FINAL
QUALITY ASSURANCE PROJECT PLAN (SHORT FORM)

FRANCIS STREET ASSESSMENT

WAYCROSS, WARE COUNTY, GEORGIA

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 4
Atlanta, GA 30303

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Date Prepared	:	December 10, 2013
EPA Task Monitor	:	Matthew Huyser, PE
Telephone No.	:	(404) 562-8934
Prepared by	:	Tetra Tech, Inc.
START III Site Manager	:	John Snyder, PG
Telephone No.	:	(678) 775-3085

Prepared by	Reviewed by	Approved by
John Snyder, PG START III Geologist	Shanna Davis START III Technical Reviewer	Andrew Johnson START III Program Manager

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APPENDICES

ATTACHMENT

QUALITY ASSURANCE PROJECT PLAN (SHORT FORM)

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 4 & TETRA TECH, INC.

SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM CONTRACT NO. EP-W-05-054

Site Name: Francis Street Assessment		**City, County:** Waycross, Ware County	**State:** Georgia
Prepared By: Tetra Tech, Inc. (Tetra Tech)		**Date:** December 10, 2013	
Approved By: Sandra Harrigan	**Date:** 11/22/13	**Signature:**	
Title: Tetra Tech Project Manager			
Approved By: Jessica Vickers	**Date:** 11/22/13	**Signature:**	
Title: Tetra Tech Quality Assurance (QA) Manager			
Approved By: Andrew Johnson	**Date:** 11/22/13	**Signature:**	
Title: Tetra Tech Superfund Technical Assessment and Response Team (START III) Program Manager			
Approved By: Matthew Huyser	**Date:** 12/11/13	**Signature:** Matthew J. Huyser Digitally signed by Matthew J. Huyser DN: cn=Matthew J. Huyser, o=EPA Region IV, ou=ERRB, email=huyser.matthew@epa.gov, c=US Date: 2013.12.11 13:26:08 -05'00'	
Title: U.S. Environmental Protection Agency (EPA) On-scene Coordinator (OSC) and Task Monitor (TM) for the Francis Street Assessment			

1.0 PROJECT INFORMATION

1.1 Distribution List

EPA Region 4:

Matthew Huyser, EPA OSC and TM

Katrina Jones, EPA Project Officer

Tetra Tech:

Angel Reed, Tetra Tech START III Document Control Coordinator

1.2 Project/Task Organization

Matthew Huyser will serve as the EPA TM for the assessment activities described in this quality assurance project plan (QAPP). John Snyder of Tetra Tech will serve as the Tetra Tech site manager and is responsible for maintaining an approved version of this QAPP. Dr. John Schendel of Tetra Tech will provide laboratory coordination and sampling plan design support. Jessica Vickers of Tetra Tech will serve as the Tetra Tech QA manager and is responsible for providing Tetra Tech approval of this QAPP, coordinating data validation, final sign-off on data, and final approval of data quality. The EPA TM has the authority to issue a Stop Work order. Specific Tetra Tech field personnel will be selected before mobilization as defined under the START III Contract No. EP-W-05-054 and organized in accordance with the organizational chart found in Figure 1-1 of Section 1.1 in the START Program Level QAPP.

1.3 Problem Definition/Background

The former Seven Out facility ("the site") is a water treatment facility located at 901 Francis Street, Waycross, Ware County, Georgia, on about 2.36 acres. The site consists of a small service building and a tank farm containing dozens of vertical and horizontal tanks, with associated piping and valve works. The site is bounded by Francis Street to the north, Folks Street to the east, and property owned by CSX railroad to the south and west. Site stormwater discharges into a small drainage trench at the southeast corner of the site and flows into a drainage ditch along the southern site boundary. The drainage ditch flows west for about 1,100 feet before discharging into a drainage canal.

The Seven Out site previously received industrial wastewater for on-site treatment, but failed to meet effluent discharge requirements and subsequently lost their discharge permit in March, 2004 (see Figure 1 of Appendix A). However, the facility continued to accept waste until full storage capacity was reached. At some time later in 2004, the owners abandoned the facility, leaving approximately 350,000 gallons of liquid waste and 150,000 gallons of sludge or solids stored on site.

In August, 2004, Tetra Tech, at the direction of EPA, performed a removal assessment at the site to characterize waste liquid, sludges, and solids present on site. Detectable concentrations of organic and inorganic chemicals were found in the tank samples, but not at levels that would qualify any of the materials as hazardous. Three soil samples were collected from the site during the removal assessment. One soil sample, SO-SW, collected directly outside of the southern containment wall, contained benzo(b)fluoranthene at a level exceeding the Region 9 Preliminary Remediation Goal (PRG) for residential soil. Benzo(a)anthracene, benzo(a)pyrene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected at levels that exceeded the Region 9 PRGs for residential and industrial soil. All of the chemicals with detections above PRG levels are part of a group of organics known as polycyclic aromatic hydrocarbons (PAH). Sample SO-SW was the only samples that contained PRG exceedances, indicating that contamination was not a widespread concern. Furthermore, a soil sample collected the same day from a location downgradient of sample SO-SW did not contain contaminants at levels exceeding PRGs. Contamination levels detected in SO-SW also did not exceed EPA Regional Screening Levels (RSLs) or Removal Action Levels (RSLs), which are levels used to provide guidance during an emergency response or time-critical removal. For these reasons, the contaminated soil was not remediated.

In January, 2005, EPA mobilized to the site to conduct an emergency removal action to address wastewater that was observed overtopping the on-site secondary containment walls and flowing into a nearby drainage ditch. EPA removed approximately 350,000 gallons of wastewater and other liquid wastes. The solids and sludge located within the treatment area were not addressed at that time.

EPA cost-recovery activities identified several entities as potentially responsible parties (PRP) for the site. In 2008 the PRPs entered into an Agreement and Order on Consent (AOC) with EPA to conduct removal activities in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan. These removal activities included removing all process solids and sludges from the site and decommissioning the tanks. The removal concluded in late 2009 and EPA issued a Notice of Completion letter on November 16, 2009. The building, tanks, and associated piping and valves remain on site, though the property remains vacant.

In 2013, local residents expressed concerns regarding possible contamination coming from the site. A sediment sample collected on behalf of a resident from the drainage canal at Folks Park contained PAHs above EPA RSLs for residential soil. In response to these concerns, EPA is conducting a soil and sediment assessment to determine if residual contamination from the site is contributing to contamination within the drainage ditch and drainage canal. Based on previous analytical results, PAHs are the chemicals-of-concern.

1.4 Project Task Description

Tetra Tech was tasked with performing a soil and sediment assessment and preparing draft and final reports detailing the findings of the assessment. The project goal is to generate data that can be used to confirm or refute the possibility that the facility is contributing to contamination in the drainage ditch and drainage canal. Generating this data will involve collecting soil and sediment samples that can be used to determine the presence or absence of contamination at locations upgradient and downgradient of the facility.

RSLs are based on assumed exposure pathways for soil, and represent a conservative threshold value for contamination within a sediment matrix; therefore, analytical results for both soil and sediment samples will be compared to RSLs for

residential and industrial exposure scenarios. Any RSL exceedances will be compared EPA Removal Management Levels (RML), which provide guidance for decision-makers when considering removal actions.

Incremental sampling methodology (ISM) will be applied to five of the eight solid sampling locations during this assessment. Five discrete areas, or "decision units (DU)", have been identified along drainage pathways (the drainage ditch and the drainage canal) at locations both upgradient and downgradient of the facility (see Figure 2 in Appendix A). The assessment of contamination levels in the DUs will allow assessors to determine whether the facility is contributing to contamination in the drainage ditch and drainage canal. The following DUs have been identified:

- DU-01 is located along the drainage ditch, upgradient of the facility (east of Folks Street). This DU will assess potential contamination sources along the drainage ditch upgradient of the facility.
- DU-02 is located along the small drainage trench from the facility to the drainage ditch. This DU will assess potential contamination coming directly from the facility and discharging into the drainage ditch.
- DU-03 is located along the drainage ditch, downgradient of the facility. This DU will assess potential drainage ditch contamination prior to entering the drainage canal.
- DU-04 is located along the drainage canal, upgradient of the confluence of the drainage canal and the drainage ditch, between Alpha Street and Margaret Street. This DU will assess potential contamination levels in the drainage canal prior to receiving drainage ditch water.
- DU-05 is located along the drainage canal, downgradient of the confluence of the drainage canal and drainage ditch, between South Georgia Parkway and Folks Street. This DU will assess potential contamination levels in the sediment of the combined pathway.

The field team will collect a total of 30 aliquots (or "increments") from each DU. Each DU will consist of ten sampling stations, spaced at roughly equal intervals along the length of the DU. At each sampling station, three increments will be collected from the ditch/canal bed: one from the left side of the bed, one from the middle of the bed, and one from the right side of the bed. Replicate (triplicate) field samples will be collected from two of the DUs (DU-03 and DU-04) for the evaluation of field relative standard deviation (RSD) and to assess DU homogeneity.

Increments will be of uniform volume and collected from 0 to 3 inches below bed grade with an incremental sampling device (if possible) or stainless steel spoon. All increments from a DU will be placed together in a single-use stainless steel pan and homogenized on site. The entire homogenized sample will then be placed in glass jars, packed in a custody-sealed cooler on ice and shipped to the laboratory for analysis of PAHs by selected ion monitoring (SIM) using the EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) Method 8270D.

The following bullet items outline the approach Tetra Tech, the EPA TM, and the laboratory has agreed to take when the sediment samples are processed by the laboratory (TestAmerica, Arvada, CO) following the ISM protocol. The goal of the approach is to achieve the objectives of ISM while minimizing to the greatest extent possible the loss of PAHs through volatilization. The approach below outlines those aspects of the laboratory's ISM protocol that will and will not be applied to the soil/sediment samples collected for this project, as well as provide clarification of choices made when multiple options are presented in the laboratory's ISM protocol. This approach does not replace applicable portions of the laboratory's protocol, but serves to focus and compliment it.

- Each bulk sediment sample resulting from ISM sampling in the field will be thoroughly mixed and homogenized to the extent possible while in the field; the collection of rocks and vegetation will be avoided as much as practical during sampling activities.
- A minimum of 1 kilogram (kg) of sediment will be collected in the field for each sediment sample.
- Approximately nine ISM samples (from three single-sample DUs and two triplicate ISM sample DUs) will be collected by ISM and shipped to the laboratory.
- For each of the two DUs selected for ISM field sampling in triplicate, one of the three sediment ISM samples will be designated by the field team ***for laboratory triplicate analysis by ISM*** in support of the evaluation of analytical RSD.
- One ISM sediment sample will be designated in the field for matrix spike/matrix spike duplicate (MS/MSD) analysis

- Once received by the laboratory, each ISM sediment sample will be kept at less than 6 degrees Celsius until the air drying/sieving/incremental sampling process is initiated and conducted by the laboratory. Afterwards, the remaining sediment sample will resume being kept at less than 6 degrees Celsius.
- Each sediment ISM sample will be air dried at ambient temperature only to the extent necessary, based on the laboratory's judgment, to render it dry enough to be sieved without caking. If the laboratory determines that a sample can be sieved as-received without requiring any drying at all, then the laboratory will skip the drying step and proceed directly to the sieving step. The laboratory will report in an appropriate place in its data package the number of hours each sample was air-dried using its drying procedure.
- After air drying and in preparation for the sieving step in the ISM procedure, the laboratory will use the approach of using a clean hand-held implement or clean gloved hands to reduce cakes of dry sediment and break up clumps of sediment. A mortar and pestle should be used *only as a last resort* to break up sample agglomerates that will not pass through the sieve; if used, they should be used as little as possible, and their use should be noted in the laboratory data package. The laboratory will *not* use any other kind of mechanical grinder during this process.
- The laboratory will sieve the air-dried sample through a 10-mesh (2 millimeter) sieve. The portion of the sample that did not pass through the sieve will be discarded.
- The portion of the sample that passed through the sieve ***will not undergo grinding of any kind***. The sieved portion will be incrementally sampled at this point.
- Percent moisture will be determined on each processed sediment sample ***after it has been air dried, sieved, and incrementally sampled***. In other words, once the 30 increments of sample have been collected from the spread-out sheet of air-dried, sieved sediment, ***an additional portion of sediment will be collected from the sheet in order to perform the percent moisture determination***. This percent moisture value will be used to calculate and report the analytical results for the sample on a dry weight basis.

In addition to the ISM sampling of the five DUs, two composite soil samples and one composite sediment sample will be collected during the assessment and analyzed for PAHs using SW-846 Method 8270D with SIM:

- During the November 14, 2013 site visit, EPA and Tetra Tech observed accumulated soil within a small concrete trench at the northeast corner of the site. The concrete trench discharges to a stormwater drain. The accumulated soil will be sampled as a 5-point composite from 0 to 6 inches bgs (if possible).
- A soil sample will be collected outside of the southern containment wall to replicate soil sample SO-SW, collected in 2004 during the removal assessment. In 2004 this location contained five PAHs above PRGs; the sample collected during this assessment will determine if contamination is still present on site and, if so, what the constituents are and if they are above current guidance values (RSLs). The sample will be a 5-point composite collected from 0 to 6 inches bgs.
- A 5-point composite sediment sample from 0 to 3 inches bgs will be collected from the drainage canal bed immediately downstream from the confluence of the drainage ditch and the drainage canal, between the railroad culvert and Francis Street. The short length of this segment of canal and its terrain make ISM sampling impractical. However, the processing of this sediment sample will be conducted in the same manner as the ISM samples, including: submitting the entire 5-point sample to the laboratory; laboratory drying (if necessary) and homogenization of the sample; sieving the sample; and incremental subsampling at the laboratory.

Percent moisture will be determined on each composite soil/sediment sample, and results will be reported on a dry-weight basis. One soil sample will be designated by the field team for MS/MSD analysis.

Schedule: Sampling activities will be conducted in December, 2013.

1.5 Quality Objectives and Criteria for Measurement Data

Identification of the seven steps of the data quality objectives (DQO) process: DQOs were established for the site to define the quantity and quality of the data to be collected to support the objectives of the sampling event. DQOs were developed using the seven-step process outlined in the following guidance documents: "EPA Requirements for Quality Assurance Project Plans," EPA QA/R-5, March 2001; "Guidance for Quality Assurance Project Plans," EPA QA/G-5, December 2002; and "Guidance on Systematic Planning Using the Data Quality Objectives Process," EPA QA/G-4, February 2006.

Step 1: State the Problem

Stakeholders: EPA Region 4, City of Waycross, Georgia Environmental Protection Division (GAEPD), Georgia Department of Health (GADOH), local community members, and PRPs.

Site History/Conceptual Site Model: The Seven Out facility previously received industrial wastewater for on-site treatment, but failed to meet effluent discharge requirements and subsequently lost their discharge permit in March, 2004. However, the facility continued to accept waste until full storage capacity was reached. At some time in 2004, the owners abandoned the facility, leaving approximately 350,000 gallons of liquid waste and 150,000 gallons of sludge or solids stored on site.

In August, 2004, Tetra Tech, at the direction of EPA, performed a removal assessment at the site. Three soil samples were collected from the site during the removal assessment. One soil sample, collected directly outside of the southern containment wall, contained PAHs above PRGs. Because these exceedances were observed in on-site soil, but not in the surface water runoff pathway (a soil sample collected from the small drainage trench running from the treatment area to the drainage ditch contained no PRG exceedances), the contaminated soil was not remediated.

In January, 2005, EPA mobilized to the site to conduct an emergency removal action to address wastewater that was observed overtopping the on-site secondary containment walls and flowing into a nearby drainage ditch. EPA removed approximately 350,000 gallons of wastewater and other liquid wastes.

In 2008, an AOC was reached with PRPs to conduct removal activities at the site. These removal activities included removing all solids, and sludges from the site and decommissioning the tanks. The removal concluded in late 2009 and the site was given No Further Action status by EPA. The building, tanks, and associated piping and valves remain on site, though the property remains vacant.

In 2013, local residents expressed concerns regarding possible contamination coming from the site. A sediment sample collected on behalf of a resident from the drainage canal at Folks Park contained PAHs above EPA RSLs for residential soil. In response to these concerns, EPA is conducting a soil and sediment assessment to determine if residual contamination from the site is contributing to contamination within the drainage ditch and drainage canal. Based on previous analytical results, PAHs are the chemicals-of-concern.

For additional information, see Sections 1.3 and 1.4 of this QAPP.

Statement of Problem: Sampling data is required to confirm or refute the hypothesis that contamination from the site is entering the drainage ditch and drainage canal, located about 1,100 feet west of the site.

Step 2: Identify the Goals of the Study

Study Questions: Is contaminated runoff from the facility entering the drainage ditch and drainage canal.

Decision Statements: If analytical data indicates the presence of PAHs downgradient, but not upgradient, of the facility, the contamination is attributable to the facility.

Step 3: Identify Information Inputs	**Inputs:** Site history contained in Sections 1.3 of this QAPP, the 2004 Tetra Tech Removal Assessment Report, the 2009 Tetra Tech Sampling Event Letter Report, and the 2010 Tetra Tech Removal Action Letter Report.
Step 4: Define Study Boundaries	**Spatial Boundary:** The Francis Street Assessment spatial boundaries include the former Seven Out property, the drainage ditch (from about 300 feet upgradient of the site to the confluence with the drainage canal), and the drainage canal (from Alpha Street to Folks Street). **Temporal Boundaries:** The temporal boundaries for sampling extend from when EPA initiates activities until EPA declares activities complete. Fieldwork is anticipated to take place in December, 2013.
Step 5: Develop the Analytic Approach	**Analytical Methods:** Laboratory analysis for soil and sediment samples will include: • PAHs by SIM using the SW-846 Method 8270D. All analyses will be performed by TestAmerica in Arvada, Colorado. All requested analyses will be reported to not exceed the reporting limits specified in Table B-1 of Appendix B. Comparison Criteria: Analytical data results will be compared with the comparison criteria listed below. • EPA RSLs for soils, May 2013; available at http://www.epa.gov/reg3hscd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2013.pdf **Decision Rules:** Analytical results will be compared to the criteria listed above. Requested reporting limits will meet the comparison criteria to the extent possible, based on sample-specific characteristics (such as dilutions and sample concentrations). Decisions made regarding the results will be determined by EPA.
Step 6: Specify Performance or Acceptance Criteria	Initial acceptance of analytical results will be determined through data validation performed by Tetra Tech that will evaluate the usability of the data. Level IV data packages for soil and sediment samples will be requested from TestAmerica. A Stage 4 validation of the Level IV data packages will be performed by Tetra Tech. Any qualified or rejected data and the reasons for qualification/rejection will be summarized in the data validation report. During the data validation process, Tetra Tech will determine if results meet the requirements of the analytical methods and START Program Level QAPP. Specific information on the acceptance criteria for the analytical results, including the quality control samples, is contained in the TestAmerica Quality Assurance Manual (QAM), which is a company confidential document that can be obtained upon request separate from this QAPP. The cover page of the TestAmerica QAM is included as Attachment 1.
Step 7: Develop the Plan for Obtaining Data	**Optimized Design:** Nine sediment ISM samples (from three single-sample DUs and two triplicate sample DUs) are proposed for this site. The sampling design consists of five DUs in the drainage trench, drainage ditch and drainage canal (see Figure 2 in Appendix A). Thirty increments will be collected for each ISM sample (see details in Section 1.4). Additionally, two 5-point composite soil samples from the site and one 5-point composite sediment sample from the confluence of the drainage ditch and drainage canal will be collected. The appropriate quality assurance/quality control (QA/QC) samples will be collected. Sample nomenclature, locations, and rationales are described in Table B-2 of Appendix B. Table B-3 of Appendix B presents the type of, and collection frequencies of various quality control samples. Refer to Section 1.4 for the sampling approach and objectives.

1.6 Special Training/Certification Requirements

☒ OSHA 29 ☒ Special Equipment/Instrument Operator (describe below): ☐ Other (describe below):

The laboratory conducting the sampling analysis will be certified by the National Environmental Laboratory Accreditation Conference (NELAC) (No. TNI00010).

1.7 Documentation and Records

The most current version of this QAPP will be distributed to the entire distribution list presented in Section 1.1. The Tetra Tech site manager will be responsible for maintaining the most current revision of this QAPP and for distributing it to all personnel and parties involved in the field effort. Field records that may be generated include the following:

- ☒ Chains-of-Custody Forms
- ☐ Field Instrument Calibration Logs
- ☐ Field Monitoring and Screening Results
- ☒ Tailgate Sign-In Sheet
- ☒ Health and Safety Plan (HASP)
- ☒ Photographic log
- ☒ Site Logbook
- ☒ Site Maps and Drawings

Field documentation and records will be generated and maintained in accordance with the requirements presented in the EPA Region 4 Science and Ecosystem Support Division (SESD) Field Branches Quality System and Technical Procedures (FBQSTP) guidance document for *Logbooks* (SESDPROC-010-R5), May 2013. This document can be found at the following web address: http://www.epa.gov/region4/sesd/fbqstp/index.html. All field-generated data will also be maintained in the project file and included, as appropriate, in project deliverables in final form after all reviews and applicable corrective actions.

The formal deliverables for EPA associated with this project are specified in the EPA technical direction document and include draft and final QAPPs, and draft and final letter reports. Draft and final letter reports will be prepared to summarize field activities and findings and present validated laboratory analytical results. All project records, including electronic and hard copies of field, laboratory, and project deliverables under Tetra Tech's control will be maintained and retained in accordance with the requirements of EPA START III Contract No. EP-W-05-054 and Section 5.0, page 15 of the Tetra Tech START Quality Management Plan (QMP), June 2013.

2.0 DATA GENERATION AND ACQUISITION

2.1 Sampling Process Design

Tables B-2 through B-5 of Appendix B present details on the types and numbers of samples collected, sampling locations and rationale, sample containers, analytical parameters, sample matrices, laboratory analytical methods, performance or acceptance criteria, preservation method, and sample holding time. The rationale for this sampling design is based on the task description in Section 1.4 of this QAPP and the DQO process discussed in Section 1.5 of this QAPP. All ISM, non-ISM, and QC samples will be submitted to the subcontract laboratory procured by Tetra Tech and analyzed for PAHs by SIM.

2.2 Sample Methods Requirements

Matrix	Sampling Method	EPA and Tetra Tech Standard Operating Procedures and Guidance
Soil	Refer to Tables B-2 through B-5 for more details, including requested analytical parameters and methods.	Refer to the EPA SW-846 Method 8270D; the Region 4, SESD FBQSTP for *Soil Sampling* (SESDPROC-300-R2), December 2011. Also refer to Section 2.2, page 19 of the Tetra Tech START Program Level QAPP, May 2012. A list of applicable Safe Work Practices is included in the HASP.
Sediment	Refer to Tables B-2 through B-5 for more details, including requested analytical parameters and methods.	Refer to the EPA SW-846 Method 8270D; the Region 4, SESD FBQSTP for *Sediment Sampling* (SESDPROC-200-R2), September 2010. ISM guidance was obtained from the Interstate Technology Regulatory Council's online ISM guidance document, available at http://itrcweb.org/ism-1/ . Also refer to Section 2.2, page 19 of the Tetra Tech START Program Level QAPP, May 2012. A list of applicable Safe Work Practices is included in the HASP.

Other Sample Method Requirements: The Tetra Tech site manager, in coordination with the EPA TM, is responsible for identifying failures in sampling and field measurement systems, overseeing any corrective actions, ensuring that the corrective actions are documented in site logbooks and other appropriate records, and assessing the effectiveness of corrective actions. Global positioning system (GPS) data collected in the field will be conducted in accordance with the EPA Region 4 SESD FBQSTP *Global Positioning System* (SESDPROC-110-R3), April 2011. Field decontamination will be conducted in accordance with the procedures provided in the EPA Region 4, SESD FBQSTP *Field Equipment Cleaning and Decontamination* (SESDPROC-205-R2), December 2011, available at the following web address: http://www.epa.gov/region4/sesd/fbqstp/index.html. Equipment required for this sampling event includes sample containers; sample preservatives; sample packaging materials such as coolers and suitable packing material; stainless steel spoons, incremental sampling tool, and stainless steel pans; a GPS receiver; and personal protective equipment (PPE) identified in the HASP (including disposable nitrile gloves and boot covers). Also see Table B-6 in Appendix B for a list of field equipment and supplies.

2.3 Sample Handling and Custody Requirements

Sample handling and chain-of-custody record keeping will be conducted in accordance with EPA Region 4, SESD FBQSTP *Packing, Marking, Labeling, and Shipping of Environmental and Waste Samples* (SESDPROC-209-R2), April 2011 and Region 4 SESD FBQSTP *Sample and Evidence Management* (SESDPROC-005-R2), January 2013. Both documents are available at the following web address: http://www.epa.gov/region4/sesd/fbqstp/index.html. Once collected, samples will be placed on ice and kept in a custody-sealed cooler in a secure location. The Tetra Tech site manager will ensure that custody of samples is maintained until they are shipped to the laboratory. Chain-of-custody records will be used to document the samples collected and their delivery to the laboratory. Also refer to Section 2.3, page 27 of the Tetra Tech START Program Level QAPP, May 2012.

2.4 Analytical Method Requirements

The analytical parameters and associated laboratory analytical methods that will be used for this project are listed in Tables B-4 and B-5 in Appendix B.

A turnaround time of 15 business days for final results will be requested for PAHs by SIM using the SW-846 Method 8270D from TestAmerica. Initial acceptance of the analytical results will be determined through data validation performed by Tetra Tech that will evaluate the usability of the data. The data validation report will discuss whether or not the quality control limits (acceptance criteria) for the results, including for quality control samples, are met.

Level IV data packages for soil and sediment samples will be requested from the laboratory procured by Tetra Tech (TestAmerica). Any qualified or rejected data and the reasons for qualification/rejection will be summarized in the data validation report. See Table B-5 in Appendix B of this QAPP.

Also refer to Section 2.4, page 30 of the Tetra Tech START Program Level QAPP, May 2012.

2.5 Quality Control Requirements

Quality control (QC) requirements for field monitoring are provided in the EPA Region 4, SESD FBQSTP *Field Measurement Uncertainty* (SESDPROC-014-R1), April 2012, and QC requirements for field sampling are provided in the EPA Region 4, SESD FBQSTP *Field Sampling Quality Control* (SESDPROC-011-R4), February 2013. Both are available at the following web address: http://www.epa.gov/region4/sesd/fbqstp/index.html. Also refer to Section 2.5.1, page 33 of the Tetra Tech START Program Level QAPP, May 2012.

QC requirements for analytical methods are presented in SW-846, Fourth Edition, Including Updates I through IVB, February 2007 (which can be found at: http://www.epa.gov/epawaste/hazard/testmethods/index.htm); and in Section 2.5.2, page 34 of the Tetra Tech START Program Level QAPP, May 2012.

Laboratory QC samples include one matrix spike and matrix spike duplicate (MS/MSD) sample set collected at a frequency of one MS/MSD set for every 20 samples per matrix. Field QC samples include field triplicate samples for sediment ISM samples and field duplicate samples for non-ISM samples. Field QC samples also include one aqueous field blank; and at least one equipment rinsate blank per type of sampling equipment used. Water used for the preparation of laboratory blanks will be certified ASTM Type 2+ Ultra Pure blank water. Field and laboratory QC samples are listed in Table B-3 in Appendix B. The laboratory will also analyze additional laboratory QC samples. All QC samples will be submitted for analyses of parameters listed in Tables B-4 and B-5 in Appendix B.

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

For instrument testing, inspections, and maintenance requirements for field monitoring, refer to the EPA Region 4, SESD FBQSTP *Equipment Inventory and Management* (SESDPROC-108-R4), February 2013; *Global Positioning System* (SESDPROC-110-R3), April 2011; and *Field Equipment Cleaning and Decontamination* (SESDPROC-205-R2), December 2011. These documents are available at the following web address: http://www.epa.gov/region4/sesd/fbqstp/index.html. Also refer to the equipment manufacturer's operating manual for further instructions on field instrument testing, inspection, and maintenance, as well as to Section 2.6.2, page 40 of the Tetra Tech START Program Level QAPP, May 2012. Table B-6 in Appendix B contains a list of field equipment that will be used during this sampling event. The site manager will ensure the correct operation of all field equipment.

A GPS receiver and pin flags will be used to layout the DUs and sampling stations.

Laboratory instrument testing, inspection, and maintenance requirements are contained in SW-846 methods, the instrument and equipment manufacturer's operating manuals associated with the analytical methods, the laboratory QAM, and Section 2.6.3, page 40 of the Tetra Tech START Program Level QAPP, May 2012.

2.7 Instrument Calibration and Frequency

For instrument calibration and frequency requirements for field monitoring, refer to the EPA Region 4, SESD FBQSTP *Equipment Inventory and Management* (SESDPROC-108-R4), February 2013; and *Global Positioning System* (SESDPROC-110-R3), April 2011. Both documents are available at the following web address: http://www.epa.gov/region4/sesd/fbqstp/index.html. Also refer to the equipment manufacturer's operating manual for further instructions on calibration, as well as to Section 2.7.1, page 41 of the Tetra Tech START Program Level QAPP, May 2012.

Instrument calibration and frequency requirements for analytical methods are specified in SW-846 methods, the instrument and equipment manufacturer's operating manuals associated with the analytical methods, the laboratory QAM, and in Section 2.7.2, page 41 of the Tetra Tech START Program Level QAPP, May 2012.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables

Supplies and consumables required for this sampling event will be inspected and accepted by the Tetra Tech site manager or designated field team member, and include sample containers, sampling implements, sample packaging materials, and PPE identified in the HASP (including disposable nitrile gloves and boot covers). All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. Certifications will be provided by the manufacturer for sample containers in accordance with pre-cleaning criteria established by EPA. See Section 2.8, page 43 of the Tetra Tech START Program Level QAPP, May 2012. See Table B-6 in Appendix B for a list of supplies and consumables that will be used during this sampling event.

2.9 Non-Direct Measurement Requirements

Information pertaining to the site (including photographs, maps, and so forth) has been compiled from file information obtained from EPA. The extent to which these data and information, if any, are used to achieve the objectives of this project will be determined by Tetra Tech in cooperation with the EPA TM. Any justifications and qualifications required for the use of these data and information will be provided in the reports generated for this project. Refer to Section 2.9, page 43 of the Tetra Tech START Program Level QAPP, May 2012.

2.10 Data Management

All reference materials generated during this investigation and included in final reports will be submitted to the EPA TM in portable document format. All field-generated data, including GPS data, chains-of-custody, photographs, and logbooks, will be managed and retained as part of the permanent field record for the project. All electronic and hard copy laboratory analytical data will be managed in accordance with the requirements specified in SW-846, Fourth Edition, Including Updates I through IVB, February 2007 (which can be found at: http://www.epa.gov/epawaste/hazard/testmethods/index.htm); as well as the laboratory QAM, and in Section 2.10, page 44 of the Tetra Tech START Program Level QAPP, May 2012. Laboratory-generated data will be inputted into the project's SCRIBE database. Finally, all field generated data, laboratory-generated data, and other records (electronic and hardcopy), including project deliverables generated or obtained during this project will be managed and retained according to the requirements of EPA START III Contract No. EP-W-05-054, as well as to Section 2.10, page 44 of the Tetra Tech START Program Level QAPP, May 2012; and Section 5.0, page 15 of the Tetra Tech START QMP, June 2013.

3.0 ASSESSMENT AND OVERSIGHT

3.1 Assessment and Response Actions

Field and laboratory audits will not be conducted for this project. All deliverables to which Tetra Tech contributes in whole or in part, including the draft and final reports, will be subject to a corporate three-tiered review process, which includes a technical review, an editorial review, and a QC review. Each reviewer will sign off on a QC review sheet recording any issues or revisions and how they have been addressed. These reviews will be performed by qualified individuals in accordance with the requirements of EPA START III Contract No. EP-W-05-054 and with Section 3.1, page 45 of the Tetra Tech START Program Level QAPP, May 2012.

3.2 Corrective Action

The Tetra Tech site manager, in coordination with the EPA TM, is responsible for identifying failures in sampling and field measurement systems, overseeing any corrective actions, ensuring that the corrective actions are documented in site logbooks and other appropriate records, and assessing the effectiveness of corrective actions. Corrective actions that deviate from the approved QAPP will be discussed in the draft and final reports. The data validation report will discuss corrective actions that affect the laboratory data package. Corrective action requirements for sample collection, field measurements, and laboratory analyses are presented in Section 3.1.2, page 47 of the Tetra Tech START Program Level QAPP, May 2012.

3.3 Reports to Management

Tetra Tech is responsible for notifying the EPA TM if any circumstances arise during the field investigation that may impair the quality of the data collected. All formal deliverables to EPA associated with this project will be prepared, reviewed, and distributed in accordance with the requirements of the EPA START III Contract No. EP-W-05-054 and Section 3.2, page 49 of the Tetra Tech START Program Level QAPP, May 2012, under the supervision of the Tetra Tech QA manager, Jessica Vickers or appropriate designee.

4.0 DATA VALIDATION AND USABILITY

4.1 Data Review, Verification, and Validation Requirements

All field-generated records (such as field sampling sheets, global positioning system coordinates of sample and other locations, and field logbook notes) will be reviewed for completeness and accuracy by the Tetra Tech project manager, site manager, and appropriate designees. Field records will be reviewed at the end of each day so that corrective actions, as necessary, can be made before field crews demobilized from the site.

GPS data generated in the field will be downloaded and reviewed by the site manager to ensure that it is accurate. Any errors will be discussed with a START GIS analyst, corrected, and noted in the logbook or other appropriate project record.

Initial acceptance of the laboratory analytical results for the samples collected will be determined through data validation performed by Tetra Tech and will allow an evaluation of the usability of the data. A Stage 4 validation of Level IV data packages will be performed in accordance with SW-846, Fourth Edition, Including Updates I through IVB, February 2007 (which can be found at: http://www.epa.gov/epawaste/hazard/testmethods/index.htm; and Section 4.2.2, page 51 of the Tetra Tech START Program Level QAPP, May 2012. Data validation procedures specified by the National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (June 2008), available at http://www.epa.gov/superfund/programs/clp/download/somnfg.pdf. Any qualified or rejected data and the reasons for qualification/rejection will be summarized in the data validation report.

4.2 Verification and Validation Methods

All field-generated data will be maintained in the project file and included (as appropriate) in project deliverables in final form after all reviews and associated corrective actions. The laboratory analytical data will be validated as discussed in Section 4.1 above. The data validation report will contain a summary of all data qualifier flags and their explanations. The laboratory data will also be included (as appropriate) in project deliverables in final, validated form (including all data qualifiers) after data validation and associated reviews have been completed. Also see Section 4.2, page 51 of the Tetra Tech START Program Level QAPP, May 2012.

4.3 Reconciliation of the Data to the Project-Specific DQOs

Limitations in the data and data qualification (including rejection) will be identified during the validation process conducted by Tetra Tech. To assess the data relative to the objectives of the project, the data will be reviewed to determine whether any data are rejected and whether any data qualifiers or limitations assigned during the validation process affect the usability of the data, as defined in Section 1.5 of this QAPP. Tetra Tech will review all final laboratory data packages to evaluate whether the site-specific DQOs, as defined in Section 1.5 of this QAPP, are met. The data will be reconciled with the project-specific DQOs also in accordance with EPA guidance documents, including "Guidance on Systematic Planning Using the Data Quality Objectives Process," EPA QA/G-4, February 2006. Also see Section 4.3, page 53 of the Tetra Tech START Program Level QAPP, May 2012.

The Tetra Tech project manager, in cooperation with the EPA TM and Tetra Tech START QA Manager, will be responsible for reconciling the data and other project results with the requirements specified in this QAPP and by the data users and decision makers. Ultimate acceptance of the data is at the discretion of the EPA TM. Depending on how specific data quality indicators do not meet the project's requirements, the data may be discarded and resampling and reanalysis of the subject samples may be required. Resampling, reanalysis, or other out-of-scope actions identified to address data quality deficiencies and data gaps will require approval by the EPA TM, EPA Project Officer, and EPA Contracting Officer.

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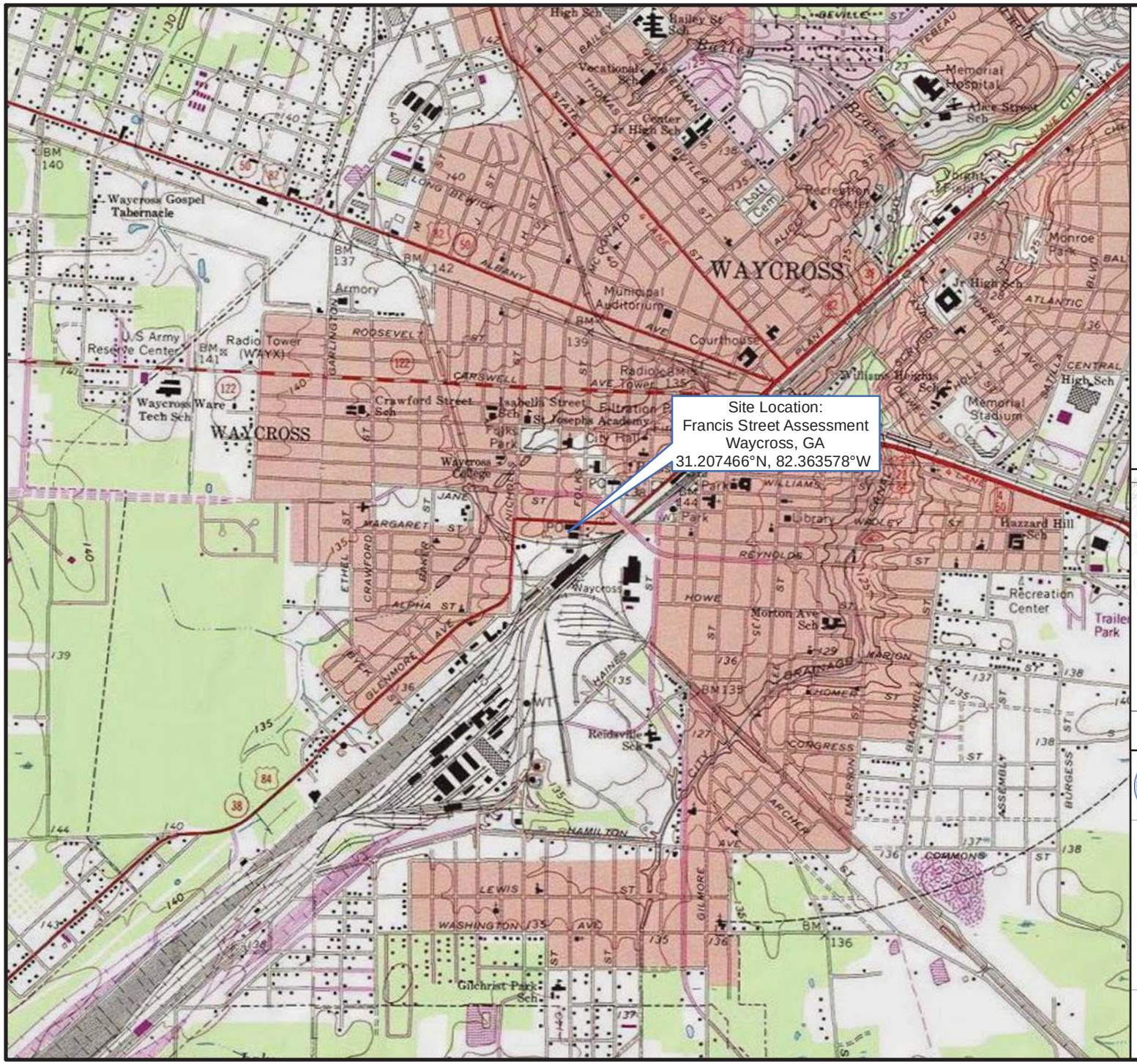
APPENDIX A

FIGURES

(Two Pages)

Figure



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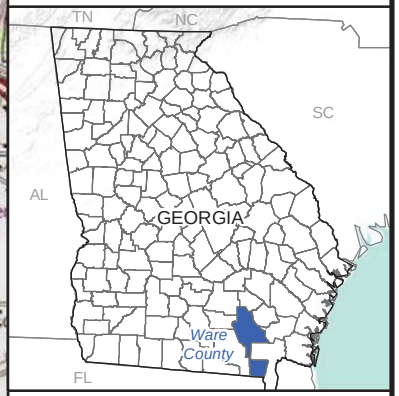
0 1,000 2,000 Feet

1:24,000

Map Source:
Modified from USGS, Waycross West, GA 1967 & Waycross East, GA 1967 Quadrangles.



United States Environmental Protection Agency Region 4

FIGURE 1

Site Location

TDD Name: Francis Street Assessment

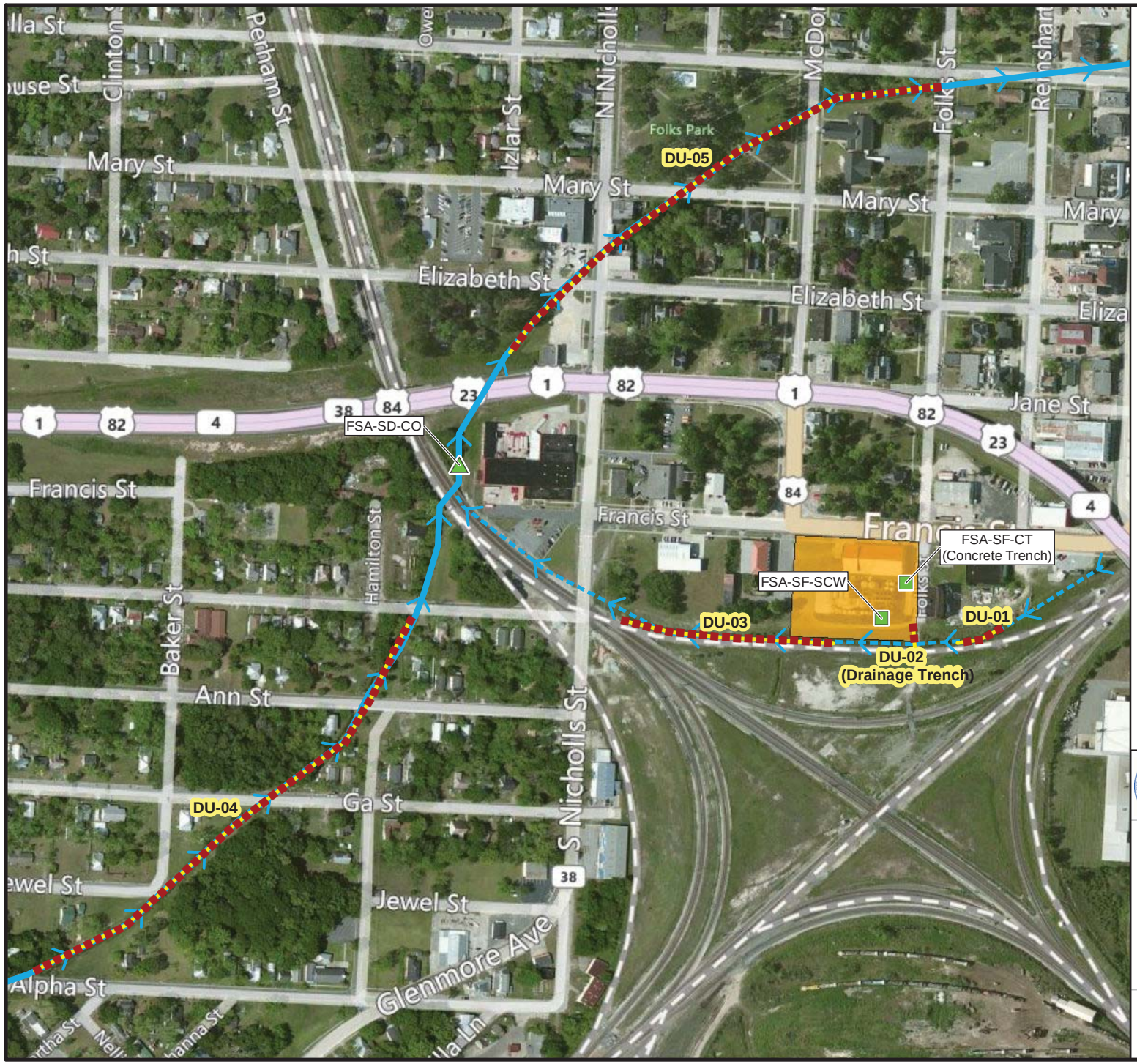
TDD No.: TTEMI-05-003-0168

City:	County:	State:
Waycross	Ware	Georgia

TETRA TECH

Date: 11/13/2013
Analyst: dale.vonbusch

File: L:\TTEMI-05-003-0168_Francis_Street_Assessment\GIS\MXDs\Site_Location\Fig1_SiteLocation_111313.mxd



Legend

- Sediment Sample
- Surface Soil Sample
- Decision Unit
- Drainage Canal
- Drainage Ditch
- Former Seven Out Facility

N
W E
S

0 200 400 Feet

1:4,800

Notes:
CO - Confluence
CT - Concrete trench
DU - Decision unit
FSA - Francis Street Assessment
SCW - South containment wall
SD - Sediment
SF - Surface soil

Map Source:
Modified from Bing Maps Imagery, 2012.

United States Environmental Protection Agency Region 4

FIGURE 2

Site Layout
& Proposed Sampling

TDD Name: Francis Street Assessment

TDD No.: TTEMI-05-003-0168

City:	County:	State:
Waycross	Ware	Georgia

TETRA TECH

Date: 11/20/2013
Analyst: dale.vonbusch

File: C:\TTEMI-05-003-0168_Francis_Street_Assessment\GIS\MXDs\Site_Layout\Fig2_SiteLayout_Proposed_Samples_112013.mxd

APPENDIX B

TABLES

(Six Pages)

Table

TABLE B-1
FRANCIS STREET ASSESSMENT
REQUESTED REPORTING LIMITS AND COMPARISON VALUES

Analyte	CAS Number	Maximum Water Reporting Limit µg/L	Maximum Soil Reporting Limit mg/kg	RSL Residential Soil[1] mg/kg	RSL Industrial Soil[1] mg/kg
Polycyclic Aromatic Hydrocarbons					
2-Methylnaphthalene	94-57-6	5	0.17	230	2,200
Acenaphthene	83-32-9	5	0.17	3,400	3,300
Acenaphthylene	208-96-8	5	0.17	NL	NL
Anthracene	120-12-7	5	0.17	17,000	17,000
Benzo(a)anthracene	56-55-3	5	0.05	0.15	2.1
Benzo(a)pyrene	50-32-8	5	0.005	0.015	0.21
Benzo(b)fluoranthene	205-99-2	5	0.05	0.15	2.1
Benzo(g,h,i)perylene	191-24-2	5	0.17	NL	NL
Benzo(k)fluoranthene	207-08-9	5	0.17	1.5	21
Chrysene	218-01-9	5	0.17	15	210
Dibenzo(a,h)anthracene	53-70-3	5	0.005	0.015	0.21
Fluoranthene	206-44-0	5	0.17	230	2,200
Fluorene	86-73-7	5	0.17	230	2,200
Indeno(1,2,3-cd)pyrene	193-39-5	5	0.05	0.15	2.1
Naphthalene	91-20-3	5	0.17	3.6	18
Phenanthrene	85-01-8	5	0.17	NL	NL
Pyrene	129-00-0	5	0.17	170	1,700

Notes:

[1] EPA RSLs for soils, May 2013; available at: http://www.epa.gov/reg3hscd/risk/human/rb-concentration_table/Generic_Tables/docs/master_sl_table_01run_MAY2013.pdf

CAS Chemical Abstracts Service
EPA US Environmental Protection Agency
µg/L Micrograms per liter
mg/kg Milligrams per kilogram
NL Not listed
RSL US EPA Regional Screening Level

TABLE B-2
FRANCIS STREET ASSESSMENT
SAMPLE TYPES, SAMPLING LOCATIONS, AND RATIONALE

Sample Location	Sample ID	Depth (inches)	Sample Type	Sample Location	Rationale
DU-01	FSA-SD-DU01	0 to 3	ISM-sediment	DU-01; in drainage ditch, upgradient of facility	Determine the presence or absence of contamination.
DU-02	FSA-SD-DU02	0 to 3		DU-02; drainage pathway from facility to drainage ditch	
DU-03	FSA-SD-DU03-A	0 to 3		DU-03; drainage ditch, downgradient of facility	
	FSA-SD-DU03-B				Replicate samples
	FSA-SD-DU03-C				
DU-04	FSA-SD-DU04-A	0 to 3		DU-04; drainage canal, upgradient of confluence with drainage ditch	Determine the presence or absence of contamination.
	FSA-SD-DU04-B				Replicate samples
	FSA-SD-DU04-C				
DU-05	FSA-SD-DU05-A	0 to 3		DU-05; drainage canal, downgradient of confluence with drainage ditch	Determine the presence or absence of contamination.
On site	FSA-SF-CT	0 to 6 (if possible)	5-point composite-soil	Concrete trench at northeast corner of former Seven Out property	
	FSA-SF-SCW	0 to 6	5-point composite-soil	Outside of south containment wall at location of 2004 Removal Assessment sample SO-SW	
Off site	FSA-SD-CO	0 to 3	5-point composite-sediment	Immediately downstream of the confluence of drainage ditch and drainage canal	

Notes:

CO	Confluence
CT	Concrete trench
DU	Decision unit
FSA	Francis Street Assessment
ID	Identification
ISM	Incremental Sampling Methodology
SD	Sediment
SF	Surface soil
SCW	South containment wall

TABLE B-3
FRANCIS STREET ASSESSMENT
QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Sample ID	Sample Type	Rationale
FSA-EB-01	Equipment rinsate blank (aqueous)	Evaluate whether decontamination procedures adequately clean sampling equipment. One equipment rinsate blank will be submitted.
FSA-FB-01	Field blank (aqueous)	Evaluate the potential for contamination of a sample from sources not associated with sample collection (ambient conditions). One field blank will be submitted for each lot of water used.
Original Sample ID	MS/MSD	Provide information about the effect of each sample matrix on the sample preparation procedures and measurement methodology. One MS/MSD sample will be designated for every 20 samples collected per matrix. One sediment ISM sample and one non-ISM sample will be designated for MS/MSD analysis.
FSA-SF-SCW-DUP	Field duplicate	Measure both field and laboratory precision. One duplicate sample will be collected for every 20 non-ISM samples collected.

Notes:

DU	Decision unit
DUP	Field duplicate
EB	Equipment rinsate blank
FB	Field blank
FSA	Francis Street Assessment
ID	Identification
ISM	Incremental sampling methodology
MS/MSD	Matrix spike/matrix spike duplicate
SF	Surface soil
SCW	South containment wall

TABLE B-4
FRANCIS STREET ASSESSMENT
ANALYTICAL PARAMETERS AND METHODS, REQUIRED SAMPLE CONTAINERS, PRESERVATION METHODS, AND HOLDING TIMES

ANALYTICAL PARAMETER	PARAMETER TO BE NOTED ON CHAIN-OF-CUSTODY RECORDS	MATRIX	ANALYTICAL METHOD[1]	NUMBER AND TYPE OF SAMPLE CONTAINER	PRESERVATION METHOD	SAMPLE HOLDING TIME
SOIL/SEDIMENT SAMPLES						
PAHs by SIM	PAH by SIM	Soil/Sediment	SW-846 Method 8270D with SIM	Three 32-ounce glass jars with Teflon-lined lid for ISM samples; one 4-oz glas jar with Teflon-lined lid for non-ISM samples (double volume for non-ISM MS/MSD samples)	Cool to ≤ 6 °C	14 days to extraction; extracts must be analyzed within 40 days following extraction.
AQUEOUS SAMPLES						
PAHs by SIM	PAH by SIM	Aqueous QC samples (field blank and equipment rinsate blank)	SW-846 Method 8270D with SIM	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to ≤ 6 °C	7 days to extraction; extracts must be analyzed within 40 days following extraction.

Notes:

[1] U.S. Environmental Protection Agency, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), available at the following web address: http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm.

≤ Less than or equal to
°C Degrees Celsius
MS/MSD Matrix spike/matrix spike duplicate
PAHs Polycyclic aromatic hydrocarbons
QC Quality control
SIM Selected ion monitoring

TABLE B-5
FRANCIS STREET ASSESSMENT
PERFORMANCE OR ACCEPTANCE CRITERIA

SOIL AND FIELD QUALITY CONTROL SAMPLES	
Analysis	**Analytical Method**
Polycyclic Aromatic Hydrocarbons by Selected Ion Monitoring	SW-846 Method 8270D
DATA QUALITY MEASUREMENTS	
Accuracy	Refer to EPA Region 4, SESD FBQSTP for *Soil Sampling* (SESDPROC-300-R2), December 2011; EPA Region 4, SESD FBQSTP for *Sediment Sampling* (SESDPROC-200-R2), September 2010; the SW-846 methods listed above; and the data validation guidance documents discussed in Sections 4.1 and 4.2 of this QAPP. Also refer to the field and laboratory protocols discussed in Section 1.4 of this QAPP for methods to be implemented to ensure accuracy of data.
Precision	Refer to EPA Region 4, SESD FBQSTP for *Soil Sampling* (SESDPROC-300-R2), December 2011; EPA Region 4, SESD FBQSTP for *Sediment Sampling* (SESDPROC-200-R2), September 2010; the SW-846 methods listed above; and the data validation guidance documents discussed in Sections 4.1 and 4.2 of this QAPP. Also refer to the field and laboratory protocols discussed in Section 1.4 of this QAPP for methods to be implemented to ensure the precision of data.
Representativeness	Sample representativeness will be achieved by following the EPA Region 4, SESD FBQSTP for *Soil Sampling* (SESDPROC-300-R2), December 2011; and EPA Region 4, SESD FBQSTP for *Sediment Sampling* (SESDPROC-200-R2), September 2010. Also refer to the field and laboratory protocols discussed in Section 1.4 of this QAPP for methods to be implemented to ensure the representativeness of data.
Completeness	The proposed sampling plan adequately addresses the site-specific conditions and potential contamination pathways.
Comparability	Sample and data comparability is expected to be achieved by conducting all field and laboratory work using the same, well-documented, uniform procedures.

Notes:

EPA Environmental Protection Agency
FBQSTP Field Branches Quality System and Technical Procedures, available at: http://www.epa.gov/region4/sesd/fbqstp/
SESD Science and Ecosystem Division
SW-846 U.S. Environmental Protection Agency, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), available at the following web address: http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm.

TABLE B-6
FRANCIS STREET ASSESSMENT
EQUIPMENT AND SUPPLIES

FIELD INSTRUMENTS	SAMPLE CONTAINERS	EQUIPMENT AND SUPPLIES	SAMPLE PROCESSING SUPPLIES	DECONTAMINATION SUPPLIES	MISCELLANEOUS SUPPLIES
Trimble GPS unit	32-ounce glass jars	stainless steel spoons	plastic baggies	buckets	digital camera
	1-liter amber glass jars	stainless steel bowls	coolers	Luminox	permanent markers
	4-ounce glass jars	pin flags	custody seals	brushes	logbooks
		nitrile gloves	labels	aluminum foil	garbage bags
		visqueen	laptop	spray bottles	first aid kit
		ultra-pure water	printer	table	eyewash
		incremental sampling device	paper	ASTM Type-2 certified organic-free water	measuring tape
			FedEx labels		
			duct tape		
			Bubble wrap		
			strapping tape		
			paper towels		

Notes:

ASTM	American Society for Testing and Materials
GPS	Global positioning system

ATTACHMENT 1

TESTAMERICA LABORATORY QUALITY ASSURANCE MANUAL

(Excerpt, One Page)

Title: Quality Assurance Program

Approvals (Signature/Date):

Margaret S. Sleevi 7/15/13
Margaret S. Sleevi Date
Quality Assurance Manager

7/15/13
William S. Cicero Date
Laboratory Director

Facility Distribution No. _____ **Distributed To:_____**