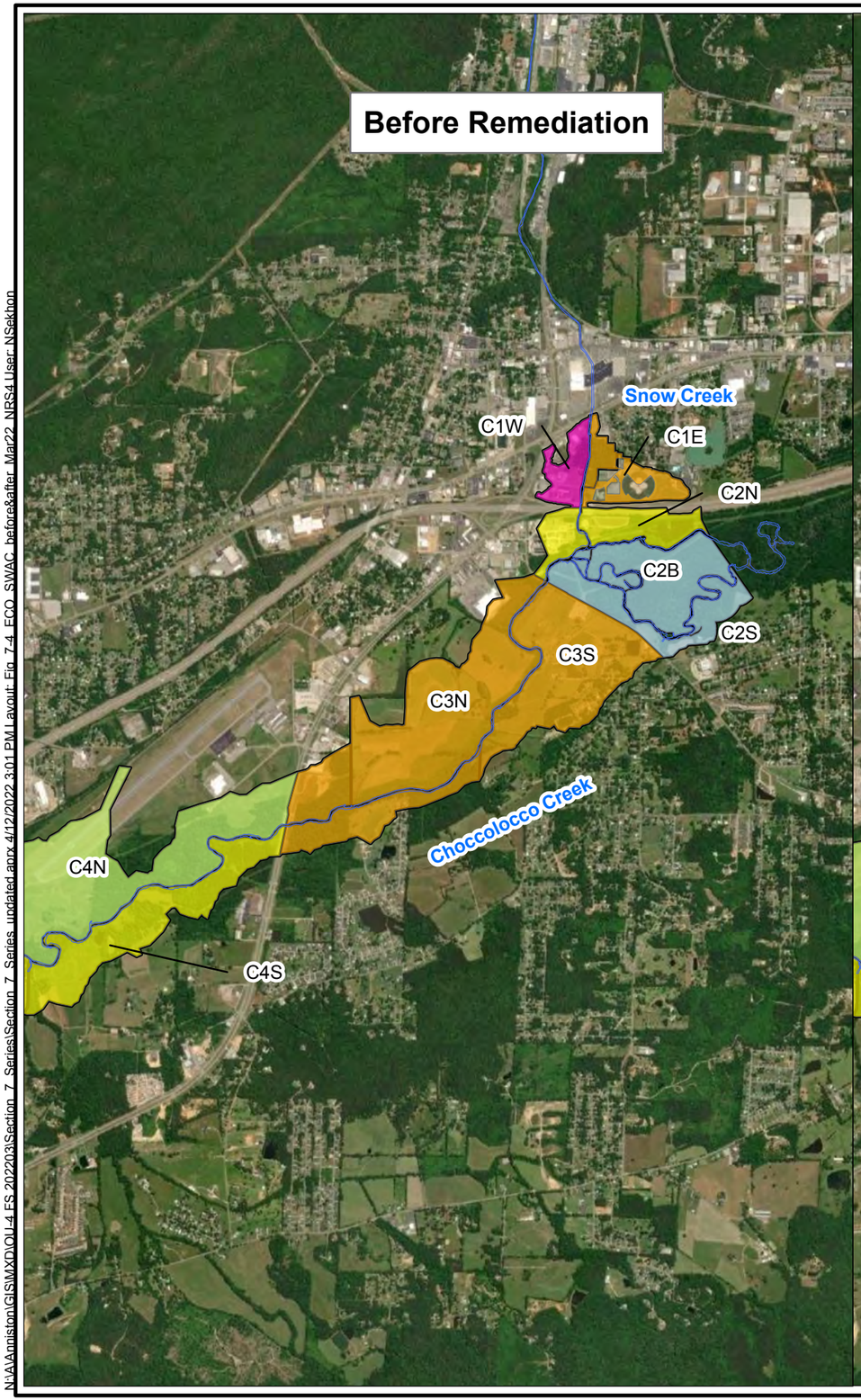
Feasibility Study Report for OU-4

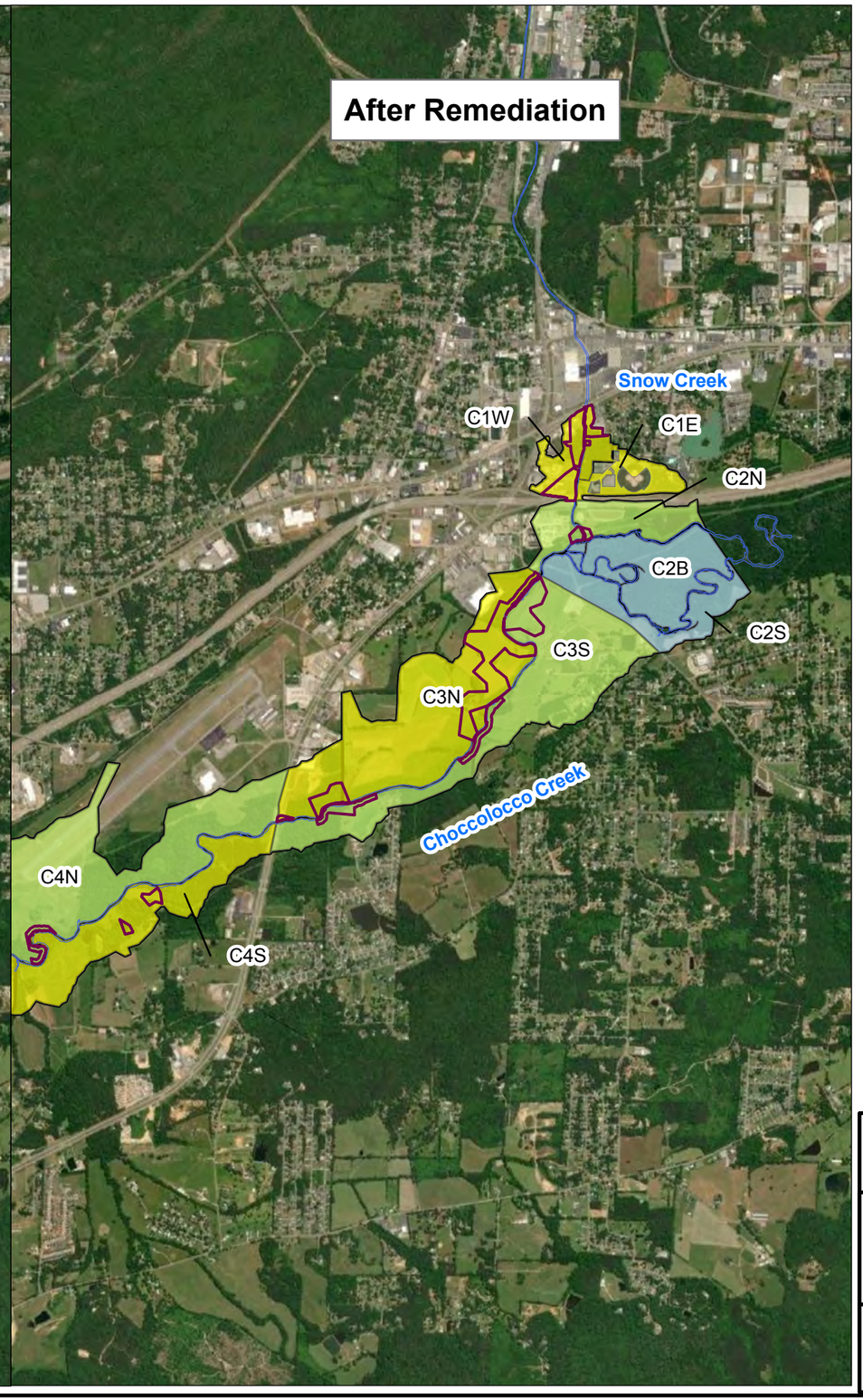
Remedial Footprint of NRS-3 for Ecological Exposure Conditions (0–0.5 ft bgs): C9S

Solutia

Figure 7-3t

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM





Legend

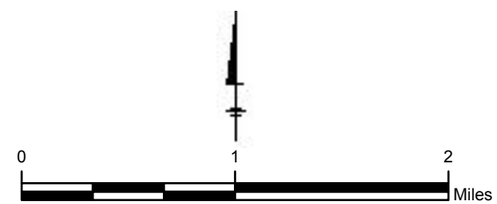
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Characterization Area
- Target Remediation Areas

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
1. Alternative NRS-4 includes the removal of soil from the 0-0.5-ft horizon to achieve a post-removal PCB SWAC of 6 mg/kg to reduce ecological risks, and removal of soil from the 0-1-ft horizon with PCB concentrations ≥ 50 mg/kg to streamline long-term soil management support.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration



Graphic Scale

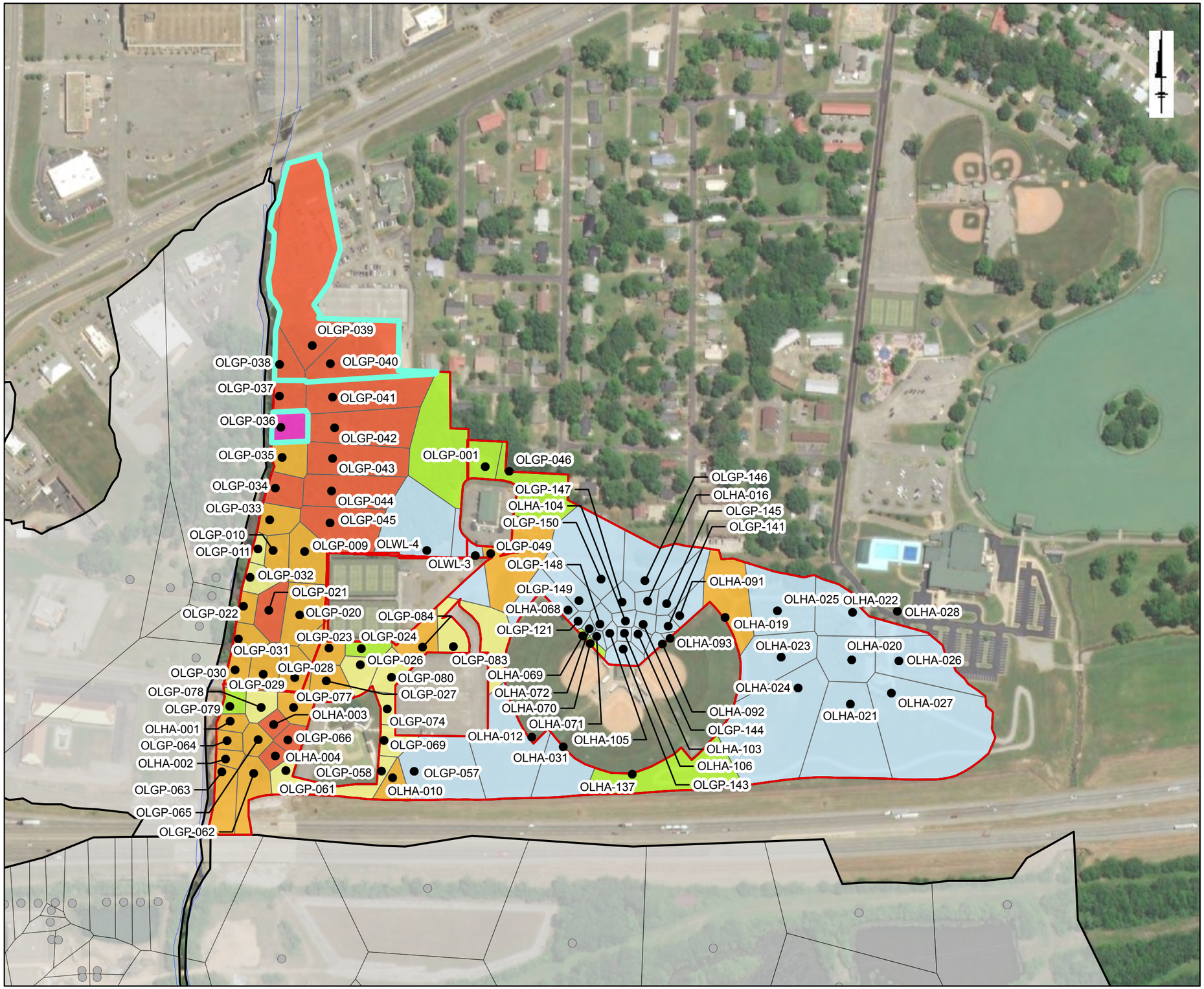
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Mean SWAC PCB Concentrations in Nonresidential Floodplain Soil for Ecological EUs (0-0.5 ft bgs): NRS-4

Solutia

Figure 7-4a

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated appx 4/12/2022 3:01 PM Layout: Fig_7-4_EQ_SWAC_before&after_Mar22_NRS4 User: NSakhon



Legend

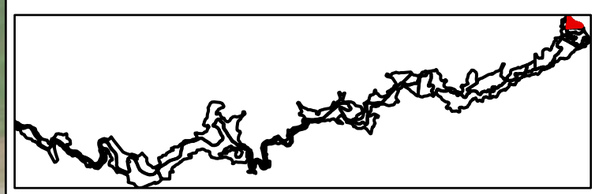
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

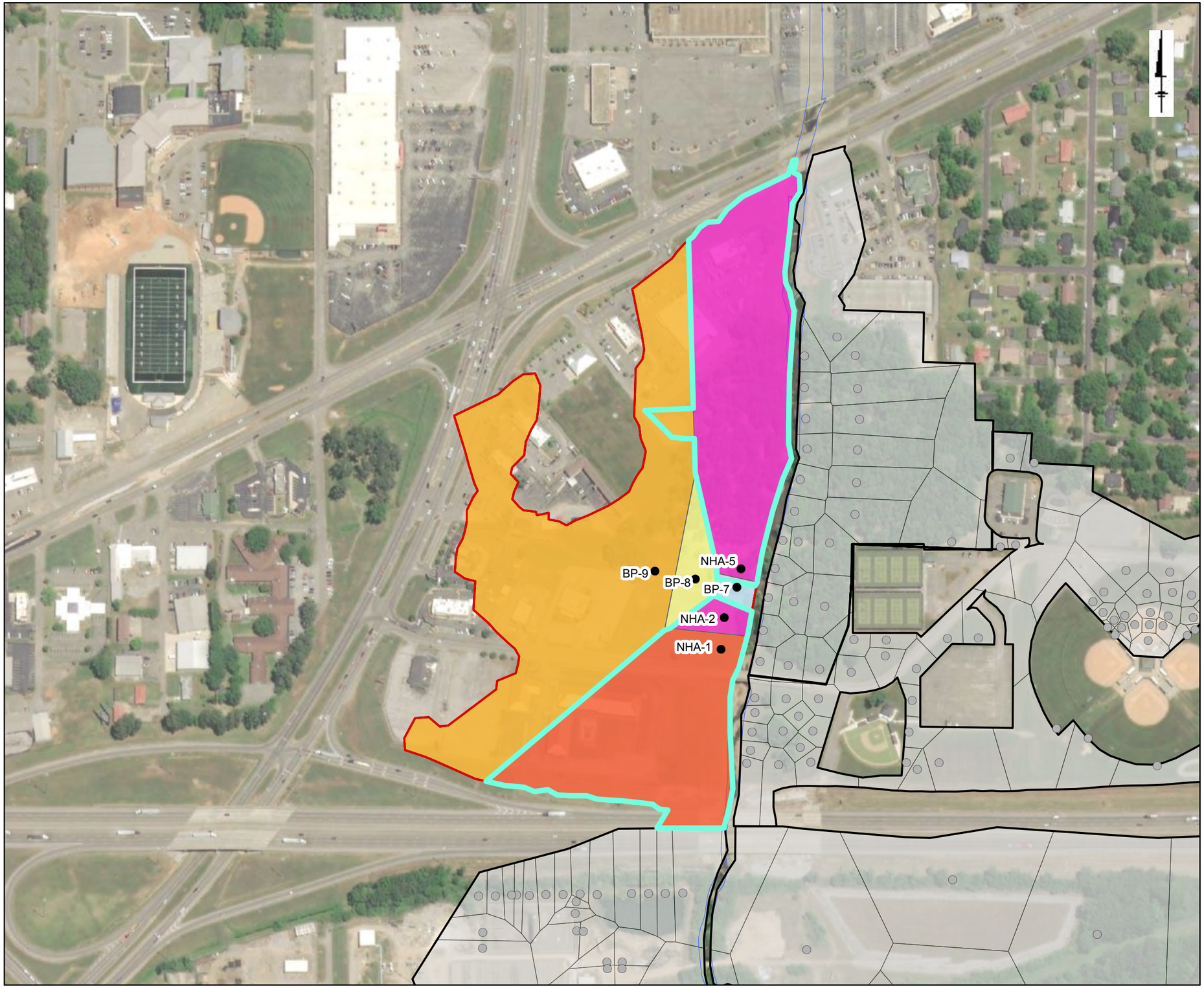
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C1E

Solutia

Figure 7-4b

N:\AA Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon



Legend

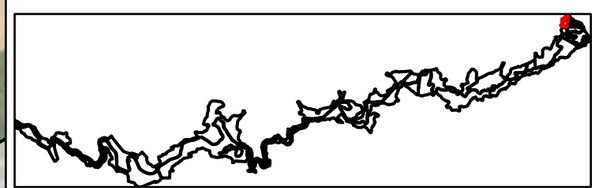
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

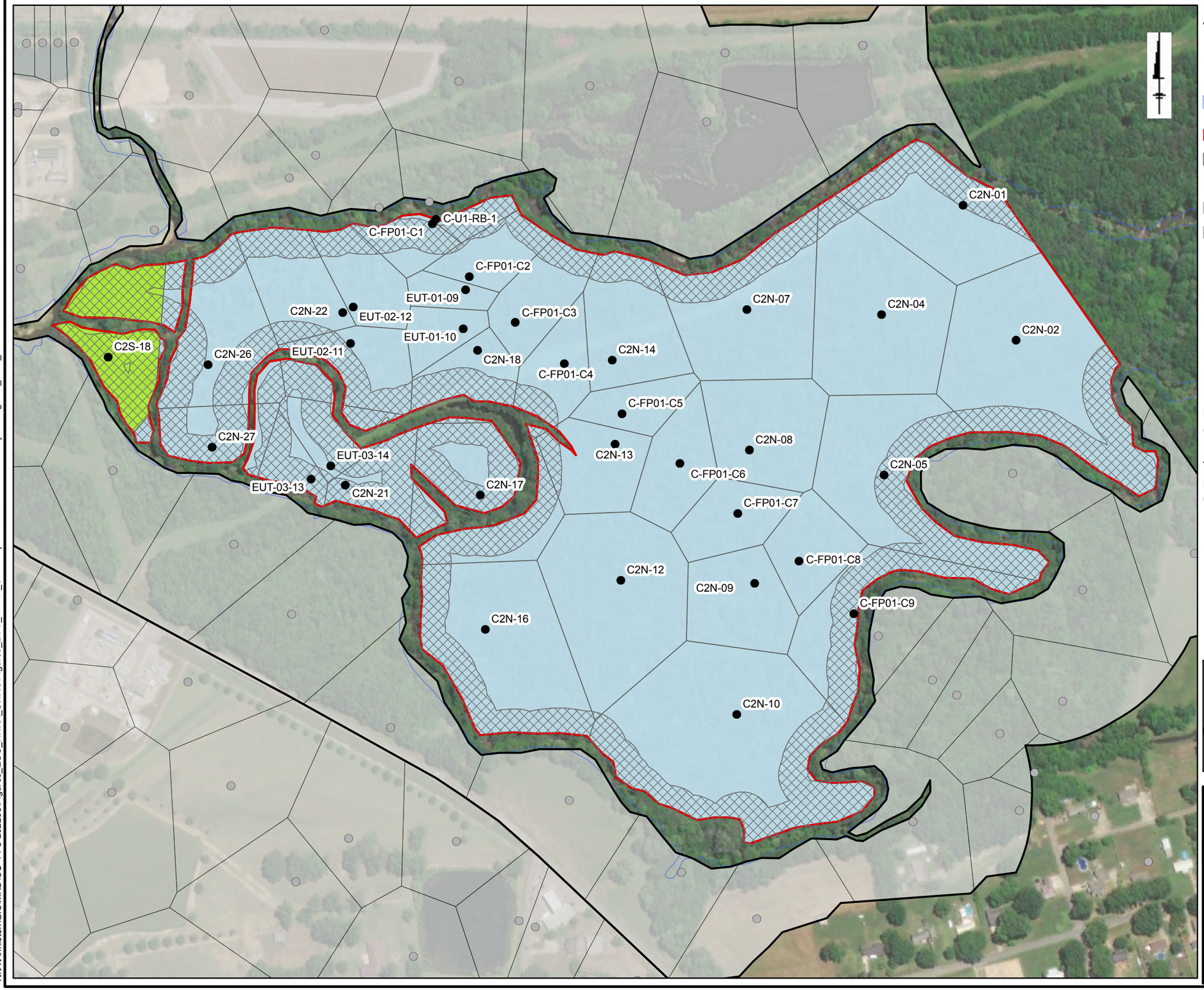
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C1W

Solutia

Figure 7-4c

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon



Legend

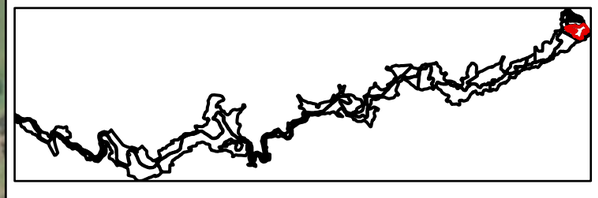
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 375 750
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

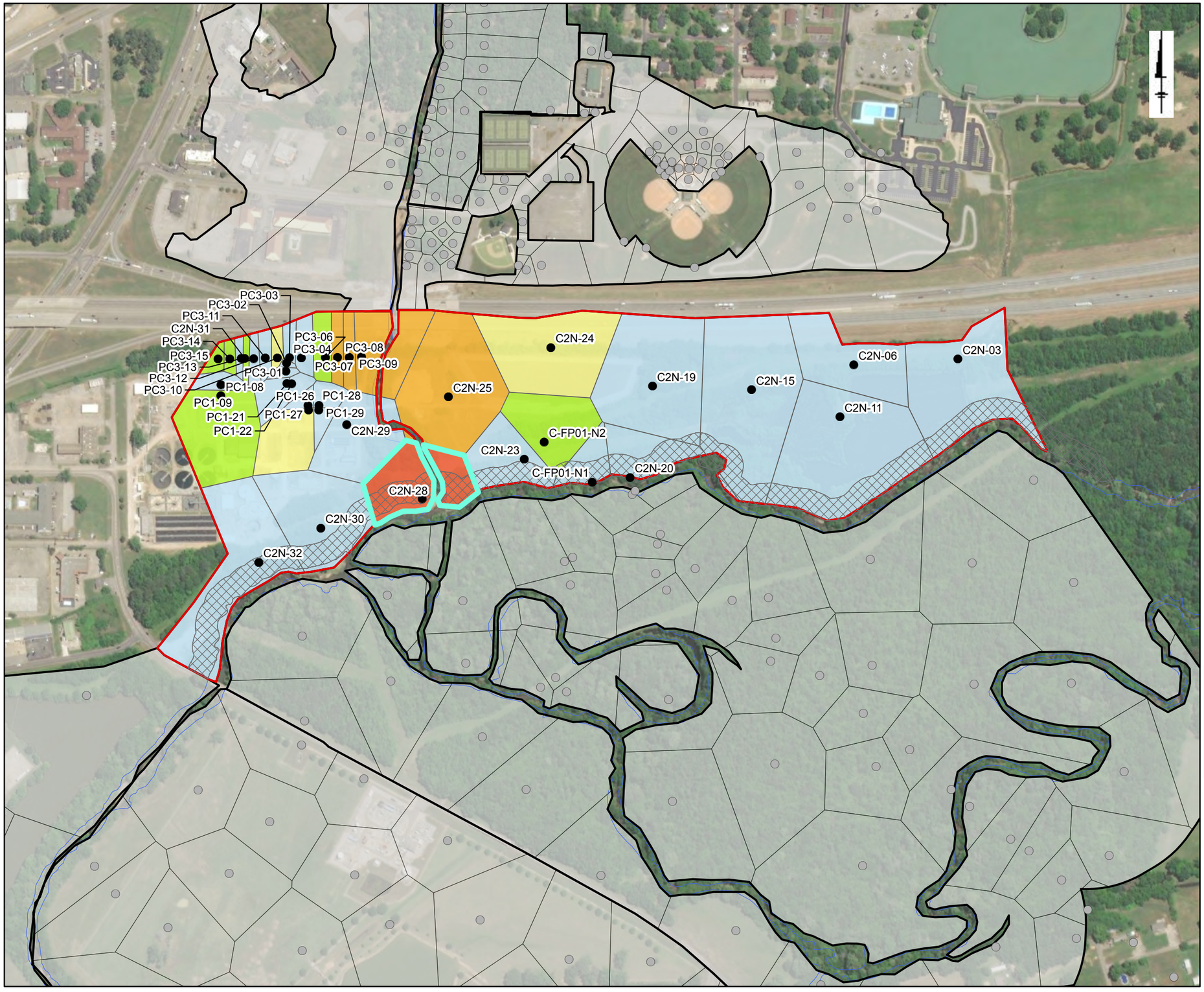
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C2B

Solutia

Figure 7-4d

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon



Legend

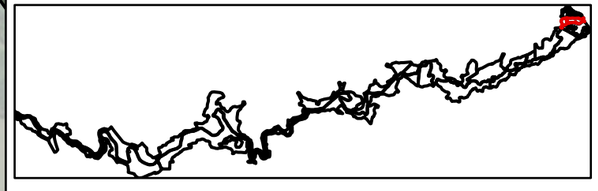
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet
Graphic Scale



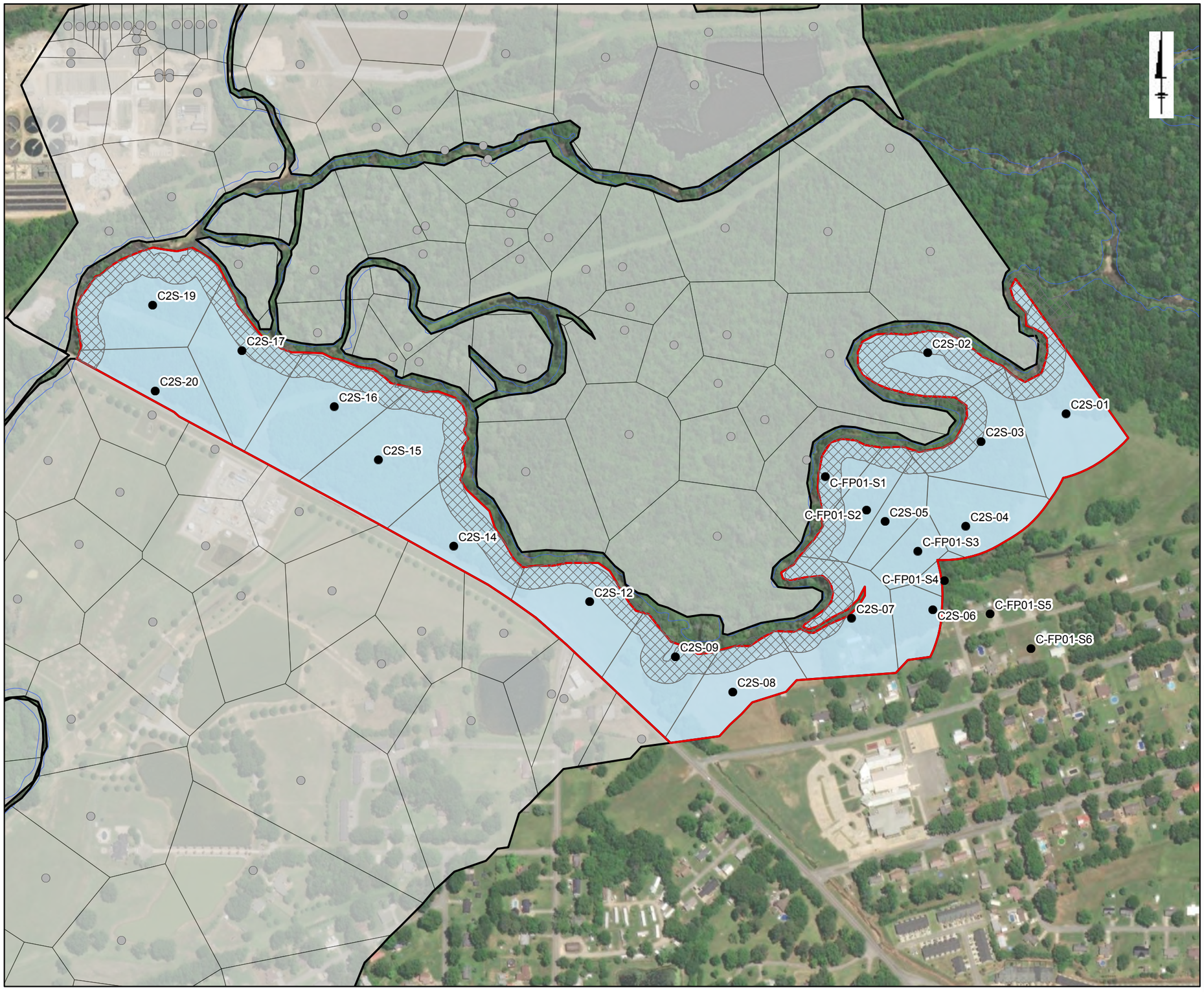
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C2N

Solutia

Figure 7-4e

N:\AV\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon



Legend

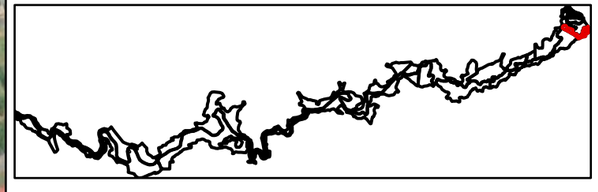
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

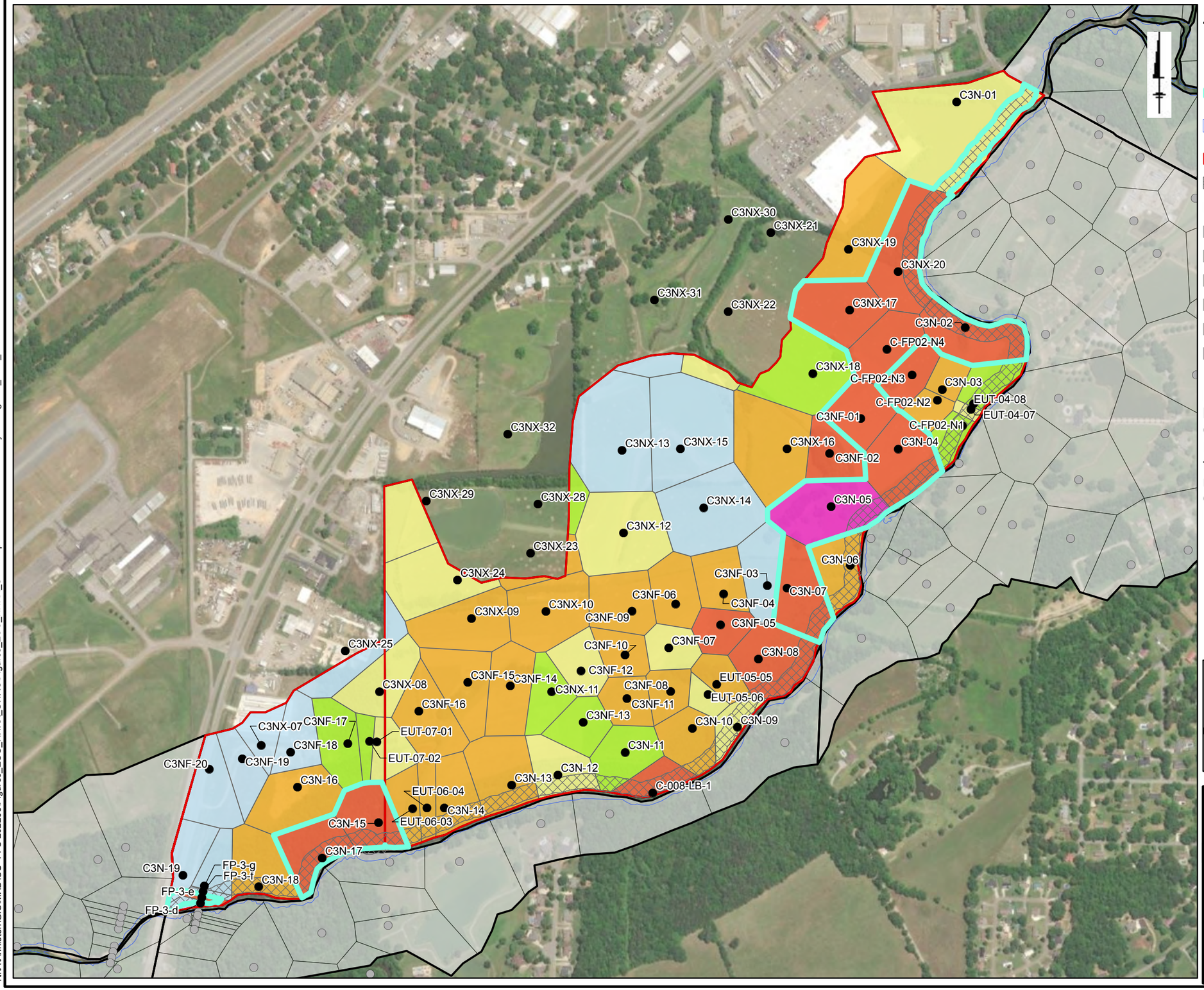
Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C2S

Solutia

Figure 7-4f

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon



Legend

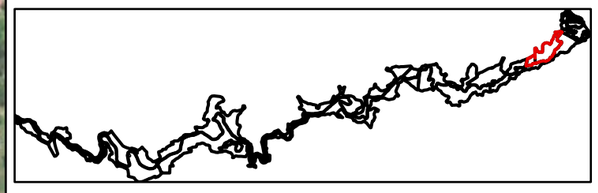
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 750 1,500 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

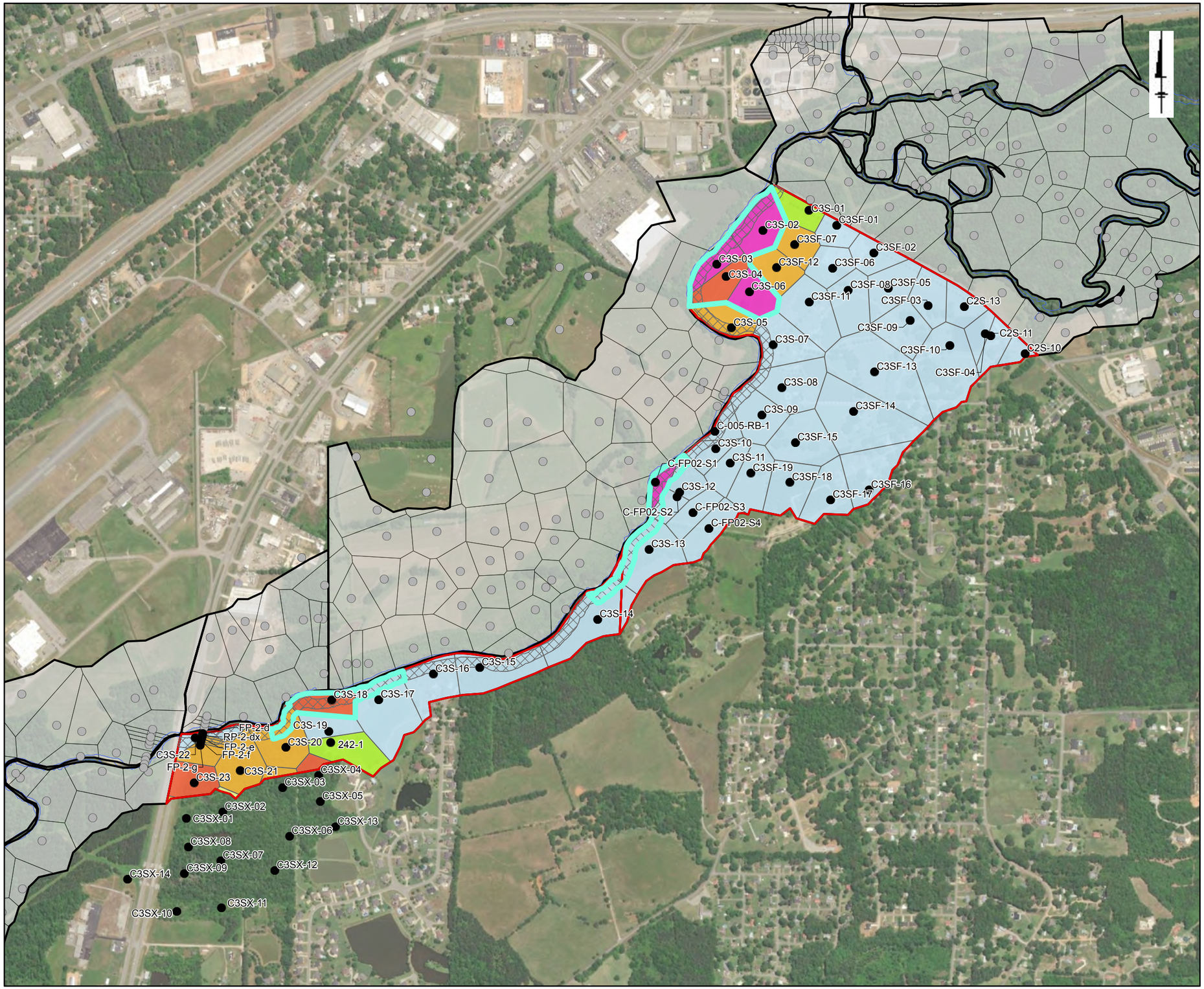
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C3N

Solutia

Figure 7-4g

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon



Legend

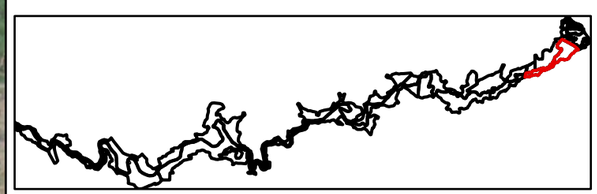
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C3S

Solutia

Figure 7-4h

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon

Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale

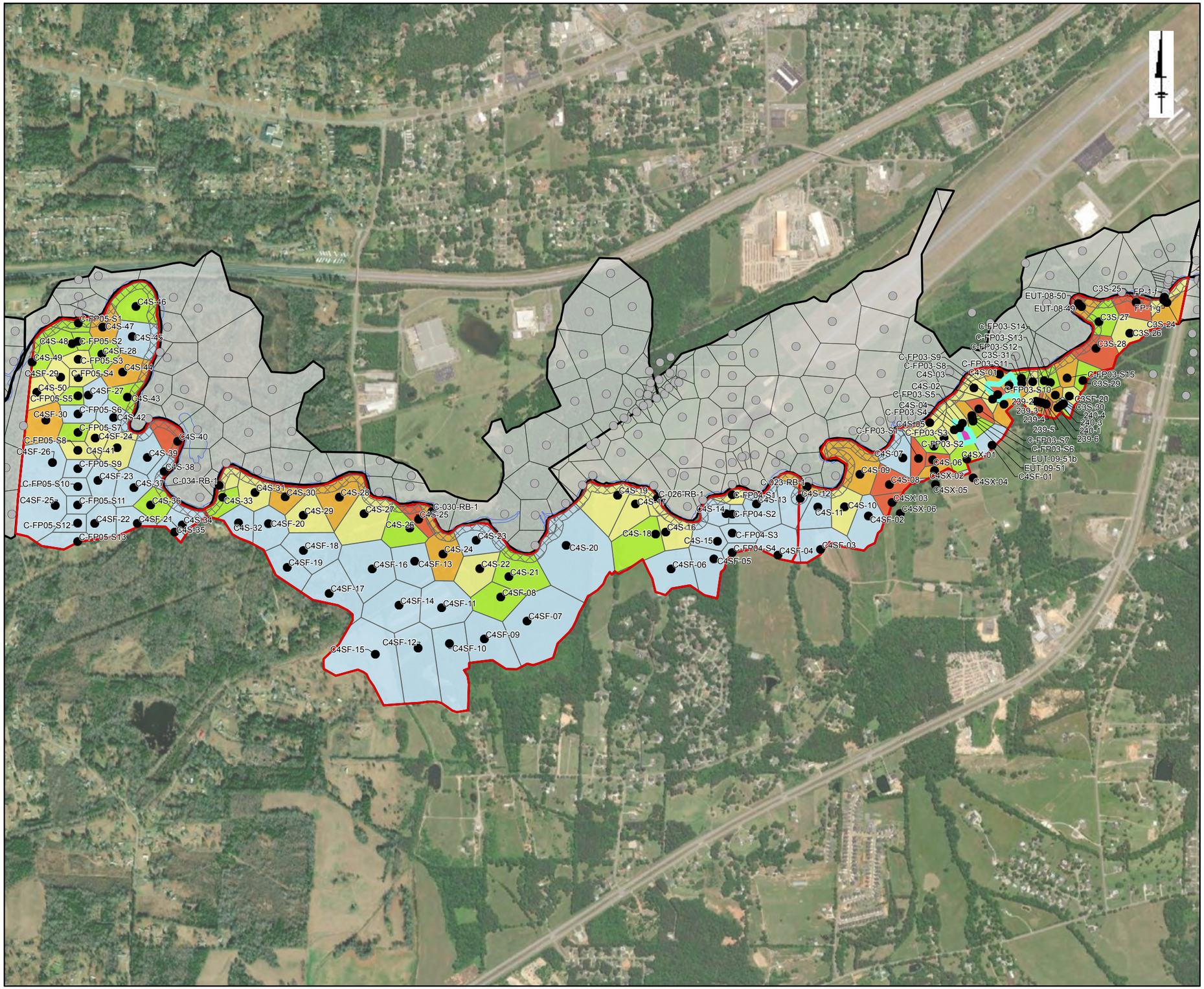
Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C4N

Solutia

Figure 7-4i



Legend

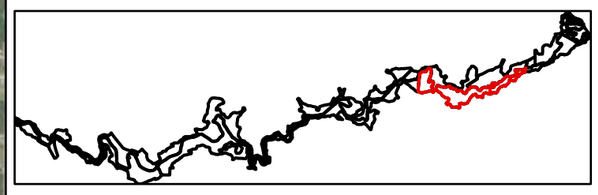
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

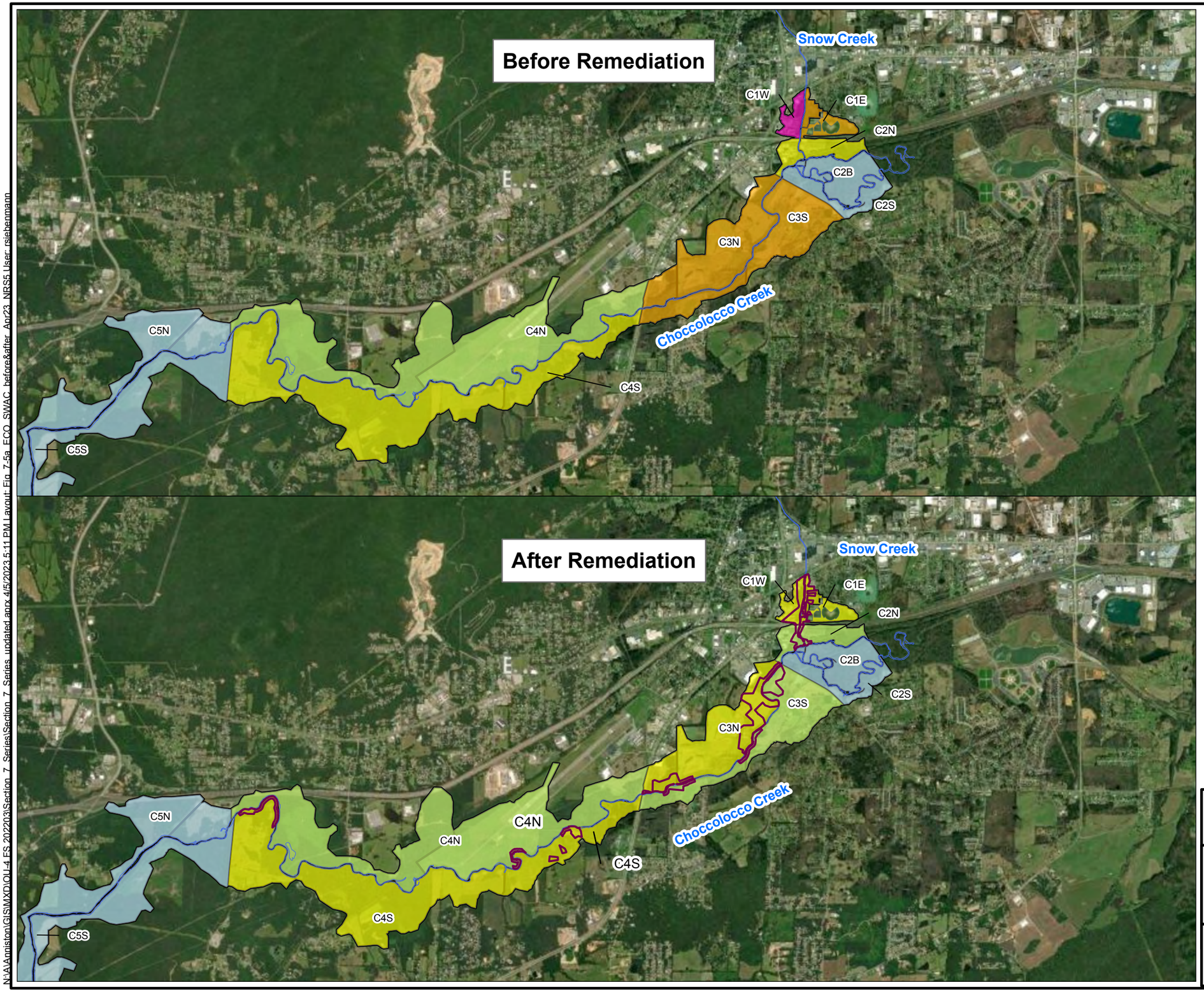
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Ecological Exposure Conditions (0-0.5 ft bgs): C4S

Solutia

Figure 7-4j

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 2:10 PM Layout: Figures_ECO_NRS4 User: NSekhon



Legend

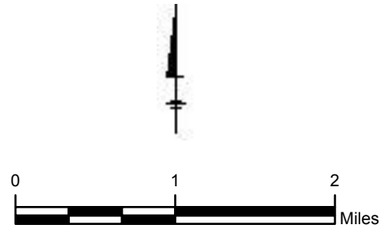
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Characterization Area
- Target Remediation Areas

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
1. Alternative NRS-5 includes the removal of soil from the 0–0.5-foot horizon to achieve a post-removal PCB SWAC of 6 mg/kg to reduce ecological risks and removal of soil from the 0–4-foot horizon with PCB concentrations ≥ 50 mg/kg to streamline long-term soil management support.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration



Graphic Scale

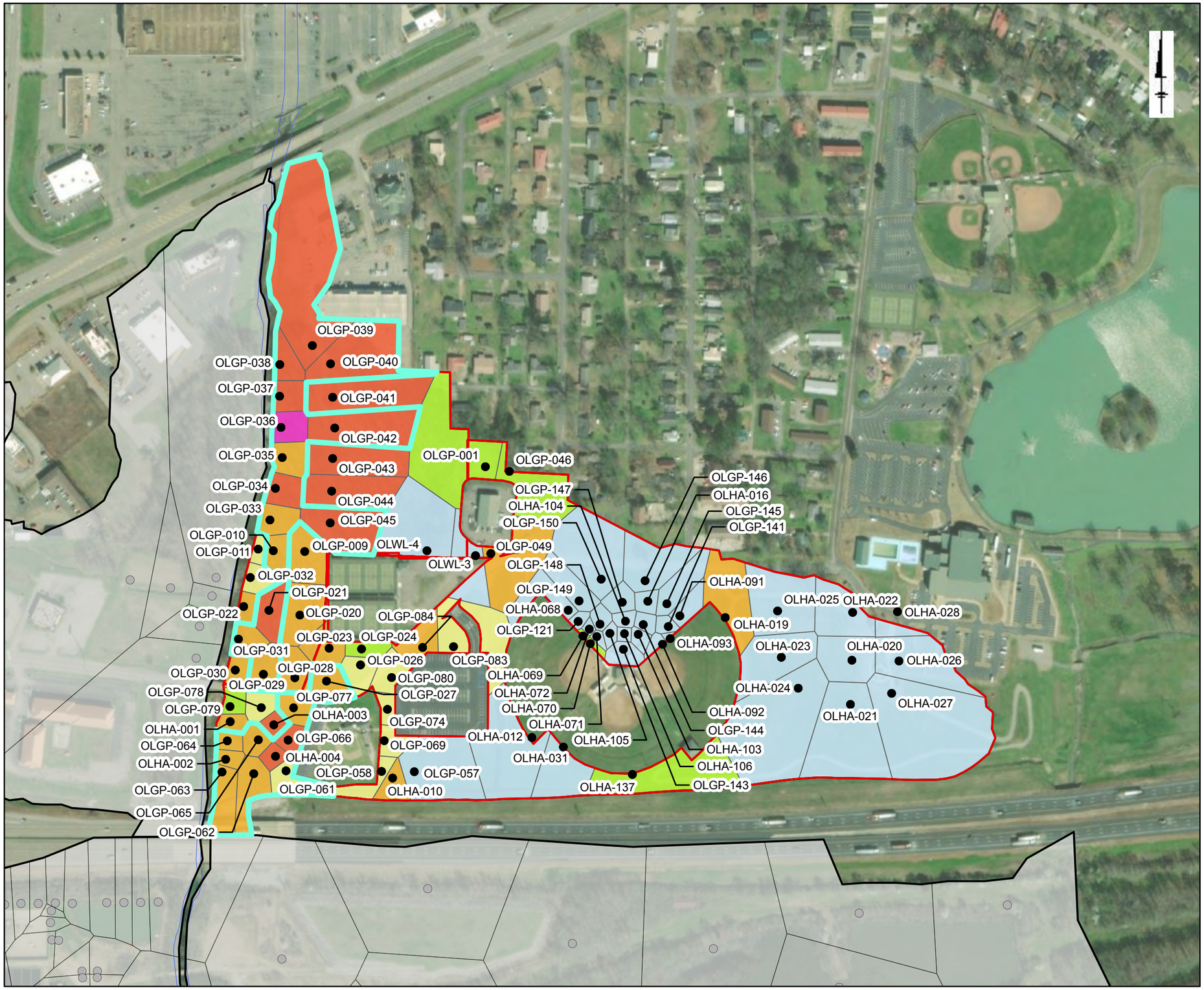
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Mean SWAC PCB Concentrations in Nonresidential Floodplain Soil for Ecological EUs (0–0.5 ft bgs): NRS-5

Solutia

Figure 7-5a

N:\Anniston\GIS\MXD\OU-4 FS 2022\03\Section_7_Series\Section_7_Series_updated.aprx 4/5/2023 5:11 PM Layout: Fig_7-5a_EQO_SWAC_before&after_Apr23_NRS5 User: rsiebenmann



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700 Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

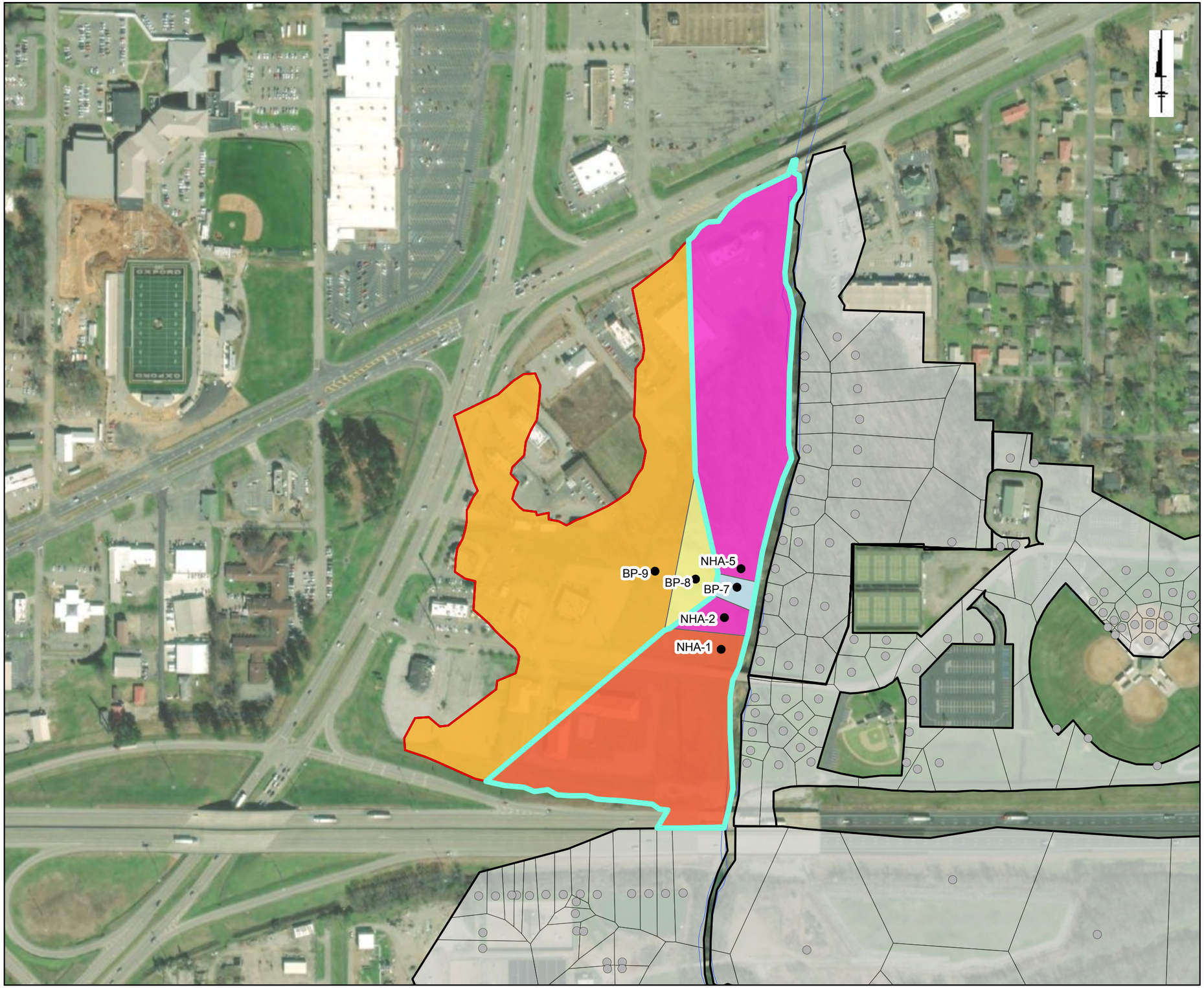
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C1E

Solutia

Figure 7-5b

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700
Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

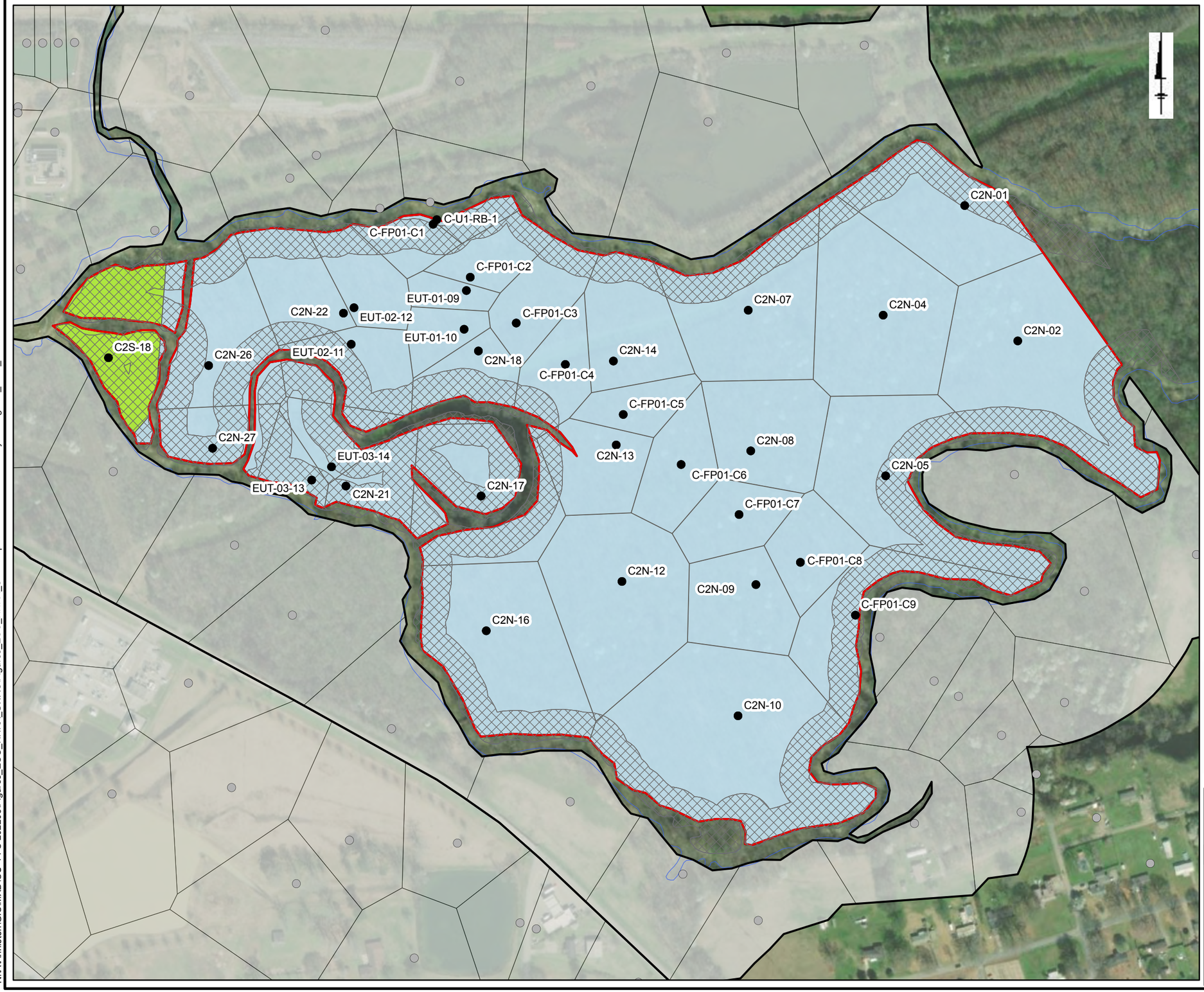
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C1W

Solutia

Figure 7-5c

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

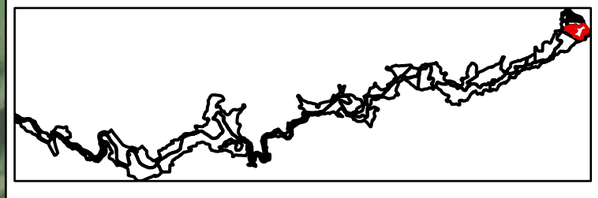
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 375 750 Feet
Graphic Scale



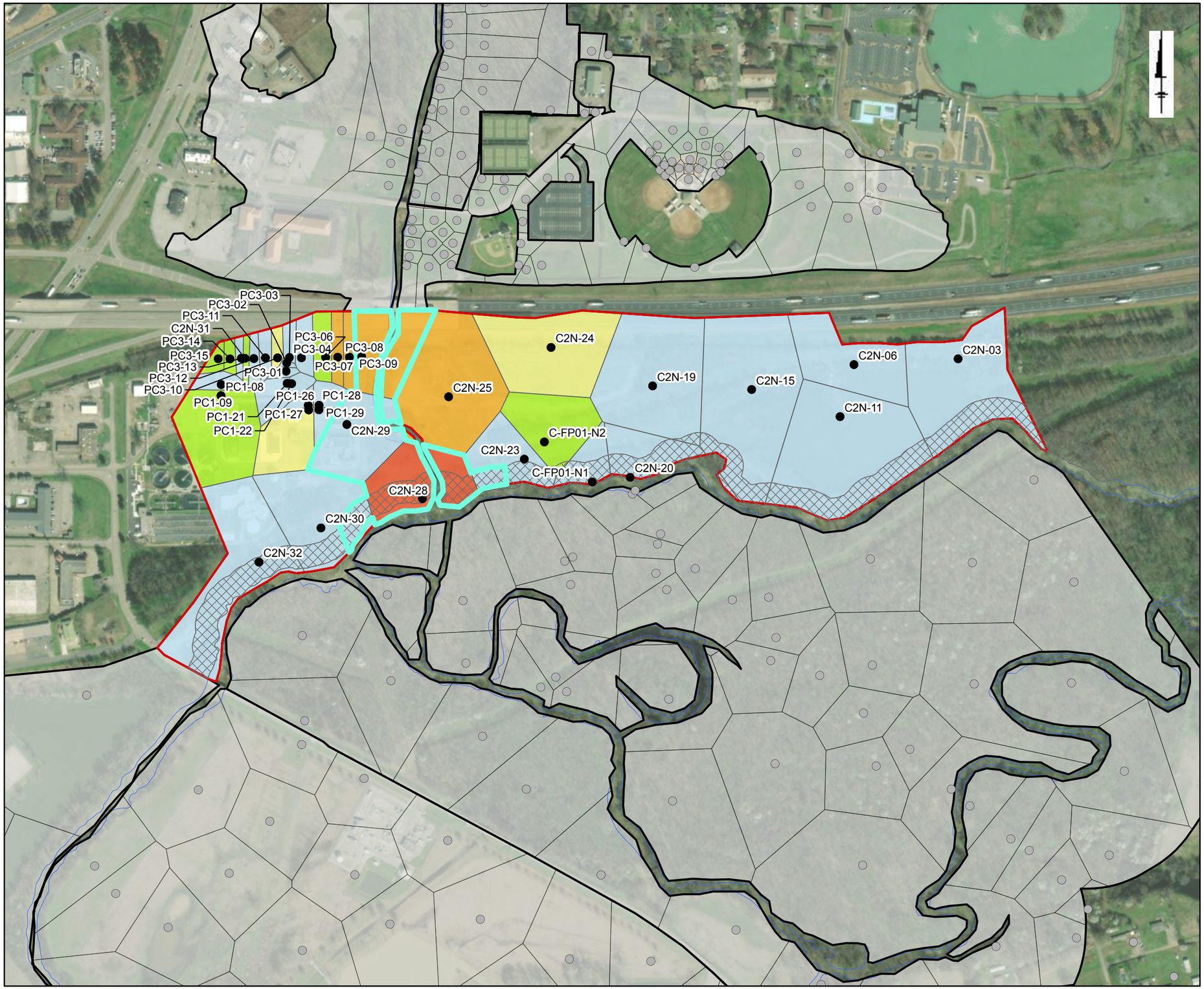
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C2B

Solutia

Figure 7-5d

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

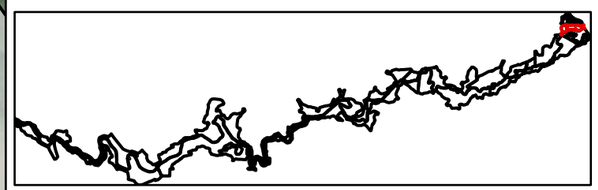
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet
Graphic Scale



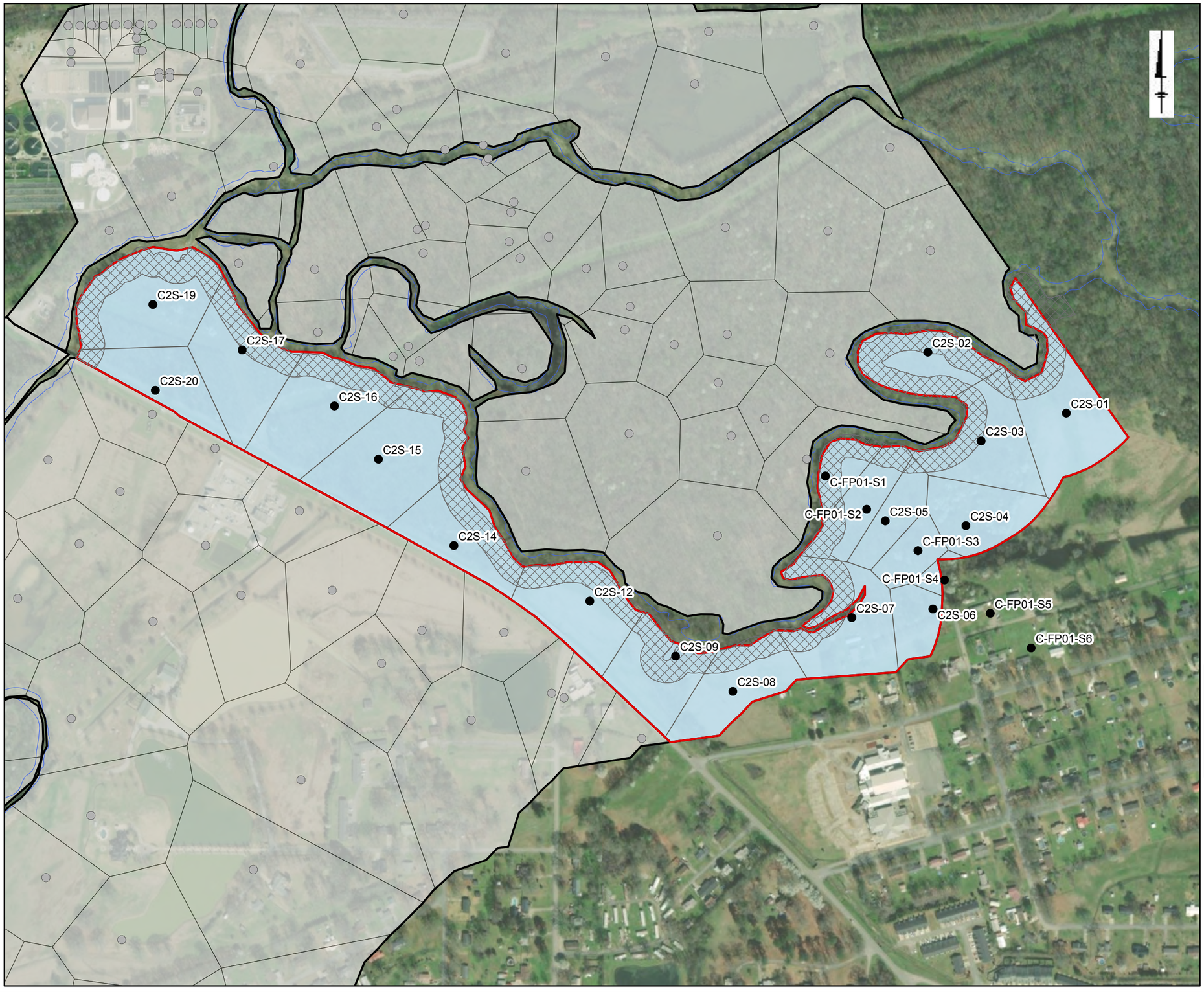
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C2N

Solutia

Figure 7-5e

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

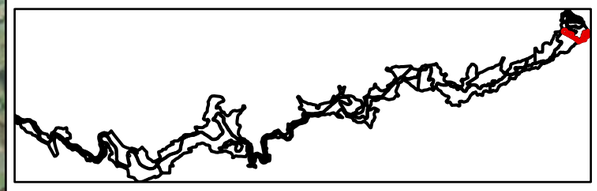
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

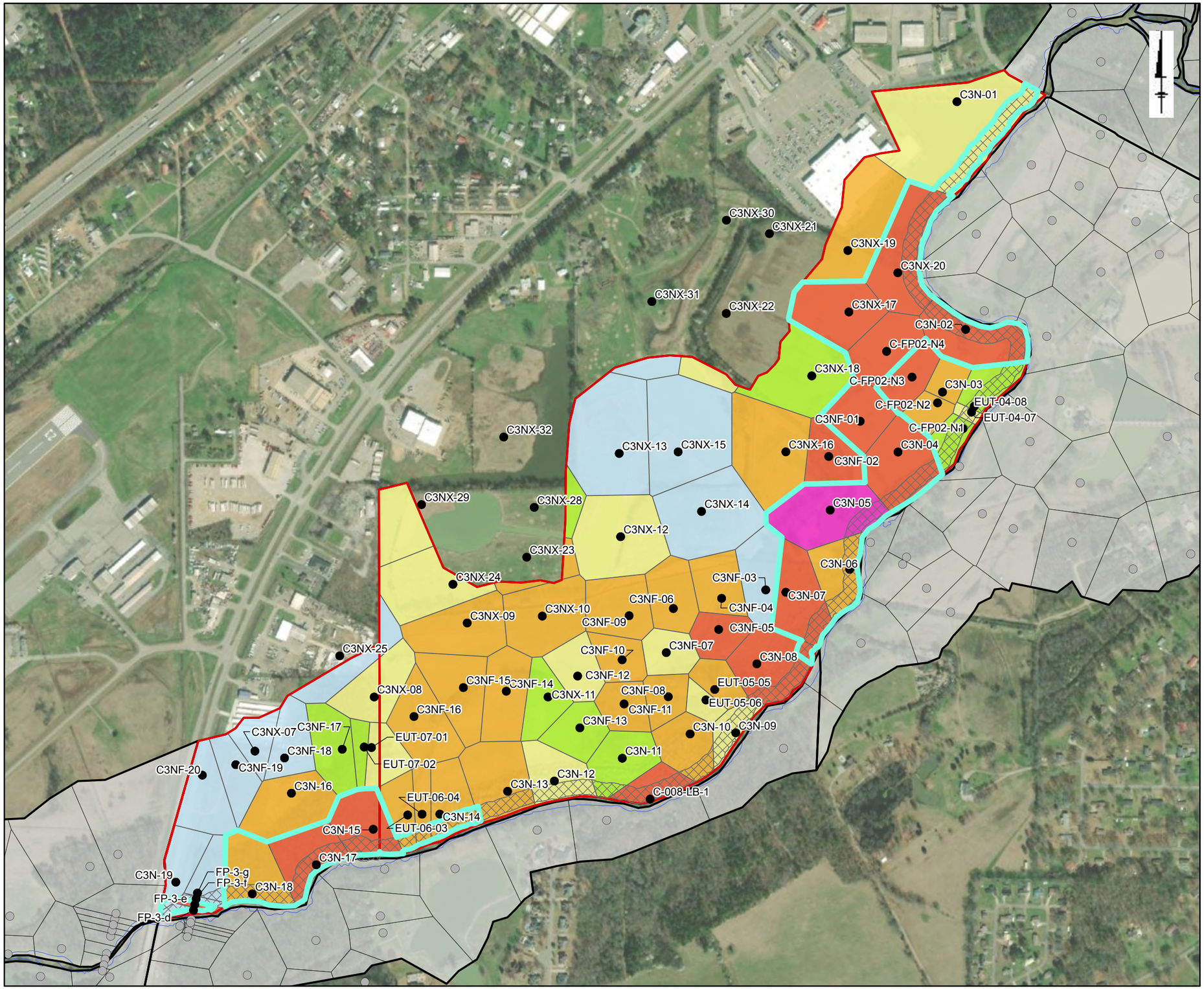
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C2S

Solutia

Figure 7-5f

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

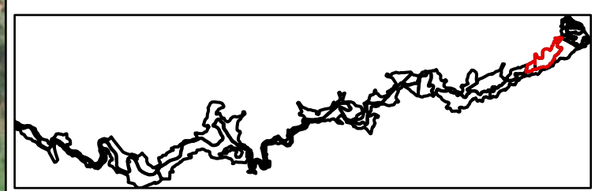
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 750 1,500 Feet
Graphic Scale



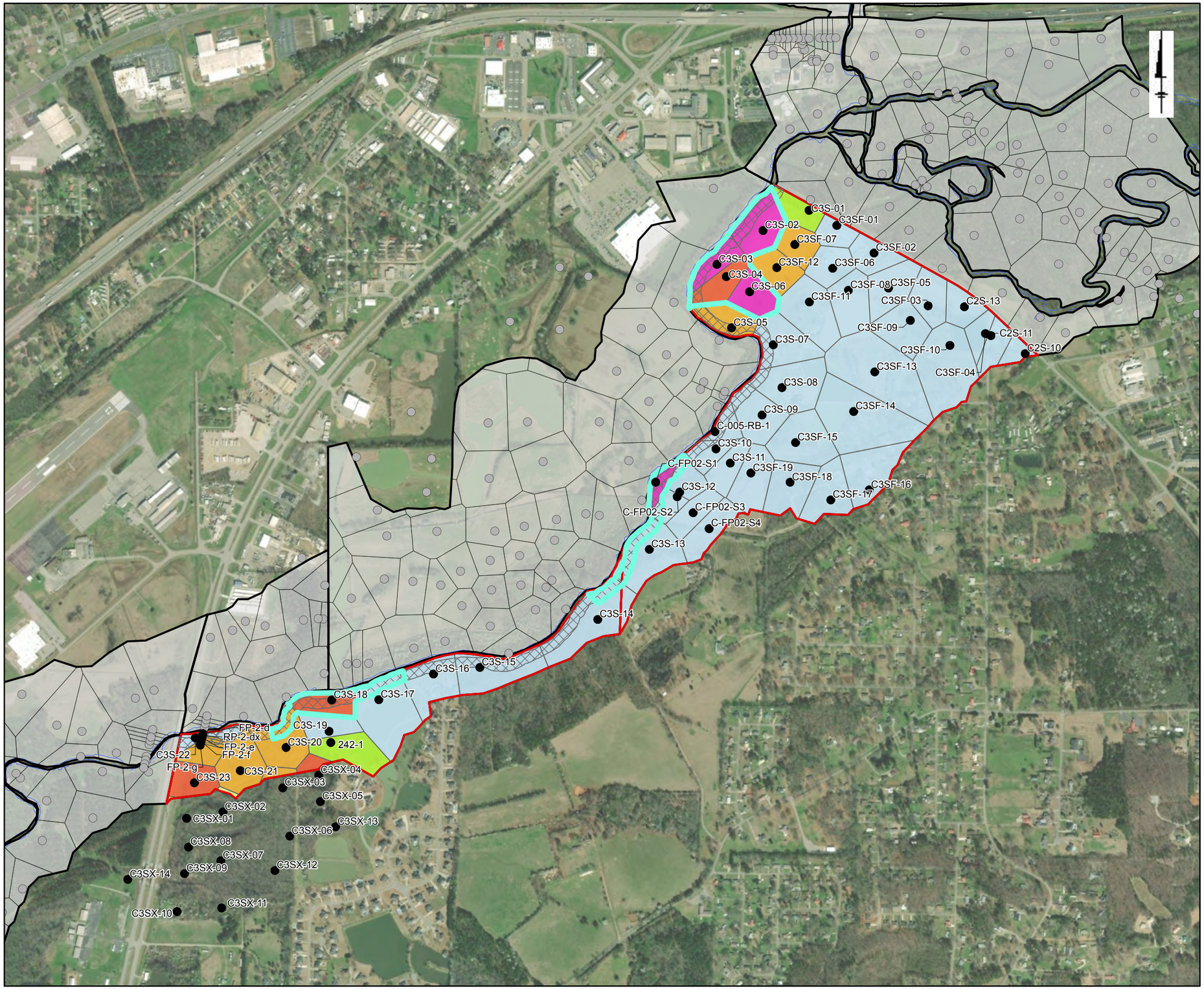
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C3N

Solutia

Figure 7-5g

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

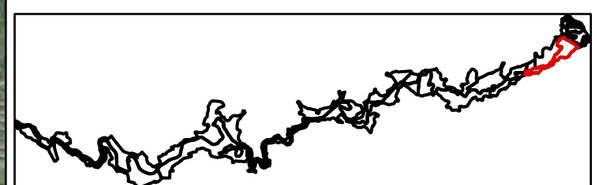
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



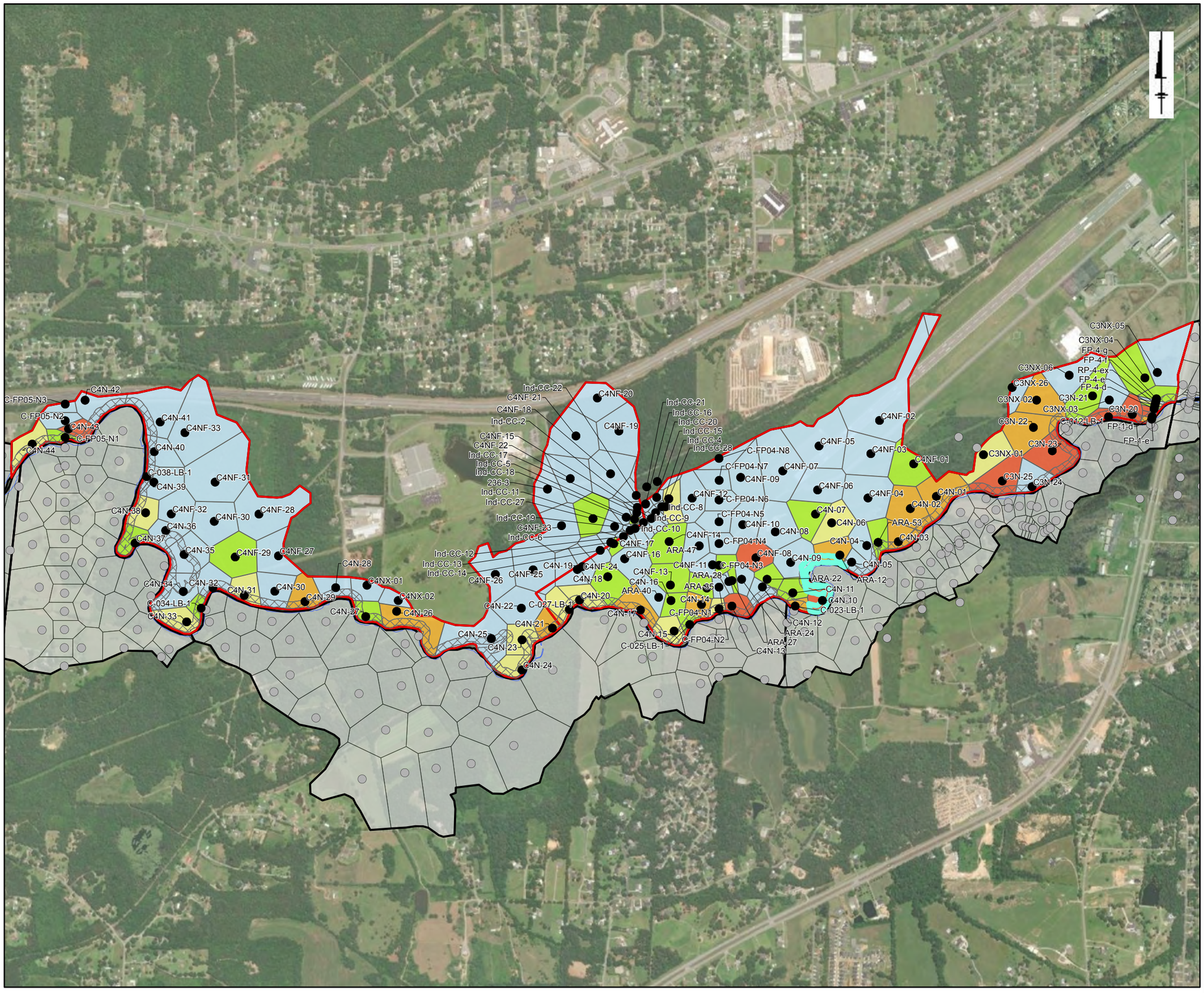
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C3S

Solutia

Figure 7-5h

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

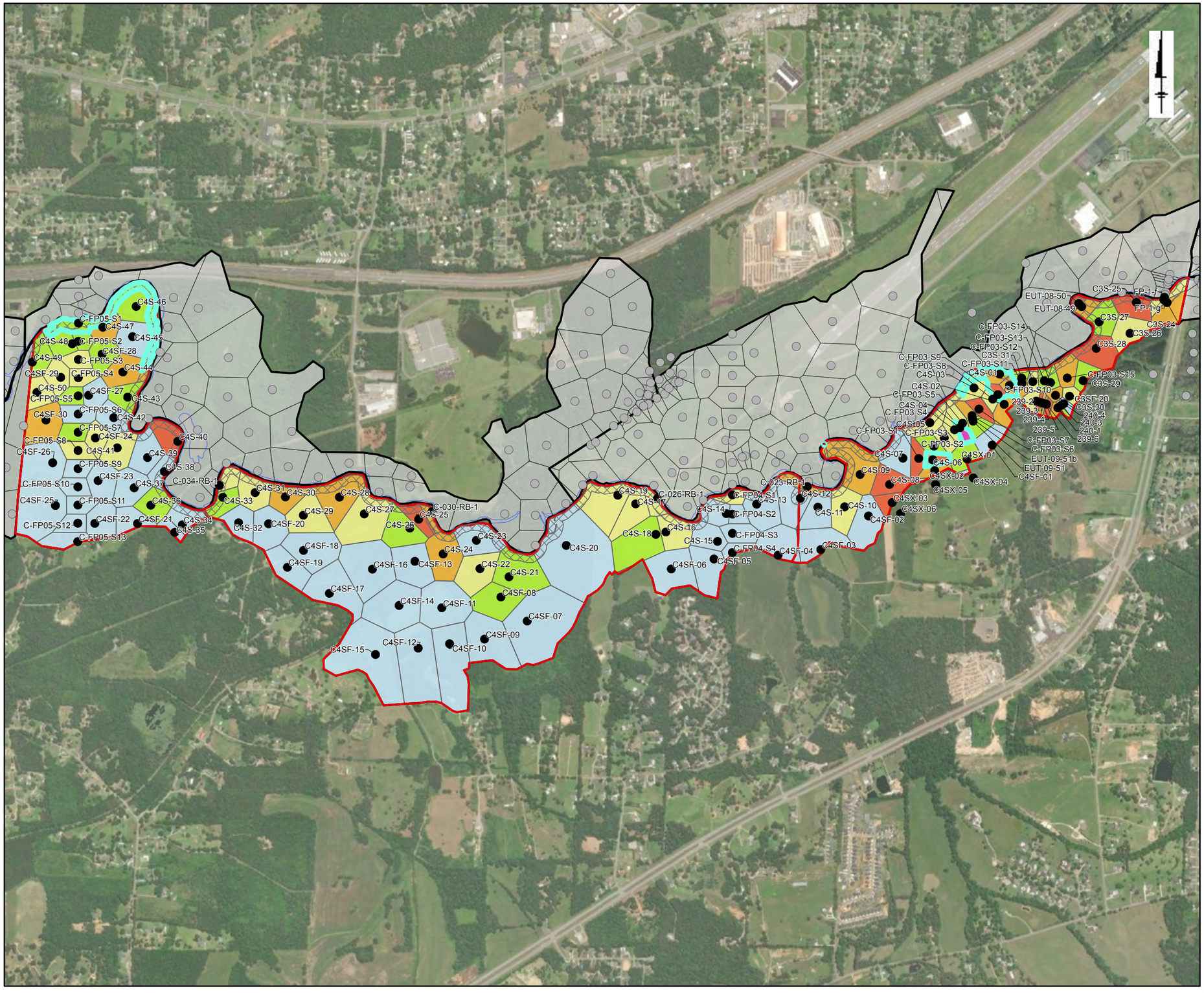
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C4N

Solutia

Figure 7-5i

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

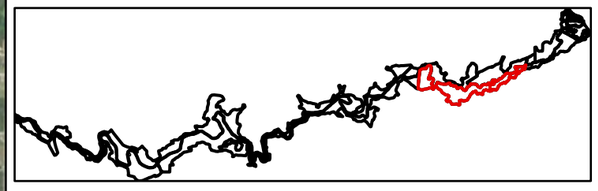
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Remedial Areas in CA Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50
- > 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

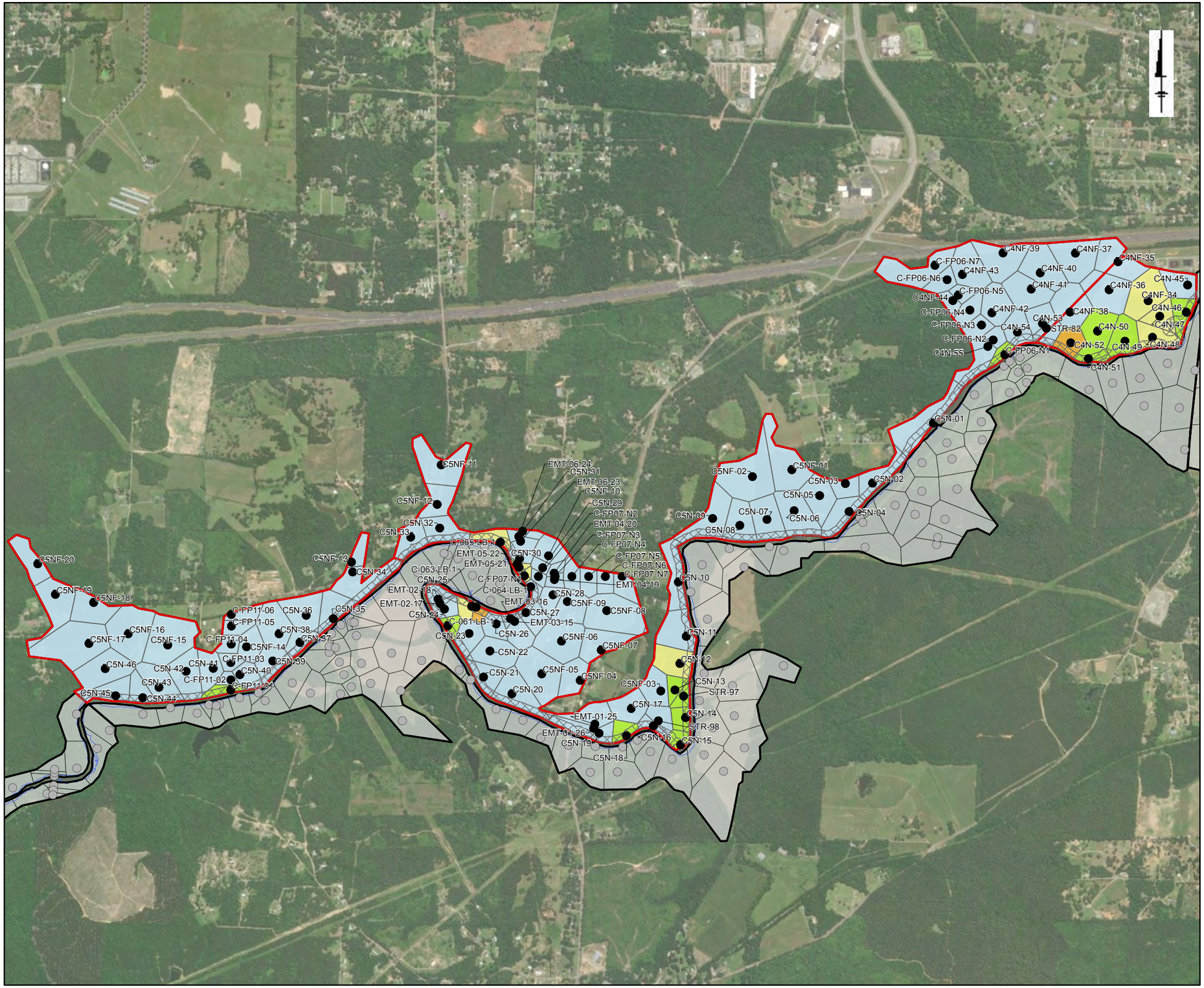
Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C4S

Solutia

Figure 7-5j

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

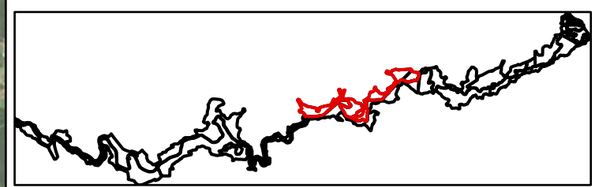
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



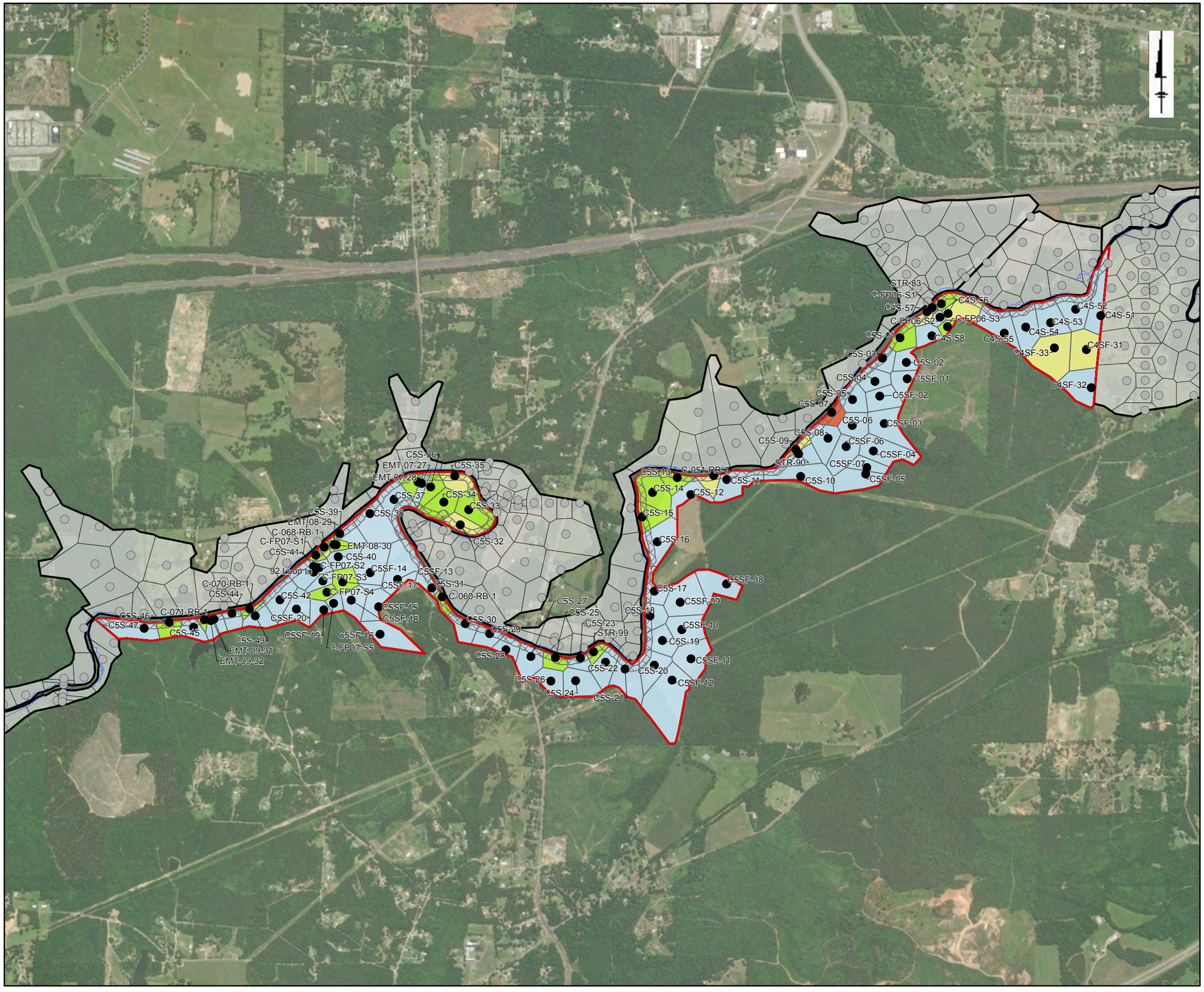
Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C5N

Solutia

Figure 7-5k



Legend

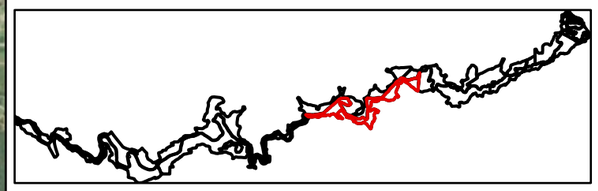
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15
- > 15 to ≤ 50

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 2,000 4,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

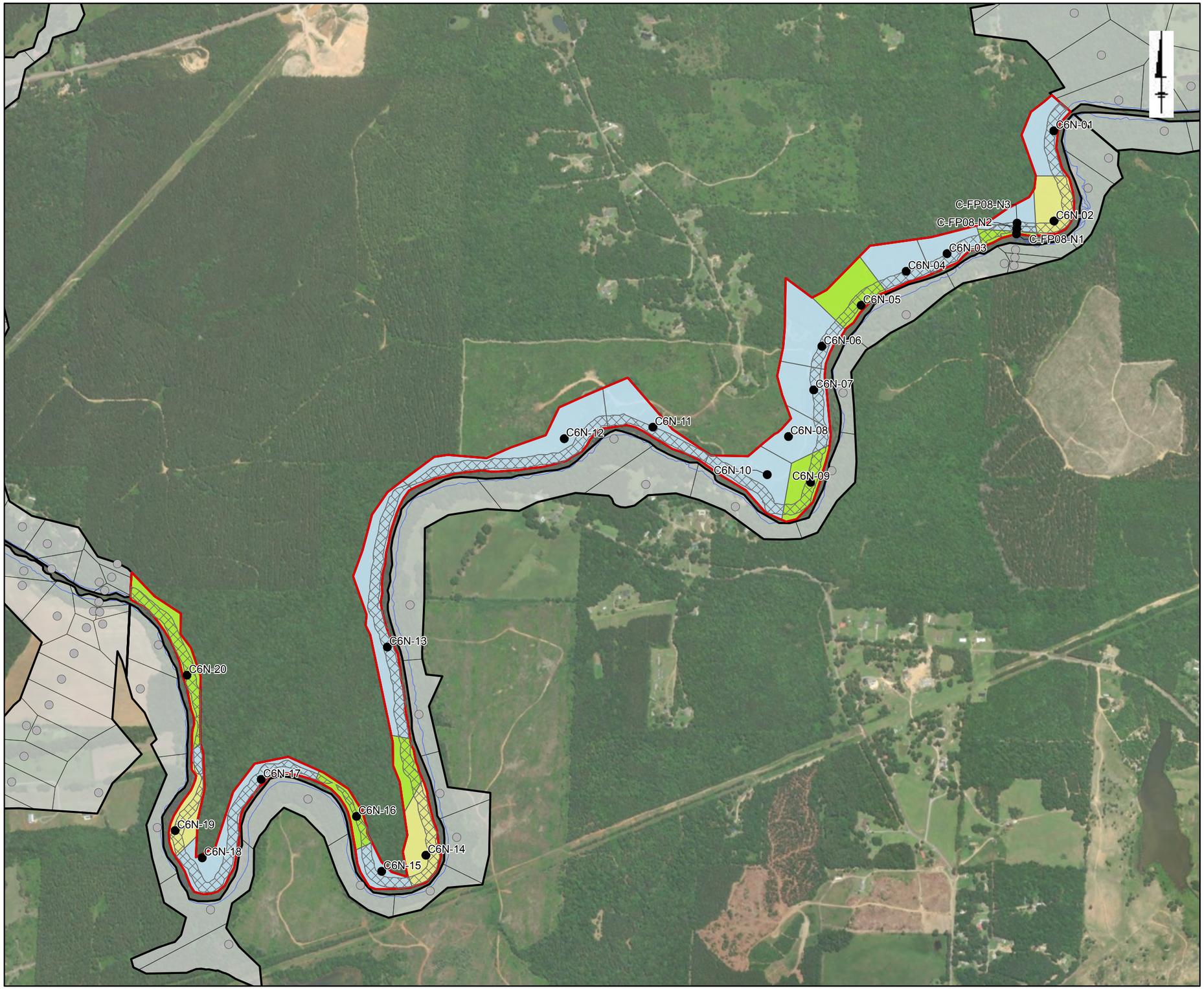
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C5S

Solutia

Figure 7-5l

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

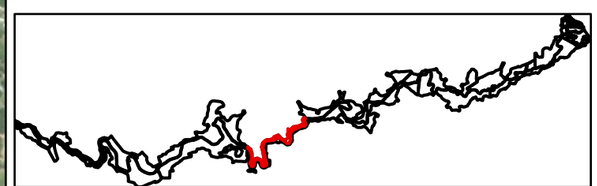
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



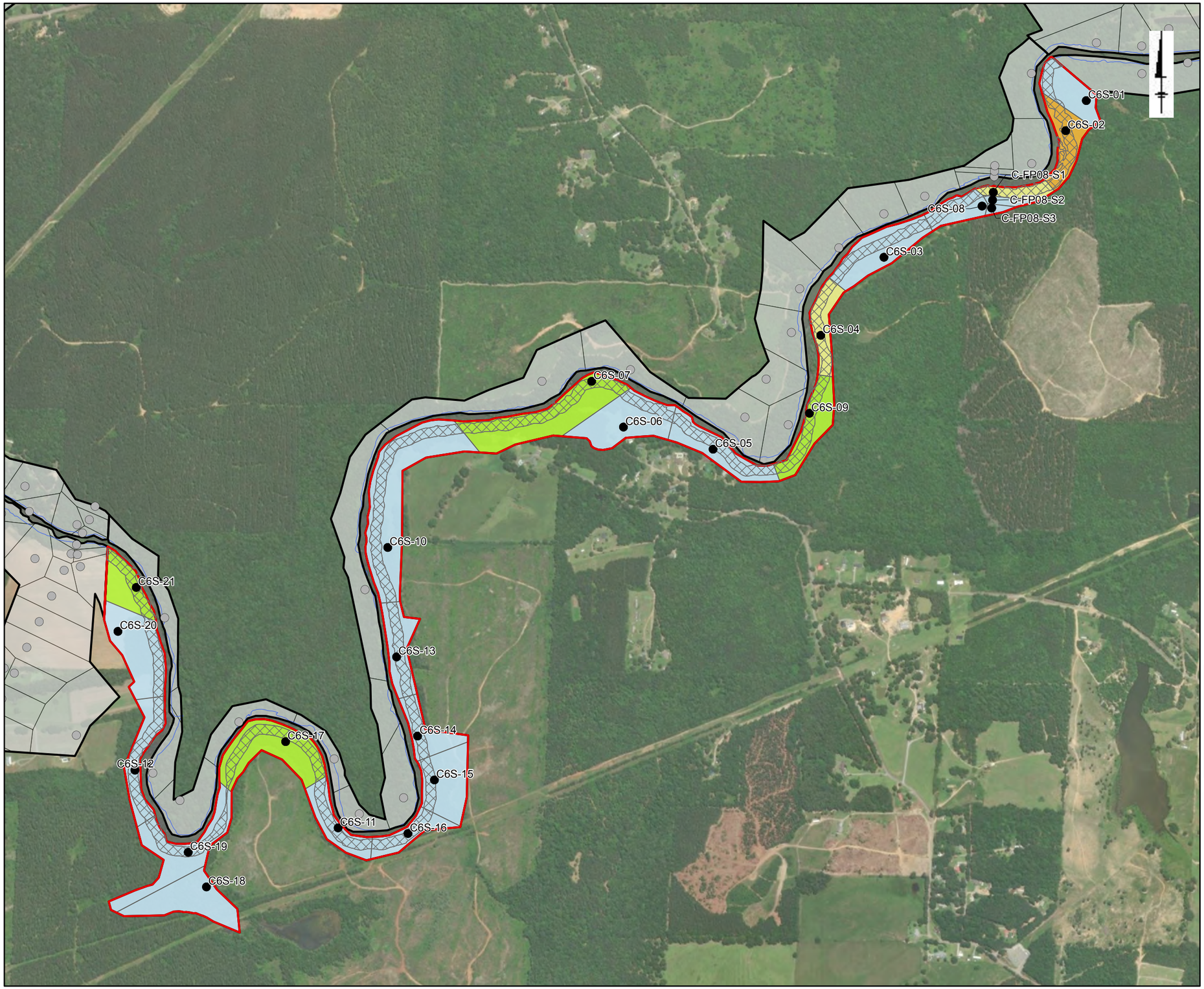
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C6N

Solutia

Figure 7-5m

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

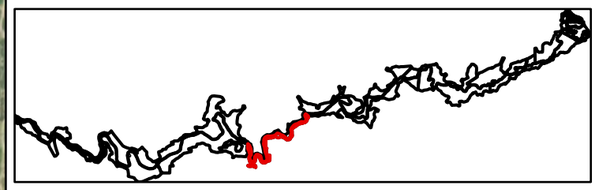
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

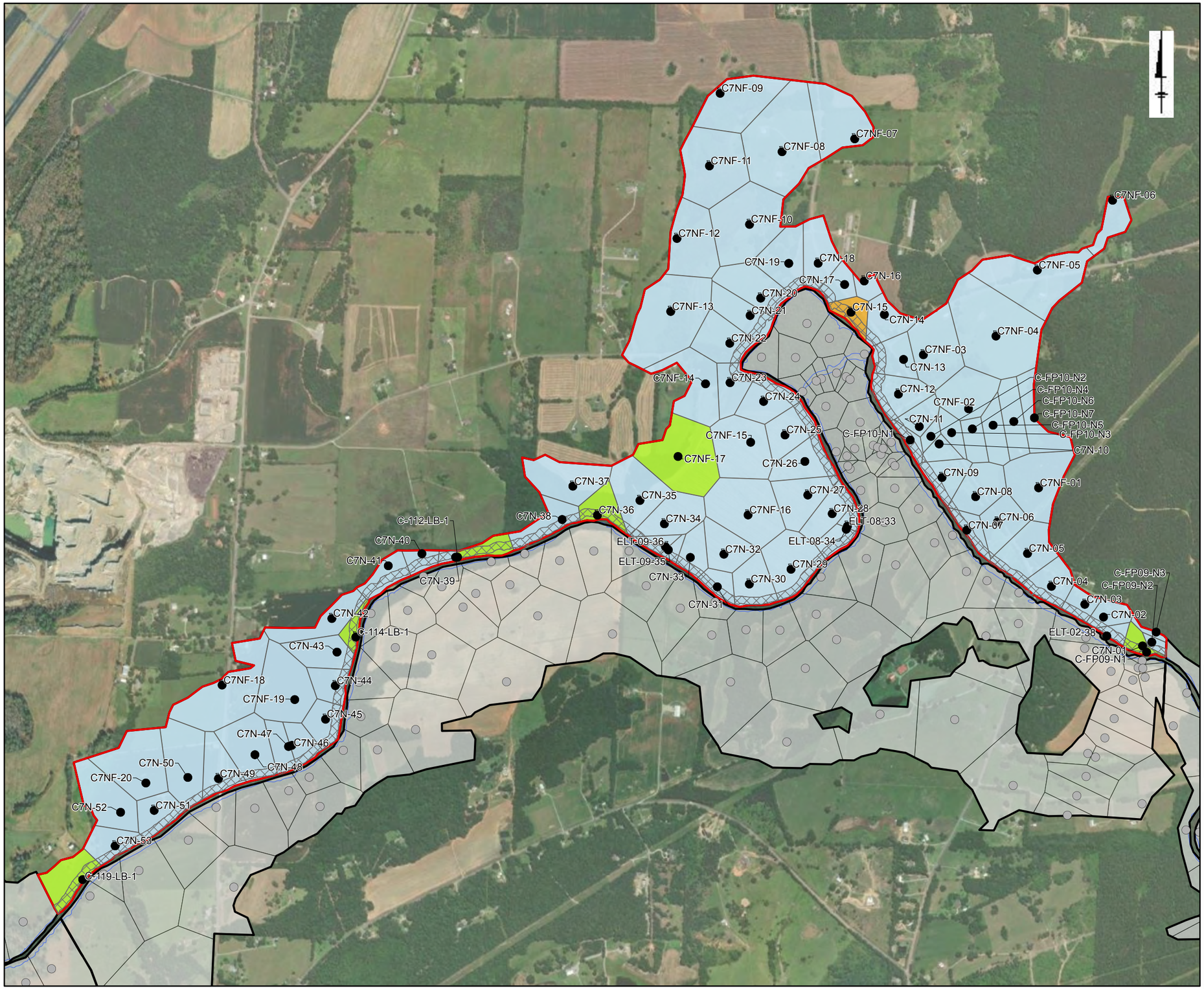
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C6S

Solutia

Figure 7-5n

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

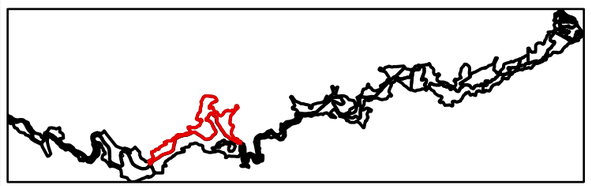
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



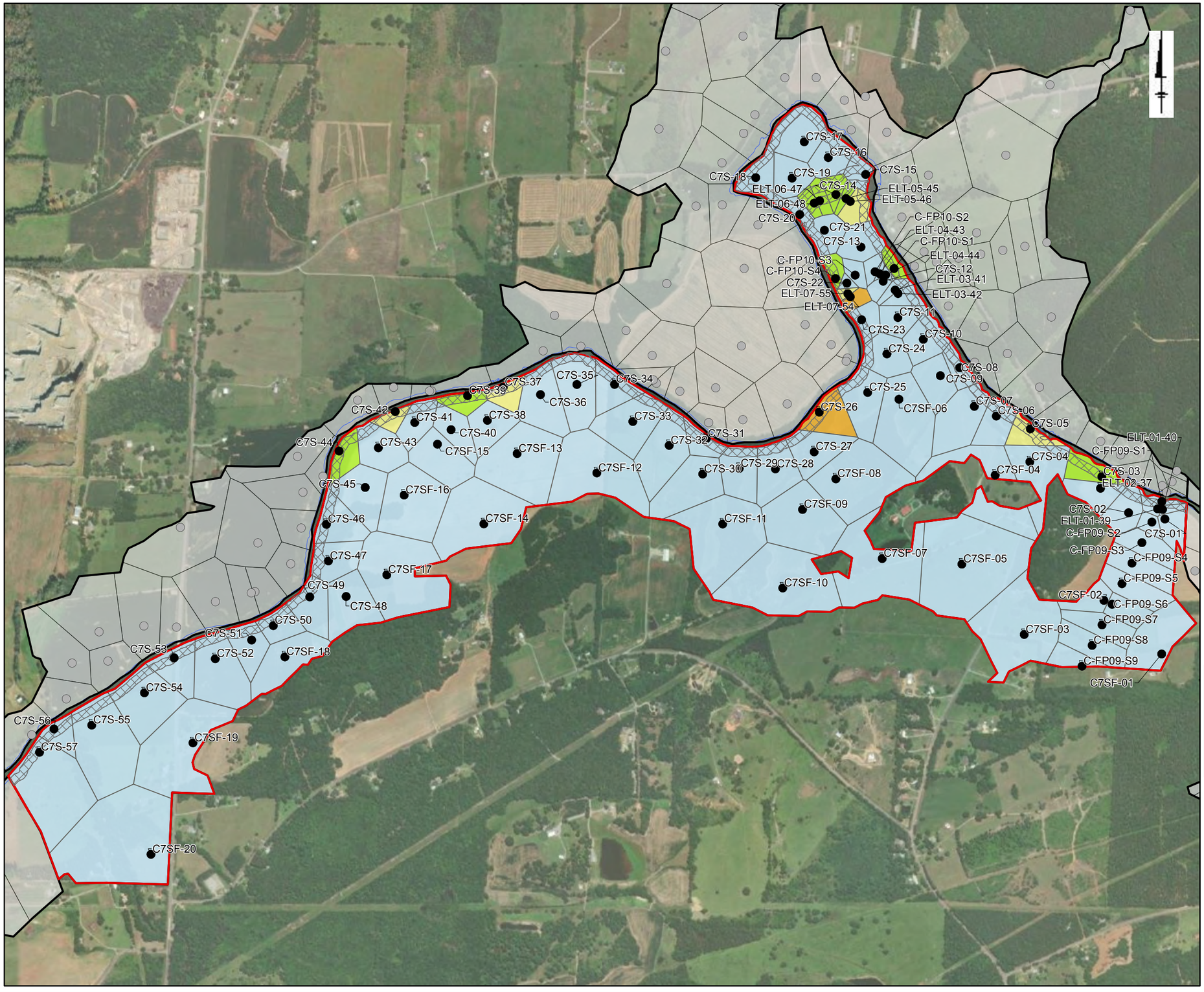
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C7N

Solutia

Figure 7-5o

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

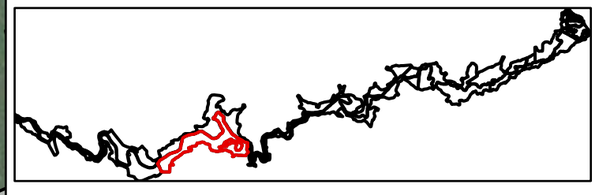
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6
- > 6 to ≤ 15

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

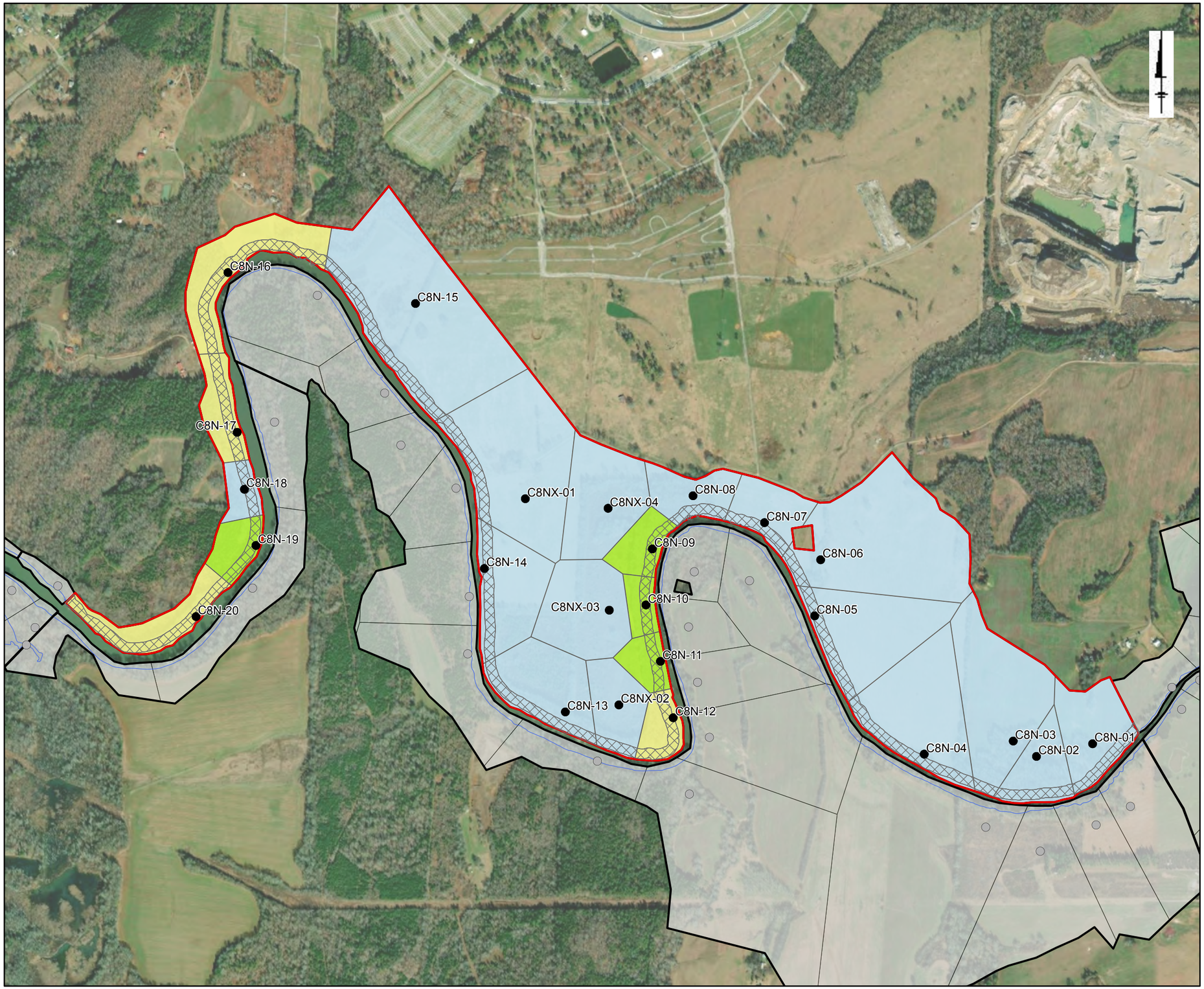
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C7S

Solutia

Figure 7-5p

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

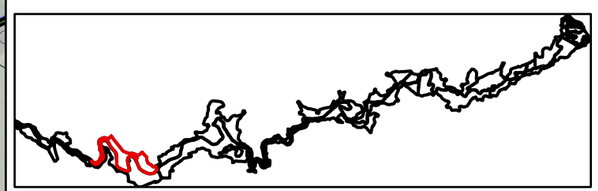
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

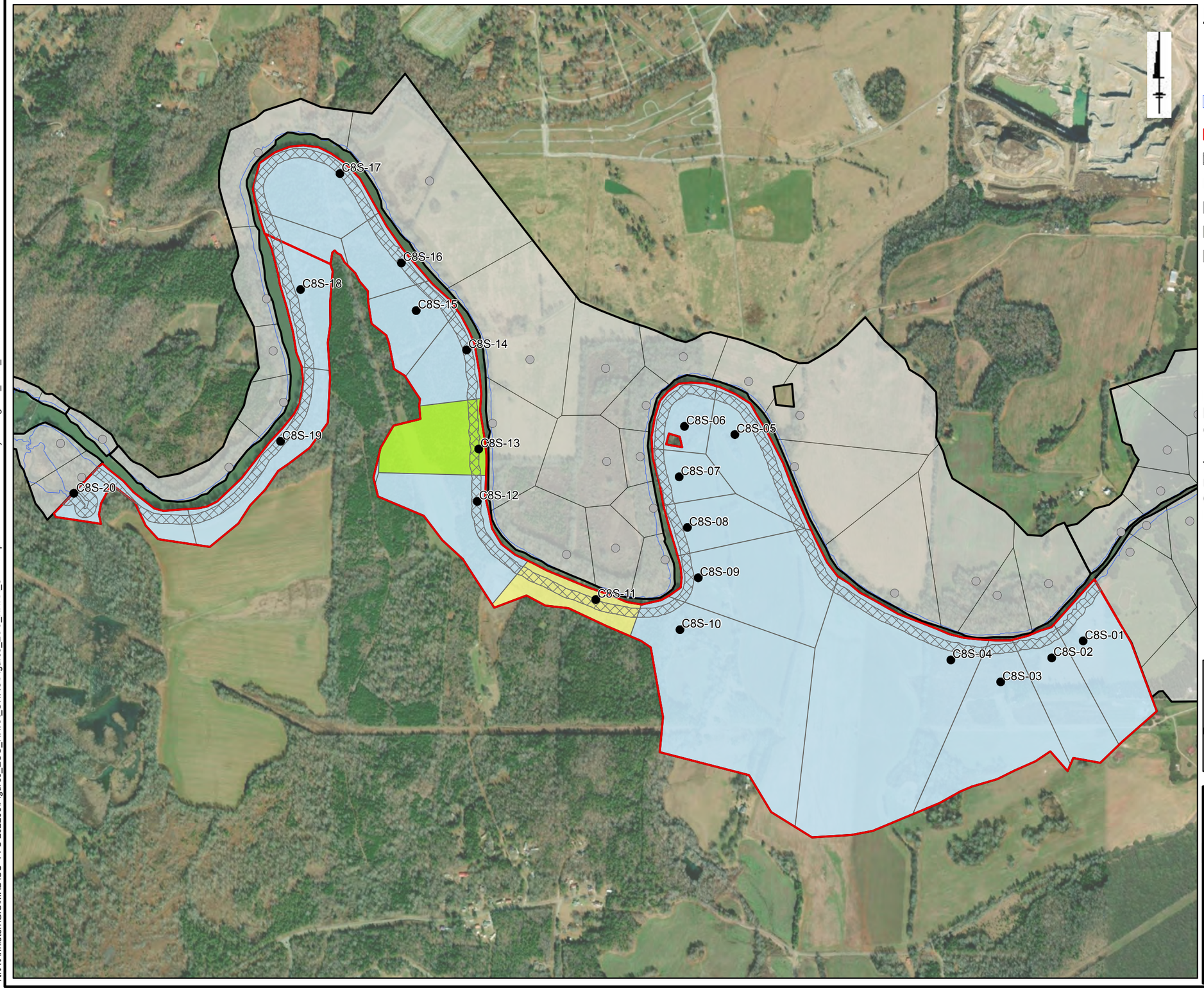
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C8N

Solutia

Figure 7-5q

N:\AA Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

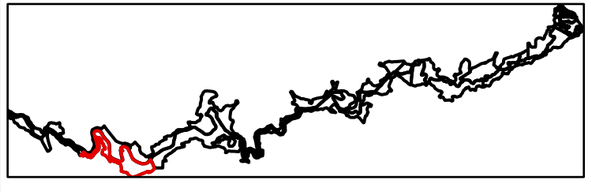
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

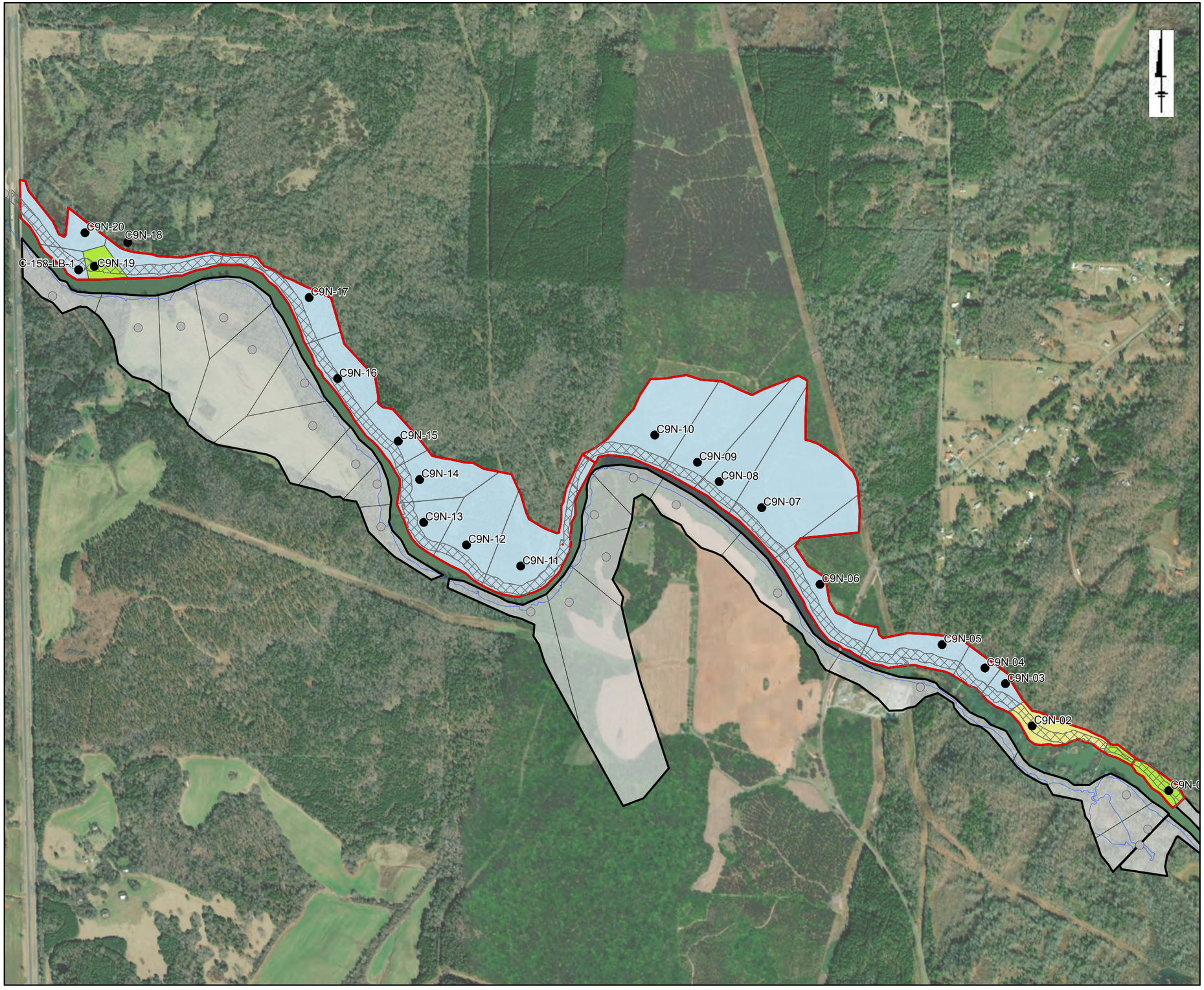
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C8S

Solutia

Figure 7-5r

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

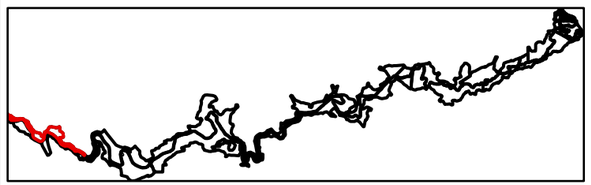
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 6

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

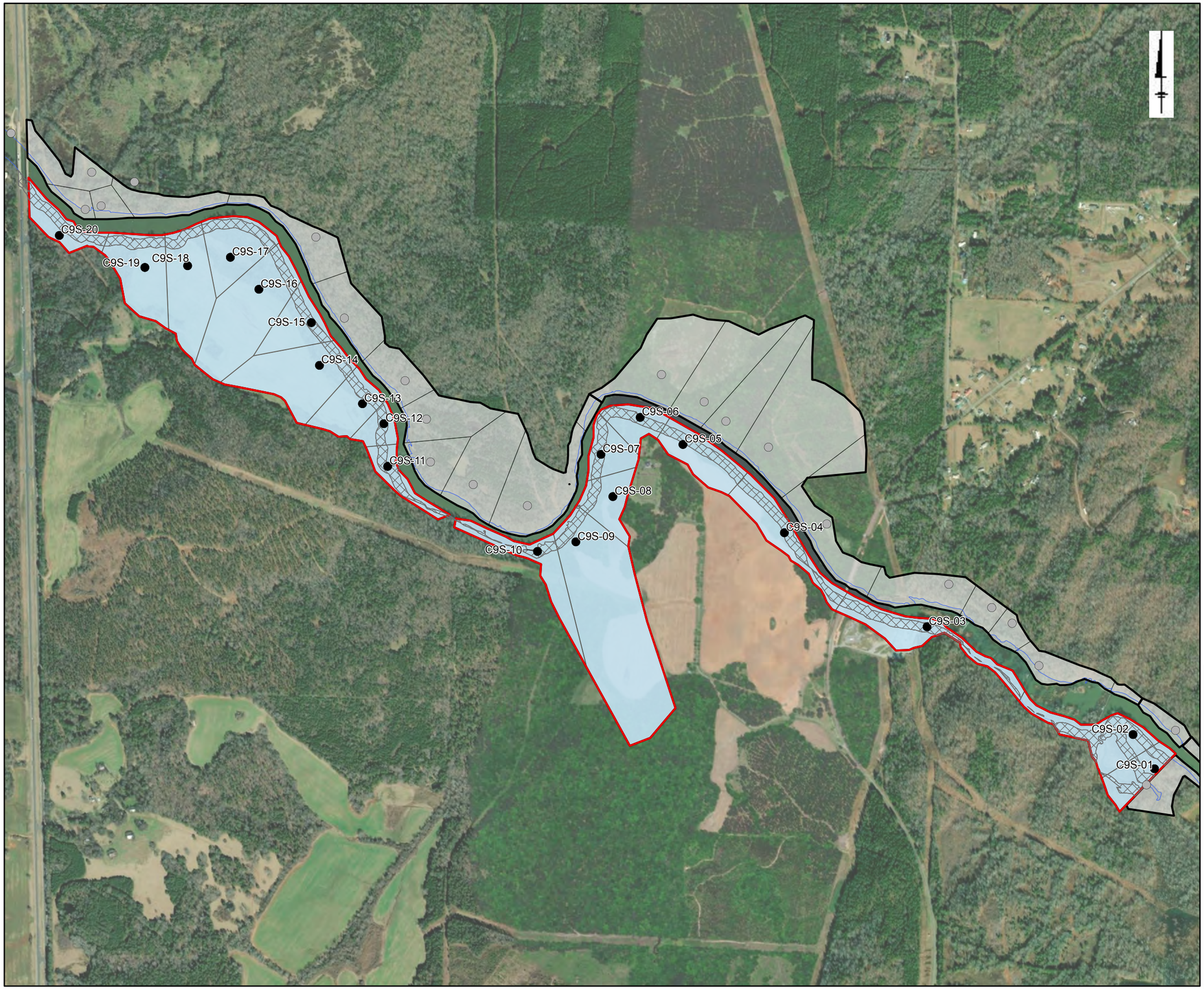
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C9N

Solutia

Figure 7-5s

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

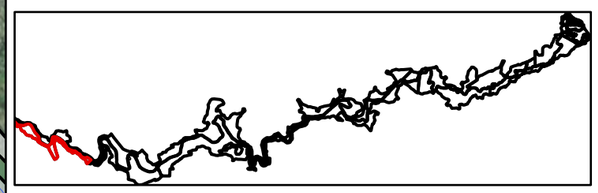
- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
CA: characterization area
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

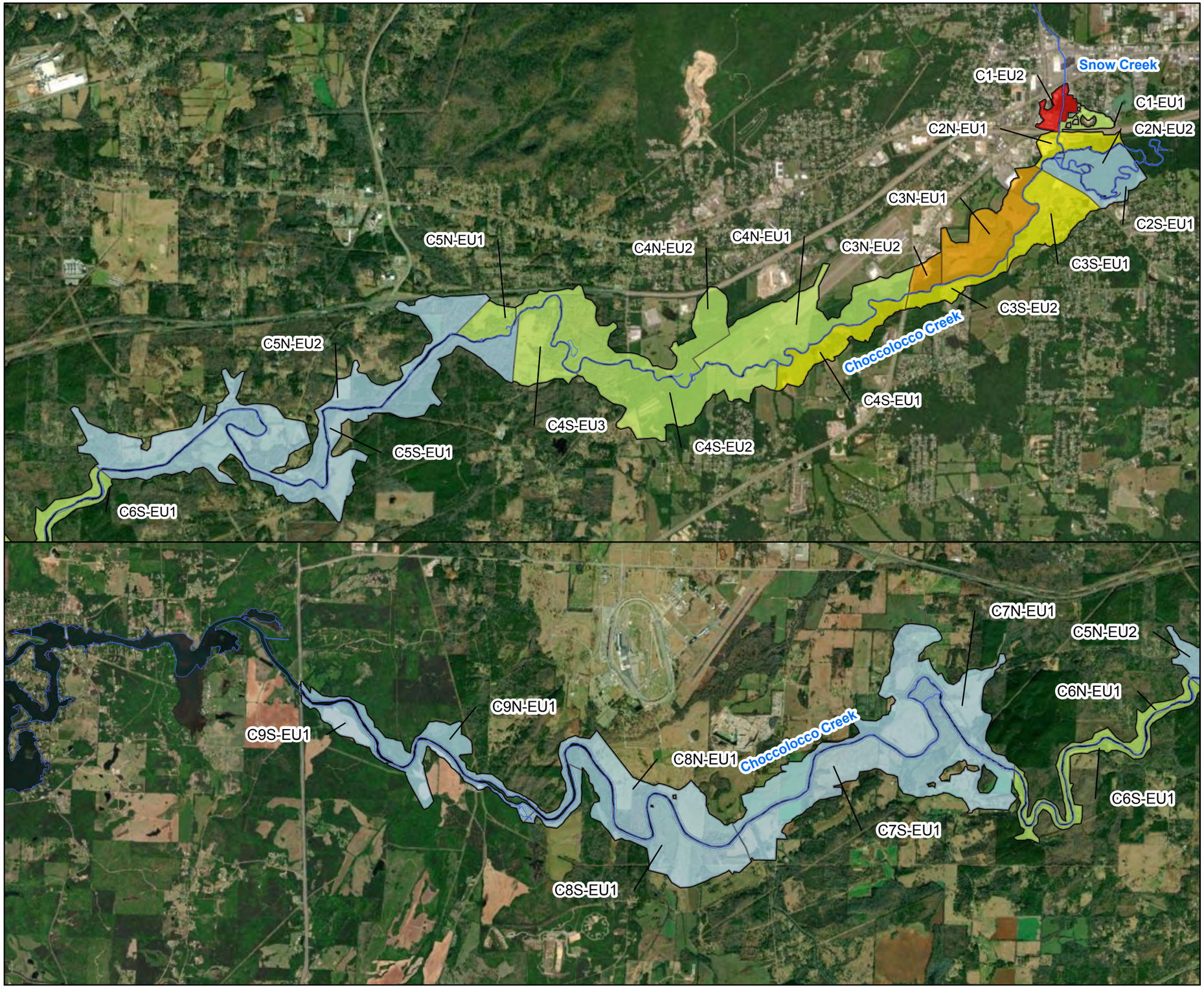
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Ecological Exposure Conditions (0–0.5 ft bgs): C9S

Solutia

Figure 7-5t

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM Layout: Figures_ECO_NRS5 User: rsiebenmann



Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Exposure Units

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration

0 1 2 Miles

Graphic Scale

Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

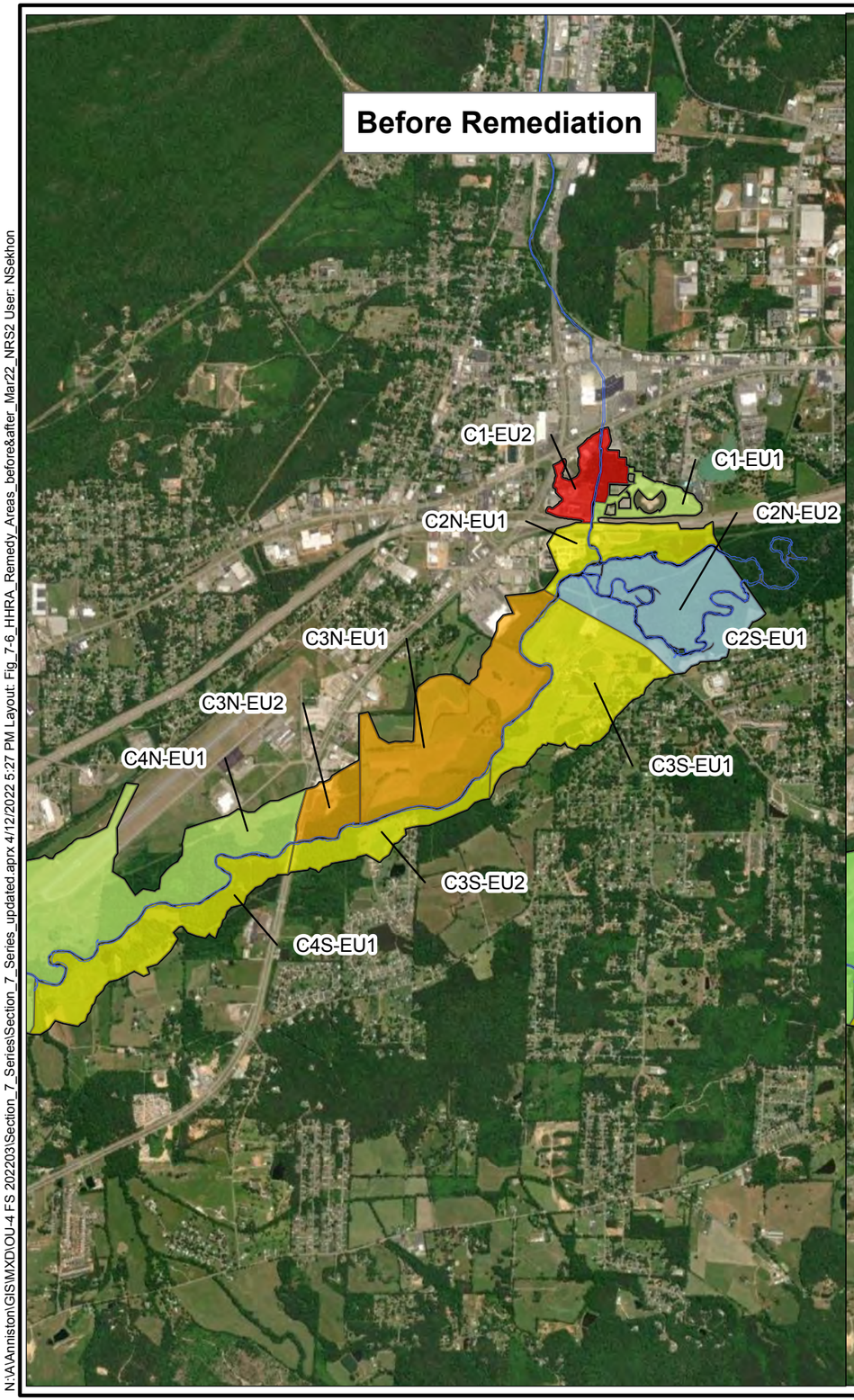
Pre-Remediation Mean SWAC PCB Concentrations in Nonresidential Soil for Human Health Exposure Conditions (0–1 ft bgs)

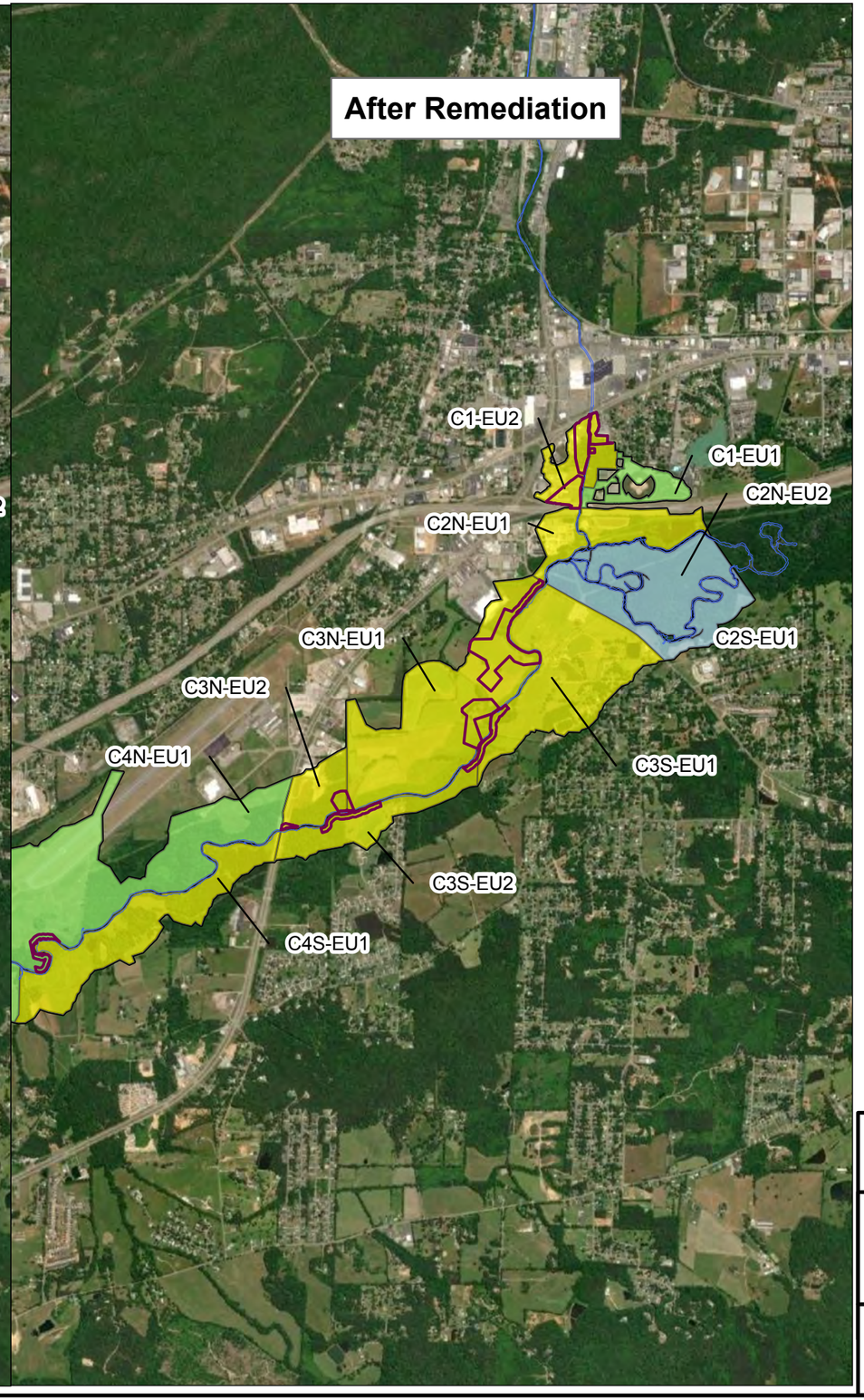
Solutia

Figure 7-6

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated.aprx 4/12/2022 2:07 PM Layout: Fig_7-5_HHRA_PreRemoval_Mar22 User: NSekhon

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated.aprx 4/12/2022 5:27 PM Layout: Fig_7-6_HHRA_Remedy_Areas_before&after_Mar22_NRS2 User: NSekhon





Legend

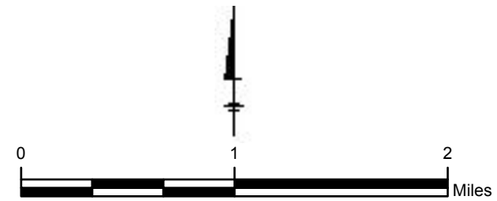
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Exposure Units
- Target Remediation Areas

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
1. Removal of soil from the 0-0.5-ft horizon to achieve a post-removal PCB SWAC of 6 mg/kg to reduce ecological risks.
2. The post-removal concentrations were developed based on an average PCB concentration for the 0–1-foot horizon. This average PCB concentration was calculated using existing PCB results for the 0.5–1-foot horizon that would not be removed and a site-specific PCB nondetect concentration to represent the clean backfill that would be placed in the upper 0.5-foot horizon following soil removal.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration



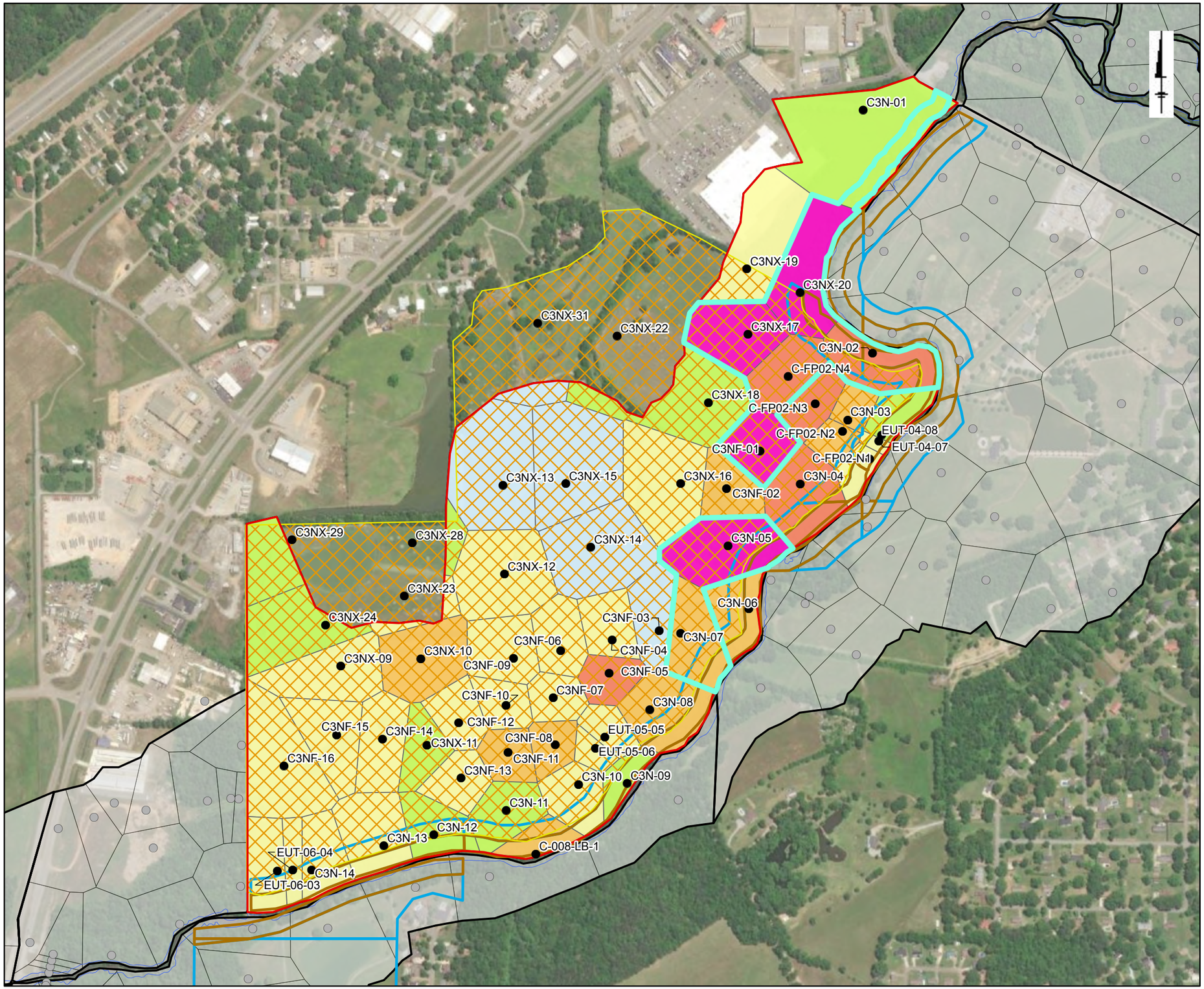
Graphic Scale

Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Mean SWAC PCB Concentrations in Nonresidential Floodplain Soil for Human Health EUs (0-1 ft bgs): NRS-2

Solutia

Figure 7-7a



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

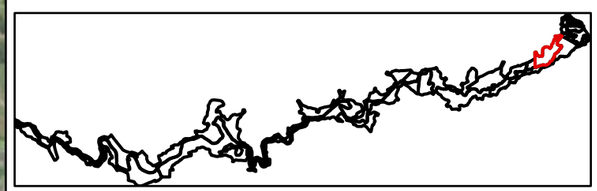
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

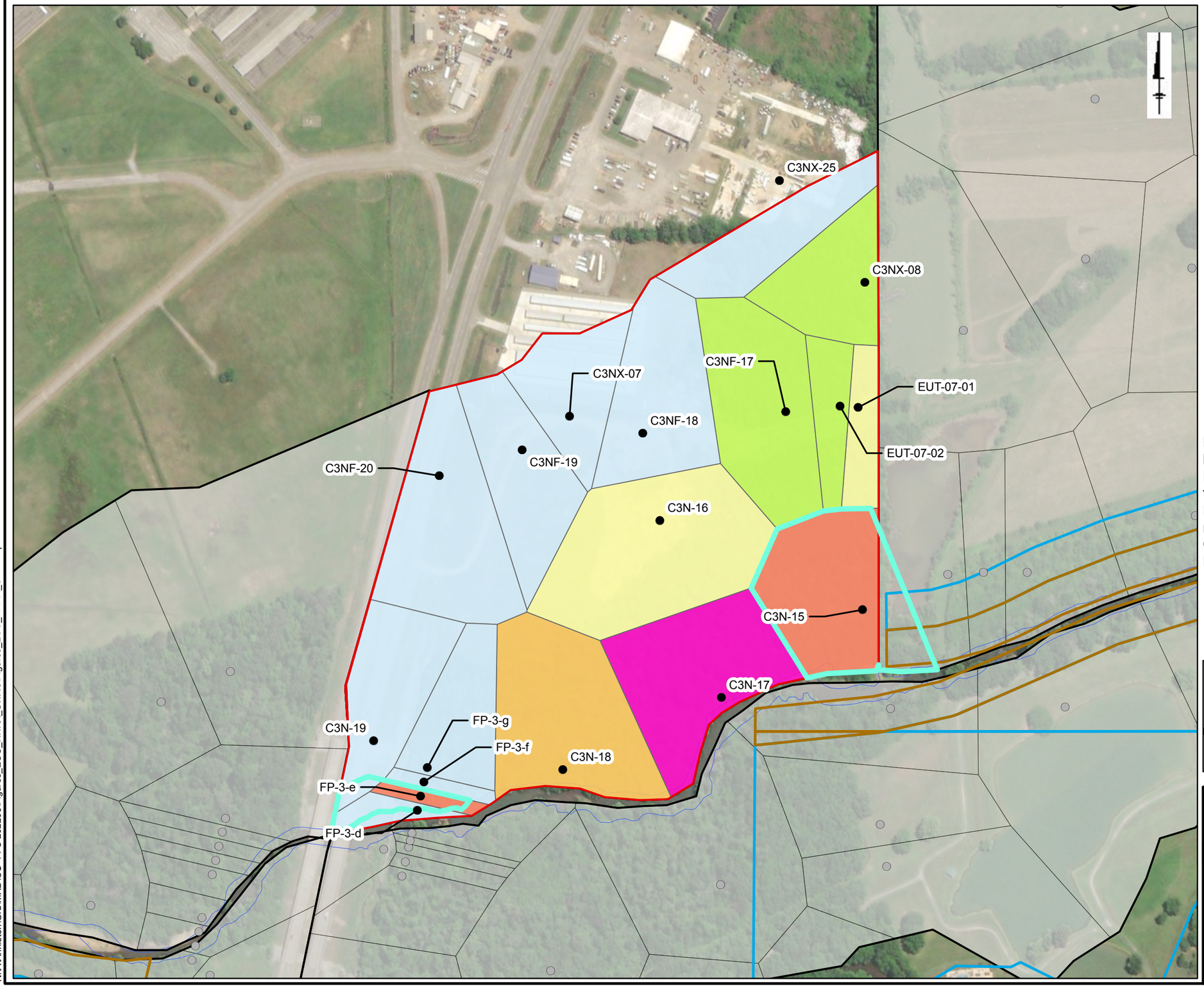
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C3N-EU1

Solutia

Figure 7-7b

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

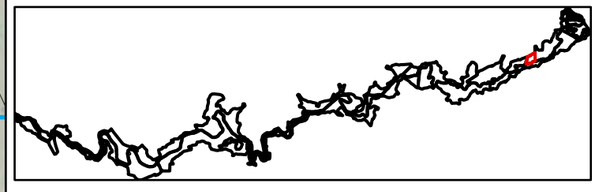
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 250 500
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

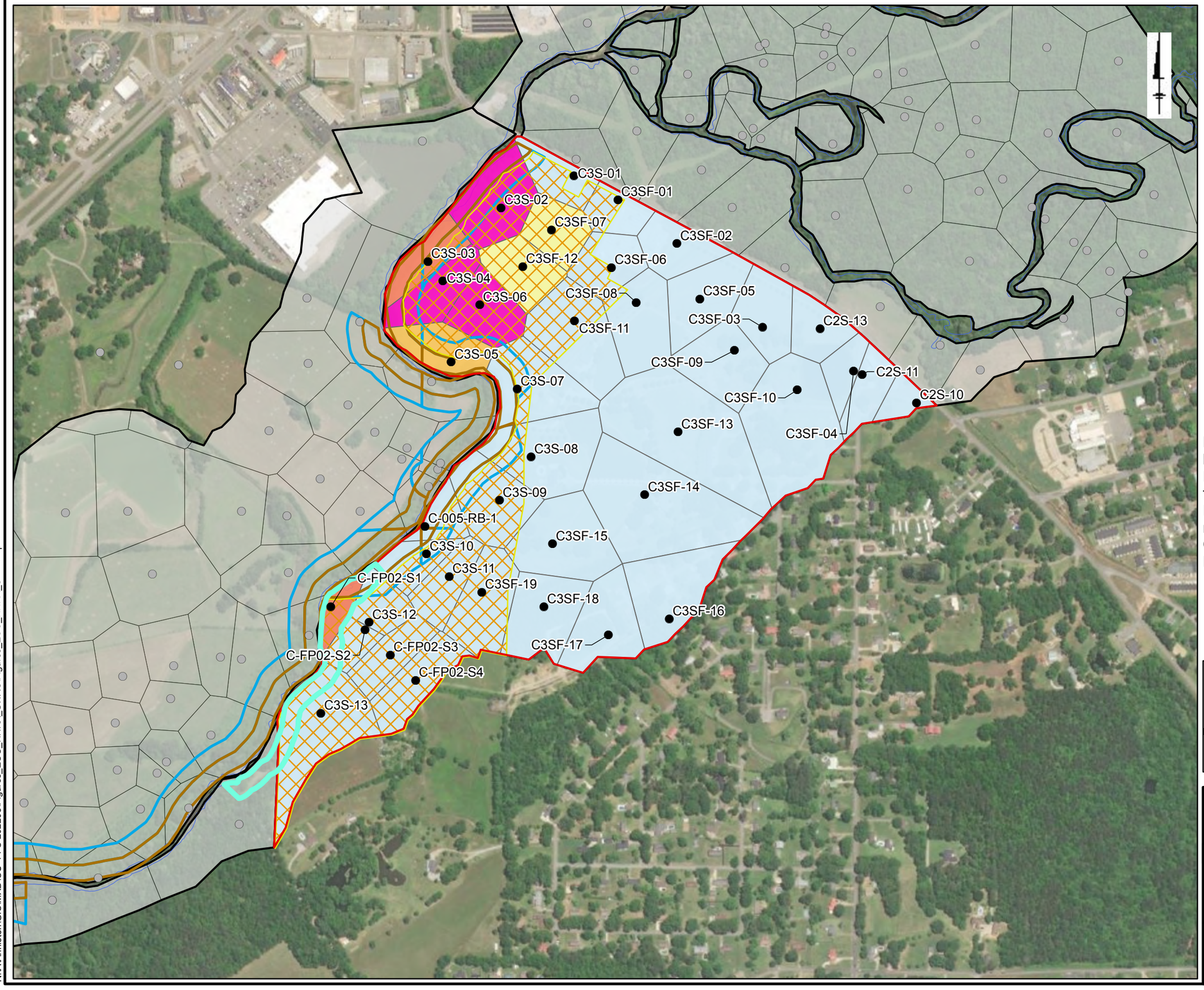
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C3N-EU2

Solutia

Figure 7-7c

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

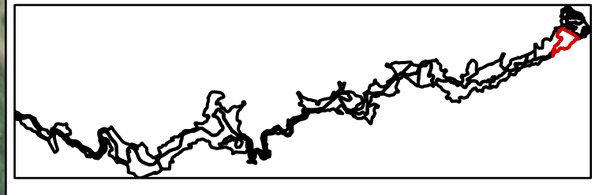
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

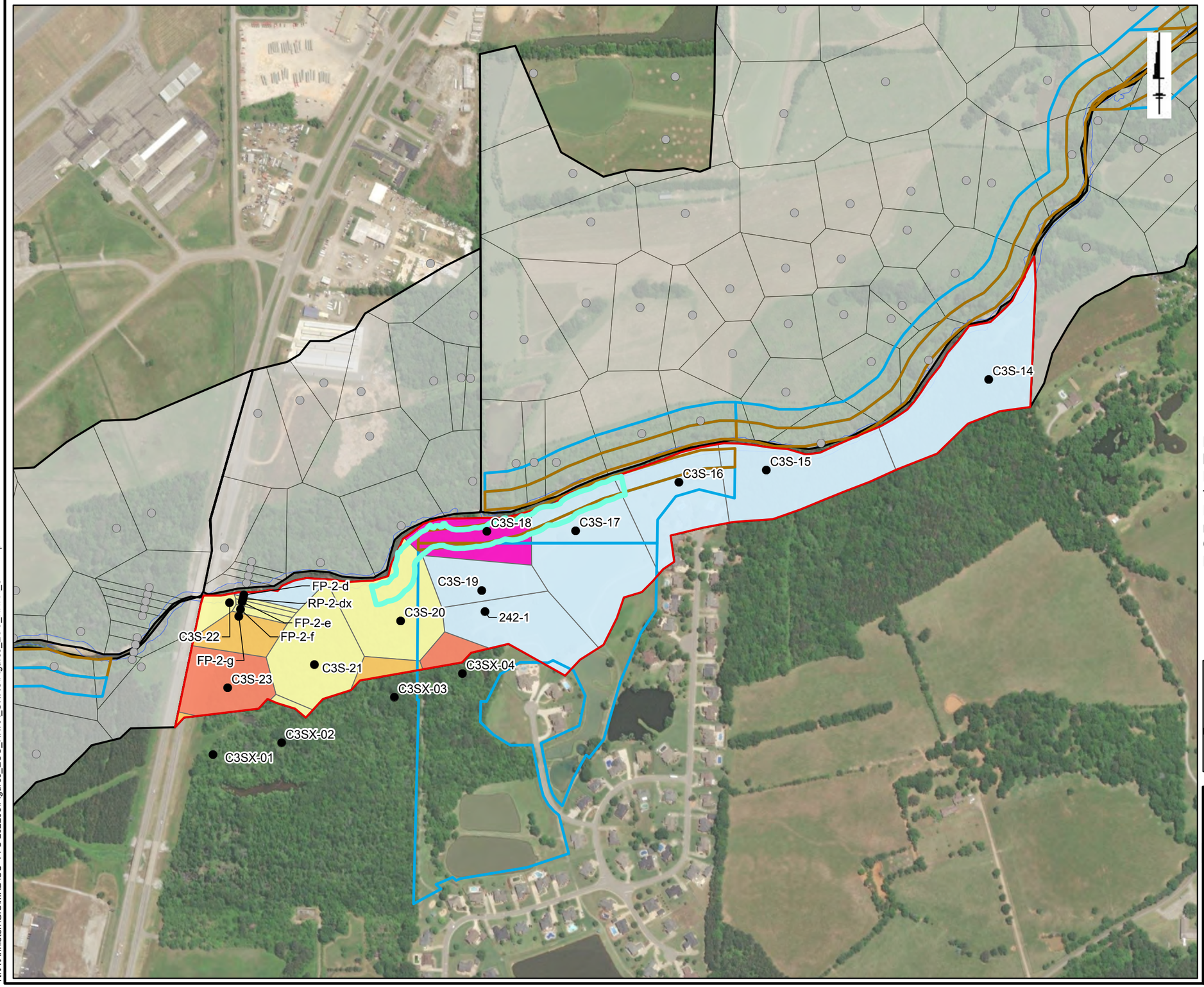
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C3S-EU1

Solutia

Figure 7-7d

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

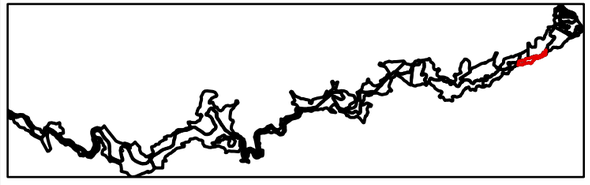
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

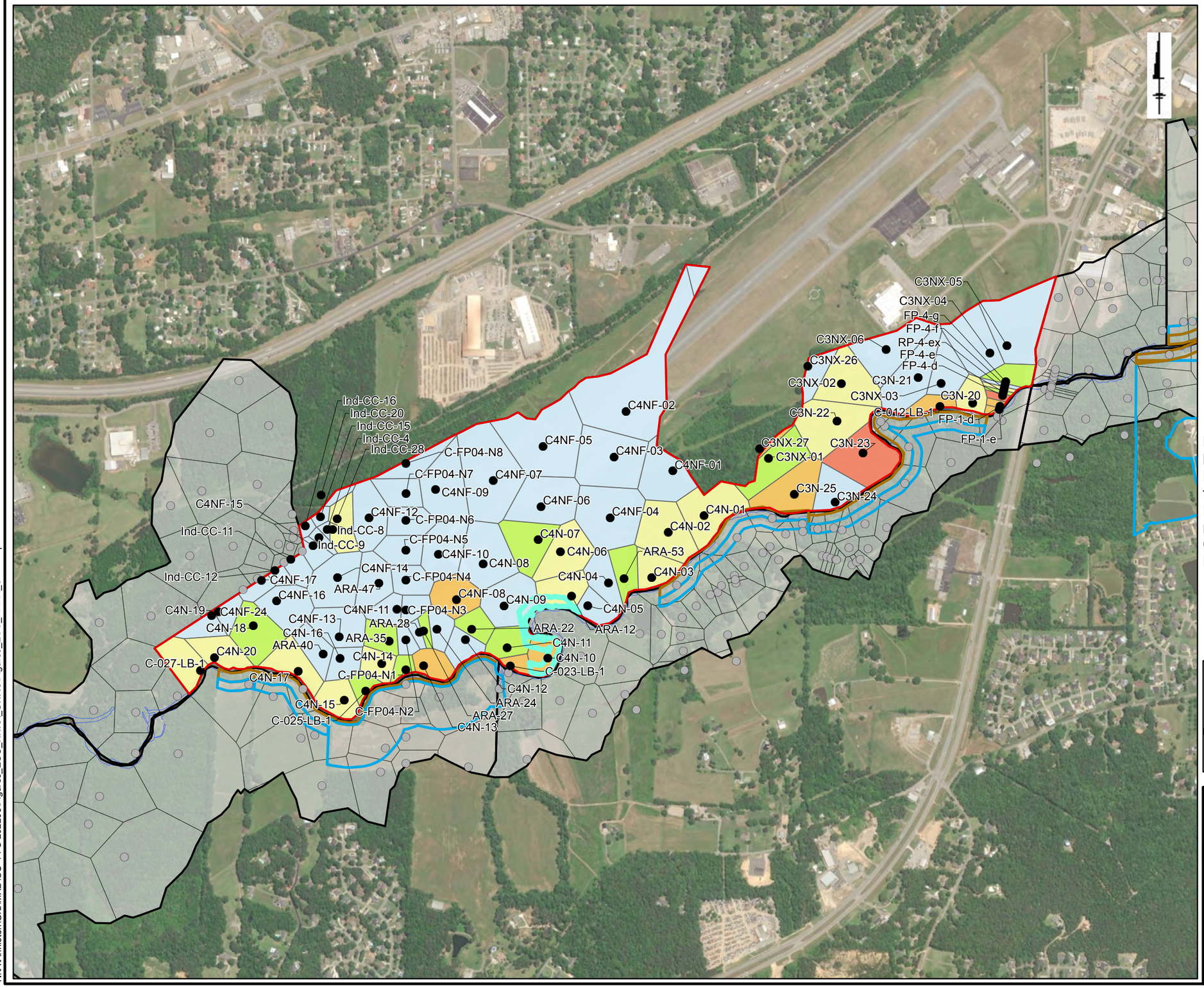
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C3S-EU2

Solutia

Figure 7-7e

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

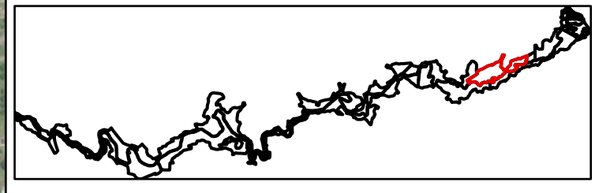
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

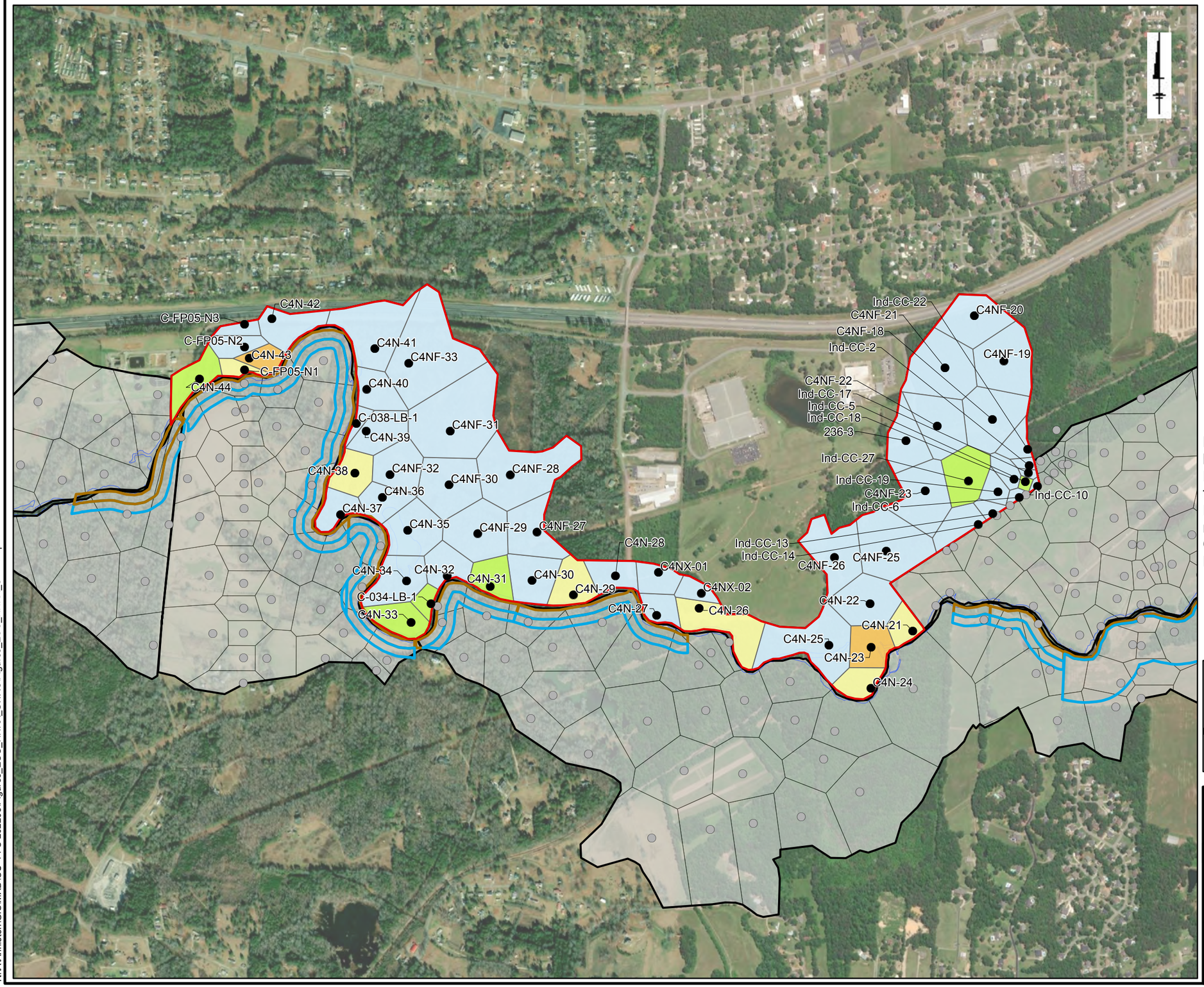
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C4N-EU1

Solutia

Figure 7-7f

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

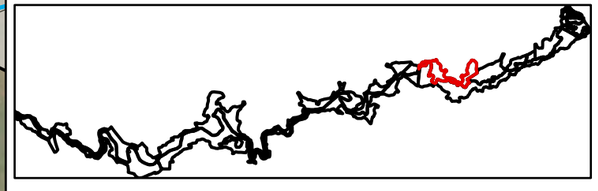
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

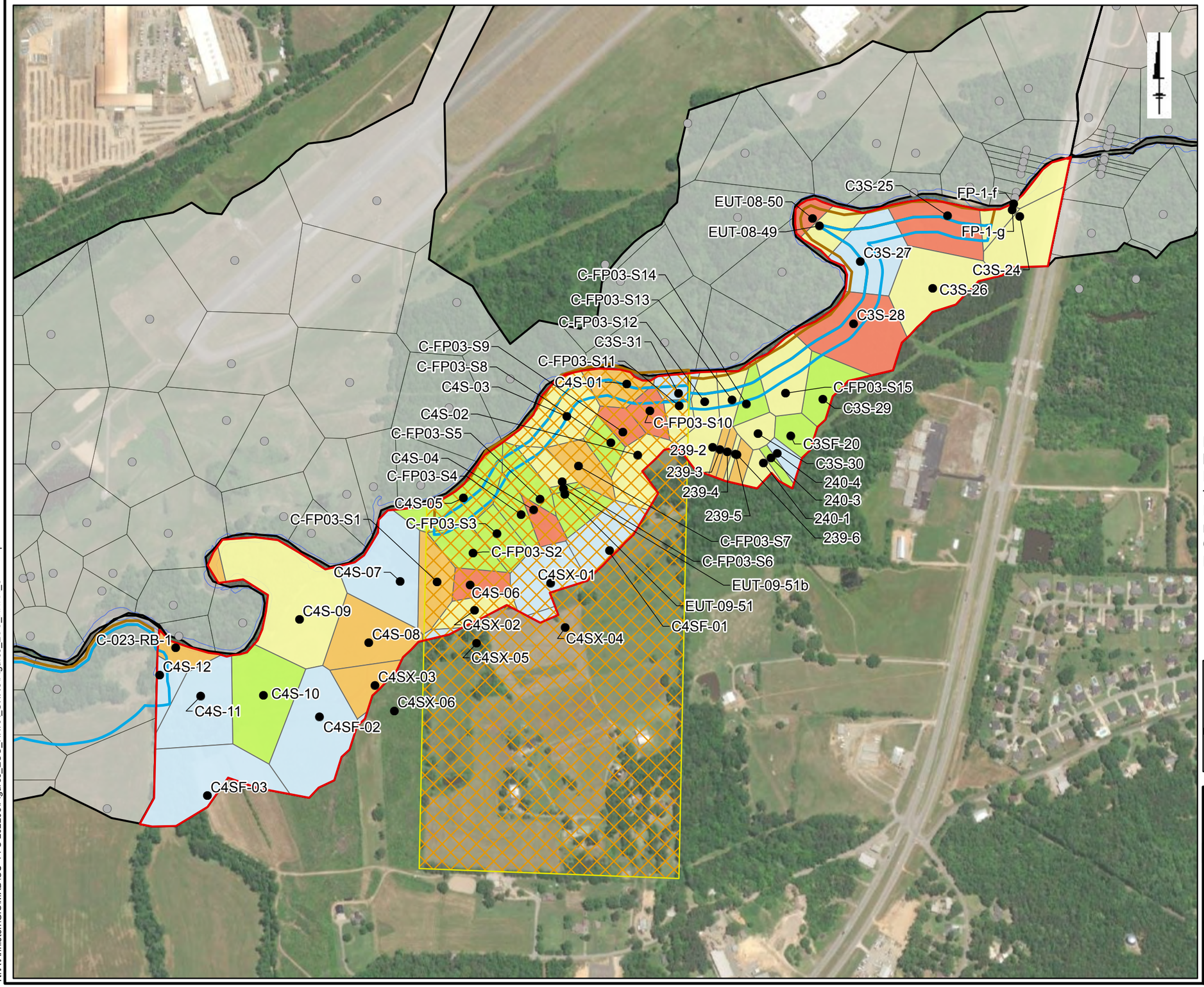
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C4N-EU2

Solutia

Figure 7-7g

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

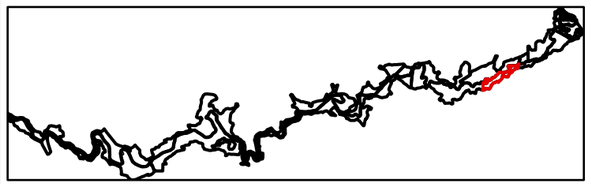
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

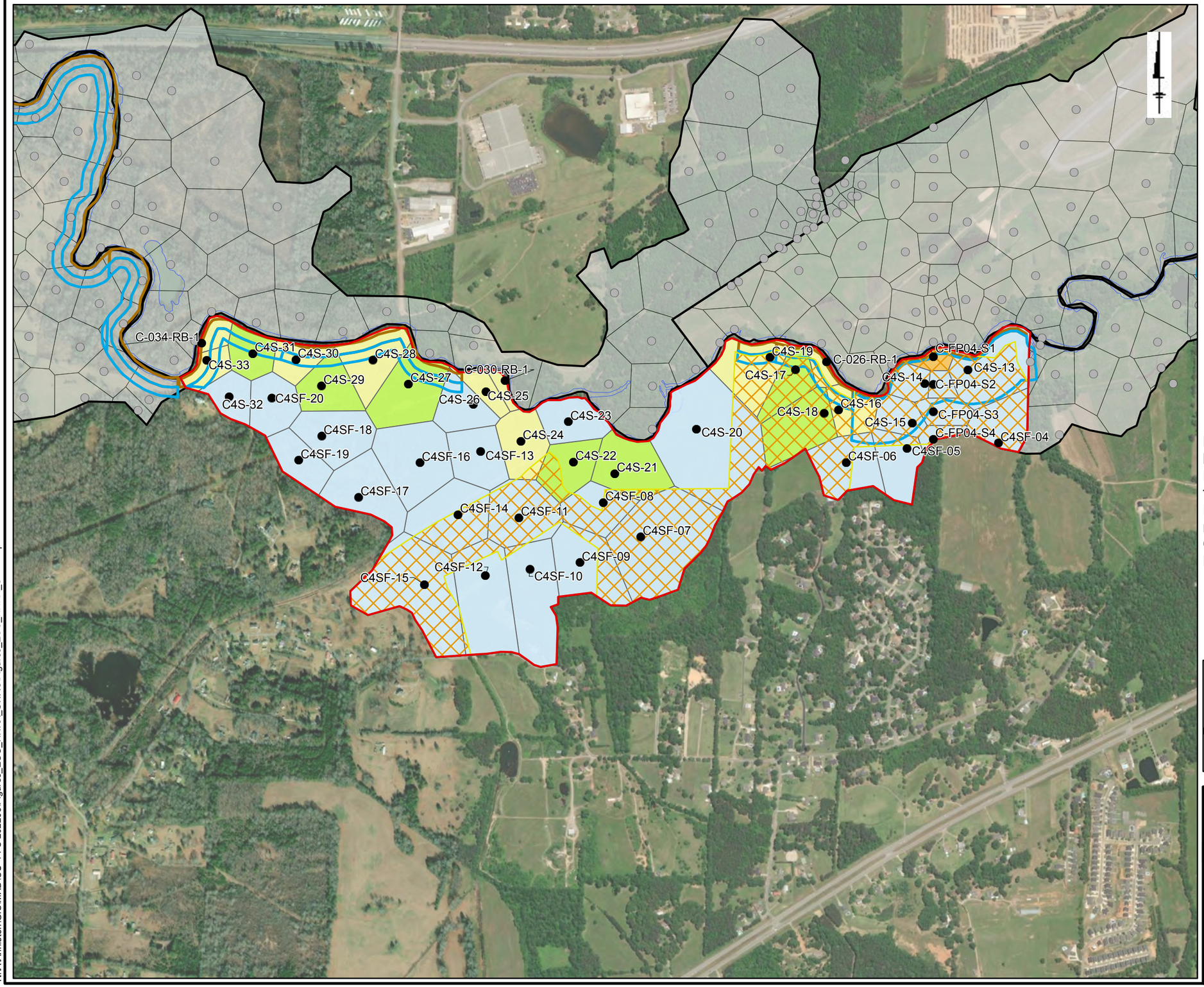
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C4S-EU1

Solutia

Figure 7-7h

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

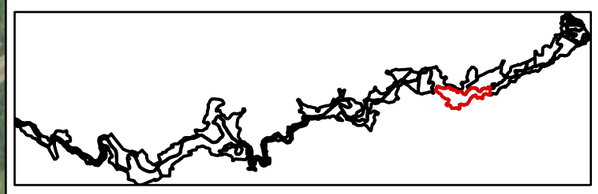
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

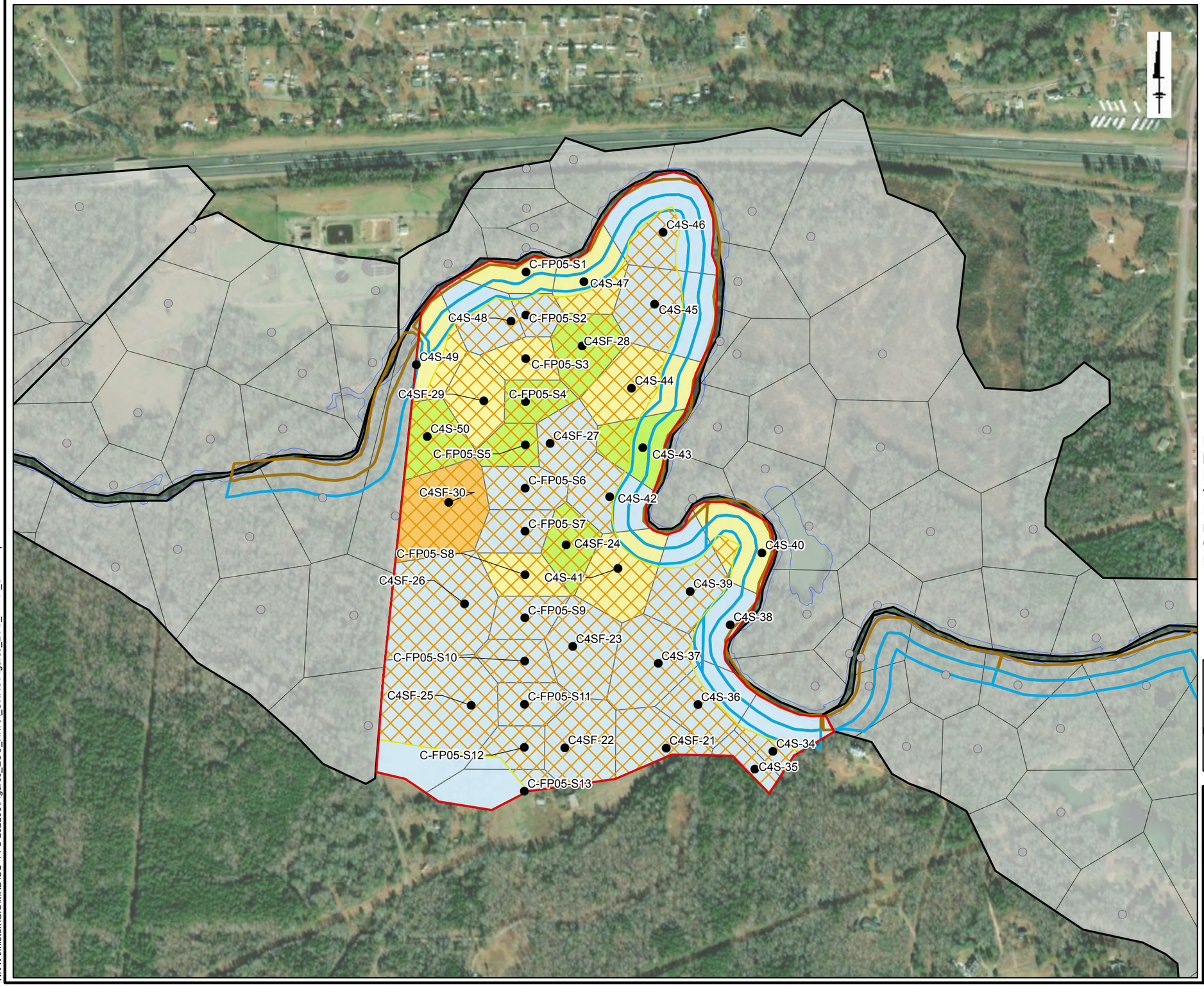
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C4S-EU2

Solutia

Figure 7-7i

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

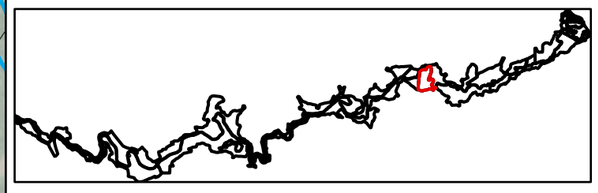
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

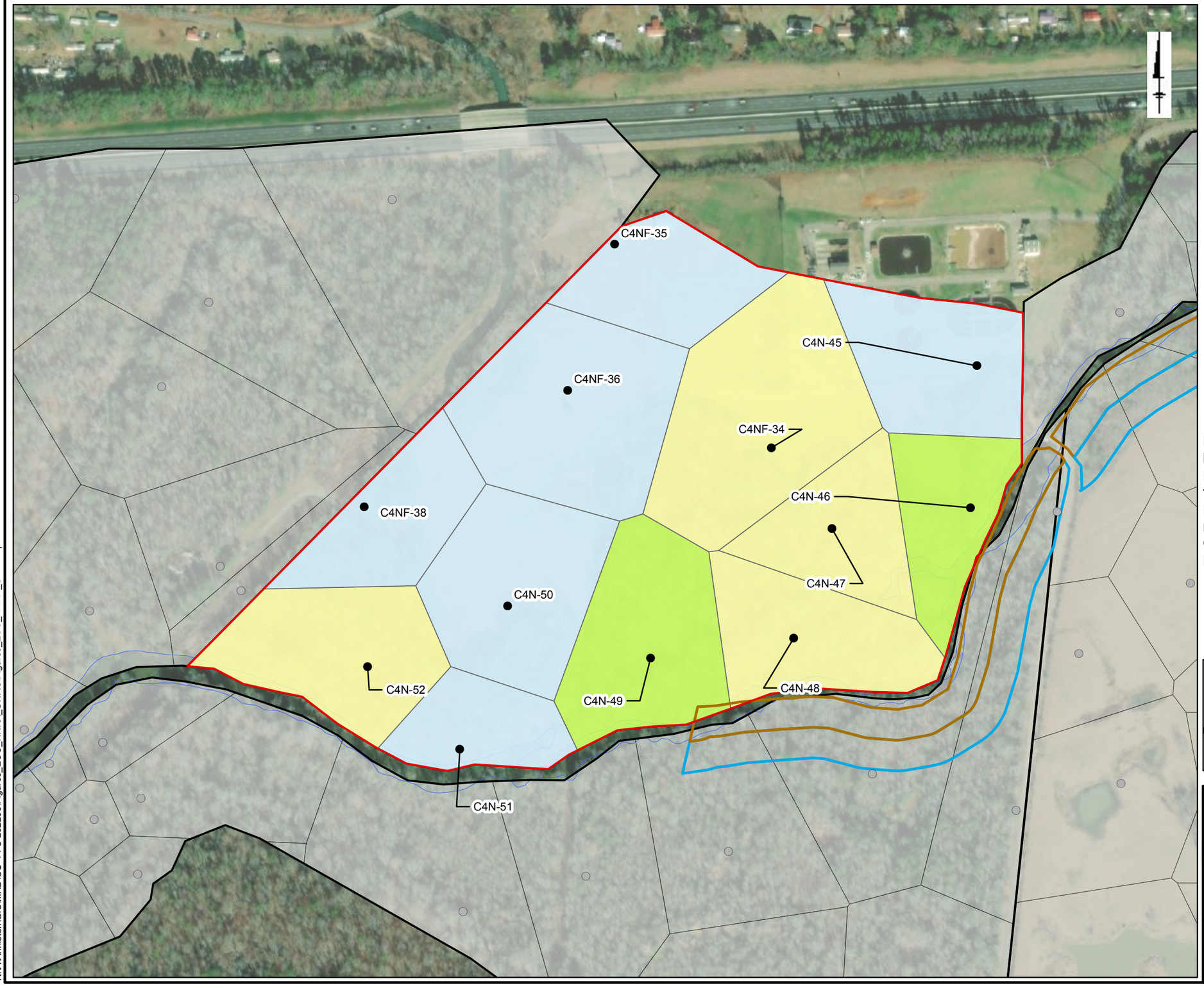
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C4S-EU3

Solutia

Figure 7-7j

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

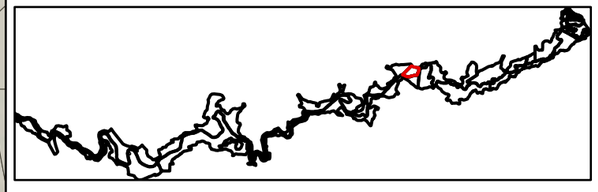
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 300 600
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

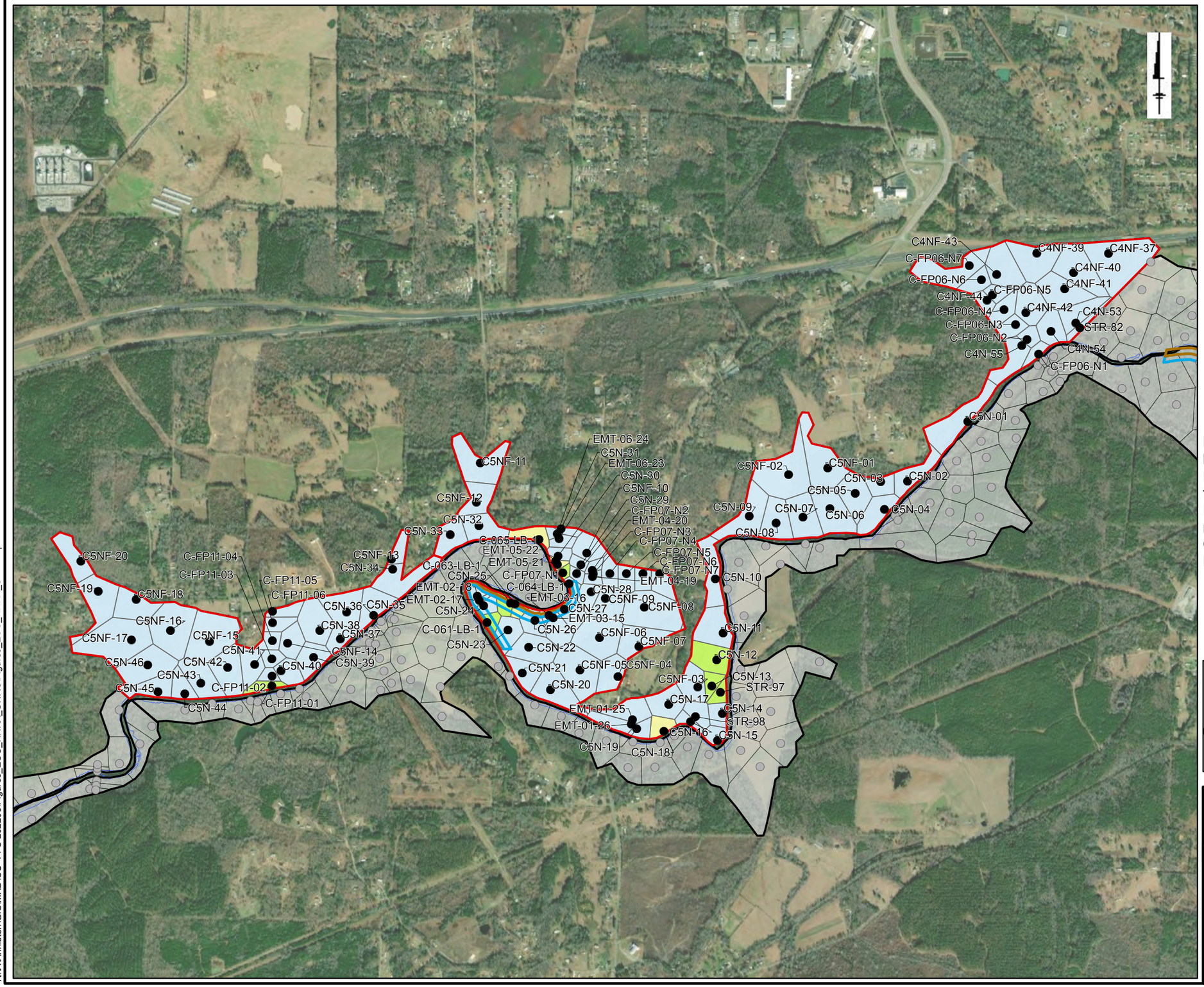
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C5N-EU1

Solutia

Figure 7-7k

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

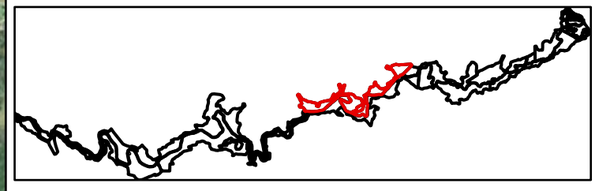
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

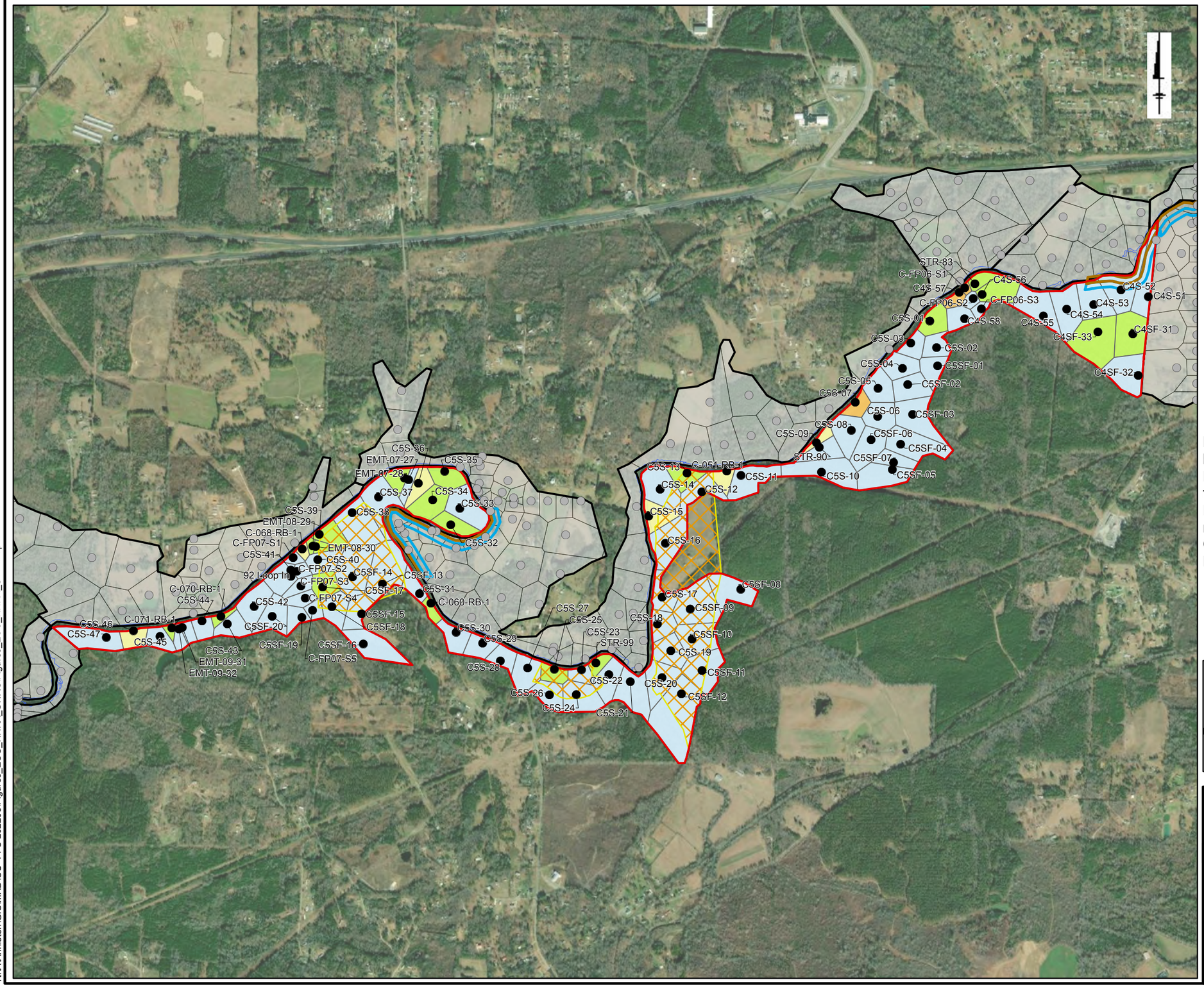
Feasibility Study Report for OU-4

Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C5N-EU2

Solutia

Figure 7-7l

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

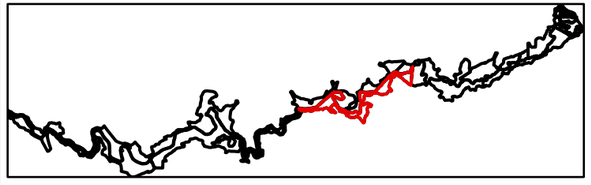
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

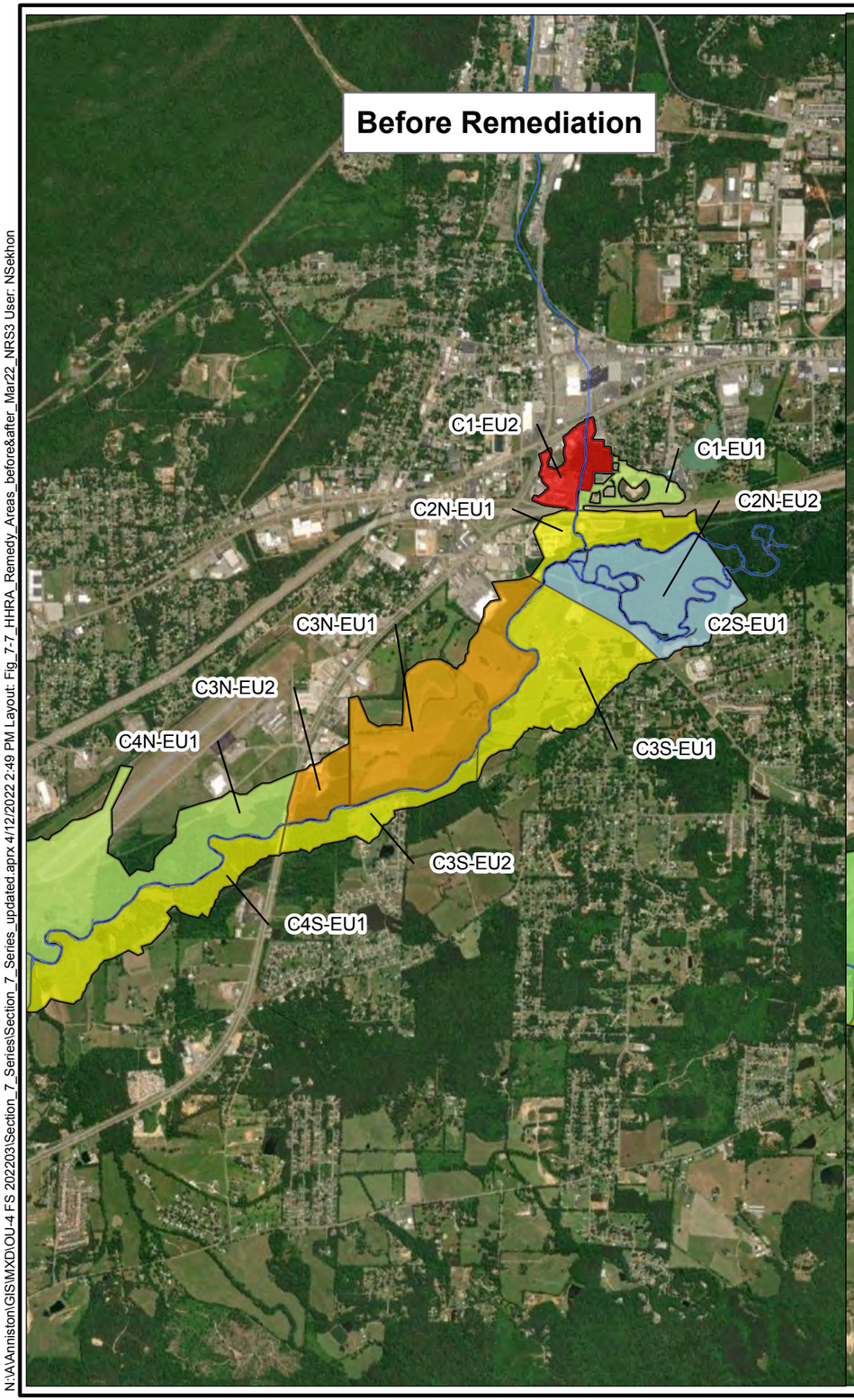
Remedial Footprint of NRS-2 for Human Health Exposure Conditions (0-1 ft bgs):C5S-EU1

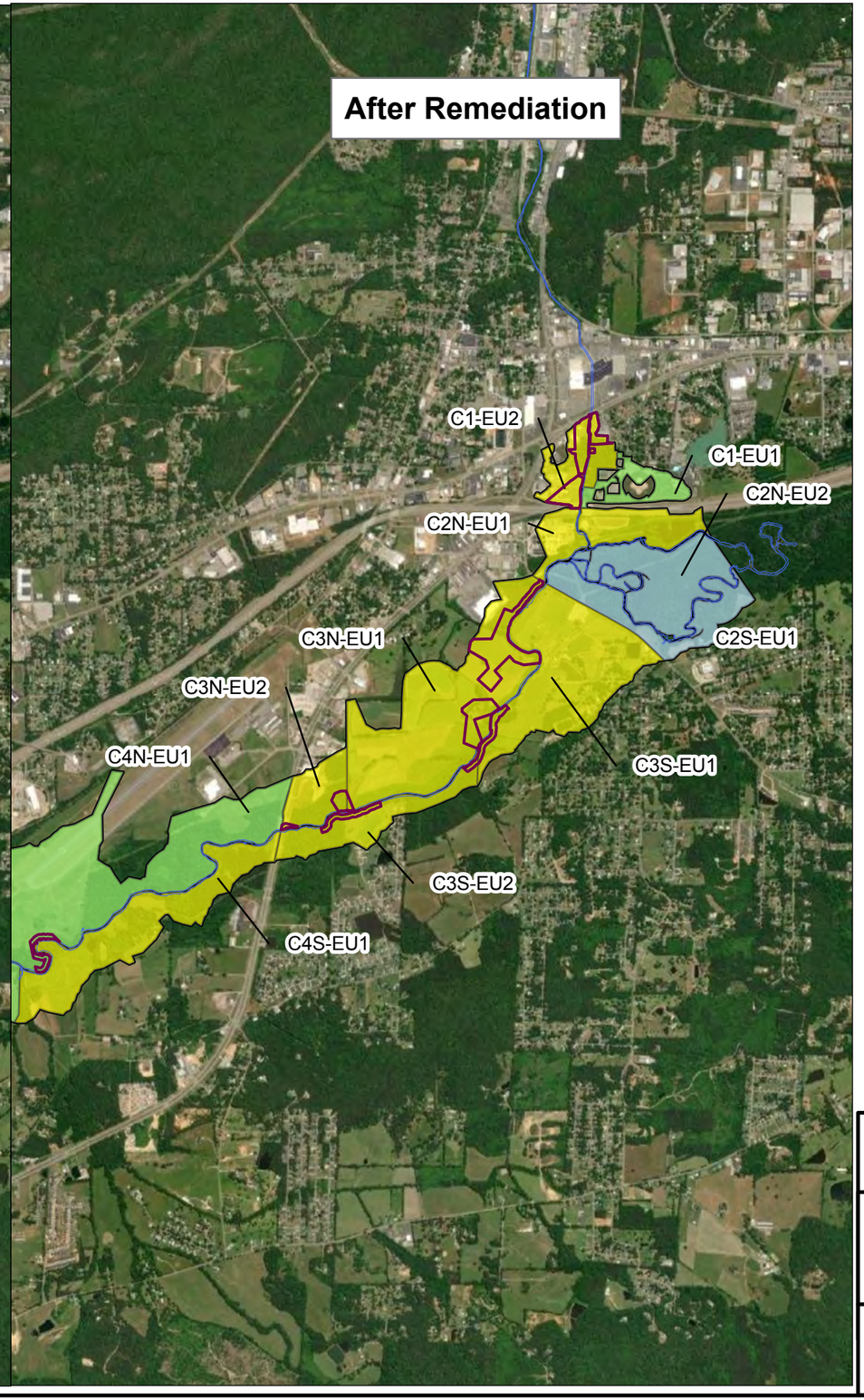
Solutia

Figure 7-7m

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated aprx 4/12/2022 2:49 PM Layout: Fig_7-7_HHRA_Remedy_Areas_before&after_Mar22_NRS3 User: NSekhon





Legend

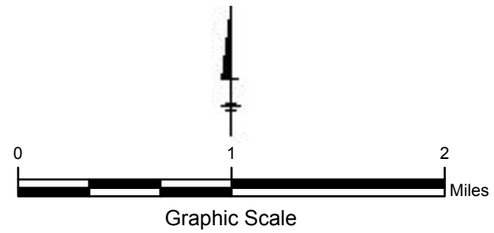
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Exposure Units
- Target Remediation Areas

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
1. Alternative NRS-3 includes the removal of soil from the 0-0.5-ft horizon to achieve a post-removal PCB SWAC of 6 mg/kg to reduce ecological risks, and removal of soil from the 0-1-ft horizon in C1-EU2 and C1-EU1 with PCB concentrations ≥ 50 mg/kg to streamline long-term soil management support.
2. The post-removal concentrations were developed based on an average PCB concentration for the 0–1-foot horizon. This average PCB concentration was calculated using existing PCB results for the 0.5–1-foot horizon that would not be removed and a site-specific PCB nondetect concentration to represent the clean backfill that would be placed in the upper 0.5-foot horizon following soil removal.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration



Graphic Scale

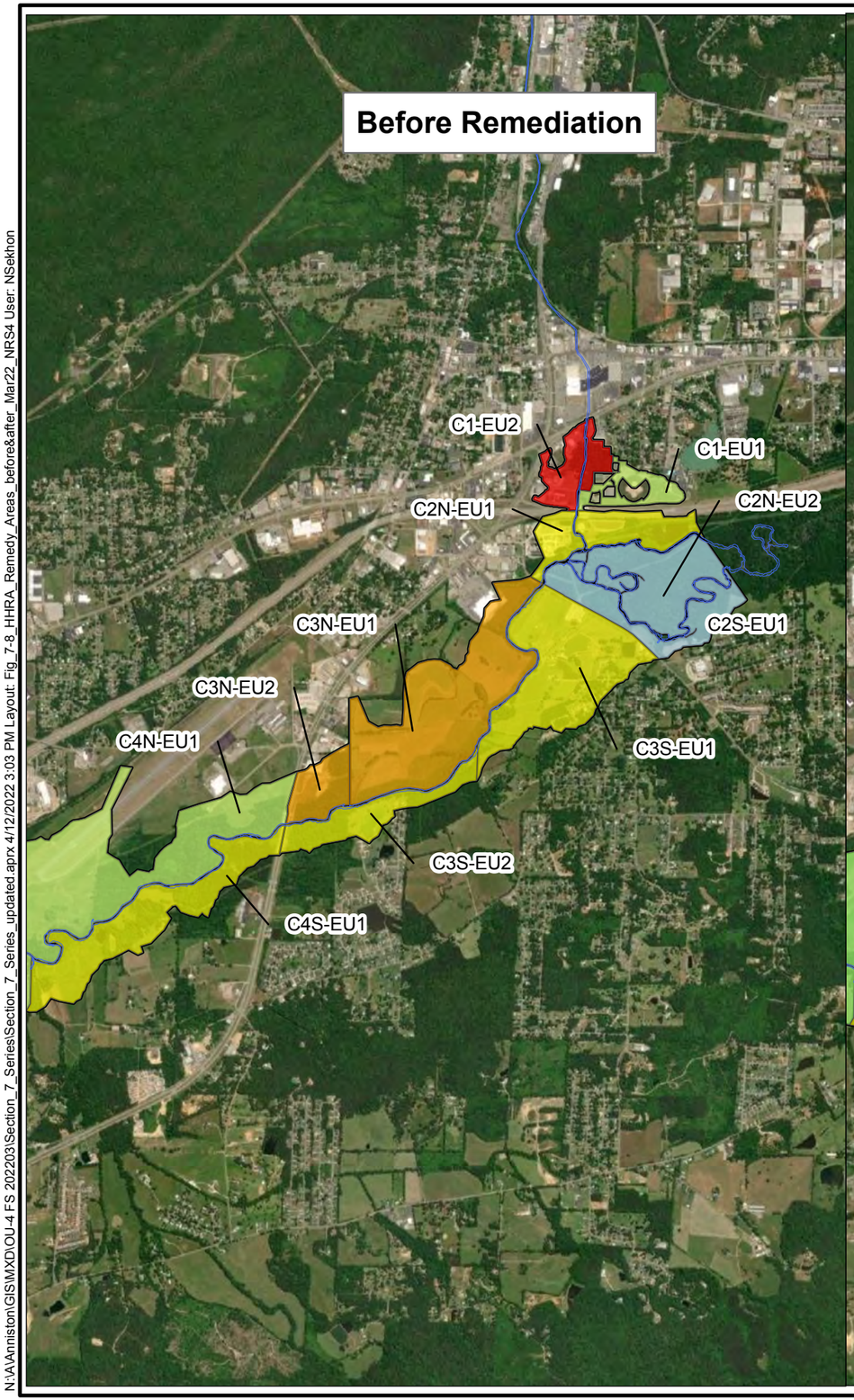
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

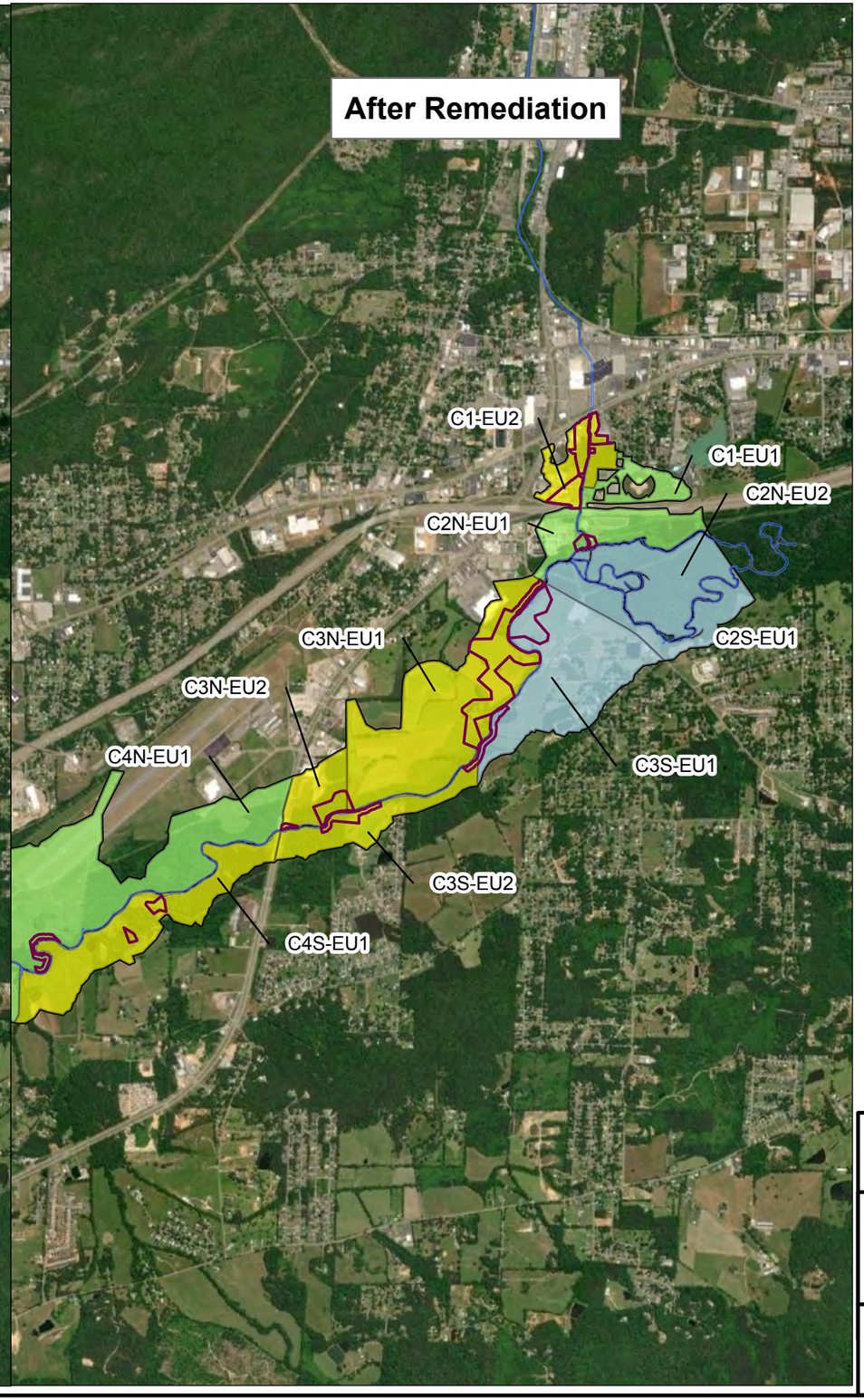
Mean SWAC PCB Concentrations in Nonresidential Floodplain Soil for Human Health EUs (0-1 ft bgs): NRS-3

Solutia

Figure 7-8

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated.aprx 4/12/2022 3:03 PM Layout: Fig_7-8_HHRA_Remedy_Areas_before&after_Mar22_NRS4 User: NSekhon





Legend

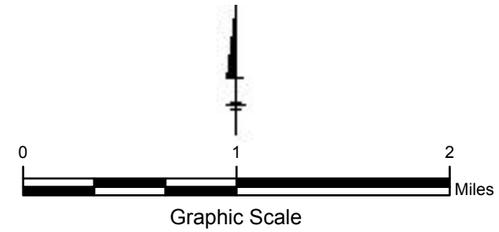
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Exposure Units
- Target Remediation Areas

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
1. Alternative NRS-4 includes the removal of soil from the 0-0.5-ft horizon to achieve a post-removal PCB SWAC of 6 mg/kg to reduce ecological risks, and removal of soil from the 0-1-ft horizon with PCB concentrations ≥ 50 mg/kg to streamline long-term soil management support.
2. The post-removal concentrations were developed based on an average PCB concentration for the 0–1-foot horizon. This average PCB concentration was calculated using existing PCB results for the 0.5–1-foot horizon that would not be removed and a site-specific PCB nondetect concentration to represent the clean backfill that would be placed in the upper 0.5-foot horizon following soil removal.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration



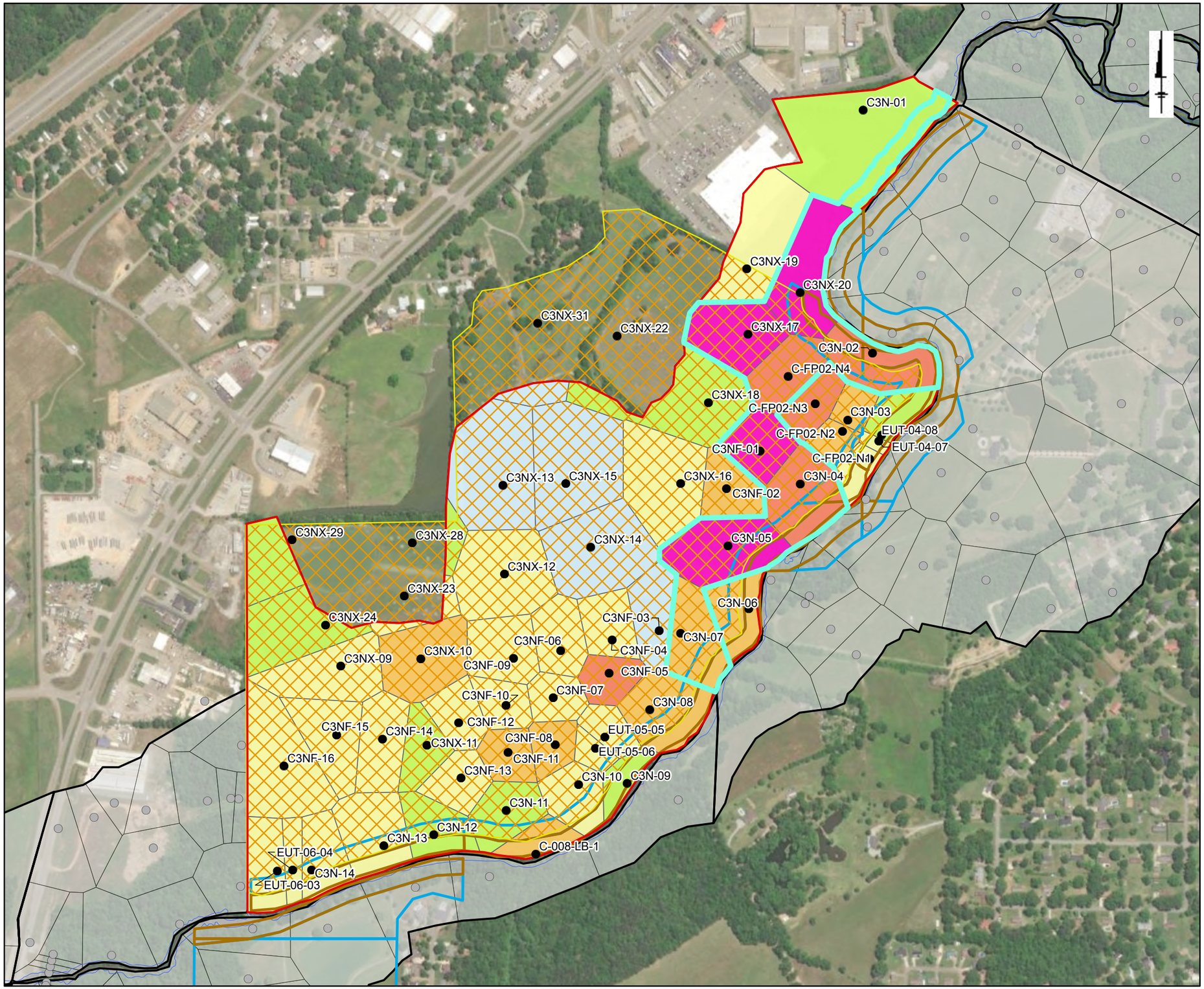
Graphic Scale

Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Mean SWAC PCB Concentrations in Nonresidential Floodplain Soil for Human Health EUs (0-1 ft bgs): NRS-4

Solutia

Figure 7-9a



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

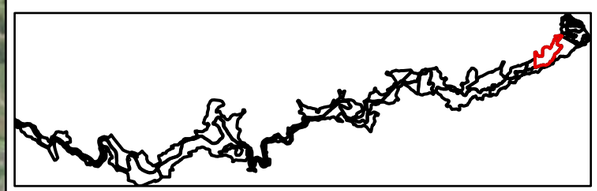
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C3N-EU1

Solutia

Figure 7-9b

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM

C3NX-25
C3NX-08
C3NF-17
C3NX-07
EUT-07-01
C3NF-18
EUT-07-02
C3NF-19
C3NF-20
C3N-16
C3N-15
C3N-17
C3N-19
FP-3-g
FP-3-f
C3N-18
FP-3-e
FP-3-d

Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 250 500
Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

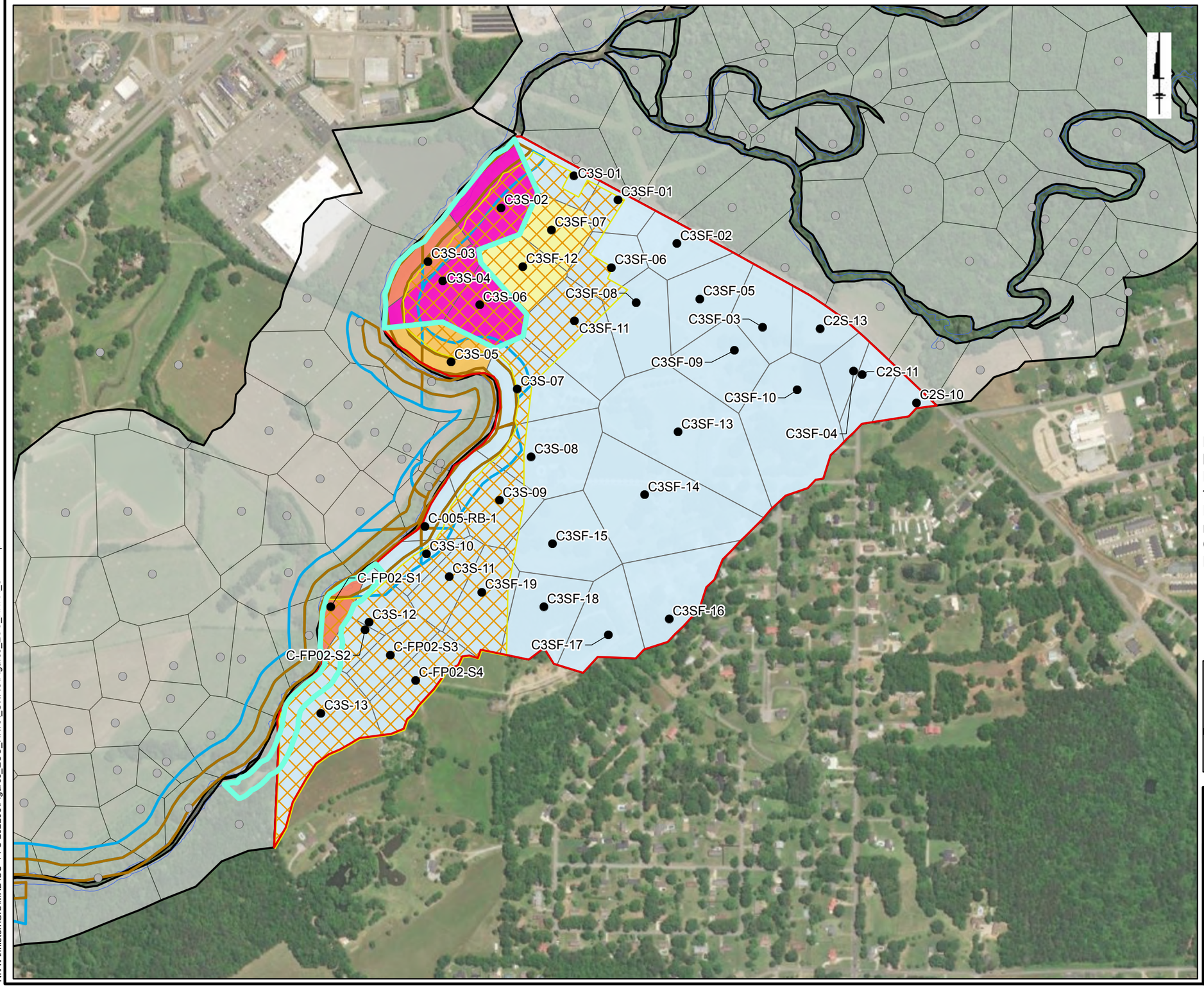
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C3N-EU2

Solutia

Figure 7-9c

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

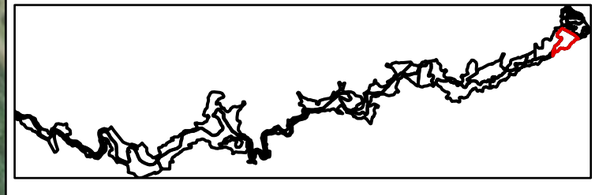
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

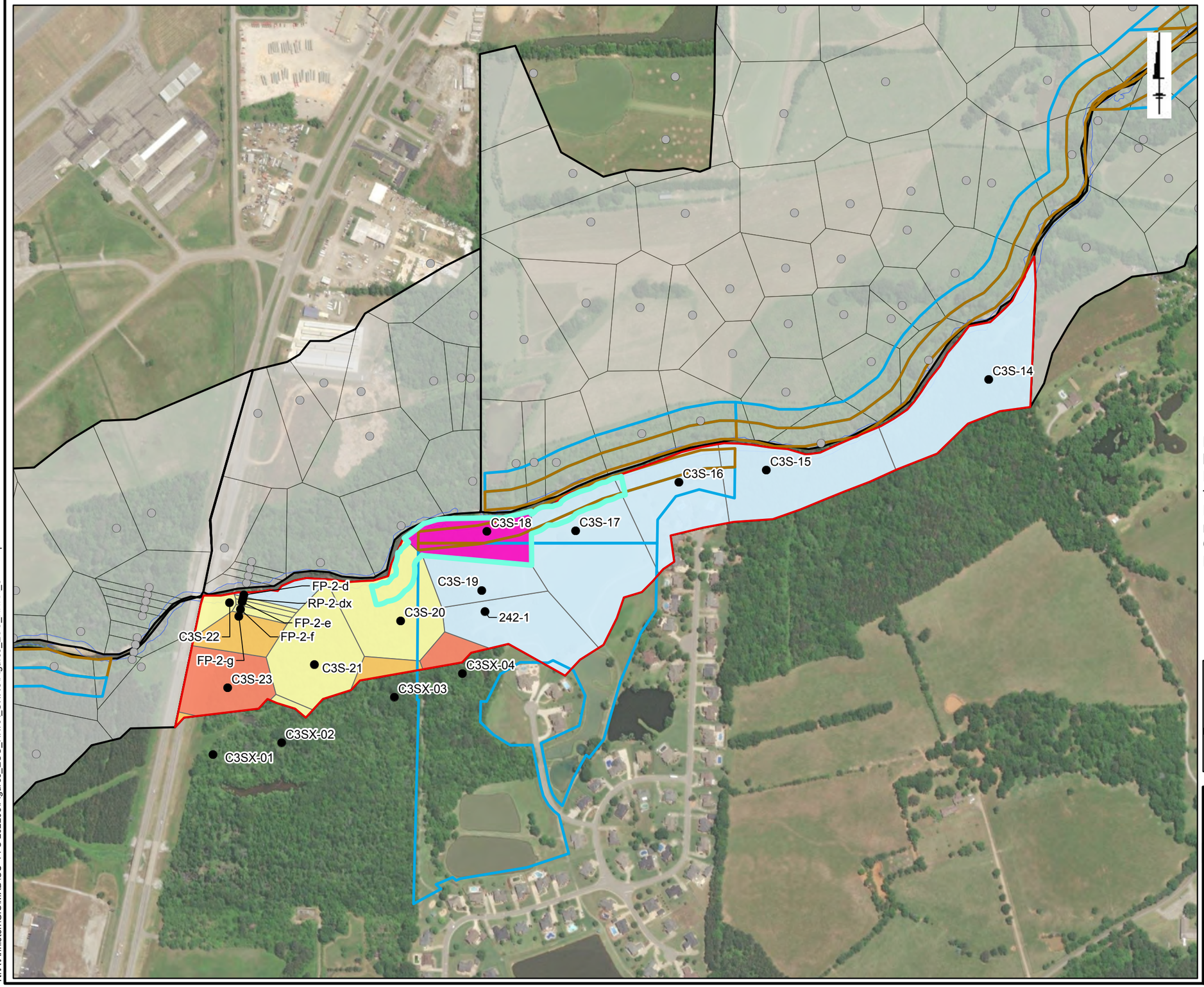
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C3S-EU1

Solutia

Figure 7-9d

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

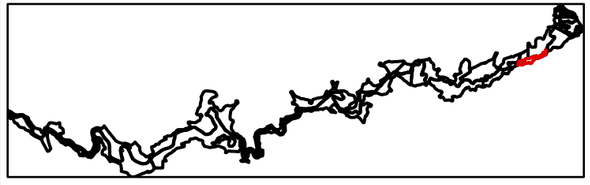
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

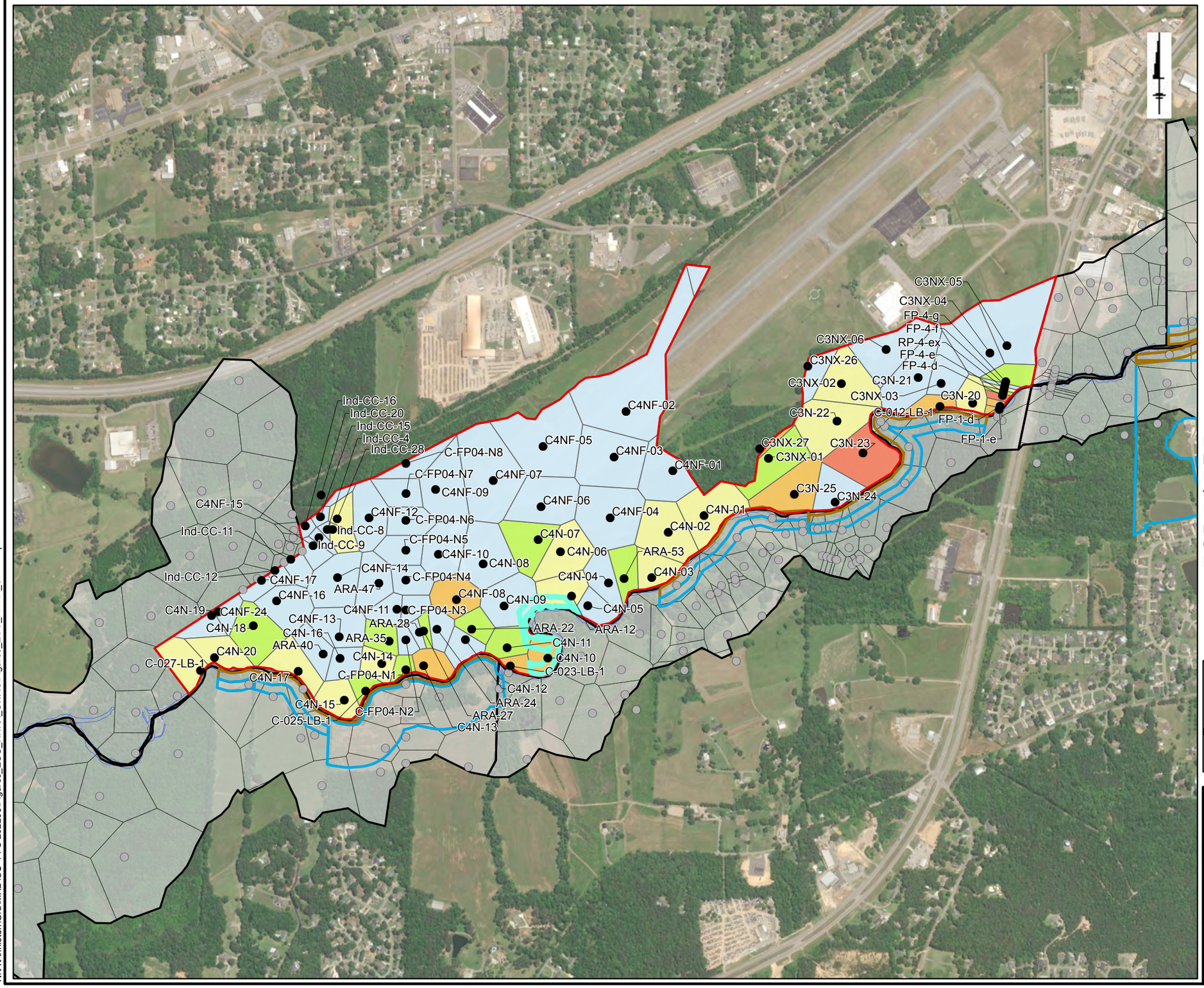
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C3S-EU2

Solutia

Figure 7-9e

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

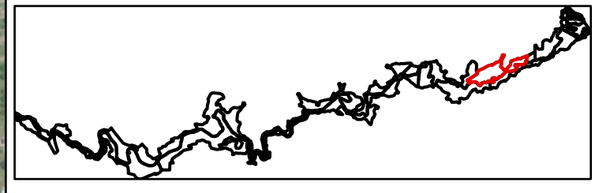
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

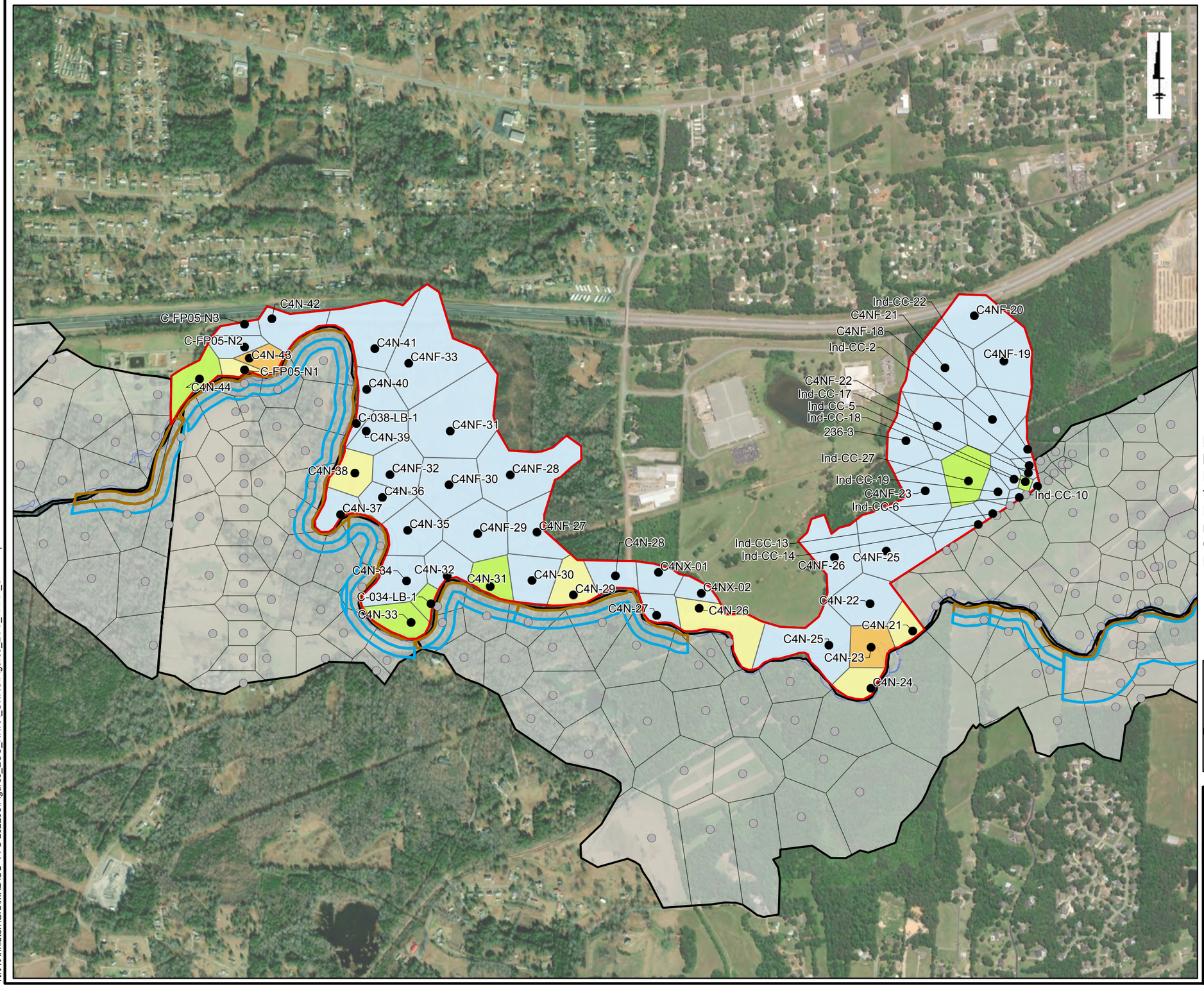
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C4N-EU1

Solutia

Figure 7-9f

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

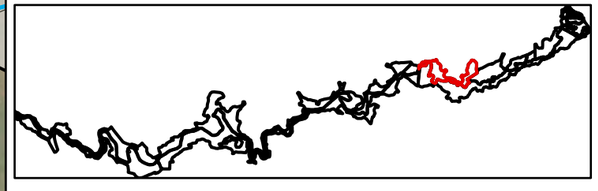
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

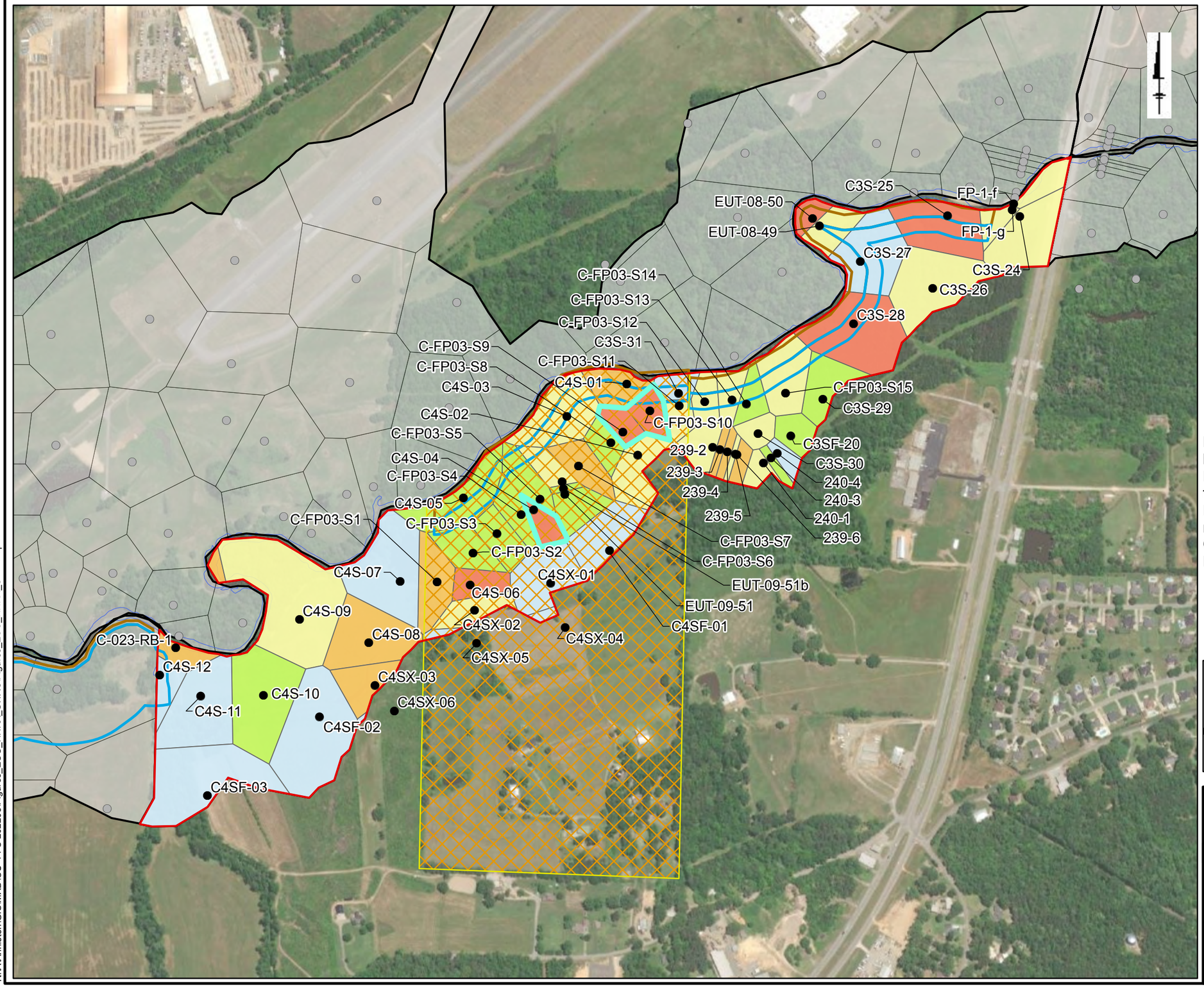
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C4N-EU2

Solutia

Figure 7-9g

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

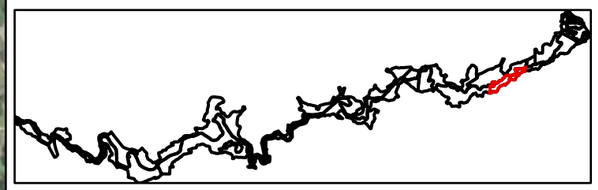
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

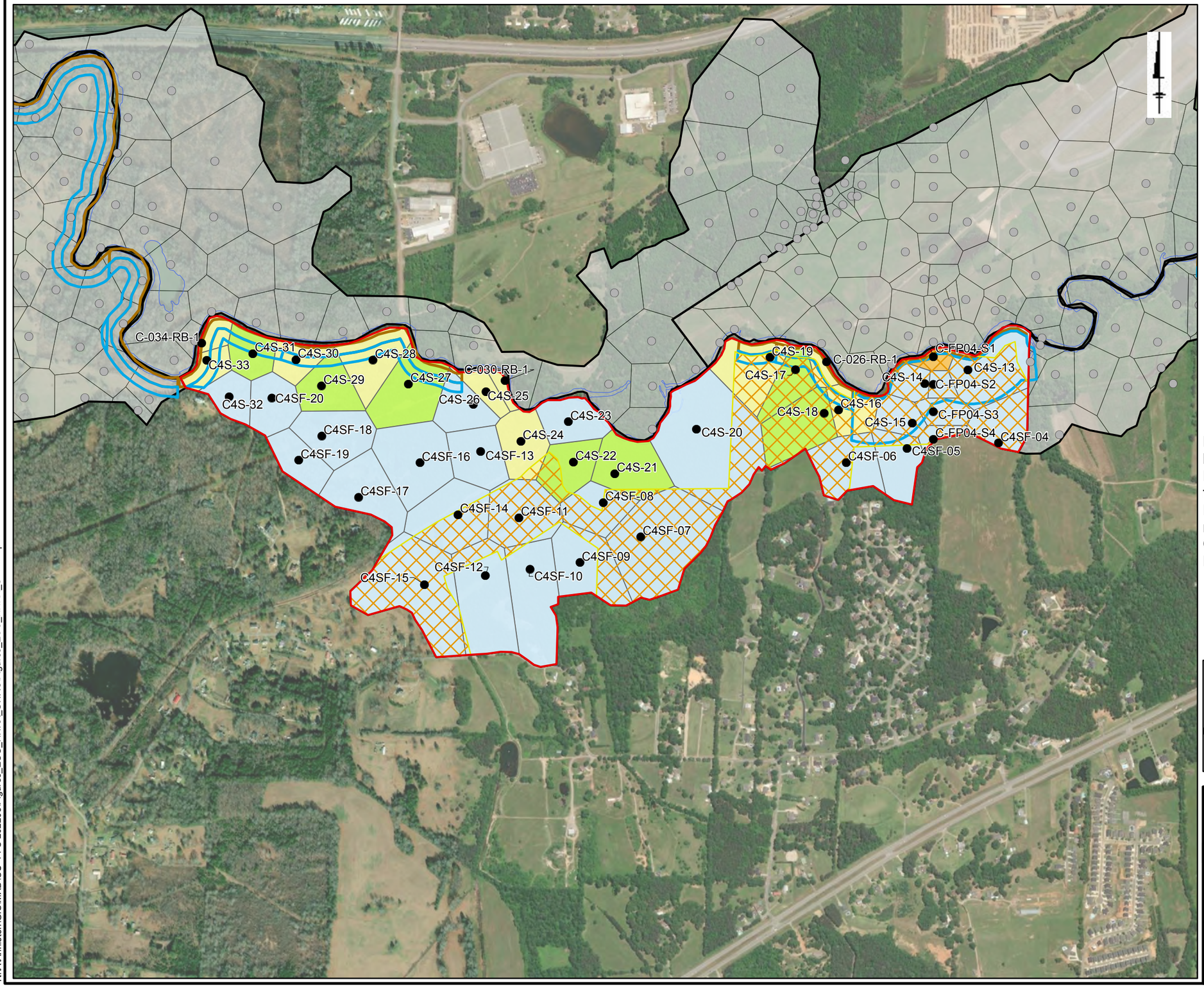
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C4S-EU1

Solutia

Figure 7-9h

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

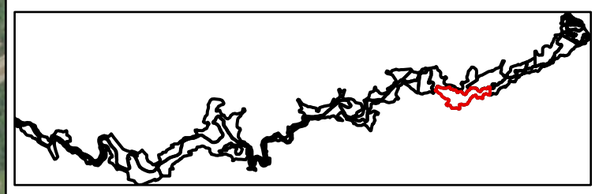
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

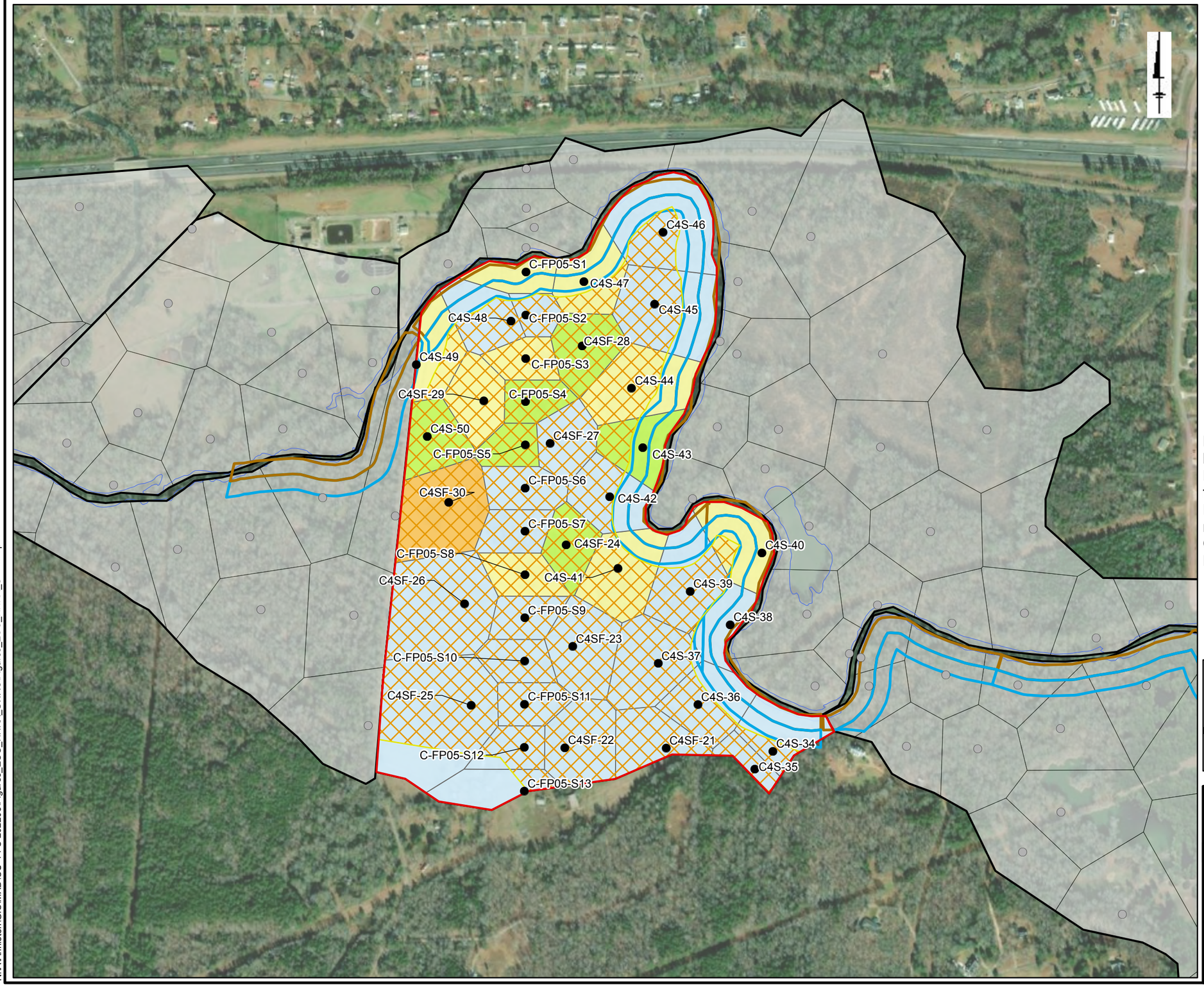
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C4S-EU2

Solutia

Figure 7-9i

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

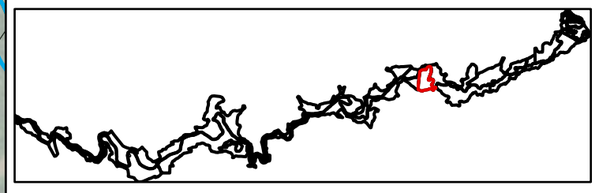
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

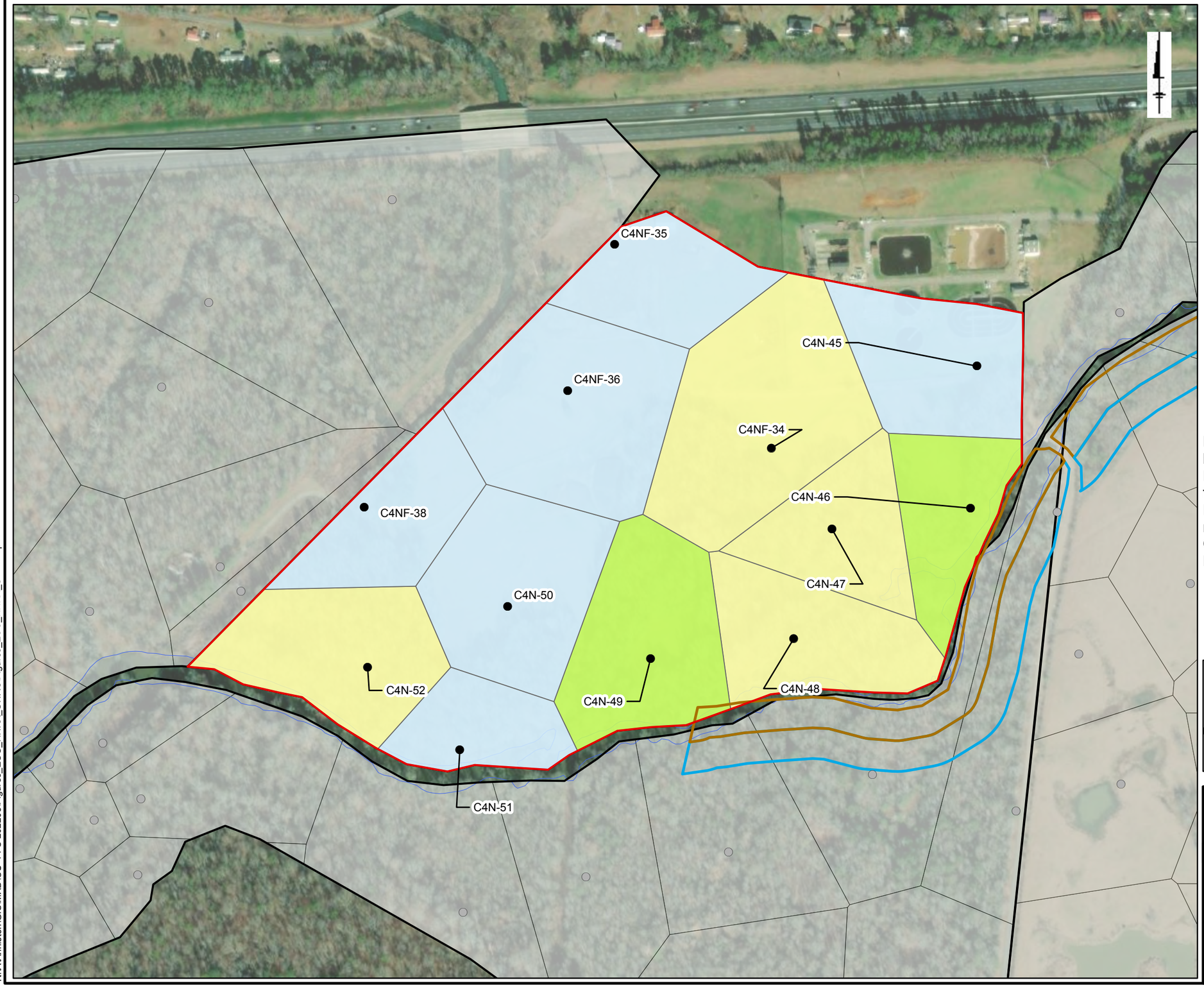
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C4S-EU3

Solutia

Figure 7-9j

N:\AlAnniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

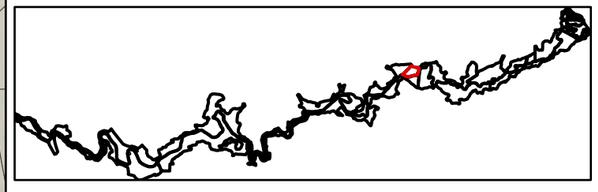
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 300 600
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

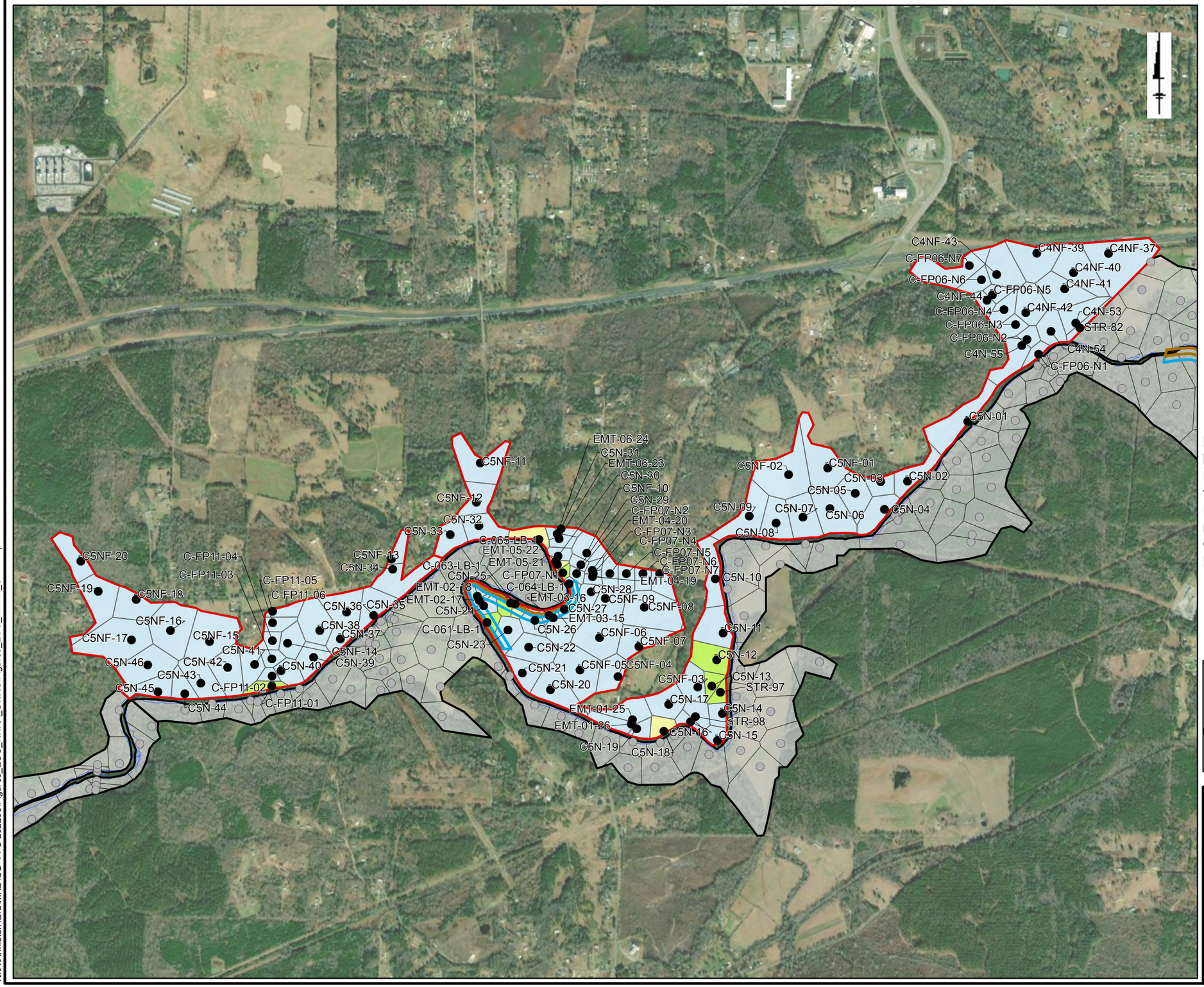
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C5N-EU1

Solutia

Figure 7-9k

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

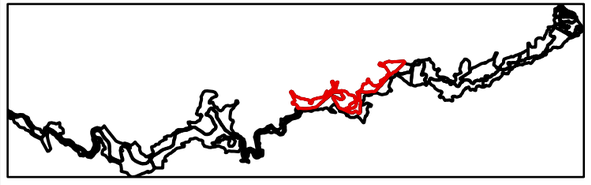
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

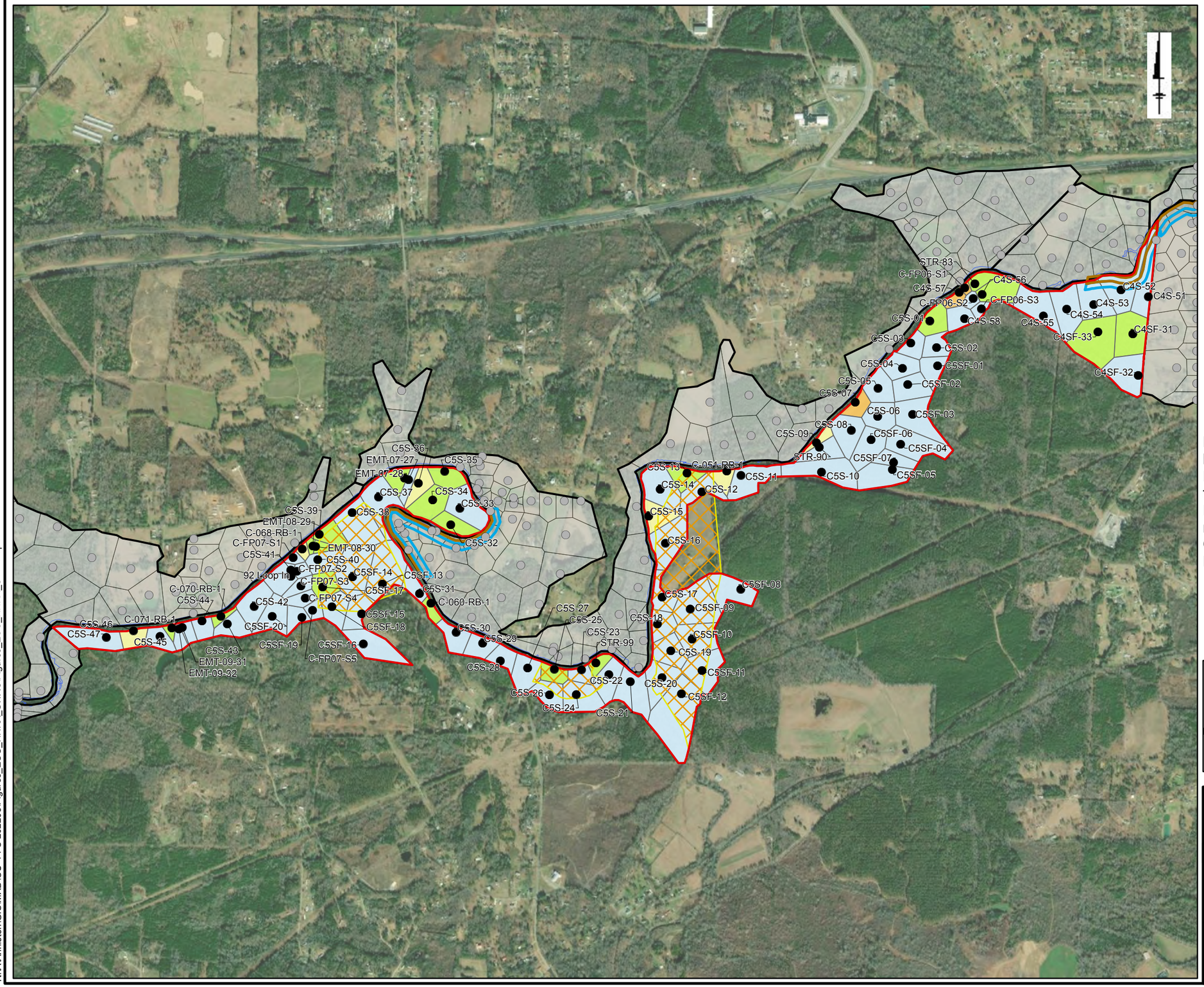
Feasibility Study Report for OU-4

Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C5N-EU2

Solutia

Figure 7-9l

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

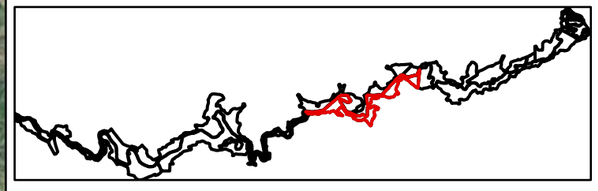
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

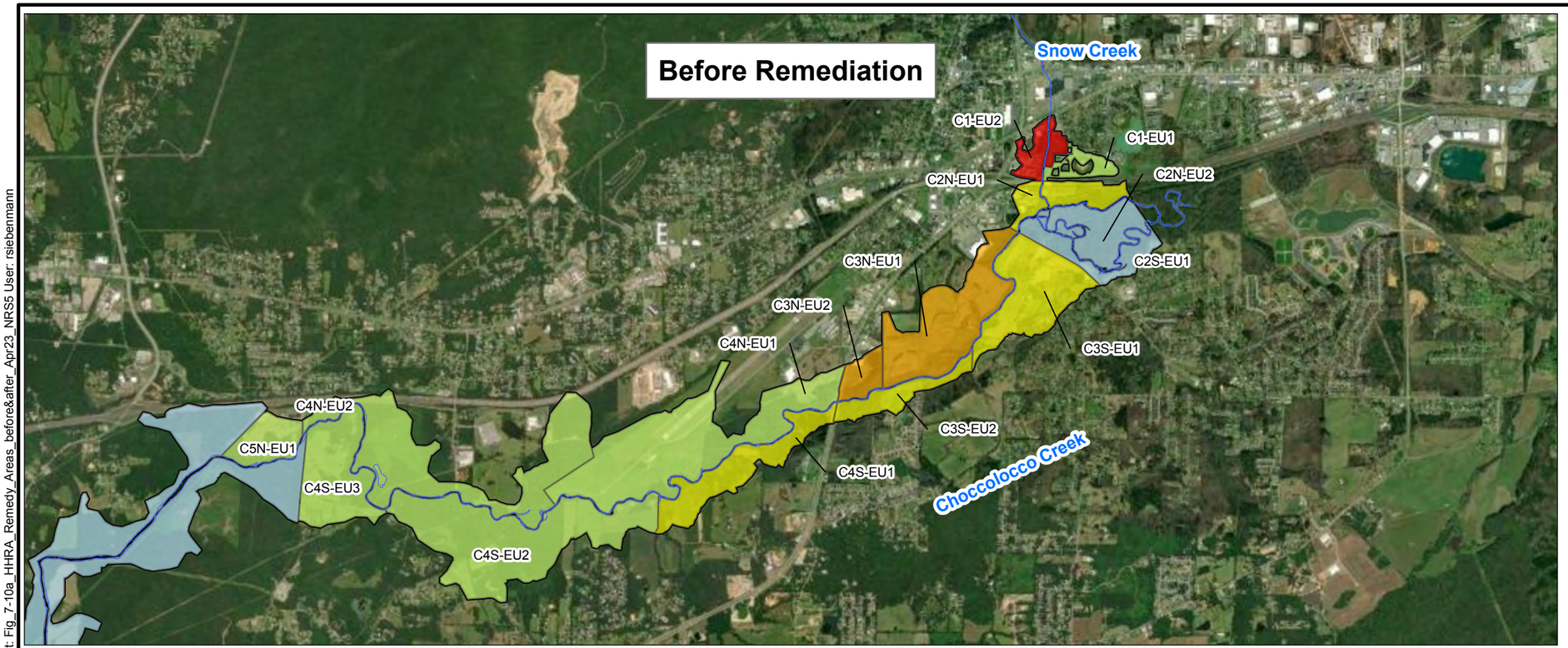
Feasibility Study Report for OU-4

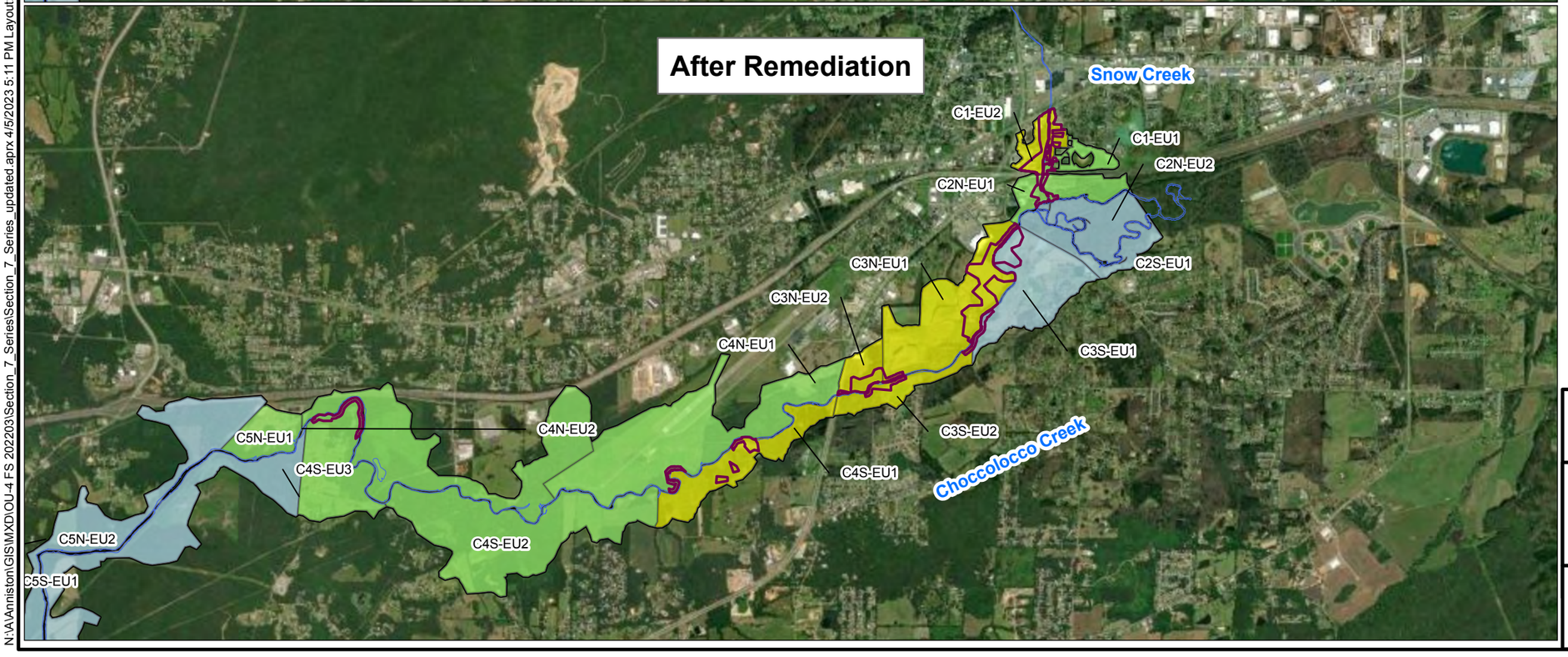
Remedial Footprint of NRS-4 for Human Health Exposure Conditions (0-1 ft bgs):C5S-EU1

Solutia

Figure 7-9m

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/12/2022 5:03 PM





Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Exposure Units
- Target Remediation Areas

Mean SWAC PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
1. Alternative NRS-5 includes the removal of soil from the 0–0.5-foot horizon to achieve a post-removal PCB SWAC of 6 mg/kg to reduce ecological risks and removal of soil from the 0–4-foot horizon with PCB concentrations ≥ 50 mg/kg to streamline long-term soil management support.
2. The post-removal concentrations were developed based on an average PCB concentration for the 0–1-foot horizon. This average PCB concentration was calculated using existing PCB results for the 0.5–1-foot horizon that would not be removed and a site-specific PCB nondetect concentration to represent the clean backfill that would be placed in the upper 0.5-foot horizon following soil removal.

bgs: below ground surface
EPC: exposure point concentration
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
SWAC: surface-weighted average concentration

0 1 2 Miles

Graphic Scale

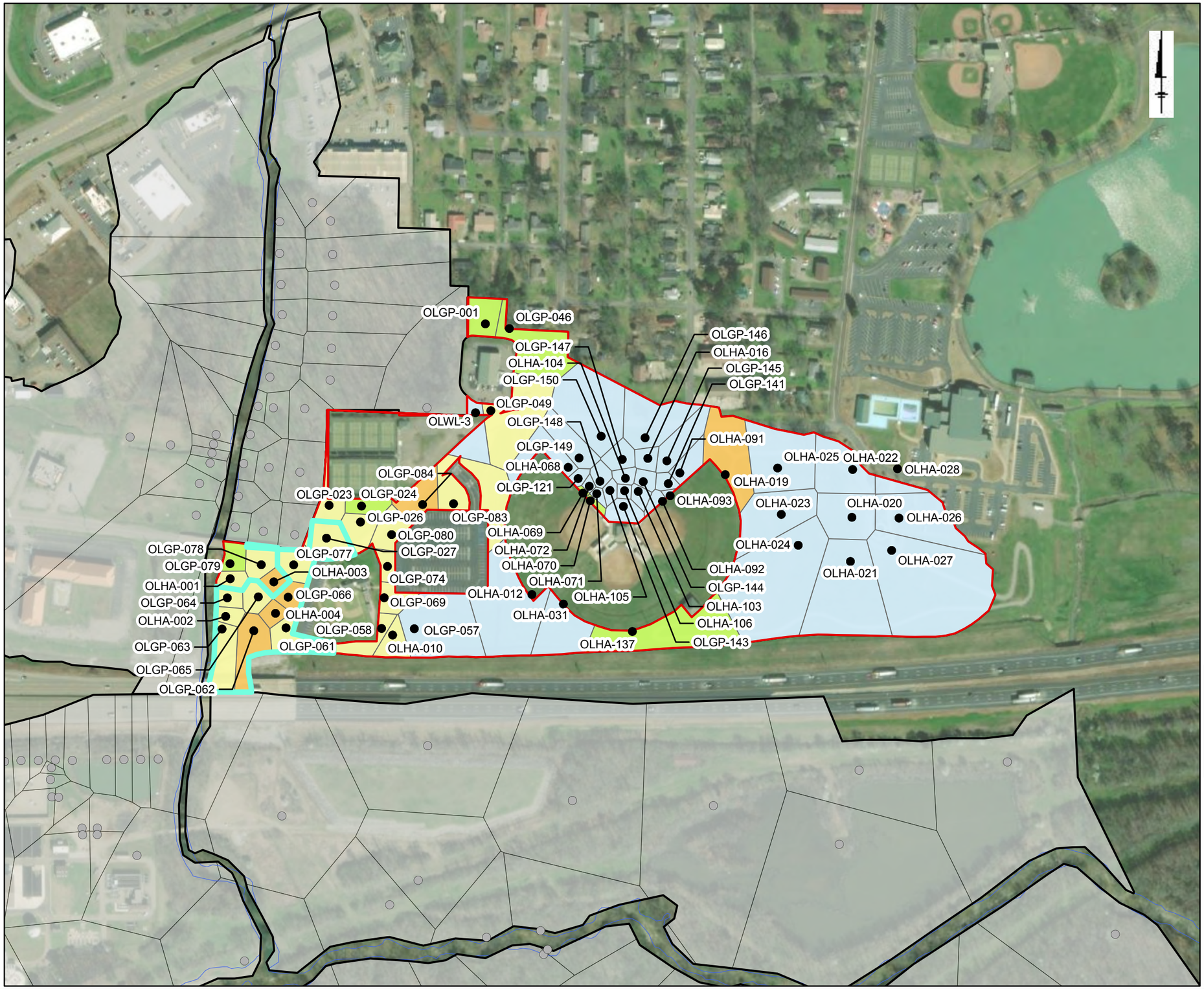
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Mean SWAC PCB Concentrations in Nonresidential Floodplain Soil for Human Health EUs (0–1 ft bgs): NRS-5

Solutia

Figure 7-10a

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Section_7_Series\Section_7_Series_updated.aprx 4/5/2023 5:11 PM Layout: Fig_7-10a_HHRA_Remedy_Areas_before&after_Apr23_NRS5 User: rsiebenmann



Legend

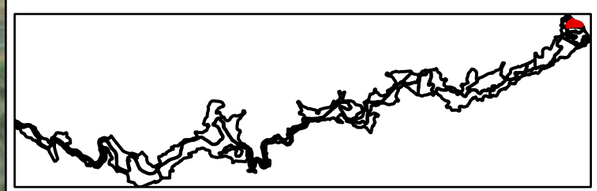
- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 300 600
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

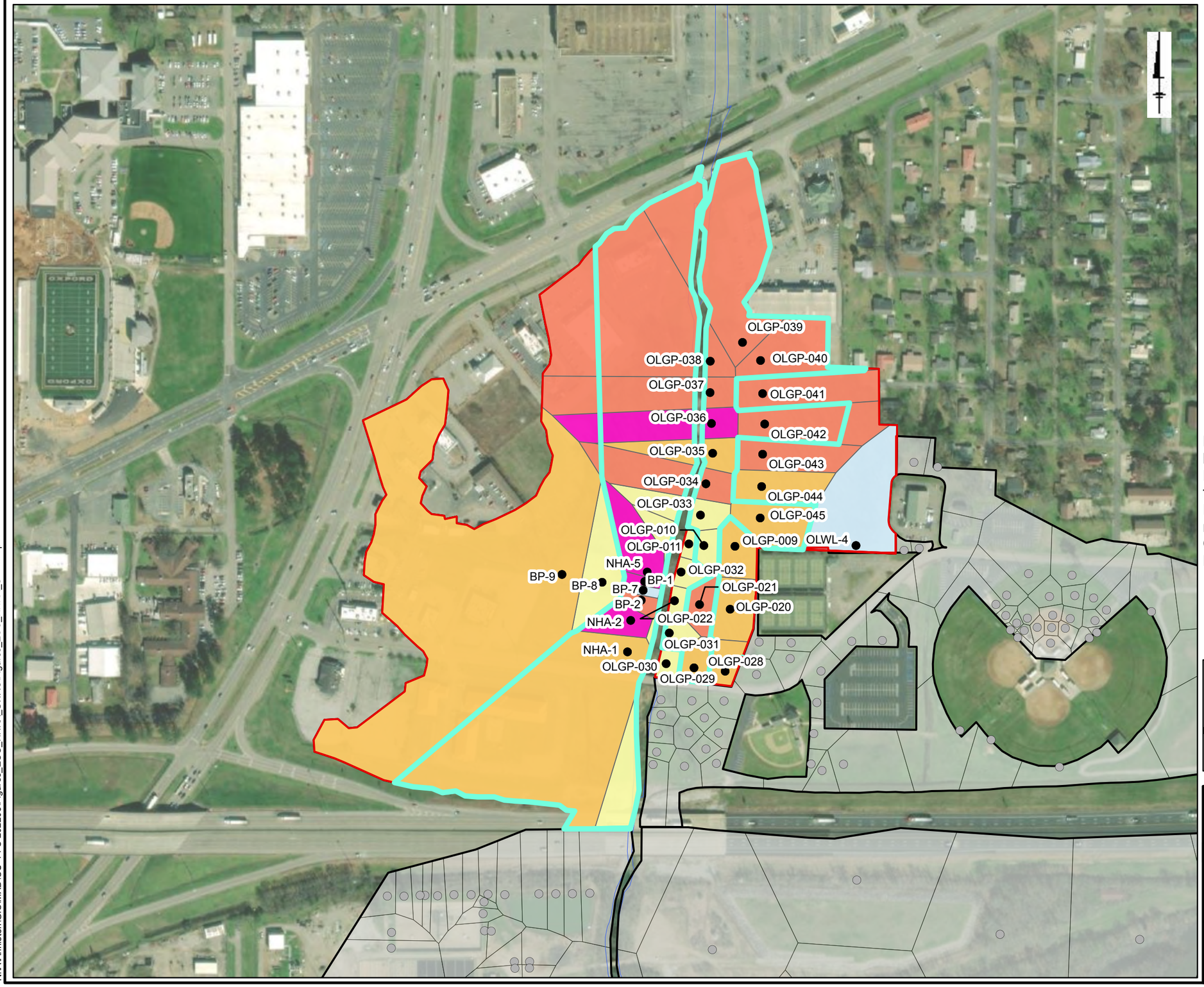
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C1-EU1

Solutia

Figure 7-10b

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

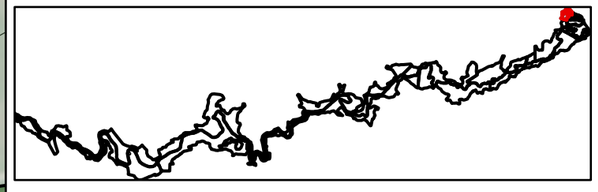
- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 300 600
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

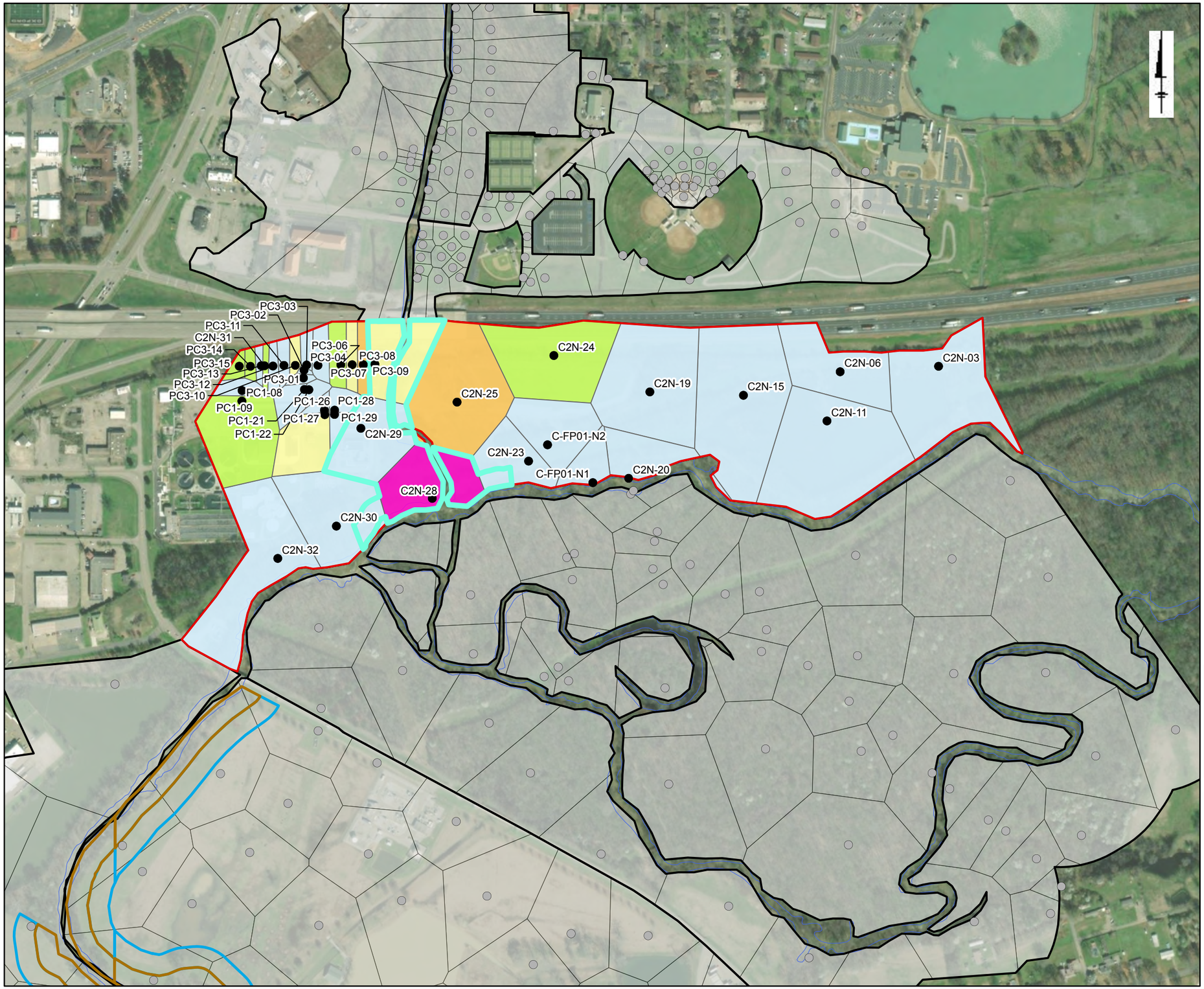
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C1-EU2

Solutia

Figure 7-10c

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

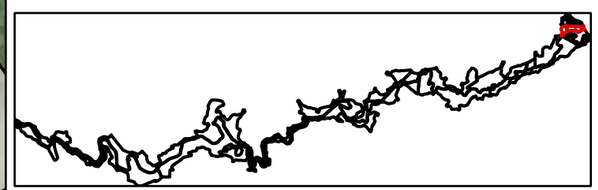
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 450 900
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

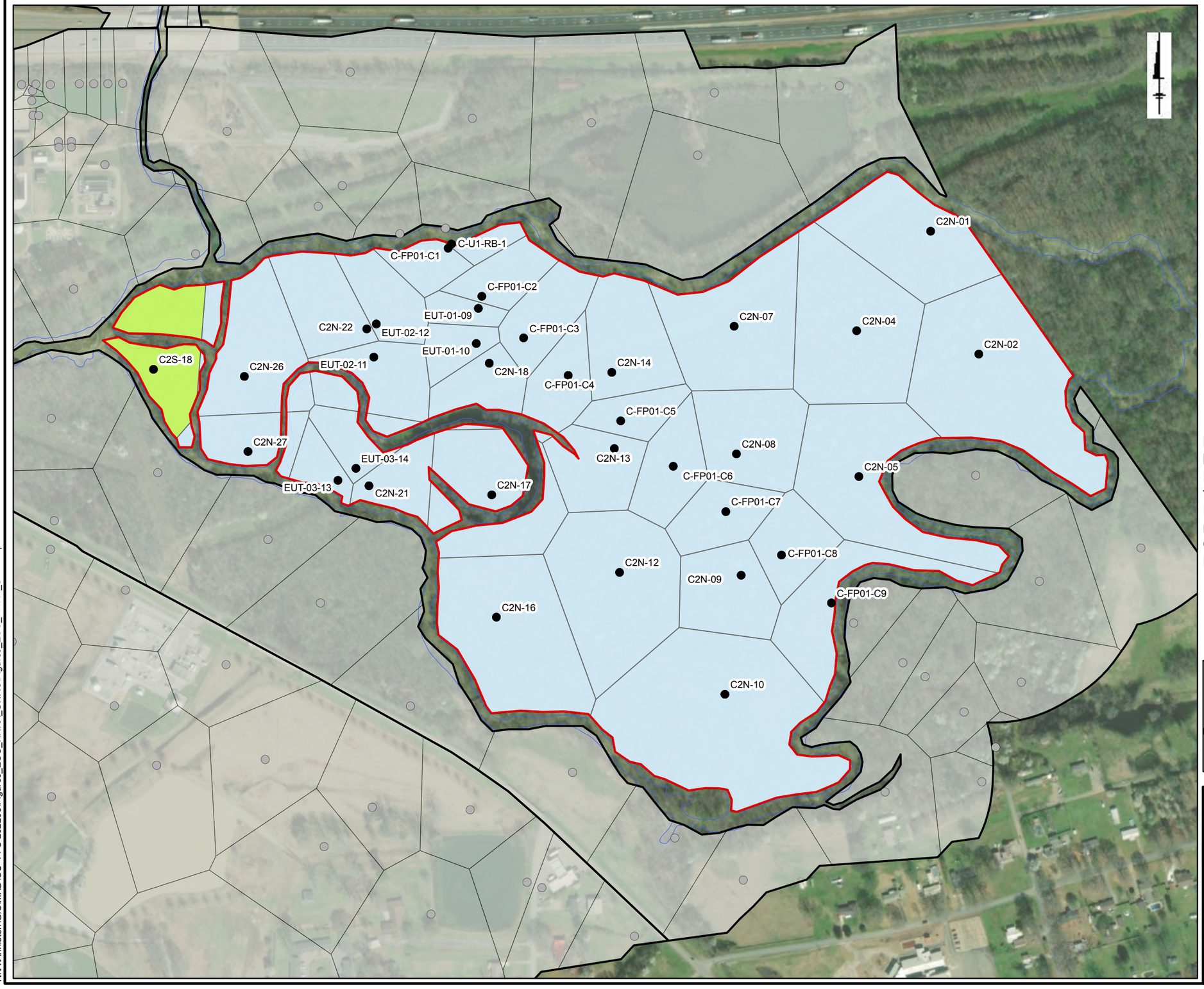
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C2N-EU1

Solutia

Figure 7-10d

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

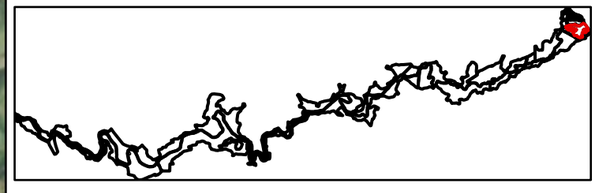
- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

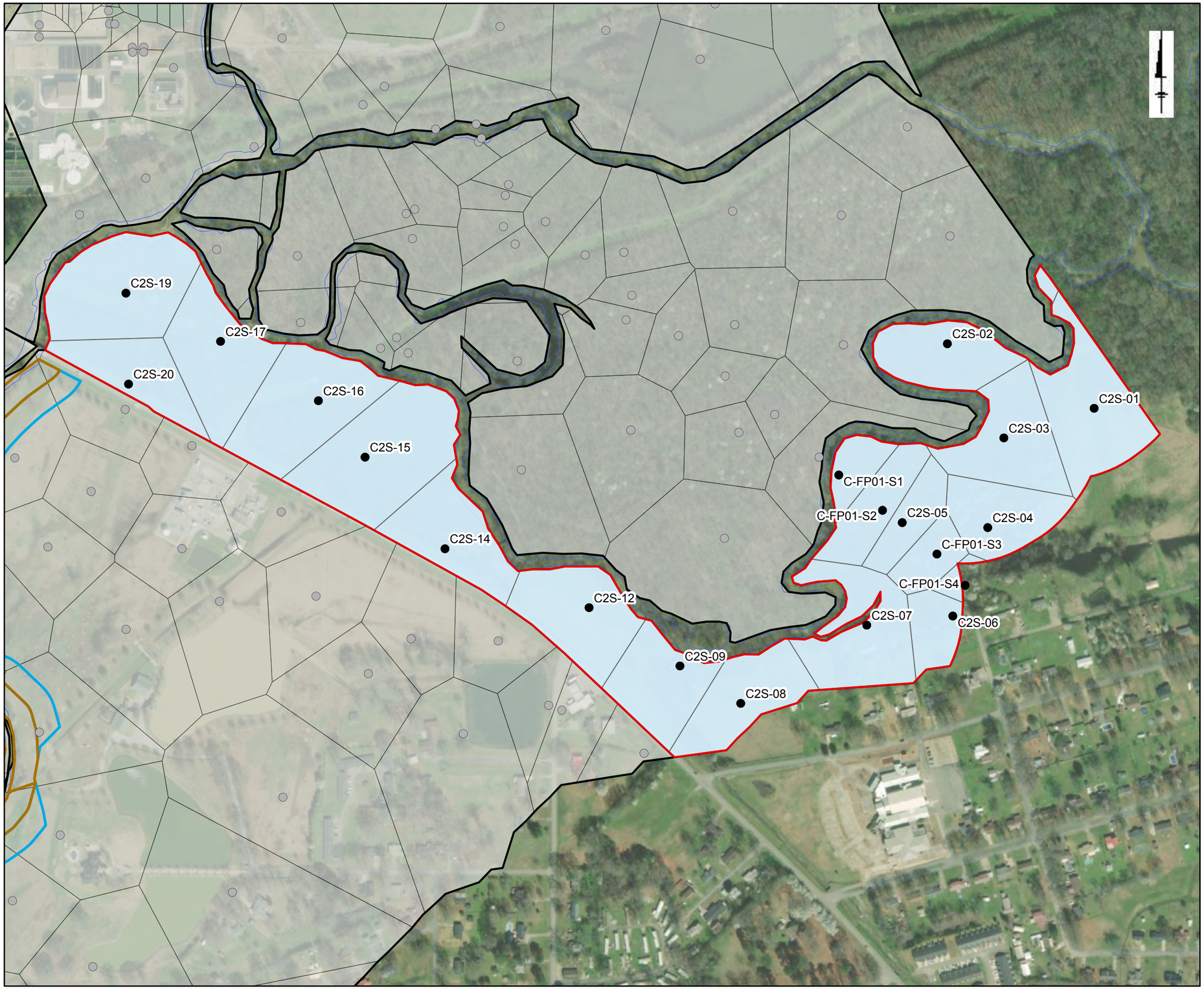
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C2N-EU2

Solutia

Figure 7-10e

N:\AV\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

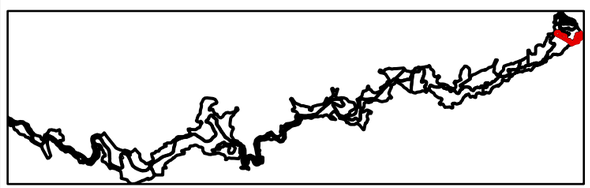
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 400 800
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

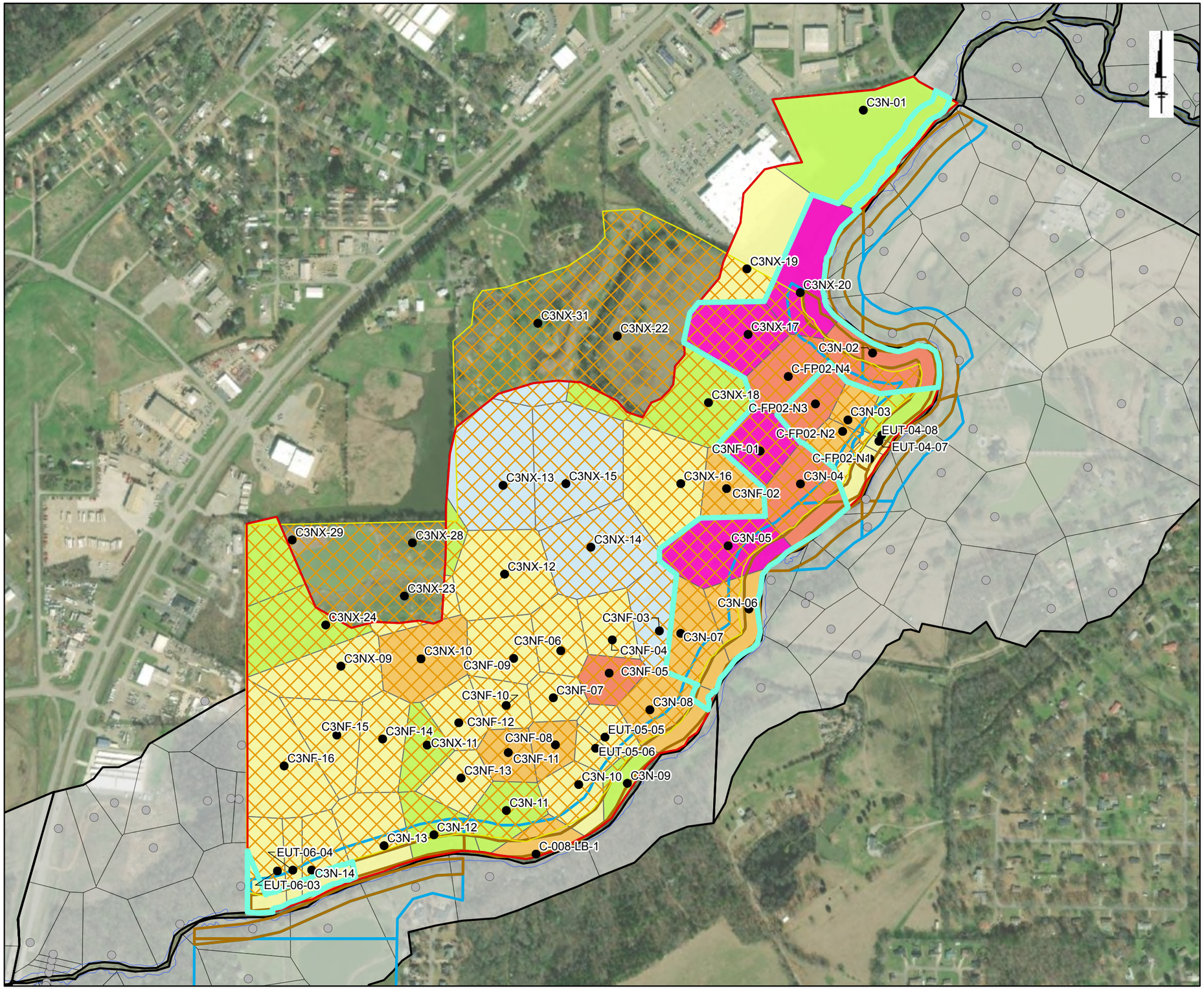
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C2S-EU1

Solutia

Figure 7-10f

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

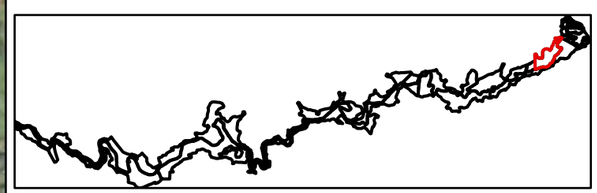
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C3N-EU1

Solutia

Figure 7-10g

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM

C3NX-25
C3NX-08
C3NX-07
C3NF-17
EUT-07-01
C3NF-18
EUT-07-02
C3NF-19
C3NF-20
C3N-16
C3N-15
C3N-17
C3N-19
FP-3-g
FP-3-f
C3N-18
FP-3-e
FP-3-d

Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 250 500
Feet
Graphic Scale

Anniston PCB Site, Anniston, Alabama

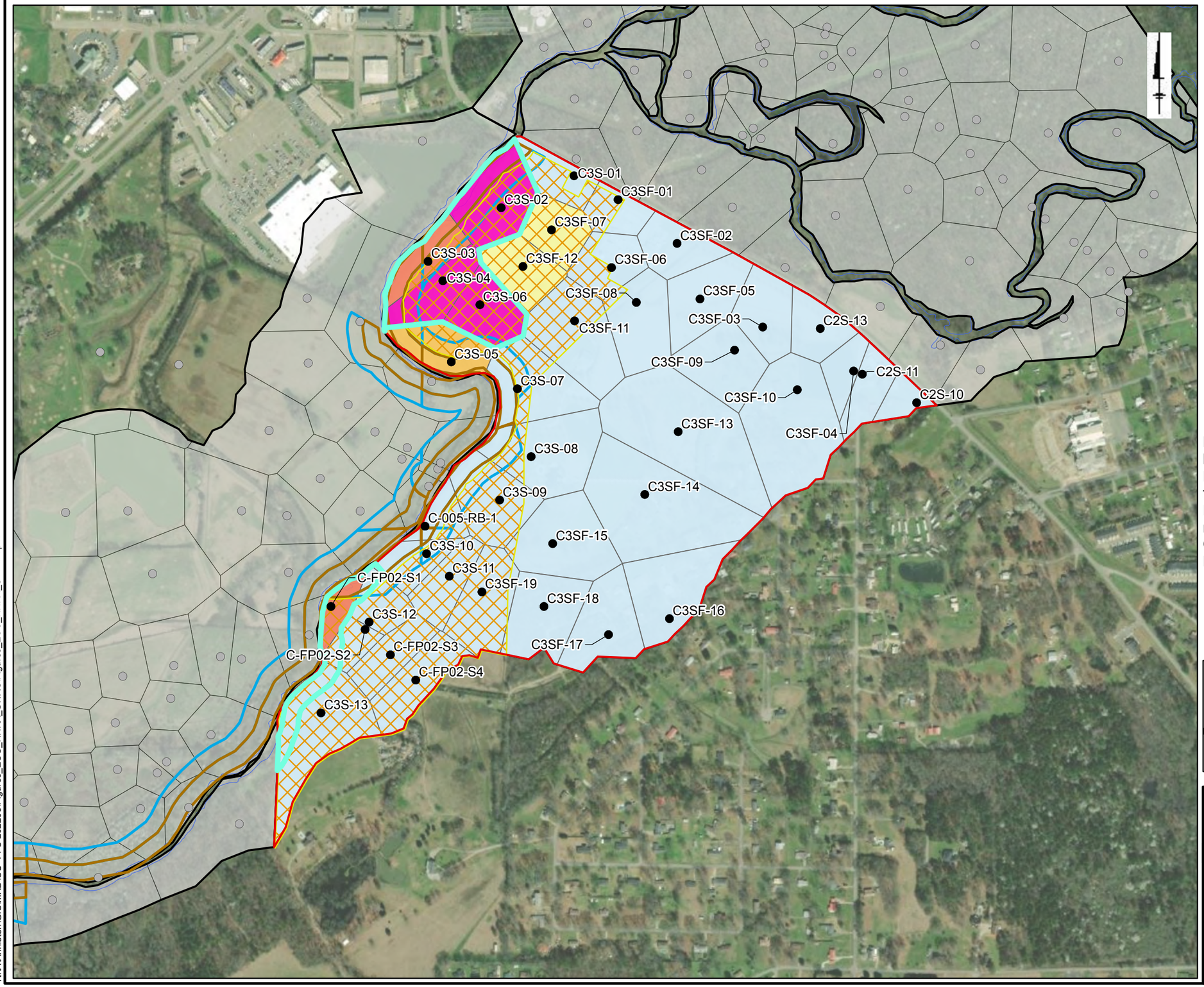
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C3N-EU2

Solutia

Figure 7-10h

N:\AA Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

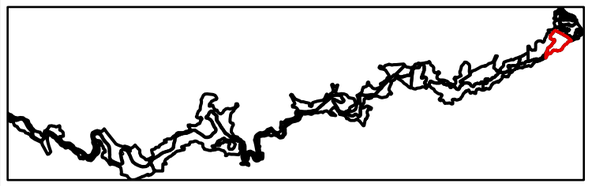
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

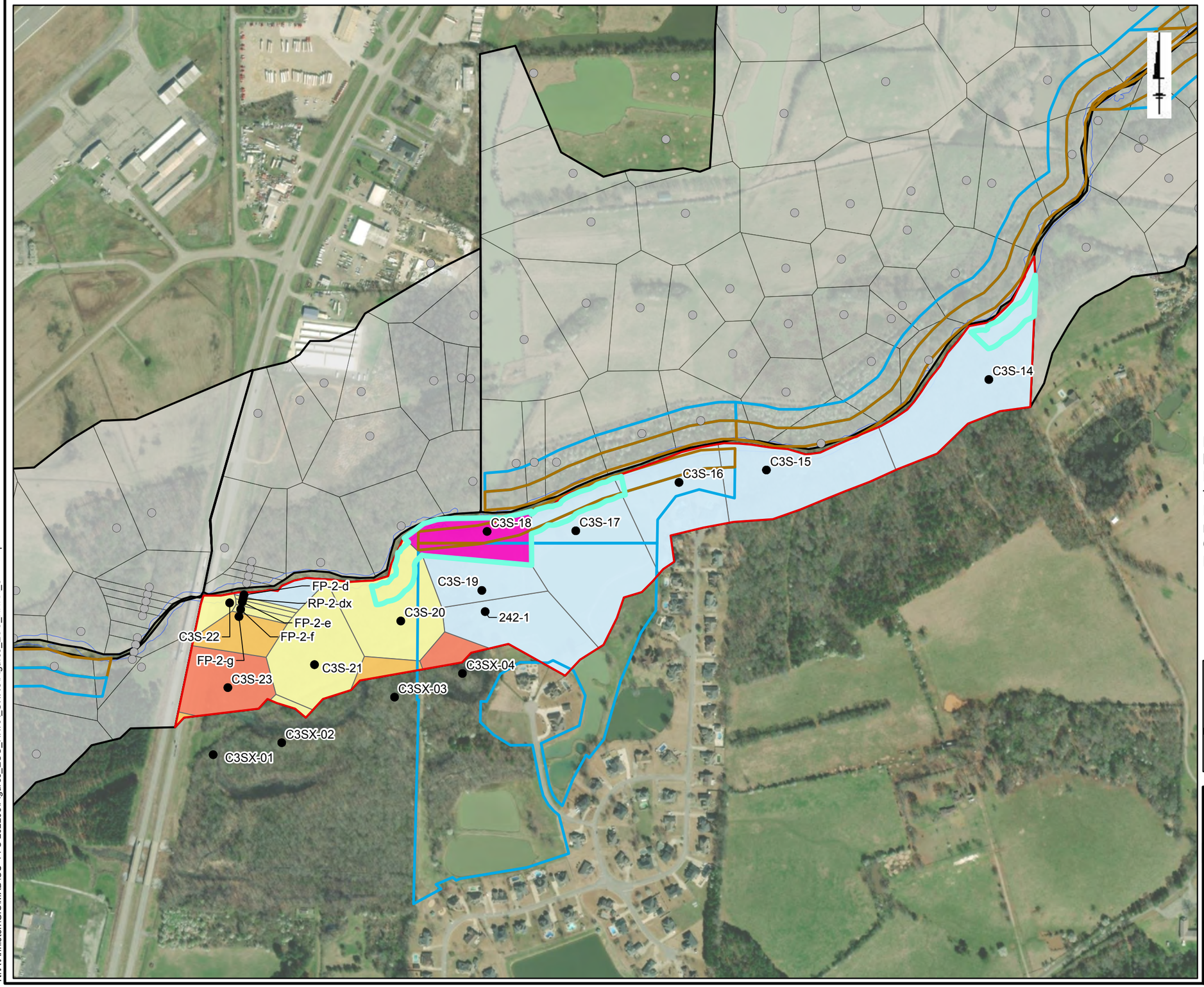
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C3S-EU1

Solutia

Figure 7-10i

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

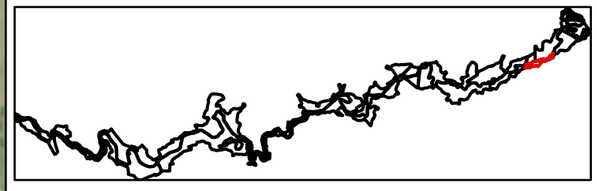
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50
- > 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 500 1,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

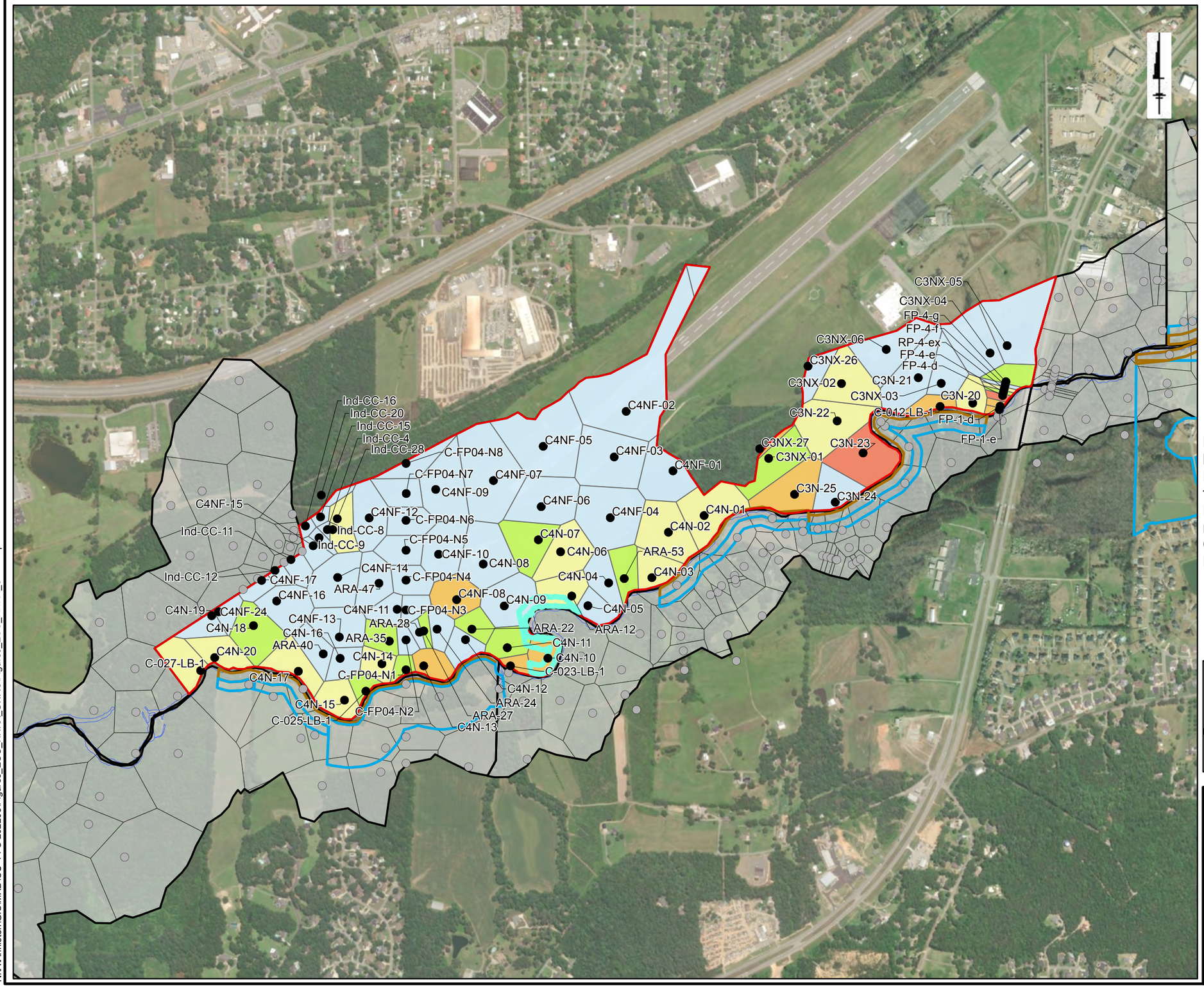
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C3S-EU2

Solutia

Figure 7-10j

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

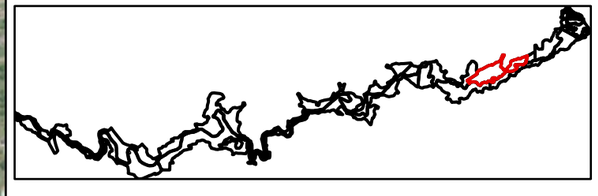
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

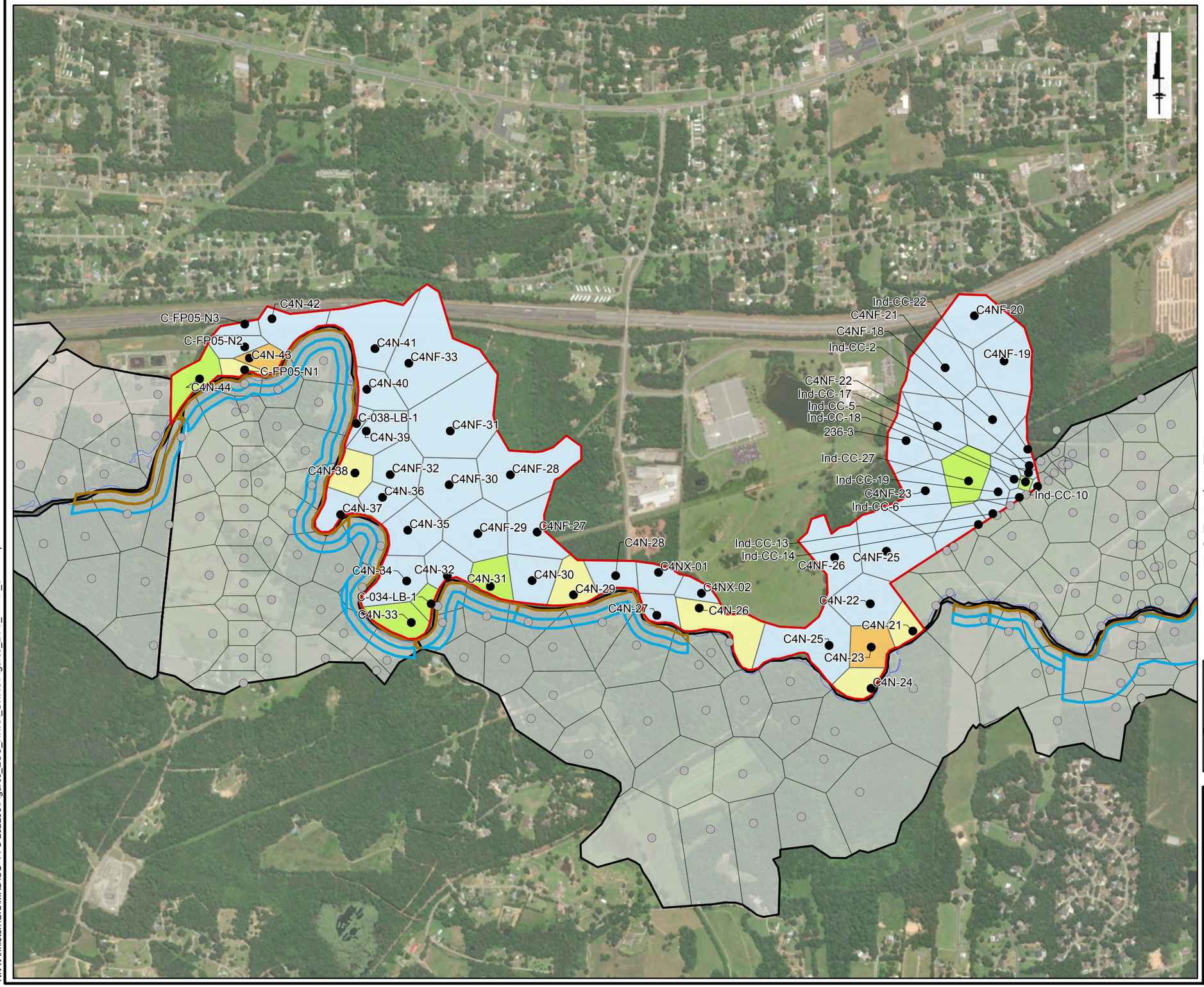
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C4N-EU1

Solutia

Figure 7-10k

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

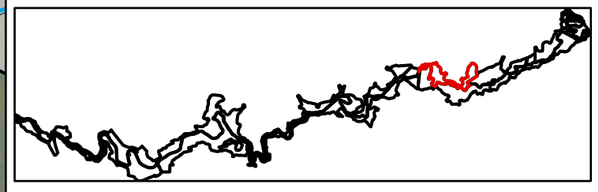
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

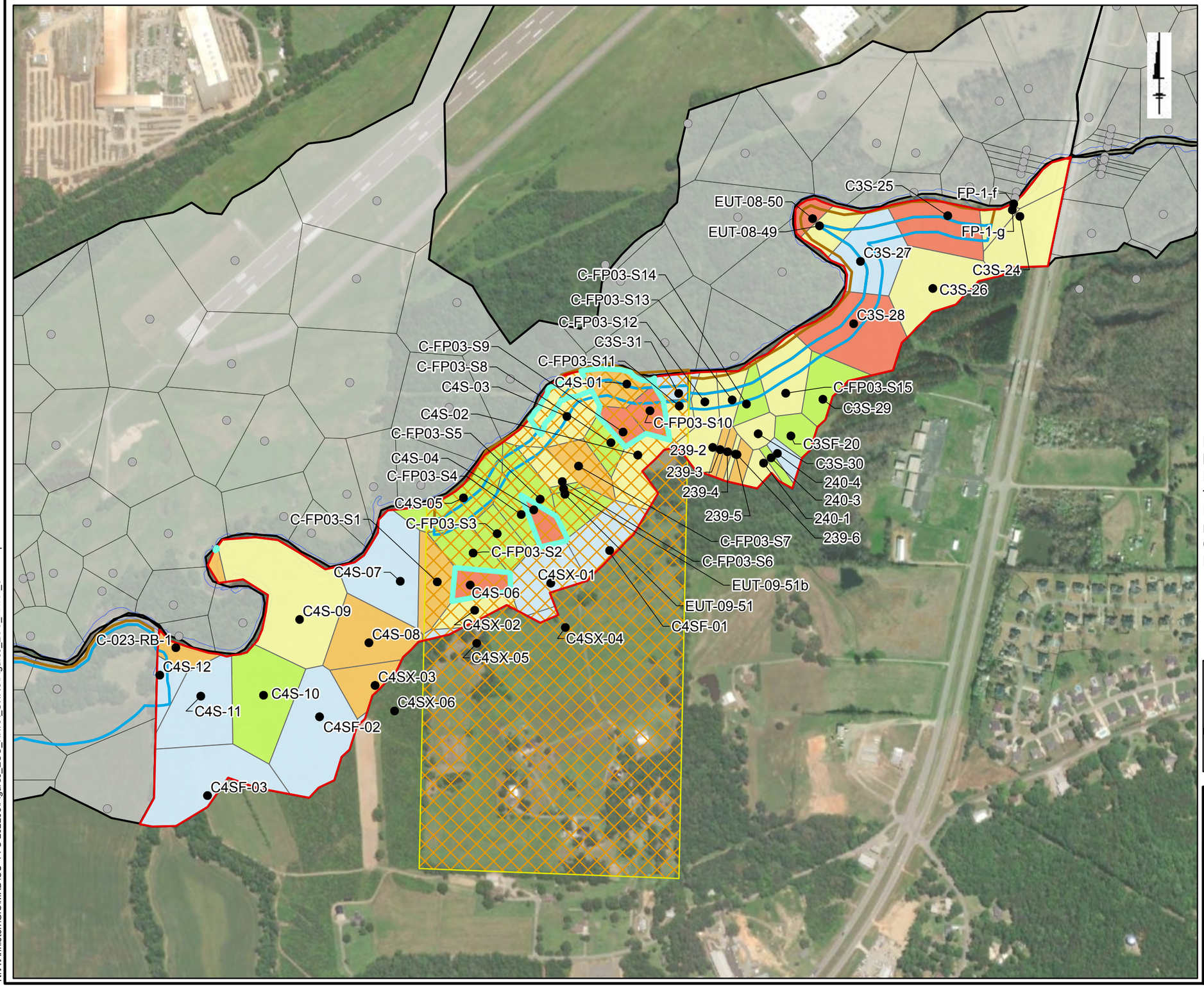
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C4N-EU2

Solutia

Figure 7-10l

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

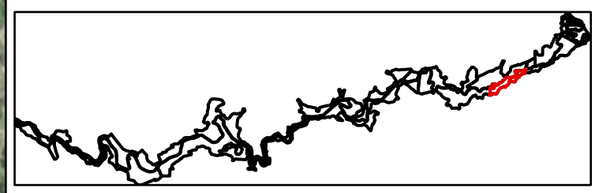
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21
- > 21 to ≤ 50

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

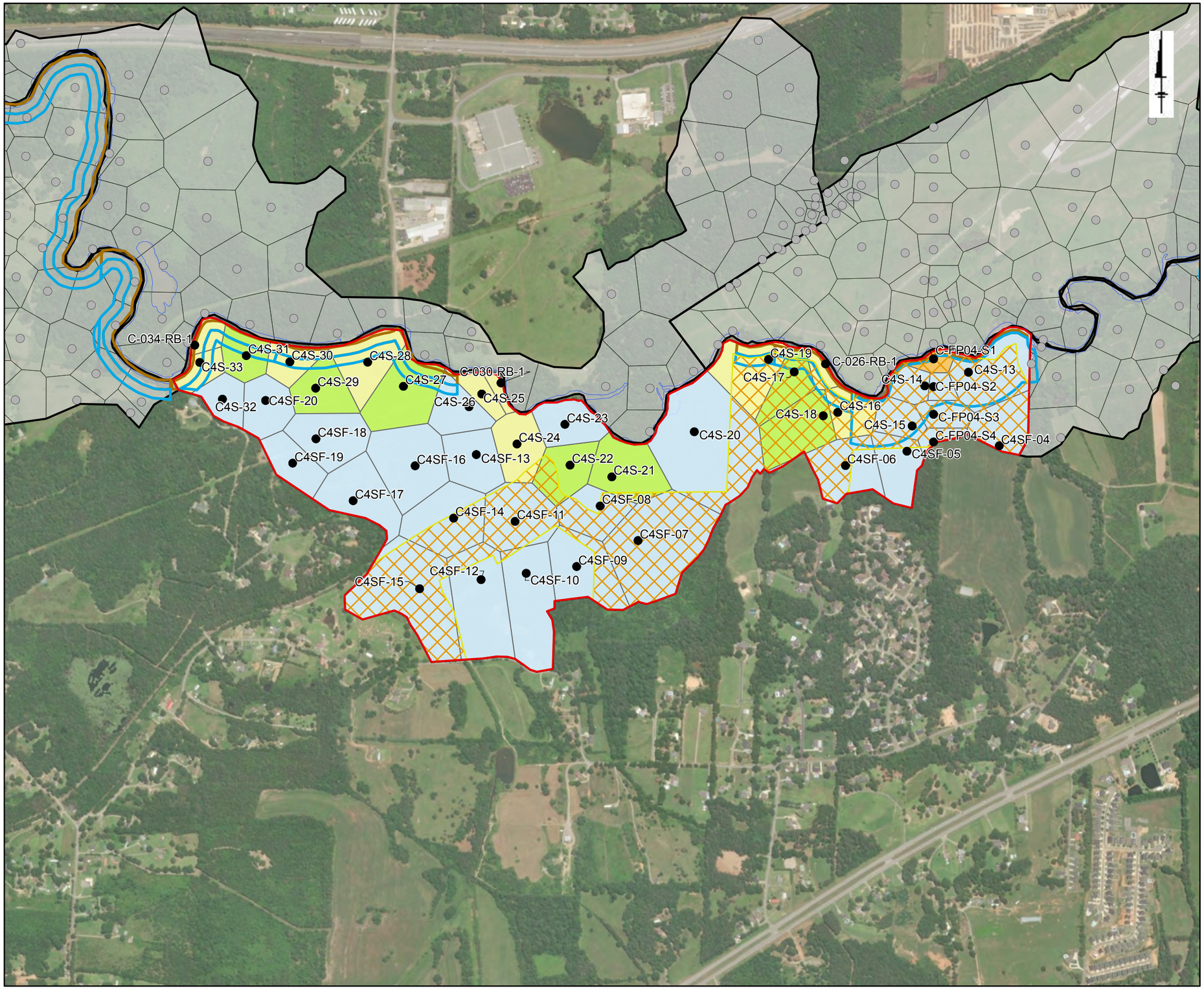
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C4S-EU1

Solutia

Figure 7-10m

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

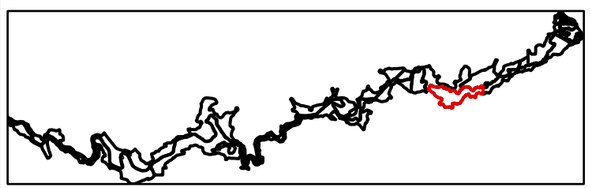
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

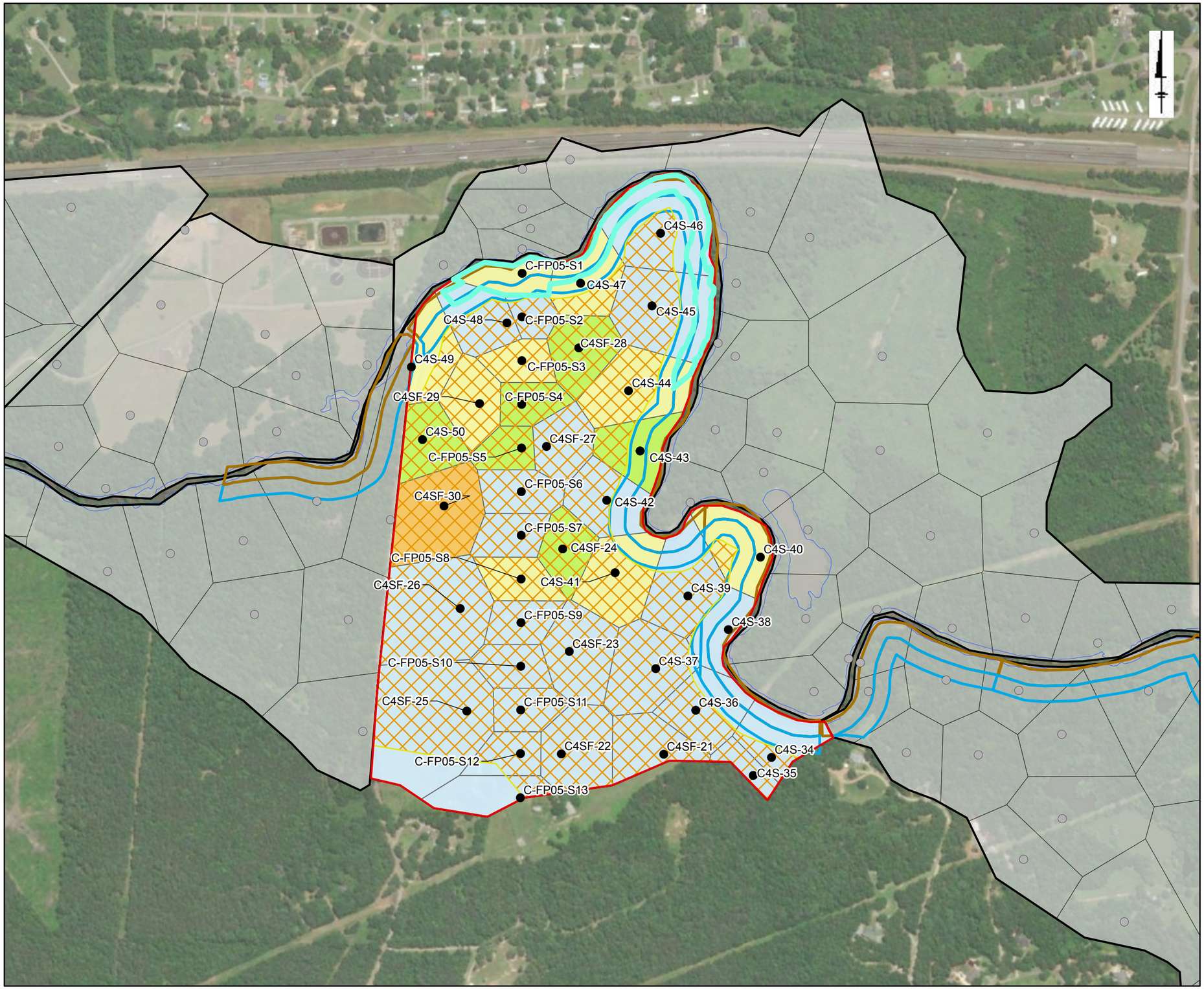
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C4S-EU2

Solutia

Figure 7-10n

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Remedial Areas in EU Boundary
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

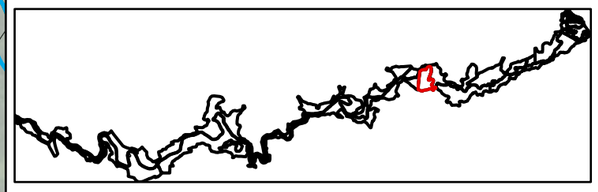
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 600 1,200
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C4S-EU3

Solutia

Figure 7-10o

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM

Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

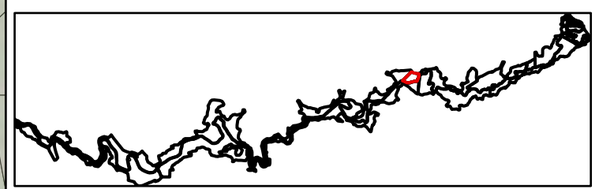
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 300 600
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C5N-EU1

Solutia

Figure 7-10p

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM

Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

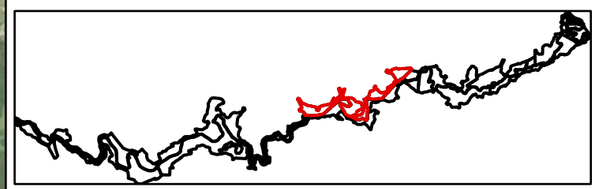
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

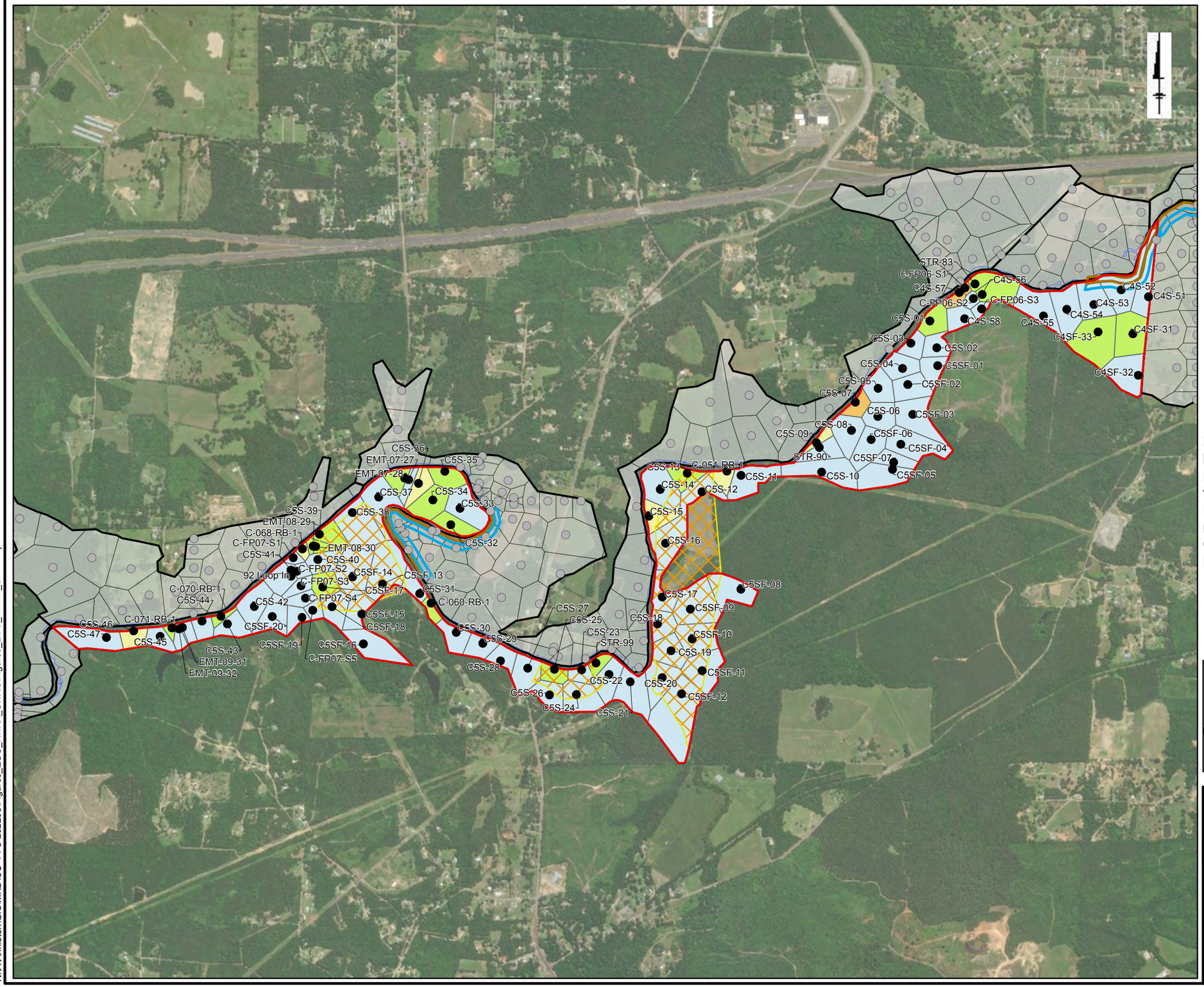
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C5N-EU2

Solutia

Figure 7-10q

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary
- Agriculture Exposure Units

Conservation Easement Zone

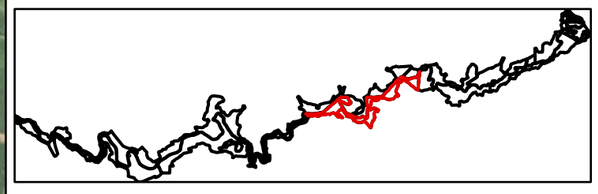
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

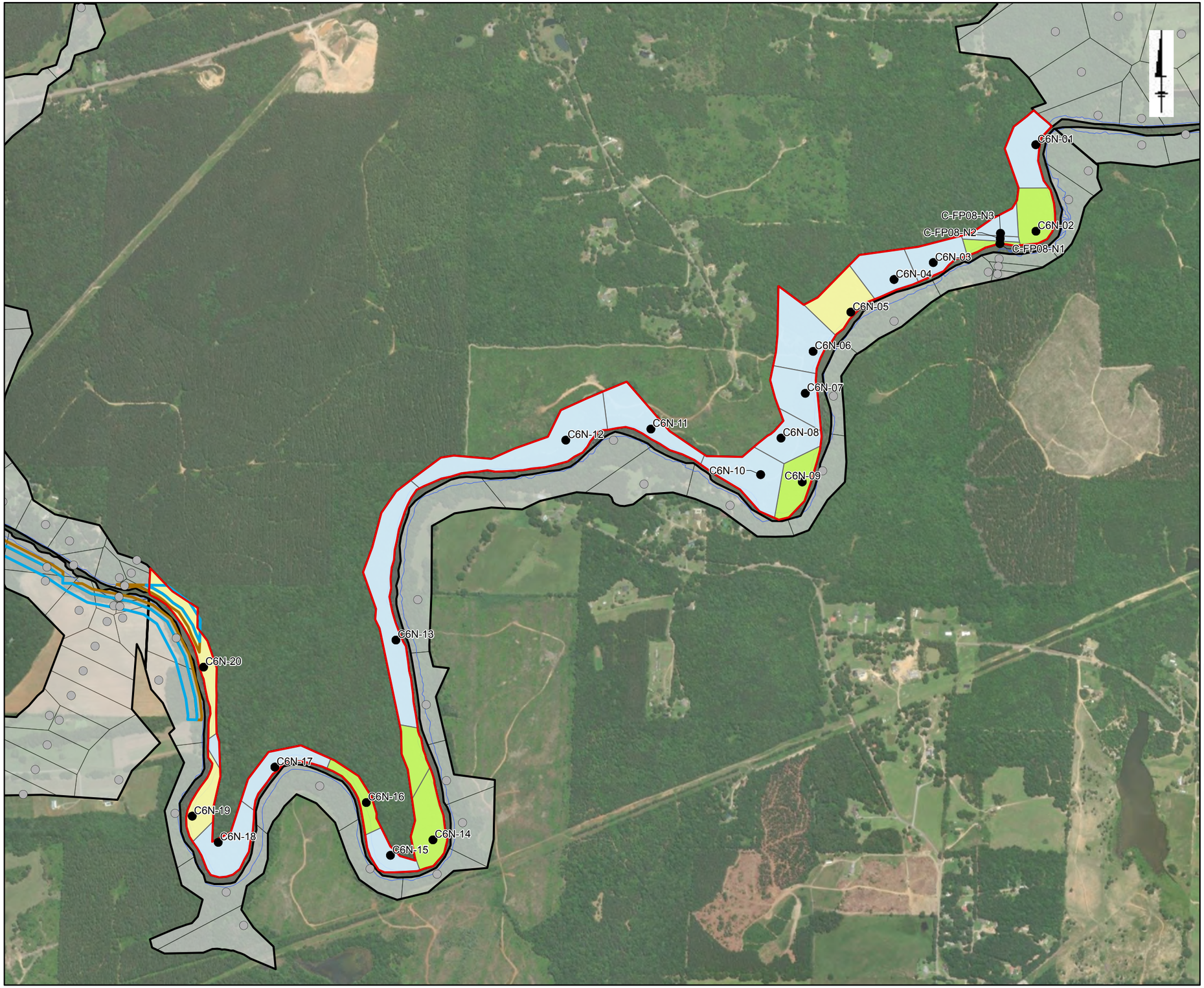
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C5S-EU1

Solutia

Figure 7-10r

N:\AL\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

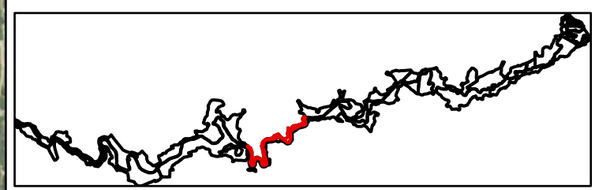
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

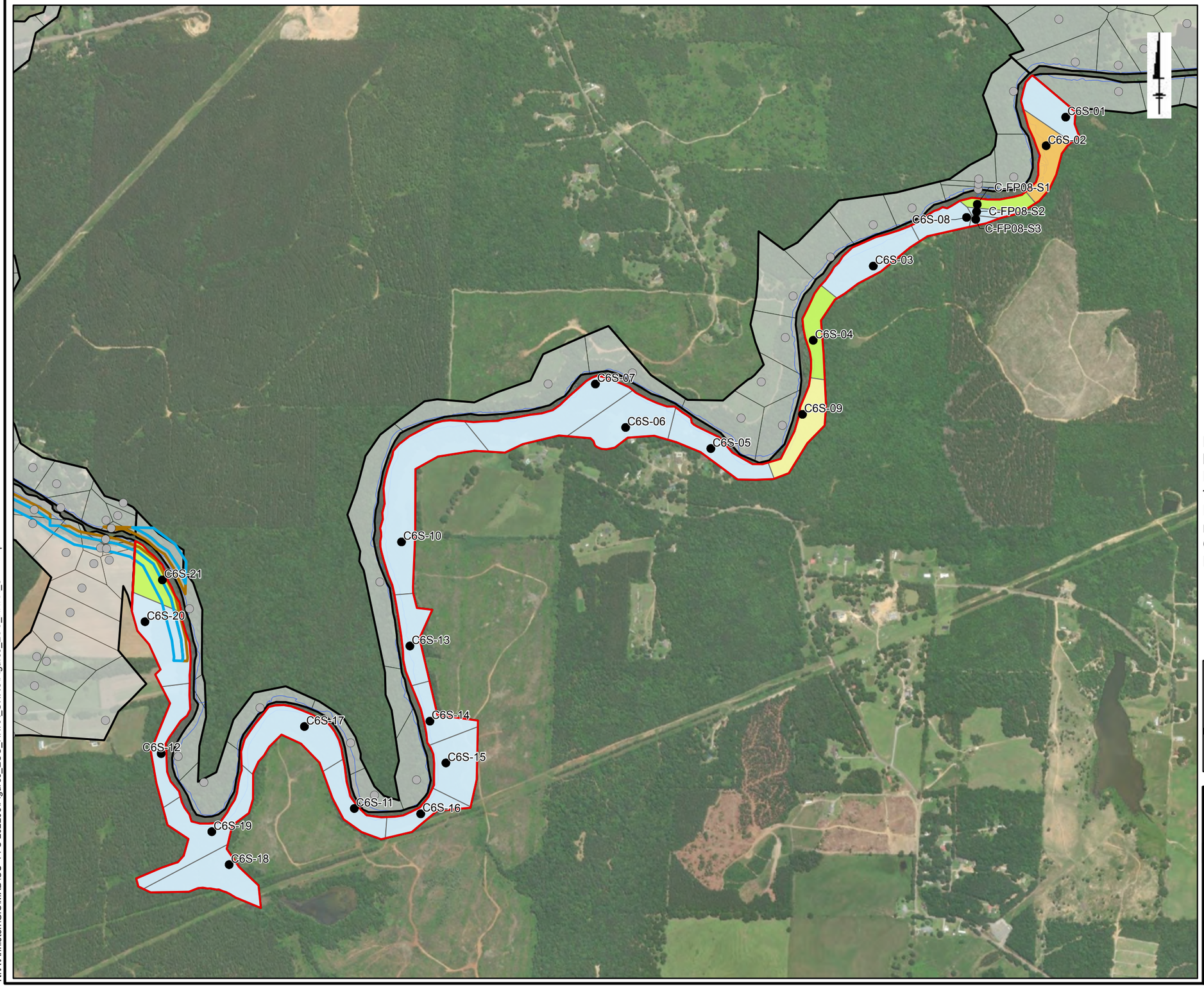
Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C6N-EU1

Solutia

Figure 7-10s

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/5/2023 5:12 PM



Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

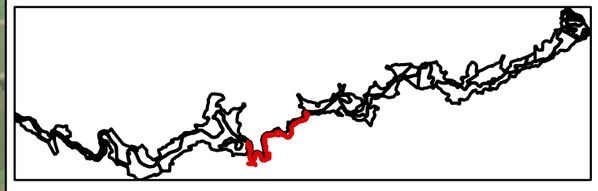
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10
- > 10 to ≤ 21

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C6S-EU1

Solutia

Figure 7-10t

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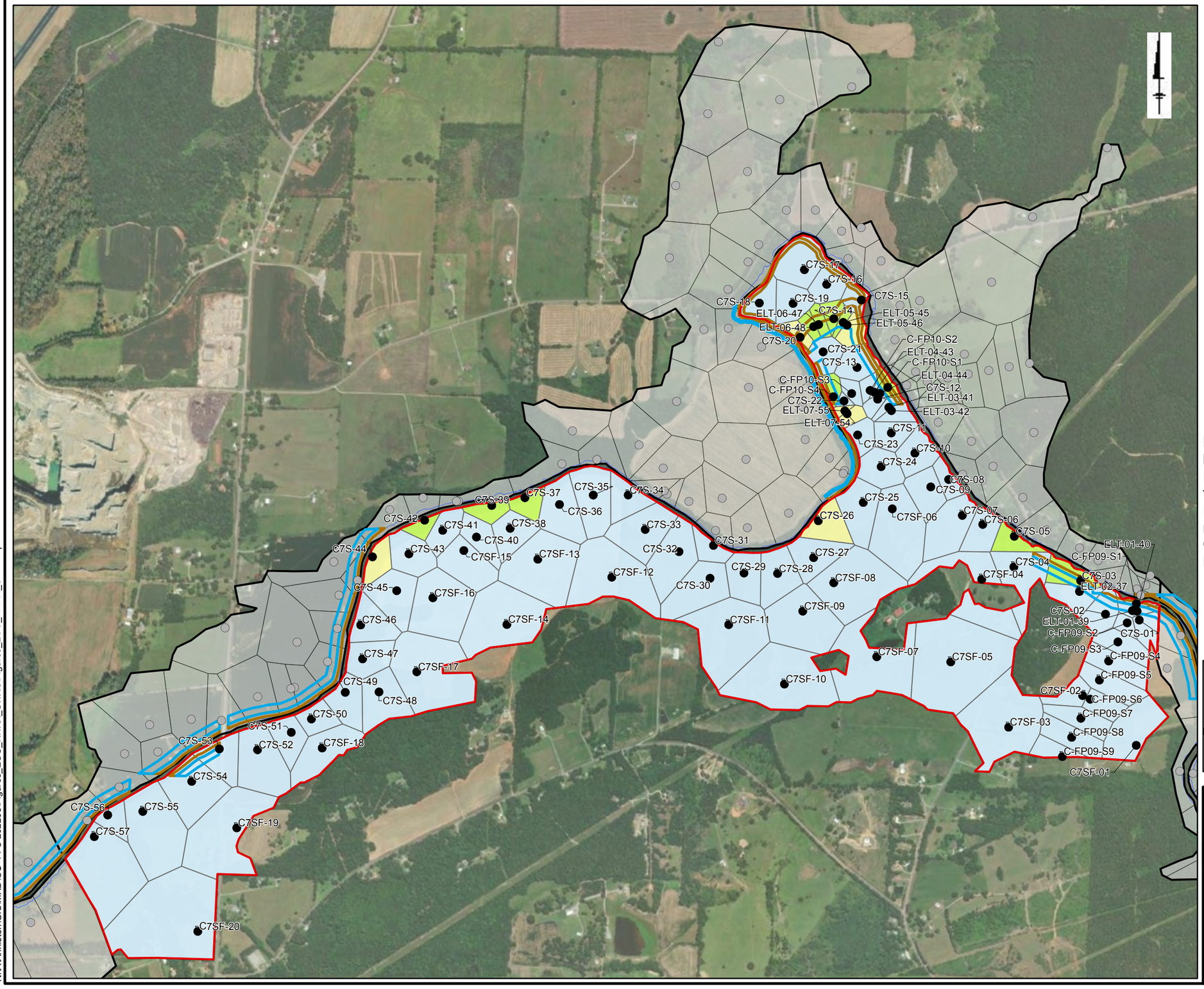


Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

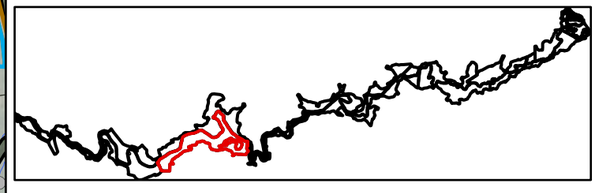
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C7S-EU1

Solutia

Figure 7-10u

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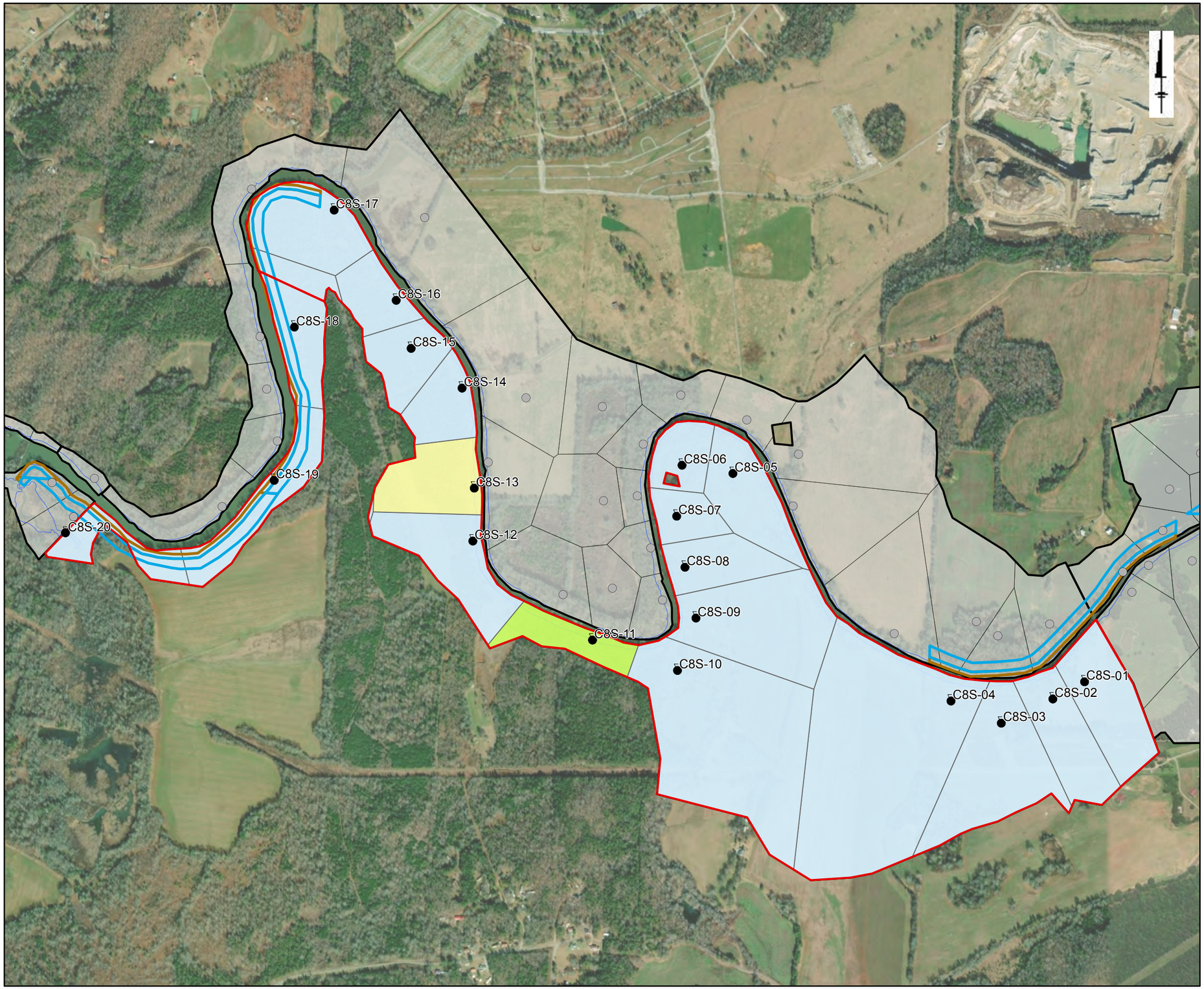


Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

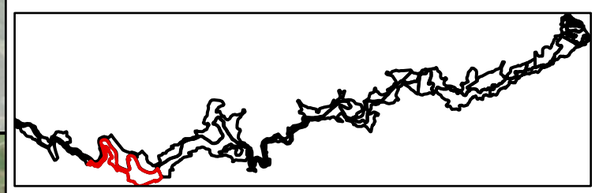
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C8S-EU1

Solutia

Figure 7-10v

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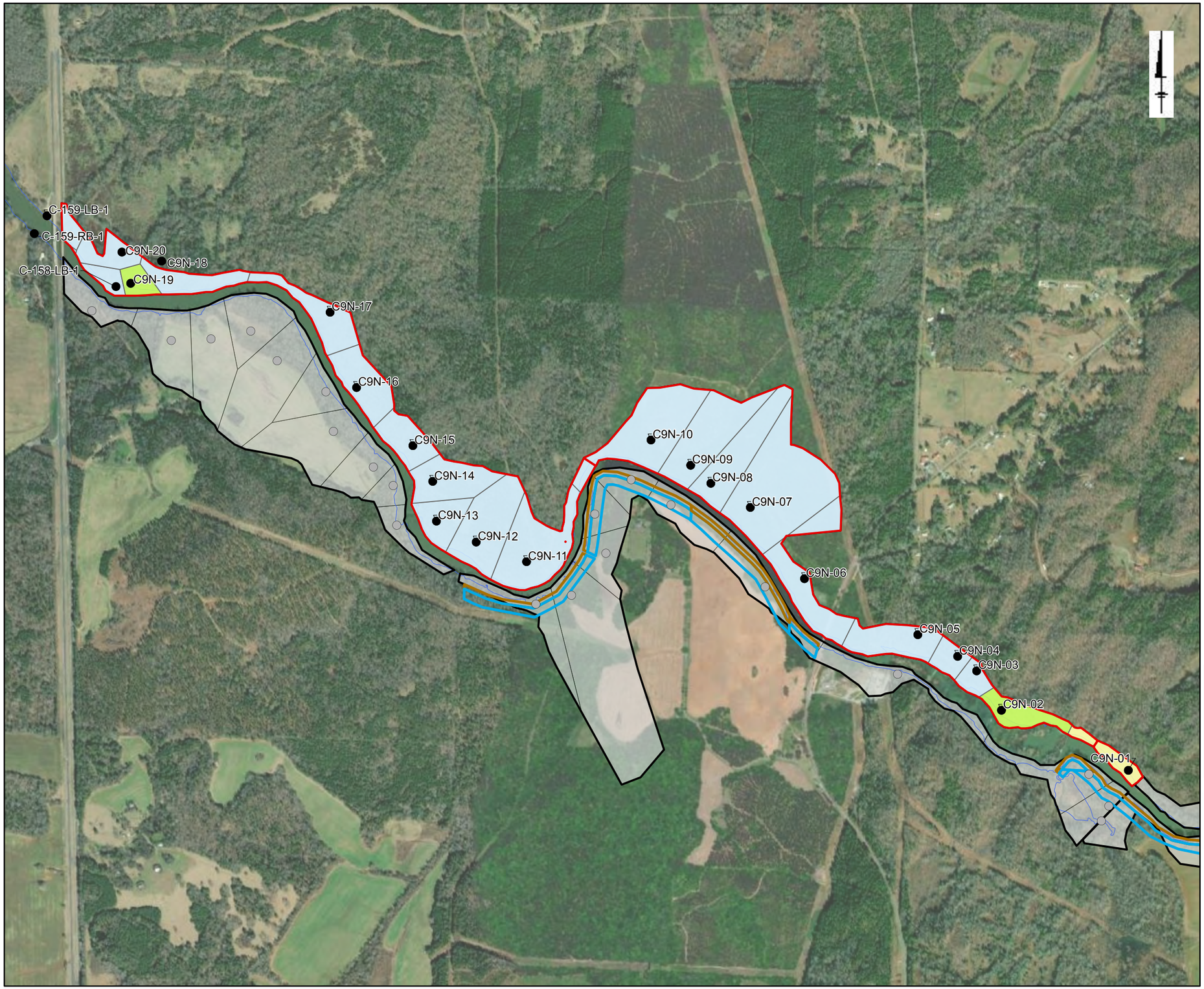


Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

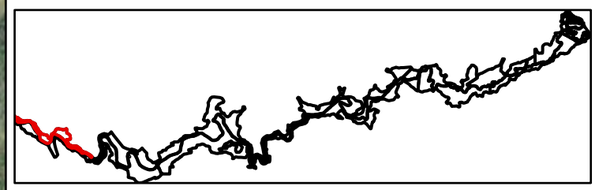
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1
- ≥ 1 to ≤ 3
- > 3 to ≤ 10

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C9N-EU1

Solutia

Figure 7-10w

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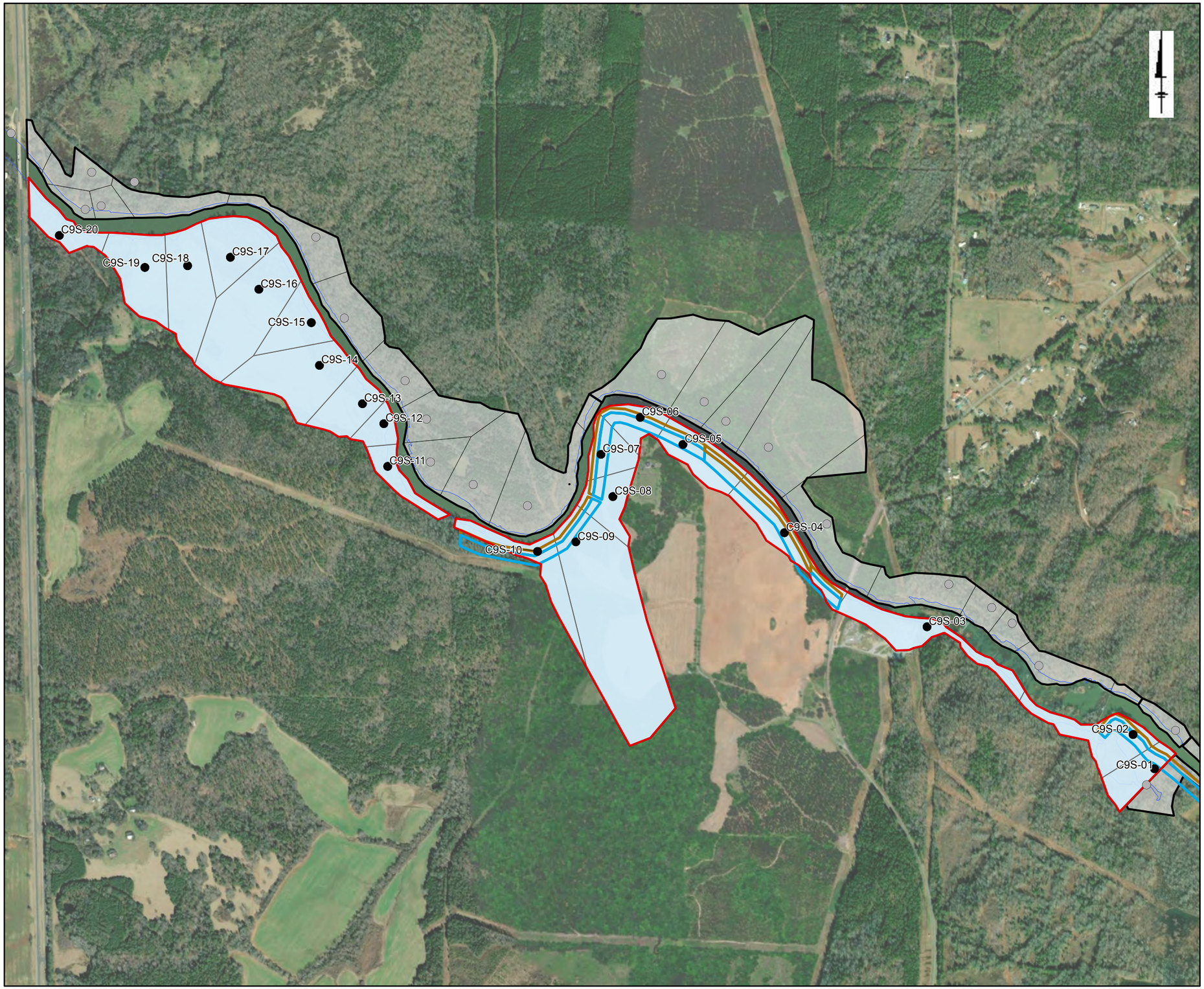


Legend

- HHRA Sampling Locations - Selected Area
- HHRA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected EU Boundary

Conservation Easement Zone

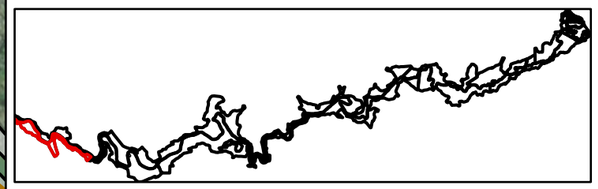
- Zone 1
- Zone 2

PCB Concentrations in Soil (mg/kg)

- < 1

Notes:
bgs: below ground surface
EU: exposure unit
ft: feet
HHRA: human health risk assessment
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

0 1,000 2,000 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Remedial Footprint of NRS-5 for Human Health Exposure Conditions (0–1 ft bgs): C9S-EU1

Solutia

Figure 7-10x

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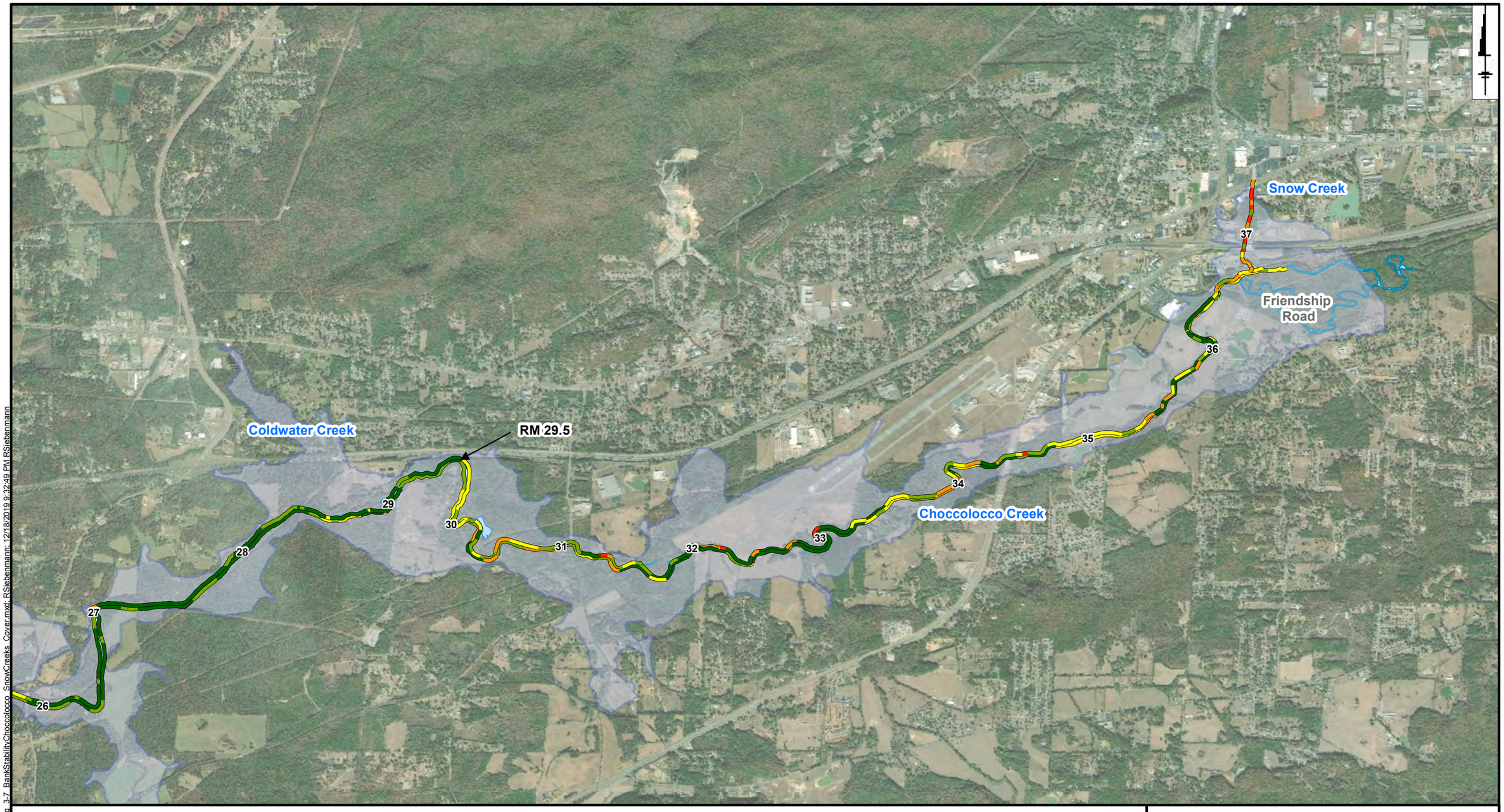


Bank Stability Ratings

- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

- Choccolocco Creek
- OU-4 100-Year Floodplain
- River Mile Station

35

0 4,000 8,000 Feet

Notes:
1. Bank stability surveys conducted in 2012 and 2014.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site, Anniston, Alabama

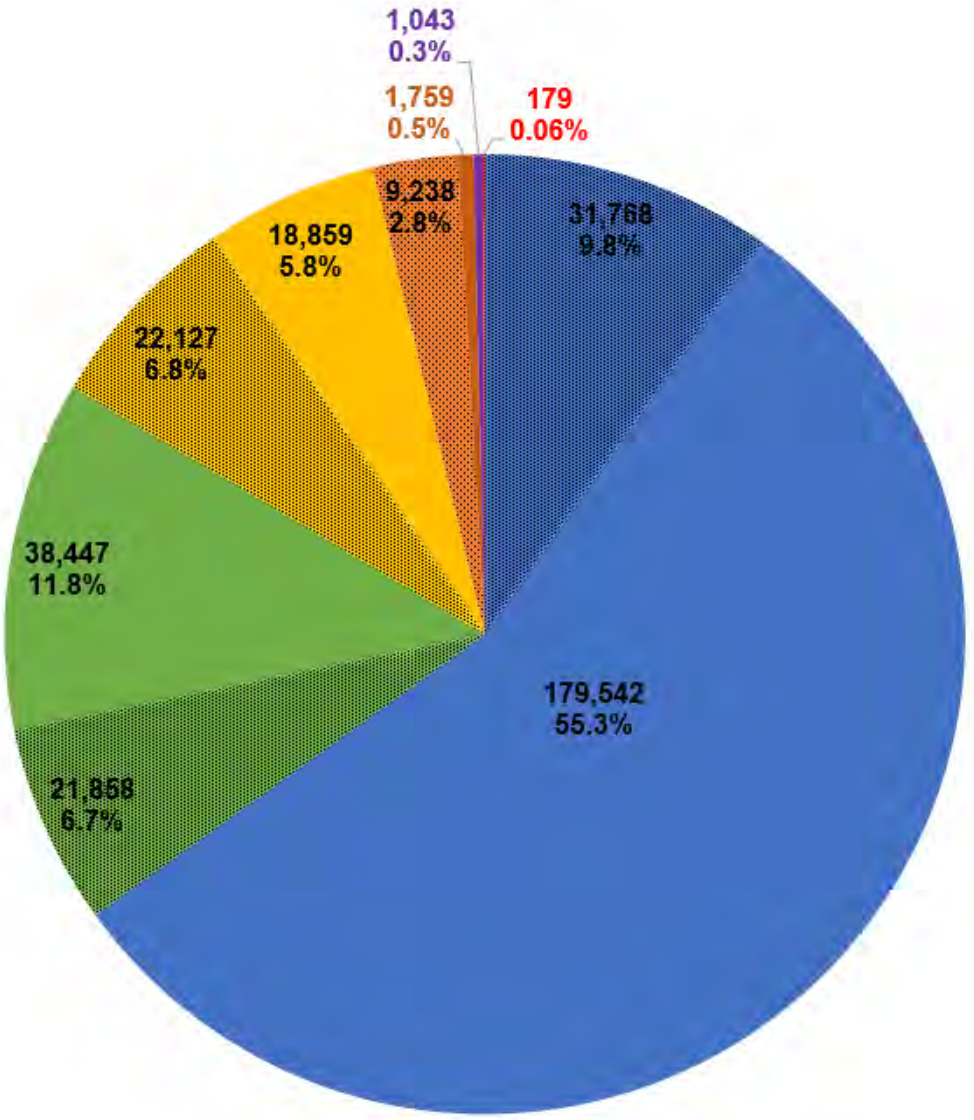
Feasibility Study Report for OU-4

Creek Bank Erosion Ratings for Upper OU-4

Solutia

Figure **7-11**

\\arg-01fs\Anniston\GIS\MXD\OU-4 FS\Fig 3-7 BankStabilityChoccolocco SnowCreeks Cover.mxd RSiebenmann 12/18/2019 9:32:49 PM RSiebenmann



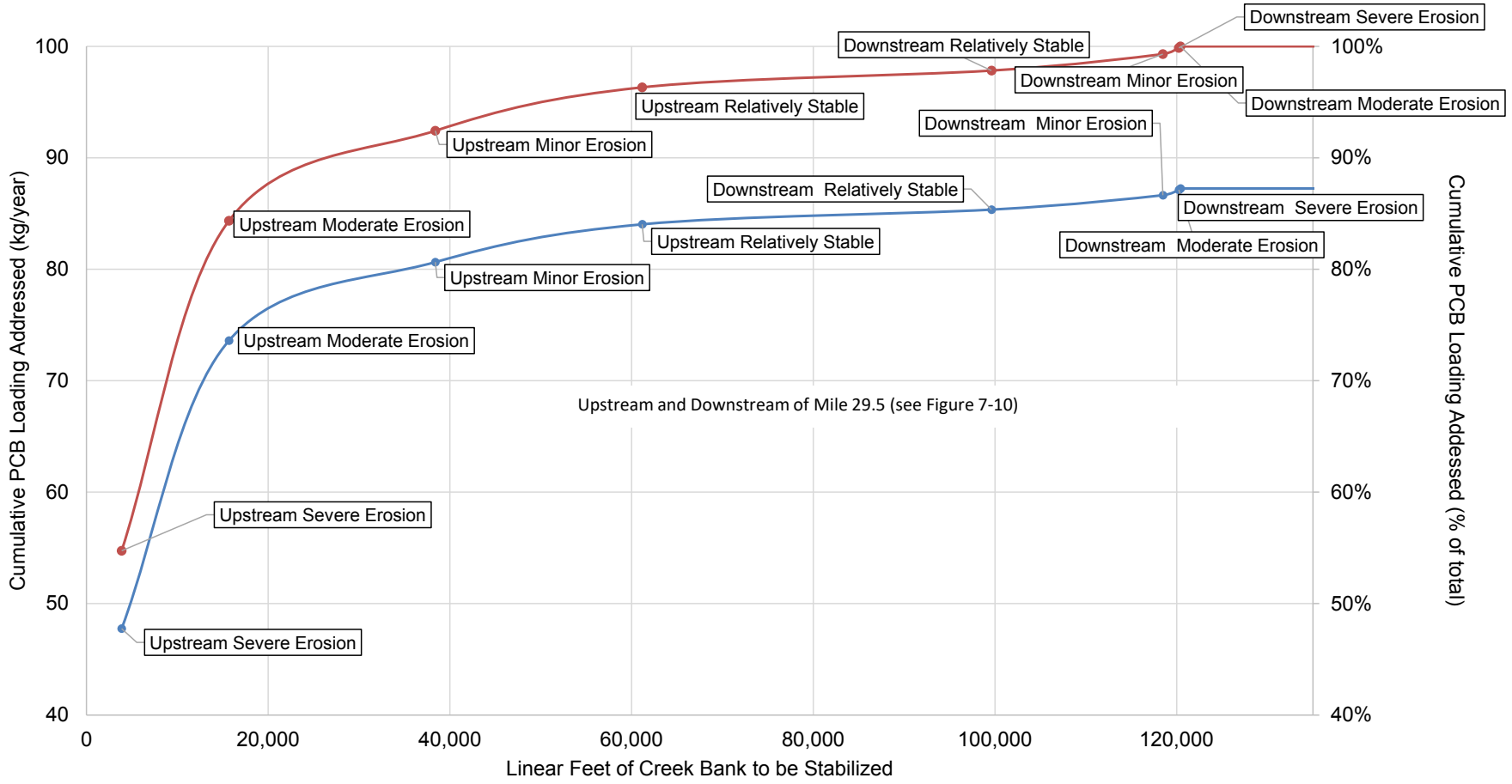
Linear feet of creek bank and percent of total upstream and downstream of river mile 29.5.

Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Summary of Creek Bank Stability Relative to River Mile 29.5 of Choccolocco Creek

Solutia

Figure
7-12



Notes:
%: percent
kg/year: kilograms per year
PCB: polychlorinated biphenyl

- PCB Loading Addressed (kg/yr)
- PCB Loading Addressed (% of total loading)

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Bank Stabilization and Annual PCB Loading

Solutia

Figure
7-13

Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Low Energy Area
- High Energy Area
- Target Sediment Remediation Areas

0 600 1,200 Feet

Graphic Scale

Anniston PCB Site, Anniston, Alabama

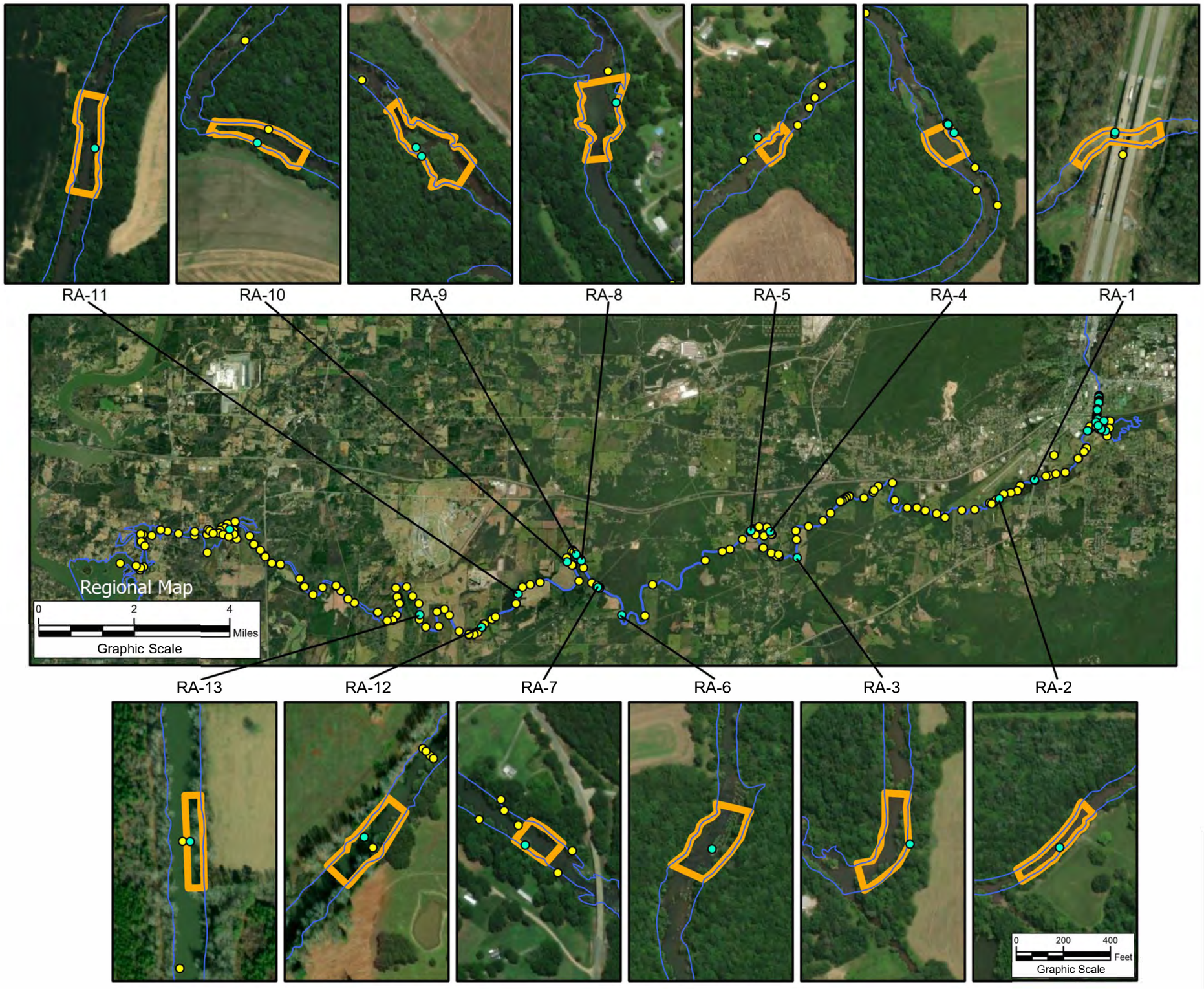
Feasibility Report for OU-4

Target Remedial Areas for Sediment Located in Upper OU-4

Solutia

Figure **7-14**

N:\A\Anniston\GIS\MXD\OU-4 FS\Fig_7-12_Sediment_Remedy_Areas_20230331.mxd 3/31/2023 8:46:03 AM



Legend

OU-4 Sediment PCB Average Concentration

- 0.02–2.6 mg/kg
- 2.61–920 mg/kg

Outline of Choccolocco Creek and Snow Creek (2011)

Target Sediment Remediation Areas

Notes:
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
RA: remediation area

Anniston PCB Site, Anniston, Alabama

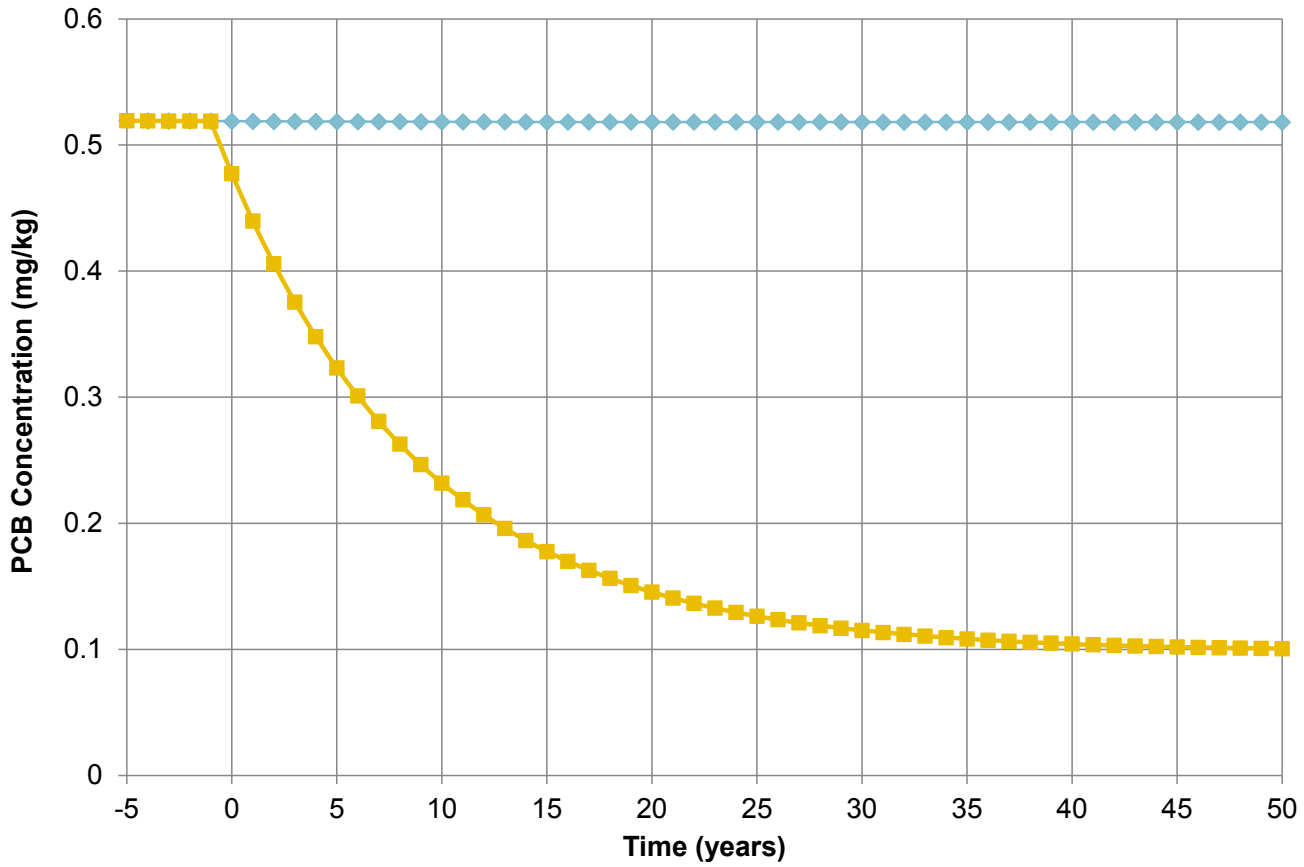
Feasibility Study Report for OU-4

Target Remedial Areas for Sediment Located in Lower OU-4

Solutia

Figure 7-15

Path: N:\A\Anniston\GIS\MXD\OU-4 FS 202304\Figure 7-13\Figure 7-13_v2.aprx



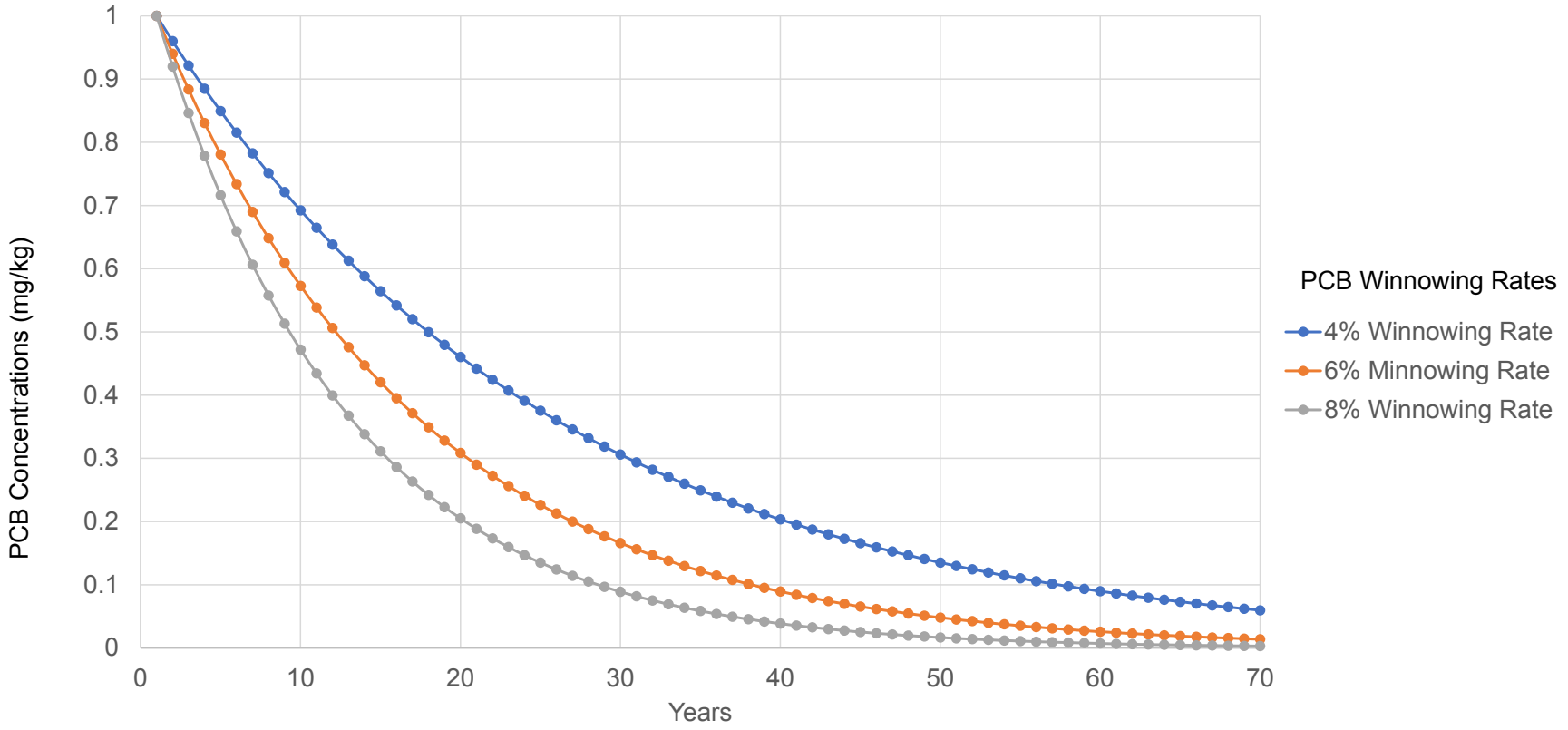
Notes:
%: percent
cm: centimeter
kg/year: kilograms per year
PCB: polychlorinated biphenyl

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Average Surface Sediment PCB Concentrations for Station 35 Following Source Control Actions along Severe and Moderate Bank Erosion Areas

Solutia

Figure
10-1



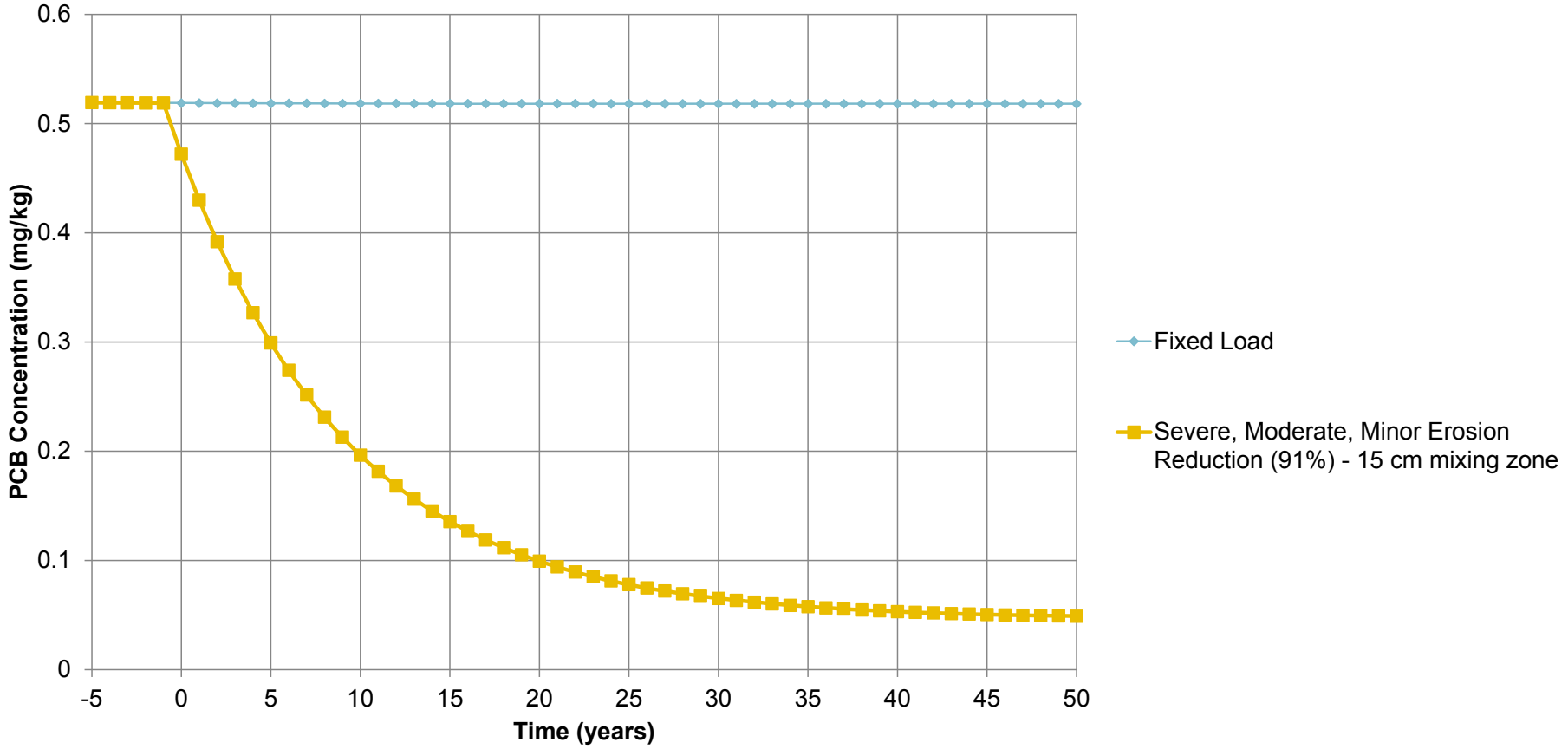
Notes:
%: percent
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Average Surface Sediment PCB Concentrations for Choccolocco Creek between Friendship Road and Jackson Shoals

Solutia

Figure
10-2



Notes:
%: percent
cm: centimeter
kg/year: kilograms per year
PCB: polychlorinated biphenyl

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Average Surface Sediment PCB Concentrations for Station 35 Following Source Control Actions along Severe, Moderate, and Minor Bank Erosion Areas

Solutia

Figure
10-3

Geosyntec
consultants

Appendix A
Proposed Special Studies for Areas Located Downstream of OU-4

APPENDIX A: PROPOSED SPECIAL STUDIES FOR AREAS LOCATED DOWNSTREAM OF OU-4

Feasibility Study for OU-4 of the Anniston PCB Site Anniston, Alabama

Prepared for

Pharmacia LLC and Solutia Inc.
Anniston, Alabama

Prepared by

Geosyntec Consultants, Inc.
227 Willow Street Suite A201
South Hamilton, Massachusetts 01982

Project BR0524C

May 2023

Geosyntec consultants

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Figure A-3 Geochronological Profile/Embayment Area Sediment PCB: MLM-GEO7

Figure A-4 Total PCB Concentrations in Sediment with Distance from Lake Logan Martin by Collection Program

Figure A-5 Mercury Concentrations in Sediment with Distance from Lake Logan Martin

Figure A-6 Special Study Sampling Locations

LIST OF ATTACHMENTS

Attachment A-1 Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

ACRONYMS AND ABBREVIATIONS

ADEM	Alabama Department of Environmental Management
ADPH	Alabama Department of Public Health
APCO	Alabama Power Company
BBL	Blasland, Bouck, & Lee, Inc.
BERA	baseline ecological risk assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
COC	contaminant of concern
CSM	conceptual site model
DL-PCB	dioxin-like polychlorinated biphenyl
FS	feasibility study
FSP	field sampling plan
Geosyntec	Geosyntec Consultants, Inc
GPS	global positioning system
IROD	Interim Record of Decision
kg/yr	kilogram(s) per year
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
mi^2	square miles
OU	operable unit
PCB	polychlorinated biphenyl
PCDD/DF	polychlorinated dibenzo-p-dioxin and dibenzofuran
PE	polyethylene
P/S	Pharmacia LLC and Solutia Inc.
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	remedial investigation
ROD	Record of Decision
TOC	total organic carbon
TSS	total suspended solids

USEPA	United States Environmental Protection Agency
UFP-QAPP	Uniform Federal Policy–Quality Assurance Project Plan
USGS	United States Geological Survey
YOY	young-of-year

1. INTRODUCTION

This appendix of the Operable Unit 4 Feasibility Study (OU-4 FS) was prepared to identify and present the scope of work of special studies that are needed to fill data gaps regarding the nature and extent of polychlorinated biphenyls (PCBs) and other contaminants of concern (COCs) in areas downstream of the OU-4 portion of the Anniston PCB Site (Site). Data collected as part of these special studies can be used by the United States Environmental Protection Agency (USEPA) to evaluate the nature and extent of contamination and communicate current conditions to local stakeholders for areas downstream of OU-4.

1.1 Site Background

On August 4, 2003, the United States District Court for the Northern District of Alabama entered a revised Partial Consent Decree (USEPA 2003) requiring, among other things, Pharmacia LLC and Solutia Inc. (together Pharmacia LLC and Solutia Inc. are referred to as P/S) to conduct a remedial investigation/feasibility study RI/FS for the Site. The Site is located in portions of Calhoun and Talladega Counties in the northcentral part of Alabama, near Anniston (Figure A-1).

The Site has been investigated for the past 25 years based on the presence of PCBs and other chemical constituents in various environmental media. The Site encompasses the Solutia Inc. Anniston Plant (the Facility) (formerly owned and operated by Monsanto Company, now known as Pharmacia LLC), other properties currently owned by Solutia Inc., certain residential and nonresidential properties owned by third parties, and portions of both Choccolocco Creek and Snow Creek and their 100-year floodplains. The Site is not on the Superfund National Priorities List, but it is being addressed through the Superfund Alternative Approach.

Because the Site is large and has varied land uses, it was initially divided into four OUs to facilitate parallel evaluation efforts in the different areas and to streamline closure in specific locations, as appropriate. The work under the Partial Consent Decree identified the four separate OUs:

- OU-1 and OU-2 consists of both residential and nonresidential properties, respectively, near the Facility and downstream, following Snow Creek to Highway 78. OU-1 and OU-2 have been combined into OU-1/OU-2. The Record of Decision (ROD) for the OU 1/OU-2 portion of the Site was issued by USEPA on November 8, 2017, (USEPA 2017), and a Consent Decree for Remedial Design/Remedial Action was entered on March 26, 2021 (USEPA 2021).
- OU-3 includes the Facility and two closed landfills adjoining the Facility. An Interim Record of Decision (IROD) for OU-3 was issued on September 29, 2011 (USEPA 2011). The remedial design and remedial action activities for OU-3 are complete (GSI Environmental Inc. 2018) except for ongoing long-term operation and maintenance.
- The OU-4 portion of the Site includes Snow Creek and its floodplain from Highway 78 to the confluence of Snow and Choccolocco Creeks and Choccolocco Creek, and its floodplain from the backwater area upstream of Snow Creek to the embayment of Lake Logan Martin on the Coosa River. Approximately 37 miles of Snow and Choccolocco Creeks and 6,000 acres of floodplain are included in OU-4. USEPA has also reserved

the right to identify other OUs for the Anniston PCB Site after data from OU-4 and any other studies become available and are reviewed.

Choccolocco Creek is the largest tributary to Lake Logan Martin and discharges to the lake 17 miles upstream of the Lake Logan Martin Dam. The lake was established to provide flood control and hydropower, and storage began in June 1964. At the dam, the Coosa River basin area is 7,743 square miles (mi^2). Lake Logan Martin is one of a series of impoundments along the Coosa River. Upstream impoundments include Weiss Reservoir and Neely Henry Lake in Alabama and Allatoona Reservoir and Carters Lake in Georgia. At the summer pool elevation (464 feet), Lake Logan Martin maintains 273,000 acre-feet of storage and covers a surface area of approximately 15,000 acres (23.5 mi^2). During autumn, water levels are typically lowered to the winter pool elevation of 460 feet, with a storage of 205,000 acre-feet and surface area of 17.5 mi^2. Historical minimum and maximum elevations since initial impoundments in 1964 are 452.5 feet (October 1972) and 475.3 feet (April 1977), respectively. The nearest long-term record of flow data for the Coosa River was available from the United States Geological Society (USGS) at Gadsden (draining more than 5,800 mi^2), located 40 miles upstream of the confluence with Choccolocco Creek. The average flow at Gadsden is 13,000 cubic feet per second (cfs) with a recorded maximum of 77,000 cfs (the 1886 flood produced an estimated flow of 115,000 cfs).

1.2 Objectives of Report

The objectives of this appendix of the OU-4 FS are to collect data that, in combination with existing data collected for areas downstream of OU-4, can be used by USEPA to evaluate the nature and extent of contamination and communicate conditions with local stakeholders. The specific objectives of this special studies plan include the following:

- Present and evaluate existing data and identify data gaps.
- Present a field sampling plan (FSP), including the media to be sampled; number of samples to be collected, including locations, aerial extent, and depths; and analytical requirements.

Section 2 presents existing data for areas located downstream of the OUs that were developed during prior investigations of floodplain soil, sediment, surface water, and fish tissue. These prior investigations were conducted by P/S, USEPA, the Alabama Department of Environmental Management (ADEM) and the Natural Resource Trustees for the Site (the Trustees). Section 3 presents a summary of the identified data gaps and the proposed special studies to be completed to address those data gaps.

1.3 Summary of Data Sources

The following historical reports were reviewed and used as sources to define the current nature and extents of PCB concentrations located downstream of OU-4:

- The *Remedial Investigation Report for Operable Unit 4 of the Anniston PCB Site* (Geosyntec Consultants Inc. [Geosyntec] 2019; OU-4 RI) was prepared by Geosyntec on behalf of P/S to describe the investigations and nature and extent of contamination in OU-4 soil, sediment, surface water, fish tissue, groundwater, and other biota.

Additionally, the OU-4 RI included discussion of the conceptual site model (CSM), the human health risk assessment (USEPA 2013), the baseline ecological risk assessment (BERA) developed for OU-4 (Arcadis 2016), and the OU-4 BERA Addendum (USEPA 2018). The data for OU-4 were largely collected during investigations conducted under the Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) programs. Most of these data were collected on behalf of P/S with a small percentage collected by other parties.

- The *Off-Site RCRA Facility Investigation (RFI) Report, Anniston, Alabama* (Off-Site RFI report) was prepared by Blasland, Bouck, & Lee, Inc. (BBL) on behalf of P/S to describe sediment, surface water, biota, and habitat assessment data collected for the off-site area (BBL 2000). The off-site area is defined as the 100-year floodplain and in-stream portions of Snow Creek downstream of the 11th Street Ditch and Choccolocco Creek from its confluence with Snow Creek (including a small upstream backwater area at the confluence) to Lake Logan Martin, as well as the portion of Lake Logan Martin between Choccolocco Creek and Lake Logan Martin Dam. The Off-Site RFI report focused on the in-stream portions of the study area only. The studies completed as part of the Off-Site RFI included an evaluation of PCB levels in sediment and fish and an assessment of potential downstream movement of PCBs within and between these water bodies. The sediment investigation included a two-phase sediment sampling and analysis program of more than 600 sampling locations. Largemouth bass (*Micropterus salmoides*) and channel catfish (*Ictalurus punctatus*) were sampled from Choccolocco Creek and Lake Logan Martin as part of the fish sampling program. The transport studies measured the loads of sediment and PCBs at key locations within Snow Creek, Choccolocco Creek, and Lake Logan Martin. Other field studies completed during the Off-Site RFI included a habitat assessment to evaluate the overall ecological character of Snow Creek, Choccolocco Creek, and Lake Logan Martin. Additional environmental investigations were continued under the RCRA Program and reported to USEPA in the *Data Summary Report* (BBL 2005).
- The *Supplemental Investigation of Sediment and Soil Chemistry in the Vicinity of the Anniston PCB Site, Anniston, Alabama* (Schein et al. 2015; Trustee report) was prepared by MacDonald Environmental Sciences Ltd. and the U.S. Army Engineer Research and Development Center on behalf of the Trustees for the Site.[1]

The key elements and results of the sampling programs are discussed in Section 2 by media (i.e., soil, sediment, surface water, fish tissue, habitat).

[1] The Natural Resource Trustees for the Site include the State of Alabama (acting through the Alabama Department of Conservative and Natural Resources and the Geological Survey of Alabama), and the Secretary of the United States Department of the Interior (as represented by the Regional Director of the Southeast Region of the United States Fish and Wildlife Service).

2. SUMMARY OF INVESTIGATIONS FOR AREAS DOWNSTREAM OF OU-4

This section describes the scope and results from various investigations that have been conducted in OU-1/OU-2, OU-3, OU-4, and areas downstream of OU-4, including sampling and analysis of floodplain soil, sediment, surface water, fish tissue, and habitat to support the RIs and FSs for these OUs. Section 2.1 provides a summary of investigations, including a discussion of the general objectives of each investigation and results, that were completed by P/S, USEPA, the National Resource Trustees, and ADEM. Results from these studies are presented in Figure A-2, for areas downstream of OU-4, and in Attachment A-1, for OU-4 and areas upstream of OU-4. Additionally, Section 2.1 presents the nature and extent of contamination from OU-1/OU-2, OU-3, and OU-4 and their impact on the areas downstream of OU-4. Section 2.2 evaluates historical data to understand the fate and transport of constituents downstream of OU-4, including source areas, potential routes of migration, contaminant persistence, and migration pathways to areas downstream of OU-4 based on historical data.

Additional details are provided in the OU-4 RI (Geosyntec 2019), Off-Site RFI (BBL 2000), and studies conducted by the Trustees and ADEM.

2.1 Investigation Summaries

Sections 2.1.1 and 2.1.2 describe the scope and results from soil and sediment sampling, respectively, completed in 2013 by the Trustees. The Trustee report includes results for 80 soil and 61 sediment samples collected and analyzed under the FSP for the *2013 Sediment and Floodplain-Soil Sampling Program for the Anniston PCB Site* (MacDonald et al. 2013). The sampling locations were chosen to address what the Trustees refer to as "*uncertainties and data gaps associated with the spatial characterization of the concentrations of PCBs and other chemical of potential concern (COPCs)…*" (Schein et al. 2015).

Surface water investigations were completed in 1999 and 2000 as part of the Off-Site RFI to evaluate flow and flow characteristics affecting the transport of suspended sediment, as quantified by total suspended solids (TSS), and the transport of PCBs in Choccolocco Creek and areas downstream of OU-4. The investigation methods and results, as previously documented in the Off-Site RFI Report (BBL 2000) are described in Section 2.1.3.

A fish sampling program completed in November and December 1999 by P/S included collecting adult bass, adult catfish, and young-of-year (YOY) bass samples from locations within Choccolocco Creek and its receiving waters, including one location in Lake Logan Martin (just upstream of Lake Logan Martin Dam) and one location in Lake Neely Henry (just upstream of the Neely Henry Dam). The investigation methods and results, as previously documented in the Off-Site RFI Report (BBL 2000), are described in Section 2.1.4.

A habitat assessment was conducted in September 1999 as part of the Off-Site RFI. Information was gathered on physical characteristics, water quality parameters, substrate and in-stream cover, and benthic macroinvertebrates from locations within Choccolocco Creek, Lake Logan Martin, and associated tributaries (i.e., Snow Creek, Eastaboga Creek, and Blue-Eye Creek). The

investigation methods and results, as previously documented in the Off-Site RFI Report (BBL 2000), are described in Section 2.1.5.

2.1.1 Floodplain Soil Investigations

The Trustees collected a total of 80 soil samples in 2013. A limited number of soil samples were collected in the OU-1/OU-2 portion of the Site; most samples were collected from OU-4, including Choccolocco Creek and its 100-year floodplain. Samples were also collected in Lake Logan Martin downstream of OU-4. All samples were analyzed for PCB Aroclors, 24 different metals, total organic carbon (TOC), percent moisture, and grain size distribution. A subset of the samples was analyzed for PCB congeners and polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/DFs). Discussion of metals and PCDD/DFs results can be found in the Trustee report (Schein et al. 2015).

The floodplain soil PCB results presented in the Attachment A-1 are presented from upstream to downstream. The 80 floodplain soil results from the Trustee report are shown using different symbols but the same color coding as the previously reported P/S data for several PCB concentration ranges. The Trustee PCB concentrations for the soil samples collected near the OU-3 boundary (Figure A-1-1a of Attachment A-1) are consistent with or lower than the P/S results. There are 17 Trustee soil sample locations in the OU-4 portion of Snow Creek and its floodplain that are located south of Highway 78 (Figure A-1-1b of Attachment A-1). Trustee samples collected near the creek had relatively high PCB concentrations, which is consistent with previous data (Figure A-1-1c of Attachment A-1), including some samples from this area having PCB concentrations above 50 milligrams per kilogram (mg/kg). Moving farther from the creek bank, concentrations drop to less than 10 mg/kg (SL-CC01-14 = 1.9 mg/kg) and then to less than 1 mg/kg (SL-CC01-17 = 0.43 mg/kg). The Trustee data set includes soil samples collected in a portion of the floodplain west of Snow Creek and north of Recreation Drive. The Trustee samples provided additional spatial coverage in this area but were consistent with the samples previously collected by P/S.

The Trustee samples from the backwater area had PCB concentrations of 1.0 mg/kg or less and are generally consistent with the previous findings (Figure A-1-1c of Attachment A-1). Except for sampling locations near the confluence of Snow and Choccolocco Creeks, surface soil PCB concentrations are low. In one area (Figure A-1-1d of Attachment A-1), previous P/S samples and Trustee samples were collected in a low-lying area just outside the 100-year floodplain border. PCB concentration results reported by P/S and the Trustees for this former geomorphological feature are similar. In the area near the airport, the surface soil sample collected by P/S (location C3NX-27) had a surface (upper foot) weighted average PCB concentration of 11 mg/kg and a maximum of 20 mg/kg. Trustee sample results for PCBs in this area (SL-CC03-05, 06, 09, 10 and SL-CC04-01) ranged from 1.4 to 20 mg/kg and are consistent with the previously reported P/S data.

With only one exception (Figure A-1-1j of Attachment A-1, Sample SL-CC07-11, 11 mg/kg), the remainder of Trustee soil PCB results were less than 5 mg/kg and consistent with previous P/S

data, with most PCB concentrations being less than 1 mg/kg. All the Trustee soil samples collected downstream of OU-4 have PCB concentrations less than 1 mg/kg (Figure A-2).

2.1.2 Sediment Investigations

The sections below provide a summary of sediment investigations in Lake Logan Martin completed in 1999 under the RCRA program, including geochronology, and by the Trustees in 2013.

2.1.2.1 Surface Sediment Sampling under the RCRA Program

Surface sediment samples from the top 2 inches of sediment were collected in 1999 from seven locations collocated with fish sampling locations as described in the Off-Site RFI Report (BBL 2000) and shown on Figure A-2. A total of 10 samples per location were collected and analyzed for PCBs, and 5 of the 10 samples from each location were also analyzed for total mercury.

Average surface sediment PCB concentrations at each fish sampling location in Choccolocco Creek were less than 1.0 mg/kg. PCBs were not detected at any of the four Lake Logan Martin sampling locations. In Choccolocco Creek, the average PCB concentration in surface sediment at ADEM 96, near Coldwater Creek, was 0.29 mg/kg; at New 99, between Cheaha Creek and Jackson Shoals, was 0.66 mg/kg; and at Station 35, near the mouth of Choccolocco Creek, was 0.84 mg/kg. Although surface sediment PCB concentrations increased in the downstream direction, there was a corresponding increase of TOC, from an average of 3,780 mg/kg near Coldwater Creek to 26,500 mg/kg at the mouth of Choccolocco Creek. When PCB concentrations are adjusted for TOC, the bioavailable PCB concentration decreased. The adjusted PCB concentrations, in terms of PCBs per kilogram TOC decreased in the upstream-to-downstream direction. This trend serves to contrast the coarse low-organic sediment upstream in the high-energy areas of Choccolocco Creek with the fine-grained, high-TOC sediment collected in the lower-energy headwaters to Lake Logan Martin.

Mercury was detected at higher concentrations in Choccolocco Creek surface sediment than in the Lake Logan Martin surface sediment. In Choccolocco Creek surface sediment, mercury was consistent, with average concentrations of 0.86 mg/kg, 0.85 mg/kg, and 1.1 mg/kg in samples collected from near Coldwater Creek, downstream of Cheaha Creek, and the mouth of Choccolocco Creek, respectively. In Lake Logan Martin surface sediment, mercury concentrations ranged from 0.035 mg/kg at Station 38 near Griffitt Bend to 0.125 mg/kg just upstream of Lake Logan Martin dam.

2.1.2.2 Geochronological Investigations under the RCRA Program

Geochronological sediment cores were collected from depositional areas in Lake Logan Martin in April 1999 to collect appropriate data to assess sediment deposition rates and evaluate sediment stability. Four cores were collected at each of three locations in the lake: upstream of Choccolocco Creek near Route 20, at the mouth of Choccolocco Creek, and downstream of Choccolocco Creek near Griffitt Bend. The cores were finely sectioned into 0–0.5–inch, 0.5–1–inch, and 1–2–inch intervals and then 2-inch intervals to the depth of the core and analyzed for radionuclides of cesium 137 (Cs-137), lead 210 (Pb-210), and beryllium 7 (Be-7). Results of the radionuclide analyses

were evaluated to characterize historical and recent sediment transport rates, sediment deposition rates, and surface sediment mixing depths.

The success of the geochronological dating of the cores collected in 1999 were mixed. The low levels of radionuclides and the variability exhibited by samples from the cores limited the use of these data for establishing a reliable depositional chronology. The radionuclide data from cores collected upstream of Choccolocco Creek and near the mouth of Choccolocco Creek suggested inconsistent local depositions, irregular mixing, a transient sediment bed, or disturbance during sampling. As discussed in the Off-Site RFI Report, it is possible that shallow water depths during the early 1970s may have altered the deposition profile due to wind-action, degradation of the radionuclides, or physical mixing due to land-based activities (BBL 2000). Based on the limited data set, the sediment deposition rates are on the order 0.3 inches per year and the surface sediment mixing zone was estimated to be in the range of 2 to 5 inches in Lake Logan Martin.

As part of the Off-Site work plan, several of the cores collected for geochronological dating were also analyzed for PCB concentrations. Specifically, PCB analysis was conducted for sediment from MLM-GEO-4, MLM-GEO-5, and MLM-GEO-7. PCB concentrations were also relatively low in the core sections, further complicating the evaluation of deposition rates in this area. Core MLM-GEO-7 had the highest PCB concentrations (1.1 mg/kg) from these cores. Considering the sediment deposition rate (0.3 inches per year) and the mixing zone (2 to 5 inches), these data indicate that the highest observed PCB concentrations correspond with the period of the 1960s to 1970s (Figure A-3). After this period, sediment PCB concentrations in Choccolocco Creek decline until the early 1990s when a spike in concentration is apparent. The timing of this increase in PCB concentration is consistent with the timing of National Resources Conservation Service dredging of the creek.

A supplemental geochronological investigation was completed in 2000 within five deep-water areas: upstream of Choccolocco Creek, at the mouth of Choccolocco Creek, and downstream of Choccolocco Creek, upstream of Logan Martin Dam, and upstream of Neely Henry Dam (Figure A-2). Results of the 2000 supplemental cores generally confirmed the results of the earlier geochronologic sampling. The sediment deposition rates were measures on the order of 0.65 to 0.8 inches per year and the surface sediment mixing zone was estimated to be in range of 6 and 12 inches for cores collected from locations near and downstream of the confluence with Choccolocco Creek.

These geochronological studies support the ongoing occurrence of natural attenuation of PCBs and are consistent with the observed declines in PCB concentrations measured in fish tissue sample collected from Lake Logan Martin.

2.1.2.3 Sediment Sampling under the Trustee Sampling Program

The Trustees collected a total of 61 sediment samples in 2013. A limited number of sediment samples were collected in the OU-1/OU-2 portion of the Site; most samples were collected from OU-4, including Choccolocco Creek and its 100-year floodplain. Samples were also collected in Lake Logan Martin downstream of OU-4. All samples were analyzed for PCB Aroclors, 24 different metals, TOC, percent moisture, and grain size distribution. A subset of the samples was analyzed for PCB congeners and PCDD/DFs. Discussion of metals and PCDD/DFs results can be found in the Trustee report (Schein et al. 2015).

Average surface sediment PCB concentrations measured in Choccolocco Creek, including off-channel sediment areas, and Lake Logan Martin in 2013 were less than 1.0 mg/kg. The concentration range for samples collected in Choccolocco Creek was 0.011 mg/kg to 4.6 mg/kg with an average of 0.75 mg/kg. The concentration range for samples collected in Lake Logan Martin was 0.015 mg/kg to 0.033 mg/kg with an average of 0.022 mg/kg.

2.1.2.4 Comparison of Sediment Concentrations under the RCRA and Trustee Sampling Programs

The P/S RCRA program and Trustee PCB results for the sediment samples collected in OU-4 and Lake Logan Martin in 2013 are presented on Figure A-2. The PCB concentrations and spatial trends of these Trustees' and P/S's results are also shown on Figure A-4, which presents the PCB concentrations graphically as a function of distance from Lake Logan Martin. The concentration and spatial distributions for PCBs demonstrate the consistency between the two data sets with the higher PCB concentration sediments being in the backwater area (Attachment A). Downstream of the backwater area, the average PCB concentrations in sediment for both data sets are well below 1 mg/kg (0.75 mg/kg for P/S's data and 0.87 mg/kg for the Trustees' data). The Trustees' PCB results for samples collected for the eastern portion of the backwater area are consistent with the P/S results (less than 1 mg/kg). The results reported by the Trustees for sediment samples collected in Lake Logan Martin presented on Figure A-2, are consistent with the results of samples collected by P/S under the RCRA program and reported in the Off-Site-RFI (BBL 2000). The average sediment PCB concentration reported by the Trustees for samples collected downstream of OU-4 was 0.022 mg/kg, and the maximum concentration was 0.033 mg/kg. In 49 of the 50 surface sediment PCB results reported in the Off-Site RFI for Lake Logan Martin, PCBs were not detected. These samples were collected throughout Lake Logan Martin, including locations upstream of where Choccolocco Creek flows into the lake.

Based on review of the RCRA and Trustee sediment sampling program data evaluation, the following observations have been made:

- PCB concentrations in Lake Logan Martin are low.
- PCB concentrations in Lake Logan Martin downstream of the Choccolocco Creek confluence are consistent with concentrations for the lake, including the upstream portion of the lake that receives PCBs from upstream sources on the Coosa River.
- PCB concentrations are similar to PCB concentrations that have been selected as the long-term remedial goal for other PCB sediment sites.

The P/S and Trustee results for metals are also similar. The consistency in concentration and spatial trends are evident on Figures A-5 for mercury. Results for other metals sampled during these programs can be found in the OU-4 RI (Geosyntec 2019). These figures present the metals concentrations based on the distance from the sample collection locations to Lake Logan Martin.

2.1.3 Surface Water Investigations

Surface water investigations were completed in 1999 to evaluate flow and flow characteristics affecting the transport of suspended sediment, as quantified by TSS, and PCB transport in Choccolocco Creek and areas downstream of OU-4. Data were collected during six base-flow events from March 1999 through January 2000 and eight high-flow events from October 1999 through April 2000.

2.1.3.1 Hydrologic Assessment

A hydrologic assessment of the off-site area was completed by measuring flow at locations under base-flow and storm conditions (Figure A-2). Base-flow conditions were used to characterize low-flow regimes, while storm conditions were used to characterize high-flow regimes in the Choccolocco watershed.

Base-flow sampling targeted steady-state flow conditions occurring during the late winter, spring, and early summer of 1999. Except for the Neely Henry Dam and Upper Lake Logan Martin sampling locations that were not sampled during the June 1999 sampling event, all six base-flow events were completed. In Snow Creek, measured flows range from 1.6 cfs during the September event to 16 cfs during the March event. Downstream in Choccolocco Creek, at Highway 77, the flow ranged from 116 cfs during the September event to 783 cfs during the March event. For Lake Logan Martin, the average daily flows during the September and March sampling events were 4,350 cfs and 9,366 cfs, respectively, based on the hourly flow release data provided by Alabama Power Company (APCO).

2.1.3.2 Total Suspended Solids Sampling

TSS concentrations were measured from two locations in Lake Logan Martin. The Upper Lake Logan Martin station was located upstream of the Choccolocco Creek confluence with the lake, while the other, identified as the Mid-Lake Logan Martin station, was located downstream of the Choccolocco Creek confluence with the lake. Average base-flow TSS concentrations entering Lake Logan Martin past Neely Henry Dam were higher and more consistent than TSS contributed to the lake by Choccolocco Creek. The average TSS concentrations observed at Neely Henry Dam was 12 milligrams per liter (mg/L). TSS concentrations in Choccolocco Creek were more variable due to flow and season variations. TSS concentrations near the Neely Henry Dam in the Coosa River were more consistent due to the daily release of water over Neely Henry Dam. Within Lake Logan Martin, a significant increase in TSS concentrations was observed between Neely Henry Dam and the Route 20 bridge, upstream of the mouth of Choccolocco Creek, with the average concentration increasing from 12 mg/L to 21 mg/L. Downstream of Choccolocco Creek, the average TSS concentration was 19 mg/L, but the individual data tended to vary more at the lake sampling location downstream of Choccolocco Creek.

TSS concentrations at the lake sampling locations were more consistent and less responsive than in the creek locations due to the regulation of flow and the large volume of water, which assimilates incoming contributions of tributaries.

2.1.3.3 Particulate-Phase PCBs

PCBs are traditionally associated with three phases in surface water including freely-dissolved, dissolved organic carbon, or particulates in the surface water. Particulate-phase PCBs are subject

to transport mechanisms like settling, burial, and resuspension that can lead to movement and redistribution of PCBs within the environment.

During each base-flow event, surface water samples for each location were filtered, and the recovered solids were analyzed for particulate-phase PCB. Results of the PCB analyses showed decreasing particulate-phase PCB concentrations between Snow Creek and Lake Logan Martin. Particulate-phase PCBs were detected in all samples collected from Lake Logan Martin; all were less than 1.0 mg/kg and all but four were less than 0.1 mg/kg TSS. At each of the three lake locations, the highest concentrations were observed during the March 1999 sampling event, during which the highest daily average flows were also observed. The particulate-phase PCB concentrations generally decreased between Neely Henry Dam and the Route 20 sampling location upstream of Choccolocco Creek and increased between Route 20 and the sampling location downstream of Choccolocco Creek. From upstream to downstream, average particulate-phase PCB concentrations were 0.16, 0.090, and 0.15 mg/kg TSS. However, due to the limited number of samples and the variability of the individual concentrations, none of these averages were found to be statistically significant from one another.

Overall, the relationship between particulate-phase PCB concentrations and flow was not as well defined as it was for TSS. Within Lake Logan Martin, particulate-phase PCB concentrations were observed to be directly related to flow. The similarity of the data between the Lake Logan Martin locations and the significance of the combined data suggest that PCB transport mechanisms are relatively similar at the various locations with no notable impact from Choccolocco Creek during the sampled base-flow events.

Instantaneous particulate-phase PCB mass loads to the creek and lake (i.e., kg of PCBs per year) were calculated from each base-flow sample at each location using the PCB analytical data and flow measurements described above. These load estimates accounted for the TSS concentrations in the individual samples and the flow rate at which they were observed. Estimated base-flow loads in Choccolocco Creek were approximately 13 kilograms per year (kg/yr) at Neely Henry Dam, and 18 kg/yr and 17 kg/yr at Lake Logan Martin upstream and downstream of Choccolocco Creek, respectively. The base-flow loads calculated at Neely Henry Dam and Lake Logan Martin were approximately twice the base-flow loads measured in Choccolocco Creek (6.7 kg/yr at Flatbridge Road and 5.8 kg/yr at Highway 77).

The average of the instantaneous annualized loads was largely driven by the results of the March 1999 sampling event, which at most locations combined the highest observed flows with the highest observed particulate-phase PCB concentrations. Although this March 1999 result is considered base-flow conditions, excluding it from the average changed the load estimates dramatically, especially for Snow Creek and Lake Logan Martin sampling locations. Excluding the March sampling event, the annual particulate-phase PCB load estimates based on base-flow monitoring decreased from 13 kg/yr to 3.9 kg/yr at Neely Henry Dam, 18 kg/yr to 2.3 kg/yr at Lake Logan Martin upstream of Choccolocco Creek, and 17 kg/yr to 3.5 kg/yr at Lake Logan Martin downstream of Choccolocco Creek. Similar order-of-magnitude reductions were observed in Snow Creek and Choccolocco Creek. Both with and without the March 1999 sampling events data, it appears that Choccolocco Creek does not increase the net particulate-phase PCB transport in and through Lake Logan Martin.

2.1.3.4 24-Hour Sampling at Neely Henry Dam

Hourly sampling of the water column was performed over a 24-hour period to assess the temporal fluctuations of TSS, particulate-phase PCB concentrations, and water quality parameters in response to controlled water releases from Neely Henry Dam. The variability of hydraulic characteristics within a 24-hour period is important in the evaluation of transport, since water is typically released at the dam only during a small period of the day to support generation of electricity. If only these short periods of high flow were sampled, they would overestimate load calculations because there is no flow for the rest of the day. Conversely, if sampling occurred when no release was occurring, the corresponding load would be zero. Therefore, for the purposes of the Off-Site RFI, the average flow release (based on average of hourly flow data provided by APCO) for the day of sampling was used in the analysis of TSS and particulate-phase PCB data. This 24-hour intensive water quality survey was performed to assess the impact of regulated flow released on measured parameters.

Sampling was conducted over a 24-hour period during June 1999, just below the Neely Henry Dam. Every hour, water column measurements of turbidity and velocity were made 3 feet from the water surface, 3 feet from the channel bottom, and at mid-depth of the channel. Results of the 24-hour sampling showed minimal impact of short-term flow release on TSS or particulate-phase PCB concentrations. Increases in water depth, water velocity, and turbidity were observed during period of high flow.

2.1.3.5 Surface Water Investigation Conclusions

Based on the results of the surface water sampling completed under the Off-Site RFI, the following conclusions related to TSS and PCB transport were made:

- TSS and PCB transport in Snow Creek and Choccolocco Creek are extremely responsive to high-flow events, with most of the annual transport occurring during relatively few, short-lived, high-flow events. Conversely, Lake Logan Martin exhibits a more tempered relationship between PCB and TSS transport and flow, which is consistent between the three lake sampling locations.
- Choccolocco Creek does not appear to substantially increase the net mass of TSS and particulate-phase PCB transported through Lake Logan Martin. A significant increase in TSS concentration and load occurs between Neely Henry Dam and the Route 20 bridge, upstream of Choccolocco Creek.
- On an annual basis, estimated particulate-phase PCBs being transported over Neely Henry Dam exceeds particulate-phase PCB contributions to Lake Logan Martin from Choccolocco Creek under base-flow conditions. Solids and particulate-phase PCB loads from Snow Creek are negligible compared to solids and particulate-phase PCB loads in Lake Logan Martin, both downstream and upstream of Choccolocco Creek, and contributions from Choccolocco Creek do not appear to increase loads as measured from upstream and downstream of the creek.

2.1.4 Fish Tissue Investigations

Fish sampling was completed between 1969 and 1999 by the facility, ADEM, and the Alabama Department of Agriculture. Samples collected by the facility in 1971 and 1972 represent the most extensive historical record, with 214 and 158 samples, respectively. The data from 1969 through 1974 are concentrated on Choccolocco Creek, its tributaries, and the feeder streams of the Coosa River. The next sampling of fish tissue for PCB analysis occurred in 1989. From 1989 through 1993, 128 samples were collected from the Coosa River and Lake Logan Martin near its confluence with Choccolocco Creek. The historical data include 44 samples collected downstream of the confluence of Lake Logan Martin and Choccolocco Creek and upstream of Logan Martin Dam.

The fish data from 1970s through 1993 demonstrated a decline in PCB concentrations moving in a downstream direction from the Snow Creek confluence and a decline in PCB concentrations over time. The decline of PCB concentrations over time was hypothesized to be due to natural attenuation associated with the deposition of non-PCB containing sediment in the creek beds and lake (BBL 2000).

The 1996 fish study collected fish samples from 13 locations (Bayne 1997). The sampling locations were in Lake Neely Henry, the Coosa River, and Lake Logan Martin. Sampling conducted in 1996 included results for 1,097 fish tissue samples from 14 locations in or near Lake Logan Martin and in Choccolocco Creek.

The fish sampling program completed in November and December 1999 by P/S included sampling of adult bass and catfish, and YOY bass samples from seven locations, including locations in Lake Logan Martin (just upstream of Lake Logan Martin Dam) and Lake Neely Henry (just upstream of the Neely Henry Dam). Ten adult fish were collected at each of the seven sampling locations. YOY sampling activities included collecting five to seven samples at each of the sampling location. Each YOY sample included five individual fish that were composited into a single homogenate for analysis.

The average concentration of PCBs in adult bass for the three Lake Logan Martin sampling locations ranged from 0.41 to 1.1 mg/kg. The average PCB concentrations of the adult catfish for the three Lake Logan Martin sampling locations ranged from 0.51 to 0.94 mg/kg. These average concentrations of PCBs in bass and catfish from Lake Logan Martin and Lake Neely Henry were less than the Alabama Department of Public Health (ADPH) advisory level of 2 mg/kg. The results of the bass and catfish sampling conducted in Lake Neely Henry also demonstrated that PCBs are present in fish upstream of Lake Logan Martin, which is indicative of background levels of PCBs in fish on a regional basis and the likely transport of PCBs into Lake Logan Martin from upstream sources.

The results of the adult bass and catfish samples collected during the Off-Site RFI were compared with the results from the 1996 fish investigation conducted by Bayne. The results for Lake Neely Henry (Station 30) and Lake Logan Martin (Station 33, 38, and 39) demonstrated a consistent pattern of decline in PCB concentrations except for Station 33 (Figure A-2). At Station 33, PCB concentrations do not change significantly with respect to the variability of the data.

In 1999, during the Off-Site RFI, 50% of the bass samples collected were also evaluated for mercury. The detected concentrations of mercury ranged from 0.025 mg/kg at Station 30 (Lake

Neely Henry) to 0.91 mg/kg at New 99 (Choccolocco Creek). The average concentrations at the seven sample locations ranged from 0.037 mg/kg at Station 30 (Lake Neely Henry) to 0.73 mg/kg at New 99 (Choccolocco Creek).

PCB concentrations in YOY samples collected in Lake Neely Henry in 1999 ranged from 0.082 to 0.14 mg/kg, with an average concentration of 0.11 mg/kg. Consistent with the adult fish sampling, the YOY samples in Lake Neely Henry indicated that PCB concentrations are below the ADPH advisory level of 2 mg/kg and are present upstream of Lake Logan Martin. PCB concentrations in YOY samples collected from Lake Logan Martin in 1999 at Stations 33, 38, and 39 ranged from 0.067 to 0.43 mg/kg. PCB concentrations in Lake Logan Martin YOY samples did not vary significantly between stations or among the individual samples. The YOY data for locations sampled in Choccolocco Creek ranged from 3.1 mg/kg to 19 mg/kg. The YOY PCB concentrations for the creek decreased in the downstream direction (i.e., ADEM 96 to Station 35), reflecting both the historical trends in fish and sediment PCB concentrations and the results of the sediment investigation completed during the Off-Site RFI (Section 2.1.2).

Overall, the results of the fish sampling programs demonstrated that average PCB and mercury concentrations in bass and catfish fillets are below the ADPH advisory level of 2 mg/kg and 1 mg/kg, respectively, in Lake Logan Martin (i.e., the regulatory standard at the time). The data also demonstrate that PCB concentrations in fish are declining throughout the off-site area.

2.1.5 Habitat Assessment

A habitat assessment was conducted in September 1999 as part of the Off-Site RFI. Information was gathered on the following:

- Physical characteristics, including surrounding land use, local watershed erosion, identification of nonpoint source pollution, stream width, stream depth, high-water mark, velocity, presence of dams, channels, sediment odors, oils deposits and substrates, and a characterization of canopy cover
- Water quality parameters, including temperature, dissolved oxygen, pH, turbidity, along with stream type, water odors, and presence of oils
- Substrate and in-stream cover, including bottom substrate, embeddedness, channel alteration, bottom scouring and deposition, pool/riffle bend/run, bank stability, bank vegetation, and streamside cover
- Species list of benthic organisms and small fish

The habitat sampling stations include five locations with Choccolocco Creek, four locations within the hydraulic influence of Lake Logan Martin, and three tributary sampling stations, including Snow Creek, Eastaboga Creek, and Blue-Eye Creek (Figure A-2 and Attachment A-1). Each sampling station represents approximately 330 feet of stream.

The habitat assessment characterized habitats within the study area and assessed potential impacts from various environmental stressors in the area, including impacts from development, agricultural, and other activities within the overall watershed. Quantitative ratings of aquatic habitat at each sampling location were developed using the USEPA rapid bioassessment protocols

(USEPA 1999), which results in a scoring system ranging from 0 to 150 habitat assessment points, with 150 points representing the highest habitat quality.

Snow Creek had an overall habitat assessment score of 60 for the reach between the overpass at Recreation Drive to Interstate 20 in Anniston (Figure A-1-1b of Attachment A-1). Benthic macroinvertebrates were represented by 23 taxa in this reach. Midges (Chironomidae) and mayflies (Baetidae, and Heptageniidae) were the most common macroinvertebrates observed.

Choccolocco Creek sampling stations habitat assessment scores ranged from 20 to 113, generally improving downstream of Snow Creek (Attachment A-1). Between 21 to 31 benthic macroinvertebrate taxa were observed at each Choccolocco Creek sampling station. Benthic macroinvertebrate taxa observations included midges (Chironomidae) at some locations typically indicative of poor habitat quality, and mayflies (Ephemeroptera, Baetidae, and Heptageniidae), stoneflies (mostly Hydroptilidae), and freshwater snails (Viviparidae) at locations typically indicative of improved habitat quality.

Eastaboga Creek, a tributary to Choccolocco Creek, had an overall habitat assessment score of 69. Benthic macroinvertebrates were represented by 30 taxa in this reach. Freshwater snails were the most abundant taxa at this location.

Blue-Eye Creek, a tributary to the Coosa River, flows into Lake Logan Martin and is upstream of the confluence of Choccolocco Creek with Lake Logan Martin. The creek's overall habitat assessment score was 53. There was no indication of dominance or co-dominance by any group of taxa. Mayflies (Heptageniidae), midges (Chironomidae), damselflies (Coenagrionidae), dragonflies (Cordulegasteridae), predaceous diving beetles (Dytiscidae), riffle beetles (Elmidae), amphipods (Talitridae), caddisflies (Leptoceridae), freshwater clams (Sphaeriidae), and snails (Lymnaeidae) were found in equal abundance.

Since the limnetic, or open and well-lit water areas, stations within Lake Logan Martin and the Choccolocco Creek stations at the lake confluence could not be scored using the same habitat metrics as those used for Choccolocco Creek and tributary stations as described above due to water depth, these stations were evaluated based solely on the benthic macroinvertebrate community results. These stations included Station C159 and Station C175 (along Choccolocco Creek and near the confluence with the lake), a mid-pool station in Lake Logan Martin (off Choccolocco Creek), and a limnetic station off Blue-Eye Creek. For each of these stations, two benthic macroinvertebrate samples were collected from shallow and deeper water locations. In general, the benthic macroinvertebrate communities in the deeper samples were typically lower in abundance than in shallower samples likely due to the higher level of productivity that is typically found in the littoral depths of the lake. The deeper water stations were almost exclusively comprised of three taxa: midges (Chironomidae), mayflies (Baetidae), and water mites (Arrenuridae). Roundworms (Nematoda) and freshwater snails (Viviparidae) were also observed at the station off Blue-Eye Creek.

The mid-pool station at Logan Martin had the most organisms of these samples. In the littoral habitat, mayflies (Heptageniidae), midges, and freshwater snails were the most common taxa. The deeper station had mostly midges (Chironomidae), freshwater snails (Lymnaeidae and Neritidae), and clams (Unionid).

The habitat assessment and benthic macroinvertebrates community evaluation conducted as part of the Off-Site RFI indicate no widespread impairment is evident in Choccolocco Creek, associated tributaries, and receiving waters. The benthic macroinvertebrate observations in Lake Logan Martin indicate a community that is different in abundance and composition from those observed in Choccolocco Creek and its tributaries.

2.2 Contaminant Fate and Transport

This section evaluates data to understand the fate and transport of constituents downstream of OU-4. Because PCBs have been identified to have originated in OU-3 and have been the most prevalent constituent identified on the Site, they are the primary focus of this evaluation. Other constituents that might be of concern (including other organics and heavy metals) have a similar affinity for solids and will have similar fate and transport properties, regardless of their origination.

Historical fate and transport are important to understanding constituent distribution in areas downstream of OU-4. Equally important is that the area downstream of OU-4 is a receiving body (i.e., Lake Logan Martin) that was and continues to be affected by upstream sources. Given the hydraulic connectivity between OU-3, OU-1/OU-2, OU-4, and areas downstream of OU-4, remedial measures conducted in the upstream OUs (i.e., OU-1/OU-2 and OU-3) have already reduced the potential for ongoing migration to OU-4 and areas downstream of OU-4. Therefore, fine-grained particulates transported downstream and deposited in areas downstream of OU-4 will tend to have lower constituent concentrations than in the past, as evidenced by the pattern of PCBs in surface and subsurface soils and in the declining fish tissue concentrations over time.

From this combination of circumstances and the data collected to date, COCs, including PCBs, are primarily associated with soil and sediment. Surface water concentrations of PCBs generally reflect PCBs that are present in sediment or soil entering the creeks through surface water runoff. Once sediment and floodplain soil are addressed, surface water PCB concentrations are expected to decline in a corresponding manner.

The most significant source areas in OU-3 and in OU-1/OU-2 have been or will be addressed either through previous interim measures or under the current IROD (OU-3) and ROD (OU-1/OU-2). To a lesser extent than the original source areas, upstream sediment and creek banks are the only remaining potential sources to OU-4 and areas downstream of OU-4. The floodplain soil data indicate that the floodplain is primarily a depositional environment as evidenced by surface soil concentrations being lower than subsurface soil concentrations. Although floodplain areas, under certain circumstances, may represent exposure risks, these soils are not likely to erode or be transported downstream. The following is a detailed discussion of fate and transport factors in areas downstream of OU-4.

2.2.1 Source Areas

Although the Facility (OU-3) had documented elevated concentrations of PCBs in soil and groundwater and is a known source for historical releases of PCBs to OU-1/OU-2 and subsequently to OU-4 and areas downstream of OU-4, this source area for the Site has largely been controlled, and the potential for ongoing transport is limited. Remedial actions specified in the OU-3 IROD, including capping remaining soil areas at the Facility and additional groundwater

containment and treatment actions, have been implemented. With these actions now complete, OU-3 no longer serves as a source of PCBs to OU-1/OU-2 or OU-4.

Snow Creek and its floodplain (OU-1/OU-2) were affected by historical releases (primarily via surface water flow and overland flooding). PCBs migrated via surface water from OU-3 to Snow Creek and then to Choccolocco Creek (OU-4). During transport and migration, PCBs became entrained on fine-grained particulates; hence, transport and deposition are associated with fine-grained sediments. During high-flow and flooding events, both Snow and Choccolocco Creeks overflow their banks, and fine-grained particulates are deposited in their respective floodplains. The floodplains are primarily depositional and do not represent measurable sources to OU-4 and areas downstream of OU-4. Upcoming remediation under the OU-1/OU-2 ROD will further reduce the potential for sediment and creek bank soil in Snow Creek to be transported downstream to OU-4 and areas downstream of OU-4.

The secondary release mechanisms are associated with surface water runoff include mobilization or movement of sediment that has settled out in Snow Creek and Choccolocco Creek. Future remedial activities in Snow Creek and Choccolocco Creek as part of the OU-1/OU-2 remedy and the OU-4 remedy could mobilize sediment and PCBs that have been effectively sequestered for many years. These future dredging or excavation of this sediment will loosen well-bedded sediment and temporarily expose higher concentration materials from older deposition. No matter how diligent the engineering controls, excavation of this sediment with relatively high PCB concentrations may release both particulate- and dissolved-phase PCBs (and other constituents) downstream. There is potential that the OU-1/OU-2 and/or OU-4 sediment remediation will cause a measurable increase in PCB concentrations in sediment, surface water, and, possibly, fish tissue. Once the remediation of Snow Creek and Choccolocco Creek is complete, downstream migration of PCBs from these creeks is expected to decrease to very low levels.

An additional secondary release mechanism is the potential release of PCBs associated with eroding creek banks. While PCBs that have migrated into floodplain soil areas generally reside there for the long term, soil located in the riparian zone adjacent to the creek has the potential to erode as part of natural geomorphological processes. The degree to which creek bank areas represent meaningful secondary PCB sources is a function of erosion potential and the associated PCB concentration of this riparian soil.

2.2.2 Potential Routes of Migration

Data collected over the past 20 years for the Site support the CSM initially summarized in 2003 (BBL 2003). Since 2003, additional data collected have affirmed the model fate and transport mechanisms and further refined the nature and extent of constituents.

The primary release mechanism of PCBs from OU-3 was identified as surface water runoff via the 11th Street Ditch and subsequent downstream flow into Snow Creek. Migration from the creek to floodplain soil occurred during periodic flooding when fine-grained particles with PCBs deposited within the lateral limits of the 100-year floodplain. Several potential release mechanisms are discussed below, including surface water transport, leaching, and volatilization/dust, that may have impacted the areas downstream of OU-4.

2.2.2.1 Surface Water and Sediment

The surface water migration pathway from OU-3 to Snow and Choccolocco Creeks was the historical route for PCBs absorbed on to particulates, primarily fine-grained particulates. The movement of sediment (and, therefore, PCBs) within the creeks and their respective floodplains may have occurred during and immediately following significant precipitation events. Historically, surface water runoff from the OU-3 followed a series of drainage ditches that, combined with overland flow, led to the 11th Street Ditch. From the 11th Street Ditch, particulates were conveyed via surface water to and along Snow Creek. During periods of higher flows, the waters of Snow Creek would transport PCBs into the OU-4 portion of Snow Creek and Choccolocco Creek, and eventually into the receiving waters of Lake Logan Martin. During these high-flow events, particulates in the surface waters of the OU-4 portion of Snow Creek and Choccolocco Creek were transported outside of the banks into the broader portions of the floodplains. Once the surface waters were outside of the creek bank, water velocities dropped dramatically due to the increased cross-sectional area for flow, and particulates (and PCBs) in the overflow waters were deposited within the floodplain.

This process of downstream migration, flooding, and deposition is the source for the historical sediment deposits in areas downstream of OU-4 that contain PCBs and other COCs from the Snow Creek watershed. As source control measures for OU-3 and OU-1/OU-2 (upstream of OU-4) have been implemented, the particulate PCB concentrations have decreased over time. This reduction in particulate PCB concentrations is evident because PCB concentrations in the surface sediment are lower than the PCB concentrations in the deeper sediment.

2.2.2.2 Floodplain Soil

Migration from surface water to floodplain soils during overbank flooding events was the primary historical transport pathway. Based on this transport mechanism and as confirmed by the floodplain soil data collected from OU-4 and areas downstream of OU-4, the lateral extent of PCB-containing soils in floodplain areas is generally within the 100-year floodplain. Once flooding occurs and water is in an overbank condition, water velocities over the floodplain are much lower than in the creek channels. This low water velocity creates a primarily depositional environment in the floodplain, and floodplain soil is not likely to further erode or migrate. Soil with high constituent concentrations also provides the potential for constituents to dissolve or leach into groundwater. Because PCBs have low water solubility and a high affinity for particulates and because they are primarily confined to shallow soil rather than in soil below the groundwater table, PCB migration from soil to groundwater is not of concern. This is supported by soil and groundwater data from OU-3, OU-1/OU-2, and OU-4 where groundwater concentrations above maximum concentration limits have not been identified in areas downstream of OU-4.

2.2.2.3 Groundwater

Based on the data from OU-3, OU-1/OU-2, and OU-4, constituent migration via groundwater to areas downstream of OU-4 is not a viable pathway. In some localized areas near the border between OU-3 and OU-1/OU-2, groundwater concentrations are influenced by soil concentrations. PCBs are leaching from soil to groundwater on a limited basis in OU-1/OU-2 (well T-11), in association with relatively high soil concentrations and lower chlorinated PCB compounds. Both the OU-3 IROD and the OU-1/OU-2 ROD address the additional steps that have been or will be

taken to address the limited additional groundwater remediation that will be needed in these areas. For both OUs, the groundwater issues are localized near OU-3 and there are no indications that groundwater is affected as far away as Lake Logan Martin.

OU-4 studies were also conducted to confirm that groundwater was not a medium of concern downstream of OU-1/OU-2 and OU-3. This included installing and sampling a groundwater well in the upper reaches of OU-4 (T-17). PCBs were not detected in the groundwater samples collected from this well. In addition, two residential drinking water wells located in the downstream portion of OU-4 were sampled and analyzed for PCBs. In both cases, PCBs were not detected. The combination of investigation results for each of the OUs at the Site support the conclusion that migration to Lake Logan Martin via groundwater has not occurred and groundwater is not a pathway of concern.

2.2.2.4 Volatilization/Fugitive Dust

Migration of PCBs in air is not a significant pathway to Lake Logan Martin from OU-1/OU-2, OU-3, and OU-4. The air data collected for OU-3 and OU-1/OU-2 show that air is not a concern from a concentration or migration pathway perspective.

2.2.3 Contaminant Persistence

PCBs are known to be persistent organic chemicals over a wide range of conditions. Although some small amount of weathering and attenuation will occur, chemical degradation, substantial reduction in concentrations, or changes in distribution patterns is not expected over the near term. Although some anaerobic dechlorination may be occurring in PCBs in deeper sediments in the backwater area, it is not likely to be the primary contributor to changes in surface sediment concentrations, and it is not likely to be occurring at rates that would change exposure risks or risk-based decisions. The non-PCB COCs for areas upstream of Lake Logan Martin (i.e., PCDD/DFs and several metals) are similar to PCBs in that they have an affinity for fine-grained particulates and are persistent over time. These non-PCB constituents are often collocated with PCBs in backwater area sediment due to the depositional nature of the backwater area and its hydraulic connection to the industrialized Snow Creek watershed.

2.2.4 Migration Pathways

Historically, the primary mechanism for the movement of PCBs from OU-3 was surface water discharge/runoff to Snow Creek via the 11th Street Ditch. From Snow Creek, surface water and suspended particulates were further transported to OU-4 and areas downstream of OU-4. Fine-grained particulates were deposited in the backwater area created by the confluence of Snow and Choccolocco Creeks. During flood events, those particulates were transported and deposited in the Choccolocco Creek floodplain. With a significant number of source control measures already implemented for OU-1/OU-2, OU-3, and OU-4 and subsequent measures to be implemented in OU-1/OU-2 and OU-4, the concentration of constituents associated with suspended solids has decreased to the point where the potential for the migration of constituents via surface water is low. PCBs remaining in Snow Creek (OU-1/OU-2) sediment will be addressed in the OU-1/OU-2 remediation and the concentrations potentially available for downstream transport will be further decreased. Also, the OU-4 floodplain is depositional and does not represent a secondary source area or have potential for migration. The most significant source that could represent secondary or

tertiary source release mechanisms are the sediments in Choccolocco Creek and the potential for erosion and migration via surface water flow. Sediment and creek bank stability conditions are key factors in understanding this potential.

Surface water and sediment data were evaluated using an integrated, weight-of-evidence approach to assess the stability of sediment in Choccolocco Creek. The findings were presented in the OU-4 *Sediment Stability Technical Memorandum* dated June 2010 (Arcadis 2010). The findings of the memorandum are important relative to migration pathways for OU-4 as the PCB-containing sediments currently in OU-4 represent a potential ongoing migration pathway to Lake Logan Martin. The OU-4 sediment stability evaluation included several lines of evidence and focused on the Choccolocco Creek portion of OU-4. The evaluation considered a combination of physical characteristics of Choccolocco Creek and chemical data to understand where PCBs have been deposited in the creek bed and how likely these are to migrate under base-flow and high-flow conditions. The following are the general characteristics that were considered:

- Water velocity and flow
- Bathymetry and gradient
- Sediment thickness and grain size distribution
- PCB data
- Radioisotope dating
- Channel alignment

Based on an evaluation of the factors listed above, the technical memorandum concluded that most of the sediment in Choccolocco Creek was not stable. However, there were three defined portions of the creek where the sediment was stable. These three creek areas include a portion of the backwater area, sediment located just upstream of Jackson Shoals that are influenced by the former dam structure, and the embayment area downstream of Jackson Shoals that is influenced by the dam at Lake Logan Martin.

3. IDENTIFIED DATA GAPS AND PROPOSED SPECIAL STUDIES

The special studies, which are proposed for areas downstream of OU-4, were developed after conducting a data gap analysis to identify the additional information needed to support future decision-making by USEPA.

During the review of existing data from historical reports summarized in Section 2, data needs and data gaps were identified for sediment, surface water, and fish-tissue matrices in Lake Logan Martin regarding the nature and extent of PCBs and other COCs in these downstream areas. Descriptions of these data gaps and proposed scopes of work are provided in the following subsections. The special studies have been designed to collect the necessary and relevant information to support USEPA's evaluation of waterbodies located downstream of OU-4.

The special study results will be presented in a stand-alone report and will include comparisons to time-based concentration trends and risk levels. The evaluations will include the upstream portion of Lake Logan Martin as an indicator of upstream background concentrations and the downstream portions of the lake as a surrogate for conditions in upper Lay Lake. If risk levels for lower Lake Logan Martin are significant, the special studies could be expanded to include the upper portion of Lay Lake. Based on the historical PCB concentrations for fish collected in Lay Lake and the concentration declines over time, conditions in Lay Lake are not anticipated to reflect significant risks. That said, the gated approach described above for potentially conducting special studies in Lay Lake is both streamlined and protective.

3.1 Data Gaps

Most of the existing soil, sediment, and surface water data for Lake Logan Martin were generated as part of the 1999 Off-Site RFI investigation or the 2013 Trustee-led investigation. Over 2,600 fish tissue samples have been collected and analyzed by ADEM and P/S over the past 20 years. However, in the past 10 years data collection has become less frequent. Past investigations have shown PCB and other COC concentrations declining over time in soils, sediment, surface water, and fish tissue of Lake Logan Martin, and additional declines are expected as remediation is conducted for the OU-1/OU-2, in accordance with the OU-1/OU-2 ROD, and OU-4 as described in the OU-4 FS. Since these investigations have been completed, upstream remedial activities have occurred that have likely limited transport of PCBs to Lake Logan Martin from the Site through soil, sediment, and surface water migration pathways.

Additional sediment, surface water, and fish-tissue sampling in Lake Logan Martin will provide information to support the following:

- Document continued concentration declines and exposure conditions.
- Assess remedy effectiveness monitoring for upstream sources, including the Coosa River and the Site.
- Assist with closure for the total maximum daily load process for the Coosa River that is linked to completing upstream source controls, including the Site remedies.

The proposed special studies are for the following geographic regions:

- Between Lake Neely Henry and the confluence of Choccolocco Creek with Lake Logan Martin
- Downstream of the confluence of Choccolocco Creek with Lake Logan Martin dam

3.2 Sediment Special Study

Surface sediment samples (i.e., the top 6 inches of sediment) will be collected from seven locations between Lake Neely Henry and the dam at Lake Logan Martin (Figure A-6). The sediment samples will be collected using an Ekman grab sampler, and analytical results of these surface sediment samples will help update surface sediment characterization. The locations will be collocated to the extent practical with surface water sampling locations. The exact location, dimension, and size of each area of sediment samples will be determined based on the area used for fish collection (see Section 3.5). It is expected that these areas will encompass many acres. There are 7 sample stations proposed (Stations 30, 33, 34, 36, 37, 38, and 39; Figure A-6), and 10 samples will be collected from each sample station. The sampling locations (arranged in a grid-like pattern) will be used to represent the approximate exposure area and habitat of the collected fish that are also proposed to be sampled from these locations. All samples will be individually analyzed for PCB Aroclors, PCB homologs, 12 dioxin-like (DL)-PCB congeners, mercury, and TOC. Surface sediment sampling locations will be surveyed using conventional ground survey methods or global positioning system (GPS) technology.

In addition to grab samples, sediment traps will be deployed in low-energy areas to document changes in PCB concentrations settling out of the water column over time. These data will be important to documenting the effectiveness of upstream source control actions and monitored natural recovery. There are seven sample stations proposed (Stations 30, 33, 34, 36, 37, 38, and 39; Figure A-6). The sediment traps will be designed to collect localized, time-integrated data on the deposition of sediment for a range of flow conditions in the system. Data from sediment traps provide additional information on suspended sediment conditions, particulate-phase PCB concentrations, and deposition rates during each sampling period. At each of the deployment locations, a set of three sediment traps will be deployed for a period of 6 months to 1 year. Once the sediment traps are deployed, they will collect sediment that settles out of the water column over the deployment duration. After the deployment period and prior to retrieval, the equipment will be observed to ensure it remains in place and in the proper orientation and to note the conditions of the equipment and any concerns or issues. Accumulated sediment from the traps will be measured, photographed, and collected. Samples will be submitted for laboratory analysis for the following parameters (in order of priority): PCB Aroclor, PCB homologs, 12 DL-PCB congeners, mercury, and TOC. Sediment trap locations will be surveyed using GPS technology.

3.3 Surface Water Special Study

Surface water will be sampled at the seven sampling stations shown on Figure A-6 using grab sampling techniques and in situ passive sampling techniques. Grab sampling techniques (e.g., Kemmerer sampler) will be used to measure total[2] and dissolved concentrations of PCBs and

[2] Total concentration in surface water includes concentrations associated with suspended particles and colloids.

mercury in surface water. In situ passive samplers, specifically commercially available polyethylene (PE) passive samplers and peepers, will be used to measure PCB (PCB Aroclors, PCB homologs, and DL-PCB congeners) and mercury concentrations, respectively, truly dissolved in surface water (i.e., not associated with suspended particles or colloids) and bioavailable. Total (unfiltered and filtered) surface water sample results will be compared to applicable state and federal ambient water quality criteria (AWQC) as part of assessing remedy effectiveness monitoring for upstream sources, including the Coosa River and the Site. The surface water results for PCBs from the passive samplers will be compared with the AQWC values and used in combination with the fish tracking results and PCB concentrations measured in fish for assessing long-term remedy performance.

The PE samplers will be preloaded with stable isotope-labeled performance reference compounds, including ^{13}C PCB-28, ^{13}C PCB-47, ^{13}C PCB-70, ^{13}C PCB-80, ^{13}C PCB-111, ^{13}C PCB-141, and ^{13}C PCB-182. The peepers will be preloaded with a bromide tracer that acts as a performance reference compound. The performance reference compounds allow the data to be corrected to equilibrium concentrations based on the loss of these compounds from the samplers. Once deployed, the sampling devices will be left in place for 4–8 weeks. At the end of deployment, the passive samplers will be retrieved and shipped for analysis of PCB Aroclors, PCB homologs, DL-PCB congeners, and mercury.

3.4 Fish Tissue Special Study

The fish monitoring program is proposed to characterize fish tissue PCB and mercury concentrations as a function of location along the Coosa River. There are 7 proposed sampling locations between Lake Neely Henry and the dam at Lake Logan Martin (Figure A-6). The fish tissue results from Stations 30, 33, and 34 can also be used to evaluate regional background concentrations as they are located upstream of the confluence with Choccolocco Creek. Surface water and sediment will also be sampled at the fish tissue sampling stations to assist in characterizing exposure conditions. The general approach collecting fish samples builds on the work conducted for OU-4 under the CERCLA and RCRA programs and work conducted by ADEM and will be based on the technical approach provided in *Using Fish Tissue Data to Monitor Remedy Effectiveness* (USEPA 2008). The conceptual proposed special study for Lake Logan Martin includes different trophic levels and feeding guilds, species targeted by local anglers, collection slot size based on ADEM procedures, and comparability with historical data:

- 10 individual fillet and 10 individual whole-body samples of largemouth bass (*Micropterus salmoides*) or spotted bass (*Micropterus punctulatus*)
- 10 individual fillet and 10 individual whole-body samples of panfish (sunfish [Centrarchidae] or crappie [Pomoxis])
- 10 individual fillet and 10 individual whole-body samples of channel catfish (*Ictalurus punctatus*) or blue catfish (*Ictalurus furcatus*)

Whole-body fish samples will consist of fish within a size range expected to be consumed by wildlife receptors. Finalization of proposed sample locations, species, numbers of samples, and sampling approaches (grab versus composites) will be conducted as part of developing the FSP

and the Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) in collaboration with USEPA. For example, if the results of a power analysis conducted using the approach presented in USEPA (2008) indicates that it is preferable to collect five composite samples of each species and that each composite sample be comprised of at least five fish, then the FSP will be developed accordingly.

The fish samples will be collected using an electrofishing boat and supplemented with other methods as needed (i.e., trotlines, gill nets, seine nets, or fish traps). Fish collection will be proposed for early fall (October and November) prior to the winter drawdown and cold temperatures, which can limit fish availability. The individual skin-off fillet fish tissue samples will be analyzed for PCB Aroclors and homologs, mercury, and percent lipids. The whole-body fish samples will be analyzed for these same constituents plus DL-PCB congeners.

3.5 Fish Movement Special Study

There are many methods of monitoring fish movement, including radio and acoustic telemetry, satellite tracking, mark recapture studies using fin clipping or tagging, and passive integrative transponder tagging among others. For this study, acoustic telemetry is proposed as it provides multiple data points and can provide records of continuous fish movement rather than limited individual data points for recaptured fish. Also, because fish tracking technology is changing rapidly, an additional assessment of methods would be conducted as part of developing the FSP and UFP-QAPP. Based on current technologies, the proposed fish movement study would combine active and passive acoustic tracking including the following:

- Passive tracking: A series of receiver gates (line of receivers placed with overlapping detection radii) will be placed at strategic areas such as narrow choke points close to the five historical ADEM fish sampling locations (Stations 33 through 37; Figure A-6). Collected fish will be surgically implanted with a battery powered tag with a unique code. When fish pass by the gates the receivers record the unique sound-pulse that would be emitted by each tag. This documents the fish's location.
- Active tracking: periodically within the study period a boat-mounted mobile receiver would be used to identify specific locations of tagged fish. This information would be used to track fish that may not be moving past one of the passive receiver gates.

Sample sizes would be determined as part of developing the FSP and would target the same trophic groups/species used in the tissue monitoring program excluding panfish. The small size of the panfish limits tags with sufficient battery life to last the duration of the study. Similar sized fish would be targeted for the telemetry study as collected in the tissue monitoring; nevertheless, tag weights will be kept to less than 2% of total fish weight, so larger individuals may be tagged depending on availability and tag size selected.

Collected fish will be measured to ensure suitable size for the tag. Tags will be surgically implanted within the fish and tested to ensure proper operation prior to releasing the fish. Battery life depends on tag size, frequency, and pulse rate, so the duration of the study can be predicted, and variables can be adjusted for the desired duration. For the proposed study it is assumed a roughly 9-month duration will be selected. This duration would require three sets of data downloads and receiver battery replacement. During each replacement and download, up to 4 days of active tracking could

be needed, and adaptive management may be used based on the results of the first tracking study. Changes to the program may be considered for following events.

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Figures

City: SYR Div/Group: SWG Created By: K.IVES Last Saved By: ldrum
Anniston (B0010291.2010.00001)
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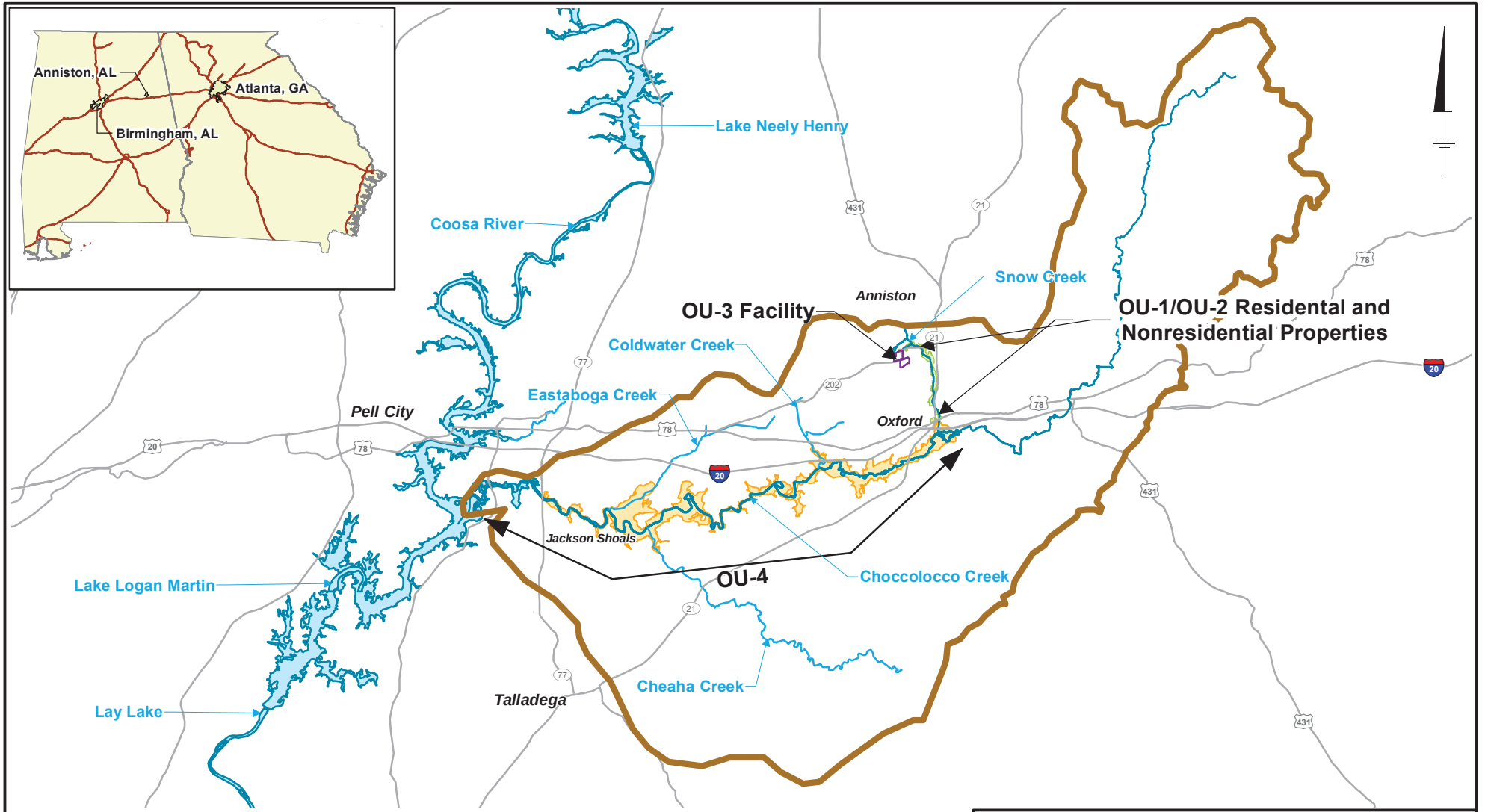

Notes:
OU: operable unit
PCB: polychlorinated biphenyl

Anniston PCB Site
Anniston, Alabama

OU-4 FS Report
Appendix A: Special Studies

Site Location Map

Solutia

Figure
A-1

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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Lake Neely Henry
STATION 30
Neely Henry Dam
STATION 31 (LOG 20)
STATION 32 (LOG 18)
BLUE01
STATION 33 (LOG 16)
BLUE02
STATION 34 (LOG 14)
Logan Martin Upstream
STATION 36 (LOG 11)
OU-4 Boundary
STATION 38 (LOG 6)
STATION 37 (LOG 9)
Logan Martin Downstream
STATION 39 (LOG 3)
LOG 1

Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. ADEM: Alabama Department of Environmental Management
mg/kg: milligrams per kilogram
ND: nondetect
OU: operable unit
PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Surface Water Suspended Sediment/PCB Sampling Location
Surface Sediment and Fish Sampling Location
Geochronological Sampling Location
2000 Sampling Event
Creek

Habitat Assessment Sampling Area
Floodplain Boundary
Jackson Shoals to Lake Logan Martin

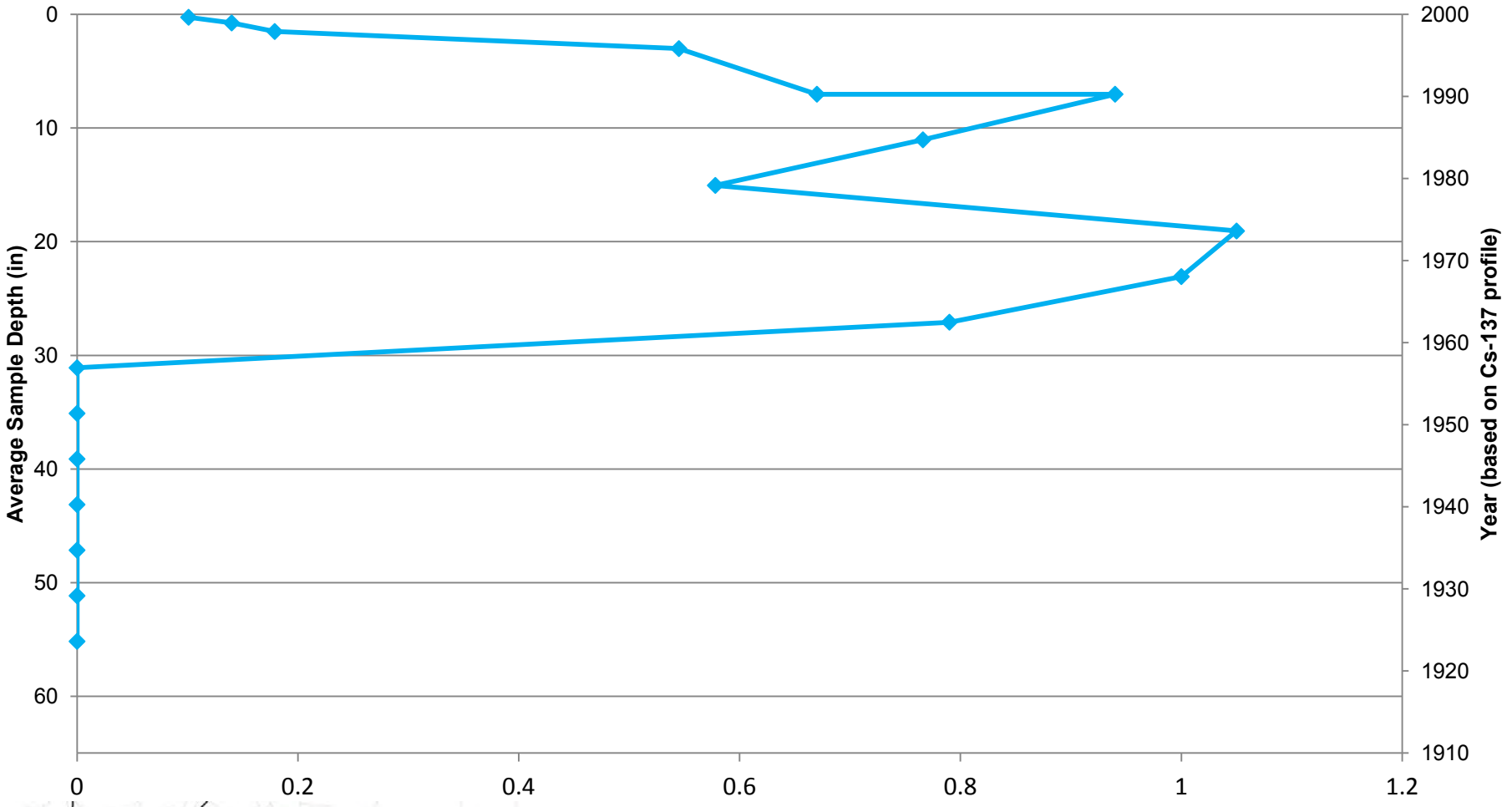
0 10,000 20,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results in Lake Logan Martin

Solutia

Figure
A-2



Notes:
Dates based on cesium-137 (Cs-137) profile.
First detectable Cs-137 reported between 26- and 28-inch sample depth, which corresponds to the 1954 horizon.

Cs-137: cesium-137
in: inches
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

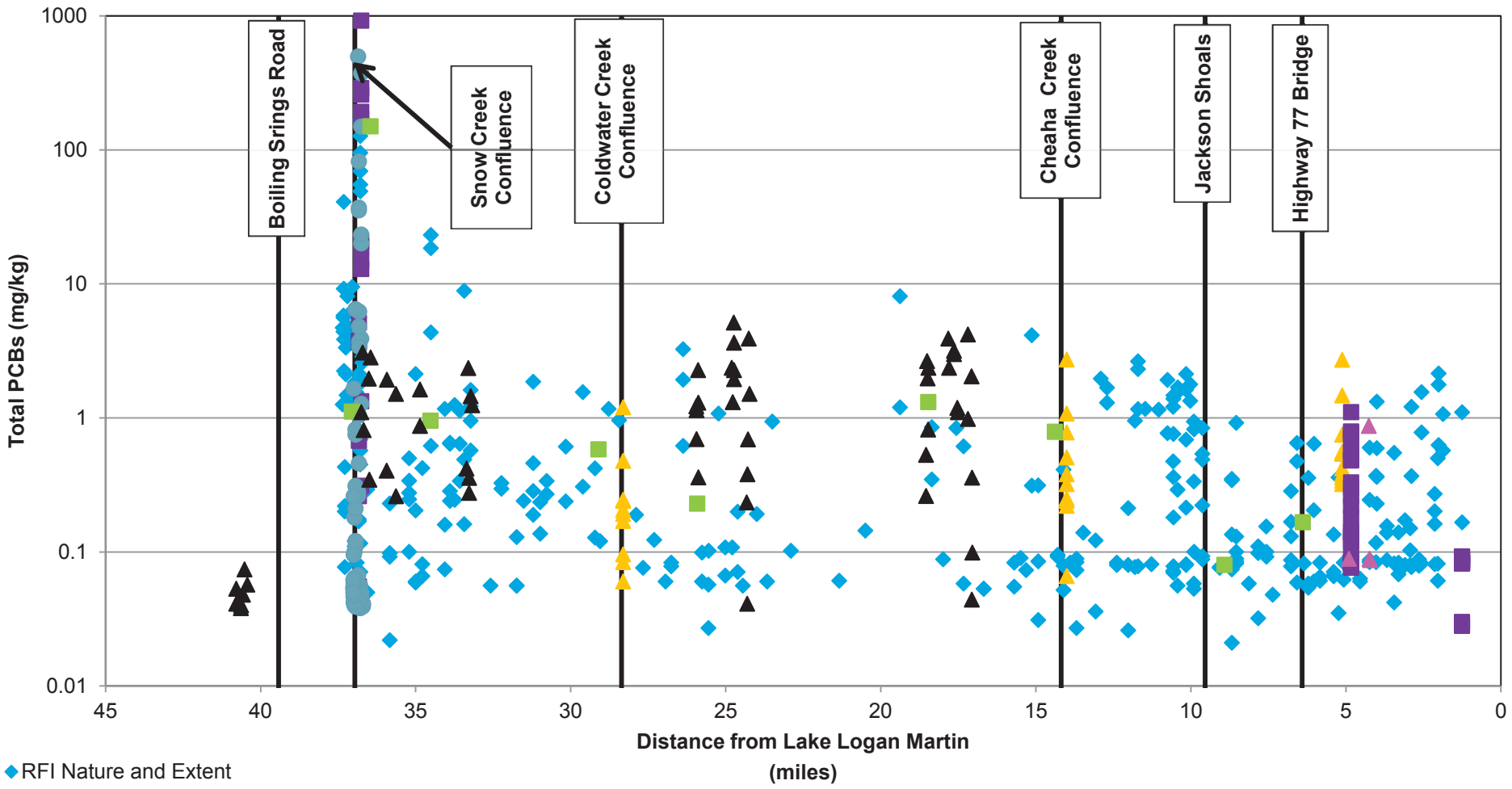
Anniston PCB Site
Anniston, Alabama

Remedial Investigation Report for OU-4

Geochronological Profile/Embayment Area Sediment PCB: MLM-GEO-7

Solutia
Ingenuity Productivity Performance

Figure
A-3



- RFI Nature and Extent
- RFI Fish Tissue Sampling Locations
- Geochronological
- RI/FS Nature and Extent
- RI/FS Fish Tissue Collection Locations
- RI/FS Ecological Program
- Lake Pointe

Notes:

mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl

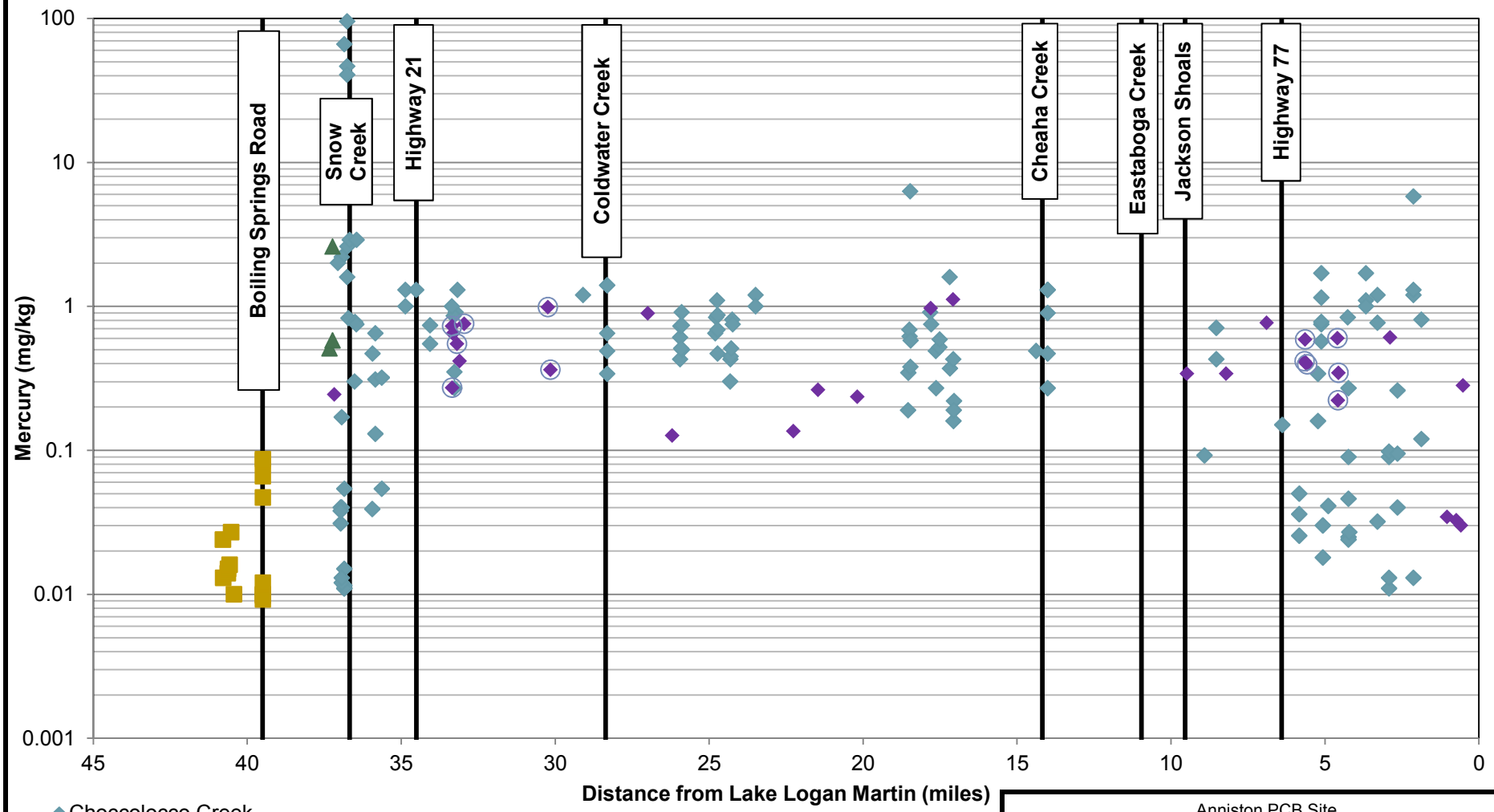
Anniston PCB Site
Anniston, Alabama
OU-4 FS Report
Appendix A: Special Studies

Total PCB Concentrations in Sediment with Distance from Lake Logan Martin by Collection Program

Solutia
Ingenuity Productivity Performance

Figure
A-4

12/2/2015
G:\PROJECTS\Anniston\Trustees 2013 Data\COPC_OU-4_Sed-Metals-Dist_20151202.xlsxFigure 7



- Choccolocco Creek
- Choccolocco Creek Upstream
- OU-4 Portion of Snow Creek
- Trustees 2013 Sediment Data
- Off-Channel Location

Notes:
mg/kg = milligrams per kilogram
OU = operable unit

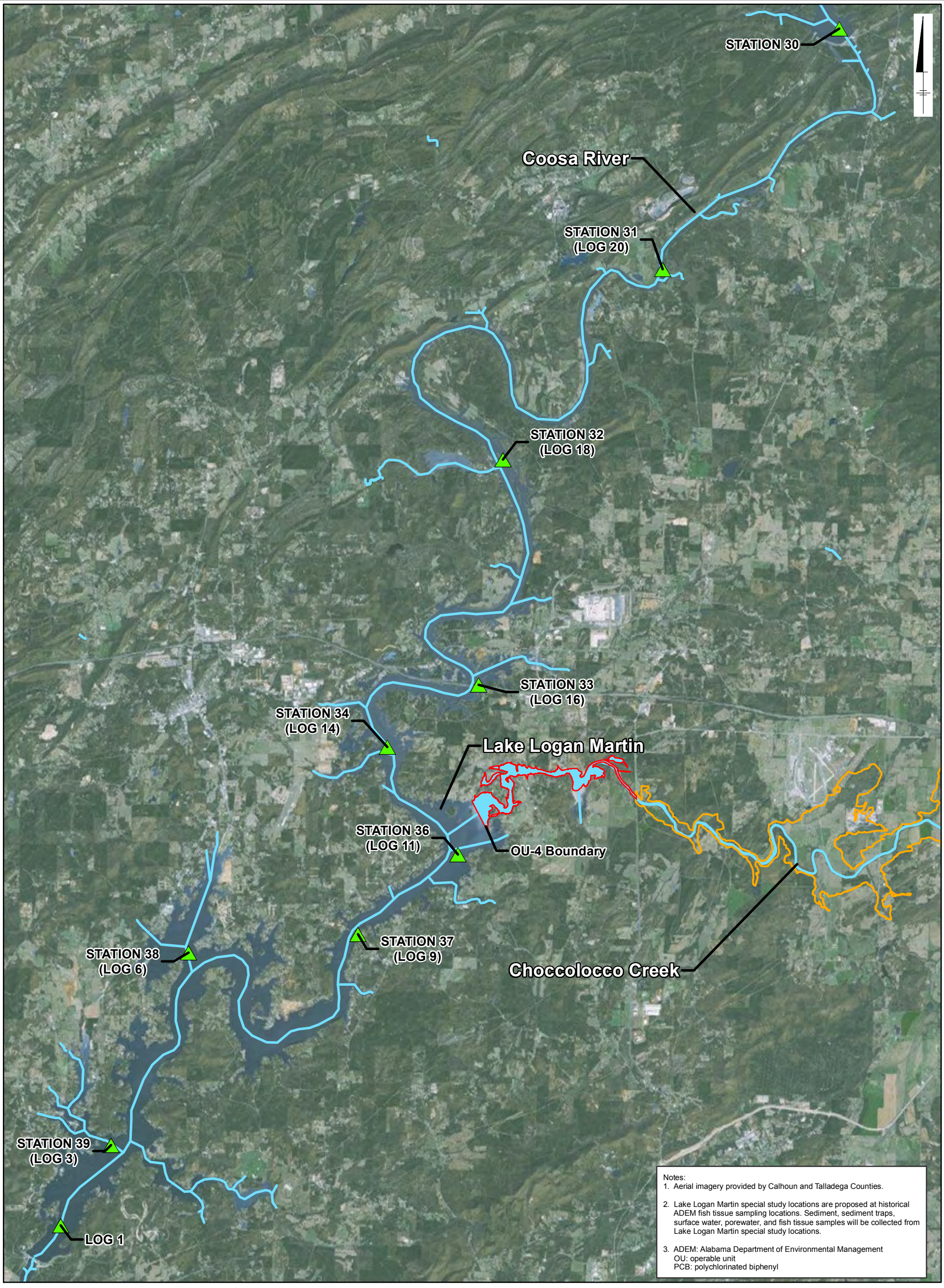
Anniston PCB Site
Anniston, Alabama
OU-4 FS Report
Appendix A: Special Studies

Mercury Concentrations in Sediment with Distance from Lake Logan Martin

Solutia

Figure
A-5

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\A\Anniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-6_Special Study.mxd 4/21/2022 10:02:07 AM



Legend

- Special Study Sampling Location
- Creek
- Floodplain Boundary
- Jackson Shoals to Lake Logan Martin

0 10,000 20,000 Feet

Graphic Scale

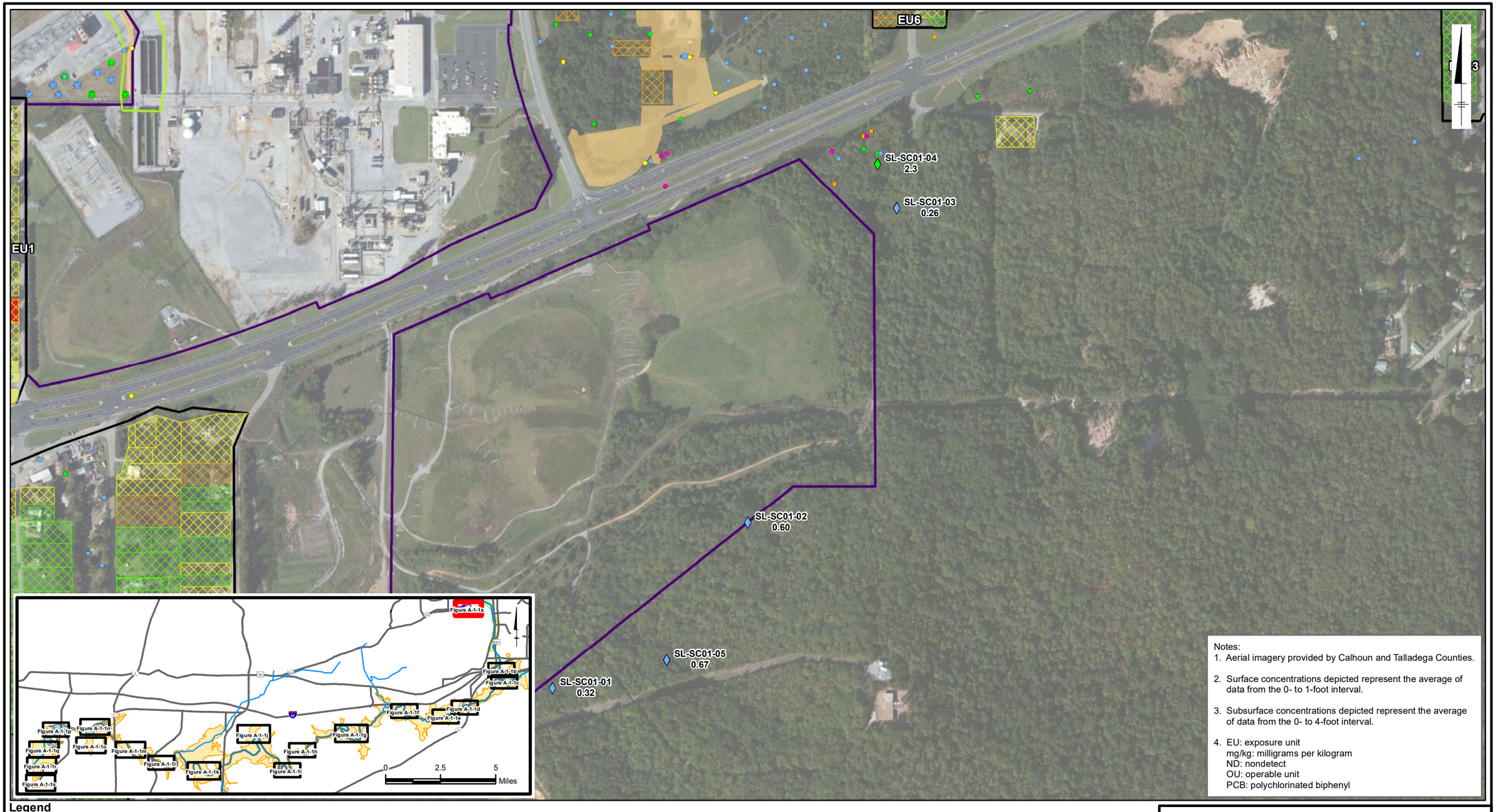
Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Special Study Sampling Locations

Solutia

Figure
A-6

Attachment A-1



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. EU: exposure unit
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Creek
- OU-1/OU-2 Downgradient

Residential Parcels Sampled
- Residential > 1 mg/kg
- Removal Conducted
- Residential < 1 mg/kg

- Interim Measure and Other Remedial Actions
- Exposure Unit
- Operable Unit 3
- Special Use: High-Activity Area
- Special Use: Low-Activity Area

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 400 800 Feet
Graphic Scale

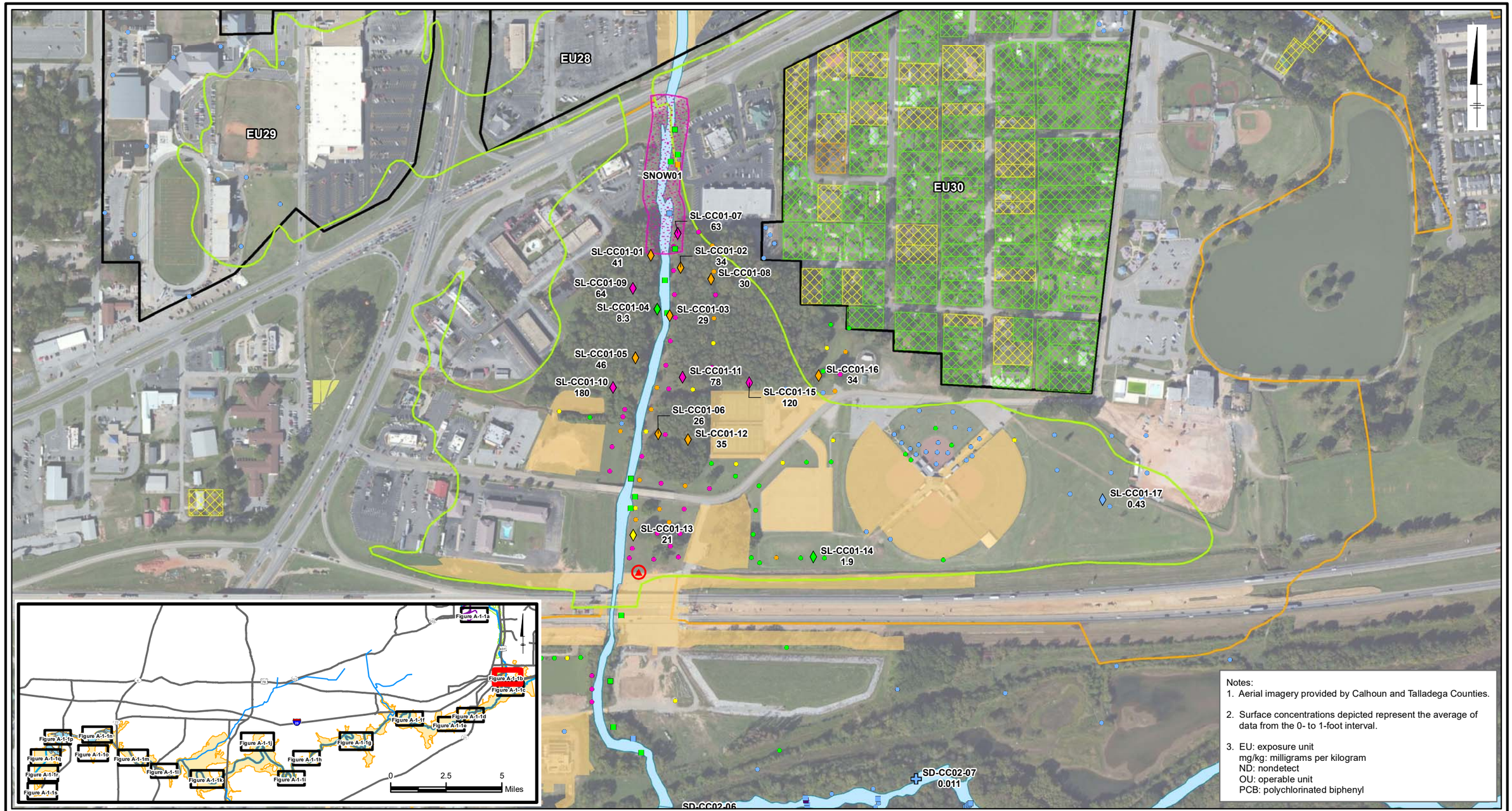
Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1a

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\Anniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1_FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. EU: exposure unit
   mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 25 to < 50
- ≥ 500

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Surface Water Suspended Sediment/PCB Sampling Location
- Flow Mesurement
- Habitat Assessment Sampling Area

- Creek
- OU-1/OU-2 Downgradient
- OU-4 100-Year Floodplain

Residential Parcels Sampled
- Residential > 1 mg/kg
- Removal Conducted
- Residential < 1 mg/kg

- Interim Measure and Other Remedial Actions
- Exposure Unit
- Special Use: Low-Activity Area

0 400 800 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1b

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\AAnniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1_FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM

SD-CC02-07
0.011

SD-CC02-06
0.28

SD-CC02-08
0.090

SL-CC02-02
0.96

SL-CC02-03
1.8

SL-CC02-05
0.71

SL-CC02-04
17

SL-CC02-06
1.0

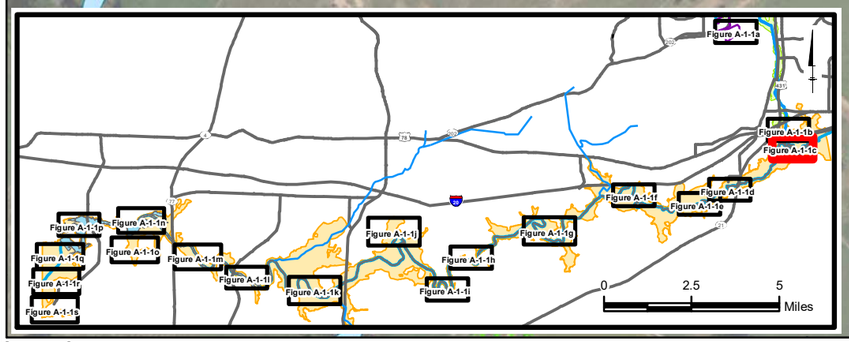
SL-CC02-07
0.18

SD-CC02-05
0

SD-CC02-13
0.0021

CU3

SD-CC02-03
0



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 50 to < 500
- ≥ 500

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Surface Water Suspended Sediment/PCB Sampling Location
- Flow Mesurement
- Habitat Assessment Sampling Area
- Creek
- OU-4 100-Year Floodplain

Residential Parcels Sampled
- Removal Conducted
- Residential < 1 mg/kg

- Interim Measure and Other Remedial Actions

0 400 800
Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1c

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\Al\Anniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1_FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM

SL-CC03-10
1.9

SL-CC03-09
1.4

SL-CC03-06
8.9

SL-CC04-02
0.38

SL-CC03-05
20

SL-CC04-01
6.5

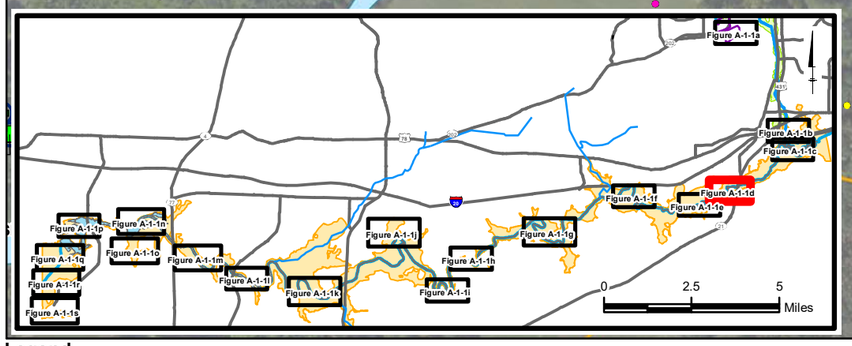
SL-CC03-07
2.2

SL-CC03-02
3.7

SL-CC03-01
2.7

SL-CC03-08
8.9

SL-CC03-03
11



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ≥ 1 to <10
- Off-Channel Sediment Location

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Creek
- OU-4 100-Year Floodplain

Residential Parcels Sampled
- Removal Conducted
- Residential < 1 mg/kg

0 400 800 Feet
Graphic Scale

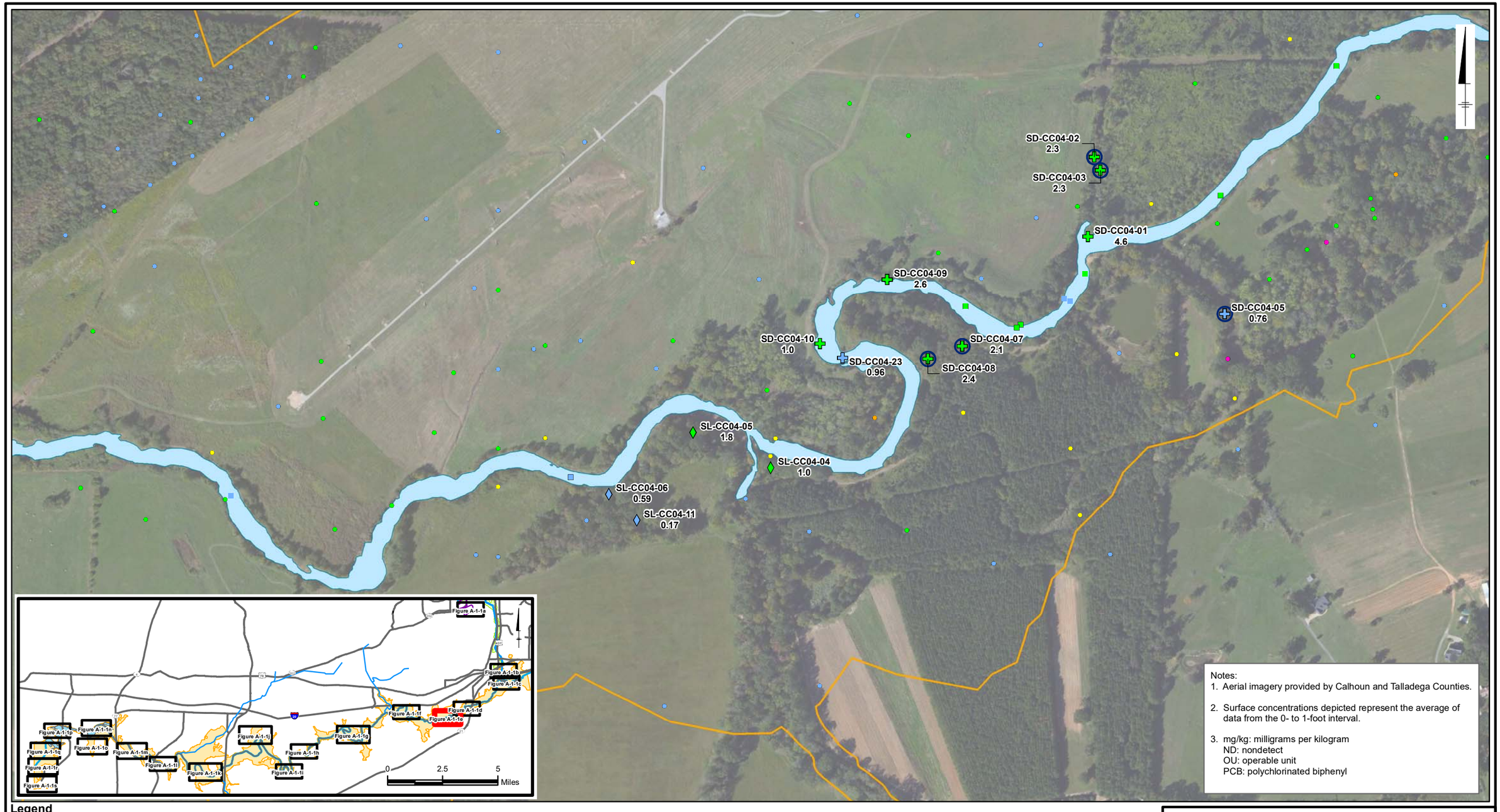
Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1d

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\AAnniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1_FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- Off-Channel Sediment Location

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Creek
- OU-4 100-Year Floodplain

0 400 800 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1e

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\AAnniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1_FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM

SL-CC04-17
2.6

SL-CC04-09
2.6

SL-CC04-18
3.7

SL-CC04-10
1.7

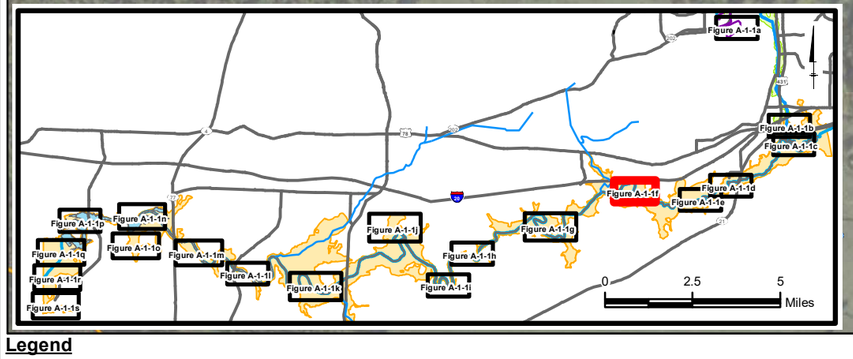
SD-CC04-19
0.57

SD-CC04-14
2.1

SD-CC04-15
1.9

SD-CC04-21
2.0

SD-CC04-11
0.42



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- Off-Channel Sediment Location

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ≥ 1 to <10

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25
- ≥ 25 to < 50
- ≥ 50 to < 500

- Surface Water Suspended Sediment/PCB Sampling Location
- Flow Mesurement
- Creek
- OU-4 100-Year Floodplain

0 400 800 Feet
Graphic Scale

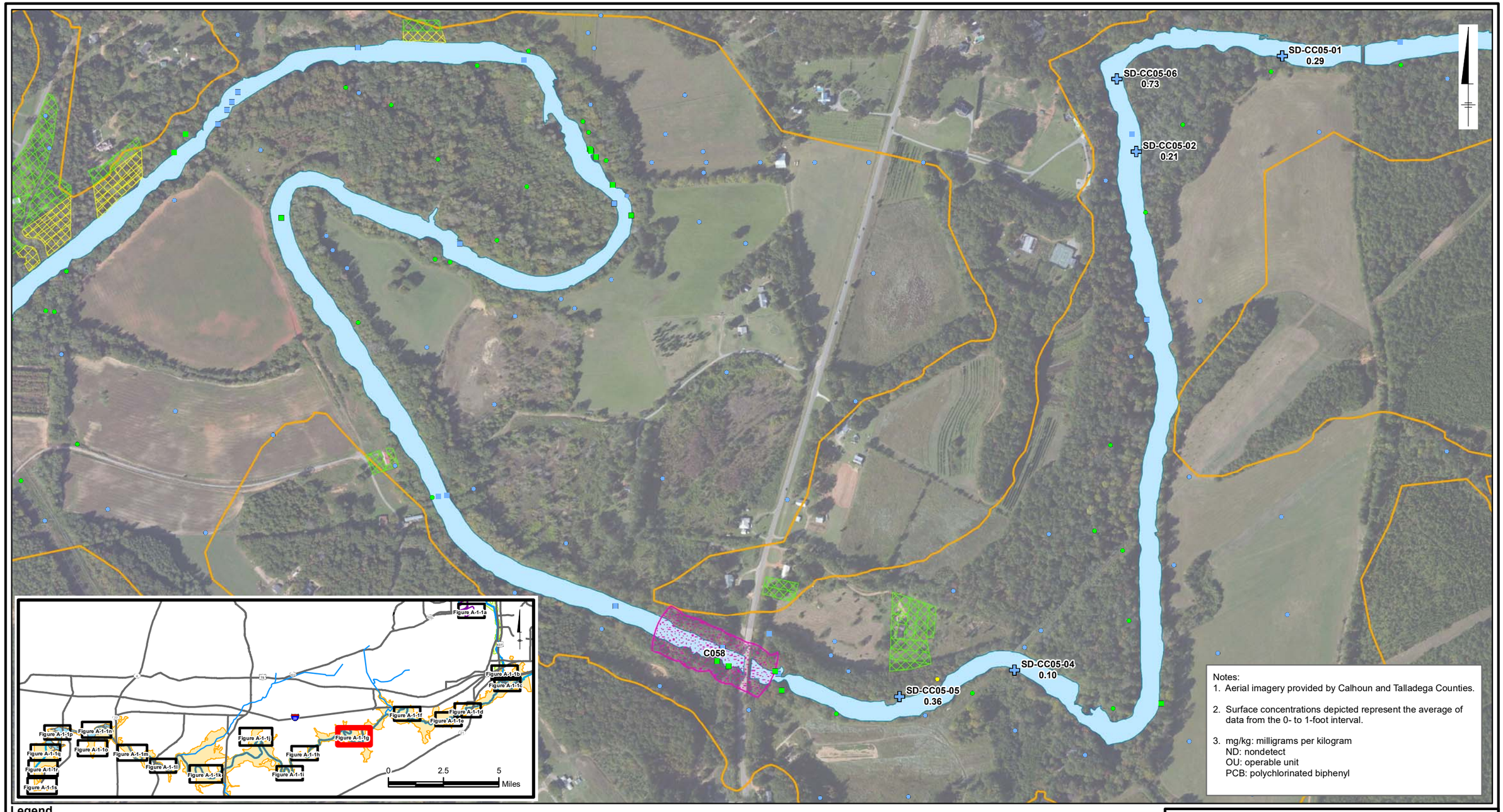
Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1f

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\AAnniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1_FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25

- Habitat Assessment Sampling Area
- Creek
- OU-4 100-Year Floodplain

Residential Parcels Sampled
- Removal Conducted
- Residential < 1 mg/kg

0 500 1,000 Feet
Graphic Scale

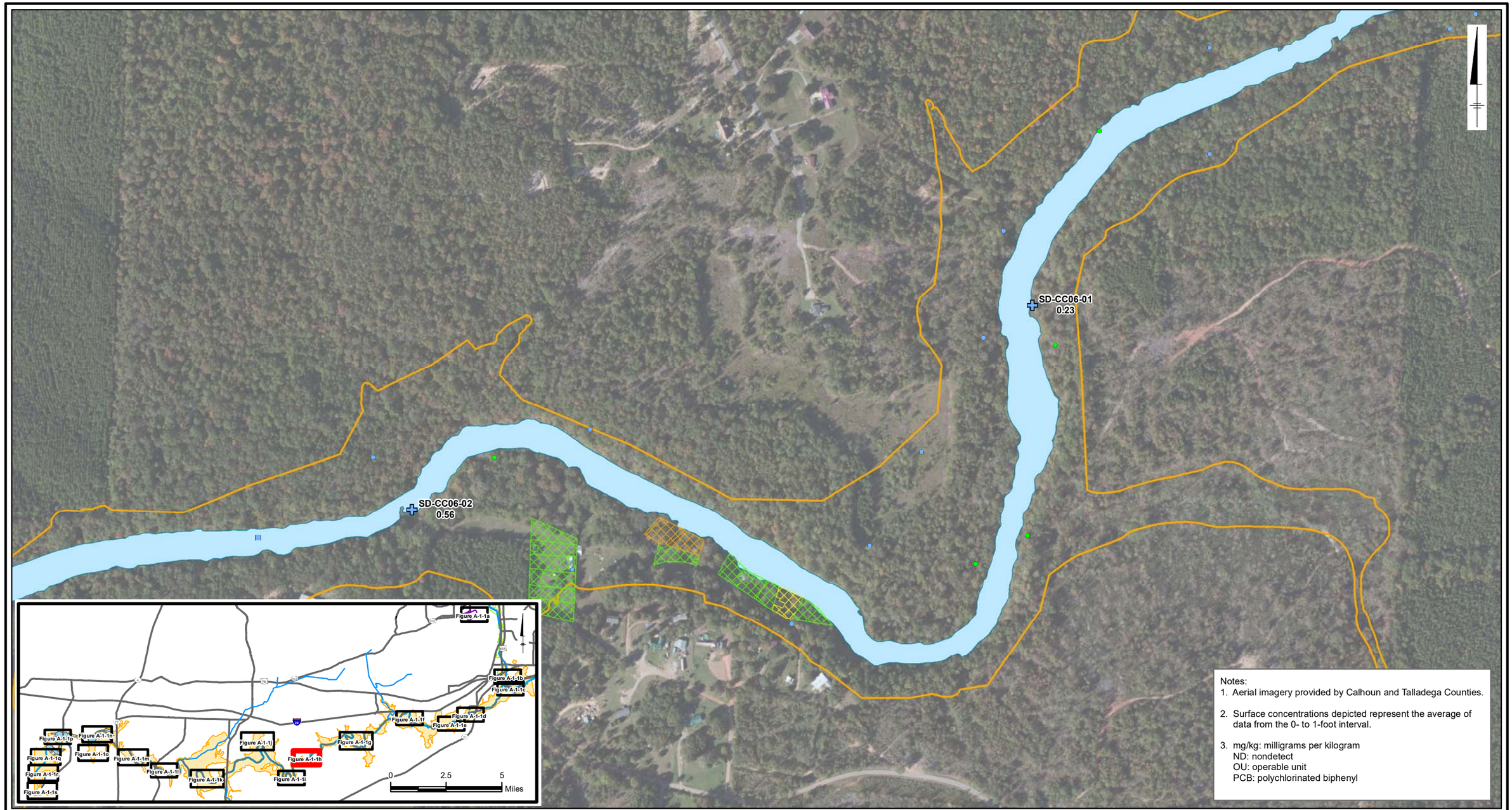
Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1g

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\Anniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1_FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

- Creek
- OU-4 100-Year Floodplain

Residential Parcels Sampled
- Residential > 1 mg/kg
- Removal Conducted
- Residential < 1 mg/kg

0 400 800 Feet
Graphic Scale

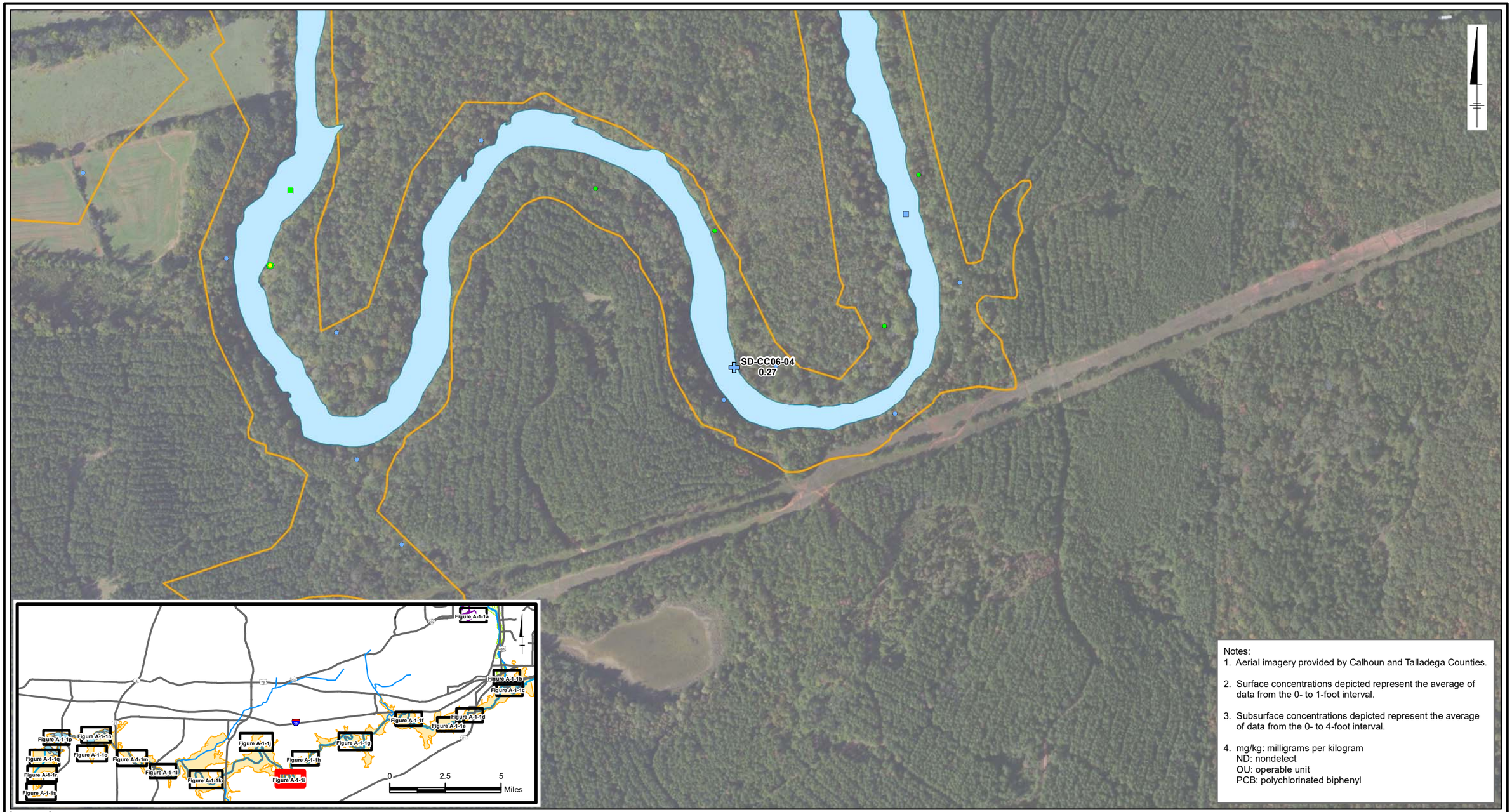
Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1h

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\Al\Anniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1_FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. Subsurface concentrations depicted represent the average of data from the 0- to 4-foot interval.
4. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25

- Creek
- OU-4 100-Year Floodplain

Inner and outer circles reflect surface and subsurface PCB concentrations, respectively.

0 400 800 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1i

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\AAnniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1 FS_OU4_Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM

SL-CC07-13
0.011

SL-CC07-08
0.0040

SL-CC07-12
0.031

SL-CC07-07
0.057

SL-CC07-06
0.23

SL-CC07-05
2.2

SL-CC07-11
11

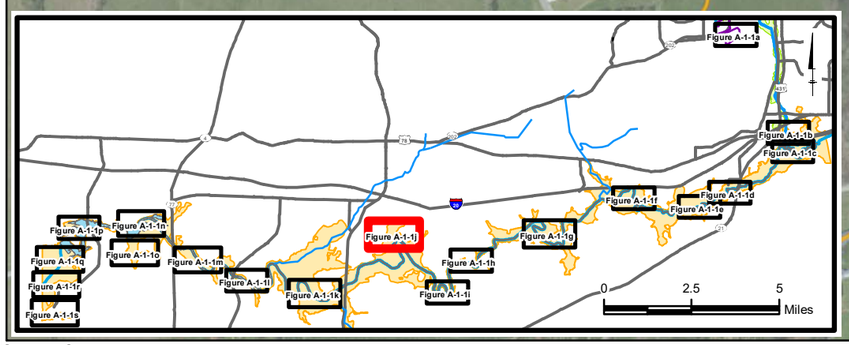
SL-CC07-10
3.1

SD-CC07-01
1.2

C103

SD-CC07-02
1.8

SL-CC07-02
2.6



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ≥ 1 to <10

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

- Habitat Assessment Sampling Area
- Creek
- OU-4 100-Year Floodplain

Residential Parcels Sampled
- Residential < 1 mg/kg

0 500 1,000 Feet
Graphic Scale

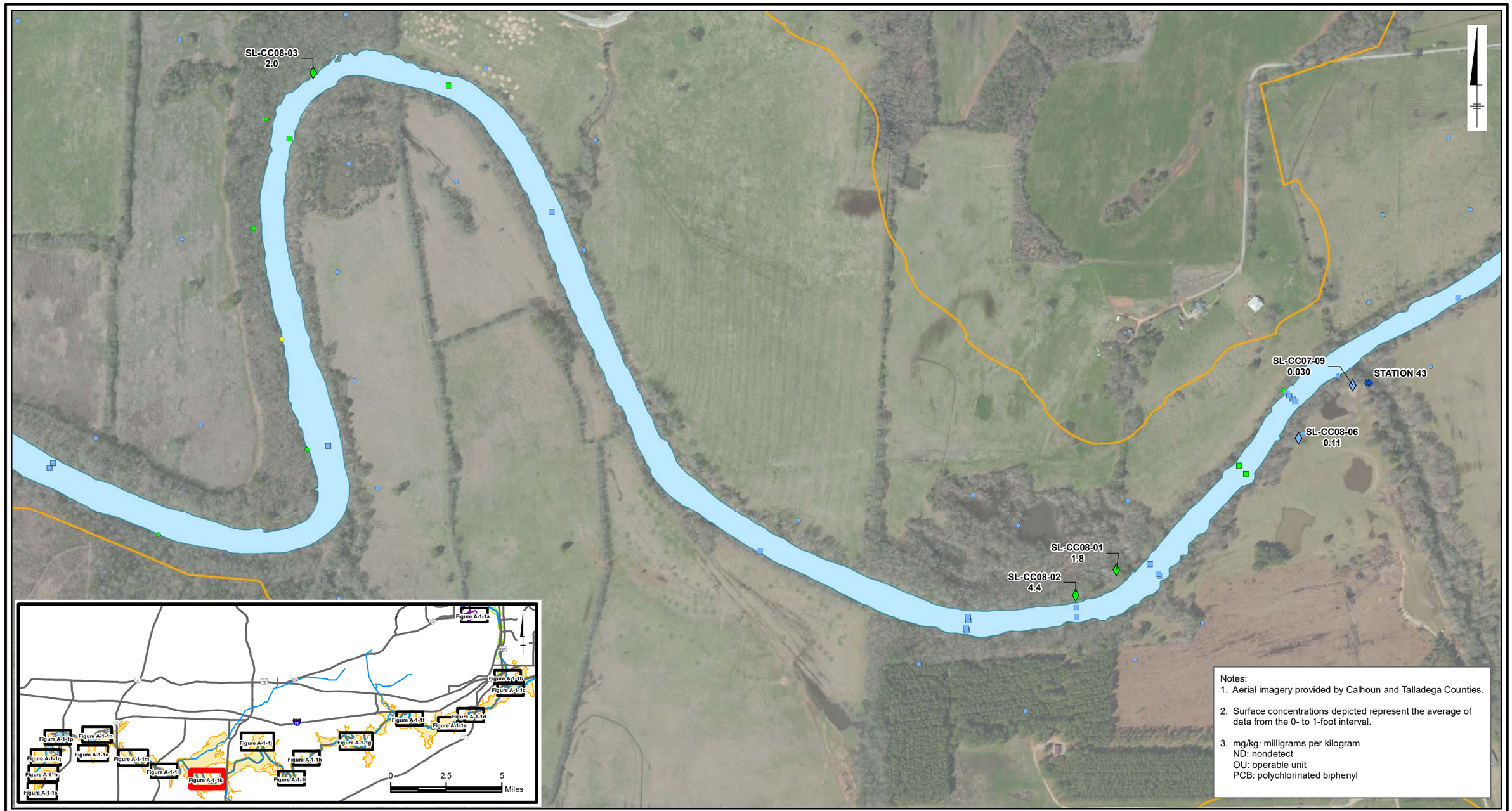
Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1j

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
N:\AAnniston\GIS\OU4 FS\Trustee_Memo_2017_Arcadis_MXDs\FigA-1 FS_OU4 Mapbook_v1_2021.mxd 3/18/2022 5:08:08 PM



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10
- ≥ 10 to < 25

- Surface Sediment and Fish Sampling Location
- Creek
- OU-4 100-Year Floodplain

0 500 1,000 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1k

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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SD-CC09-04
0.071

SL-CC09-02
2.1

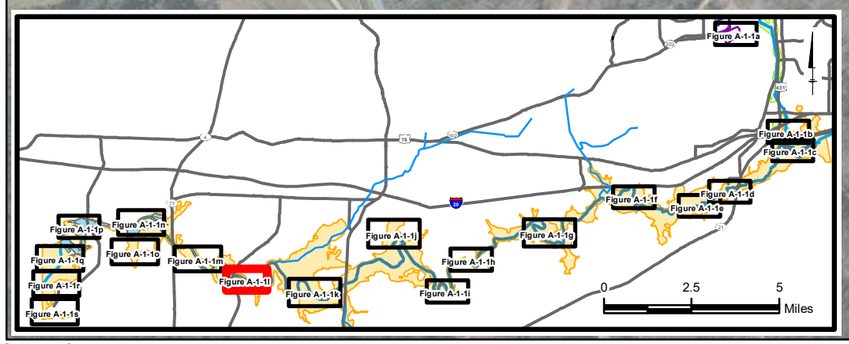
SL-CC09-04
1.1

SD-CC09-03
0.12

SD-CC09-40
0.22

SD-CC09-02
0.030

SL-CC09-01
0.014



Notes:
1. Aerial imagery provided by Calhoun and Talladega Counties.
2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

- Surface Water Suspended Sediment/PCB Sampling Location
- Flow Mesurement
- Creek
- OU-4 100-Year Floodplain

0 400 800 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1l

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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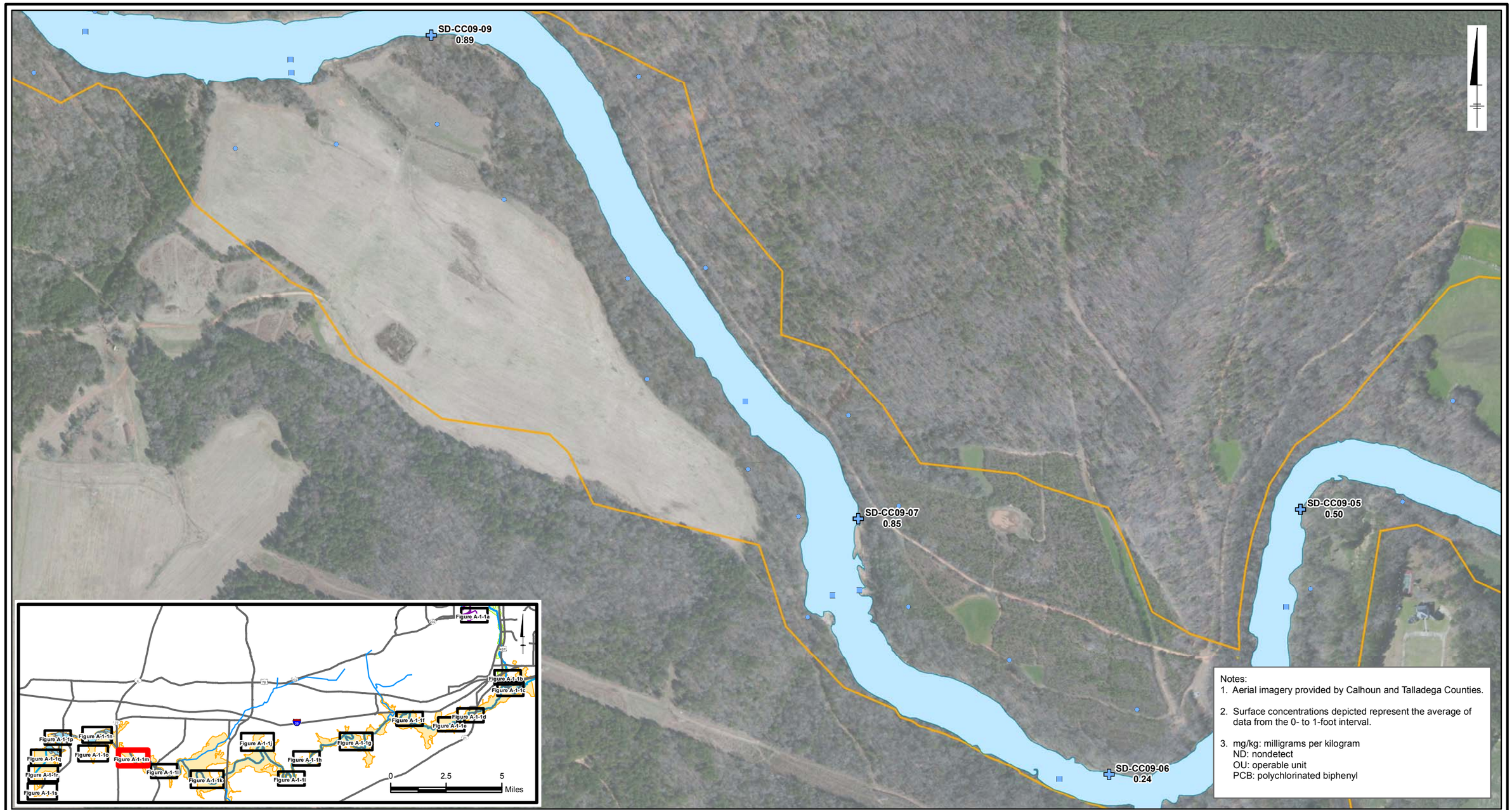

Notes:
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2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1

- Creek
- OU-4 100-Year Floodplain

0 450 900 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1m

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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SD-CC10-04
0.21

SD-CC10-15
0.93

SD-CC10-02
0.89

SD-CC10-03
0.24

SL-CC10-04
1.5

SL-CC10-01
1.6

SL-CC10-05
0.14

SD-CC10-11
0.11

SL-CC10-02
3.4

STATION 35 (CHOC 1)

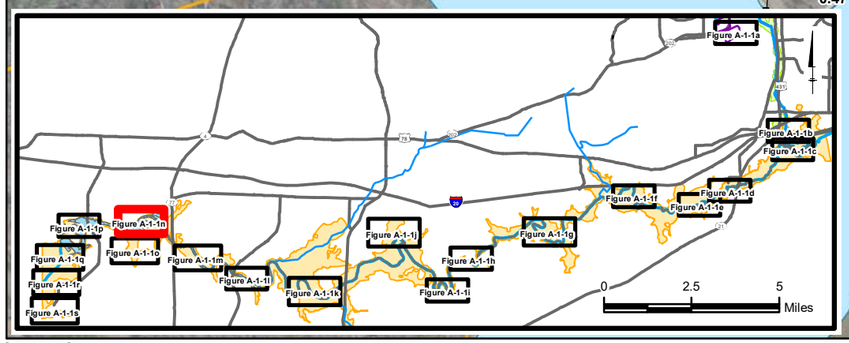
SD-CC10-05
0.47

SD-CC10-01
0.81

SL-CC10-03
0.42

MLM-GEO-5 MLM-GEO-7

SL-CC10-06
0.24



Notes:
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2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1
- Off-Channel Sediment Location

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1

Surface Sediment and Fish Sampling Location
Geochronological Sampling Location
2000 Sampling Event

Creek
OU-4 100-Year Floodplain

0 450 900 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure A-1-1n

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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Notes:
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2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1
- Off-Channel Sediment Location

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1

- Creek
- OU-4 100-Year Floodplain

0 450 900 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1o

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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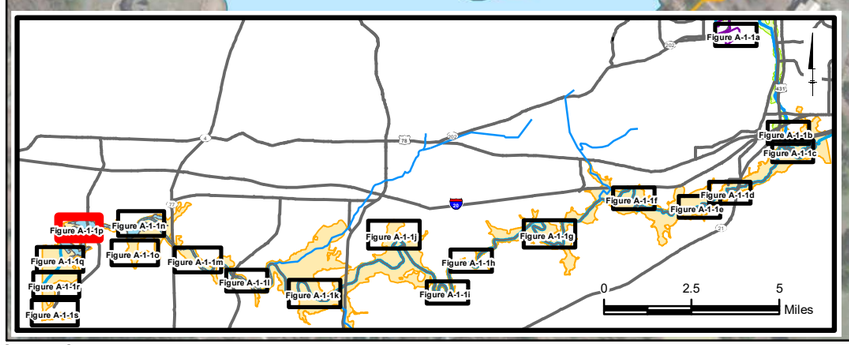
SL-CC10-11
0.069

SD-CC10-12
0.99

SD-CC10-13
0.10

SD-CC10-14
0.15

C175



Notes:
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3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

- Habitat Assessment Sampling Area
- Creek
- OU-4 100-Year Floodplain

0 400 800 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1p

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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SD-CR02-01
0.021

SD-CR02-08
0.031

MLM-GEO-4

SD-CR02-02
0.08

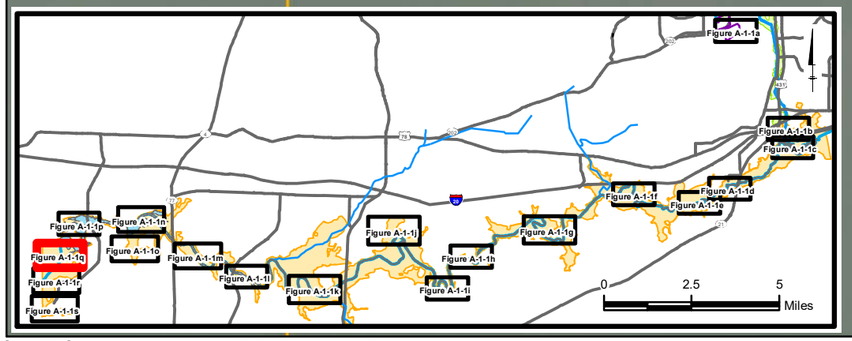
SL-CC10-09
0.013

SL-CR02-08
0.12

SD-CR02-03
0.033

SL-CR02-05
0.028

SD-CR02-04
0.015



Notes:
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2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1

Sediment Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1
- ≥ 1 to <10

Soil Sample Location
Total PCB Concentration (mg/kg)
- ND or < 1

Geochronological Sampling Location
- 1999 Sampling Event

Creek

OU-4 100-Year Floodplain

0 450 900
Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1q

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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Notes:
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2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
ND or < 1

Surface Sediment and Fish Sampling Location

Habitat Assessment Sampling Area
Creek
OU-4 100-Year Floodplain

0 450 900 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1r

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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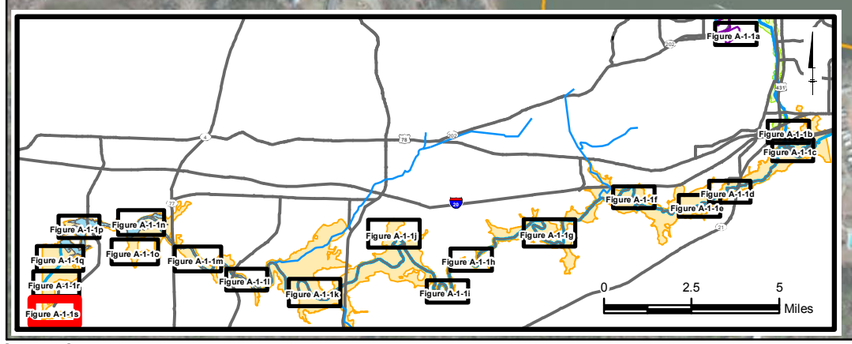
SD-CR02-07
0.016

SL-CR02-03
0.02

SL-CR02-02
0.013

SL-CR02-06
0.013



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2. Surface concentrations depicted represent the average of data from the 0- to 1-foot interval.
3. mg/kg: milligrams per kilogram
   ND: nondetect
   OU: operable unit
   PCB: polychlorinated biphenyl

Legend

Trustee Sediment Location
Total PCB Concentration (mg/kg)
- ND or < 1

Trustee Soil Location
Total PCB Concentration (mg/kg)
- ND or < 1
- Creek
- OU-4 100-Year Floodplain

0 450 900 Feet
Graphic Scale

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Summary of Historical Investigation Sample Locations and Results within and Downstream of OU-4

Solutia

Figure
A-1-1s

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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Appendix B
Proposed Long-Term Monitoring Plan

Appendix B: Long-Term Monitoring Program

1. INTRODUCTION

This long-term monitoring plan has been developed as Appendix B to the Operable Unit 4 Feasibility Study (OU-4 FS) for the Anniston PCB Site (the Site). The plan has been developed at the conceptual level to describe proposed long-term monitoring that will be conducted to assess the effectiveness of the remedy selected by the United States Environmental Protection Agency (USEPA) for OU-4 in the Record of Decision. The proposed long-term monitoring efforts described in this plan are focused on the aquatic and floodplain portions of OU-4. The aquatic monitoring focuses on creek and creek bank portions of OU-4 along with areas in Lake Logan Martin that are immediately downstream of Choccolocco Creek. Long-term monitoring activities also include soil management support to assist in managing residual polychlorinated biphenyls (PCBs) should they be present in areas where intrusive construction activities are planned that could disturb creek bank soils or sediment. Soil management in floodplain areas would focus on the potential disturbance of PCB residuals and potential changes in land use from nonresidential to residential.

This conceptual long-term monitoring plan will be refined as part of the remedial design (RD) for OU-4. This refinement process will include developing detailed field sampling plans (FSPs) and quality assurance projects plans (QAPPs) that will be reviewed and approved by USEPA as part of the RD. While the sampling program is designed to assess remedy effectiveness, baseline monitoring will be conducted during the RD to document current conditions (prior to implementing the remedy).

This baseline monitoring will also provide an opportunity to refine the sampling program during the RD using adaptive site management (ASM) principles and initial deployment results. The ASM process was previously used during the OU-4 remedial investigation (RI) and risk assessments based on its historical application by USEPA for planning and managing watershed issues (USEPA 2004) and more recently for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites as outlined in USEPA's Superfund task force recommendation (USEPA 2018). The ASM process is also used by other governmental agencies for federal site restoration as described by the National Research Council (NRC) in Environmental Cleanup at Navy Facilities: Adaptive Site Management (NRC 2003). The NRC and the Interstate Technology & Regulatory Council (ITRC) have also recommended the use of ASM for sites with PCB-contaminated sediment (NRC 2001, ITRC 2017). The baseline sampling approach and any ASM responses also recognize that implementing sediment cleanup in OU-4 will likely increase PCB concentrations in downstream media (e.g., sediment, fish tissue). These increases are typically associated with disturbances to the water column that are inevitable even for a well-designed remedy that is carefully implemented. These increases in downstream media concentrations are typically observed during and following remedy implementation and are expected to decline over time.

The proposed long-term monitoring was developed based on the remedial action objectives (RAOs) and preliminary remedial goals (PRGs) for OU-4 and will provide information to document the effectiveness of the OU-4 remedy. Because OU-4 is located downstream of other Site OUs, the monitoring program results will also reflect the collective effects of remediation

conducted for these upstream OUs (i.e., OU-3, OU-1/OU-2) along with OU-4. The proposed long-term monitoring includes sampling in OU-4 and downstream of OU-4 (Lake Logan Martin) as shown on Figure B-1. Stations 33 and 34 are in Lake Logan Martin upstream of the confluence with Choccolocco Creek and are designed to reflect background conditions in Lake Logan Martin. Stations 36 and 37 are in Lake Logan Martin downstream of the confluence with Choccolocco Creek and downstream of OU-4. These two Lake Logan Martin sampling stations will reflect changes in lake conditions based on the remediation of upstream OUs relative to the lake's upstream background conditions. The five OU-4 locations are in Choccolocco Creek: BW-01, HHFL-03, HHFL-06, HHFL-08, and Station 35 (Figure B-1).

The long-term monitoring program also includes assessing creek bank conditions for the upper portion of the OU, including Snow Creek and the portion of Choccolocco Creek downstream of Snow Creek to River Mile 29.5 (RM 29.5). The creek bank monitoring will focus on the long-term stability of those creek bank areas that were part of the OU-4 remedy and inspection of those creek bank areas that in the upstream portion of the OU that were not part of the remedy. The inspections will be based on the potential for the alignment of the creek channel to move over time (creek migration zone [CMZ]). This potential for migration will also consider climate change using USEPA guidance.

The long-term monitoring results would be used to assess the performance of the OU-4 remedy over time, including conditions within the OU-4 footprint and in the downstream portions of Lake Logan Martin. The long-term monitoring program for the aquatic portions of OU-4 includes collecting data for traditional exposure media (sediment, surface water, and biota [fish tissue and whole-body]) associated with the PRGs identified in the OU-4 FS. The assessment of long-term remedy performance using only traditional monitoring means (e.g., sediment, unfiltered surface water and biota) could otherwise lead to confounded conclusions. To supplement the traditional monitoring methods, the long-term monitoring program includes collecting dissolved-phase surface water and porewater data and conducting fish tracking studies. These studies will be useful to understand the long-term distribution and time-based constituent concentrations in fish, and ultimately the effectiveness of the OU-4 remedy over time.

The results will also be used to assess the potential for changes in the monitoring program or refinements to the remedy as part of the 5-year review process using ASM.

If USEPA selects a series of supplemental studies that are proposed for areas downstream of OU-4, as described in Appendix A to the OU-4 FS, the baseline sampling event for many of the investigations described in this appendix could be conducted in combination with the proposed supplemental studies. This is based on the overlap in scope and geography between the two sampling programs for the areas located downstream of OU-4. Since there is uncertainty regarding the scope and timing of the supplemental studies, this long-term monitoring plan has been developed as stand-alone document.

2. LONG-TERM MONITORING FOR AQUATIC AND CREEK BANK AREAS

The long-term monitoring program for the aquatic portions of OU-4 includes collecting data for traditional exposure media (sediment, surface water, and biota [fish tissue and whole body]) associated with the PRGs identified in the OU-4 FS. This long-term monitoring program also proposes collecting additional data that can be used early in the process to identify time-based trends in remedy performance (positive or negative). It is important to identify these near-term performance trends because the traditional data remedy metrics, such as fish tissue, can take 5 to 10 years (or more) to provide meaningful information regarding remedy performance. The additional remedy metrics data include changes in PCB concentrations over time by using sediment traps for depositional areas with low hydraulic energy and using passive sampling to assess dissolved PCBs that are truly bioavailable in surface water and porewater. An overview of the proposed long-term monitoring to assess remedy performance for the aquatic portions of OU-4 and the areas located downstream of OU-4 (i.e., Lake Logan Martin) is provided below.

The sampling program design includes nine sampling locations:

- Five collection stations in OU-4: one at the upstream end of OU-4 in the backwater area, three from the OU-4 human health risk assessment (HHRA), and one at the downstream end of OU-4 (Figure B-1)
- Four collection stations in Lake Logan Martin

The sampling locations in OU-4 include locations on Choccolocco Creek and one near the downstream end of OU-4.

- Choccolocco Creek locations:
  - BW-01 in the backwater area
  - HHFL-08 near the Snow Creek confluence and downstream of the Friendship Road Bridge
  - HHFL-06 near the confluence of Coldwater Creek
  - HHFL-03 near the confluence with Cheaha Creek
- Downstream end of OU-4:
  - Station 35 near the downstream end of OU-4

Three locations are human health fish locations (HHFL) from the OU-4 HHRA developed for USEPA (J. M. Waller Associates, Inc. [JMWA] and Avatar Environmental 2013). Station 35 has been sampled by the Alabama Department of Environmental Management (ADEM) for several decades and provides a substantially large data set of time trend data. Sampling location BW-01 is in a portion of the backwater area that is close to the Snow Creek confluence where significant remedial activities are anticipated. The four sampling locations proposed for Lake Logan Martin are all historical ADEM sampling stations that are upstream (Station 33 and 34) and downstream (Station 36 and 37) of where OU-4 ends in the embayment portion of Lake Logan Martin.

The proposed long-term monitoring efforts described below include sampling the water column and porewater, sampling fish tissue and whole-body fish, sampling surface sediment, and deploying and recovering sediment traps to assess concentrations associated with material settling out of the water column. In addition to baseline sampling, this monitoring will be conducted periodically over time recognizing the importance of the results to USEPA's 5-year review process. For conceptual level planning purposes, the monitoring described above will be planned for years 1, 3, and 5 following remedy implementation and then once every 5 years thereafter (years 10, 15, 20, etc.). Additionally, floodplain monitoring, as described in Section 3, will be conducted once every 3 years once the baseline monitoring activities have been completed.

The long-term monitoring program will also monitor creek bank conditions over time for the OU-4 portion of Snow Creek and the portion of Choccolocco Creek located upstream of RM 29.5 where PCB concentrations in creek bank soil may be elevated.

Additional details for monitoring the sediment, surface water, porewater, fish, and creek bank areas are provided below.

2.1 Sediment Sampling

Surface sediment samples will be collected for the top 6 inches of sediment at all locations in Choccolocco Creek and Lake Logan Martin (Figure B-1). The samples will be collected using grab sampling techniques (e.g., Ekman grab sampler or Lexan core), and the analytical results for these samples will track changes in sediment concentrations over time following implementation of remedial activities in upstream OUs, including OU-4. The sediment samples will be collocated to the extent practical with sediment trap, surface water, fish collection, and porewater sampling locations. All samples will be analyzed for PCB Aroclors, PCB homologs, the 12 dioxin-like (DL) PCB congeners (for ecological exposures and receptors), mercury, and total organic carbon. Surface sediment sampling locations will be surveyed using conventional ground survey methods or global positioning system (GPS) technology.

In addition to grab samples, sediment traps will be deployed in low-energy areas to document changes in concentrations settling out of the water column over time. These data will be important to documenting the effectiveness of upstream source control actions and monitored natural recovery (MNR). The low-energy locations identified for the sediment traps include Stations 33 through 37 in Lake Logan Martin and the BW-01 in the backwater area (Figure B-1). The sediment traps will be designed to collect localized, time-integrated data on the deposition of sediment for a range of flow conditions in the system. Data from sediment traps provide additional information on suspended sediment conditions, particulate-phase constituent concentrations, and deposition rates during each sampling period. At each of the deployment locations, a set of three sediment traps will be deployed for a period of 6 months to 1 year. Once the sediment traps are deployed, they will collect sediment that settles out of the water column over the deployment duration. After the deployment period and prior to retrieval, the equipment will be observed to ensure it remains in place and in the proper orientation and to note the conditions of the equipment and any concerns or issues. Accumulated sediment from the traps will be measured, photographed, and collected. Samples will be submitted for laboratory analysis for the following parameters (in order of priority): PCB Aroclors, PCB homologs, DL-PCB congeners, mercury, and total organic carbon. Sediment trap locations will be surveyed using GPS technology.

2.2 Surface Water Sampling

The surface water program is proposed to characterize total and dissolved concentrations in surface water as a function of time, including concentration declines following remediation. Surface water will be sampled at all sampling locations shown on Figure B-1 using grab sampling and passive sampling techniques. Grab sampling will be used to measure total and dissolved concentrations of PCB Aroclors, PCB homologs, and DL-PCBs congeners, and mercury in surface water. The samples will be collected during non-storm conditions (not within 7 days of a precipitation event that results in 0.1 inches of precipitation at the Anniston Airport). In situ passive samplers, specifically commercially available polyethylene (PE) passive samplers, will be used to measure PCB concentrations (PCB Aroclors, PCB homologs, and DL-PCB congeners). The PE samplers will measure PCBs that are truly dissolved in surface water in contrast to PCBs that may be associated with suspended particles or colloids. The in situ passive samplers will be deployed at each location for 4 to 8 weeks in the general proximity of where fish samples are collected. The grab samples will be collected at these same locations when the PE sampling devices are being deployed or retrieved. Total (unfiltered and filtered) surface water sample results will be compared to ambient water quality criteria (AWQC) as part of assessing remedy performance. Additionally, the surface water results collected using passive samplers in combination with the fish tracking results and tissue/whole body concentrations measured for fish will be critical to assessing long-term remedy performance. The truly dissolved PCB results from the passive samplers will also be compared against the AWQC values.

Grab samples of surface water will be collected using bottle immersion, Kemmerer sampler (or equivalent), or a peristaltic pump depending on the water depth at a given location. Filtered samples will be collected using a 0.1-micron filter to evaluate the dissolved fractions of PCBs and mercury. Surface-water filtering will be completed in the field.

PE passive samplers will be deployed at the same locations shown on Figure B-1. The configuration of these passive samples will depend on whether the sampling location is classified as low energy or high energy (Figure B-2). For low-energy settings, the PE passive sampler will be secured to a line held in place by an anchor and marked with a buoy. For high-energy settings, the PE passive sampler will be secured to a piece of steel rebar driven into the rocky substrate. The PE samplers will be preloaded with stable isotope-labeled performance reference compounds, including ^{13}C PCB-28, ^{13}C PCB-47, ^{13}C PCB-70, ^{13}C PCB-80, ^{13}C PCB-111, ^{13}C PCB-141, and ^{13}C PCB-182. Once deployed, the sampling devices will be left in place for 4 to 8 weeks. After the deployment, the passive samplers will be retrieved and shipped for analysis.

2.3 Porewater Sampling

Porewater will be sampled using the same passive sampling techniques proposed for surface water sampling and will be sampled at all sampling locations shown on Figure B-1. PE passive samplers will be used to measure PCB concentrations truly dissolved in porewater (PCB Aroclors, PCB homologs, and DL-PCB congeners). PE passive samplers will be deployed at each location in the general proximity of where the other media samples are collected. As with surface water, the configuration of the porewater PE samplers will depend on whether the location is classified as low energy or high energy (Figure B-2). For low-energy settings, the PE passive sampler will be inserted into the sediment, secured to a line held in place by an anchor, and marked with a buoy. For high-energy settings, the PE passive sampler will include two deployment methods—securing the sample media to a brick placed at the sediment-water interface and direct insertion of the

sample media into the rocky substrate. The brick will be worked into the rocky substrate such that its surface is at a similar elevation to the surrounding rocky substrate. This placement will protect the sampling device from potential damage due to bedload transport during high-flow conditions and provide an opportunity to assess exposure conditions from light, flocky materials that periodically form on these surfaces between high-flow events. A second PE sampling device will be inserted into the rocky substrate to obtain measurements of porewater conditions.

The PE samplers will be preloaded with the same stable isotope-labeled performance reference compounds as the surface water samplers (Section 2.2). As with the surface water samplers, once deployed, the porewater PE sampling devices will be left in place for 4 to 8 weeks. After the deployment, the passive samplers will be retrieved and shipped to the laboratory for analysis.

Additionally, for low-energy settings, separate sediment grab samples will be collected for ex situ porewater evaluations using methods described in Section 2.1. Similar sediment grab samples will not be collected for ex situ porewater evaluations at high-energy setting locations because of the difficulties associated with maintaining the in situ structure of a rocky substrate sample following its collection and shipment to the laboratory. The grab samples will be shipped to the laboratory for processing and analysis. Collected sediment mass will be homogenized and divided into equal volumes (approximately 500 milliliters) for assessment of PCB Aroclors PCB homologs, and DL-PCB congeners. A PE sampler preloaded with stable isotope-labeled performance reference compounds will be placed into each jar, and the jars will be tumbled for a minimum of 28 days and approximately the same duration as the devices that were deployed in the field. After tumbling is complete, the PE samplers will be removed from the sediment for extraction and analysis.

Results from the passive porewater sampling will also be used in assessing PCB concentrations in fish and for comparison with the AWQC values.

2.4 Fish Sampling

The fish monitoring program is proposed to characterize constituent concentrations in fish tissue as a function of time, including concentration declines following remediation. The skin-off fillet fish tissue samples will be analyzed for PCB Aroclors and homologs, mercury, and percent lipids. The whole-body fish samples will be analyzed for these same constituents plus DL-PCB congeners. The proposed sampling locations include the four OU-4 stations in OU-4 and the four Lake Logan Martin stations (Figure B-1). The fish results from Stations 33 and 34 can also be used to determine background concentrations. As described, surface water, porewater, and sediment will also be sampled at the fish tissue sampling stations to assist in characterizing exposure conditions. The general approach for the collection of fish samples builds on the work conducted for OU-4 under the CERCLA and Resource Conservation and Recovery Act (RCRA) programs and work conducted by ADEM and will be based on the technical approach provided in *Using Fish Tissue Data to Monitor Remedy Effectiveness* (USEPA 2008). The conceptual proposed long-term monitoring for OU-4 and Lake Logan Martin includes different trophic levels and feeding guilds, species targeted by local anglers, collection slot size based on ADEM procedures, and comparability with historical data:

- 10 individual fillet samples and 10 whole-body samples of predator fish (i.e., spotted bass [*Micropterus punctulatus*] or largemouth bass [*Micropterus salmoides*])

- 10 individual fillet samples and 10 whole-body samples of bottom feeder fish (i.e., channel catfish [*Ictalurus punctatus*] or blue catfish [*Ictalurus furcatus*])

- 10 individual fillet samples and 10 whole-body samples of forage fish (i.e., sunfish [Centrarchidae] or crappie [Poximus])

The sample locations, species, numbers of samples, and sampling approaches (grab versus composites) will be finalized as part of developing the FSP and QAPP in collaboration with USEPA. For example, if the results of a power analysis conducted using the approach presented in USEPA (2008) indicate that it is preferable to collect five composite samples of each species and that each composite sample be comprised of at least five fish, then the FSP would be developed accordingly.

The fish samples will be collected using an electrofishing boat and supplemented with other methods as needed (i.e., trotlines, gill nets, seine nets, or fish traps). Fish collection will be proposed for early fall (October and November) prior to the winter drawdown and cold temperatures, which can limit fish availability.

2.5 Fish Tracking

The fish tracking study results are critical to the proposed long-term monitoring evaluation because the simplifying assumption that fish are being exposed by local conditions may not be accurate and could lead to an incorrect assessment of remedy performance. There are many methods of monitoring fish movement, including radio and acoustic telemetry, satellite tracking, mark recapture studies using fin clipping or tagging, and passive integrative transponder tagging among others. For this study, acoustic telemetry is proposed because it provides multiple data points and can provide records of continuous fish movement rather than limited individual data points for recaptured fish. Also, because fish tracking technology is changing rapidly, additional methods would be assessed as part of developing the FSP and QAPP. Based on current technologies, the proposed fish movement study would combine active and passive acoustic tracking:

- Passive tracking: A series of receiver gates (line of receivers placed with overlapping detection radii) will be placed at strategic areas, such as narrow choke points close to the five historical ADEM fish sampling locations (Stations 33 through 37; Figure B-1). Collected fish will be surgically implanted with a battery-powered tag with a unique code. When the fish passes by the gates, the receivers record the unique sound-pulse that would be emitted by each tag. This documents the fish's location.

- Active tracking: Periodically within the study period a boat-mounted mobile receiver would be used to identify specific locations of tagged fish. This information would be used to track fish that are not moving past one of the passive receiver gates.

Sample sizes would be determined as part of developing the FSP and would target the same trophic groups/species used in the tissue monitoring program excluding panfish. The small size of the panfish limits tags with sufficient battery life to last the duration of the study. Similar sized fish would be targeted for the telemetry study as collected in the tissue monitoring; nevertheless, tag weights will be kept to less than 2% of total fish weight, so larger individuals may be tagged depending on availability and tag size selected.

Collected fish will be measured to ensure suitable size for the tag. Tags will be surgically implanted within the fish and tested to ensure proper operation prior to releasing the fish. Battery life depends on tag size, frequency, and pulse rate, so the duration of the study can be predicted, and variables can be adjusted for the desired duration. For the proposed study it is assumed a roughly 9-month duration will be selected. This duration would require three sets of data downloads and receiver battery replacement. During each replacement and download, up to 4 days of active tracking could be needed. The ASM process will be used to review the fish tracking results throughout the course of the 9-month program. If warranted, ASM-based adjustments may be made to the program to optimize the data collected. The fish movement study will be completed as part of baseline monitoring and during the third year (year 3) after remedy implementation. Additional rounds of fish tracking could also be added to the long-term monitoring program if new data gaps are identified through the ASM process.

2.6 Creek Bank Monitoring

All the active remedial alternatives for sediment in OU-4 include source control actions for creek banks located upstream of RM 29.5 on Choccolocco Creek, including the OU-4 portion of Snow Creek. These source control actions have been developed to reduce the potential release of PCBs associated with eroding creek banks. While PCBs that have migrated into floodplain soil areas generally reside there for the long term, soil located in the riparian zone adjacent to the creek could be an ongoing source as creek banks erode as part of natural geomorphological processes. The degree to which creek bank areas represent meaningful PCB sources is a function of the degree of erosion and the associated PCB concentration of the creek bank soil. Details for the efforts to estimate creek bank erosion rates and the associated PCB loadings are provided in Appendix F of the OU-4 FS.

While the location and length of proposed source control actions vary between remedial alternatives, it will be important to confirm over time that the source control actions, in combination with in-creek and upstream remedial activities, will result in meeting the RAOs and PRGs. In addition to monitoring the areas where actions were taken, the RD process will identify additional areas for focused monitoring based on their location being upstream of RM 29.5 and the potential for lateral movement of the creek channel into these creek bank areas. The RD will identify these areas based on a CMZ analysis conducted using techniques developed by the Washington State Department of Ecology and presented in *A Framework for Delineating Channel Migration Zones* (Rapp and Abbe 2003). The CMZ approach is often used to evaluate the management and restoration of creek banks and adjoining floodplain areas in the Pacific Northwest, including Washington, Oregon, and Montana.

The overall approach for CMZ is based on geomorphological principles where creek channels move over time. The approach uses this knowledge to proactively protect critical habitat or infrastructure. The results of a predictive CMZ analysis can be in support of not placing infrastructure or developing areas along creek bank areas (riparian zones). The CMZ assessment will be used to predict lateral movement of the creek channels over time to limit residual creek bank sources from becoming a primary source, once other sources have been addressed. One advantage that OU-4 has over many rural creek settings is the riparian protections that have been put in place along most of the OU-4 portion of Snow Creek and the upper reaches Choccolocco Creek. These protections include a 1,500-acre Conservation Corridor with protective easements that prevent development and limit most activities within the riparian buffer zone. Development

of other areas that are not part of the Conservation Corridor are protected from future development by their existing use as City-owned lands with designated long-term uses, including a recreational area and use as a municipal wastewater treatment plant. The importance of understanding changes in creek channel and bank positions over time is illustrated in the image below (Exhibit 1). The image shows the creek location from 1940 to 2011 based on a review of the four historical aerial photographs included as Exhibit 2 for 1940, 1976, 2001, and 2011.

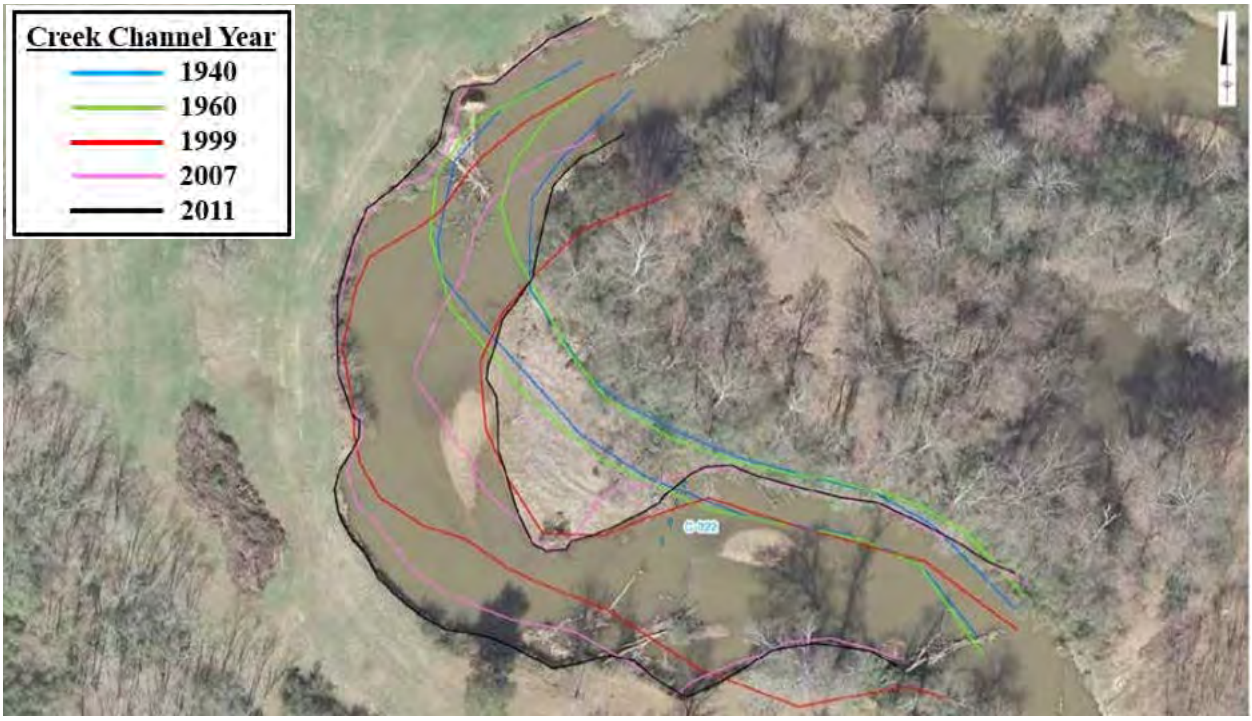

Exhibit 1. Channel Movement Along Choccolocco Creek

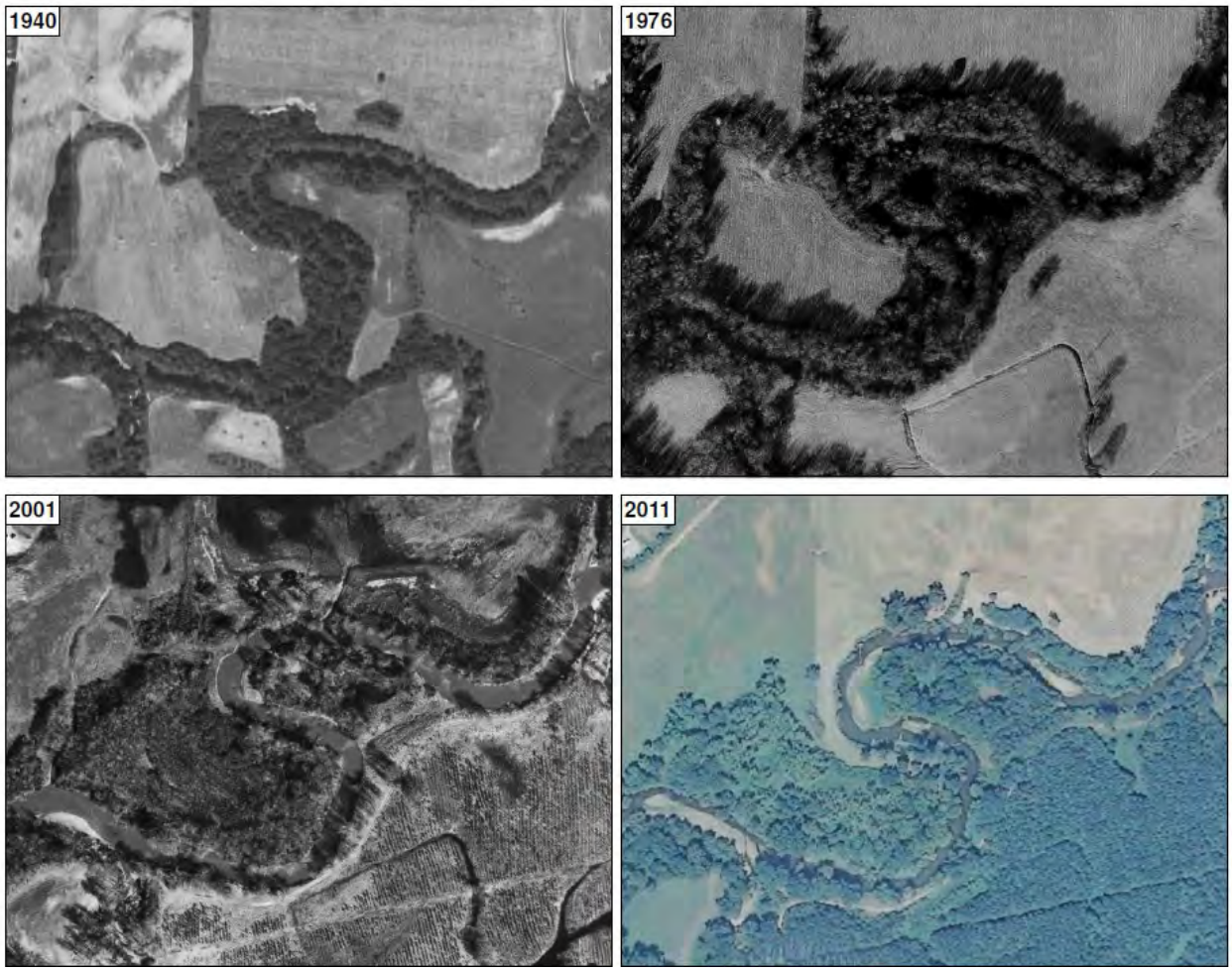

Exhibit 2. Historical Photographs of Choccolocco Creek

The CMZ analysis would be conducted as part of the OU-4 RD and would include a combination of field investigations and desktop modeling. The results of evaluation would be to identify where the creek channel might migrate laterally in the future such that creek bank areas addressed as part of the OU-4 remedy could be appropriately designed from an engineering and restoration perspective. The CMZ results would also be used to identify creek bank areas where remediation is not required but movement of the creek channel could necessitate actions to limit residual creek bank sources from becoming a primary source once other sources have been addressed.

The process to conduct the CMZ analysis begins with mapping the channel over time to develop the historical migration zone (HMZ). This process is typically conducted as a desktop exercise using historical photographs to identify trends in channel movement. This evaluation typically includes a time series of aerial photographs that are georeferenced such that changes in location can be quantified using geographic information system (GIS) tools. The aerial photographs can also be supplemented with in-field survey measurements, the placement and monitoring of erosion pins, and/or a series of light detection and ranging (LiDAR) surveys taken over time. Following the HMZ evaluation, which is largely a desktop assessment, it will be important to conduct a field mapping exercise. The field assessment would be documenting in-creek, creek bank, and riparian conditions. The following are example elements of the field assessment:

- Characterizing in-creek sediment deposits, including location, size, thickness, and material characteristics
- Developing a geomorphological map of the in-creek, creek bank, riparian zone, and floodplain conditions
- Identifying and characterizing former flow channels, including former flow path and dimensions
- Documenting creek bank conditions, including material properties, vegetation, and failure mechanisms (where applicable), and identifying if mass wasting of bank areas is occurring
- Identifying infrastructure features such as bridges and bridge abutments
- Characterizing the roughness of in-creek features such as sediment bed materials and the presence of woody debris
- Observing upstream and tributary inputs as well as downstream features

The next step in the process is identifying the avulsion hazard zone (AHZ) where the channel could migrate to a secondary or relic channel, swales, or other area outside of the HMZ. This evaluation step is important because channel movement to an AHZ could put a creek bank area at risk that was previously not of concern based on the HMZ.

3. LONG-TERM MONITORING FOR FLOODPLAIN AREAS

While residential development is prohibited in much of the OU-4 floodplain through protective easements implemented as part of the Conservation Corridor, the potential still exists for some wooded or agricultural lands in the OU-4 floodplain to be transitioned to residential use. Long-term monitoring would be conducted as an additional measure of protection for this future exposure pathway. The monitoring would be focused on wooded and agricultural areas outside of the Conservation Corridor bounds that have residual PCB concentrations greater than or equal to the PRG (1 milligram per kilogram). The monitoring would be conducted using a comparative review of aerial photographs to detect potential changes in land use for these areas. The results of this desktop comparison may be supplemented with in-field inspections if the results of the aerial photographic comparison are not conclusive. For example, a new structure may be identified during the desktop evaluation that, upon field inspection, is determined to be a barn and not a residential structure. The monitoring would include an initial baseline study as part of the RD to establish initial conditions. Going forward, the comparison of aerial photographs would be conducted once every 3 years given the significant amount of time necessary to implement residential development projects. The results of these evaluations, including the aerial photographic comparisons and any field inspections, would be available for USEPA's use in preparing the 5-year reviews.

4. SOIL MANAGEMENT SUPPORT

The approach for soil management in OU-4 would be consistent with the OU-1/OU-2 remedy and would focus on construction-related projects that could disturb PCB residuals. While termed soil management support, the concept and program apply to floodplain soil, creek bank areas, and in-creek sediment. The projects could include new construction or the repair of existing infrastructure. The concept of soil management is to identify planned intrusive activities prior to project implementation, so a decision can be made proactively and not reactively regarding the need for soil management support. Representative projects with intrusive activities could include bridges, pipelines, building foundations, utilities, shoreline retaining walls/structures, or docks. These projects could be implemented by large public organizations, utility companies, service companies such as plumbers or electricians, or directly by the homeowners. The approach for soil management support would be gated through the 811 utility clearance system as an institutional control (IC). Use of the 811 system to register intrusive work prior to implementation is required by law in Alabama.

The process would provide for a review of planned intrusive projects identified through the 811 system by a competent profession with knowledge of where residual PCBs are located in OU-4 and soil management procedures. The results of this review would determine if soil management support would be needed and, if needed, the type of support. This information would be conveyed to the party planning the intrusive work such that if support is needed, the appropriate resources can be provided, and the intrusive work would be conducted in accordance with soil management procedures developed during the RD and presented in the long-term monitoring plan.

Potential intrusive work for creek bank and in-creek areas located downstream of Jackson Shoals would also be subject to an additional IC from the Alabama Power Company (APCO). This additional IC includes a formal permitting process that requires APCO review and approval prior to project implementation. As part of reviewing the permit applications, APCO, as a matter of practice, shares the permit applications with USEPA for the purpose of identifying any soil management concerns.

5. DATA EVALUATION AND REPORTING

The results of the baseline and performance monitoring data collected over time will be reviewed for quality control purposes and validated in accordance with the requirements of the QAPP. The results will be uploaded to the project database and evaluated, recognizing that the initial evaluation will be conducted for the baseline results. This evaluation relative to the baseline monitoring results will be important because they may inform the RD of potential changes that are necessary for monitoring post-implementation conditions over the long term. The evaluation will focus on documenting system improvements and achieving the PRGs. Part of this process will be conducting evaluations to further understand the relationships between measured concentrations in fish tissue and the various exposure media (surface water, porewater, and sediment). The dissolved-phase PCB results as calculated from the PE will also be valuable to assess the bioavailable fraction of PCBs. These data in combination with the fish tracking study results will be useful for understanding the long-term distribution and time-based concentrations measured in fish tissue as part of assessing remedy performance.

The fish tracking study results are critical to this evaluation because the simplifying assumption that fish are being exposed by local conditions may not be accurate and could lead to an incorrect assessment of remedy performance. The results from the long-term monitoring program will be helpful in setting benchmarks for background conditions as context for OU-4 remedy performance. The results and information will also be applicable for USEPA's outreach with Site and Lake Logan Martin stakeholders regarding the performance of remedies implemented for the Site and general conditions in the lake.

6. REFERENCES

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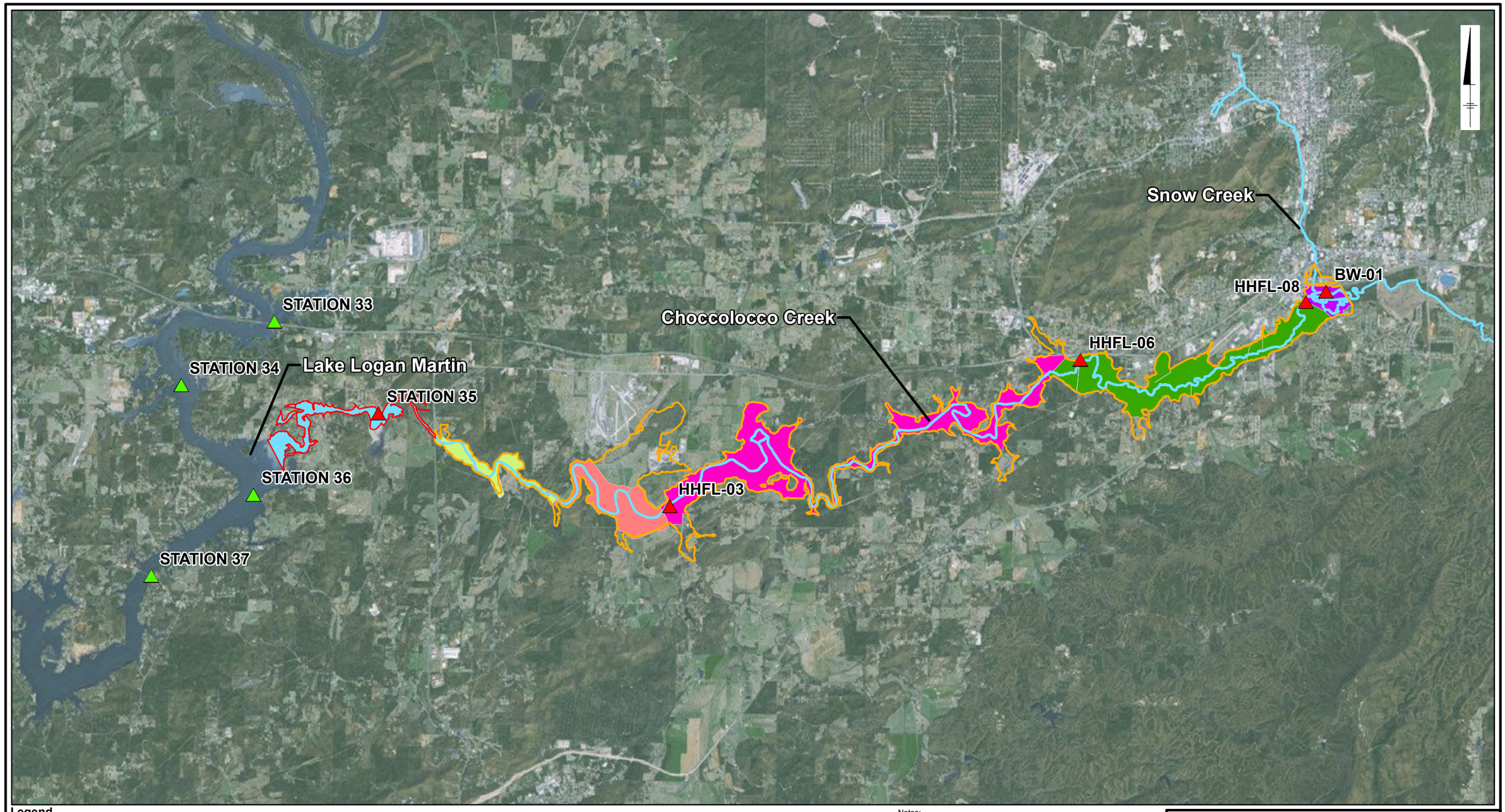
USEPA. 2018. *Superfund Task Force Recommendation #3: Broaden the Use of Adaptive Management.* United States Environmental Protection Agency. Office of Land and Emergency Management. OLEM 9200.3-120. July.

Figures



Legend

- OU-4 Long-Term Monitoring Location
- Lake Logan Martin Long-Term Monitoring Location
- Creek
- Floodplain Boundary

Reaches

- Backwater Area (Upstream of Friendship Road)
- Friendship Road to Coldwater Creek
- Coldwater Creek to Cheaha Creek
- Cheaha Creek to Jackson Shoals
- Jackson Shoals
- Jackson Shoals To Lake Logan Martin

0 10,000 20,000 Feet

Graphic Scale

Notes:

1. OU-4 long-term monitoring locations are proposed at previous human health risk assessment locations (JMWA and Avatar Environmental 2013) and in the backwater area. Sediment, surface water, porewater, and fish tissue samples will be collected from OU-4 long-term monitoring locations BW-01, HHFL-03, HHFL-06, and HHFL-08.
2. Lake Logan Martin (Station 33, 34, 36, and 37) and OU-4 (Station 35) long-term monitoring locations are proposed at historical ADEM fish tissue sampling locations. Sediment, sediment traps, surface water, porewater, and fish tissue samples will be collected from Lake Logan Martin long-term monitoring locations and OU-4 long-term monitoring location Station 35.
3. ADEM: Alabama Department of Environmental Management
   BW: backwater area
   HHFL: human health fish location
   JMWA: J. M. Waller Associates, Inc.
   OU: operable unit
   PCB: polychlorinated biphenyl

Anniston PCB Site
Anniston, Alabama
Feasibility Report for OU-4

Long-Term Monitoring Locations

Solutia

Figure
B-1

City: SYR Div/Group: SWG Created By: K. Ives Last Saved By: cnelson
Anniston
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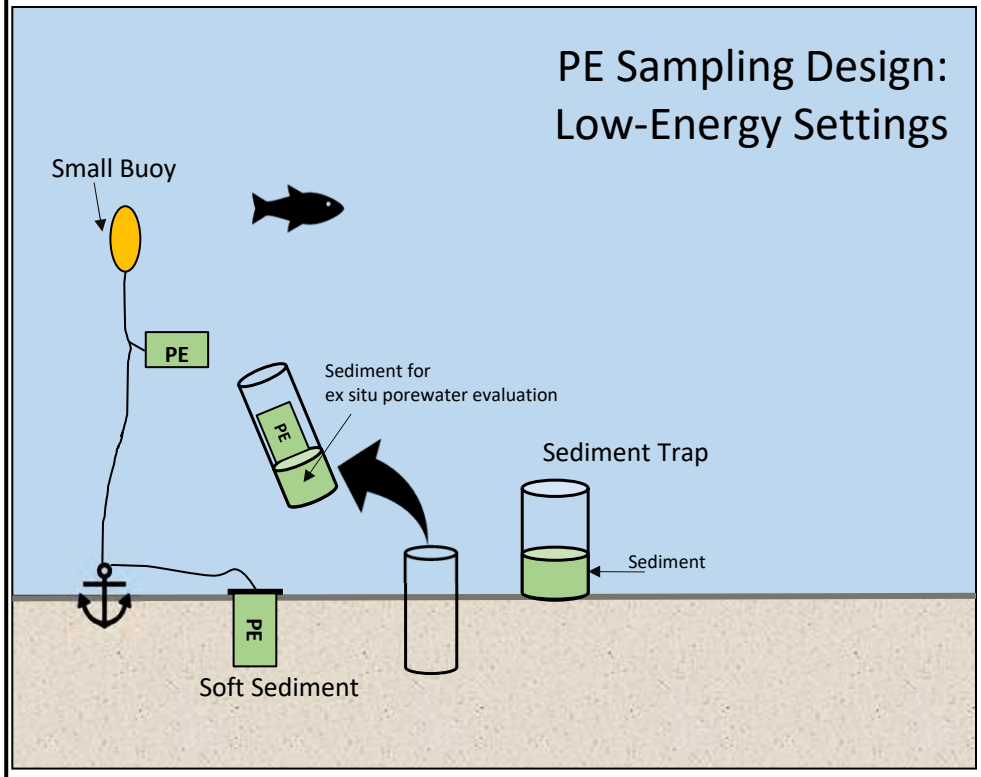

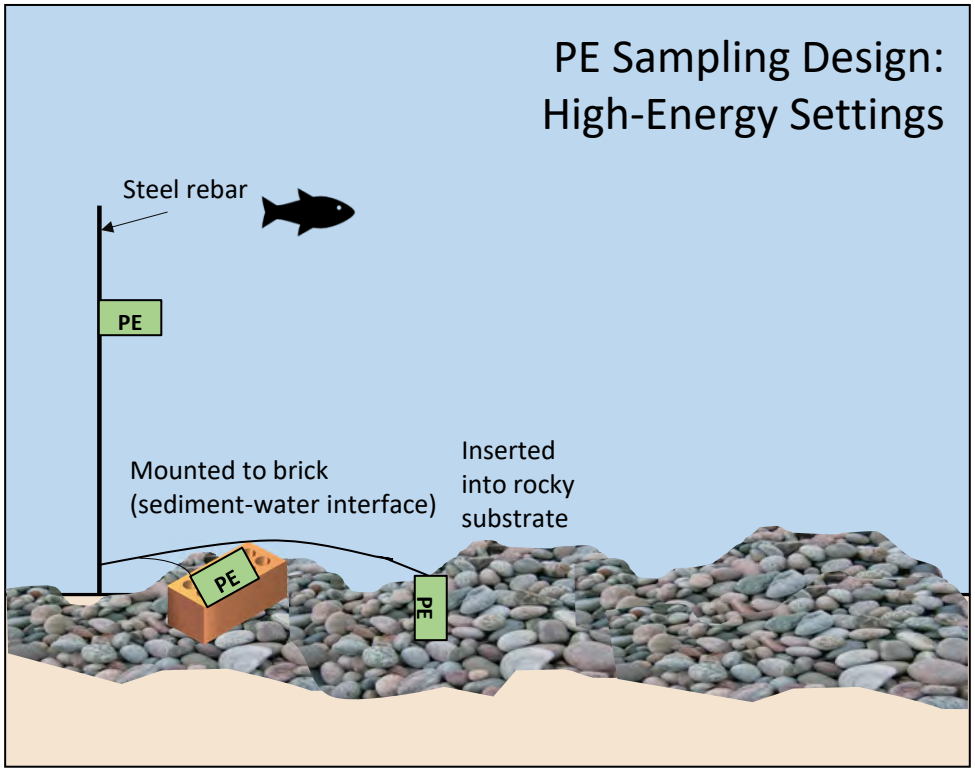

Notes:
PE: polyethylene

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

**Sampling Design for
Low-Energy and High-Energy Settings**

Solutia

Figure
B-2

Appendix C
USEPA Letter Dated August 19, 2005

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

August 19, 2005

4WD-SRTSB

Mr. Chip Crockett
Alabama Department of Environmental Management
1400 Coliseum Blvd.
Montgomery, AL 36110

SUBJ: Document Clarification
Anniston PCB Site, Anniston, Alabama

EPA CERCLA ID # ALD000400123
EPA RCRA ID # ALD004019048

Dear Mr. Crockett:

Please find enclosed a clarification of the Preliminary Remedial Action Objectives (RAOs) and Data Quality Objectives (DQOs) developed for the Anniston PCB Site, as previously presented in the following United States Environmental Protection Agency (EPA) approved documents:

- Remedial Investigation/Feasibility Study Work Plan, Revision 2, December 2004
- Quality Assurance Project Plan for the Anniston PCB Site, Revision 2, February 2005
- Operable Unit 3 Field Sampling Plan, Revision 2, February 2005
- Field Sampling Plan for the Non-Residential Properties of the Operable Unit 1/Operable Unit 2 Area of the Anniston PCB Site, October 2004

The clarification was prepared by EPA and Solutia/Pharmacia jointly and is intended to amend the documents above and provide a framework for moving forward on future work plans and field sampling plans.

If you have any questions, please contact me at (404)562-8935.

Sincerely,

Pamela J. Langston Scully, P.E.
Remedial Project Manager
Superfund Remedial and Technical Services Branch

Enclosure

cc: Mr. Craig Branchfield, Solutia
Mr. Peter L. Virden, Jr., Monsanto
Mr. G. Douglas Jones, Esq.
Mr. Thomas Dahl
Mr. Gregory Hogue, DOI
Mr. Warren Lorentz, USFWS
Mr. Robert Mink, GSA
Mr. William Brantley, ADCNR
Mr. Bob Safay, ATSDR
Mr. Anthony Isolda, CDM
Mr. Bertrand Thomas, TA
Rev. N. Q. Reynolds, CAG

Clarifications to Data Quality Objectives (DQOs)
Anniston PCB Site , Anniston, Alabama
USEPA CERCLA ID #ALD000400123

Purpose

The primary purpose of this document is to clarify the Preliminary Remedial Action Objectives (RAOs) and Data Quality Objectives (DQOs) developed for the Anniston PCB Site, as previously presented in the following United States Environmental Protection Agency (USEPA)-approved documents:

- Remedial Investigation/Feasibility Study Work Plan, Revision 2, December 2004
- Quality Assurance Project Plan for the Anniston PCB Site, Revision 2, February 2005
- Operable Unit 3 Field Sampling Plan, Revision 2, February 2005
- Field Sampling Plan for the Non-Residential Properties of the Operable Unit 1/Operable Unit 2 Area of the Anniston PCB Site, October 2004

The clarifications presented herein clarify, modify or supplement requirements described in the above-listed approved documents, and all such documents are hereby amended to incorporate these clarifications as a USEPA approval requirement.

This clarification document also provides a framework for moving forward on future work plans and field sampling plans. While the DQOs described herein do not include requirements for Operable Unit 4 (Choccolocco Creek), a similar framework will be used to develop appropriate DQOs for characterization of the nature and extent of contamination, ecological risks and human health risks in this operable unit in accordance with requirements of the Partial Consent Decree (PCD) executed between the USEPA, Solutia Inc. and Pharmacia Corporation (Parties to the PCD).

Preliminary Remedial Action Objectives (RAOs)

The Preliminary RAOs developed for the Anniston PCB Site are refined from the Remedial Investigation/Feasibility Study (RI/FS) Work Plan as follows:

- Address the potential human and ecological risks from exposures to constituents of potential concern (COPCs) in floodplain soils, ground water, surface water, sediments, and (consumption of) biota;
- Reduce the potential for off-site impacts to ground water;
- Control sources of COPCs to, and within, Snow and Choccolocco Creeks;
- Minimize, to the extent practicable, the potential migration of COPCs from Snow and Choccolocco Creeks;
- Address COPC concentrations in Choccolocco Creek biota; and
- Address potential risks from exposure to COPCs in air.

Data Quality Objectives (DQOs)

Additional COPCs

COPC DQO #1: COPCs other than polychlorinated biphenyls (PCBs) as Aroclors require measurement for characterization and risk assessment purposes. Additional COPC data will be collected in accordance with the approved RI/FS Work Plan Appendix I, including the constituents listed in Table 1 (Appendix F) of the RI/FS Agreement in the PCD. Data collection decisions will be made on an Operable Unit (OU)-by-OU basis and include nature and extent and risk characterization. Results of additional COPC analyses will be used to direct future data collection requirements as follows:

- No further characterization required based on either non-detect for all additional samples or detect level below appropriate screening level
- If a compound is detected to be above an appropriate screening level, or it is detected but no screening value exists, then one of these two options may be chosen:
    - Further characterization is needed; or
    - The compound is determined to pose unacceptable risk but will not be further characterized beyond a narrative statement in the ecological risk assessment (e.g. compound is not a primary risk driver for which a clean up level needs to be developed, or is not associated with Solutia Inc./Monsanto Company plant site operations).

PCB Congeners

PCB Congeners DQO #1: A proportion of all future samples from all media will be analyzed for PCB congeners in accordance with the media-specific DQOs described below and the approved FSPs for OU-1/2, OU-3, and RI/FS Work Plan Appendix I. The congener information will be used in the human health and ecological risk assessments. USEPA Method 1668A will be used, and the results will be reported as follows:

- PCB total homolog groups
- Total PCBs as the sum of all reported PCB total homolog groups
- Dioxin-like PCB congeners (12 WHO PCB congeners)
- PCB congener 153 (IUPAC No 153)

Air

Air DQO #1: The hypothesis is that PCBs in air in OUs 1, 2, and 3 will be the same as the previous sampling rounds conducted by the Parties to the PCD. Sampling of air will be as described in the OU-1/2 Field Sampling Plan (FSP) for Non-Residential Properties (The samples will be collected at two locations using high volume samples collecting data over a 24-hour

period using USEPA Method TO-04A). Analysis will include PCBs as homologs, as congeners, and dioxins/furans. The congener data from OU-1/2 are assumed to be representative of OU-3 such that the homolog database can be utilized for risk estimations. If the Parties to the PCD later decide that this assumption is scientifically invalid, and that the OU-2 congener data are not representative of OU-3 congener distributions, then additional samples will be collected from OU-3. The risk management decision for OU-1/2 will also be appropriate for and applicable to OU-4.

Ground Water

GW DQC #1: For areas in OU-1/2 and -4 where there are known interim soil management areas containing PCBs greater than 10 milligrams per kilogram (mg/kg) (i.e., Northside and Eastside properties, Quintard Mall, Oxford Park, 111 Hall Street) well samples will be collected to evaluate the effectiveness of the interim measures and to evaluate ground water in the RI/FS. PCBs and the wider list of constituents will be analyzed. A supplemental Field Sampling Plan will be required to identify specific well installation and sampling requirements in these areas.

GW DQC #2: The sampling of ground water at OU-3 is needed to complete the characterization of the nature and extent of contamination, and risks. The sampling requirements, as per the approved OU-3 FSP includes a total of 19 ground water samples collected from existing and newly installed wells at the following specific locations: OW-21 area, MW-9A/MW-14 area, the interior of the facility, the northeast perimeter, and the West End Landfill. PCBs will be analyzed at all specific locations, and the requirements for the wider list of constituents will also be met as specified in the approved OU-3 FSP. The intent of this sampling is to complete our understanding of ground water at the facility.

GW DQC #3: The sampling of ground water at OU-1/2 is needed to provide data for characterization of the nature and extent of contamination, and risks. The sampling of ground water shall initially be based upon results of the soil sampling program in accordance with the approved OU-1/2 FSP for Non-Residential Properties. A maximum of 20 wells will be installed in locations where soil samples taken at or below the water table have PCB concentrations of 10 mg/kg or greater. If the PCB concentration in ground water is at or above 0.5 micrograms per liter (μg/L), a ground water investigation will be conducted to determine the extent of impact. In all installed wells, analysis of the wider constituent list, or a subset thereof as per the soil sampling described in the FSP, will be conducted.

GW DQC #4: A private well survey will be conducted within a 1-mile radius of the Solutia Inc. facility to determine the presence or absence of water wells and if wells are located on the property to determine the type of water usage, well construction methods, the number and age of users, and the volume and rate of water usage. If an active water supply well is found, an evaluation will be made to determine what additional characterization or investigation work is needed.

Soil

Soil DQO #1: The sampling of soils at the Solutia Inc. plant site (OU-3), beyond that previously performed under the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Confirmation Sampling (RFI/CS) program, is needed to provide sufficient data for characterization of the nature and extent of contamination, and risks. Sampling and analysis at 16 locations will be conducted in accordance with the approved OU-3 FSP and will include the collection of three samples for analysis of the wider constituent list at locations corresponding to high, medium and low PCB concentrations.

Soil DQO #2: The sampling of floodplain soils in the Residential portions of OU-1/2 is needed to provide data for characterization of the nature and extent of contamination, and risks, and to determine which properties are subject to a Non-Time-Critical (NTC) Removal Action under provisions of the NTC Removal Agreement contained in the PCD. Sampling will be conducted in accordance with the approved NTC Supplemental Sampling and Analysis Plan (SSAP). If composite surface soils exhibit PCB concentrations of 1 mg/kg or greater at a particular location, depth samples, indoor dust samples and crawl space samples will be collected in accordance with the SSAP, and a Removal Action will be performed in accordance with the approved NTC Removal Action Residential Soil Removal Work Plan.

Soil DQO #3: The sampling of floodplain soils in the Non-Residential portions of OU-1/2 is needed to provide data for characterization of the nature and extent of contamination, and risks. Sampling will be conducted in accordance with the approved OU-1/2 FSP for Non-Residential Properties. A total of 542 additional surface samples will be collected for PCB and total organic carbon (TOC) analyses from 31 Characterization Areas. A minimum of 20 percent of these samples will also be analyzed for grain size. If samples appear to contain foundry fill based on visual observations, they will also be sampled for lead. Ten percent of the surface samples will also be analyzed for the wider constituent list. Ten percent of the surface sampling locations, coinciding with the highest PCB concentrations found in surface soil samples, will be sampled at depth for PCB analysis. If these locations coincide with the randomly selected locations for analysis of the wider constituent list, the depth samples will also be analyzed for the wider list.

Surface Water

SW DQO #1: The sampling of surface water in Snow Creek is needed to provide additional data for characterization of the nature and extent of COPCs other than PCBs as Aroclors. Three samples will be collected and analyzed for the wider constituent list. The samples will be collected from a single location in the downstream area of Snow Creek during high flow conditions. Samples of the collected water will be submitted for total suspended solids analysis to determine total particulate content. The remaining water will be filtered, and the particulate matter will be submitted for analysis of the wider constituent list.

Sediments

Sediment DQO #1: The sampling of sediments from Snow Creek within OU-1/2 is needed to provide additional data for characterization of the nature and extent of COPCs other than PCBs as Aroclors. Three sediment samples will be collected from sediment deposit locations representing high, medium and low PCB concentrations as determined from sampling previously performed at the Site during the RFI/CS program.

General Notes and Additional Requirements:

1. COPCs comprising the "wider constituent list" include constituents listed in Appendix I of the approved RI/FS Work Plan and in Table 1 (Appendix F) of the RI/FS Agreement in the PCD. RI/FS Work Plan Appendix I includes a requirement for "dioxin analysis." As indicated in the approved Site-Wide Quality Assurance Project Plan, "dioxin analysis" is to include analyses for 2,3,7,8-substituted polychlorinated dibenzo-p-dioxin congeners, dibenzofuran congeners and total dibenzo-p-dioxin and dibenzofuran homologs (PCDD/DFs) in accordance with USEPA Method 8290.
2. DQOs necessary to determine the nature and extent of contamination and assess risks in OU-4 have not yet been developed, but are expected to include requirements for biota, surface water, sediments and their associated pore waters, floodplain soil, and ground water, and possibly air. The results of data collection and analysis in OUs-1/2 and 3 will be used in conjunction with previous data collected in OU-4 to develop appropriate DQOs for OU-4.
3. DQOs related to assessment of ecological risks in OU-3 and OU-1/2 have not been developed, pending USEPA review of additional biological survey work performed and a subsequent decision regarding the need to conduct a baseline ecological risk assessment (BERA). In the event that a BERA is required, additional DQOs will be required, and may include soil, surface water, sediments and their associated pore waters, and biota DQOs, which may expand and/or supersede the proposed data collection efforts described above.
4. DQOs developed for risk characterization purposes, both human health and ecological, may need to be expanded to include data required to establish exposure point concentrations (EPCs). Such requirements will be evaluated as methodologies for determining EPCs are developed and subsequently approved by the USEPA.

Last Revision: August 8, 2005

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Appendix D
Development of PCB SWACs for Floodplain Soil

Appendix D: Development of PCB SWACs for Floodplain Soil

1. INTRODUCTION

This appendix has been prepared to document the methods used to identify remedial areas (and volumes) based on the proposed polychlorinated biphenyl (PCB) preliminary remedial goals (PRGs) for nonresidential floodplain soils as part of the Operable Unit 4 Feasibility Study (OU-4 FS) for the Anniston PCB Site (the Site).

Four methods of analysis were combined to identify target remediation areas:

- Thiessen polygons were used to identify areas associated with sampling locations.
- The areas of each sampling location were used to calculate surface-weighted average concentrations (SWACs) for each ecological exposure unit (EU) and human health characterization area (CA).
- Spatially weighted bootstrapped 95% upper confidence limits (95% UCLs) on the mean were calculated using the areas of each sampling location for informational purposes.
- Iterative truncation (a.k.a. hill-topping) was used to identify remedial areas.

SWACs were calculated and hill-topping was used to provide an alternate assessment of exposure point concentrations (EPCs) and, therefore risk, that incorporates spatial distribution of sampling locations; traditional ecological and human-health risk assessment methods do not take this into account.

The 95% UCL is often used as the EPC, as an upper-bound estimate of average contaminant concentration for assessing risk at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites. Mathematical tools available from the United States Environmental Protection Agency (USEPA) (ProUCL v.4) and developed to simplify the computation of 95% UCLs are broadly accepted and used in environmental decision-making. However, a fundamental assumption in developing 95% UCLs is random sampling—a condition rarely encountered in real-world data sets. Typically, sites are assessed in a phased approach, which targets sampling in areas with known or suspected elevated concentrations. The biased data set that results often overrepresents the most heavily contaminated portions of the site. Fortunately, the majority of nonresidential floodplain soil samples collected within each CA were located based on a randomized approach using Visual Sampling Program (VSP) software (Version 5.3) to select the sample locations. The current version of VSP is available at http://vsp.pnl.gov. The similarity in size, location, and geometry of the CAs used for the human health risk assessment and the EUs used for the ecological risk assessment provides a largely randomized data set in the respective CAs and EUs. The process for selecting the randomized sampling locations for the CAs is presented in the *Phase 2 Field Sampling Plan for Operable Unit 4, Revision 2* (Arcadis 2010).

An alternative method for developing EPCs is to use SWACs to account for spatial weighting of the areas surrounding the sample locations. This process can be used to calculate mean concentration SWACs or, in the cases where non-randomized sampling was conducted, the development of SWACs based on the 95% UCL. The results of either approach can be used for developing remedial areas and volumes recognizing that mean SWACs are more applicable to

remediation and 95% UCL SWACs are more applicable to risk assessment. USEPA commonly uses mean SWACs and not 95% UCL SWACs as the measurable goal to demonstrate that a proposed remedy is effective in remediating sediment sources and has recently used this method in the Lower Passaic (USEPA 2021).

A commonly used approach for developing SWACs is Thiessen polygons. Thiessen polygons are constructed for sample data sets such that the polygon's boundaries define the area that is closest to each sample location relative to other locations. Area weighting factors are generated for each polygon relative to the exposure areas. The uncertainty in the data set is addressed by bootstrap resampling techniques. These techniques are applied to the weighted sampling data to calculate spatially weighted mean exposure values. The techniques can also be applied using 95% UCLs to account for nonrandom sampling recognizing that most of the nonresidential soil samples collected in the OU-4 floodplain were located using a randomized approach.

2. METHOD OF ANALYSIS

This section describes the four methods combined and used to identify target remediation areas evaluated as part of the OU-4 FS.

2.1 Thiessen Polygon Development

Thiessen polygons were developed because during site characterization, sampling programs are often biased to target locations with elevated chemical concentrations that are often not spatially extensive and that are bound by lower concentrations. The use of Thiessen polygons provides a method to assess the spatial importance, or weight, of each sample.

Thiessen (also called Voronoi or Dirichlet) polygons, or cells, are polygons that represent the set of points in a given data set whose distance to a given object, in this case a sampling location, is no greater than their distance to the other objects. As an example, each polygon below represents the area that is closest to each black dot.

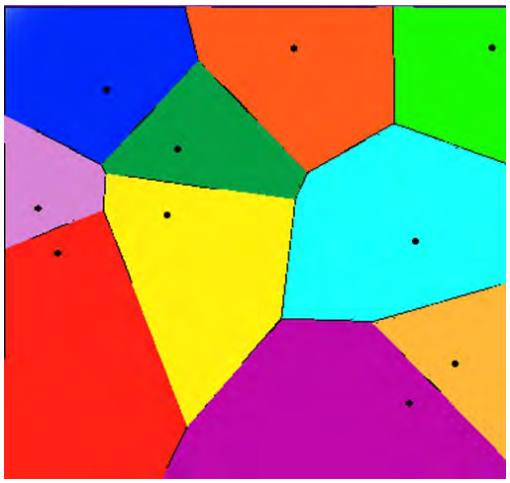

Figure 1: Example Thiessen Polygons

Thiessen polygons were calculated using geographic information system (GIS) software for total PCBs in floodplain soil. The soil data set is detailed in the OU-4 Remedial Investigation Report (Geosyntec 2019). The boundaries of the floodplain EUs, the riparian corridor, and CAs were used to bound and compute a geometric intersection with the Thiessen polygons.

Figure 2: Example geometric intersection of two polygon data sets

As an additional refinement, areas address under interim measures (IMs), such as soil remediated in Oxford Lake Park, were removed from the Thiessen polygons data set. The area of each polygon was calculated using GIS tools, and this area was carried forward to be used in the calculation of SWACs.

2.2 Surface-Weighted Average Concentrations

A SWAC is a weighted average of sample data intended to estimate mean contaminant concentration over a specified spatial area. As mentioned in Section 2.1, weights are intended to correct for spatial biases in sampling programs.

To calculate SWACs, weighting factors, in this case the Thiessen polygon area calculated in Section 2.1, are applied to sample concentrations and summed. The result is then divided by the total area being evaluated. The following formula was used for each EU and CA:

$$\frac{(Concentration\ A\ x\ Area\ A)\ +\ (Concentration\ B\ x\ Area\ B)\ +\ \ldots\ +\ (Concentration\ Z\ x\ Area\ Z)}{(Area\ A\ +\ Area\ B\ +\ \ldots\ +\ Area\ Z)}$$

The result of this calculation is a mean concentration for each EU and CA.

2.3 Spatially Weighted Bootstrap

To better understand the uncertainty associated with the SWACs calculated in Section 2.2, a spatially weighted bootstrap approach was used to calculate the upper bound of the EPC.

The bootstrap method is a computational method for assigning measures of accuracy to sample estimates. The basic idea of the bootstrap is to use an existing sample data set to create a new sample data set by randomly selecting from the original sample data set many times over (10,000 times) using a Monte Carlo algorithm and computing the mean for each of these bootstraps. The size of the resample data set is equal to the size of the original data set.

The relative areas of each sample's Thiessen polygon are used to weight the probability of that sample being selected randomly for each bootstrap.

Sample	Area	Relative Area	Concentration
1	859	8.6%	1392
2	86.1	0.86%	2002
3	26.9	0.27%	14555
4	1278	13%	543
5	1594	16%	303
6	243	2.4%	1137
7	73.1	0.73%	3749
8	2772	28%	84.2
9	1860	19%	159
10	1208	12%	12.6

Table 1: Example data set for demonstration purposes only

For example, the relative area of sample 8 in Table-1 is 28%, and there is therefore a 28% chance of selecting that sample when creating a new sample set for each bootstrap.

After a new data set (i.e., bootstrap has been selected) a new SWAC is calculated using the concentration and areas from the new data set. The SWAC of the sample population was bootstrapped 10,000 times, and the 95th percentile of the SWAC concentration is selected to represent the 95% UCL on the mean.

2.4 Iterative Truncation

To model post-remediation conditions, we calculated new SWACs based on remediation of target areas. Target areas were developed for each EU and CA with SWACs above cleanup levels by replacing the sample with the highest concentration in the model for each EU or CA with a post-remediation concentration (e.g., concentration found in clean fill). A post-remediation SWAC was calculated. If the results of the model show that cleaning up the area with the highest concentration failed to reach the cleanup goal, then the next highest concentration sampled was removed and replaced with a post-remediation concentration. This process was repeated until the model showed which areas within an EU or CA need to be remediated for the EU or CA to meet the target cleanup goal.

In practical terms, the steps involved in iterative truncation (USEPA 2005) are as follows:

- Order the sampling data from lowest to highest concentration.
- Start with the highest concentration and remove a sample (i.e., a sample polygon) and replace it with the post-remediation concentration (e.g., concentration found in clean fill). This process is called truncating the data.
- Recalculate the post-remediation SWAC and compare the resulting concentration to the cleanup goal.
- If the SWAC is above the cleanup goal, repeat the process iteratively until the SWAC is less than or equal to the cleanup goal.

3. CONCLUSIONS

The purpose of this modeling is to identify target areas and volumes that were carried forward as part of alternatives analysis. SWACs were used to estimate current mean contaminant concentrations to correct for spatial biases in sampling programs. To understand uncertainty associated with the SWACs, a spatially weighted bootstrap approach was used to calculate the upper bound of the contaminant concentrations.

To identify target remediation areas that will meet cleanup goals, iterative truncation was used to model SWACs under post-remediation conditions. The results of this modeling can be found throughout the OU-4 FS.

It is also important to note that candidate remedial areas identified in the OU-4 FS would be refined during the remedial design process, including implementing a pre-design investigation (PDI). The PDI would include developing sampling and data evaluation plans using the general construct of SWACs for nonresidential floodplain soil. The PDI would be developed using the final remedial goals selected by USEPA in the OU-4 Record of Decision and incorporate USEPA's data quality objectives process as part of developing a PDI Work Plan. The specific means and methods for locating samples and conducting statistical evaluations of the sample results to refine the remedial areas will also be presented in the PDI Work Plan and supporting Quality Assurance Project Plan.

4. REFERENCES

Arcadis. 2010. *Phase 2 Field Sampling Plan for Operable Unit 4*. Revision 2, Anniston, Alabama. April.

Geosyntec. 2019. *Remedial Investigation Report for Operable Unit 4 of the Anniston PCB Site*. Geosyntec Consultants Inc. September.

USEPA. 2005. *Guidance on Surface Soil Cleanup at Hazardous Waste Sites: Implementing Cleanup Levels*. EPA 9355.0-91.

USEPA. 2021. *Record of Decision for an Interim Remedy in the Upper 9 Miles of the Lower Passaic River Study Area*. EPA 630399.

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Appendix E
Alternative Remediation Scenarios 1 through 3
for Floodplain Soils

Appendix E: Alternative Remediation Scenarios 1 through 3 for Floodplain Soil

1. INTRODUCTION

Preliminary remedial goals (PRGs) were identified to address ecological risks and human health risks as part of the Operable Unit 4 feasibility study (OU-4 FS). The PRGs are based on the range of polychlorinated biphenyl (PCB) remedial goal options presented in the risk assessments and the applicable, relevant, and appropriate requirements (ARARs) identified in Section 6.2 of the OU-4 FS and are summarized in Table 6-5 of the OU-4 FS. The areas and volumes included in the OU-4 FS are based on post-remediation conditions meeting the ecological PCB PRG for soil (6 milligrams per kilogram [mg/kg] PCB surface-weighted average concentration [SWAC] 0–0.5-foot horizon) and the human health PRG for the future agricultural exposure scenario (10 mg/kg PCB SWAC for 0–1-foot horizon). The active alternatives evaluated in the OU-4 FS include excavation and off-site disposal of the soil followed by backfilling of the excavated areas and stabilization with a vegetative cover. Nonresidential soil alternative 2 (NRS-2) includes off-site disposal at permitted landfills of soils excavated from the 0–6-inchhorizon over a 71-acre footprint to achieve the ecological and human health PRGs. The remedial volume for soil under NRS-2 is 57,475 cubic yards. The estimated cost is approximately $30.9 million. The remediation footprint for this scenario is presented on Figures 7-2a through 7-2t of the OU-4 FS. A total of 22 landowners, 34 parcels, and 19.2 riparian acres would be impacted under NRS-2.

This appendix of the OU-4 FS includes the preliminary identification of areas and volumes that are associated with three alternative remediation scenarios for nonresidential (i.e., floodplain) soil. A summary for each alternative scenario is provided along with the size of the remedial footprint and the associated volume of soil that would need to be removed to achieve the alternative PCB post-remediation SWACs defined for each alternative below. The cost implications of implementing the alternative remediation scenarios are also provided. This information is being provided to assess the significant and widespread impact of potentially implementing an alternative remediation scenario.

2. ALTERNATIVE REMEDIATION SCENARIO 1

This alternative remediation scenario includes removing floodplain soil based on achieving a post-remediation PCB SWAC of 2 mg/kg for the 0–0.5-foot horizon. The remediation footprint for this alternative scenario is 306 acres, and the removal volume is 247,070 cubic yards (approximately 4 times the removal volume of NRS-2). The estimated cost is approximately $128.2 million. The remediation footprint for this scenario is presented on Figures E-1 through E-8. A total of 47 landowners, 75 parcels, and 81.5 riparian acres would be impacted under this alternative remediation scenario. The improvement in protectiveness for this additional effort and cost would be approximately 4% on a site-wide basis. This estimate is based on the difference in area remaining after removal efforts that would be greater than 2 mg/kg and greater than 6 mg/kg. In comparison to NRS-2, an additional 62.2 riparian acres (or 4 times the riparian acres) would be impacted under this alternative scenario. Also, an additional 25 landowners and 41 parcels would be impacted under this alternative remediation scenario compared to NRS-2.

3. ALTERNATIVE REMEDIATION SCENARIO 2

This alternative remediation scenario includes removing floodplain soil based on achieving a post-remediation PCB SWAC of 2 mg/kg for the 0–0.5-foot horizon and removing PCB-containing soil with concentrations greater than or equal to 50 mg/kg for the 0–4-foot horizon. The remediation footprint for this alternative remediation scenario is 327 acres, and the removal volume is 456,709 cubic yards (approximately 8 times the removal volume of NRS-2). The estimated cost is approximately $242.5 million. The remediation footprint for this scenario is presented on Figures E-9 through E-16. A total of 47 landowners, 75 parcels, and 89.9 riparian acres would be impacted under this alternative remediation scenario. In comparison to NRS-2, the remediation footprint is greater than 4 times the remedial footprint of NRS-2 and an additional 70.2 riparian acres would be impacted. More than 2 times the number of landowners and parcels would be impacted under this alternative remediation scenario. The reduction to a SWAC target of 2 mg/kg only improves protectiveness by approximately 4% over the OU-4 footprint. The additional removal of concentrations at depth does not improve protectiveness for ecological receptors because they are not exposed to these deeper soils.

4. ALTERNATIVE REMEDIATION SCENARIO 3

This alternative remediation scenario includes removing floodplain soil based on achieving a post-remediation PCB SWAC of 1 mg/kg for the 0–4-foot horizon. The remediation footprint for this alternative remediation scenario is 533 acres, and the removal volume is 1,240,194 cubic yards (approximately 21 times the removal volume of NRS-2). The estimated cost is approximately $484.8 million. The remediation footprint for this scenario is presented on Figures E-17 through E-33. A total of 96 landowners, 134 parcels, and 216.8 riparian acres would be impacted under this alternative remediation scenario. In comparison to NRS-2, the remediation footprint is greater than 7 times the remedial footprint of NRS-2 and an additional 197.6 riparian acres would be impacted. Between 3 to 4 times the number of landowners and parcels would be impacted under this alternative remediation scenario. This scenario would result in catastrophic habitat destruction and would not improve protectiveness because populations of all ecological receptor groups evaluated would be protected at a post remedial SWAC target of 2 mg/kg.

Tables

Table E-1. Scenario E1. Estimated Costs for Alternative PRG Appendices - SWAC of 2 mg/kg
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Scenario E1: Excavate surface soils to meet a SWAC of 2 mg/kg for the 0 to 0.5 foot horizon. Excavated soils would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is three years.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$2,591,000	$2,591,000
2	Site Preparation	LS	1	$547,600	$547,600
3	Site Facilities	MO	34	$84,200	$2,895,600
4	Haul Road Installation and Maintenance	LS	1	$1,020,800	$1,020,800
5	Soil Excavation	CY	247,070	$37	$9,141,600
6	Backfill	CY	164,700	$32	$5,270,400
7	Off-Site Transportation and Disposal (T&D - TSCA)	TON	259,400	$202	$52,398,800
8	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	111,200	$68	$7,561,600
9	Restoration	ACRE	306	$22,800	$6,983,600
10	Decontamination	LS	1	$46,800	$46,800
11	Contractor Management	MO	34	$233,500	$8,030,000
12	Demobilization	LS	1	$2,591,000	$2,591,000
13	Construction Management	MO	34	$45,600	$1,568,200
14	Predesign Sampling	LS	1	$1,300,000	$1,300,000
				Total Capital Costs:	$101,947,000
Administrative/Management					
15	Project Management (3% of Construction Cost)	LS	1	$1,259,598	$1,259,600
16	Engineering Design (6% of Capital Cost)	LS	1	$2,519,196	$2,519,200
				Administrative/Management Costs:	$3,778,800
17	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$21,145,160	$21,145,200
			Total Construction Cost (Capital Costs and Administrative/Management):		$126,871,000
Long-Term Operation, Maintenance, and Monitoring					
18	Long-Term OMM Program with 20% Contingency	Year	30	$131,000	
19	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$1,369,300	$1,369,300
				Total Estimated Cost:	$128,240,300
				Total Estimated Cost (Rounded):	$128,200,000

Acronyms:

CY: cubic yard

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: Toxic Substances Control Act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Scenario E1 Notes and Assumptions

The following numbered notes address the corresponding line-item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) around the perimeter of targeted remediation areas and to perform clearing (as needed) within targeted construction areas. This estimate assumes that site preparations associated with the sediment and creek bank options can also be used during the nonresidential floodplain work at no additional cost. This includes use of the support pads constructed during the sediment and creek bank work. It is also assumed that additional pads would be constructed of high-density polyethylene (HDPE) liner and crusher run material outside floodplain areas where a support pad was not previously constructed.

3. *Site Facilities*: This estimate includes site facilities and accessories needed for the duration of the work. Site facilities include office trailers, storage units, sanitary facilities, generators, and access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction equipment. This estimate assumes that the costs for installation of site facilities is included in the sediment and creek bank options.

4. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel needed to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run stone. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the sediment and creek bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

5. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel needed to excavate targeted floodplain soils to achieve a surface-weighted average concentration (SWAC) for polychlorinated biphenyls (PCBs) of 2 milligrams/kilogram (mg/kg) in the 0–0.5-foot horizon. The cost also assumes the work will be completed at a production rate between 96 and 384 cubic yards of soil per day depending on the location of the removal and the articulated dump truck used. An excavator will load material into a dump truck for transport to a transfer station. At the transfer station, the articulated dump truck will dump material on a pad where a second excavator will load stockpiled excavated material and place it in a triaxle truck that will deliver the material to the targeted disposal facility. The excavation does not include an over-removal allowance. Contractor uptime is assumed to be 25% for the smaller dump approach and 50% for the larger dump approach due to logistical challenges including creek crossings and densely forested terrain. This estimate assumes 90% of the excavation will be conducted using the method with a production rate of 384 cubic yards of soil per day and 10% will be conducted using the method with a production rate of 96 cubic yards of soil per day.

6. *Backfill:* This estimate includes labor, materials, equipment, and fuel needed to backfill targeted floodplain excavations. It is assumed that triaxle trucks from the borrow source will stockpile material on nearby clean support pads and a loader will load an articulated dump truck that will deliver the material to the targeted placement area where a skid-steer loader will be used to grade backfill material. The production rate is assumed to be between 280 and 400 cubic yards per day depending on the location of the backfill area and the articulated dump truck used. Backfill material will be replaced up to 2 inches below pre-construction grade with no overplacement allowance. The costs to rebuild the support pads with clean material and liners after excavation are included in line item No. 2.

7. *Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of excavated soil from the targeted floodplain areas containing PCBs greater than or equal to 50 mg/kg at Waste Management's Toxic Substance Control Act (TSCA) disposal facility located in Emelle, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 70% of excavated soil would be disposed as TSCA.

8. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated soil with PCBs less than 50 mg/kg from the targeted floodplain areas to Advanced Disposal's Three Corners Regional disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 30% of excavated soil would be disposed under this line item.

9. *Restoration:* This estimate includes labor, materials, equipment, and fuel needed to restore nonresidential properties after the remediation is complete. This includes placing 2 inches of topsoil (with no overplacement allowance) in removal areas by the methods described in line item No. 6. This estimate also includes hydroseeding within removal areas at an assumed production rate of 90,000 square feet per day, tree replanting within removal areas on 50-foot centers, and disposal of support pads constructed for nonresidential soil (NRS) work at Waste Management's Emelle, Alabama, TSCA disposal facility.

10. *Decontamination:* This estimate includes labor and materials needed to decontaminate equipment used to remove and handle impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a HDPE liner to contain the potentially impacted material. It is also assumed that a laborer will need 30 days to decontaminate equipment over the course of the project.

11. *Contractor Management:* This estimate includes labor needed for the contractor's management of the project and includes a monthly flight allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, and superintendent for travel to and from the site. The estimate also includes labor and equipment needed to conduct pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project and a monthly flight allowance for the field staff member to travel to and from the site.

14. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials needed to perform predesign investigation sampling. This includes the labor and field equipment needed to collect four cores per acre within targeted removal areas to further delineate the project area. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

15. *Project Management*: This estimate assumes 3% of the total capital costs for labor and fees to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

16. *Engineering Design*: This estimate assumes 6% of the total capital costs for labor and fees to complete the remedial design.

17. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the total capital and administrative/management costs.

18. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials needed to conduct yearly long-term monitoring. This is assumed to include a yearly in-person visual inspection of the site, associated reporting, and the consultant's project management services. This estimate also includes the assumed labor needed to manage the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy. This includes tracking the Alabama 811 system, community outreach, data management, reporting, and the consultant's project management. Both the yearly in-person visual inspection and the Alabama 811 management work include a 20% contingency.

19. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 18 over 30 years with a 7% discount factor.

Table E-2. Scenario E2. Estimated Costs for Alternative PRG Appendices - PCB SWAC of 2 mg/kg and at 0 to 0.5 feet and greater than 50mg/kg from 0 to 4 feet
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Scenario E2: Excavate surface soils to meet a SWAC of 2 mg/kg for the 0 to 0.5 foot horizon and remove all material with PCB concentrations greater than 50 mg/kg from the 0 to 4 foot horizon. Excavated soils would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is six years.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$4,323,000	$4,323,000
2	Site Preparation	LS	1	$584,600	$584,600
3	Site Facilities	MO	64	$84,200	$5,352,600
4	Haul Road Installation and Maintenance	LS	1	$1,089,700	$1,089,700
5	Soil Excavation	CY	456,709	$37	$16,898,200
6	Backfill	CY	368,800	$32	$11,801,600
7	Off-Site Transportation and Disposal (T&D - TSCA)	TON	573,900	$202	$115,927,800
8	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	111,200	$68	$7,561,600
9	Restoration	ACRE	327	$22,800	$7,455,600
10	Decontamination	LS	1	$50,000	$50,000
11	Contractor Management	MO	64	$233,500	$14,843,500
12	Demobilization	LS	1	$4,323,000	$4,323,000
13	Construction Management	MO	64	$45,600	$2,898,800
14	Predesign Sampling	LS	1	$1,400,000	$1,400,000
				Total Capital Costs:	$194,510,000
Administrative/Management					
15	Project Management (3% of Construction Cost)	LS	1	$2,130,618	$2,130,600
16	Engineering Design (6% of Capital Cost)	LS	1	$4,261,236	$4,261,200
				Administrative/Management Costs:	$6,391,800
17	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$40,180,360	$40,180,400
				Total Construction Cost (Capital Costs and Administrative/Management):	$241,082,200
Long-Term Operation, Maintenance, and Monitoring					
18	Long-Term OMM Program with 20% Contingency	Year	30	$131,000	
19	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$1,369,300	$1,369,300
				Total Estimated Cost:	$242,451,500
				Total Estimated Cost (Rounded):	$242,500,000

Acronyms:

CY: cubic yard

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: Toxic Substances Control Act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Scenario E2 Notes and Assumptions

The following numbered notes address the corresponding line item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) around the perimeter of targeted remediation areas and to perform clearing (as needed) within targeted construction areas. This estimate assumes that site preparations associated with the sediment and creek bank options can also be used during the nonresidential floodplain work at no additional cost. This includes use of the support pads constructed during the sediment and creek bank work. It is also assumed that additional pads would be constructed of high-density polyethylene (HDPE) liner and crusher run material outside floodplain areas where a support pad was not previously constructed.

3. *Site Facilities*: This estimate includes site facilities and accessories needed for the duration of the work. Site facilities include office trailers, storage units, sanitary facilities, generators, and access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction equipment. This estimate assumes that the costs for installation of site facilities is included in the sediment and creek bank options.

4. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel needed to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run stone. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the sediment and creek bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

5. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel needed to excavate targeted floodplain soils to achieve a surface-weighted average concentration (SWAC) for polychlorinated biphenyls (PCBs) of 2 milligrams/kilogram (mg/kg) in the 0–0.5-foot horizon and excavate remaining floodplain soils with PCB concentrations greater than 50 mg/kg in the 0–4-foot horizon. The cost also assumes the work will be completed at a production rate between 96 and 384 cubic yards of soil per day depending on the location of the removal and the articulated dump truck used. An excavator will load material into a dump truck for transport to a transfer station. At the transfer station, the articulated dump truck will dump material on a pad where a second excavator will load stockpiled excavated material and place it in a triaxle truck that will deliver the material to the targeted disposal facility. The excavation does not include an over-removal allowance. Contractor uptime is assumed to be 25% for the smaller dump approach and 50% for the larger dump approach due to logistical challenges including creek crossings and densely forested terrain. This estimate assumes 90% of the excavation will be conducted using the method with a production rate of 384 cubic yards of soil per day and 10% will be conducted using the method with a production rate of 96 cubic yards of soil per day.

6. *Backfill:* This estimate includes labor, materials, equipment, and fuel needed to backfill targeted floodplain excavations. It is assumed that triaxle trucks from the borrow source will stockpile material on nearby clean support pads and a loader will load an articulated dump truck that will deliver the material to the targeted placement area where a skid-steer loader will be used to grade backfill material. The production rate is assumed to be between 280 and 400 cubic yards per day depending on the location of the backfill area and the articulated dump truck used. Backfill material will be replaced up to 2 inches below pre-construction grade with no overplacement allowance. The costs to rebuild the support pads with clean material and liners after excavation are included in line item No. 2.

7. *Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of excavated soil from the targeted floodplain areas containing PCBs greater than or equal to 50 mg/kg at Waste Management's Toxic Substance Control Act (TSCA) disposal facility located in Emelle, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 70% of excavated soil associated with achieving a SWAC for PCBs in the 0–0.5-foot horizon of 2 mg/kg would be disposed as TSCA as well as the remaining excavated soil associated with PCB concentrations greater than 50 mg/kg in the 0–4-foot horizon.

8. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated soil with PCBs less than 50 mg/kg from the targeted floodplain areas to Advanced Disposal's Three Corners Regional disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 30% of excavated soil associated with achieving a SWAC for PCBs in the 0–0.5-foot horizon of 2 mg/kg would be disposed under this line item.

9. *Restoration:* This estimate includes labor, materials, equipment, and fuel needed to restore nonresidential properties after the remediation is complete. This includes placing 2 inches of topsoil (with no overplacement allowance) in removal areas by the methods described in line item No. 6. This estimate also includes hydroseeding within removal areas at an assumed production rate of 90,000 square feet per day, tree replanting within removal areas on 50-foot centers, and disposal of support pads constructed for nonresidential soil (NRS) work at Waste Management's Emelle, Alabama, TSCA disposal facility.

10. *Decontamination:* This estimate includes labor and materials needed to decontaminate equipment used to remove and handle impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a HDPE liner to contain the potentially impacted material. It is also assumed that a laborer will need 32 days to decontaminate equipment over the course of the project.

11. *Contractor Management:* This estimate includes labor needed for the contractor's management of the project and includes a monthly flight allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, and superintendent for travel to and from the site. The estimate also includes labor and equipment needed to conduct pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project and a monthly flight allowance for the field staff member to travel to and from the site.

14. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials needed to perform predesign investigation sampling. This includes the labor and field equipment needed to collect four cores per acre within targeted removal areas to further delineate the project area. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

15. *Project Management*: This estimate assumes 3% of the total capital costs for labor and fees to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

16. *Engineering Design*: This estimate assumes 6% of the total capital costs for labor and fees to complete the remedial design.

17. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the total capital and administrative/management costs.

18. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials needed to conduct yearly long-term monitoring. This is assumed to include a yearly in-person visual inspection of the site, associated reporting, and the consultant's project management services. This estimate also includes the assumed labor needed to manage the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy. This includes tracking the Alabama 811 system, community outreach, data management, reporting, and the consultant's project management. Both the yearly in-person visual inspection and the Alabama 811 management work include a 20% contingency.

19. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 18 over 30 years with a 7% discount factor.

Table E-3. Scenario E3. Estimated Costs for Alternative PRG Appendices - PRG of 1 mg/kg from 0 to 4 Feet
OU-4 Feasibility Study of the Anniston PCB Site, Anniston Alabama

Scenario E3: Excavate surface soils to meet a PRG of 1 mg/kg for the 0 to 4 foot horizon. Excavated soils would be disposed of in an appropriately permitted off-site landfill. Soil management would be conducted as part of the remedy. The soil management activities would limit future intrusive activities on the nonresidential properties from adversely impacting the effectiveness of the nonresidential surface soil remedy including using the Alabama 811 system as an institutional control component of long-term soil management. The estimated time frame to complete is fifteen years.

ITEM NO.	DESCRIPTION	UNITS	NO. OF UNITS	UNIT COST	ESTIMATED COST (ROUNDED)
Capital Costs					
1	Mobilization	LS	1	$11,049,000	$11,049,000
2	Site Preparation	LS	1	$952,900	$952,900
3	Site Facilities	MO	173	$84,200	$14,534,900
4	Haul Road Installation and Maintenance	LS	1	$1,776,300	$1,776,300
5	Soil Excavation	CY	1,240,194	$37	$45,887,200
6	Backfill	CY	1,096,900	$32	$35,100,800
7	Off-Site Transportation and Disposal (T&D - TSCA)	TON	573,900	$202	$115,927,800
8	Off-Site Transportation and Disposal (T&D - Non-TSCA)	TON	1,286,400	$68	$87,475,200
9	Restoration	ACRE	533	$22,800	$12,152,400
10	Decontamination	LS	1	$81,500	$81,500
11	Contractor Management	MO	173	$233,500	$40,307,700
12	Demobilization	LS	1	$11,049,000	$11,049,000
13	Construction Management	MO	173	$45,600	$7,871,600
14	Predesign Sampling	LS	1	$2,200,000	$2,200,000
				Total Capital Costs:	$386,366,300
Administrative/Management					
15	Project Management (3% of Construction Cost)	LS	1	$5,488,899	$5,488,900
16	Engineering Design (6% of Capital Cost)	LS	1	$10,977,798	$10,977,800
				Administrative/Management Costs:	$16,466,700
17	Contingency Capital Cost (20% of Total Capital Costs and Administrative/Management Costs)	LS	1	$80,566,600	$80,566,600
				Total Construction Cost (Capital Costs and Administrative/Management):	$483,399,600
Long-Term Operation, Maintenance, and Monitoring					
18	Long-Term OMM Program with 20% Contingency	Year	30	$131,000	
19	Present Worth of Long-Term OMM Program (Years 1-30 NPV with 7% Discount)	LS	1	$1,369,300	$1,369,300
				Total Estimated Cost:	$484,768,900
				Total Estimated Cost (Rounded):	$484,800,000

Acronyms:

CY: cubic yard

LS: lump sum

MO: month

No.: number

NPV: net present value

OMM: operations, maintenance, and monitoring

TSCA: Toxic Substances Control Act

T&D: transport and disposal

General Notes:

1. All costs are in 2023 dollars, should be considered preliminary and subject to revision after a remedy for the Site has been selected and the project transitions from the feasibility study (FS) to the remedial design phase.

2. Costs are rounded, as appropriate.

3. Costs include 10% taxes on material, labor, and rental equipment. All costs include overhead and profit, 20% contingency on capital costs, and 20% contingency on long-term monitoring and maintenance costs.

4. The estimates were developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events, and actual costs could be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, Site conditions that were unknown to Anchor QEA, LLC, at the time the estimates were made, future changes in Site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs could vary from these estimates and such variations may be material. Anchor QEA is not licensed as accountants or securities attorneys and, therefore, makes no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

5. Costs do not include property costs (where applicable), access costs, legal fees, agency oversight, or public relations efforts.

6. It is assumed that work will be conducted 10 hours per day, 6 days per week.

7. Contractor-driven costs include 20% overhead and profit—except for transport and disposal (or treatment) of excavated or dredged material and site clearing, which includes 5% contractor overhead and profit.

8. All cost estimates include material and labor, unless otherwise noted. Unit costs are estimated using standard estimating guides (e.g., RSMeans), vendor estimates, professional judgment, and experience from other projects. Labor rates are estimates based on professional judgment and experience from other projects.

Scenario E3 Notes and Assumptions

The following numbered notes address the corresponding line item costs:

1. *Mobilization:* This estimate includes mobilization of labor, equipment, and materials necessary to complete the work as described above. The mobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

2. *Site Preparation:* This estimate includes labor, materials, equipment, and fuel needed to install erosion and sedimentation controls (i.e., silt fencing) around the perimeter of targeted remediation areas and to perform clearing (as needed) within targeted construction areas. This estimate assumes that site preparations associated with the sediment and creek bank options can also be used during the nonresidential floodplain work at no additional cost. This includes use of the support pads constructed during the sediment and creek bank work. It is also assumed that additional pads would be constructed of high-density polyethylene (HDPE) liner and crusher run material outside floodplain areas where a support pad was not previously constructed.

3. *Site Facilities*: This estimate includes site facilities and accessories needed for the duration of the work. Site facilities include office trailers, storage units, sanitary facilities, generators, and access to water. This estimate also includes the cost for a fuel truck and truck driver to be on-site throughout the project to fuel construction equipment. This estimate assumes that the costs for installation of site facilities is included in the sediment and creek bank options.

4. *Haul Road Installation and Maintenance*: This estimate includes labor, materials, equipment, and fuel needed to install and maintain haul roads at the site. Haul roads will be 12 feet wide and constructed with nonwoven geotextile overlain with a 1-foot-thick layer of crusher run stone. Haul roads will include pull-off areas to allow for two-way traffic along longer stretches of access road. Assumed maintenance includes replacement of 10% of the haul roads. It is assumed that all haul roads developed as part of the sediment and creek bank alternative will remain in place for this alternative and that at the completion of the project all haul roads will remain in place.

5. *Soil Excavation:* This estimate includes labor, materials, equipment, and fuel needed to excavate targeted floodplain soils to achieve a surface weighted average concentration (SWAC) for polychlorinated biphenyls (PCBs) of 1 milligrams/kilogram (mg/kg) in the 0–4-foot horizon. The cost also assumes the work will be completed at a production rate between 96 and 384 cubic yards of soil per day depending on the location of the removal and the articulated dump truck used. An excavator will load material into a dump truck for transport to a transfer station. At the transfer station, the articulated dump truck will dump material on a pad where a second excavator will load stockpiled excavated material and place it in a triaxle truck that will deliver the material to the targeted disposal facility. The excavation does not include an over-removal allowance. Contractor uptime is assumed to be 25% for the smaller dump approach and 50% for the larger dump approach due to logistical challenges including creek crossings and densely forested terrain. This estimate assumes 90% of the excavation will be conducted using the method with a production rate of 384 cubic yards of soil per day and 10% will be conducted using the method with a production rate of 96 cubic yards of soil per day.

6. *Backfill:* This estimate includes labor, materials, equipment, and fuel needed to backfill targeted floodplain excavations. It is assumed that triaxle trucks from the borrow source will stockpile material on nearby clean support pads and a loader will load an articulated dump truck that will deliver the material to the targeted placement area where a skid-steer loader will be used to grade backfill material. The production rate is assumed to be between 280 and 400 cubic yards per day depending on the location of the backfill area and the articulated dump truck used. Backfill material will be replaced up to 2 inches below pre-construction grade with no overplacement allowance. The costs to rebuild the support pads with clean material and liners after excavation are included in line item No. 2.

7. *Off-Site Transportation and Disposal (TSCA):* This estimate includes the transport and disposal of excavated soil from the targeted floodplain areas containing PCBs greater than or equal to 50 mg/kg at Waste Management's Toxic Substance Control Act (TSCA) disposal facility located in Emelle, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 70% of excavated soil associated with achieving a SWAC for PCBs in the 0–0.5-foot horizon of 2 mg/kg would be disposed as TSCA as well as the remaining excavated soil associated with PCB concentrations greater than 50 mg/kg in the 0–4-foot horizon.

8. *Off-Site Transportation and Disposal (Non-TSCA)*: This estimate includes the transport and disposal of excavated soil with PCBs less than 50 mg/kg from the targeted floodplain areas to Advanced Disposal's Three Corners Regional disposal facility in Piedmont, Alabama. The density of the excavated soil is assumed to be 1.5 tons per cubic yard. Assumed 30% of excavated soil associated with achieving a SWAC for PCBs in the 0–0.5-foot horizon of 2 mg/kg would be disposed as under this line item as well as the remaining excavated soil associated with achieving a SWAC for PCBs in the 0–4-foot horizon of 1 mg/kg that is less than 50 mg/kg.

9. *Restoration:* This estimate includes labor, materials, equipment, and fuel needed to restore nonresidential properties after the remediation is complete. This includes placing 2 inches of topsoil (with no overplacement allowance) in removal areas by the methods described in line item No. 6. This estimate also includes hydroseeding within removal areas at an assumed production rate of 90,000 square feet per day, tree replanting within removal areas on 50-foot centers, and disposal of support pads constructed for nonresidential soil (NRS) work at Waste Management's Emelle, Alabama, TSCA disposal facility.

10. *Decontamination:* This estimate includes labor and materials needed to decontaminate equipment used to remove and handle impacted material. It is assumed a laborer will decontaminate equipment via dry methods (hand tools) while the equipment is staged over a HDPE liner to contain the potentially impacted material. It is also assumed that a laborer will need 52 days to decontaminate equipment over the course of the project.

11. *Contractor Management:* This estimate includes labor needed for the contractor's management of the project and includes a monthly flight allowance for the project manager, health and safety officer, project engineer, quality assurance/quality control manager, and superintendent for travel to and from the site. The estimate also includes labor and equipment needed to conduct pre-construction, post-removal, post-backfill placement, and post-topsoil placement confirmation surveys at an assumed rate of 1 acre per day.

12. *Demobilization:* This estimate includes demobilization of labor, equipment, and materials necessary to complete the work described above. The demobilization cost is estimated at 10% of the total direct construction costs less transport and disposal of excavated material.

13. *Construction Management:* This estimate includes labor for the Owner's Representative to perform construction quality assurance for the project. This includes having a project engineer and field staff member on-site for the entire project and a monthly flight allowance for the field staff member to travel to and from the site.

14. *Predesign Sampling*: This estimate includes labor, equipment, laboratory-related costs, and materials needed to perform predesign investigation sampling. This includes the labor and field equipment needed to collect four cores per acre within targeted removal areas to further delineate the project area. It is assumed that each core will be divided into three intervals with the upper two intervals submitted to the laboratory for PCB analysis and the deepest interval submitted to the lab as an archive sample.

15. *Project Management*: This estimate assumes 3% of the total capital costs for labor and fees to complete the management of the project. This includes attending meetings, reviewing contractor documents, and providing engineering services during construction.

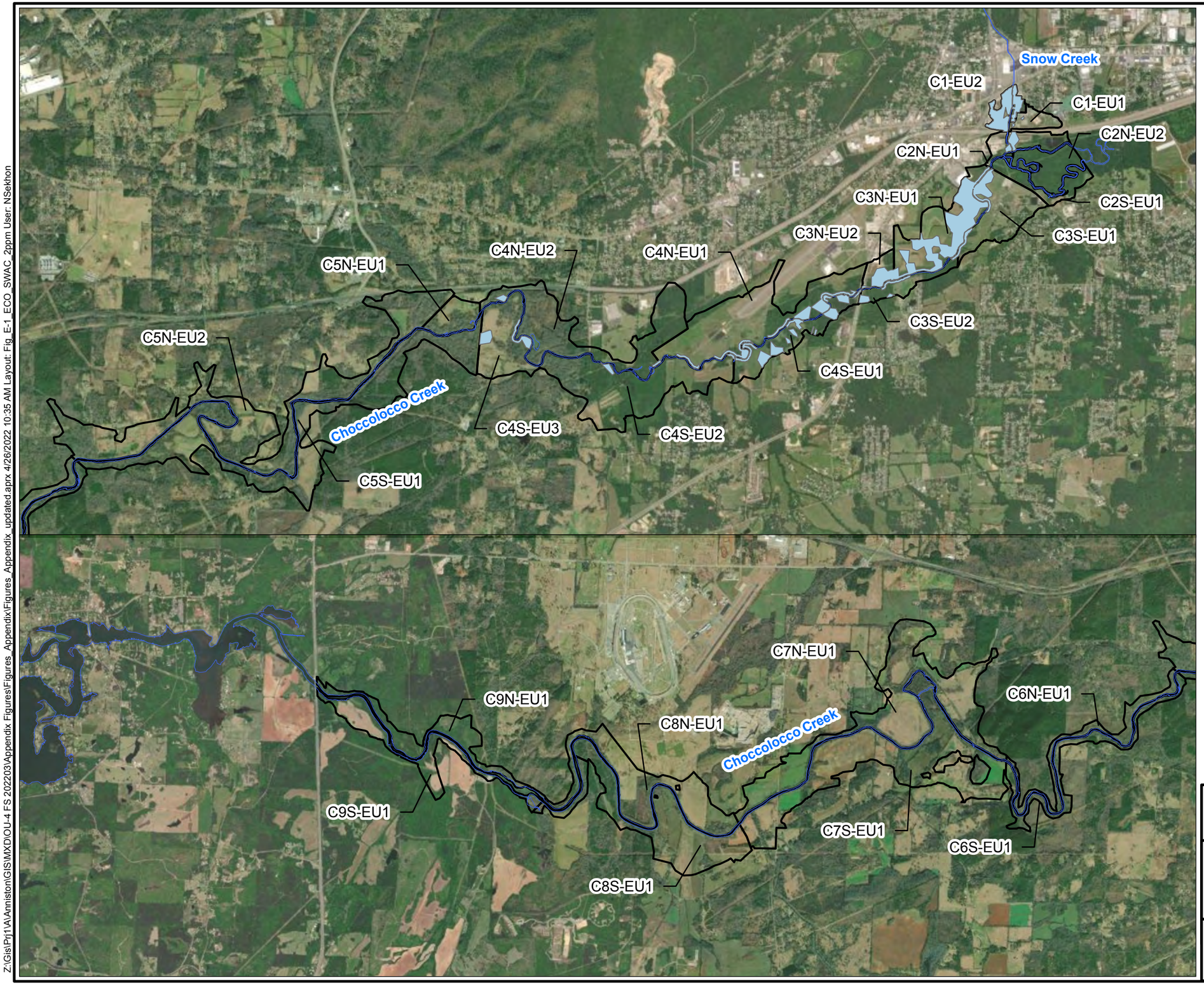
16. *Engineering Design*: This estimate assumes 6% of the total capital costs for labor and fees to complete the remedial design.

17. *Contingency Capital Cost*: This estimate assumes a 20% contingency on the total capital and administrative/management costs.

18. *Long-Term Operations, Maintenance, and Monitoring (OMM) Program:* This estimate includes the assumed labor and materials needed to conduct yearly long-term monitoring. This is assumed to include a yearly in-person visual inspection of the site, associated reporting, and the consultant's project management services. This estimate also includes the assumed labor needed to manage the Alabama 811 system to identify the potential for intrusive activities that without proper soil management support could negatively impact the effectiveness of the remedy. This includes tracking the Alabama 811 system, community outreach, data management, reporting, and the consultant's project management. Both the yearly in-person visual inspection and the Alabama 811 management work include a 20% contingency.

19. *Present Worth of Long-Term Cost (Net Present Value)*: This estimate provides the net present value for the long-term OMM program as described in line item No. 18 over 30 years with a 7% discount factor.

Figures



Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Exposure Units

Remedial Depth (ft bgs)

- 0.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
ft: feet
mg/kg: milligram(s) per kilogram
EPC: exposure point concentration
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 1 2 Miles

Graphic Scale

Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Alternative Floodplain Soil PRG: 2 mg/kg SWAC (0 to 0.5 feet)

Solutia

Figure E-1

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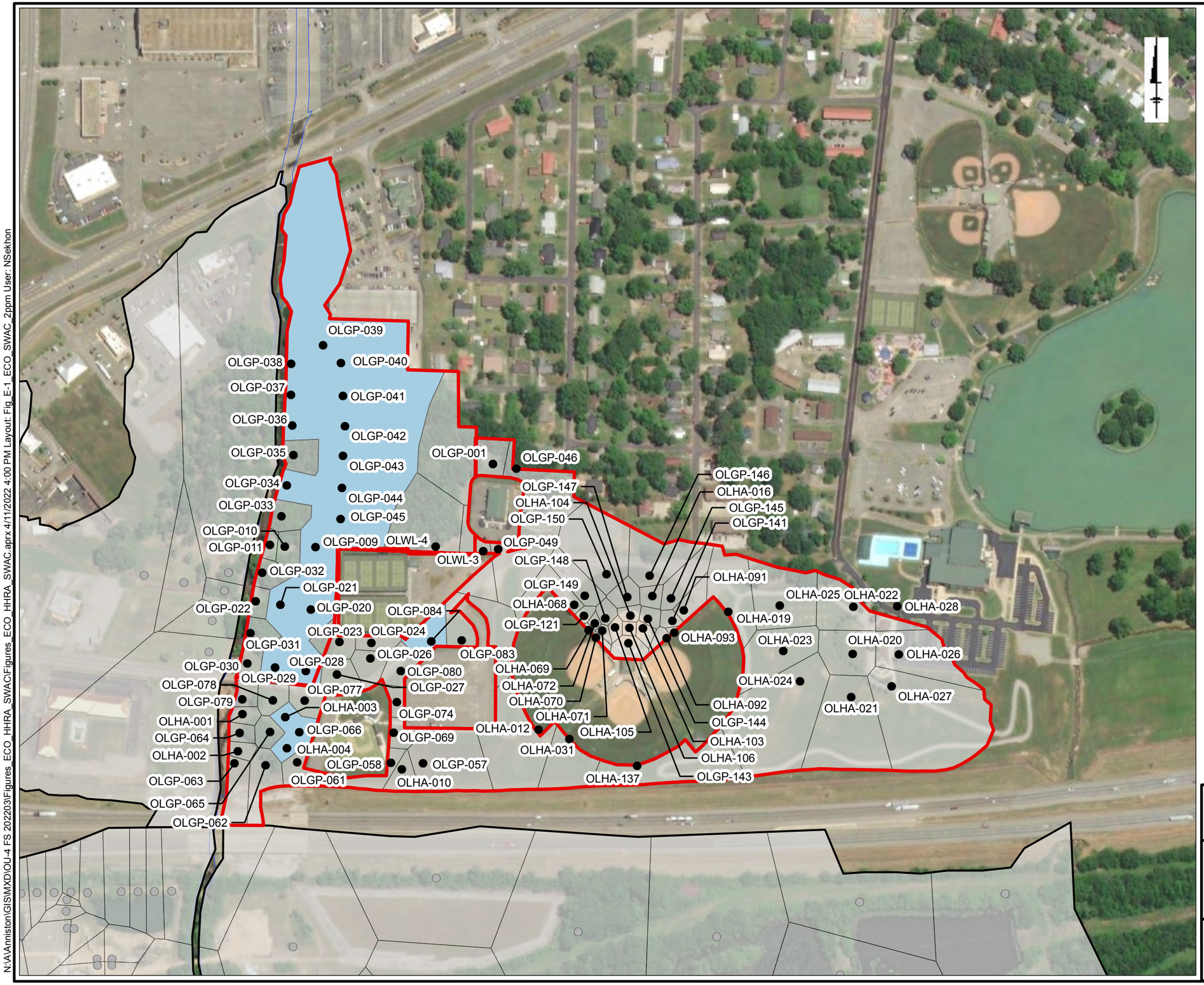


Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

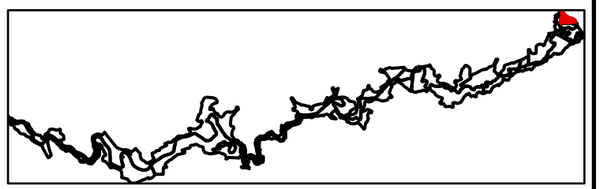
Remedial Depth (ft bgs)

- 0.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

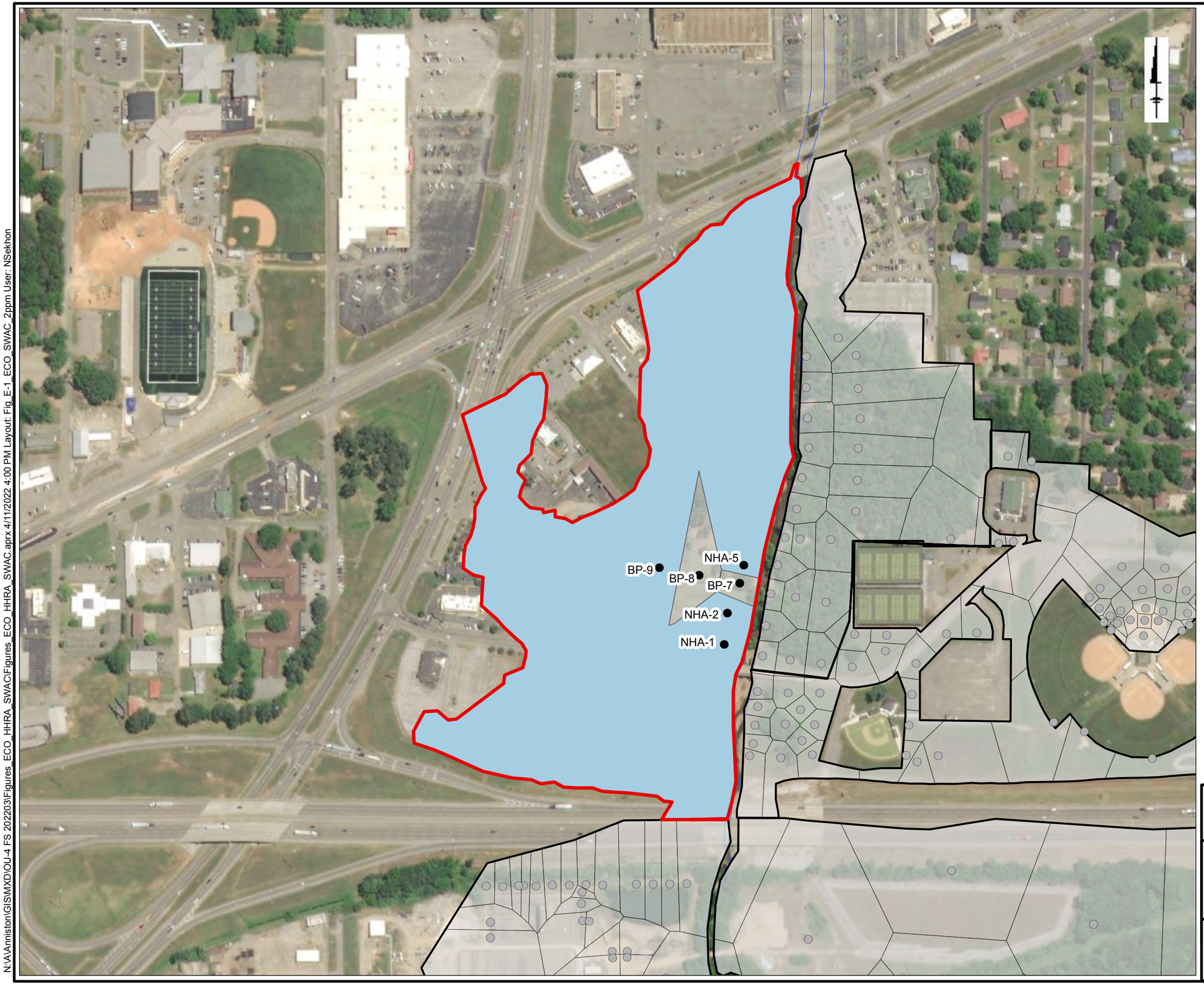
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C1E: 2 mg/kg SWAC (0 to 0.5 feet)

Solutia

Figure E-2

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:00 PM Layout: Fig_E-1_ECO_SWAC_2ppm User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

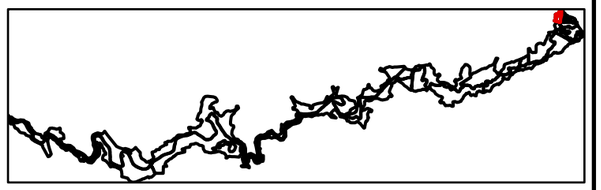
Remedial Depth (ft bgs)

- 0.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

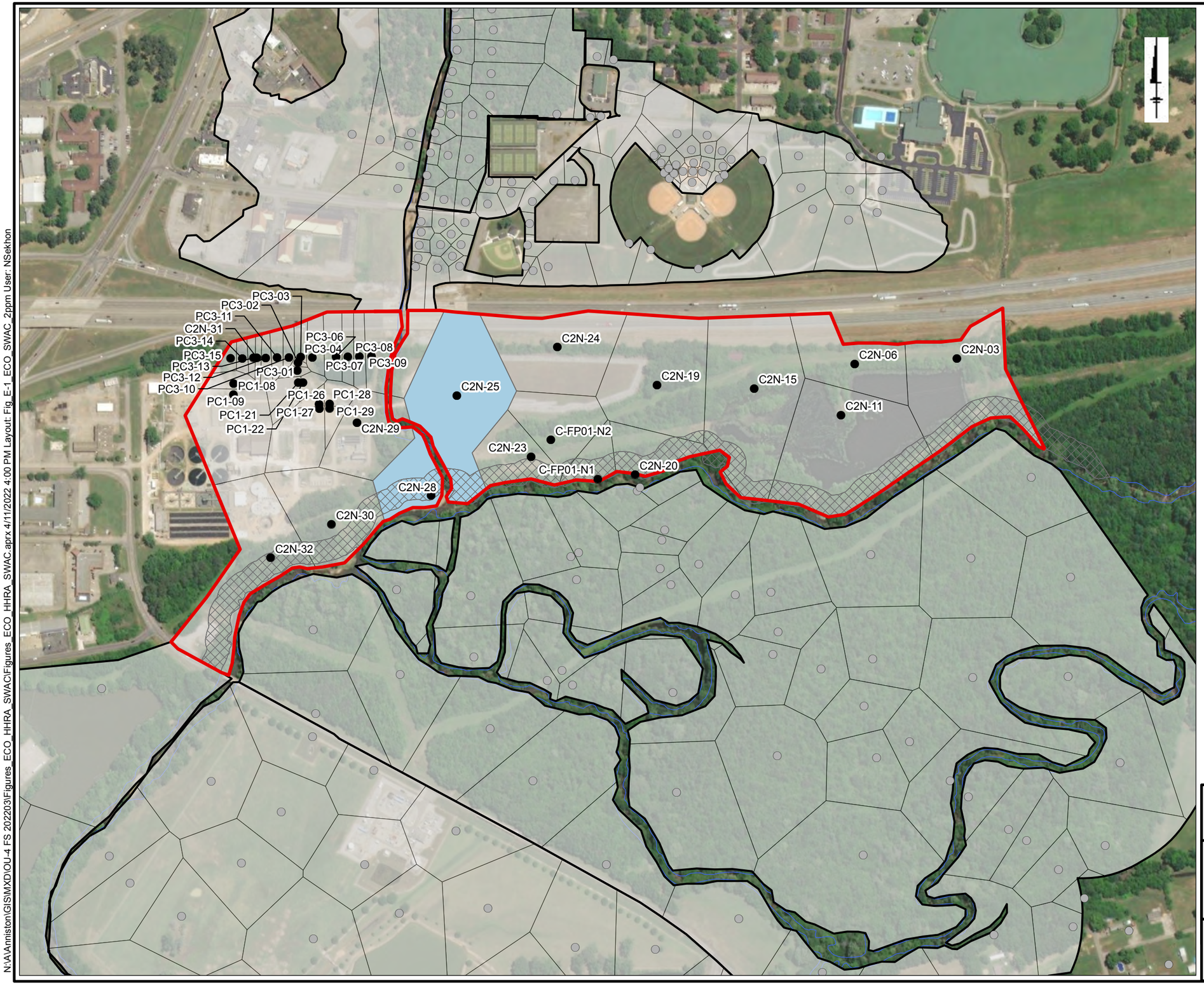
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C1W: 2 mg/kg SWAC (0 to 0.5 feet)

Solutia

Figure E-3

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:00 PM Layout: Fig_E-1_ECO_SWAC_2ppm User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

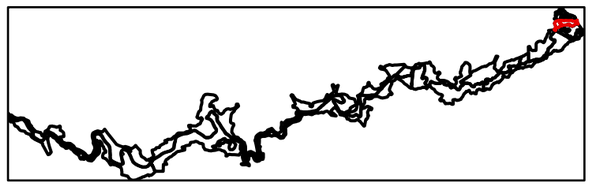
Remedial Depth (ft bgs)

- 0.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

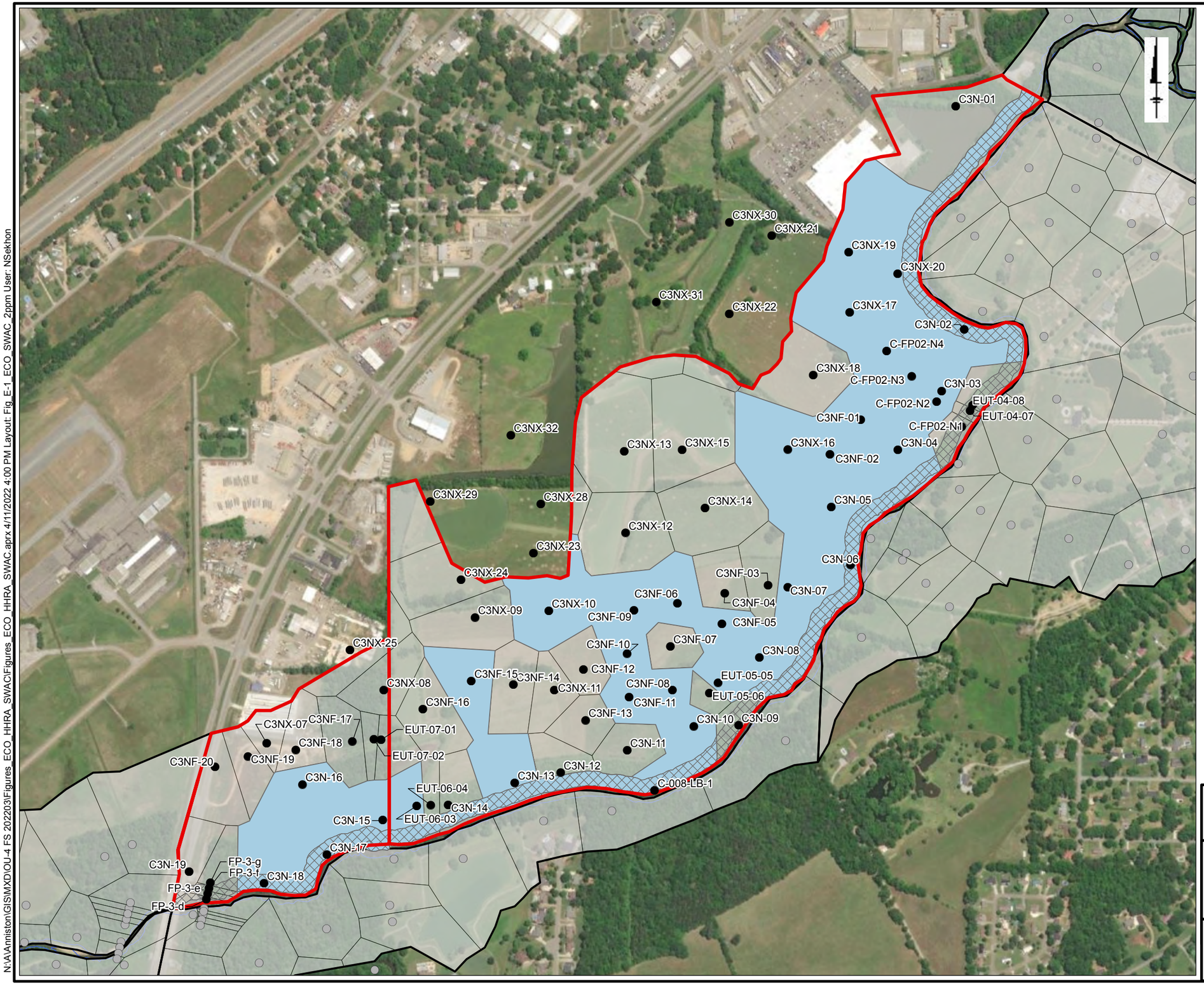
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C2N: 2 mg/kg SWAC (0 to 0.5 feet)

Solutia

Figure E-4

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:00 PM Layout: Fig. E-1_ECO_SWAC_2ppm User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

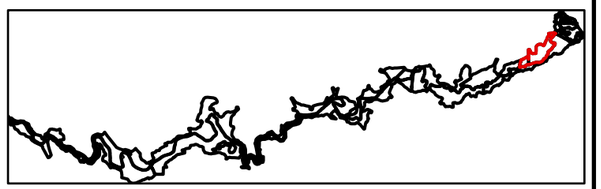
Remedial Depth (ft bgs)

- 0.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

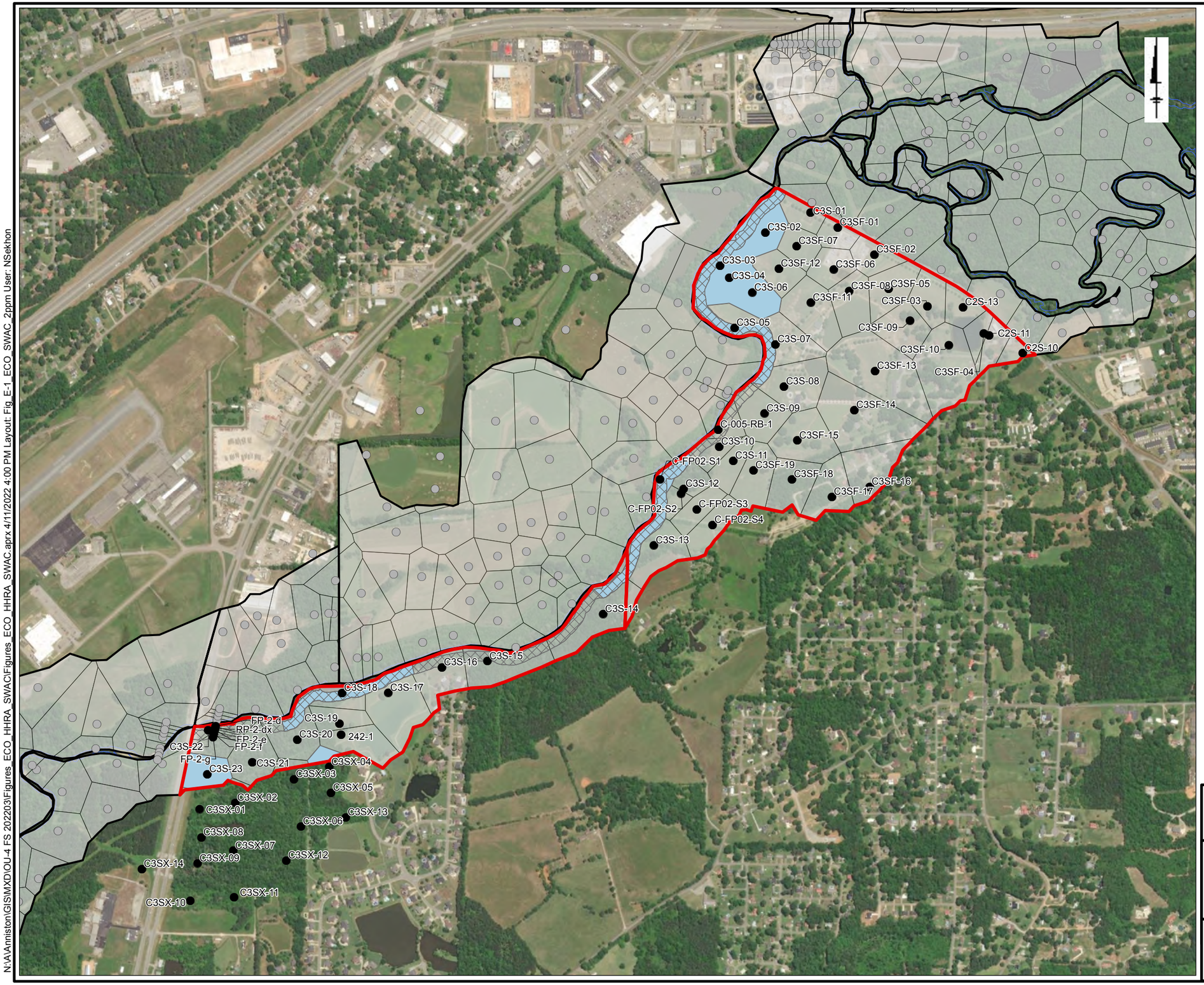
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C3N:
2 mg/kg SWAC (0 to 0.5 feet)**

Solutia

Figure E-5

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:00 PM Layout: Fig. E-1_ECO_SWAC_2ppm User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

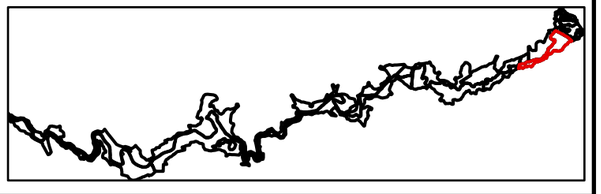
Remedial Depth (ft bgs)

- 0.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

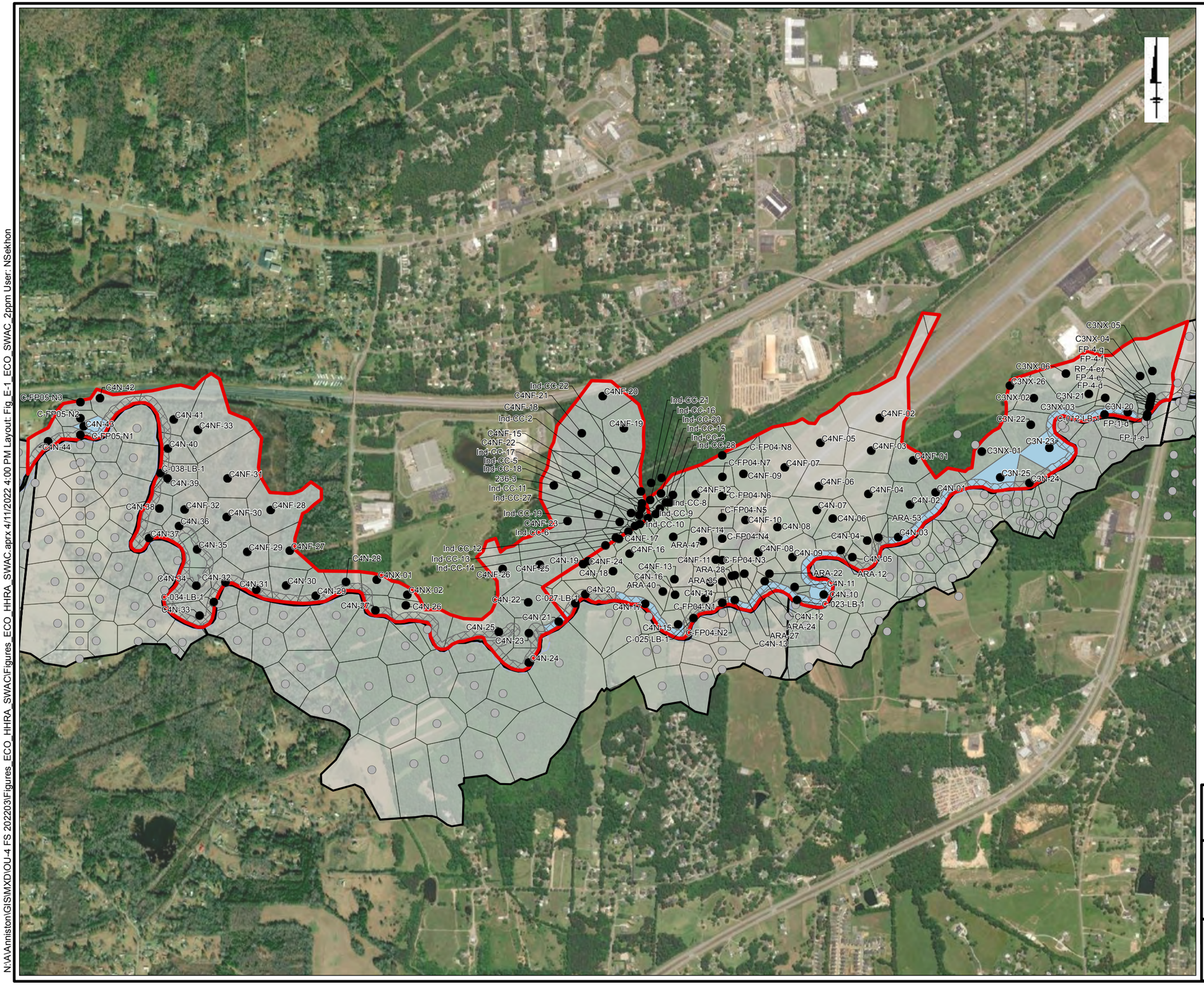
**Alternative Floodplain Soil PRGs in C3S:
2 mg/kg SWAC (0 to 0.5 feet)**

Solutia

Figure E-6

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:00 PM Layout: Fig. E-1_ECO_SWAC_2ppm User: NSekhon

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:00 PM Layout: Fig_E-1_ECO_SWAC_2ppm User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

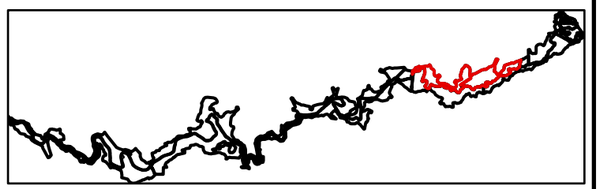
Remedial Depth (ft bgs)

- 0.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

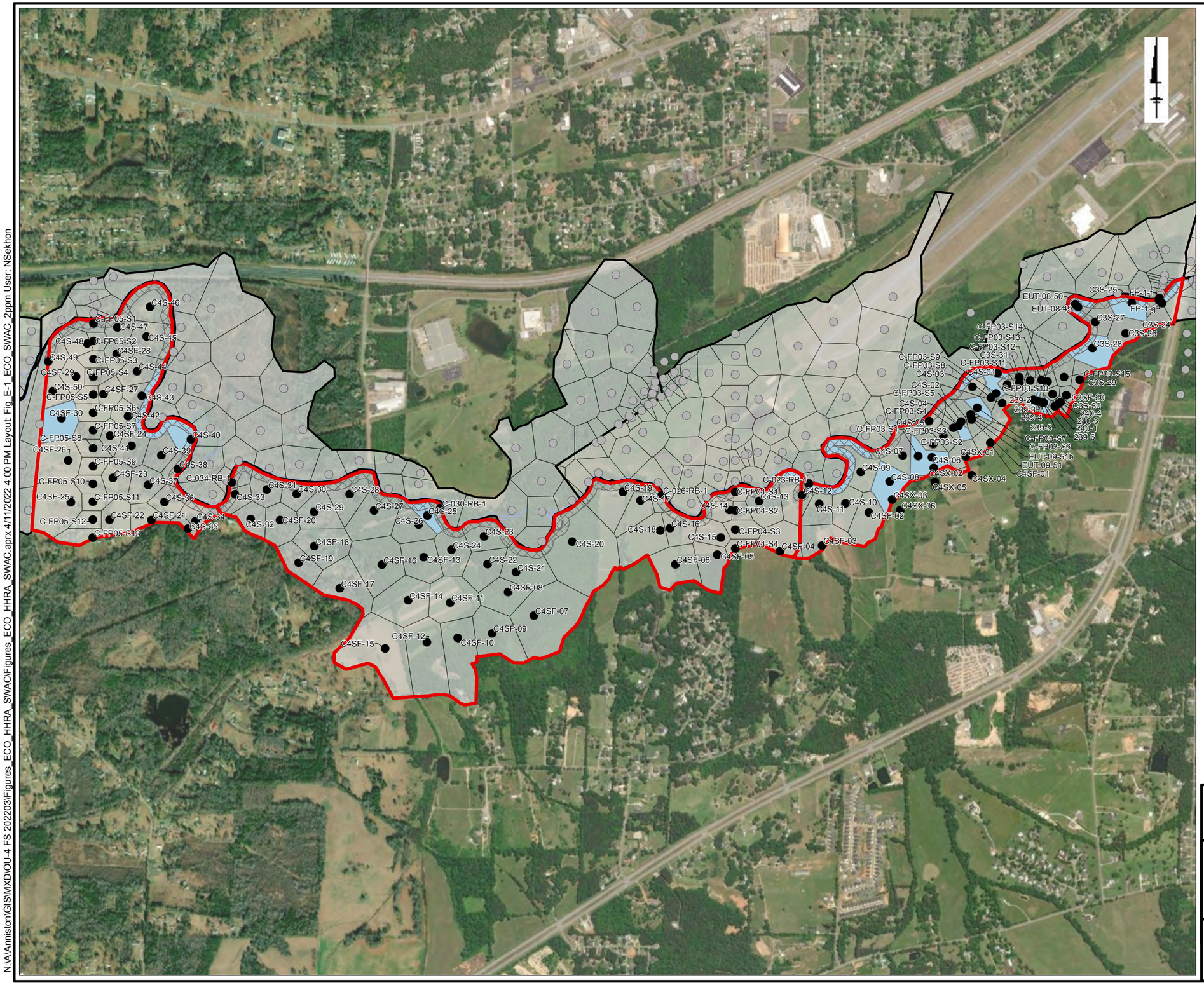
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C4N:
2 mg/kg SWAC (0 to 0.5 feet)

Solutia

Figure E-7

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:00 PM Layout: Fig_E-1_ECO_SWAC_2ppm User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

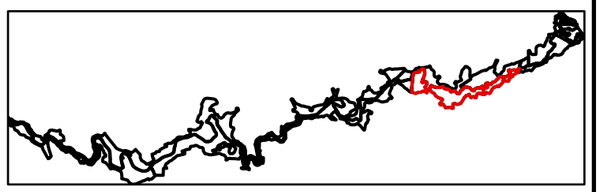
Remedial Depth (ft bgs)

- 0.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



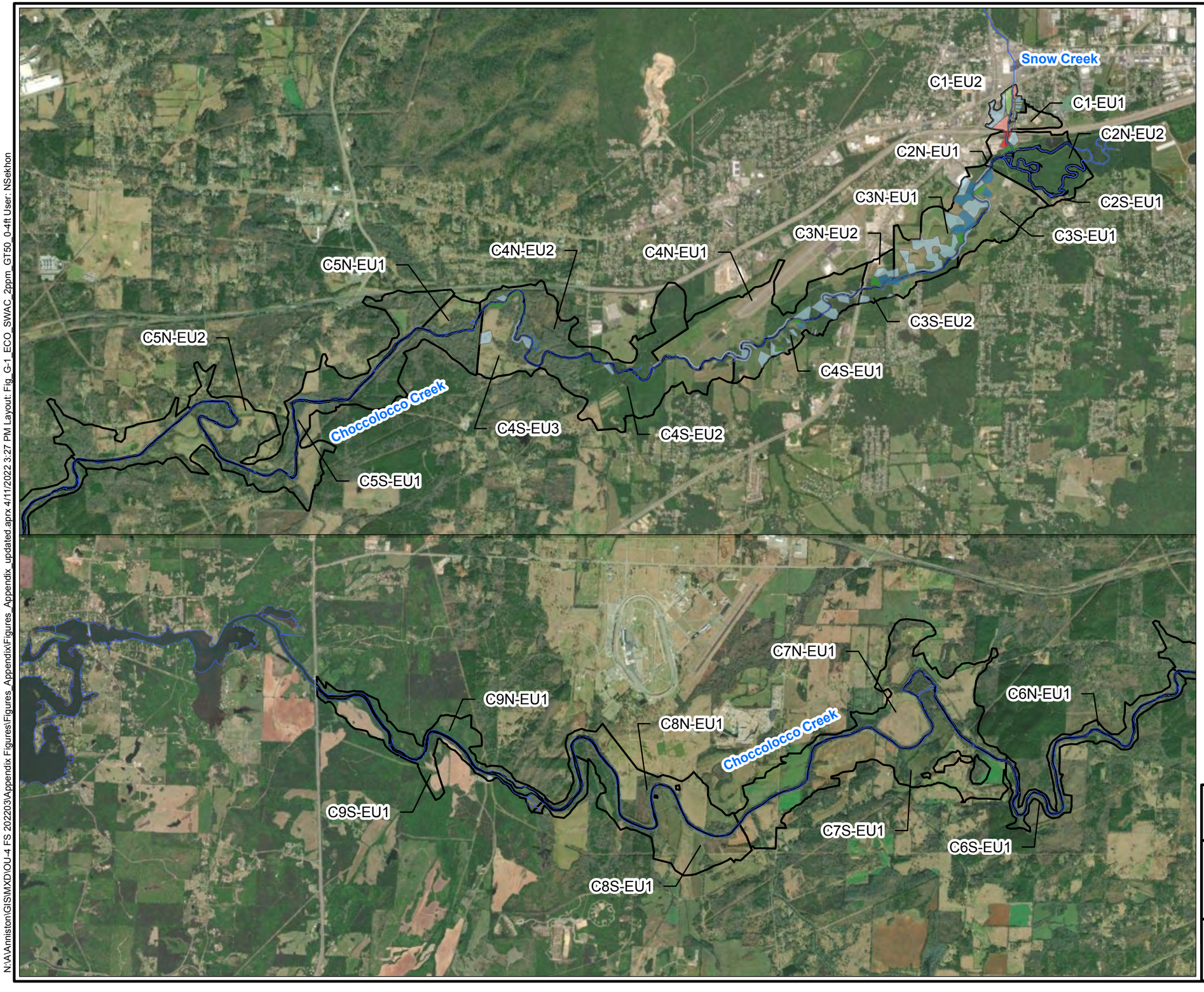
Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C4S:
2 mg/kg SWAC (0 to 0.5 feet)**

Solutia

Figure E-8



Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Exposure Units

Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
ft: feet
mg/kg: milligram(s) per kilogram
EPC: exposure point concentration
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 1 2 Miles

Graphic Scale

Anniston PCB Site, Anniston, Alabama

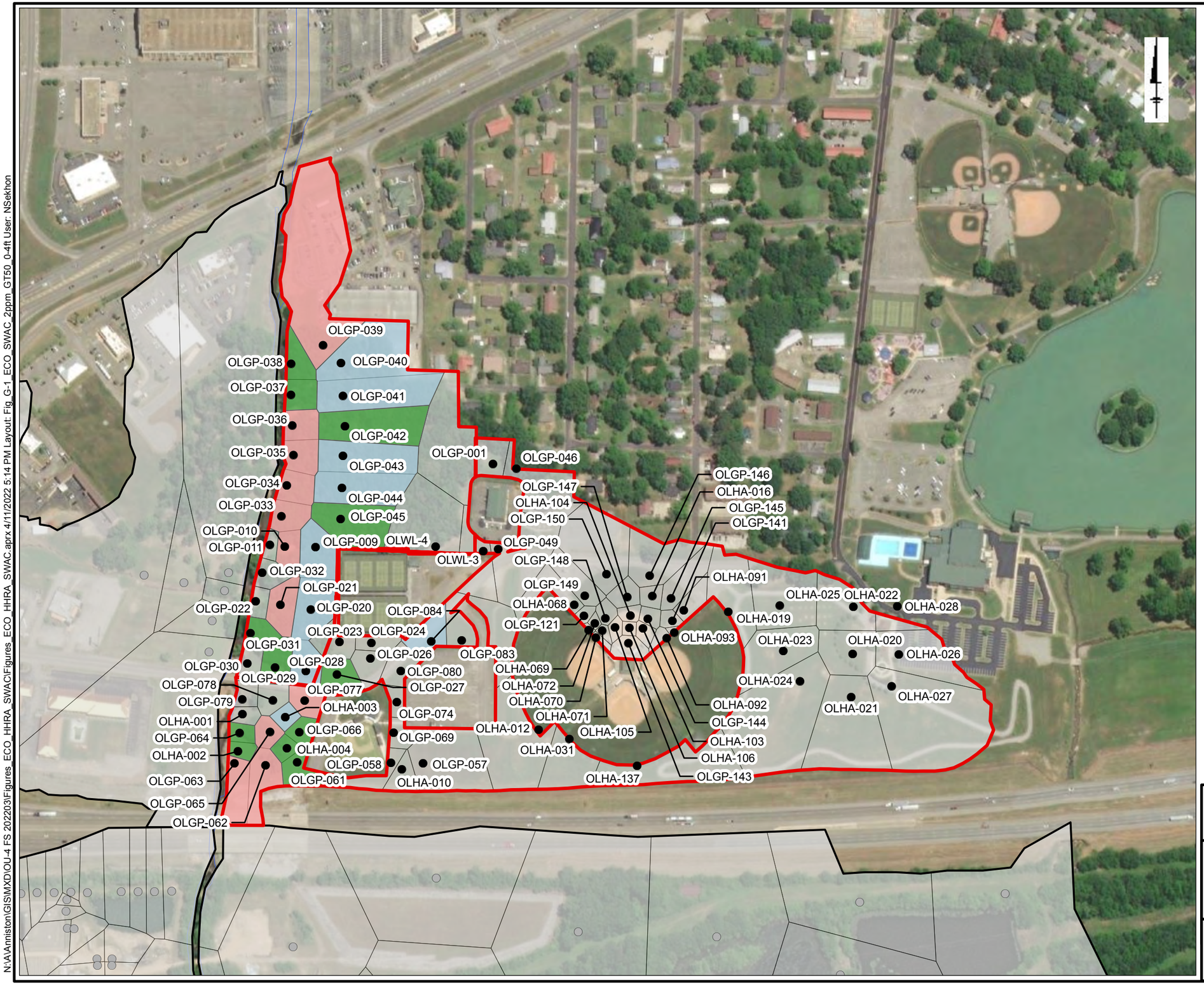
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs:
2 mg/kg SWAC (0 to 0.5 feet) and Removal of Soil with Concentrations ≥ 50 mg/kg (0 to 4 feet)

Solutia

Figure E-9

N:\AAnniston\GIS\MXD\OU-4 FS 202203\Appendix Figures\Figures_AppendixFigures_Appendix_updated.aprx 4/11/2022 3:27 PM Layout: Fig_G-1_ECO_SWAC_2ppm_GT50_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

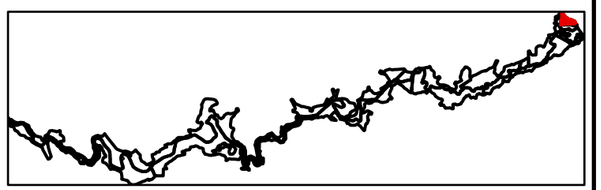
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

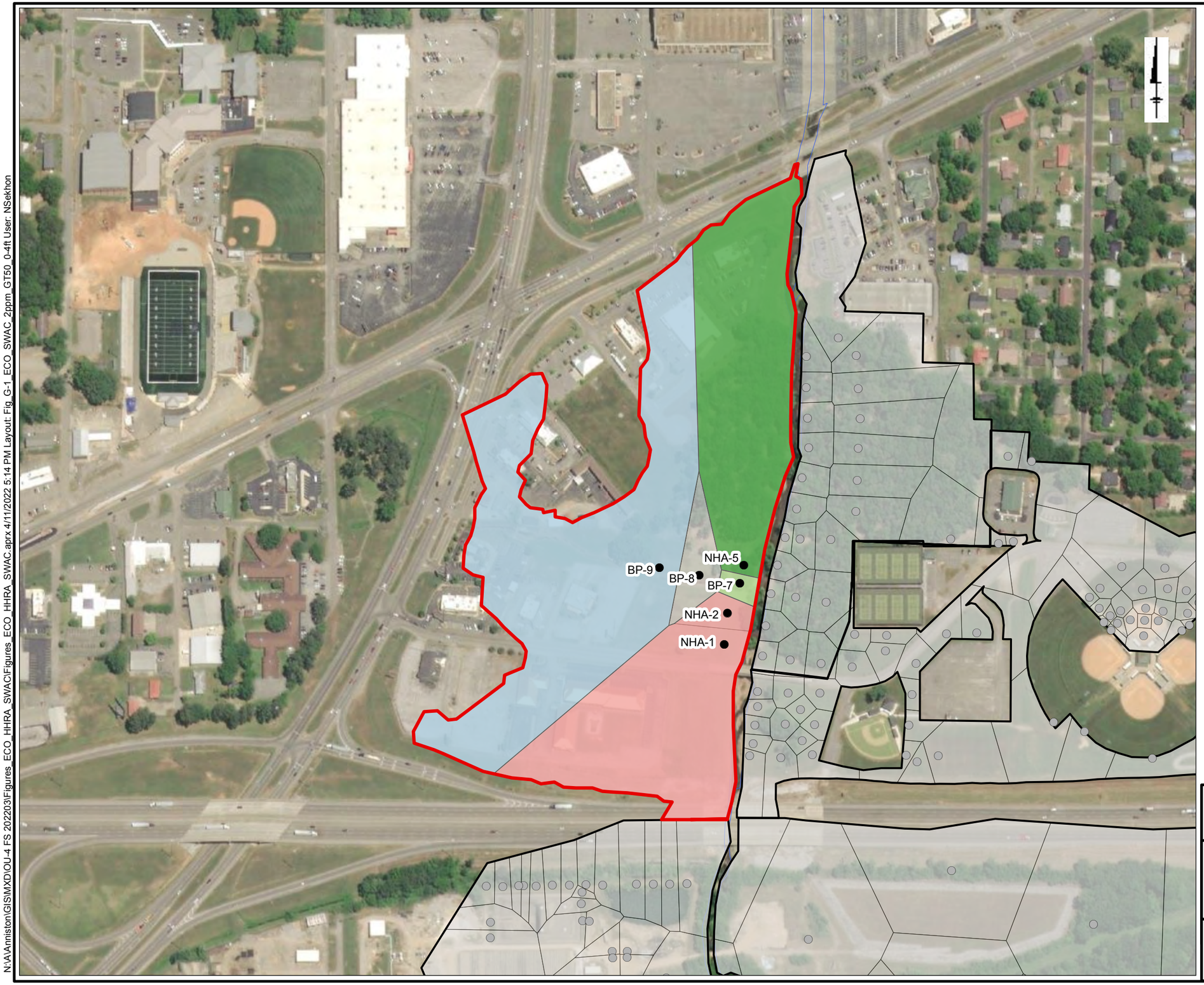
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C1E:
2 mg/kg SWAC (0 to 0.5 feet) and Removal of Soil with Concentrations ≥ 50 mg/kg (0 to 4 feet)**

Solutia

Figure E-10

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC aprx 4/11/2022 5:14 PM Layout: Fig_G-1_ECO_SWAC_2ppm_GT50_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

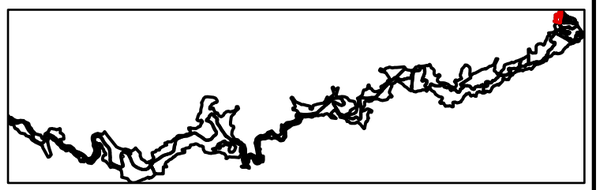
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

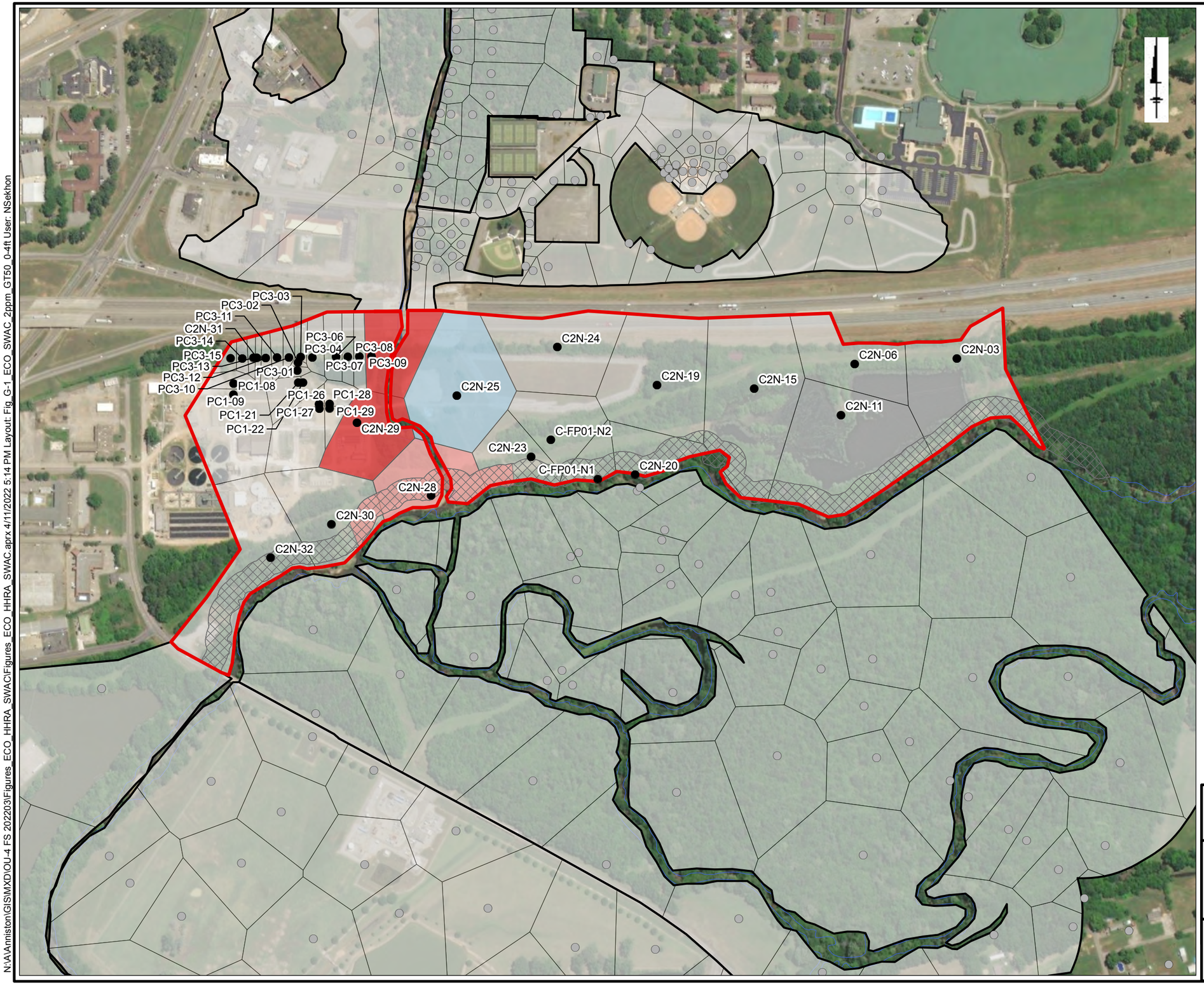
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C1W: 2 mg/kg SWAC (0 to 0.5 feet) and Removal of Soil with Concentrations ≥ 50 mg/kg (0 to 4 feet)

Solutia

Figure E-11

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 5:14 PM Layout: Fig_G-1_ECO_SWAC_2ppm_GT50_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

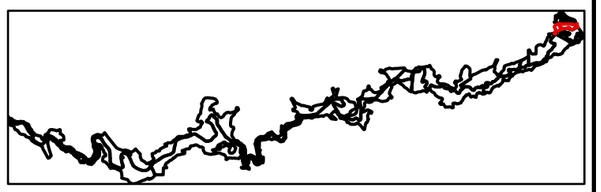
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

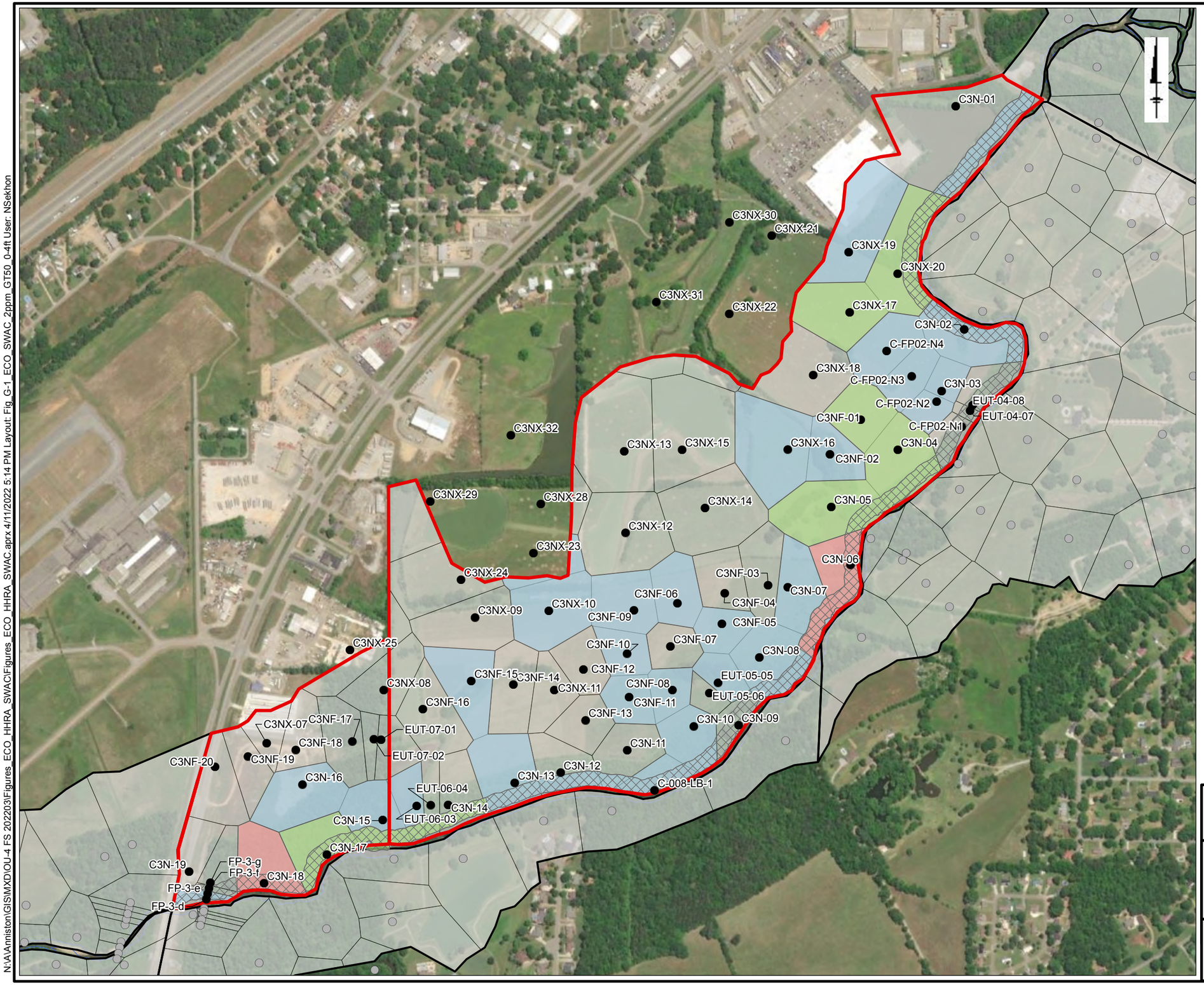
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C2N:
2 mg/kg SWAC (0 to 0.5 feet) and Removal of Soil with Concentrations ≥ 50 mg/kg (0 to 4 feet)**

Solutia

Figure E-12

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 5:14 PM Layout: Fig. G-1_ECO_SWAC_2ppm_GT50_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

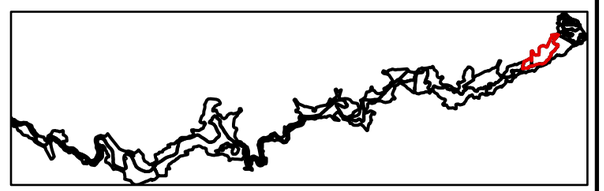
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

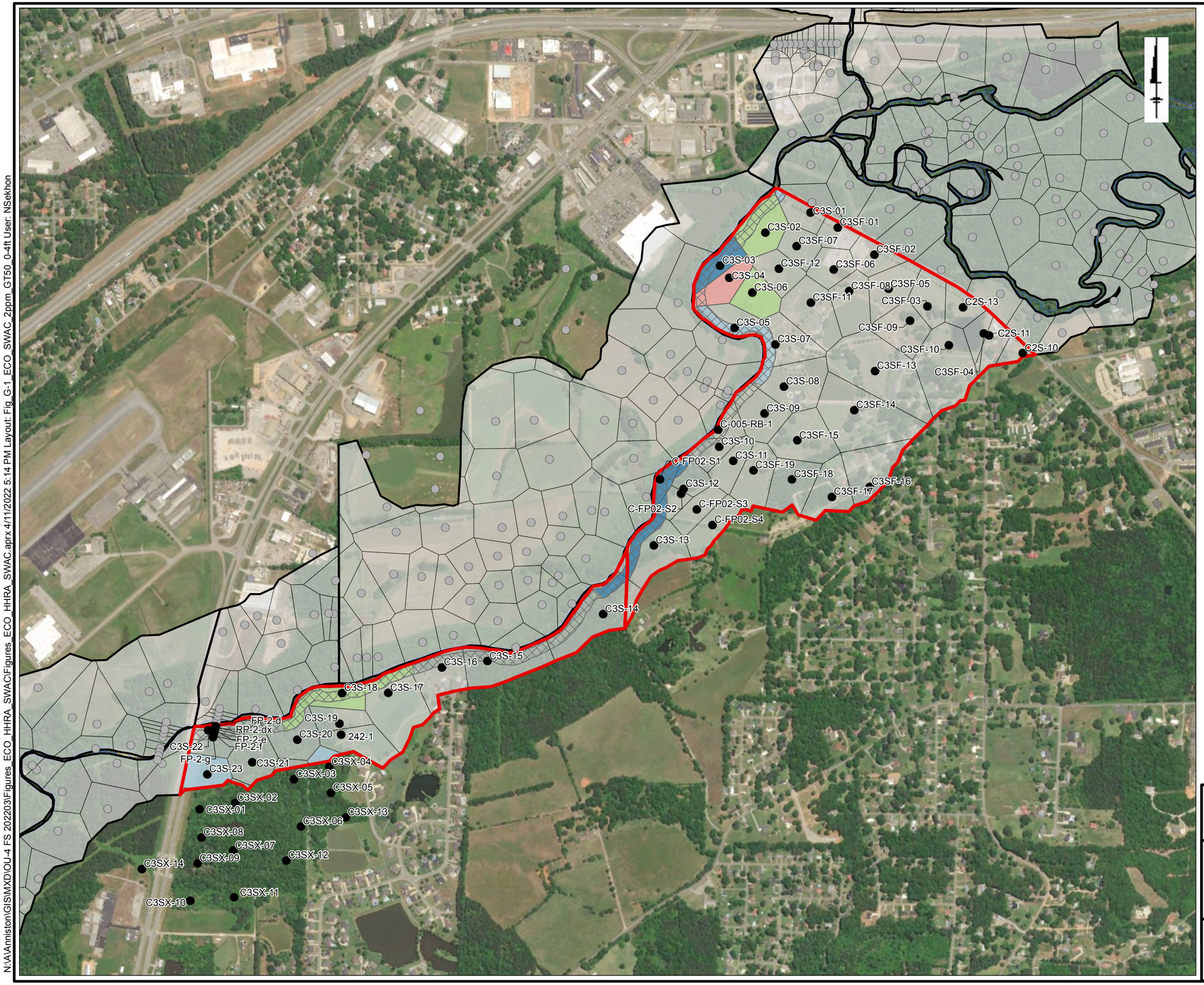
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C3N:
2 mg/kg SWAC (0 to 0.5 feet) and Removal of Soil with Concentrations ≥ 50 mg/kg (0 to 4 feet)**

Solutia

Figure E-13

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 5:14 PM User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

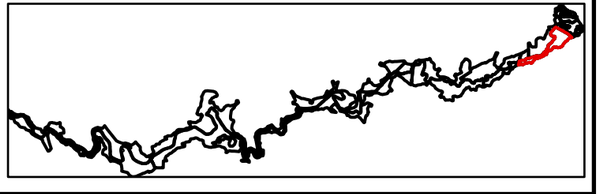
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

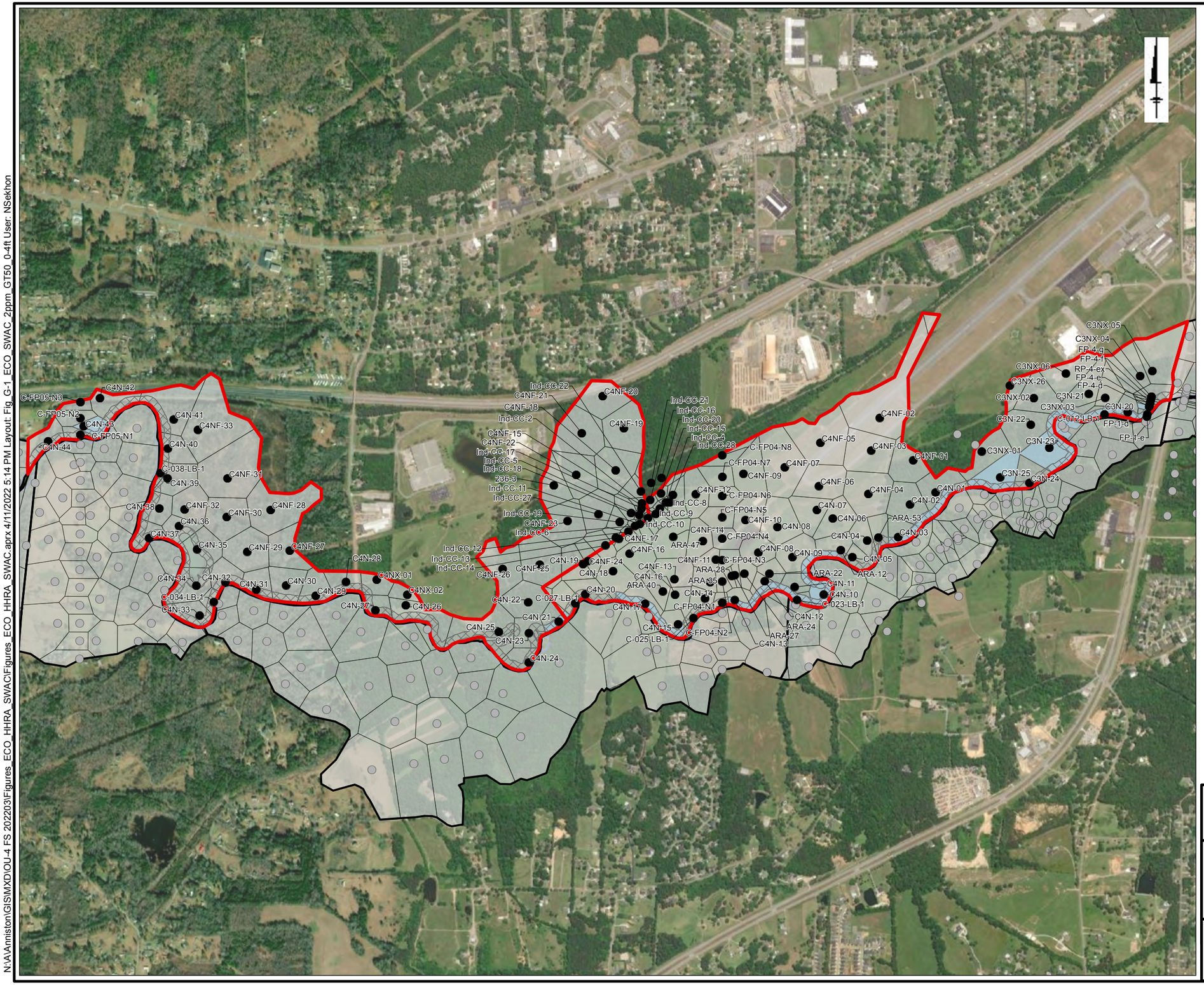
**Alternative Floodplain Soil PRGs in C3S:
2 mg/kg SWAC (0 to 0.5 feet) and Removal of Soil with Concentrations ≥ 50 mg/kg (0 to 4 feet)**

Solutia

Figure E-14

N:\Anniston\GIS\MXD\OU-4 FS 202203\Figures ECO_HHRA_SWAC\Figures ECO_HHRA_SWAC.aprx 4/11/2022 5:14 PM Layout: Fig_G-1_ECO_SWAC_2ppm_GT50_0-4ft User: NSekhon

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 5:14 PM Layout: Fig_G-1_ECO_SWAC_2ppm_GT50_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

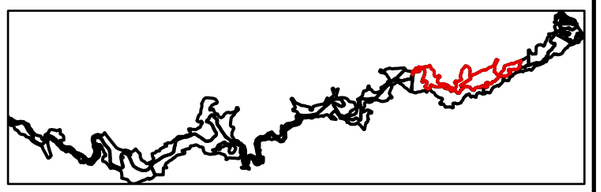
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

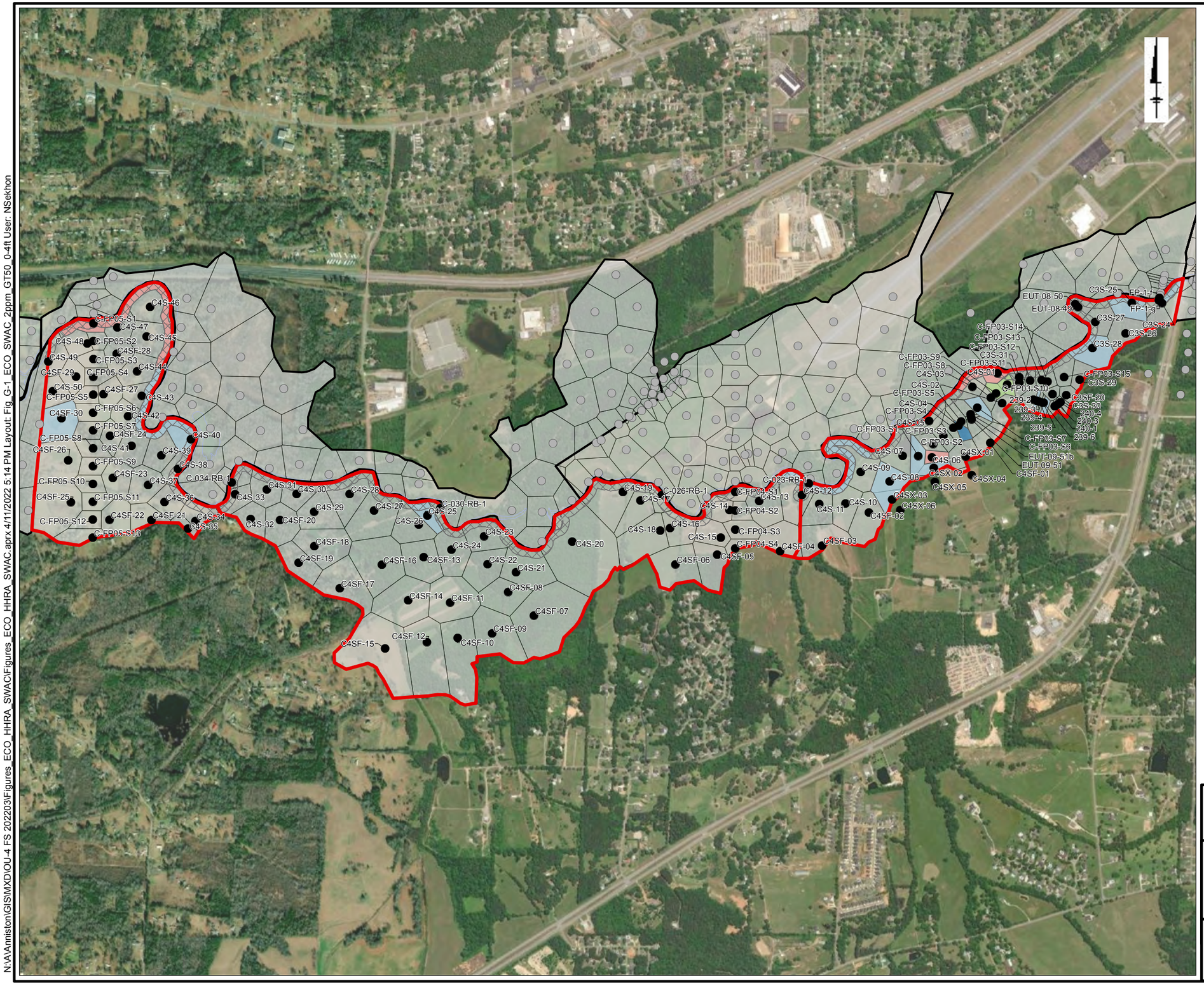
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C4N:
2 mg/kg SWAC (0 to 0.5 feet) and Removal of Soil with Concentrations ≥ 50 mg/kg (0 to 4 feet)

Solutia

Figure E-15

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 5:14 PM Layout: Fig_G-1_ECO_SWAC_2ppm_GT50_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

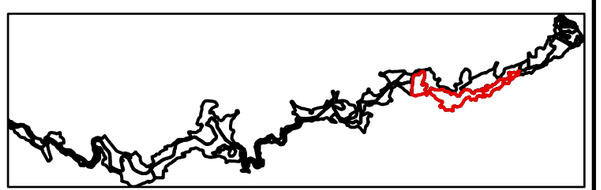
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



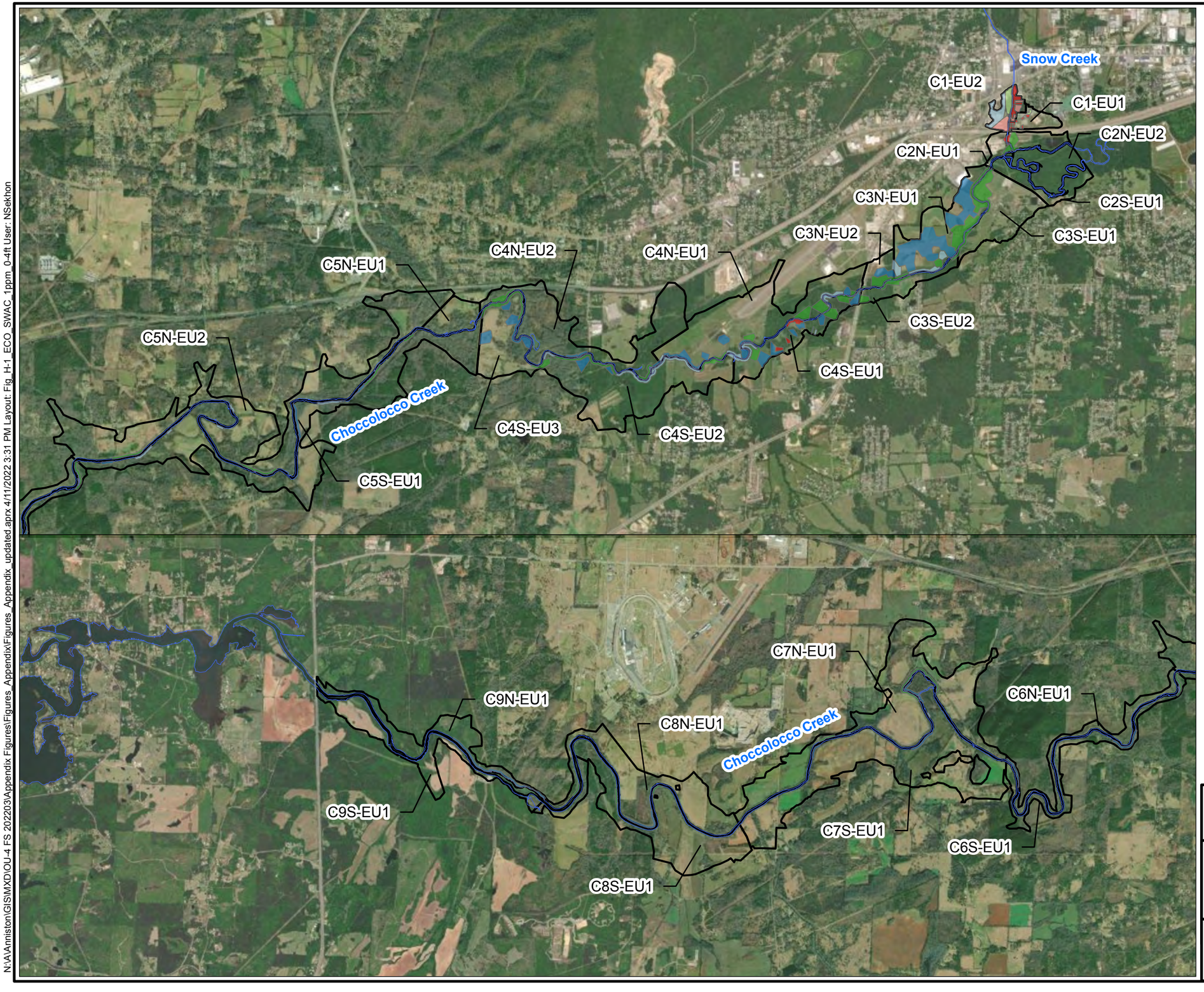
Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C4S:
2 mg/kg SWAC (0 to 0.5 feet) and Removal of Soil with Concentrations ≥ 50 mg/kg (0 to 4 feet)**

Solutia

Figure E-16



Legend

- Outlines of Choccolocco Creek and Snow Creek (2011)
- Exposure Units

Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
ft: feet
mg/kg: milligram(s) per kilogram
EPC: exposure point concentration
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 1 2 Miles

Graphic Scale

Anniston PCB Site, Anniston, Alabama

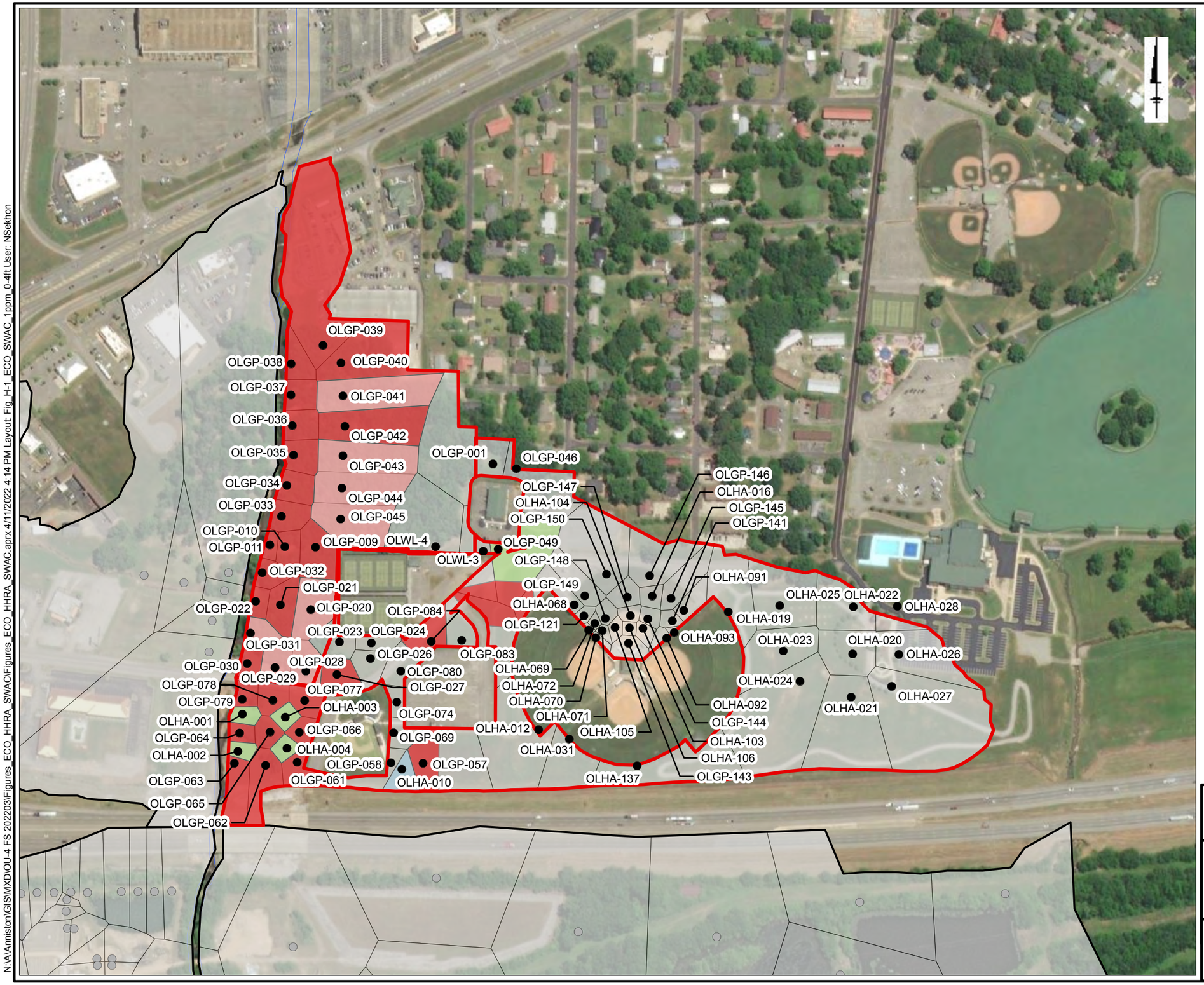
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRG: 1 mg/kg (0 to 4 feet)

Solutia

Figure E-17

N:\AAnniston\GIS\MXD\OU-4 FS 202203\Appendix Figures\Figures_AppendixFigures_Appendix_updated.aprx 4/11/2022 3:31 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

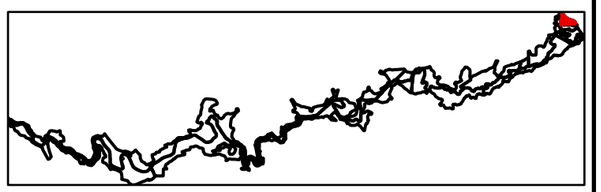
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

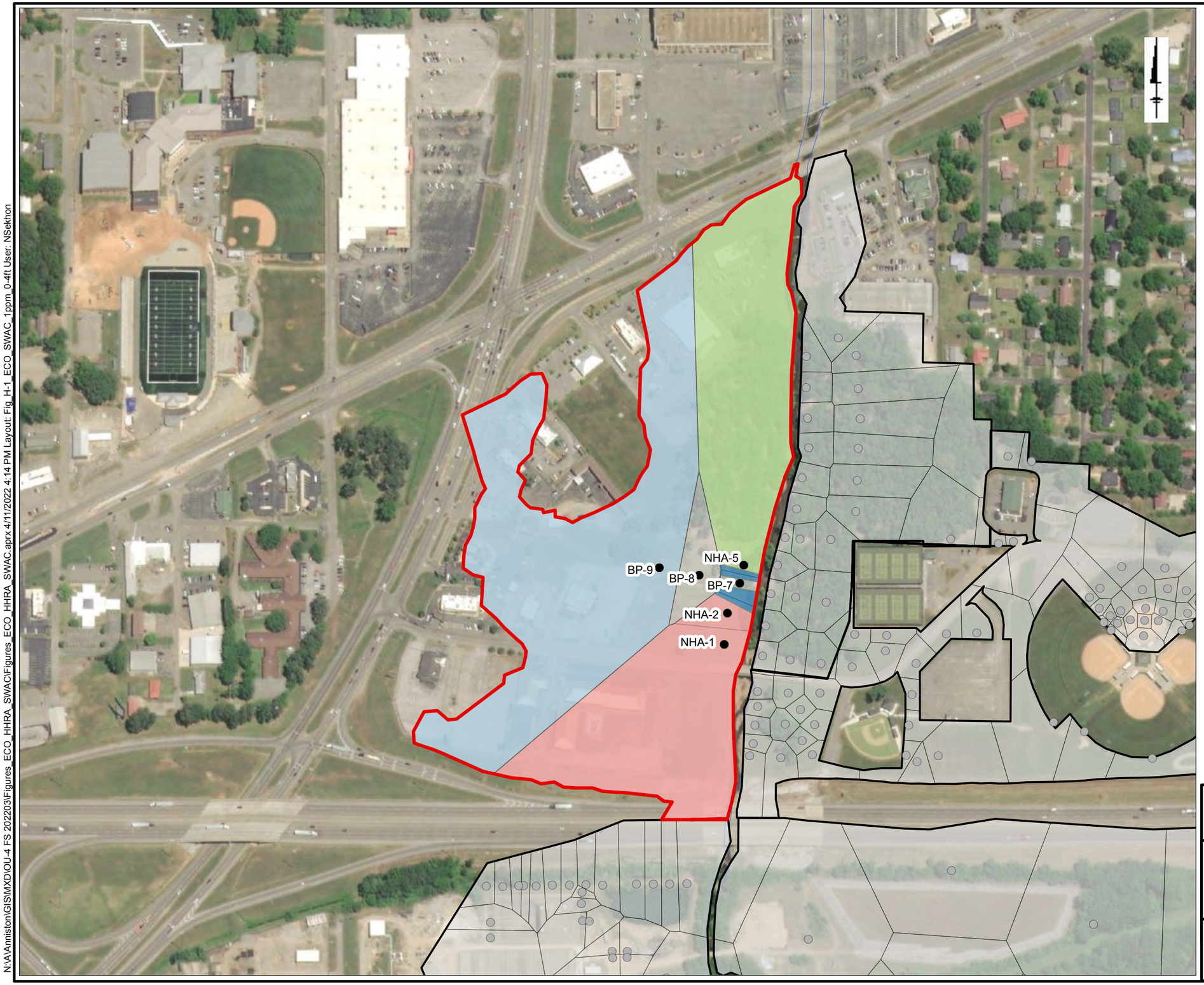
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C1E: 1 mg/kg (0 to 4 feet)

Solutia

Figure E-18

N:\A\Anniston\GIS\MXD\OU-4 FS 202209\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

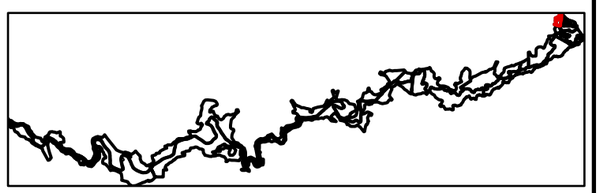
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C1W: 1 mg/kg (0 to 4 feet)

Solutia

Figure E-19

N:\AAnniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon

Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

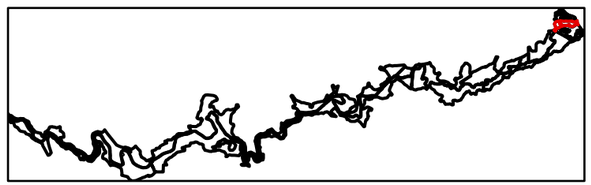
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700 Feet
Graphic Scale



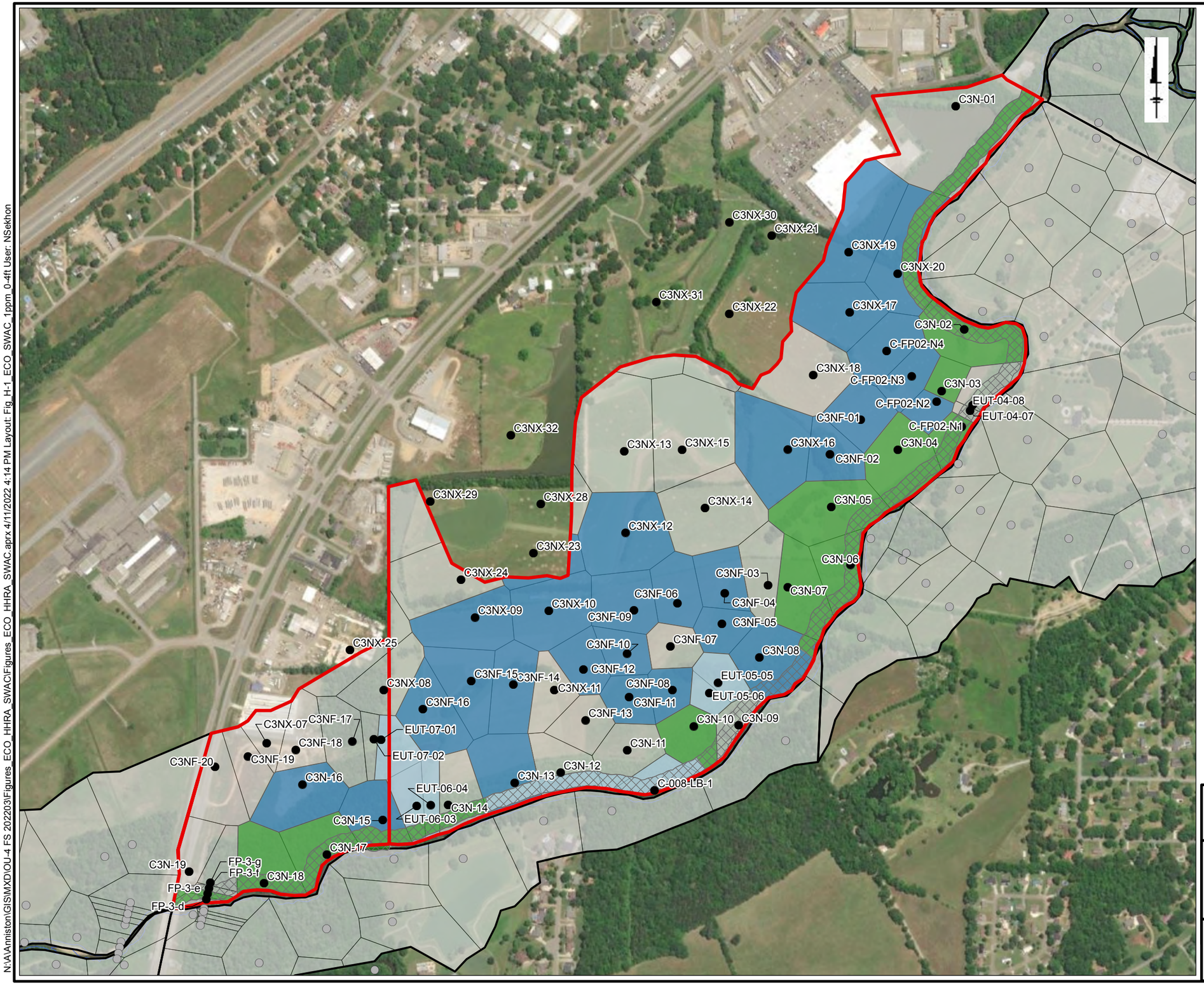
Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C2N:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-20

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

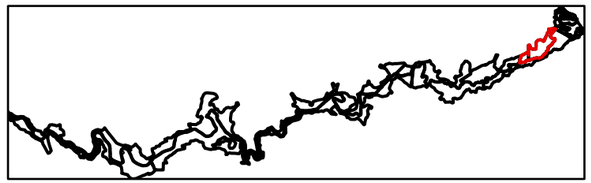
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700 Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

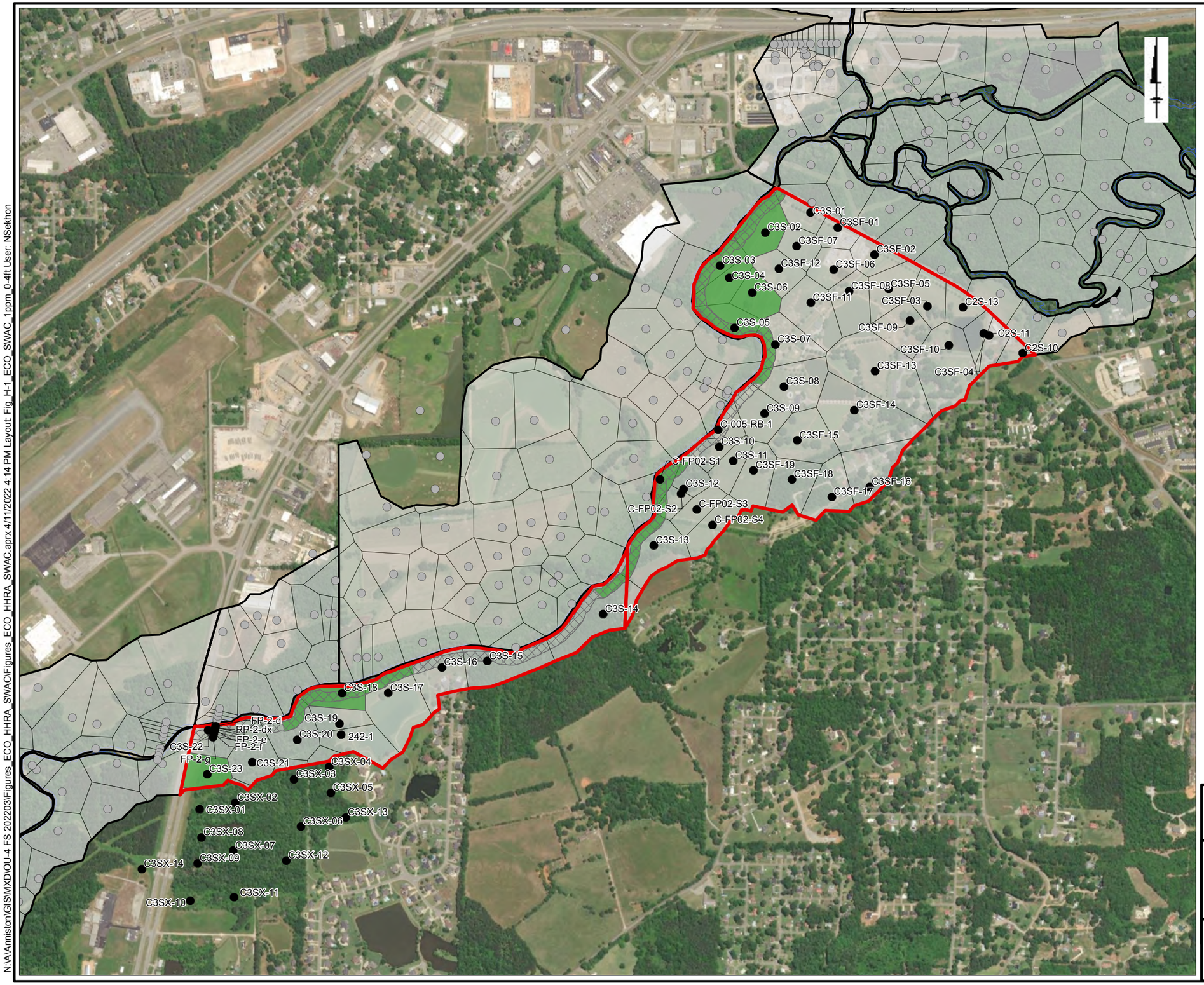
Alternative Floodplain Soil PRGs in C3N: 1 mg/kg (0 to 4 feet)

Solutia

Figure E-21

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon

N:\Anniston\GIS\MXD\OU-4 FS 202203\Figures ECO_HHRA_SWAC\Figures ECO_HHRA_SWAC_1ppm_0-4ft User: NSekhon
Time: 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

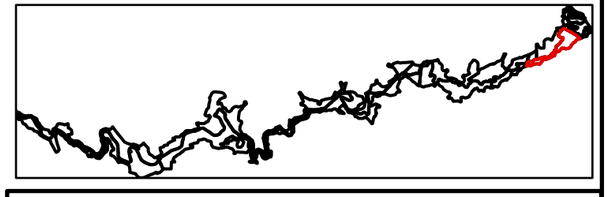
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

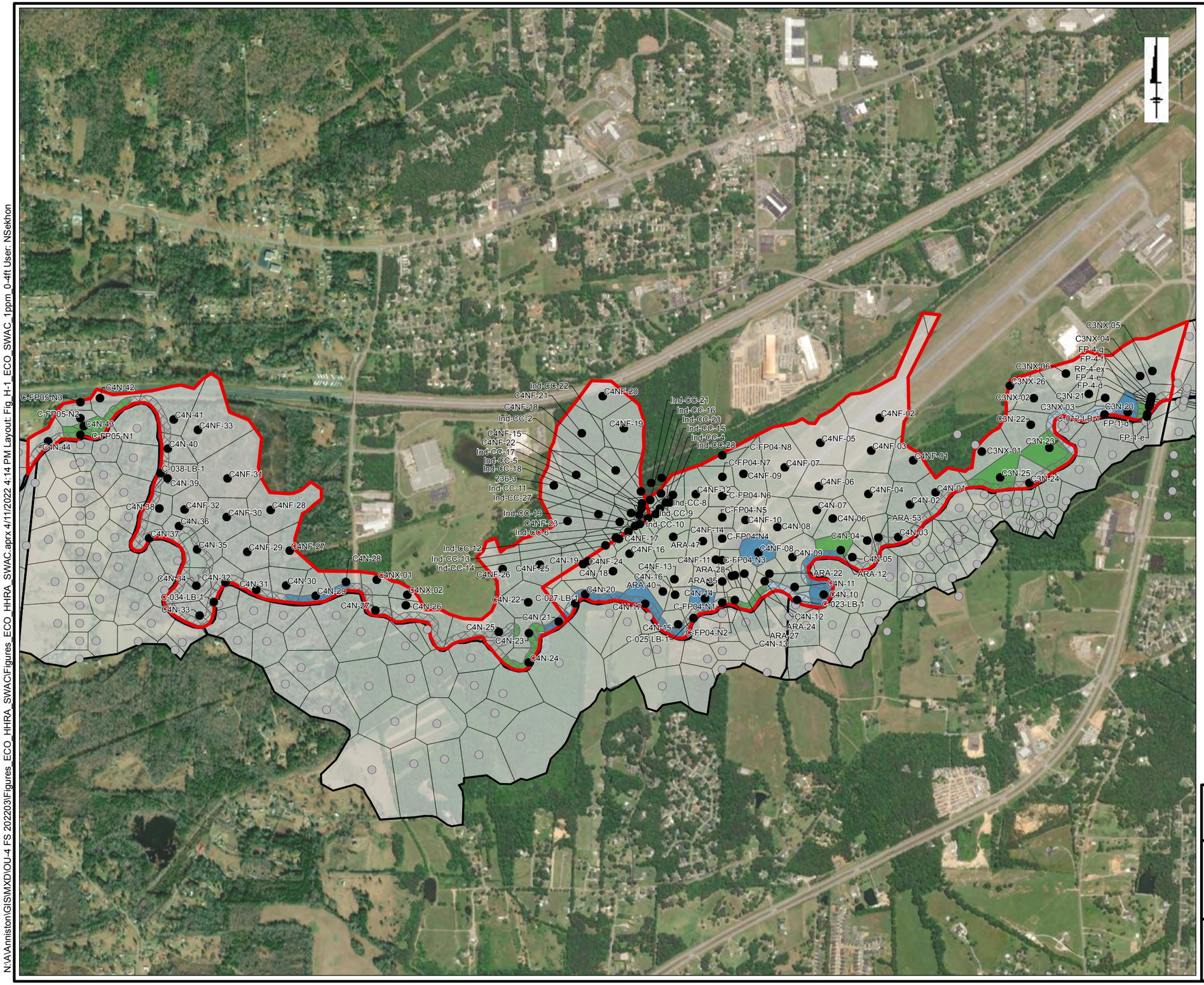
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C3S:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-22

N:\AAnniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

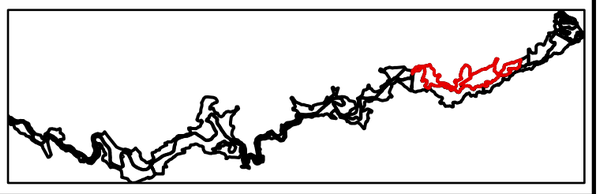
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale

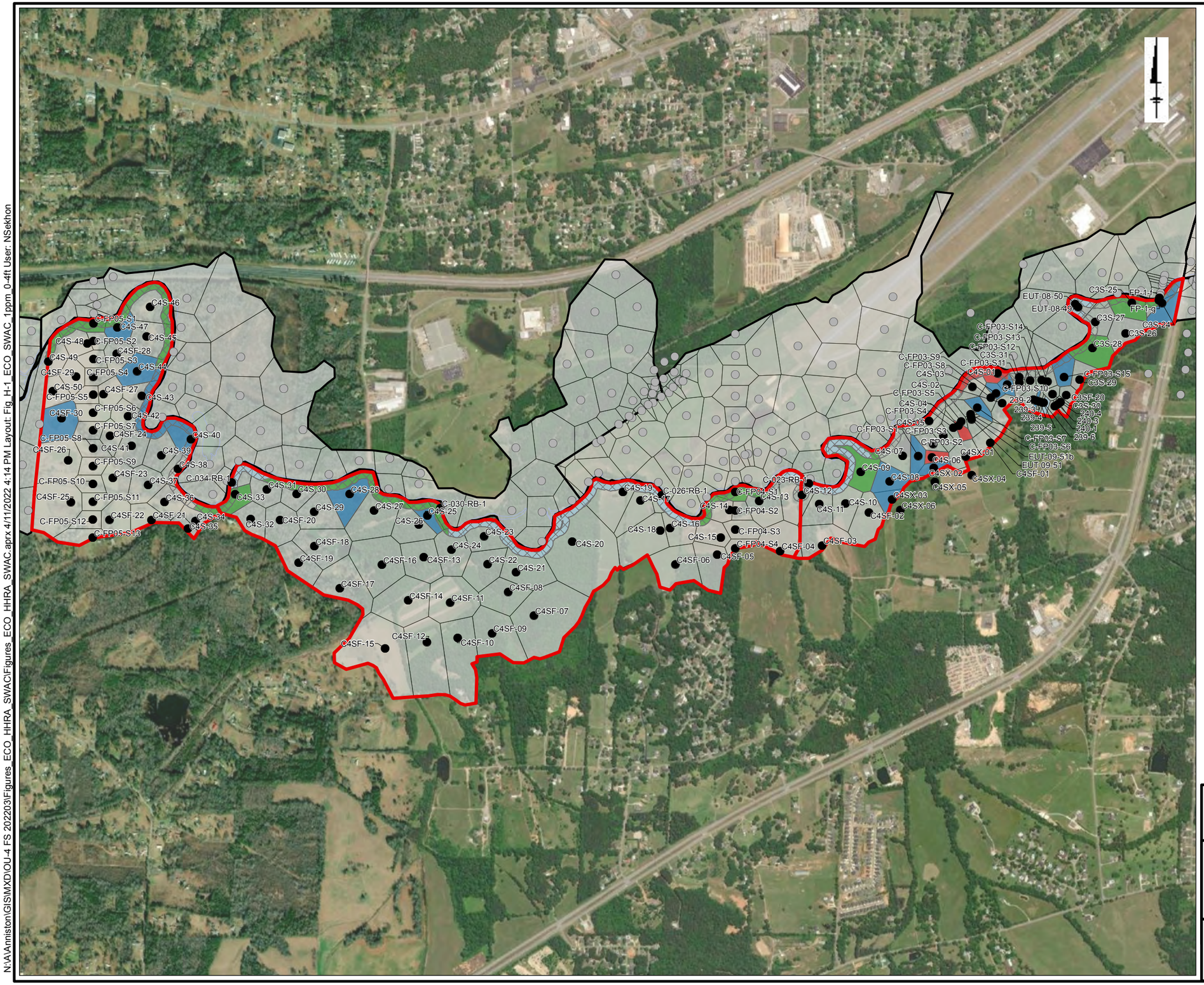


Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C4N:
1 mg/kg (0 to 4 feet)

Solutia

Figure E-23



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

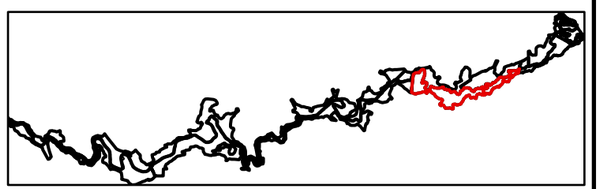
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

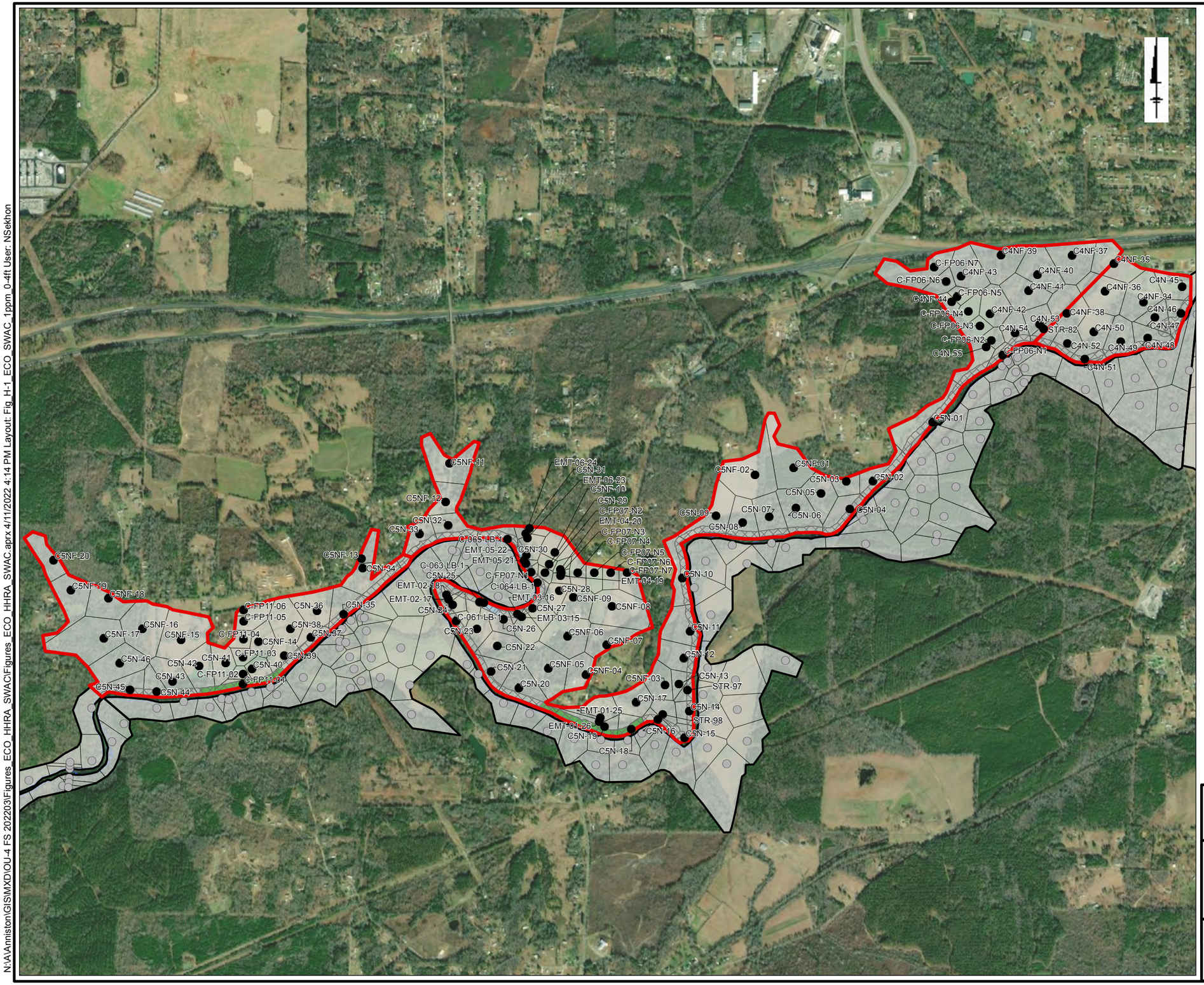
Alternative Floodplain Soil PRGs in C4S:
1 mg/kg (0 to 4 feet)

Solutia

Figure E-24

N:\A\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures ECO_HHRA_SWAC\Figures ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

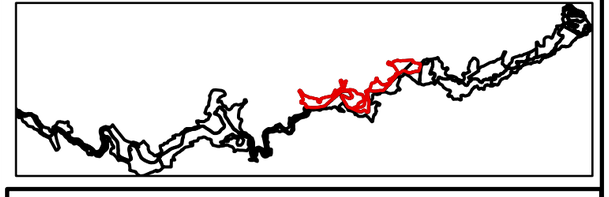
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C5N:
1 mg/kg (0 to 4 feet)**

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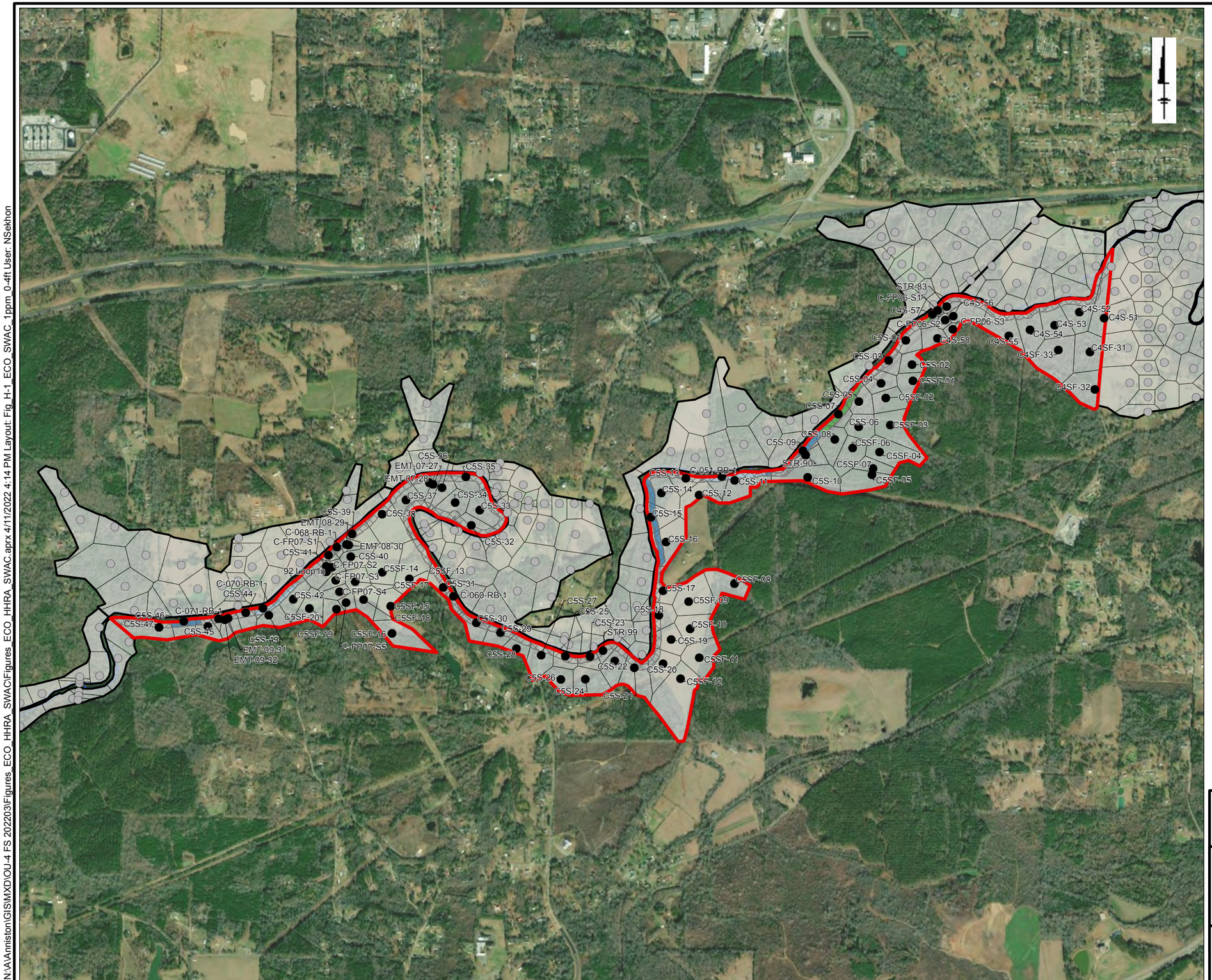
Figure E-25



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

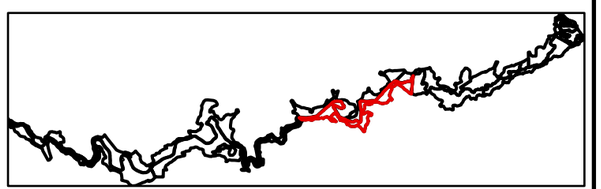
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

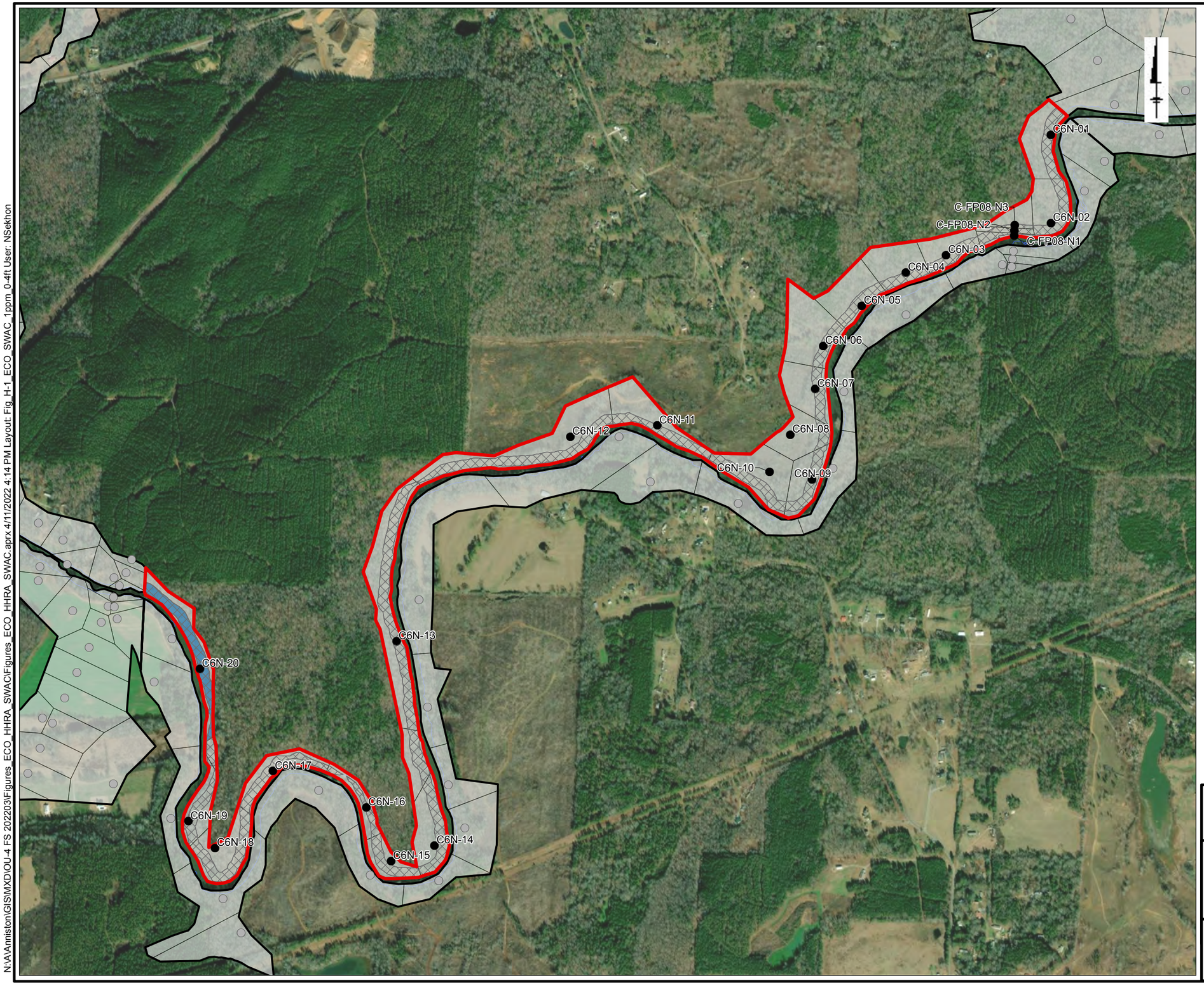
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C5S:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-26

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

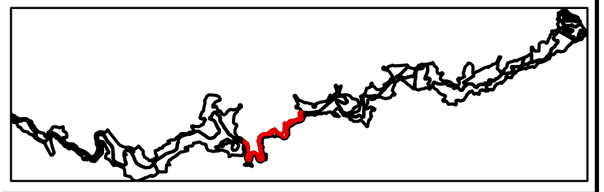
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

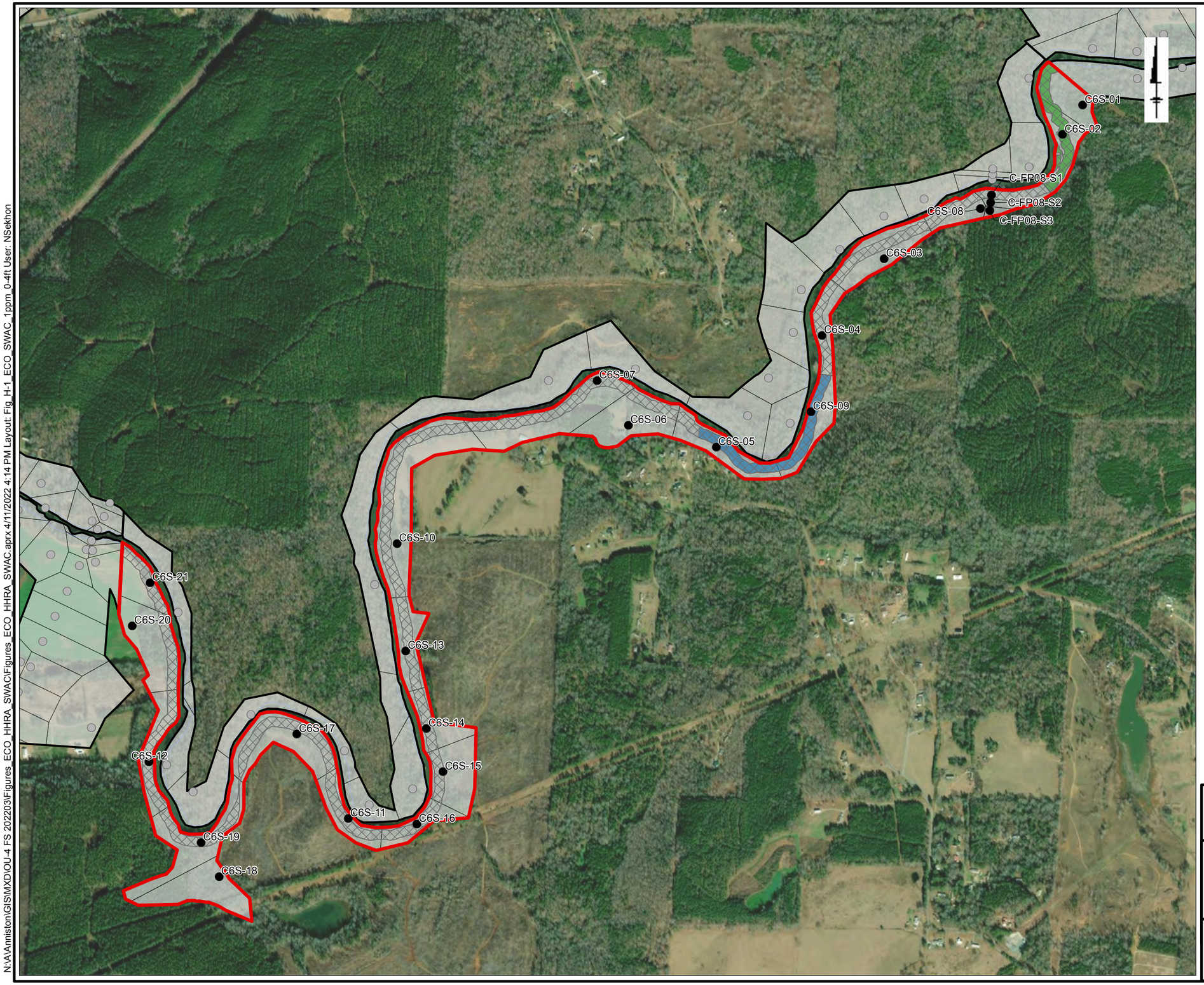
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C6N:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-27

N:\AA\Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM Layout: Fig_H-1_ECO_SWAC_1ppm_0-4ft User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

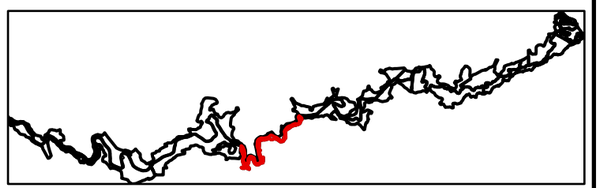
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

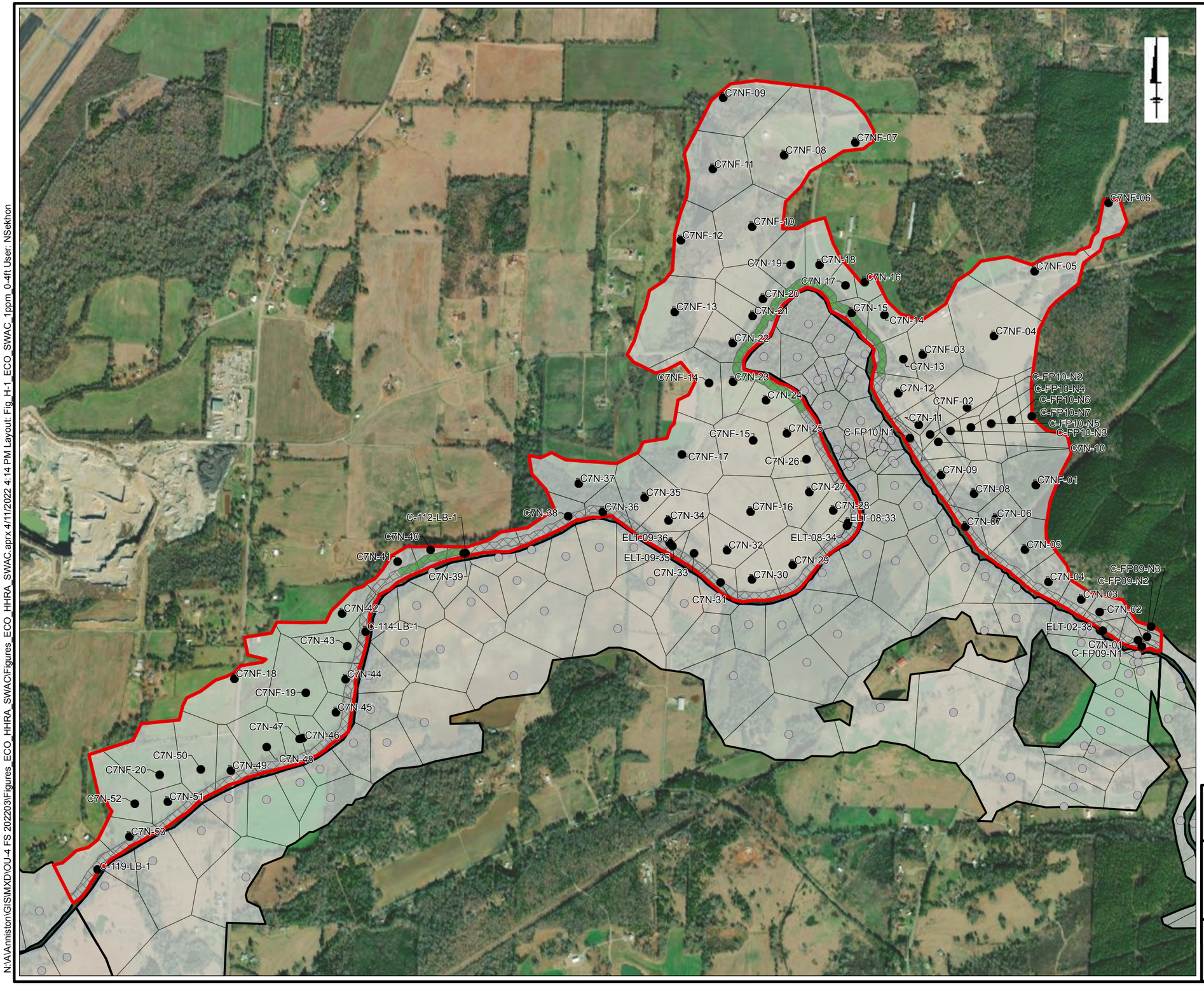
Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C6S:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-28

N:\AA Anniston\GIS\MXD\OU-4 FS 202203\Figures_ECO_HHRA_SWAC\Figures_ECO_HHRA_SWAC.aprx 4/11/2022 4:14 PM User: NSekhon



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

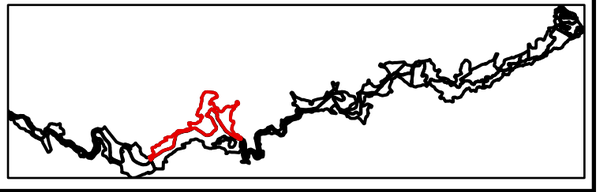
Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
CA: characterization area
EPC: exposure point concentration
ERA: ecological risk assessment
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C7N:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-29

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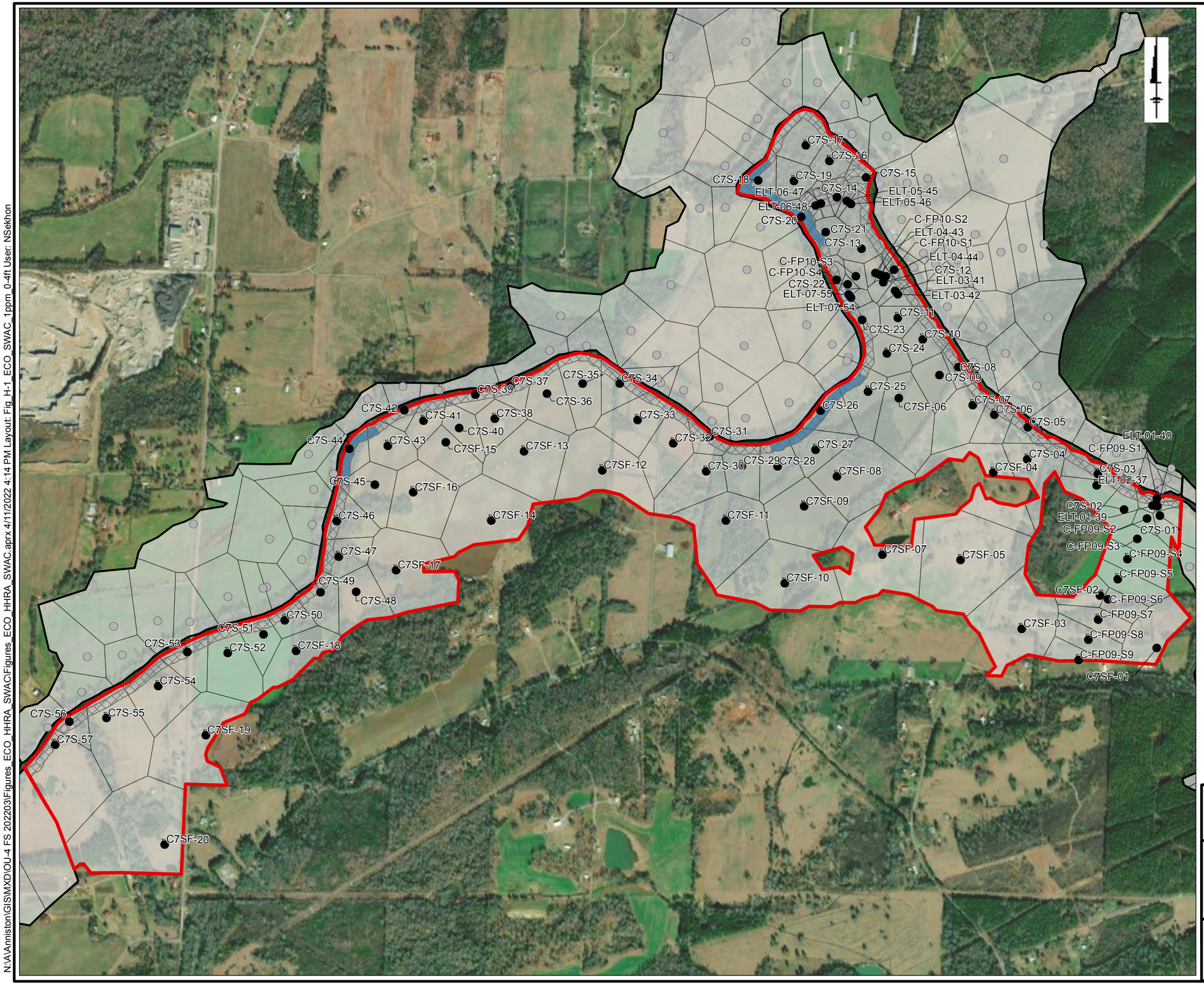

Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
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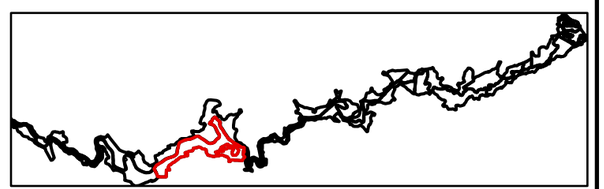
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C7S:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-30

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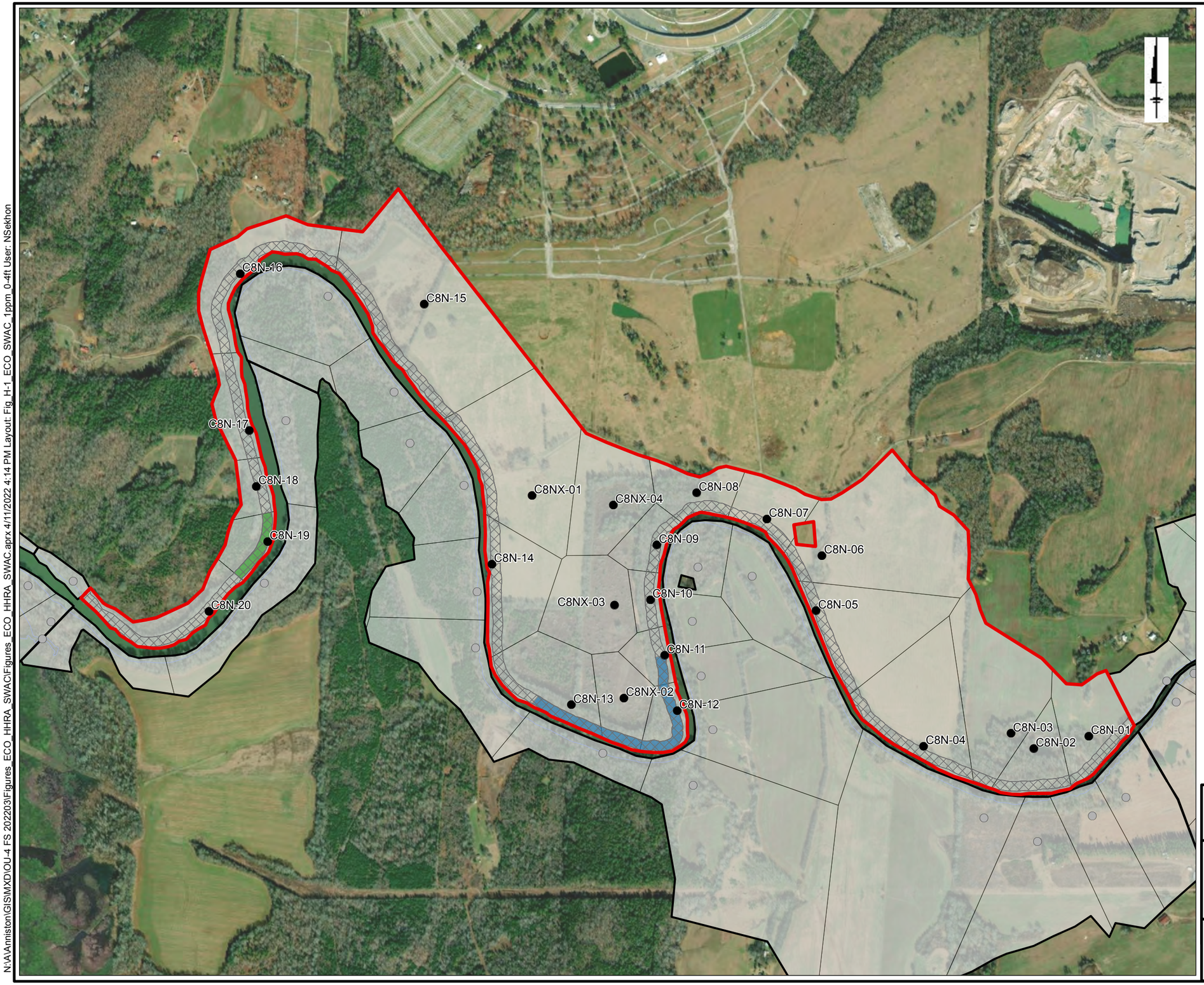
Fig_H-1_ECO_SWAC_1ppm_0-4ft 4/11/2022 4:14 PM



Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
- 2
- 2.5
- > 2.5

Notes:
1. PCB EPC based on SWAC.

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EPC: exposure point concentration
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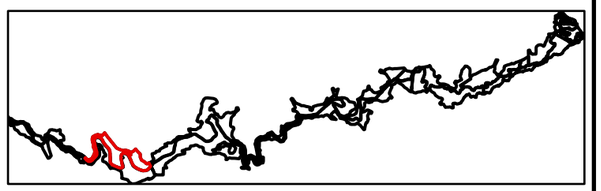
ft: feet
mg/kg: milligram(s) per kilogram
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

Alternative Floodplain Soil PRGs in C8N: 1 mg/kg (0 to 4 feet)

Solutia

Figure E-31

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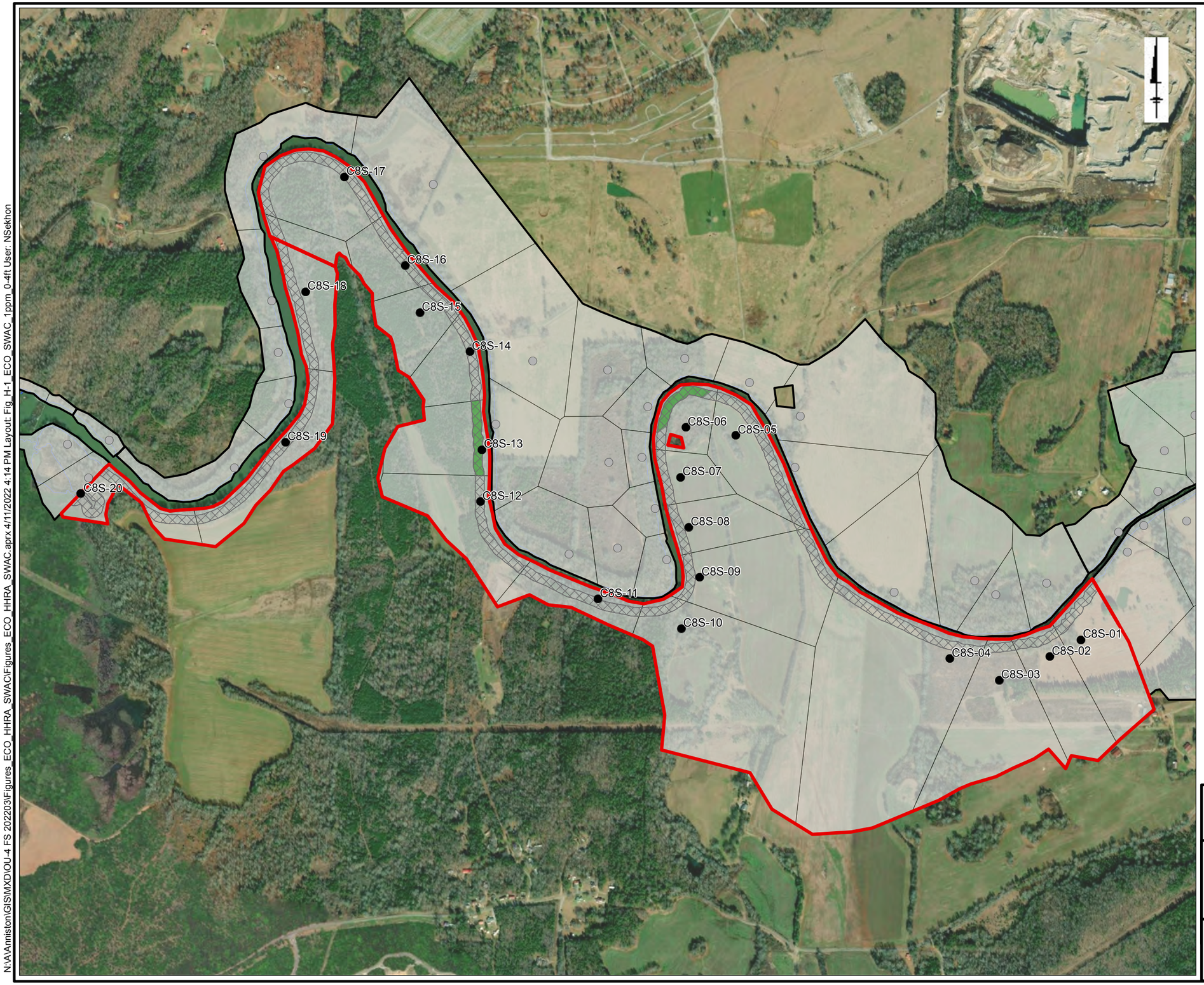

Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

Remedial Depth (ft bgs)

- 0.5
- 1
- 1.5
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- 2.5
- > 2.5

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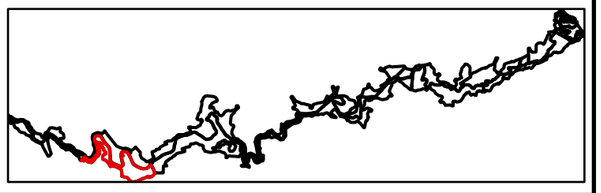
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C8S:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-32

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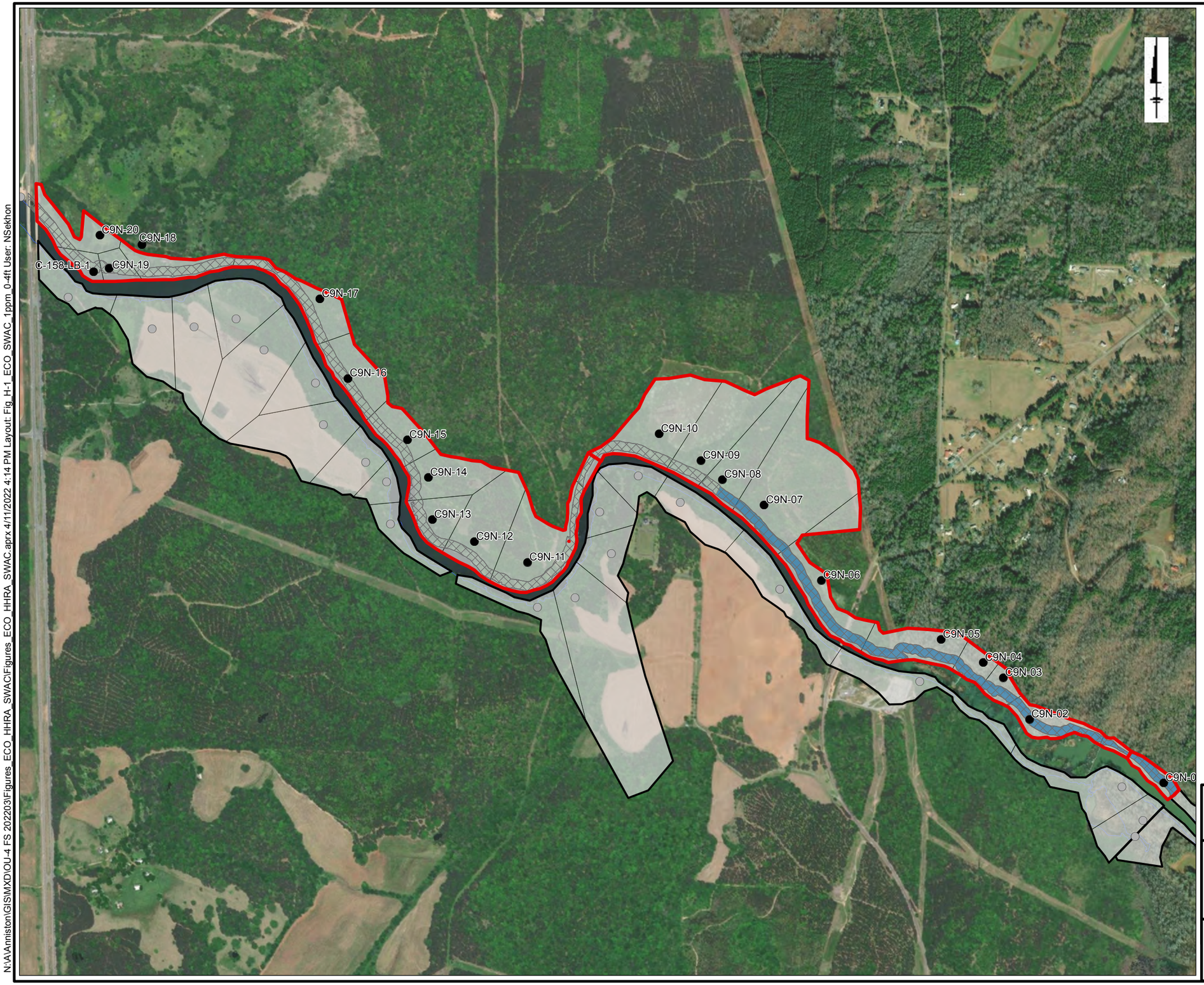

Legend

- ERA Sampling Locations - Selected Area
- ERA Sampling Locations
- Outlines of Choccolocco Creek and Snow Creek (2011)
- Selected CA Boundary
- Riparian Zone

Remedial Depth (ft bgs)

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- 1.5
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Notes:
1. PCB EPC based on SWAC.

bgs: below ground surface
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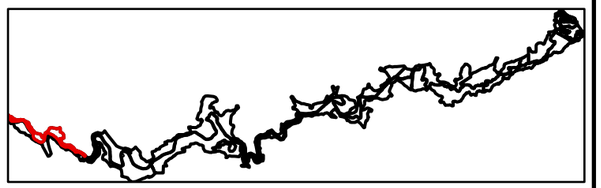
OU: operable unit
PCB: polychlorinated biphenyl
PRG : preliminary remedial goal
SWAC: surface-weighted average concentration

0 350 700
Feet
Graphic Scale



Anniston PCB Site, Anniston, Alabama

Feasibility Study Report for OU-4

**Alternative Floodplain Soil PRGs in C9N:
1 mg/kg (0 to 4 feet)**

Solutia

Figure E-33

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Geosyntec
consultants

Appendix F
Description of the Creek Bank Erosion Model

Appendix F: Description of Creek Bank Erosion Model

1. INTRODUCTION

This appendix has been prepared to provide information for the creek bank erosion modeling conducted as part of the Operable Unit 4 Feasibility Study (OU-4 FS) for the Anniston PCB Site (the Site). The appendix also includes information describing how calculated creek bank erosion rates were used to calculate polychlorinated biphenyl (PCB) loadings to the OU-4 portion of Snow Creek and Choccolocco Creek. The PCB loadings for creek bank soil were calculated by combining the creek bank erosion rates with the results of field surveys conducted to characterize creek bank stability conditions, and PCB concentration results for creek bank soil.

The PCB loadings associated with creek bank soil were also used to assess the effectiveness of source control actions for the creek bank soil and sediment remedial alternatives presented in the OU-4 FS. These remedial alternatives and the specific source control approach for creek bank soil are described below:

- SED-1: No action
- SED-2: Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment for sediment in low-energy areas; long-term soil management; and MNR of sediment
- SED-3: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment of sediment in low-energy areas; long-term soil management; and MNR of sediment
- SED-4: Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment
- SED-5: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; capping for low-energy areas; long-term soil management; and MNR of sediment
- SED-6: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment
- SED-7: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of contaminated sediment in high- and low-energy areas; off-site treatment of principal threat waste; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment

The calculated reductions in PCB loads associated with the remedial alternatives described above were also included as inputs to monitored natural recovery (MNR) calculations (Appendix G). As described in Appendix G to the OU-4 FS, implementing creek bank source control and RAL-based

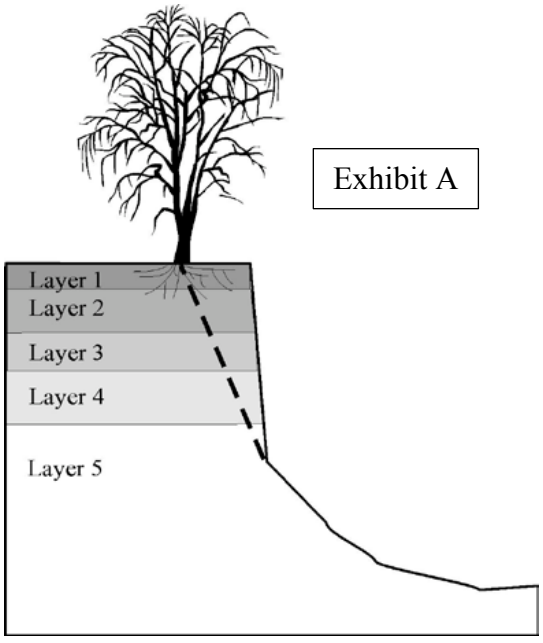
actions to address PCBs in sediment are critical MNR-related inputs because clean sediment from the surrounding watershed are transported into OU-4 and mix with the sediment bed to further reduce PCB concentrations in sediment, surface water, and biota over time.

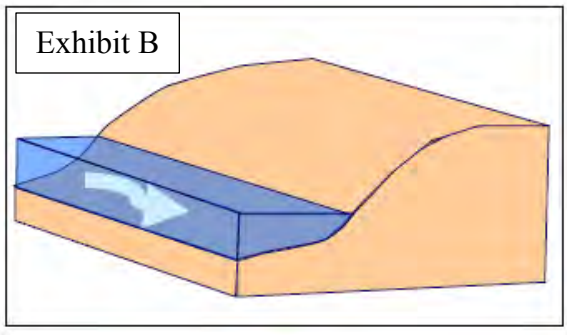
2. CREEK BANK EROSION MODEL

The creek bank erosion model used for OU-4 was developed by the United States Department of Agriculture (USDA) National Sedimentation Laboratory. The model is identified as the Bank Stability and Toe Erosion Model (BSTEM). The BSTEM is publicly available and can be downloaded at BSTEM-5.4.xls (live.com). The results for OU-4 were developed using version 4.5 of BSTEM. Although USDA continues to refine the BSTEM, it is not expected that using subsequent model versions would significantly change the results for OU-4 because past model refinements have not changed the underlying equations and operating principles. Future creek bank erosion modeling that could be conducted as part of the remedial design (RD) for OU-4 would consider the current version of the BSTEM along with other model options available at that time. Evaluations conducted as part of the RD would consider potential changes in hydraulics due to climate change and the potential effects related to changes to the channel migration zone (CMZ) that could occur over time.

2.1 Input Parameters and Assumptions

The BSTEM includes bank stability and toe erosion components that account for site-specific conditions. The bank stability component of the BSTEM includes creek bank geometry, including bank heights and the potential presence of bank-armoring. The bank stability component of the model can include up to five discrete soil layers in creek banks (Exhibit A) and can account for varying levels of soil strength, vegetation, water table elevation changes, and confining pressures. The toe erosion component of the BSTEM accounts for hydraulic erosion of the creek bank and toe based on hydraulic shear stress, channel form including roughness due to vegetation, sediment, and bedform (Exhibit B).





The BSTEM was directly applied to two creek bank stability conditions: the minor-to-moderate-erosion scenario and the severe-erosion scenario. The input parameters for these two scenarios are provided in Table F-1, and cross sections for these two scenarios are provided on Figures F-1 and F-2. The creek bank cross sections were developed using the results of surveys conducted as part of the *Off-Site RCRA Facility Investigation* (Off-Site RFI: BBL 2000). The cross section for the minor-to-moderate-erosion scenario was location C005, which is just downstream of Friendship Road. The cross section selected for the severe-erosion scenario (C022) was adjacent to the Anniston Airport. The locations

of these transects are shown in the Figure F-3, which was developed from Figure 3-1 in the Off-Site RFI (BBL 2000).

The hydraulics for the BSTEM were developed using site-specific data collected from 1984 through 2012 for Choccolocco Creek. The data were downloaded through 2012 because that is when the BSTEM modeling was conducted. These flow data were available from the United States Geological Survey (USGS) for the surface water gauging station at Jackson Shoals. The surface water flow data included daily stage and discharge information since 1961, which is when this USGS gauging station came on-line. The data were available at USGS Surface Water data for USA: USGS Surface-Water Annual Statistics.[1]

Although surface flow data were available from as far back as 1961, the surface water flow data period selected for this evaluation (1984 to 2012) provided a robust data set that was inclusive of effects related to climate change. The probability distribution for flow in cubic feet per second (cfs) based on this data set is presented on Figure F-4. These data were reduced to provide simplified annual flow duration inputs. The rates are provided in Table F-2 and include flow rates, annualized durations, and water depths. The calculated flows range from 388 cfs occurring 72% of the year to 8,758 cfs occurring 3% of the year. For reference, the average annual monthly flows range from 260 cfs during the month of October to 1,561 cfs during the month of March. The average flow for a 10-year event is approximately 10,000 cfs.

Choccolocco Creek flows outside of its banks several times throughout the year; thus, the full expanse of the creek banks is subjected to the higher surface water velocities multiple times throughout the year. In-creek surface water velocities do not significantly increase during out-of-bank conditions because the additional surface water flows are conveyed at low velocity over the relatively flat and wide expanse of the floodplain (BBL 2000).

2.2 Creek Bank Erosion Model Results

Graphic model outputs for the minor-to-moderate-erosion scenario are provided for a range of conditions. For each output, the graphics include a cross-section profile for the location, which includes elevations for the floodplain, creek bank, creek bed, and the five soil layers. The elevations of groundwater and water surface are also shown on the figures along with the locations where creek bank failures occur. The range of conditions for the minor-to-moderate-erosion scenario are presented on Figures F-5a through F-5d and include the following:

- Sub-full bank conditions (Figure F-5a)
- Bank full and over-bank conditions (Figure F-5b)
- Receding surface water elevations with a lower groundwater table (Figure F-5c)
- Receding surface water elevations with an elevated groundwater table (Figure F-5d)

[1] It is possible that the retrieval of historical surface water flow data may now require a specific request because the USGS is in the process of updating the websites for their surface water gauging stations.

The BSTEM calculates factors of safety based on modeled conditions with a factor of safety of 1.3 reflecting stable conditions. The calculated factor of safety for the condition shown on Figure F-5c is 1.26 and is considered to be conditionally stable. As the groundwater elevation increases, the calculated factor of safety is lowered to 0.61 and the bank is considered to be unstable (Figure F-5d). The calculated recession rate for creek banks with minor-to-moderate erosion is 0.1 meters per year (m/yr).

A similar set of figures was developed for the severe erosion scenario (Figures F-6a through F-6d). These figures use the same general nomenclature as the Figure F-5 series:

- Erosion of the creek bank toe at lower surface water flow conditions (Figure F-6a)
- Erosion of the creek bank toe at higher surface water flow conditions (Figure F-6b)
- Undercutting of the creek bank during bank-full conditions (Figure F-6c)
- Creek bank failure when surface water and groundwater elevations are lowered (Figure F-6d)

The calculated factor of safety for the severe creek bank erosion condition shown on Figure F-6d is 0.81. Under these conditions, creek banks with severe erosion are identified as unstable and include a calculated creek bank recession rate of 1.0 m/yr.

3. KEY INPUTS FOR CREEK BANK PCB LOADINGS

Several project components were brought together in the OU-4 remedial investigation (OU-4 RI; Geosyntec 2019) to calculate PCB loadings associated with creek bank erosion. The three components included the following:

- Creek bank conditions survey results for the OU-4 portions of Snow Creek and Choccolocco Creek
- PCB concentration results for floodplain soil loaded adjacent to creek bank areas
- Creek bank recession rates

A summary of these three inputs is provided below along with references to portions of the OU-4. The PCB loading results for creek bank erosion are separately presented in Section 4.

3.1 Creek Bank Condition Survey Results

The creek bank conditions survey is described in Section 4.1.8 of the OU-4 FS and is supported by a set of detailed figures showing the results (Figures 4-31b through 4-31j). The creek bank conditions survey was conducted using a consistent set of field personnel and rating system to provide consistency in the results. The rating system for the ranking included five categories of creek bank conditions: stable, moderately stable, minor erosion, moderate erosion, and severe erosion. The creek bank stability results (Figures 4-31b through 4-31j of the OU-4 FS) showed that the system becomes more stable downstream of river mile 29.5 (RM 29.5). This observation was consistent with the character of the creek downstream of this point where the Choccolocco Creek begins to widen. The portion of Choccolocco Creek where creek bank erosion is more active (upstream of RM 29.5) is shown on Figure F-7. This figure also includes the results from the creek bank conditions survey.

3.2 Floodplain PCB Concentration Results

There were multiple floodplain soil sampling programs conducted for OU-4, including samples collected under the RCRA and CERCLA programs (Section 4.1.1 of the OU-4 FS). To develop an understanding of the PCB concentrations along the creek bank areas, PCB results within a 33-foot-wide swath on both sides of Snow Creek and Choccolocco Creek were averaged along several reaches. The width of 33 feet was an engineering judgement based on a balance of having a sufficient number of sample results and including areas that may be subject to future erosion. The creek reaches selected for characterizing average PCB concentrations were based on the trend in decreasing PCB concentration with downstream distance, logical physical breaks in the system, a sufficient number of sample results for a reach, and breakpoint in creek bank condition results at RM 29.5 that showed downstream of this breakpoint, the creek banks were generally more stable.

The different OU-4 reaches and average PCB concentrations based on length-weighting the PCB results for the upper 2 feet of soil at each location are as follows:

- Snow Creek: 49.3 milligrams per kilogram (mg/kg)
- Choccolocco Creek upstream of Highway 21: 17 mg/kg

- Choccolocco Creek from Highway 21 to RM 29.5: 6.1 mg/kg
- Choccolocco Creek downstream of RM 29.5: 3.3 mg/kg

3.3 Creek Bank Recession Rates

The two calculated creek bank recession rates identified in Section 2.2 of this appendix from the BSTEM evaluation were used to identify recession rates for the five erosion categories used to rate OU-4 creek bank conditions. The recession rates calculated with the BSTEM results included 0.1 m/yr for creek banks with minor-to-moderate erosion and 1.0 m/yr for creek banks with severe erosion. These two recession rates were used to develop individual recession rates for the five creek bank stability classifications used to characterize conditions in OU-4. The following are the resulting creek bank recession rates for OU-4:

- Stable: 0 m/yr for creek banks that are not receding
- Moderately stable: 0.05 m/yr as the midpoint between the minor erosion and stable erosion rates
- Minor erosion: 0.1 m/yr as a conservative estimate because the BSTEM rate of 0.1 m/yr was for a minor-to-moderate condition
- Moderate erosion: 0.4 m/yr as a conservative midpoint estimate between the BSTEM value of 0.1 m/yr for the minor-to-moderate erosion condition and the BSTEM value of 1.0 m/yr for the severe-erosion condition
- Severe erosion: 1.0 m/yr using the BSTEM results

3.4 Summary of Key Inputs for Creek Bank PCB Loadings

The key inputs to calculate the loading of PCB-containing creek bank soil to the OU-4 portions of Snow Creek and Choccolocco Creek bank are presented in Tables F-3 and F-4, respectively. The information contained in these tables includes the following:

- Geographic reaches for each creek, including the linear footage, erosion classification (i.e., stable, moderately stable, minor, moderate, and severe), and the associated recession rate
- Volume and mass of PCB-containing creek bank soil entering the creeks that is associated with the upper 2-foot layer
- PCB concentration for the creek bank soil associated with each reach

The quantity of creek bank soil entering the creeks only accounts for the PCB-containing soil from the upper 2-foot horizon of the soil column. The floodplain soil PCB results for OU-4 show this upper 2-foot horizon to be the soil layer of concern from a PCB perspective. Soil from deeper horizons that erodes into the creeks is part of the clean soil entering the creek system from the surrounding watershed that is part of the natural recovery process. The estimated quantity of clean soil entering Choccolocco Creek from the surrounding watershed ranges from 16,000 to 35,000 tons of mostly fine-grained material that enters upstream of Jackson Shoals to support natural recovery (BBL 1999).

4. CREEK BANK PCB LOADING RESULTS

The PCB loadings from creek bank soil for Snow Creek and Choccolocco Creek were calculated using the inputs identified in Section 3 and are shown on Tables F-5 and F-6. The tables include the individual reaches for each creek and the calculated loadings of PCB-containing creek bank soil on an annualized basis under the no action scenario. These two tables also include calculated PCB loadings on a per-mile basis to highlight reaches where PCB loadings are the highest and mitigative actions could have the largest benefits in terms of potential source control actions.

The collective creek bank conditions for both creeks indicate that creek banks for approximately 95% of the overall system are stable, moderately stable or have minor erosion (Figure F-8). Most of the areas with moderate or severe erosion are located upstream of RM 29.5. The PCB loading results show that creek banks with moderate-to-severe erosion are located upstream of RM 29.5 and contribute 81% of the PCBs from all creek bank areas (Figure F-9). This finding is further emphasized in the cumulative annual PCB loadings (Figure F-10). The cumulative annual loading results demonstrate the positive impacts for conducting targeted source control actions for creek banks located upstream of RM 29.5 with moderate and severe erosion. Adding the small lengths of Snow Creek with minor and relatively stable banks to creek banks with moderate and severe erosion increases the effectiveness of the targeted source control actions. It would be difficult from creek bank construction perspective to skip over these relatively short lengths of Snow Creek as part of targeted source control actions: including them with the other targeted actions for creek banks with moderate-to-severe erosion increases the overall source control to 83%.

The information presented in this appendix supports the presence of some select bank areas that could be acting as PCB sources to OU-4. The information and evaluations also highlight specific creek bank areas where potential source control actions could be meaningful relative to long-term remedy effectiveness. The percentage reduction calculations included with this appendix can also be used in calculating the effectiveness of MNR following a combination of source control actions targeting select creek bank areas and other sediment-related remediation activities.

The information presented in this appendix recognizes that additional creek bank erosion modeling could be conducted as part of the OU-4 RD. These supplemental efforts would consider creek bank erosion and hydraulic models available at that time, the results of predesign investigation floodplain soil sampling, potential changes in system hydraulics due to climate change, and potential CMZ effects.

5. REFERENCES

BBL. 1999. *Supplemental RCRA Facility Investigation Work Plan for the Off-Site Portion of the RFI/CS Program*. February.

BBL. 2000. *Off-Site RCRA Facility Investigation (RFI) Report. Solutia Inc., Anniston, Alabama*. June.

Tables

Table F-1. Preliminary Bank Stability and Toe Erosion Model
Inputs OU-4 Feasability Study Report
Anniston PCB Site, Anniston, Alabama

Parameters	Units	Minor-to-Moderate-Erosion Scenario	Severe-Erosion Scenario
Bank height	ft	9.8	7.9
Bank angle	degrees	40	65
Toe angle	degrees	20	15
Toe length	ft	12.5	13.1
Bank material properties (for each layer)	-	All layers moderate to resistant silt	Top layer: moderate to resistant silt Middle layer: moderate to resistant silt Base layer: moderate to resistant sand and gravel
Toe material properties	-	Riprap armoring	Less resistant silt, sand, and gravel
Root reinforcement parameters	-	None	None
Presence of absence of riprap (toe and bank)	-	None	None
Reach length	ft	1 ft unit length used	1 ft unit length used
Flow regime	-	Idealized 10-year flow series	Idealized 10-year flow series with 3 to 4 bank-full events
Top soil layer thickness	ft	2	2

Notes:

1. Case 1 is for minor to moderate erosion.
2. Case 2 is for severe erosion.

ft: foot or feet

WL: water level

Table F-2. Simplified Flow Duration Curve
OU-4 Feasability Study Report Anniston PCB Site, Anniston, Alabama

Water Depth Range (D) (feet)	Representative Water Depth (feet)	Discharge (cfs)	Estimated Duration (hours/year)
0	0	0	0
D < 1.2	3.9	395	6,327
1.2 ≤ D < 2.4	5.9	970	2,209
D ≥ 2.4	7.9	1725	224

Notes:
cfs: cubic feet per second

Table F3. Key Inputs for Creek Bank PCB Loadings: Snow Creek (OU-4 Portion)
OU-4 Feasibility Study Report
Anniston PCB Site, Anniston, Alabama

Area	Erosion Classification	Bank Length (ft)	Bank Recession Rate (m/yr)	PCB Layer Thickness (m)	Soil Density (kg/m^3)	Estimated PCB Concentration (C1) (mg/kg)	Bank Length (m)
Snow Creek	Stable	1	0	0.6	1780	49.3	0
Snow Creek	Relatively Stable	918	0.05	0.6	1780	49.3	280
Snow Creek	Minor	584	0.1	0.6	1780	49.3	178
Snow Creek	Moderate	2,580	0.4	0.6	1780	49.3	786
Snow Creek	Severe	2,818	1	0.6	1780	49.3	859
Total	**All**	**6,901**					**2,103**

Notes:
ft: feet
kg/m^3: kilograms per cubic meter
m: meter
m/yr: meters per year
mg/kg: milligrams per kilogram
OU: operable unit
PCB: polychlorinated biphenyl

Table F-4. Key Inputs for Creek Bank PCB Loadings: Choccolocco Creek
OU-4 Feasibility Study Report
Anniston PCB Site, Anniston, Alabama

Area	Erosion Classification	Bank Length (ft)	Bank Recession Rate (m/yr)	PCB Layer Thickness (m)	Soil Density (kg/m^3)	Estimated PCB Concentration (C1) (mg/kg)	Bank Length (m)
Upstream of RM 29.5	Stable	31,768	0	0.6	1780	0	9,683
Downstream of Hwy 21	Relatively Stable	17,398	0.05	0.6	1780	6.1	5,303
Upstream of Hwy 21	Relatively Stable	4,460	0.05	0.6	1780	17	1,359
Downstream of Hwy 21	Minor	11,782	0.1	0.6	1780	6.1	3,591
Upstream of Hwy 21	Minor	10,345	0.1	0.6	1780	17	3,153
Downstream of Hwy 21	Moderate	6,772	0.4	0.6	1780	6.1	2,064
Upstream of Hwy 21	Moderate	2,466	0.4	0.6	1780	17	752
Total Moderate	**Moderate**	**9,238**	**0.4**	**0.6**	**1780**	**--**	**2,816**
CL18	Severe	43	1	0.6	1780	17	13
CR34	Severe	166	1	0.6	1780	17	51
CR58	Severe	168	1	0.6	1780	8.3	51
CR68	Severe	194	1	0.6	1780	8.3	59
CR52	Severe	472	1	0.6	1780	8.3	144
Total Severe	**Severe**	**1,043**	**1**	**0.6**	**1780**	**--**	**318**
Total Upstream of RM 29.5	**All**	**86,034**	**--**	**--**	**--**	**--**	**26,223**
RM 29.5 to Hwy 77	Stable	179,542	0	0.6	1780	3.3	54,724
RM 29.5 to Hwy 77	Relatively Stable	38,447	0.05	0.6	1780	3.3	11,719
RM 29.5 to Hwy 77	Minor	18,859	0.1	0.6	1780	3.3	5,748
RM 29.5 to Hwy 77	Moderate	1,759	0.4	0.6	1780	3.3	536
RM 29.5 to Hwy 77	Severe	179	1	0.6	1780	3.3	55
RM 29.5 to Hwy 77	**All**	**238,786**	**--**	0.6	1780	3.3	**72,782**
Total System	**All**	**324,820**	**--**	**0.6**	**1780**	**--**	**29,039**

Notes:
1. Bank Lengths for RM 29.5 to Highway 77 are based on the 2015 field survey program and upstream of RM 29.5 during the 2012 field survey program.
ft: feet
Hwy: highway
kg/m^3: kilograms per cubic meter
kg/yr: kilograms per year
m: meter
m/yr: meters per year
mg/kg: milligrams per kilogram
PCB: polychlorinated biphenyl
RM: river mile

Table F-5. Creek Bank PCB Loadings: Snow Creek (OU-4 Portion)
OU-4 Feasibility Study Report
Anniston PCB Site, Anniston, Alabama

Area	Erosion Classification	PCB Containing Volume (m^3/yr)	Mass of PCB Containing Layer (kg/yr)	PCB Loading (kg/yr)	PCB Loading per Mile (kg/mi/yr)
Snow Creek	Stable	0	0	0	0
Snow Creek	Relatively Stable	8	14,942	0.74	4.24
Snow Creek	Minor	11	19,011	0.94	8.47
Snow Creek	Moderate	189	335,943	16.56	33.89
Snow Creek	Severe	515	917,333	45.22	84.74
Total	**All**	**723**	**1,287,229**	**63**	**48.55**

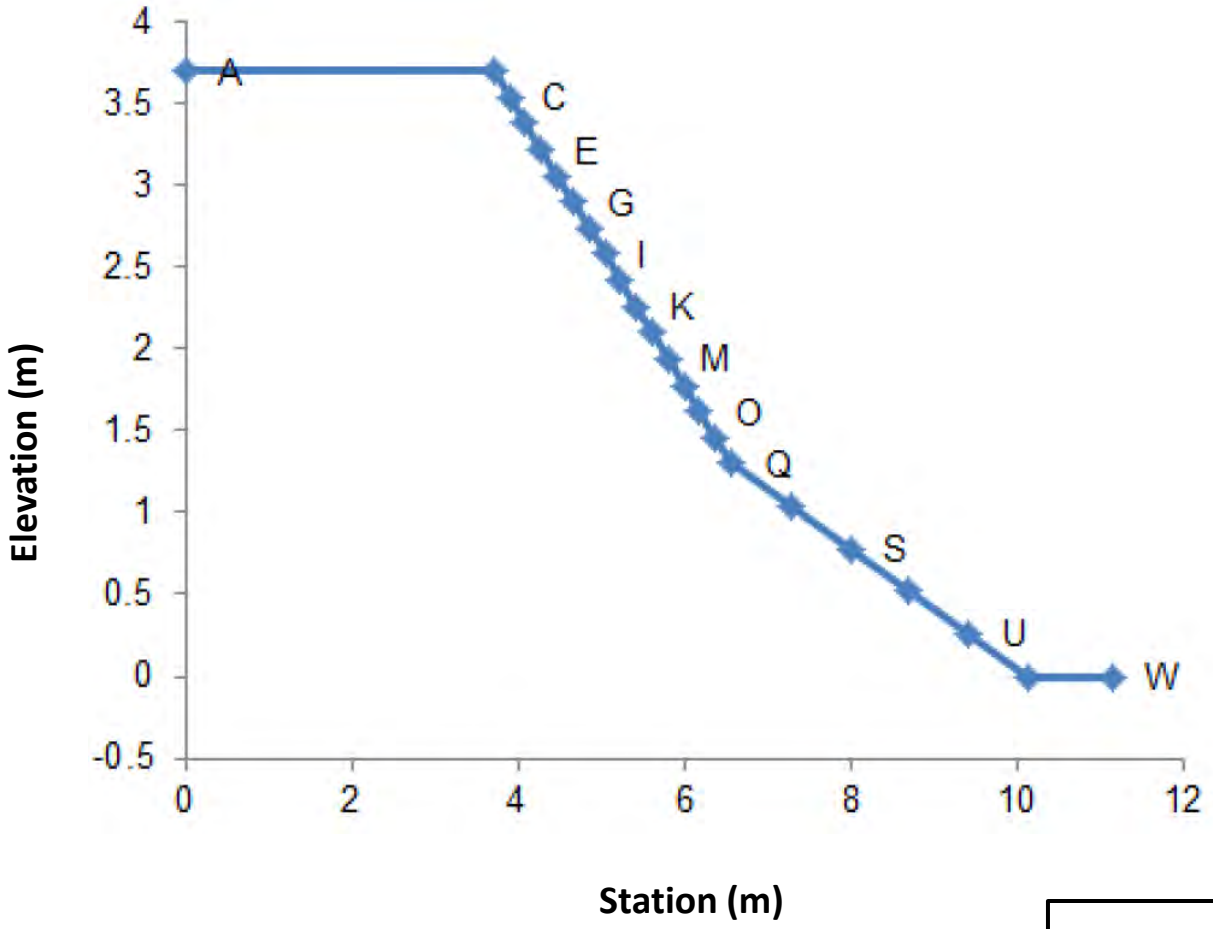
Notes:
ft: feet
kg/mi/yr: kilograms per mile per year
kg/yr: kilograms per year
m^3/yr: cubic meters per year
OU: operable unit
PCB: polychlorinated biphenyl

Table F-6. Creek Bank PCB Loadings: Choccolocco Creek
OU-4 Feasibility Study Report
Anniston PCB Site, Anniston, Alabama

Area	Erosion Classification	PCB Containing Volume (m^3/yr)	Mass of PCB Containing Layer (kg/yr)	PCB Loading (kg/yr)	PCB Loading per Mile (kg/mi/yr)
Upstream of RM 29.5	Stable	0	0	0	0
Downstream of Hwy 21	Relatively Stable	159	283,175	1.73	0.52
Upstream of Hwy 21	Relatively Stable	41	72,592	1.23	1.46
Downstream of Hwy 21	Minor	215	383,535	2.34	1.05
Upstream of Hwy 21	Minor	189	336,757	5.72	2.92
Downstream of Hwy 21	Moderate	495	881,786	5.38	4.19
Upstream of Hwy 21	Moderate	180	321,099	5.46	11.69
Total Moderate	**Moderate**	**676**	**1,202,885**	**10.84**	**6.19**
CL18	Severe	8	13,998	0.24	29.22
CR34	Severe	30	54,037	0.92	29.22
CR58	Severe	31	54,688	0.45	14.27
CR68	Severe	35	63,152	0.52	14.27
CR52	Severe	86	153,648	1.28	14.27
Total Severe	**Severe**	**191**	**339,524**	**3.41**	**17.26**
Total Upstream of RM 29.5	**All**	**1,471**	**2,618,469**	**25.27**	**1.55**
RM 29.5 to Hwy 77	Stable	0	0	0.00	0.00
RM 29.5 to Hwy 77	Relatively Stable	352	625,776	2.07	0.28
RM 29.5 to Hwy 77	Minor	345	613,910	2.03	0.57
RM 29.5 to Hwy 77	Moderate	129	229,040	0.76	2.27
RM 29.5 to Hwy 77	Severe	33	58,269	0.19	5.67
RM 29.5 to Hwy 77	**All**	**858**	**1,526,996**	5.04	0.11
Total System	**All**	**2,147**	**3,821,354**	**30.3**	**0.49**

Notes:
1. Bank Lengths for RM 29.5 to Highway 77 are based on the 2015 field survey program and upstream of RM 29.5 during the 2012 field survey program.
ft: feet
Hwy: highway
kg/mi/yr: kilograms per mile per year
kg/yr: kilograms per year
m^3/yr: cubic meters per year
PCB: polychlorinated biphenyl
RM: river mile

Figures



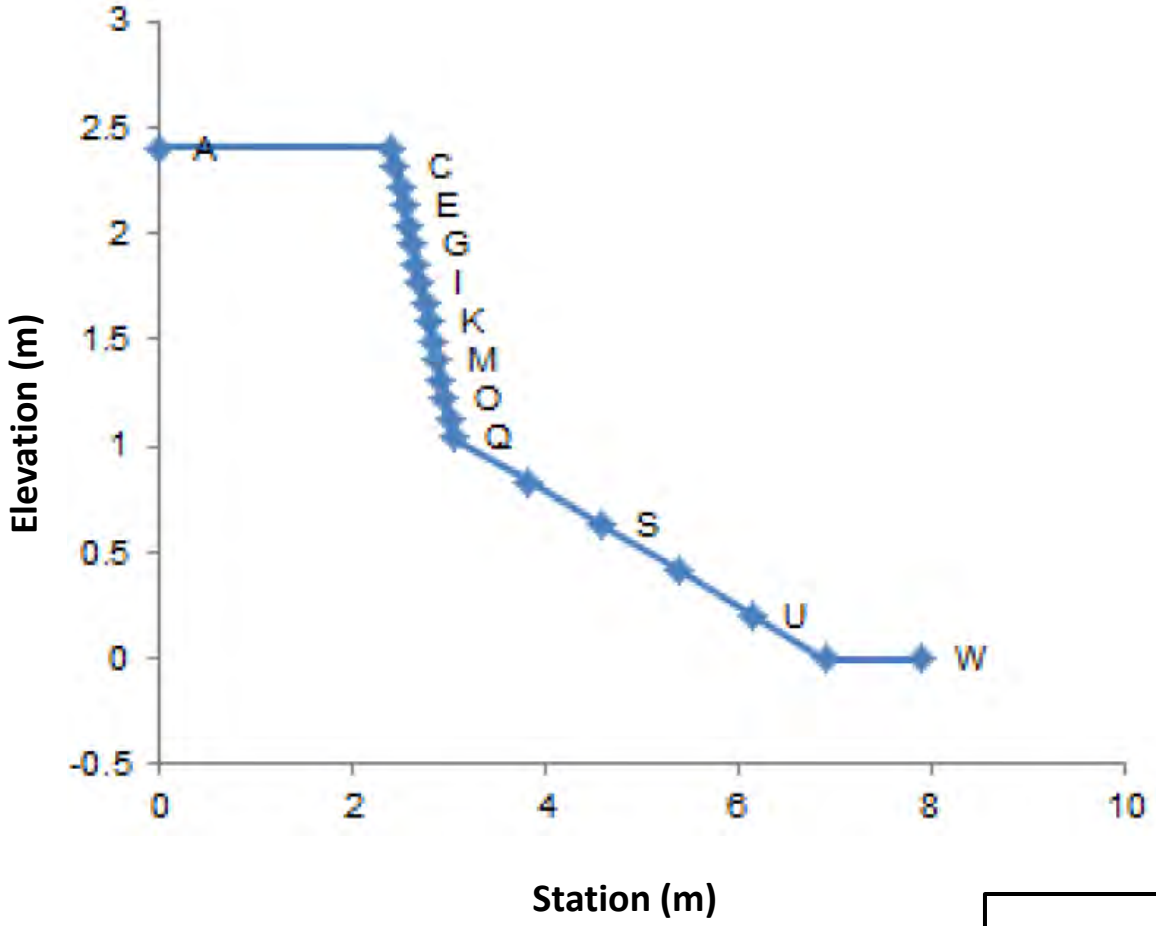
Notes:
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Initial Section Geometry: Minor to Moderate Erosion

Solutia

Figure
F-1



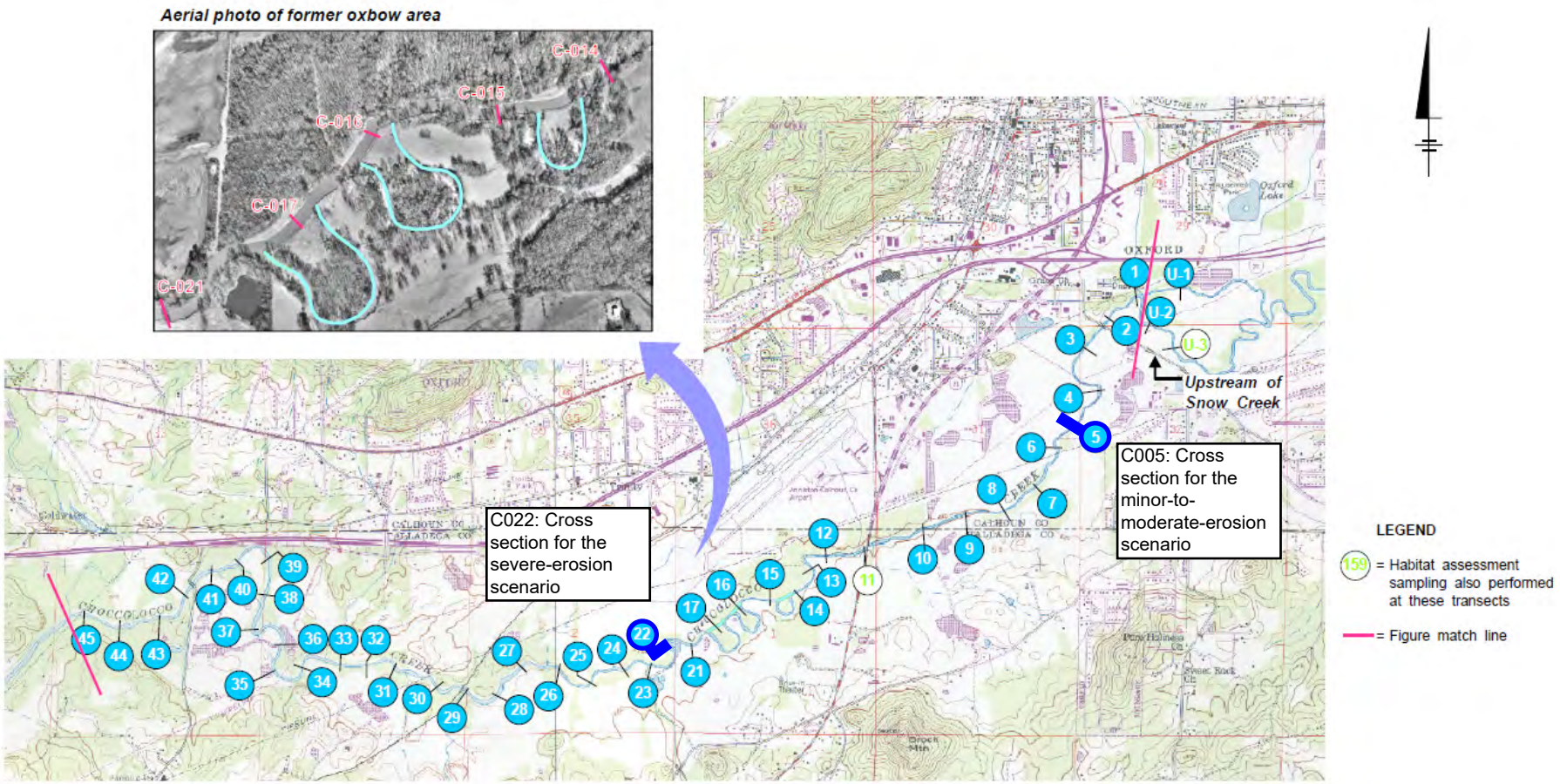
Notes:
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Initial Section Geometry: Severe Erosion

Solutia

Figure
F-2



Notes:

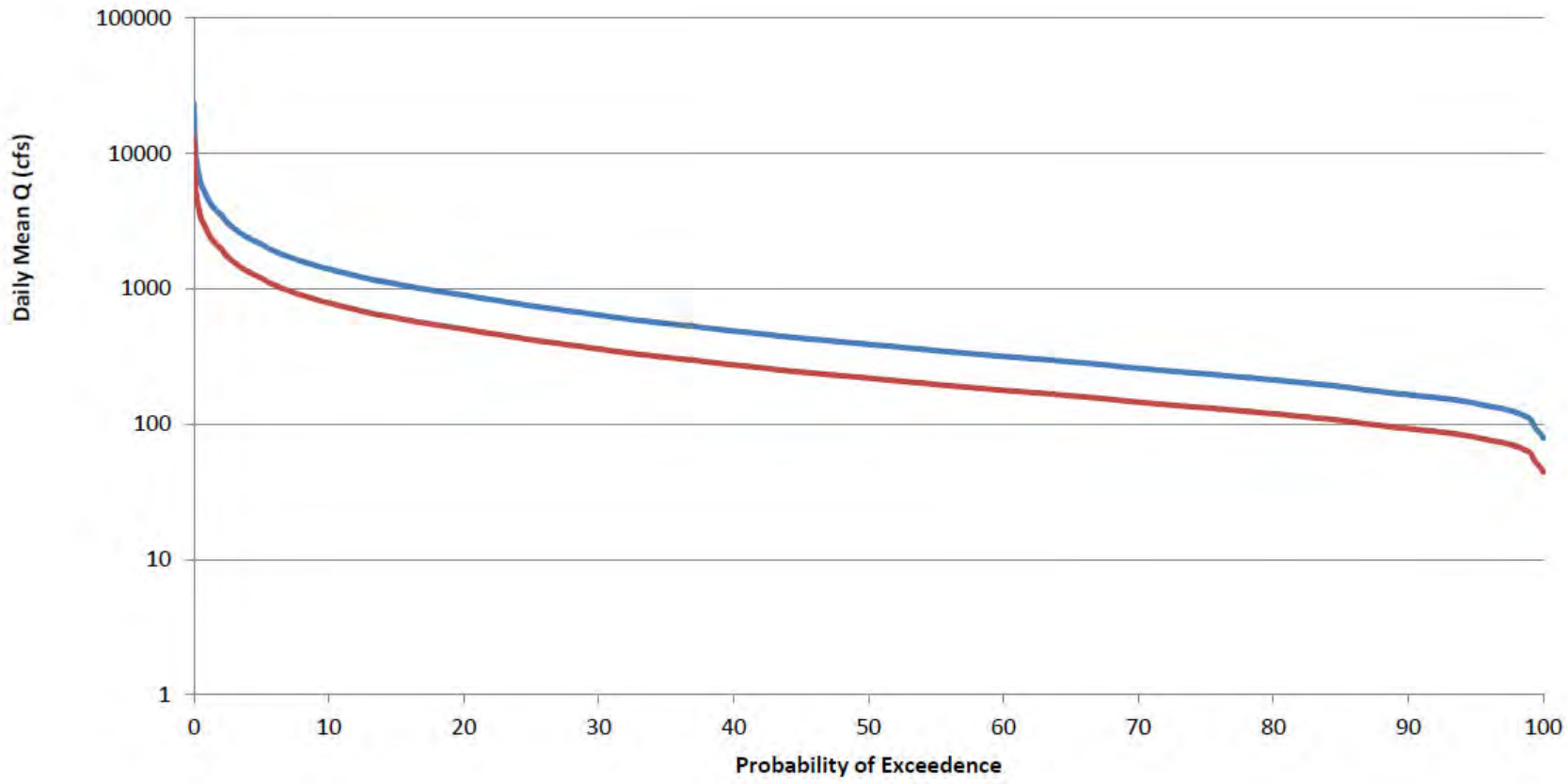
1. Initial transect locations included three transects in the former oxbows that were not sampled as part of the creek characterization. To preserve the initial transect spacing and numbering scheme upstream and downstream of the reach, transects 18, 19, and 20 are not shown.
2. Base map source United States Geological Society 7.5 Minute Quad. Series Oxford, Alabama, 1956 (Photo revised 1983), and Munford, Alabama, 1956 (Photo revised 1983).

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Choccolocco Creek Transects: Snow Creek Confluence to Coldwater Creek

Solutia

Figure
F-3



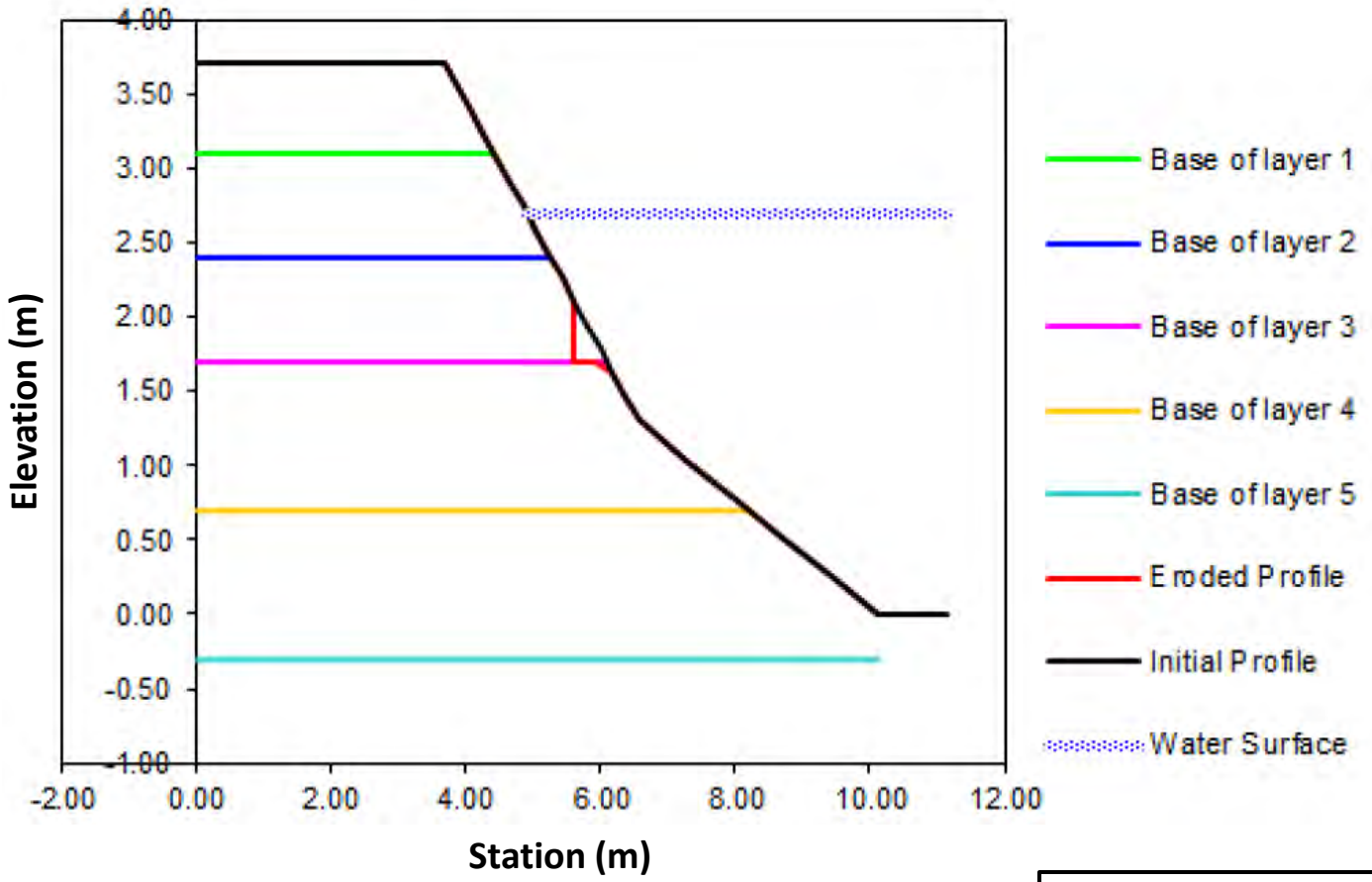
Notes:
1. Based on daily mean flow series from 1984 to 2012.
cfs: cubic feet per second
Q: flow

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Flow Duration Curve

Solutia

Figure
F-4



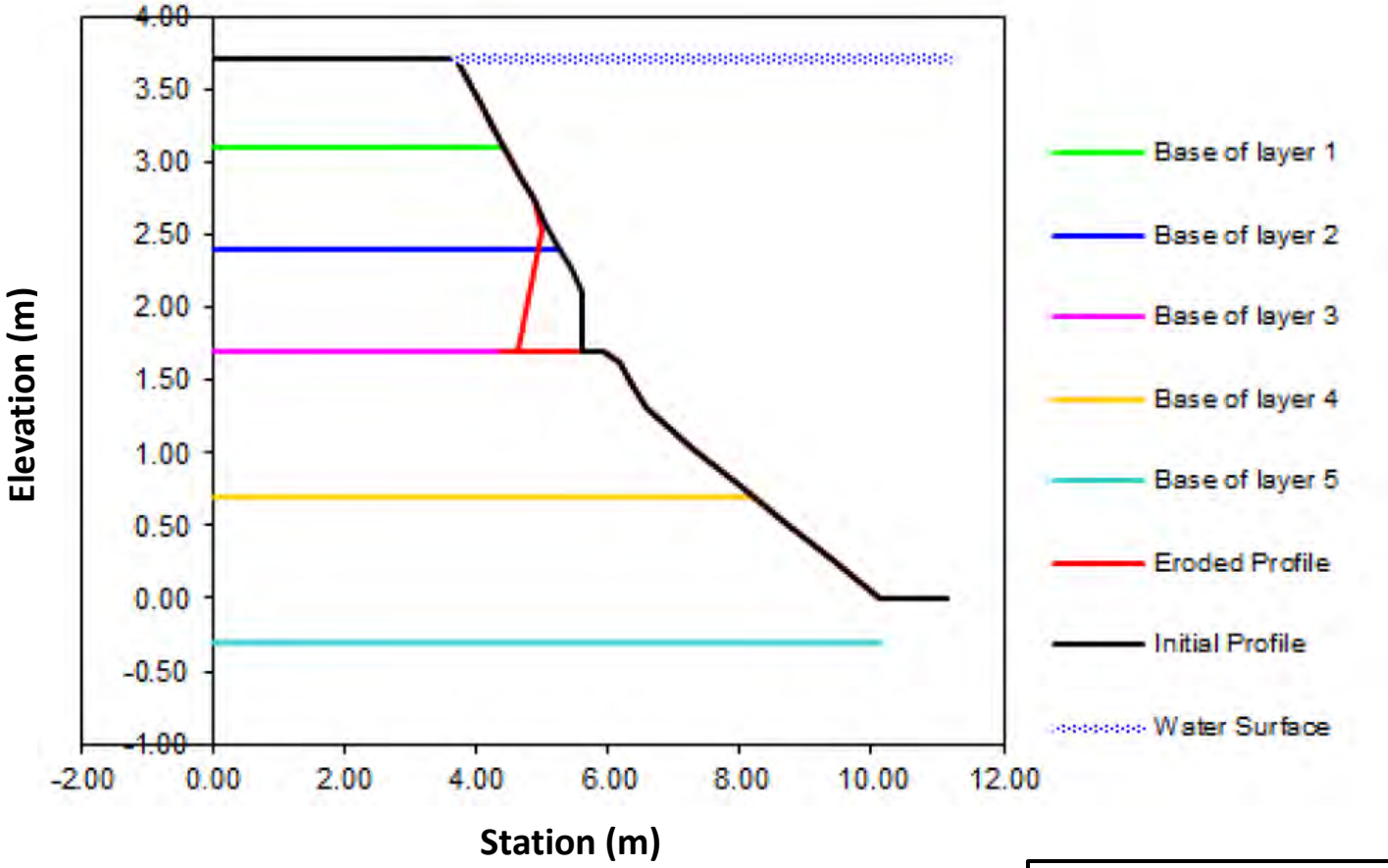
Notes:
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Minor-to-Moderate Bank Erosion during High, Sub-bankfull Flows

Solutia

Figure
F-5a



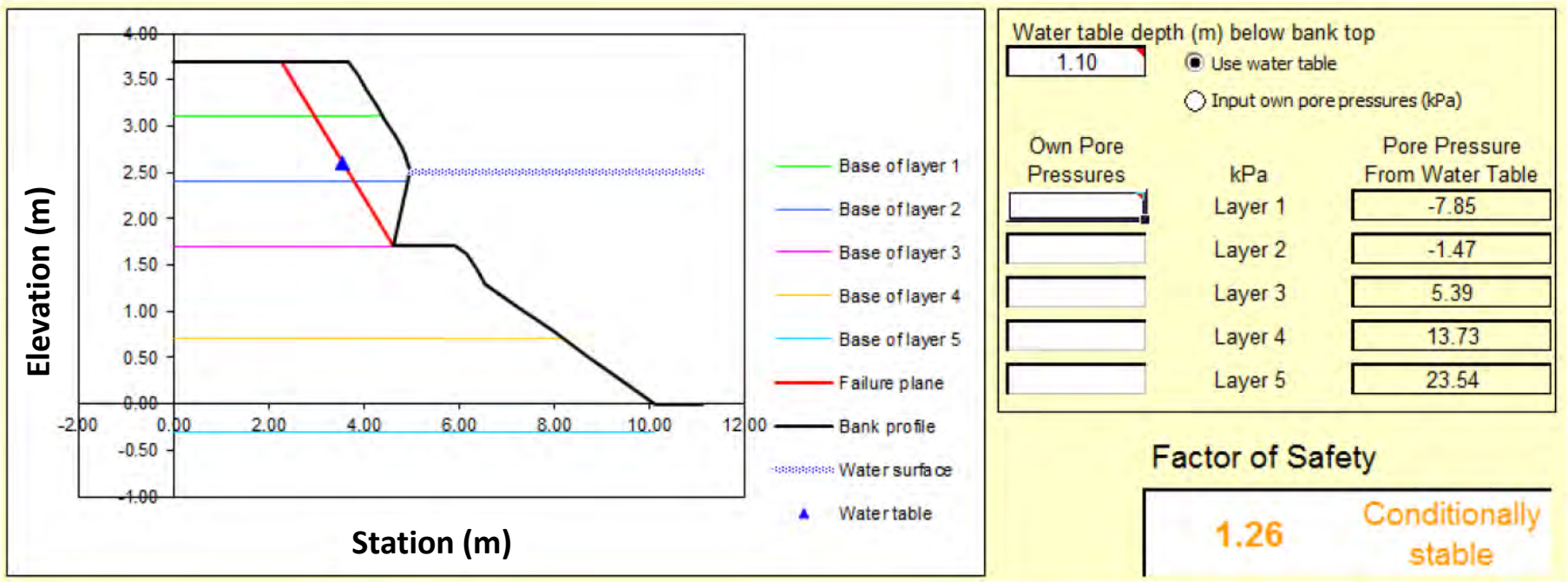
Notes:
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Minor-to-Moderate Bank Erosion during Bank Full and Over-Bank Flows

Solutia

Figure
F-5b



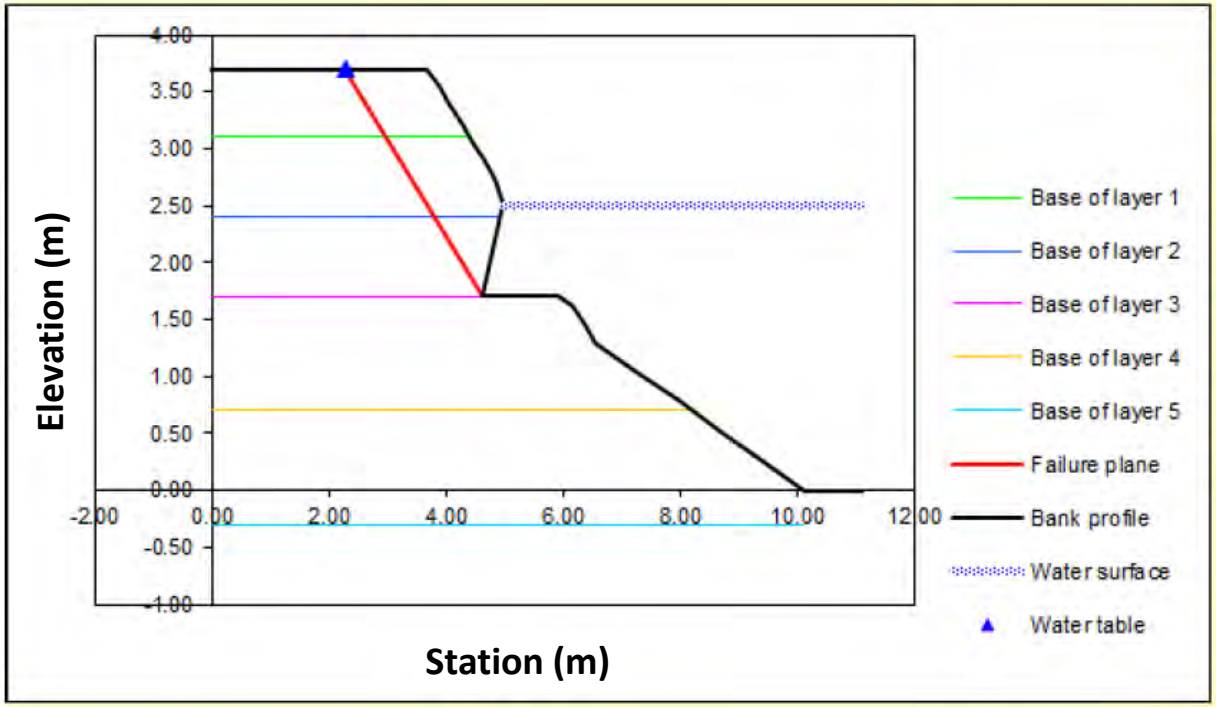
Notes:
kPa: kilopascal
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Example of Bank Failure Occurring as Surface Water Levels in the Creek Recede with a Lower Groundwater Table

Solutia

Figure
F-5c



Water table depth (m) below bank top

0.00

Use water table

Input own pore pressures (kPa)

Own Pore Pressures	kPa	Pore Pressure From Water Table
	Layer 1	2.94
	Layer 2	9.32
	Layer 3	16.18
	Layer 4	24.52
	Layer 5	34.32

Factor of Safety

0.61 Unstable

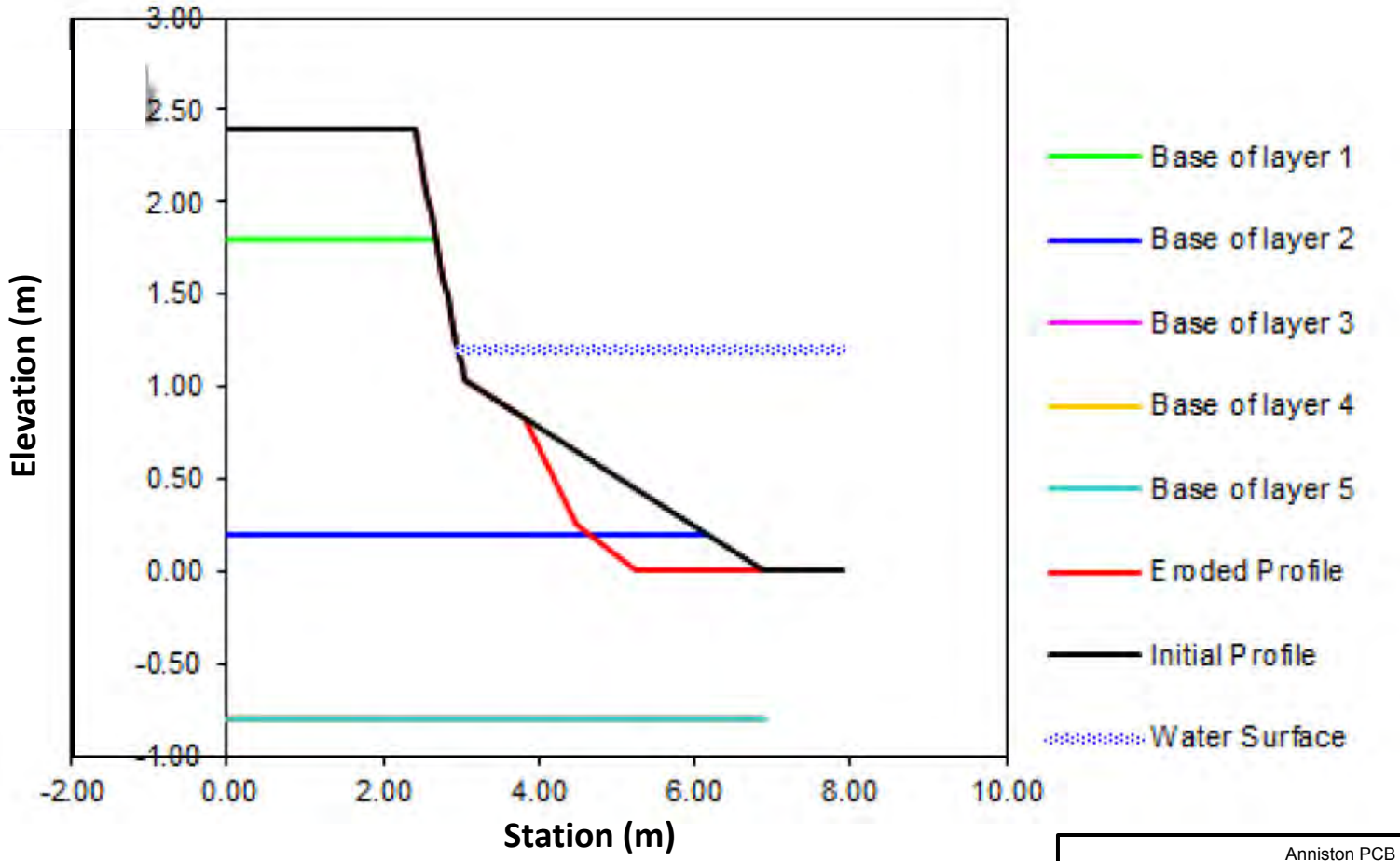
Notes:
kPa: kilopascal
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Example of Bank Failure Occurring as Surface Water Levels in the Creek Recede with an Elevated Groundwater Table

Solutia

Figure
F-5d



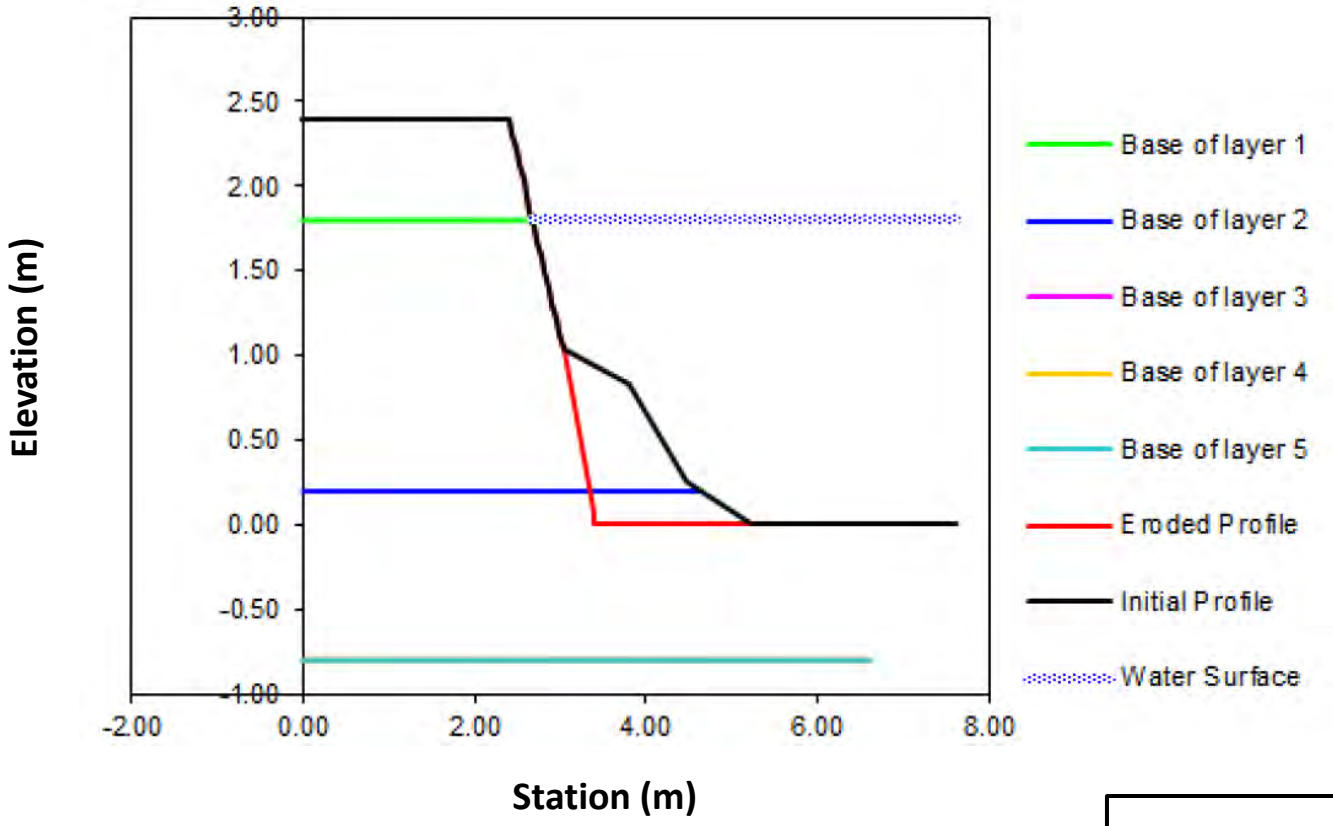
Notes:
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Erosion of the Creek Bank Toe at Lower Surface Water Flow Conditions

Solutia

Figure
F-6a



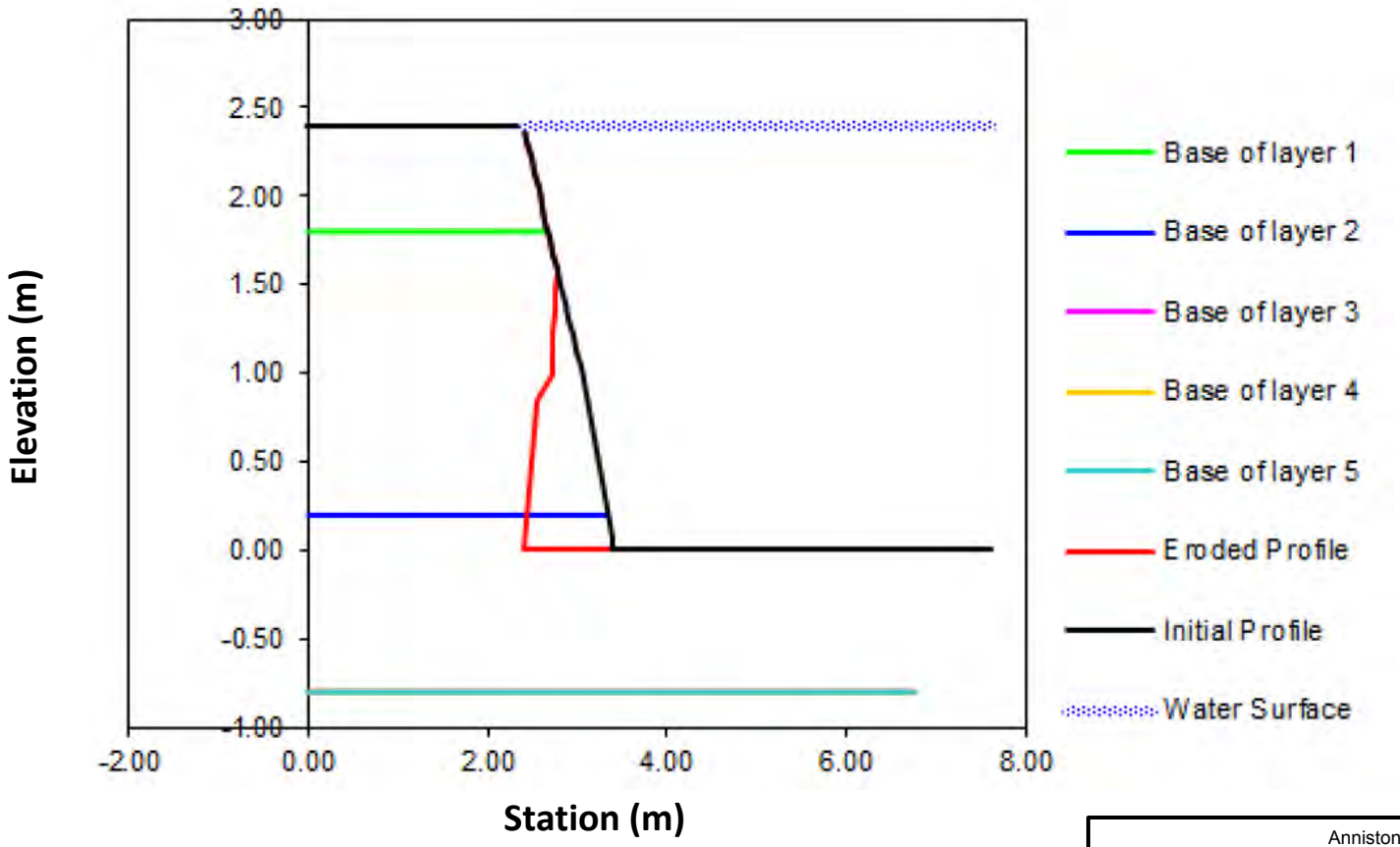
Notes:
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Erosion of the Creek Bank Toe at Higher Surface Water Flow Conditions

Solutia

Figure
F-6b



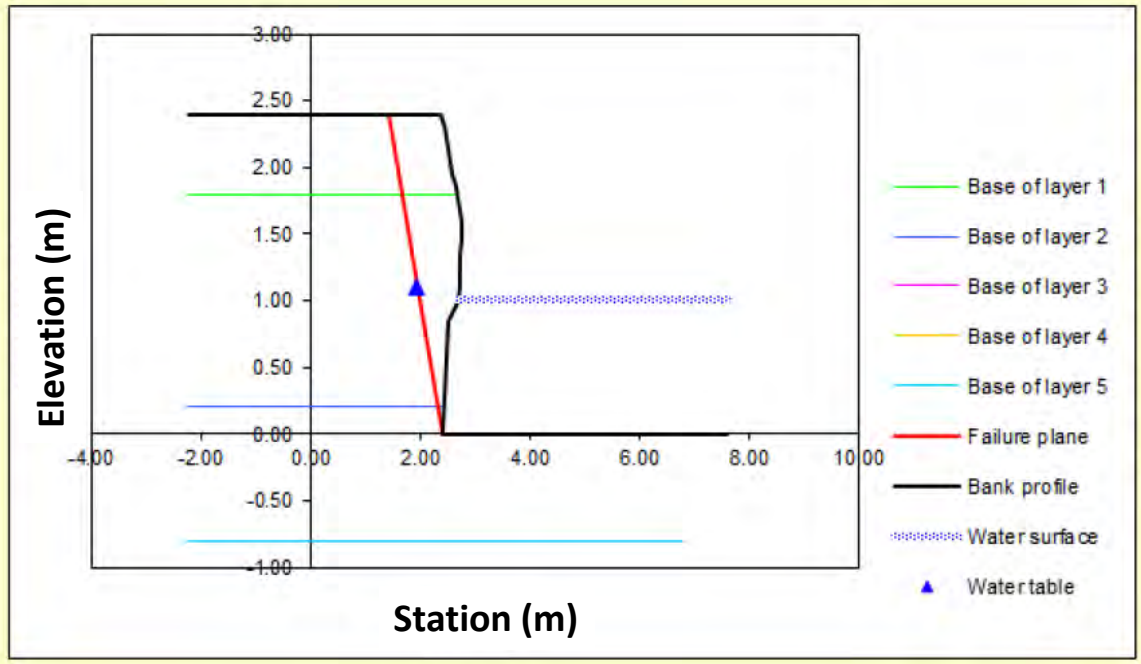
Notes:
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Undercutting of the Creek Bank During Bank-Full Conditions

Solutia

Figure
F-6c



Water table depth (m) below bank top: 1.30

(●) Use water table

( ) Input own pore pressures (kPa)

Own Pore Pressures	kPa	Pore Pressure From Water Table
	Layer 1	-9.81
	Layer 2	0.98
	Layer 3	13.73
	Layer 4	18.63
	Layer 5	18.63

Factor of Safety

0.81 Unstable

Notes:
kPa: kilopascal
m: meter

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Creek Bank Failure When Surface Water and Groundwater Elevations are Lowered

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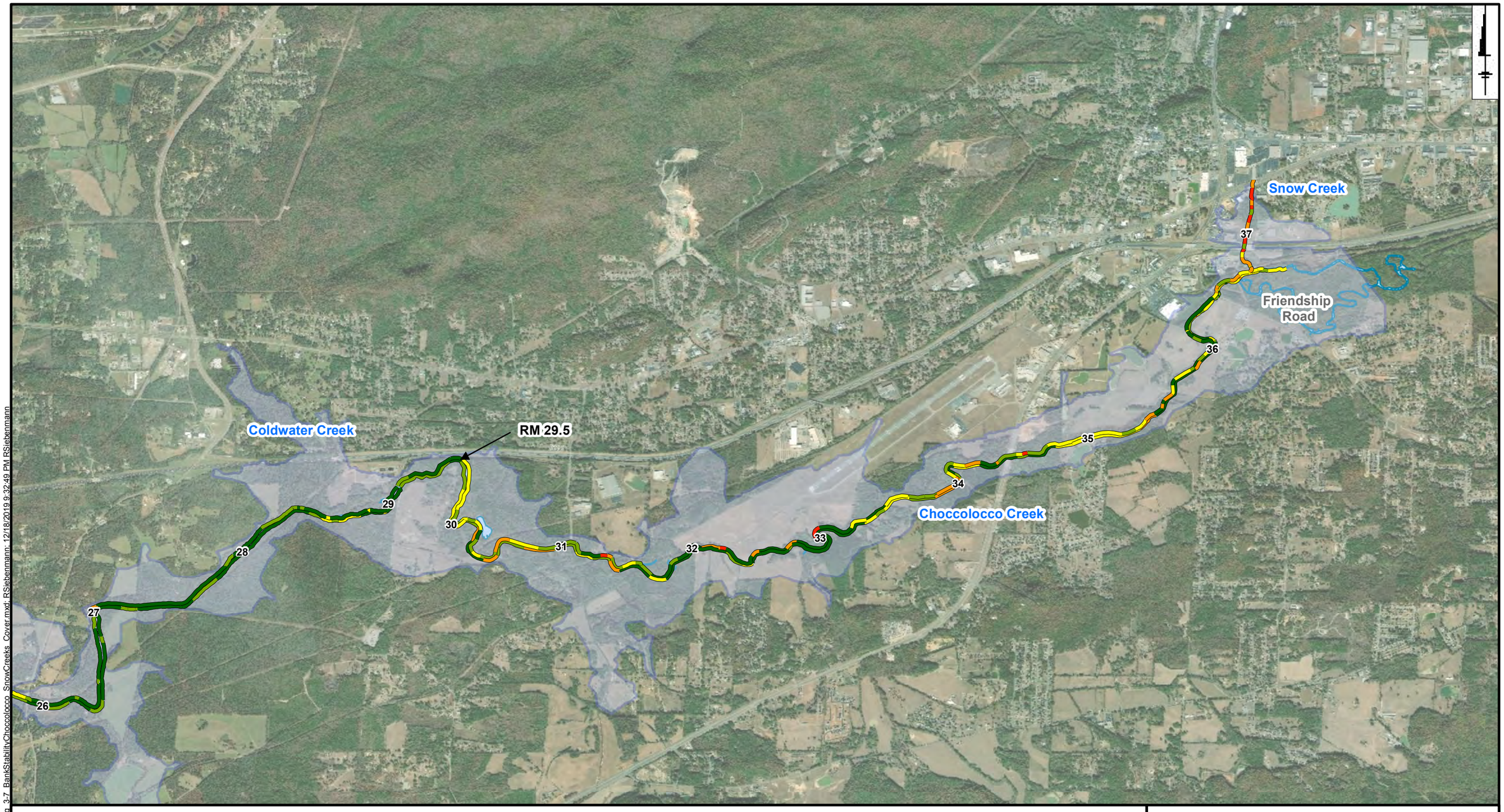
Figure
F-6d



Bank Stability Ratings
- Stable
- Relatively Stable
- Minor Erosion
- Moderate Erosion
- Severe Erosion

Choccolocco Creek
OU-4 100-Year Floodplain
River Mile Station
35

0 4,000 8,000 Feet

Notes:
1. Bank stability surveys conducted in 2012 and 2014.
2. Source aerial images from Calhoun County, Talladega County, and Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Anniston PCB Site, Anniston, Alabama

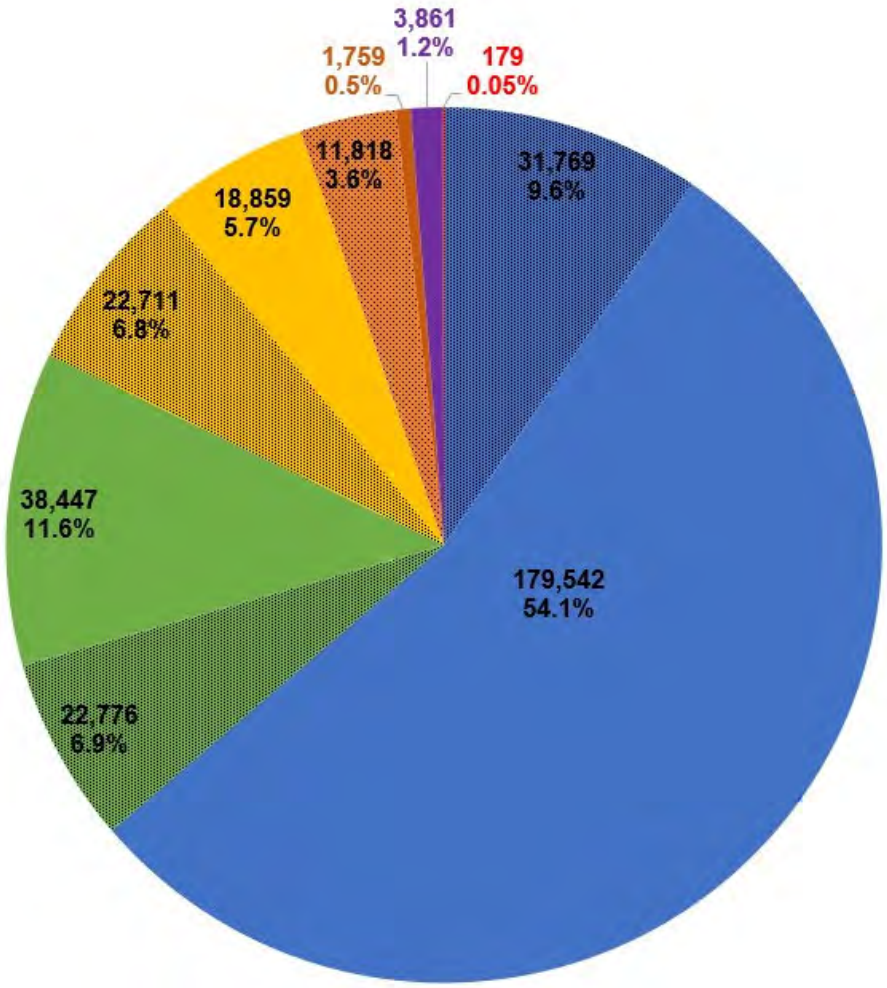
Feasibility Study Report for OU-4

Creek Bank Erosion Ratings for Upper OU-4

Solutia

Figure **F-7**

\\arg-01fs\Anniston\GIS\MXD\OU-4 FS\Fig 3-7 BankStabilityChoccolocco SnowCreeks Cover.mxd RSiebenmann 12/18/2019 9:32:49 PM RSiebenmann



- Upstream Stable
- Downstream Stable
- Upstream Relatively Stable
- Downstream Relatively Stable
- Upstream Minor Erosion
- Downstream Minor Erosion
- Upstream Moderate Erosion
- Downstream Moderate Erosion
- Upstream Severe Erosion
- Downstream Severe Erosion

Linear feet of creek bank and percent of total upstream and downstream of river mile 29.5.

Notes:
%: percent
PCB: polychlorinated biphenyl

Anniston PCB Site, Anniston, Alabama
Feasibility Study Report for OU-4

Summary of Creek Bank Stability Relative to River Mile 29.5 of Choccolocco Creek

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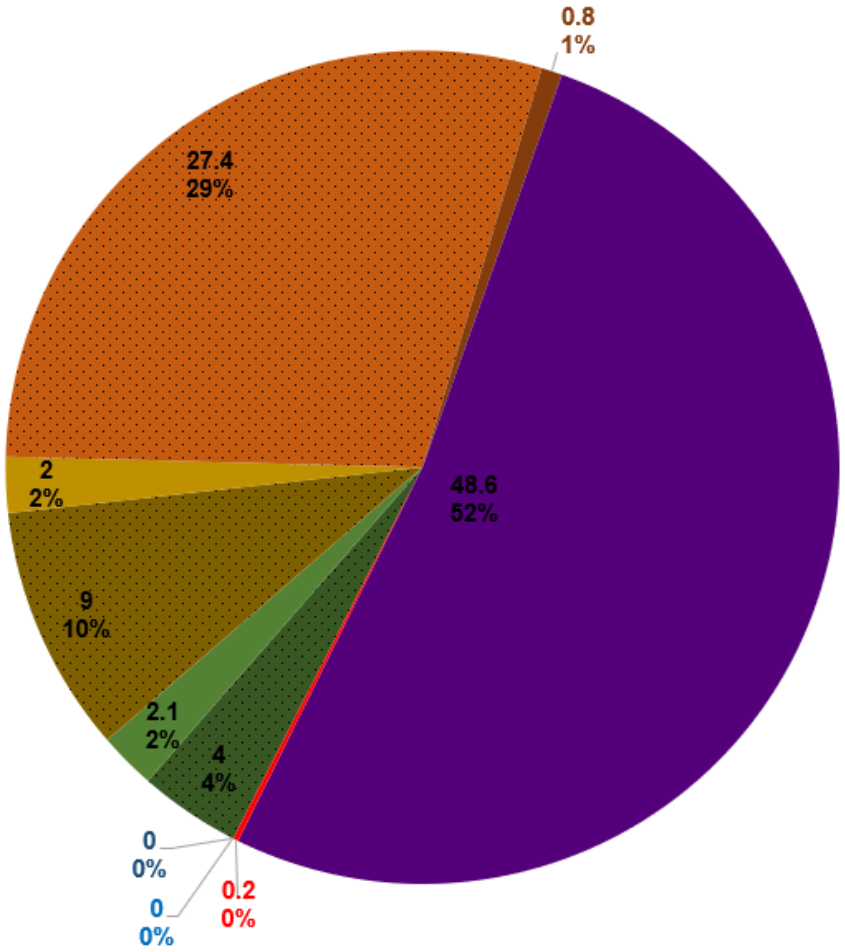
Figure
F-8



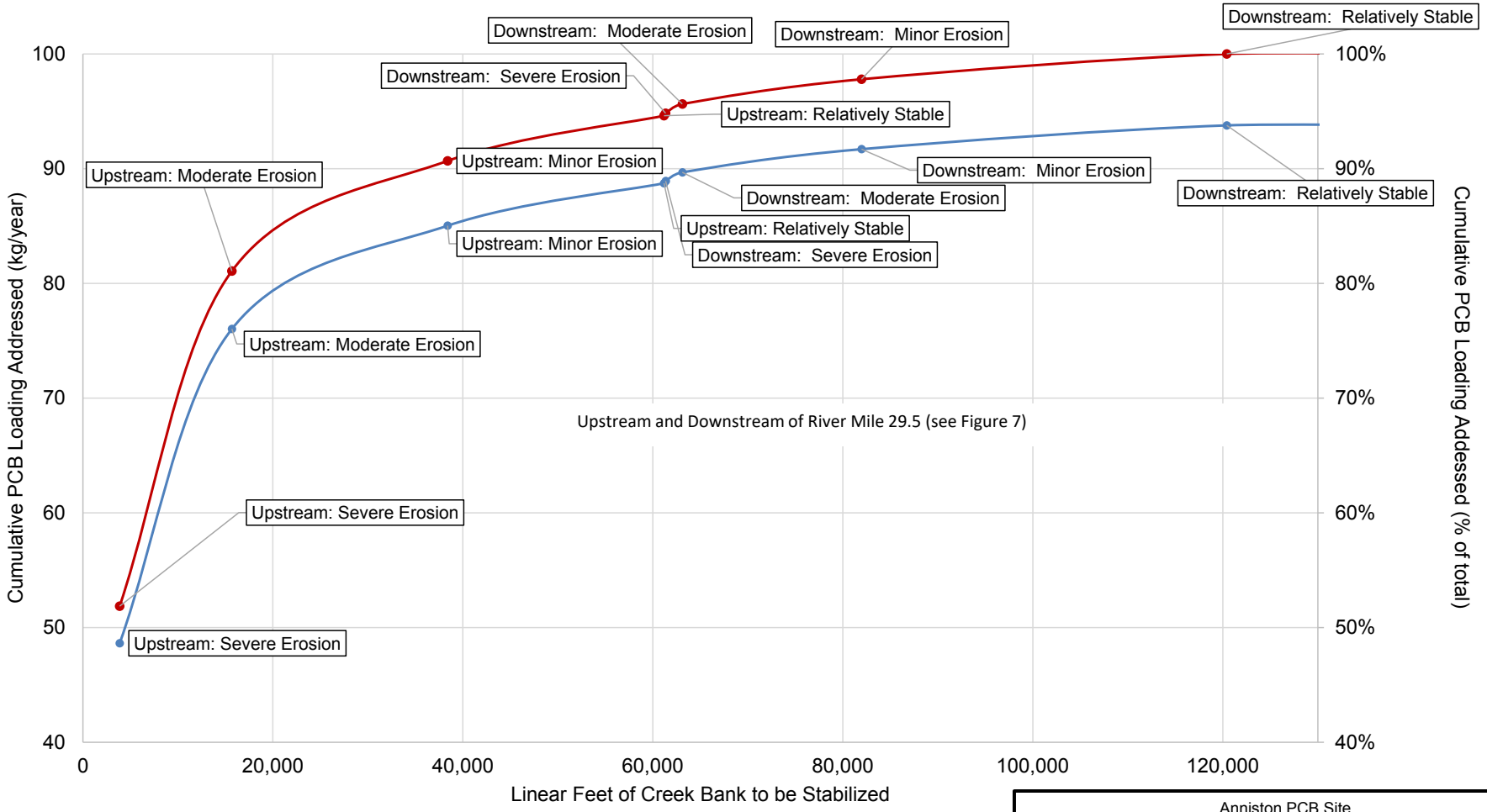
Notes:
%: percent
PCB: polychlorinated biphenyl

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Summary of PCB Loading Relative to River Mile 29.5 of Choccolocco Creek

Solutia

Figure
F-9



Notes:
%: percent
kg/year: kilograms per year
PCB: polychlorinated biphenyl

- PCB Loading Addressed (kg/year)
- PCB Loading Addressed (% of total loading)

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Bank Stabilization and Annual PCB Loading

Figure
F-10

Geosyntec consultants

Appendix G
Description of the MNR Model

Appendix G: Description of Monitored Natural Recovery Model

1. INTRODUCTION

Monitored natural recovery (MNR) for sediment uses natural processes to reduce exposure concentrations of a given contaminant over time. For polychlorinated biphenyls (PCBs) in sediment, the primary MNR mechanism is introducing and mixing relatively cleaner sediment brought into the aquatic system through flow from upstream. Other fate and transport processes that occur in sediment, such as biodegradation, volatilization, dispersion, adsorption, and dissolution, play a lesser role in MNR. This description of the MNR recovery model has been developed as Appendix G to the Operable Unit 4 Feasibility Study (OU-4 FS) for the Anniston PCB Site (the Site). The MNR recovery model is ultimately used to assess the potential effectiveness of the creek bank and sediment remedy selected by the United States Environmental Protection Agency (USEPA) for OU-4 in the Record of Decision for the low-energy portions of the OU located downstream of Jackson Shoals.

The MNR model was used during completion of the OU-4 FS alternatives analysis of the seven remedial alternatives developed and screened against the two threshold criteria (i.e., overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements [ARARs]) and seven balancing criteria (i.e., long-term effectiveness and permanence; reduction of toxicity, mobility, or volume; short-term effectiveness; implementability; cost; state acceptance; community acceptance) as defined in the National Contingency Plan (NCP; 40 Code of Federal Regulations [C.F.R.] § 300 et. seq.) for the creek banks and sediment. Each active remedial alternative relies on combining different remedial approaches with two common elements: source control and MNR:

- SED-1: No action
- SED-2: Creek bank soil source control for contaminated areas with moderate and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment for sediment in low-energy areas; long-term soil management; and MNR of sediment. Under this alternative, the PCB remedial action levels (RALs) for dredging high-energy areas include 2.6 milligrams per kilogram (mg/kg) as a not-to-exceed (NTE) value and a surface-weighted average concentration (SWAC) less than 1 mg/kg.
- SED-3: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; in-place treatment of sediment in low-energy areas; long-term soil management; and MNR of sediment. Under this alternative, the PCB RALs for dredging high-energy areas include 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg.
- SED-4: Creek bank source control for contaminated areas with moderate and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment. Dredging would be

conducted for the high-energy and low-energy areas using PCB RALs of 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg.

- SED-5: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high-energy areas; off-site disposal for soil and sediment; capping for low-energy areas; long-term soil management; and MNR of sediment. Under this alternative, the PCB RALs for dredging high-energy areas include 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg.
- SED-6: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of sediment in high- and low-energy areas; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment. Dredging would be conducted for the high-energy and low-energy areas using PCB RALs of 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg.
- SED-7: Creek bank soil source control for contaminated areas with minor, moderate, and severe erosion; dredging of contaminated sediment in high- and low-energy areas; off-site treatment of principal threat waste; off-site disposal for soil and sediment; long-term soil management; and MNR of sediment. Dredging would be conducted for the high-energy and low-energy areas using PCB RALs of 2.6 mg/kg as an NTE value and a SWAC less than 1 mg/kg.

Each of these alternatives, except SED-1 (no action) include source control measures to address creek bank areas that are contributing PCBs to OU-4 and would not otherwise be addressed by upstream source measures in OU-3 and OU-1/OU-2. Once creek bank source control, sediment removal, backfill placement, and sediment are complete, these remedial alternatives rely on MNR where clean sediment from the surrounding watershed would be transported downstream into OU-4 and mix with the sediment bed to further reduce PCB concentrations in sediment, surface water, and biota over time.

Calculated MNR rates for areas upstream of Jackson Shoals are presented in Section 10.7.2.1 of the OU-4 FS. MNR rates for this upstream portion of OU-4 are based on active remediation being conducted for multiple areas and a winnowing-out of PCB-containing fine-grained materials from the sediment bed in areas where active remediation is not conducted. The evaluation includes time-based estimates for achieving preliminary remedial goals (PRGs) for this upstream portion of OU-4 that are presented in Figure 10-2 of the OU-4 FS.

2. MNR RECOVERY MODEL

The MNR recovery model is a mass balance mixing model that was applied to the large depositional area located downstream of Jackson Shoals (embayment area) to predict PCB concentrations in the surficial sediment layer over time. The model provides a conservative bound for the natural recovery rate expected for the portion of OU-4 under the six active remedial alternatives evaluated as part of the OU-4 FS. This section describes the assumptions, parameters, and methods used to develop the mass balance model for MNR based on the results of the creek bank erosion model presented in Appendix F of this OU-4 FS.

2.1 Input Parameters and Assumptions

The following assumptions are applied to the model:

- The surface layer is of a constant volume and is perfectly mixed.
- The only mechanism for solids to leave the surface layer of sediment is through burial (i.e., no sediment resuspension).
- Solids loading occurs uniformly throughout the area at a constant rate.
- All PCBs in the model are associated with solids (i.e., no dissolved transport or storage).
- There is no transport of solids or PCB out of the embayment area.
- The decay of the input load is exponential and occurs at uniform rate.

Line	Parameter Name	Unit	Value	Data Source
A	Sediment Surface Area	m^2	14,178,155	5.5 miles by 637 feet wide
B	Surface Sediment Mixing Depth	cm	15	Based on geochronology model
C	Mixing Layer Sediment Volume	m^3	2,126,723	Calculated value
D	Sediment Bulk Density	kg/m^3	528	Based on percent solids from upper four inches of geochronology cores
E	Sediment Burial Rate	cm/year	1.65	Based on geochronology model
F	Sediment Burial Volume	m^3	233,940	Calculated
G	Mixing Layer Sediment Mass (S_m)	kg	1,122,909,876	Calculated
H	Depositing Sediment Mass (D_m)	kg	123,520,086	Calculated
I	Initial Surface Sediment PCB Concentration	mg/kg	0.52	SWAC for Embayment, 0-6 inches
J	Initial Surface Sediment PCB Mass	kg	584	Calculated

Line	Parameter Name	Unit	Value	Data Source
K	Initial Incoming Annual PCB Load	kg/year	36.7	Estimated from regression and USGS data, average annual load, 1999–2013
L	PCB Load Decay Constant	1/year	0.0936	Based on rate of decline in PCB in geochronological core MLM7 from 1990 to 1999
M	PCB Load Half Time	year	7.4	Calculated

Notes:
cm: centimeters
cm/yr:
kg: kilograms
m^2: square meter
m^3: cubic meter
mg/kg: milligram per kilogram
USGS: United States of America Geological Service

2.2 Mass Balance Calculations

The concentration of PCBs in the sediment mixing layer is modeled using the following equations. The initial condition as measured in year 1 of the field sampling program.

$$Load_{t+1} = Load_t * e^{-kt}$$

$$PCB_{t+1} = [(PCB_t + Load_{t+1}) / (S_m + D_m)] * S_m$$

$$PCB\ Concentration_t = PCB_t / S_m$$

Where:

D_m = depositing sediment mass (kilograms [kg])

K = PCB load decay constant (1/year)

$Load_t$ = Incoming PCB Mass to the mixing layer at time t (kg/year)

PCB_t = Mass of PCB in the mixing layer at time t (kg)

$PCB\ Concentration_t$ = Concentration of PCB in the mixing layer at time (mg/kg)

S_m = mixing layer sediment mass (kg)

t = time (year)

The model assumes that the entire embayment area downstream of Jackson Shoals contained approximately 6 inches of sediment that were prone to mixing as the biologically active zone (BAZ). As new sediment is deposited, sediment at the bottom of the mixing layer becomes buried and is no longer available to the sediment at the surface, as such, the burial rate and net sediment deposition rate were effectively assumed to be equal.

To provide a temporal estimate for the MNR, the sediment recovery model was applied to the BAZ for the portion of Choccolocco Creek located downstream of Jackson Shoals (i.e., Station 35 from

the fish collection program) for existing conditions. The MNR model calculates long-term remedy performance for sediment PCB concentration as a function of time for creek bank source control measures implemented for creek banks located upstream of RM 29.5 for two scenarios:

- Creek banks with severe and moderate erosion applicable (SED-2 and SED-4)
- Creek banks with severe, moderate, and minor erosion (SED-3, SED-5, SED-6, and SED-7)

An initial sediment PCB concentration of 0.52 mg/kg was used for this downstream reach under both model scenarios. For the scenario of severe and moderate erosion reduction (SED-2 and SED-4), the calculated PCB source reduction of 81% from Appendix F (presented on Figure G-1) was used for the MNR model. For the scenario of severe, moderate, and minor erosion reduction (SED-3, SED-5, SED-6, and SED-7), the calculated PCB source reduction from Appendix F of 91% (presented on Figure G-1) was used for the model.

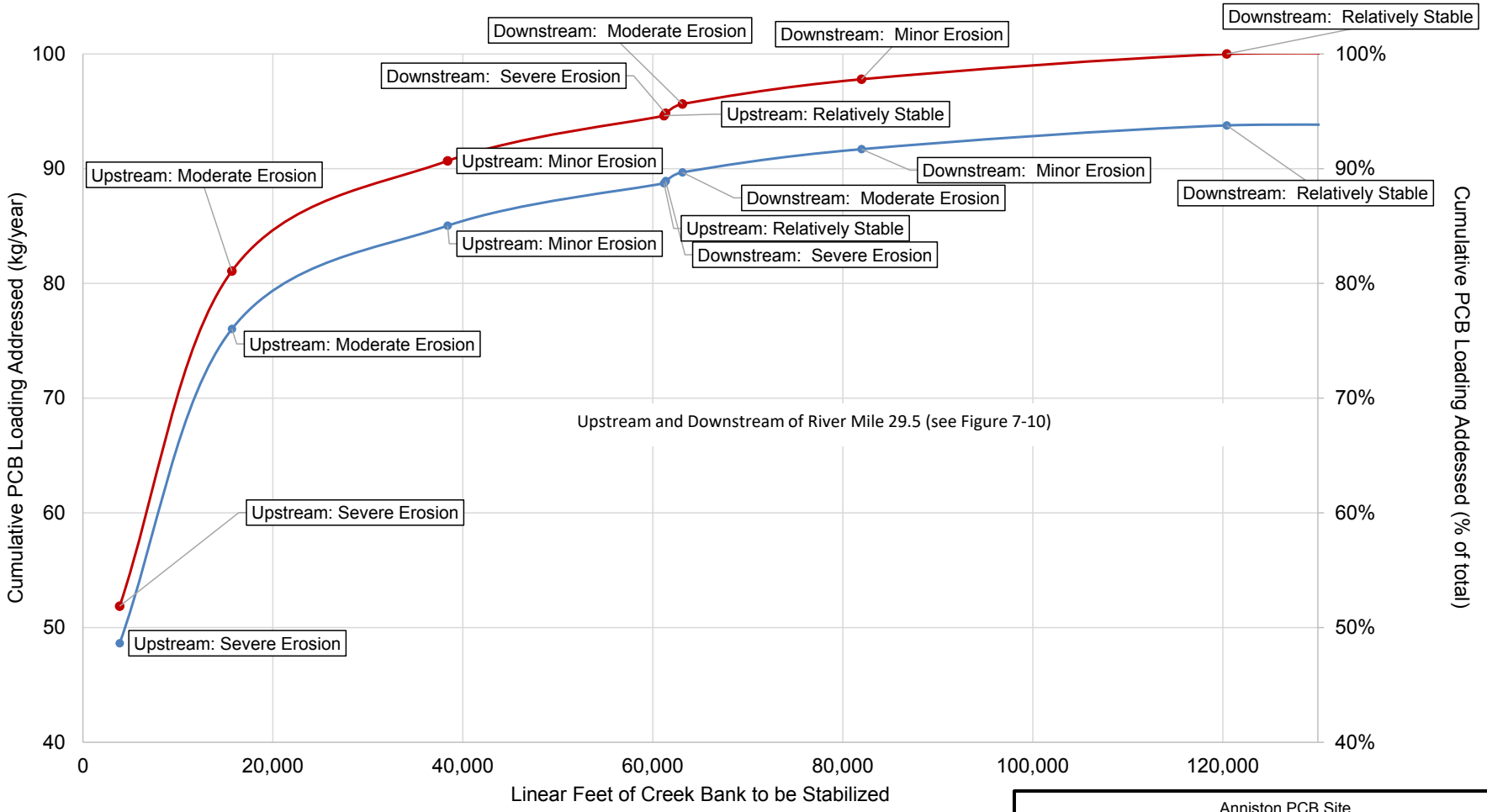
3. SUMMARY OF RESULTS

The model results are presented on Figure G-2 for creek banks with severe and moderate erosion, and on Figure G-3 for creek banks with severe, moderate, and minor erosion. Both scenarios were modeled for the 30–35-year time period following remedy implementation, and both scenarios show that sediment PCB concentrations are projected to achieve the long-term PRG of 0.1 mg/kg for this downstream portion of OU-4.

4. REFERENCES

BBL. 1999. *Supplemental RCRA Facility Investigation Work Plan for the Off-Site Portion of the RFI/CS Program*. February.

Figures



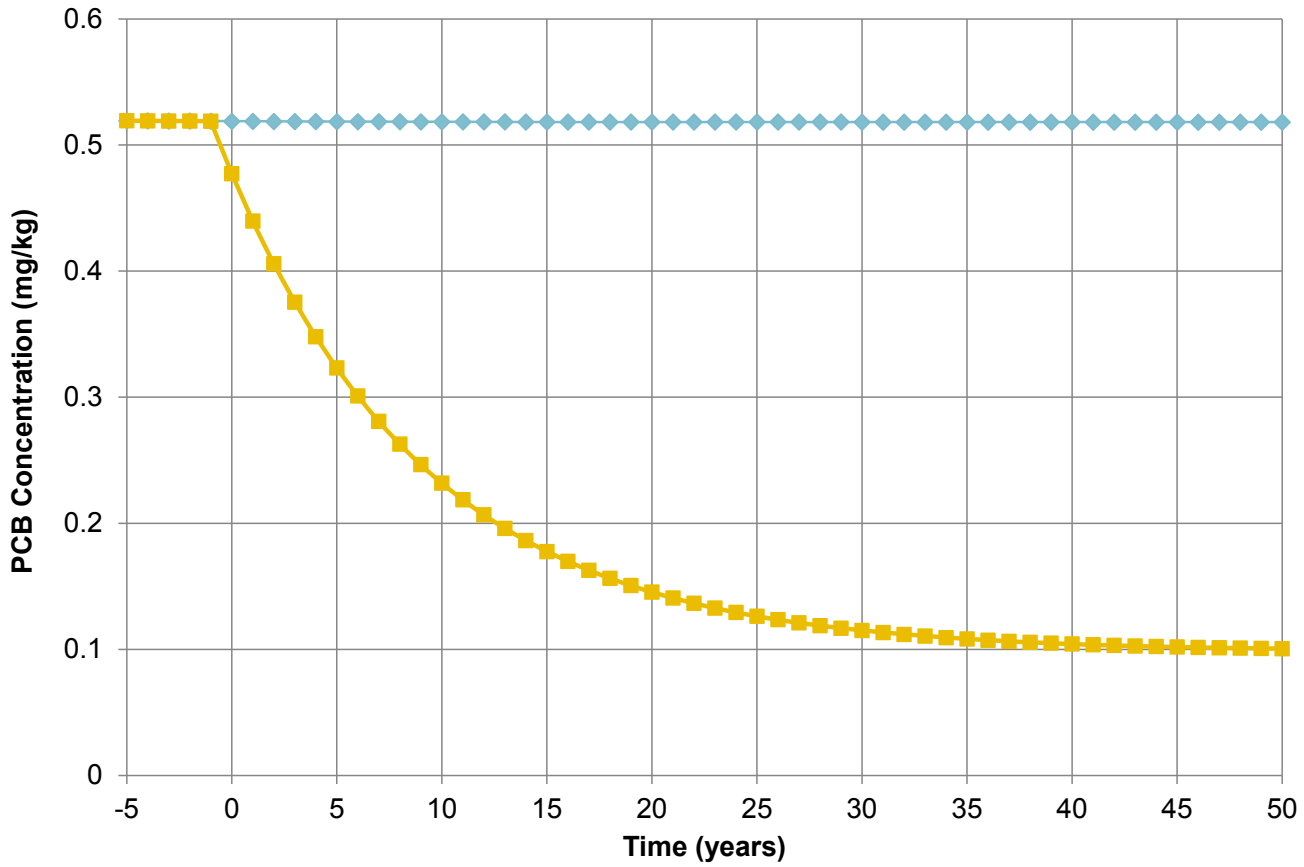
Notes:
%: percent
kg/year: kilograms per year
PCB: polychlorinated biphenyl

- PCB Loading Addressed (kg/year)
- PCB Loading Addressed (% of total loading)

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Bank Stabilization and Annual PCB Loading

Figure
G-1



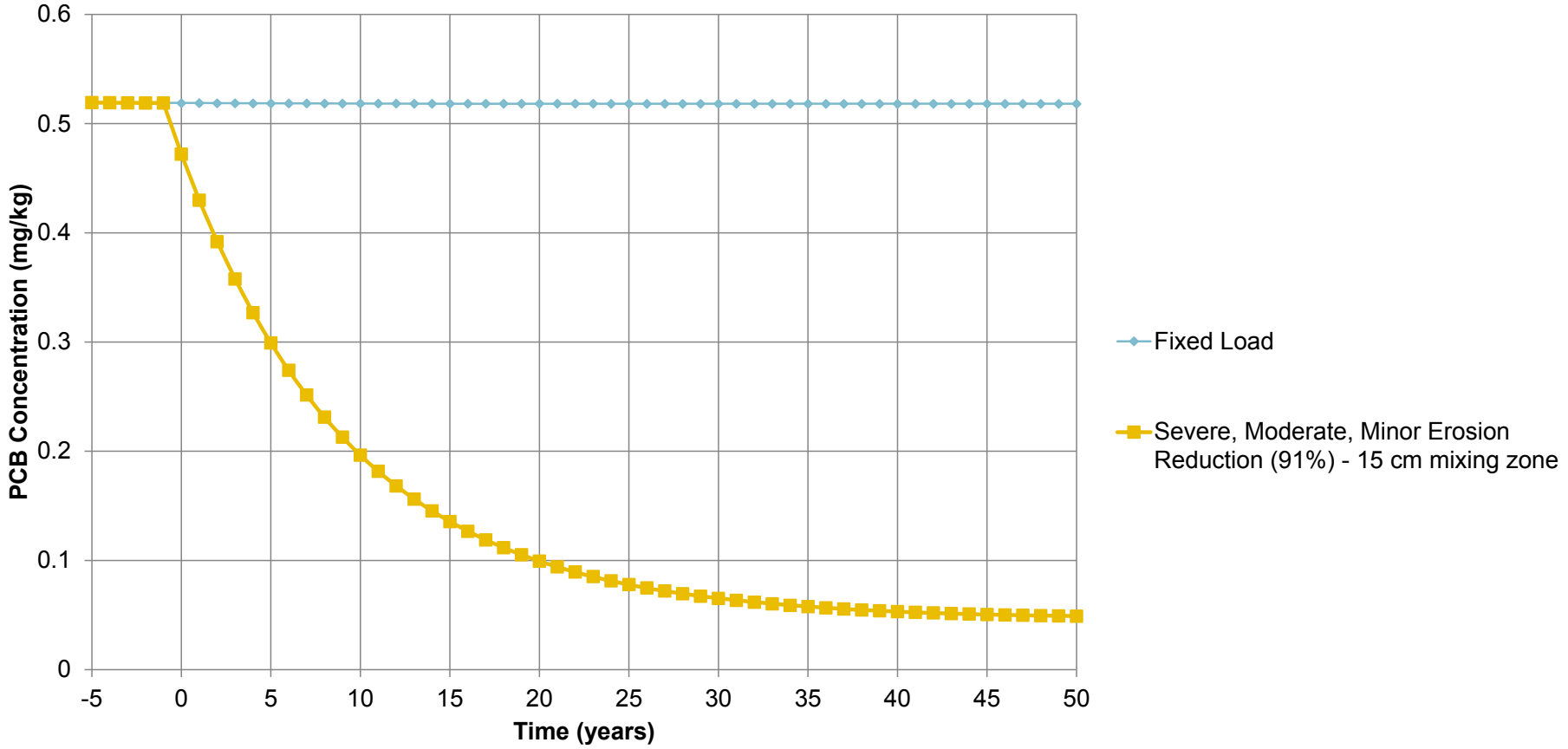
Notes:
%: percent
cm: centimeters
kg/year: kilograms per year
PCB: polychlorinated biphenyl

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Average Surface Sediment PCB Concentrations for Station 35 Following Source Control Actions Along Severe and Moderate Bank Erosion Areas

Solutia

Figure
G-2



Notes:
%: percent
cm: centimeters
kg/year: kilograms per year
PCB: polychlorinated biphenyl

Anniston PCB Site,
Anniston, Alabama
Feasibility Study Report for OU-4

Average Surface Sediment PCB Concentrations for Station 35 Following Source Control Actions Along Severe, Moderate, and Minor Bank Erosion Areas

Solutia

Figure
G-3

Geosyntec
consultants

Appendix H

Summary of "Review of Remediation Goals at Contaminated Sediment Sites in the United States" (Pelletier et al. 2019)

Appendix H: Summary of "Review of Remediation Goals at Contaminated Sediment Sites in the United States" (Pelletier et al. 2019)

1. INTRODUCTION

This appendix summarizes the findings of the 2019 article "Review of Remediation Goals at Contaminated Sediment Sites in the United States" authored by Derek Pelletier and others (Pelletier et al. 2019). Remediation goals are project-specific and contaminant-specific and may be derived using various criteria. Identified remediation goals included by Pelletier et al. in their Sediment Remediation Goals Database (Supplemental Table 1) are based on action levels (i.e., not-to-exceed values), surface-weighted average concentrations (SWACs), and unspecified cleanup goals based on a review of 30 years of decision documents (e.g., records of decisions, explanation of significant differences, feasibility study reports) from sediment sites throughout the United States. For occurrences where the type of remediation goals were identified as unspecified, Pelletier et al. assumed these remediation goals were consistent with action levels.

SWACs can be calculated using the area weighted average or the 95% upper confidence limit (95% UCLs) of the mean. For this appendix, we evaluated the types of site information (e.g., state, United States Environmental Protection Agency [USEPA] region, sediment type, constituents of concern [COCs]) and the type of SWAC-based remedial goal for the sites included in the remediation goals database provided by Pelletier et al. Remediation goals listed as "SWAC" in the Pelletier et al. database were assessed by reviewing the listed source materials to determine which method Pelletier et al. used to calculate the SWAC. Supplemental Table 1 from Pelletier et al. was then amended to specify the basis (i.e., mean or the 95% UCL of the mean) for SWAC remedial goals. The amended Supplemental Table 1 from Pelletier at al. is included as Table H-1 of this appendix.

2. SURFACE-WEIGHTED AVERAGE CONCENTRATION CALCULATION TYPES

SWACs are commonly developed by compartmentalizing the area of interest (AOI) into Thiessen polygons. Thiessen polygons are constructed for sample data sets such that the polygon's boundaries define the area that is closest to each sample location relative to other locations. The concentration of the contaminant and the area of each polygon are then used to calculate the weighted mean concentration, in which the concentration of the contaminant is weighted based on the proportion of its polygon area to that of the entire AOI, as shown in the equation below:

$$Weighted\ Concentration\ of\ Polygon\ A = Concentration\ A\ x\ Relative\ Area\ A$$

Once the weighted concentrations are calculated, the SWAC for the AOI is often calculated by one of two methods: (1) the average value of the weighted concentrations, as shown in the equation below:

$$\frac{(Concentration\ A\ x\ Area\ A)\ +\ (Concentration\ B\ x\ Area\ B)\ +\ \ldots\ +\ (Concentration\ Z\ x\ Area\ Z)}{(Area\ A\ +\ Area\ B\ +\ \ldots\ +\ Area\ Z)}$$

or (2) the 95% UCL of the mean weighted concentrations. The 95% UCL is an upper-bound estimate of average contaminant concentration for assessing risk at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites that uses bootstrapping to account for uncertainty. The basic idea of the bootstrap is to use an existing sample data set to create a new sample data set by randomly selecting from the original sample data set many times over (10,000 times) using a Monte Carlo algorithm and computing the mean for each of these bootstraps. The size of the resample data set is equal to the size of the original data set. In doing so, a distribution of means is generated from which the 95th percentile is chosen as the mean.

Both methods of calculating SWACs have assumptions and limitations that need to be considered. The 95% UCL is dependent on the assumption that samples were collected randomly. This assumption may not be valid because site assessments are often evaluated in a phased approach targeting areas with known or suspected elevated concentrations. In comparison, the area weighted average does not account for potential uncertainties. Either approach can be used for developing remedial areas and volumes recognizing that mean SWACs are more applicable to remediation (and the evaluation of the success of the remedy) and 95% UCL SWACs are more applicable to risk assessment. USEPA commonly uses mean SWACs and not 95% UCL SWACs as the measurable goal to demonstrate that a proposed remedy is effective in remediating sediment sources and has recently used this method in the Lower Passaic River (USEPA 2021).

3. SURFACE-WEIGHTED AVERAGE CONCENTRATION CALCULATION METHOD TRENDS OVER TIME

The Pelletier et al. remediation goals database has 182 entries, of which 121 have remediation goals driven by action levels, 40 by SWACs, and 21 by unspecified cleanup goals. For the sites with SWAC-specified remediation goals, 27 (68%) were calculated using the area weighted average concentration. When evaluating SWAC methods by chemical class, the area weighted average concentration was used for 4 of 5 sites with polycyclic aromatic hydrocarbons (PAHs) (80%), 14 of 23 sites with polychlorinated biphenyls (PCBs) (61%), 1 of 2 sites with lead (50%), and 8 of 9 sites with mercury (89%).

As presented in Pelletier et al., instances of SWAC-based sediment remediation goals being used in decision documents has increased over time for PCBs and mercury. From 2010 through 2017 (the end of the document review period by Pelletier et al.), the majority of sites with these COCs indicated that SWAC-based remediation goals were used in decision documents to account for the integrated exposure of the bioaccumulative COCs for receptors (e.g., foraging fish). For sites where SWAC-based remediation goals were included in decision documents, the SWAC calculation method was based on calculating the weighted mean concentration for the majority of uses as shown in Figure H-1.

The prevalent use of the area weighted average indicates that it is a common and acceptable method to establish remediation goals for contaminated sediment in the United States and, moreover, is applicable to and appropriate for the Anniston PCB Site COCs.

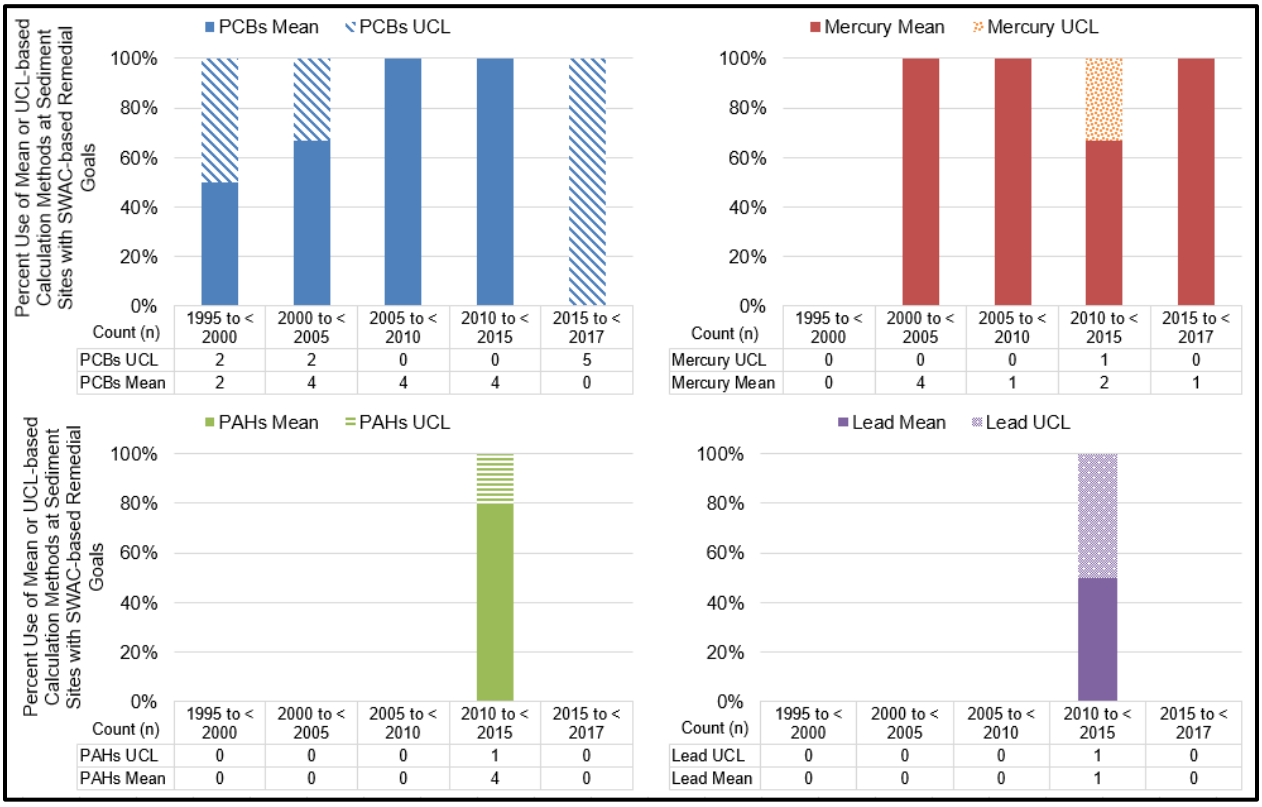


Figure H-1. Percent of sites with SWAC calculated using average (mean) value of weighted concentrations method and UCL method over time included in in Pelletier et al. (2019).

4. REFERENCES

Pelletier, D., V.P. Sacks, M. Sorensen, and V. Magar. 2019. "Review of Remediation Goals at Contaminated Sediment Sites in the United States." *Integrated Environmental Assessment and Management*. 15(5):772–782.

USEPA. 2021. *Record of Decision for an Interim Remedy in the Upper 9 Miles of the Lower Passaic River Study Area, OU4 of the Diamond Alkali Superfund Site, Essex, Bergen, and Passaic Counties, New Jersey*. United States Environmental Protection Agency, Region 2. September.

Tables

Table H-1. Amended Sediment Remediation Goals Database from Pelletier et al. (2019)
Feasability Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Specific Name	Site Name	State	USEPA Region	Document Year (ROD, RAWP, etc.)	Sediment Type	Chemical	RG Type	SWAC Basis	RG Value (mg/kg)	Notes	Source	Action Lead
GE - Housatonic River (Upper 1/2 Mile Reach)	Housatonic River	MA	1	1999	Freshwater Sediment	PCBs	SWAC	Mean	1	"The surficial sediment PCB concentrations were then assessed following implementation of the sediment removal and replacement activities to determine the post-removal spatial average PCB concentration in the surficial sediments of the 1/2-Mile Reach. This post-removal surficial spatial average PCB concentration was calculated as less than 1 ppm." p. 4-2 (RAWP 1999)	BBL. (1999). Removal Action Work Plan - Upper 1/2-Mile Reach of Housatonic River. Pittsfield, MA.	EPA Ovrsght
GE - Housatonic River (Rest of River, Reaches 7-8)	Housatonic River	MA	1	2016	Freshwater Sediment	PCBs	SWAC	95% UCL	1	"For surface sediment (0- to 12-inch depth): remove sufficient sediment, including any areas with ≥ 50 mg/kg total PCBs, and replace with a contiguous Engineered Cap to achieve a spatially-weighted average concentration of 1 mg/kg total PCBs in surface sediment in each averaging area." p. 30 (USEPA 2016b)	USEPA. (2016b). Final Permit Modification to the Reissued RCRA Permit and Selection of CERCLA Remedial Action (RA) and Operation and Maintenance (O&M) for Rest of River. Pittsfield, MA.	EPA Ovrsght
GE - Housatonic River (Rest of River, Vernal Pools Adjacent to Reaches 5 through 8)	Housatonic River	MA	1	2016	Freshwater Sediment	PCBs	SWAC	95% UCL	3.3	"...place an amendment such as activated carbon and/or other comparable amendments in Vernal Pools that exceed a spatially- weighted average concentration of 3.3 mg/kg total PCBs (based upon risk to amphibians) to reduce the bioavailability of PCBs to a level less than or equivalent to the bioavailability of PCBs associated with 3.3 mg/kg total PCBs in sediment." p. 47 (USEPA 2016b)	USEPA. (2016b). Final Permit Modification to the Reissued RCRA Permit and Selection of CERCLA Remedial Action (RA) and Operation and Maintenance (O&M) for Rest of River. Pittsfield, MA.	EPA Ovrsght
Peconic River, Brookhaven National Lab, Offsite	Brookhaven National Lab	NY	2	2004	Freshwater sediment	Mercury	SWAC	Mean	2.00	"The average mercury concentration within the sediment outside Laboratory property will be less than 0.75 ppm, with a goal of no sample in any excavated area exceeding 2 ppm." (p. iii, USDOE 2004)	US Department of Energy Brookhaven National Laboratory. (2004). Final Operable Unit V Record of Decision for Area of Concern 30 (Peconic River). Upton, NY.	Fed Fac
Peconic River, Brookhaven National Lab, Onsite	Brookhaven National Lab	NY	2	2004	Freshwater sediment	Mercury	SWAC	Mean	1	"The average mercury concentration after remediation will be less than 1 ppm, with a goal of no sample in any excavated area exceeding 2 ppm." (p. iii, USDOE 2004)	US Department of Energy Brookhaven National Laboratory. (2004). Final Operable Unit V Record of Decision for Area of Concern 30 (Peconic River). Upton, NY.	Fed Fac
Buffalo River	Buffalo River	NY	2	2011	Freshwater Sediment	PCBs	SWAC	Mean	0.2	"The RG for PCBs is to achieve a surface-weighted average concentration (SWAC) for PCBs equal to or below a 0.20 mg/kg." (p. 21 FFS, ENVIRON et al. 2011)	ENVIRON International Corporation, MACTEC Engineering & Consulting, Inc., and LimnoTech. (2011). Feasibility Study for the Buffalo River, New York. Buffalo, NY.	GLLA
Buffalo River	Buffalo River	NY	2	2011	Freshwater sediment	Lead	SWAC	Mean	90	"The RG for lead is to achieve a SWAC equal to or below 90 mg/kg, which is reflective of current average surface condition in the river." (p. 21 FFS, ENVIRON et al. 2011)	ENVIRON International Corporation, MACTEC Engineering & Consulting, Inc., and LimnoTech. (2011). Feasibility Study for the Buffalo River, New York. Buffalo, NY.	GLLA
Buffalo River	Buffalo River	NY	2	2011	Freshwater sediment	Mercury	SWAC	Mean	0.44	"the RG for mercury is to achieve a SWAC equal to or below 0.44 mg/kg." (p. 21 FFS, ENVIRON et al. 2011)	ENVIRON International Corporation, MACTEC Engineering & Consulting, Inc., and LimnoTech. (2011). Feasibility Study for the Buffalo River, New York. Buffalo, NY.	GLLA
Bridgeport Rental & Oil Services, 'Little Timber Creek Swamp	Little Timber Swamp	NJ	2	2006	Freshwater Sediment	PCBs	SWAC	Mean	10	Table 9-3, Wetland Preliminary Remediation Goals (pdf p.84 of 145). 10 mg/kg (Surface Average) ROD 2006.	USEPA. (2006c). EPA Superfund Record of Decision: Bridgeport Rental & Oil Services OU2. Bridgeport, NJ.	EPA Ovrsght
Geddes Brook/Ninemile Creek Site	Onondaga Lake	NY	2	2009	Freshwater sediment	Mercury	SWAC	Mean	0.8	"The selected remedy will [] attain a 0.8 mg/kg site-specific bioaccumulation-based sediment quality value (BSQV) for mercury in sediments for protection of wildlife consumption of fish " (2009 ROD, pdf pg 6)	NYSDEC, & USEPA. (2009a). Operable Unit 1 of the Geddes Brook/Ninemile Creek Site Onondaga County, New York. Onondaga County, NY. NYSDEC, & USEPA. (2009b). Record of Decision Operable Unit 1 of the Geddes Brook/Ninemile Creek Site Operable Unit of the Onondaga Lake Bottom Subsite, Onondaga Lake Superfund Site, Onondaga County, NY. Parsons, Exponent, & QEA. (2008). Geddes Brook/Ninemile Creek Operable Unit 1 Supplemental Feasibility Study Report. Onondaga County, NY.	St Ovrsght
LCP Brunswick, Georgia	LCP Brunswick	GA	4	2015	Estuarine Sediment	Mercury	SWAC	Mean	2	SWAC cleanup level based on wildlife and human exposures to fish. 2015 EPA ROD. P. 54	USEPA. (2015d). Record of Decision LCP Chemicals Site Operable Unit 1 - Marsh. Glynn County, GA.	EPA Ovrsght

Table H-1. Amended Sediment Remediation Goals Database from Pelletier et al. (2019)
Feasability Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Specific Name	Site Name	State	USEPA Region	Document Year (ROD, RAWP, etc.)	Sediment Type	Chemical	RG Type	SWAC Basis	RG Value (mg/kg)	Notes	Source	Action Lead
Fields Brook; Ashtabula River	Ashtabula River	OH	5	1997	Freshwater Sediment	PCBs	SWAC	95% UCL	1.3	"Upon consideration of the various issues associated with PCB risks at the Fields Brook, site, U.S. EPA has set the total PCB CUGs for the SOU as follows: 1.3 ppm on average in residential areas, and 3.1 ppm on average in industrial areas. " (pages 10 and 13 of RODs)	USEPA. (1997a). EPA Superfund Record of Decision: Fields Brook. Ashtabula, OH. USEPA. (1998b). EPA Superfund Record of Decision: Fields Brook Site, OU4. Ashtabula, OH. Ashtabula River Partnership. (2001a). Ashtabula River Partnership Comprehensive Management Plan and Environmental Impact Statement, Volume 2 of 2 Technical Appendices. Ashtabula River Partnership. (2001b). Final Comprehensive Management Plan, Volume 1 of 2 Main Report. Ashtabula, OH.	EPA Ovrsght
Fields Brook; Ashtabula River	Ashtabula River	OH	5	1997	Freshwater Sediment	PCBs	SWAC	95% UCL	3.1	"Upon consideration of the various issues associated with PCB risks at the Fields Brook, site, U.S. EPA has set the total PCB CUGs for the SOU as follows: 1.3 ppm on average in residential areas, and 3.1 ppm on average in industrial areas. " (pages 10 and 13 of RODs)	USEPA. (1997a). EPA Superfund Record of Decision: Fields Brook. Ashtabula, OH. USEPA. (1998b). EPA Superfund Record of Decision: Fields Brook Site, OU4. Ashtabula, OH. Ashtabula River Partnership. (2001a). Ashtabula River Partnership Comprehensive Management Plan and Environmental Impact Statement, Volume 2 of 2 Technical Appendices. Ashtabula River Partnership. (2001b). Final Comprehensive Management Plan, Volume 1 of 2 Main Report. Ashtabula, OH.	EPA Ovrsght
Ashtabula River	Ashtabula River	OH	5	1998	Freshwater Sediment	PCBs	SWAC	Mean	0.35	"Develop an optimized dredging contaminant removal plan for the problem areas that will...set targeted long-term surface sediment concentrations for PCBs...of equal to or less than 0.35 ppm." (p. 41 of Comprehensive Management Plan, Ashtabula River Partnership 2001b)	USEPA. (1997a). EPA Superfund Record of Decision: Fields Brook. Ashtabula, OH. USEPA. (1998b). EPA Superfund Record of Decision: Fields Brook Site, OU4. Ashtabula, OH. Ashtabula River Partnership. (2001a). Ashtabula River Partnership Comprehensive Management Plan and Environmental Impact Statement, Volume 2 of 2 Technical Appendices. Ashtabula River Partnership. (2001b). Final Comprehensive Management Plan, Volume 1 of 2 Main Report. Ashtabula, OH.	EPA Ovrsght
Lower Fox River and Green Bay Superfund Site OU1	Fox River	WI	5	2002	Freshwater Sediment	PCBs	SWAC	Mean	0.25	Table 3. Estimated PCB SWAC OU1 after amended remedy (p.21 2007 Amended ROD)	USEPA & Wisconsin Department of Natural Resources. (2008). Record of Decision Amendment OU1 Lower Fox River and Green Bay Superfund Site. Green Bay, WI.	EPA Ovrsght
Lower Fox River and Green Bay Superfund Site OU4	Fox River	WI	5	2007	Freshwater Sediment	PCBs	SWAC	Mean	0.25	Table 3. Estimated PCB SWAC OU4 after amended remedy (p.22 2007 Amended ROD)	USEPA & Wisconsin Department of Natural Resources. (2007). Record of Decision Amendment Operable Unit 2 (Deposit DD), Operable Unit 3, Operable Unit 4, and Operable Unit 5 (River Mouth). Green Bay, WI.	EPA Ovrsght
Lower Fox River and Green Bay Superfund Site OU3	Fox River	WI	5	2007	Freshwater Sediment	PCBs	SWAC	Mean	0.28	Table 3. Estimated PCB SWAC OU3 after amended remedy (p.22 2007 Amended ROD)	USEPA & Wisconsin Department of Natural Resources. (2007). Record of Decision Amendment Operable Unit 2 (Deposit DD), Operable Unit 3, Operable Unit 4, and Operable Unit 5 (River Mouth). Green Bay, WI.	EPA Ovrsght
Kalamazoo River, Allied Paper/Portage Creek, OU1 (Allied Landfill)	Kalamazoo River	MI	5	2016	Freshwater Sediment	PCBs	SWAC	Risk based, 95% UCL	0.33	"The selection of a sediment FRG for PCBs considered the human health RBC values associated with the human receptors who consume fish. MDEQ and EPA conducted a joint review of available sediment criteria and selected a sediment FRG of 0.33 mg/kg for PCBs. MDEQ concluded that this FRG value is appropriate for sediment because it is sufficiently protective of the high-end sport angler." (ROD 2016) p.27 "An FRG of 0.33 mg/kg is protective of the selected human and ecological receptors."	USEPA. (2016a). Allied Paper/Portage Creek/Kalamazoo River Superfund Site Operable Unit 1 Allied Landfill Record of Decision. Kalamazoo, MI.	EPA Ovrsght
Kalamazoo River, Portage Creek and Kalamazoo River Sediments - OU5 (Area 1)	Kalamazoo River	MI	5	2016	Freshwater Sediment	PCBs	SWAC	95% UCL	1	"The sediment performance standard goal was the same as for the Plainwell Impoundment TCRA (1 mg/kg)." p. 6 (Kalamazoo Proposed Plan OU5)	USEPA. (2015g). Superfund Program Proposed Plan Allied Paper/Portage Creek/Kalamazoo River - Operable Unit 5, Area 1. Kalamazoo, MI.	EPA Ovrsght

Table H-1. Amended Sediment Remediation Goals Database from Pelletier et al. (2019)
Feasability Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Specific Name	Site Name	State	USEPA Region	Document Year (ROD, RAWP, etc.)	Sediment Type	Chemical	RG Type	SWAC Basis	RG Value (mg/kg)	Notes	Source	Action Lead
Little Mississinewa River	Little Mississinewa River	IN	5	2004	Freshwater Sediment	PCBs	SWAC	Mean	1	(p. 37 of Little Mississinewa River ROD) "... CUG of 1.0 ppm PCBs. To achieve this 1.0 ppm average, all PCB-contaminated sediments in the top 12 inches of river sediment that exceed 4.0 ppm must be removed."	USEPA. (2004a). EPA Superfund Record of Decision: Little Mississinewa River. Union City, IN.	EPA Ovrsght
Sheboygan River & Inner Harbor, Sheboygan, WI	Sheboygan River	WI	5	2000	Freshwater Sediment	PCBs	SWAC	Mean	0.5	(p.3 and 4 of Sheboygan Harbor & River-ROD 2000)	USEPA. (2000d). EPA Superfund Record of Decision: Sheboygan Harbor & River. Sheboygan, WI.	EPA Ovrsght
Shiawassee River	Shiawassee River	MI	5	2001	Freshwater Sediment	PCBs	SWAC	Mean	1	(p. 27 of Shiawassee River-Review Report 2014) Long-Term Cleanup Goal: 0.003 to 0.2ppm	USEPA. (2014b). Five-Year Review Report for Shiawassee River Superfund Site. Howell, Livingston County, MI.	EPA Ovrsght
Outboard Marine Corp. Waukegan Harbor Site. OU1 of the OMC Superfund site	Waukegan Harbor	IL	5	2009	Freshwater Sediment	PCBs	SWAC	Mean	0.2	EPA issued a ROD Amendment in October 2009, to hydraulically dredge sediment from the harbor where PCB concentrations exceed 1 ppm followed by the application of a 6 inch sand layer in order to achieve a 0.2 ppm PCB surface weighted average sediment concentration (SWAC). (USEPA 2012, 4th 5-year review report, p. 6, 38, and 42)	USEPA. (2009b). Record of Decision Amendment Outboard Marine Corporation Superfund Site. Waukegan, IL. USEPA. (2012a). Fourth Five-Year Review Report for Outboard Marine Corporation Superfund Site, Waukegan. Lake County, Illinois, (January).	EPA Perf
Alcoa (Point Comfort)/ Lavaca Bay	Lavaca Bay	TX	6	2001	Estuarine Sediment	Mercury	SWAC	Mean	0.25	RG "for fringe marsh-type habitat". Long term target remedial goals based on average exposure concentrations. (p.8-3, 2001 ROD)	USEPA. (2001). Record of Decision Alcoa (Point Comfort)/ Lavaca Bay Site. Point Comfort, TX.	EPA Ovrsght
Alcoa (Point Comfort)/ Lavaca Bay	Lavaca Bay	TX	6	2001	Estuarine Sediment	Mercury	SWAC	Mean	0.5	RG "for open water". Long term target remdial goals based on average exposure concentrations. (p.8-3, 2001 ROD)	USEPA. (2001). Record of Decision Alcoa (Point Comfort)/ Lavaca Bay Site. Point Comfort, TX.	EPA Ovrsght
San Diego Ship Yard	San Diego Ship Yard	CA	9	2012	Estuarine Sediment	PCBs	SWAC	Mean	0.194	RG for total PCBs (PCBs = sum of 41 congeners: 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206). Alternative Cleanup Levels: Shipyard Sediment Site, Surface Weighted Average Concentrations Table, p.32-1	California Regional Water Quality Control Board. (2012). Technical Report for Cleanup and Abatement Order No. R9-2012-0024 for the Shipyard Sediment Site San Diego Bay. San Diego, CA.	California Regional Water Quality Control Board
San Diego Ship Yard	San Diego Ship Yard	CA	9	2012	Estuarine Sediment	PAHs	SWAC	Mean	2.45	RG for HPAHs (HPAHs = sum of 10 PAHs: Fluoranthene, Pyrene, Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo(a)pyrene, indeno[1,2,3-c,d]pyrene, Dibenz[a,h]anthracene, and Benzo[g,h,i]perylene.) Alternative Cleanup Levels: Shipyard Sediment Site, Surface Weighted Average Concentrations Table, p.32-1	California Regional Water Quality Control Board. (2012). Technical Report for Cleanup and Abatement Order No. R9-2012-0024 for the Shipyard Sediment Site San Diego Bay. San Diego, CA.	California Regional Water Quality Control Board
San Diego Ship Yard	San Diego Ship Yard	CA	9	2012	Estuarine Sediment	Mercury	SWAC	Mean	0.68	Alternative Cleanup Levels: Shipyard Sediment Site, Surface Weighted Average Concentrations Table, p.32-1	California Regional Water Quality Control Board. (2012). Technical Report for Cleanup and Abatement Order No. R9-2012-0024 for the Shipyard Sediment Site San Diego Bay. San Diego, CA.	California Regional Water Quality Control Board
Lower Duwamish Waterway	Duwamish Waterway	WA	10	2014	Estuarine Sediment	PCBs	SWAC	Mean	0.002	Remedial Action Levels for RAO 3 presented in Table 27 of 2014 ROD. (p.135 and 138 of Lower Duwamish Waterway ROD_2014). 12 mg/kg OC RAL for Recovery Category 1 Areas. Cleanup levels in Table 19 of 2014 ROD. Cleanup level is the long-term goal with the minimum value based on protection of human health from fish consumption, based on background concentrations (p. 74 of ROD)	USEPA. (2014c). Record of Decision for the Lower Duwamish Waterway Superfund Site. Seattle and Tukwila, King County, WA.	EPA Ovrsght
Lower Duwamish Waterway Superfund Site, Seattle	Duwamish Waterway	WA	10	2014	Estuarine Sediment	PAHs	SWAC	Mean	0.38 [2]	cPAHs, cPAHs = benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene. Total cPAHs are normalized to TEQ based on benzo(a)pyrene (p. 48 in 2014 ROD), assumed to represent a SWAC LDW-wide cleanup level for cPAHs (Table 19).	USEPA. (2014c). Record of Decision for the Lower Duwamish Waterway Superfund Site. Seattle and Tukwila, King County, WA.	EPA Ovrsght
Lockheed West Seattle Superfund Site	Lockheed West Seattle	WA	10	2013	Estuarine Sediment	Lead	SWAC	95% UCL	11	Table 12. Summary of Cleanup Levels for COCs in Sediment. Lead. Protective of HH from seafood consumption, RAO 1. ROD 2013 (pdf pg. 82).	USEPA. (2013). Record of Decision Lockheed West Seattle Superfund Site. Seattle, WA.	EPA Ovrsght

Table H-1. Amended Sediment Remediation Goals Database from Pelletier et al. (2019)
Feasability Study Report for OU-4
Anniston PCB Site, Anniston, Alabama

Specific Name	Site Name	State	USEPA Region	Document Year (ROD, RAWP, etc.)	Sediment Type	Chemical	RG Type	SWAC Basis	RG Value (mg/kg)	Notes	Source	Action Lead
Lockheed West Seattle Superfund Site	Lockheed West Seattle	WA	10	2013	Estuarine Sediment	Mercury	SWAC	95% UCL	0.17	Table 12. Summary of Cleanup Levels for COCs in Sediment. Mercury. Protective of HH from seafood consumption in intertidal, RAO 1. ROD 2013.	USEPA. (2013). Record of Decision Lockheed West Seattle Superfund Site. Seattle, WA.	EPA Ovrsght
Lockheed West Seattle Superfund Site	Lockheed West Seattle	WA	10	2013	Estuarine Sediment	PCBs	SWAC	Mean	0.002	Table 12. Summary of Cleanup Levels for COCs in Sediment. Total PCBs. Protective of HH from seafood consumption, RAO 1. ROD 2013.	USEPA. (2013). Record of Decision Lockheed West Seattle Superfund Site. Seattle, WA.	EPA Ovrsght
Lockheed West Seattle Superfund Site	Lockheed West Seattle	WA	10	2013	Estuarine Sediment	PAHs	SWAC	95% UCL	0.009	Table 12. Summary of Cleanup Levels for COCs in Sediment. Total carcinogenic PAHs. Protective of HH from seafood consumption, RAO 1. ROD 2013.	USEPA. (2013). Record of Decision Lockheed West Seattle Superfund Site. Seattle, WA.	EPA Ovrsght
Portland Harbor	Portland Harbor	OR	10	2017	Freshwater Sediment	PCBs	SWAC	95% UCL	0.009	9 ppb is the background based remedial goal because the HH-based remedial goal was orders of magnitude lower (EPA FS 2015, EPA ROD 2017). This is a long-term RG. RAL of 75 ppm corresponds to the selected alternative in the ROD (Table 18, EPA ROD 2017).	USEPA. (2017). Record of Decision. Portland Harbor Superfund Site. Seattle, WA.	EPA Ovrsght
Puget Sound Naval Shipyard Complex, OU2 (Sinclair Inlet)	Puget Sound Naval Shipyard	WA	10	2000	Estuarine Sediment	PCBs	SWAC	90% UCL	0.012 [1]	pdf p.72 (/139) of Puget Sound Naval Shipyard Complex-ROD 2000	USEPA. (2000c). EPA Superfund Record of Decision: Puget Sound Naval Shipyard Complex. Bremerton, WA.	Fed Fac
Puget Sound Naval Shipyard Complex, Marine OU B Sediment Minimum Cleanup Level (MCUL)	Puget Sound Naval Shipyard	WA	10	2000	Estuarine Sediment	PCBs	SWAC	90% UCL	0.03 [1]	pdf p.74 (/139) of Puget Sound Naval Shipyard Complex-ROD 2000	USEPA. (2000c). EPA Superfund Record of Decision: Puget Sound Naval Shipyard Complex. Bremerton, WA.	Fed Fac
St. Maries Creosote Site	St Maries Creosote Site	ID	10	2014	Freshwater Sediment	PAHs	SWAC	Mean	3.7 [1]	LPAHs, These cleanup levels were originally specified as action levels in the ROD (2007, Table 25) but were changed to SWACs in the 2014 ESD.	USEPA. (2014a). Explanation of Significant Differences for the St. Maries Creosote Site. St. Maries, ID.	EPA Ovrsght
St. Maries Creosote Site	St Maries Creosote Site	ID	10	2014	Freshwater Sediment	PAHs	SWAC	Mean	9.6 [1]	HPAHs, These cleanup levels were originally specified as action levels in the ROD (2007, Table 25) but were changed to SWACs in the 2014 ESD.	USEPA. (2014a). Explanation of Significant Differences for the St. Maries Creosote Site. St. Maries, ID.	EPA Ovrsght

Notes:

[1] RG value based on OC- normalzed goals. OC-normalized goals were converted to mg/kg dry weight sediment assuming a total organic carbon content of 1%, consistent with development of USEPA sediment screening values (USEPA 2002a).

[2] RG value based on TEQ-normalized goals. Total cPAHs are normalized to TEQ based on benzo(a)pyrene. cPAHs = benz(a)anthracene, benzo(a)pyrene, benzo(b)fluroanthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene.

[3] Designated lead on the remedial action task defined in USEPA's Superfund Enterprise Management System <https://www.epa.gov/superfund/superfund-data-and-reports>

EPA ovrsght EPA Oversight
EPA Perf EPA Performed
EPA Perf In-Hse EPA Performed In-House
Fed Fac Federal Facility
St Perf State Performed

cPAH: chlorinated polycyclic aromatic hydrocarbon
COC: constituent of concern
CUG: cleanup goal
EPA: United States Environmental Protection Agency
ESD: explanation of significant difference
FFS: focused feasibility study
FRG: final remedial goal
HH: human health
HPAH: high molecular weight polycyclic aromatic hydrocarbon
LDW: Lower Duwamish Waterway
LPAH: low molecular weight polycyclic aromatic hydrocarbon
MDEQ: Michigan Department of Environmental Quality
mg/kg: milligram(s) per kilogram
OC: organic carbon
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
ppm: parts per million
RAL: remedial action level
RAO: remedial action objective
RAWP: remedial action work plan
RG: remedial goal
ROD: Record of Decision
SOU: sediment operable unit
SWAC: surface-weighted area concentration
TCRA: time-critical remedial action
TEQ: toxicity equivalent
UCL: upper confidence limit of the mean
USDOE: United States Department of Energy
USEPA: United States Environmental Protection Agency