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SCANNED

July 30, 2019

Ms. Kim Kuhn
Bureau of Land and Waste Management
SC Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

RECEIVED
JUL 31 2019
SITE ASSESSMENT
REMEDIATION &
REVITALIZATION

Regarding: Bench Scale Treatability Study Work Plan
Shakespeare Composite Structures Site
Newberry, South Carolina
SCDHEC VCC Number 14-6271-RP

Dear Ms. Kuhn:

Please find attached one hard copy and one electronic copy (on compact disc) of the Bench Scale Treatability Study (BSTS) Work Plan for the Shakespeare Composite Structures Site (the Site) located in Newberry, South Carolina. This work plan is being submitted at the request of the South Carolina Department of Health and Environmental Control (SCDHEC) as a follow-up to the Feasibility Study Work Plan submittal in May 2019.

Should you have any questions regarding the work plan, please feel free to contact me at your convenience.

Sincerely,
AECOM Technical Services, Inc.

Scott E. Ross, P.G.
Project Manager
803-201-9662
scott.ross@aecom.com

RECEIVED
JUL 30 2019
SC Department of
Health & Environmental Control

cc: Mr. Dean Weeks – Signify North America

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Bench Scale Treatability Study Work Plan Shakespeare Composite Structures Site

RP-VCC-146271-RP
Signify North America

July 2019

Project # 60534283

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Newberry Bench-Scale Treatability Study Table of Contents

Figures

Tables

List of Acronyms

BLS	below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2 – dichloroethene
COC	chemical of concern
CVOCs	chlorinated volatile organic compounds
1,1-DCA	1,1-dichloroethane
DO	dissolved oxygen
DOT	Department of Transportation
DPT	direct push technology
EI	Expanded Investigation
ESA	environmental site assessment
FS	feasibility study
FT	feet
HASP	Health and Safety Plan
i	groundwater gradient
ID	inside diameter
IDW	investigation derived waste
MCL	maximum contaminant level
µg/L	micrograms per liter
mg/L	milligrams per liter
MNA	monitored natural attenuation
NCP	National Contingency Plan
OD	outside diameter
ORP	oxidation-reduction potential
OSWER	Office of Solid Waste and Emergency Response
PCE	tetrachloroethene
PENAC	Philips Electronics North America Corporation
PID	photoionization detector
PLNA	Philips Lighting North America
PPE	personal protective equipment
PVC	polyvinyl chloride
QC	quality control
RCRA	Resource Conservation and Recovery Act

RI	remedial investigation
RP-VCC	responsible party-voluntary cleanup contract
SC	specific conductance
SCDHEC	South Carolina Department of Health and Environmental Control
SI	site investigation
SSL	soil screening level
SU	standard unit
SV	soil vapor
SVS	soil vapor sample
TCE	trichloroethene
trans-1,2-DCE	trans-1,2-dichloroethene
ug/kg	micrograms per kilogram
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VCC	voluntary cleanup contract
VOCs	volatile organic compounds

Section 1. Introduction

The Shakespeare Composite Structures Site (the "Site"), located in Newberry, South Carolina is participating in a voluntry cleanup program with the South Carolina Department of Health and Environmental Control (SCDHEC). The Site is currently listed as responsible party – voluntary cleanup contract (RP-VCC) number RP-VCC-146271-RP. As part of the RP-VCC process the Site has undergone a Remedial Investigation (RI), which was completed in November 2018. The RI efforts delineated a plume of dissolved phase chlorinated volatile organic compounds (CVOCs) in Site groundwater. Based on the resuls of the RI, it is anticipated that an active groundwater treatment remedy will be required for at least a portion of Site groundwater. The RP for this Site [Signify North America – (Signify)] is conducting several activities that will be incorporated into the completion of a Feasibility Study (FS) for potential remedial efforts for CVOC-impacted groundwater. The next planned activity to be performed at the Site is a bench-scale treatability study (BSTS). This document serves as the work plan for the BSTS.

1.1 Purpose

As previously indicated, it is anticipated that an active groundwater treatment remedy will be required for at least a portion of the CVOC-impacted Site groundwater.. In order to develop a more definitive groundwater remedial plan and prior to developing an FS, this BSTS is being conducted to evaluate and determine the most effective Site-specific in situ bioremedation approach. The BSTS will assess the potential of several variations of in situ bioremediation to treat the CVOCs detected in Site groundwater.

Independent of the BSTS, total oxidant demand (TOD) permanganate testing will also be conducted. The results from TOD analysis can be used to conduct a more accurate evaluation of an in situ chemical oxidation approach for CVOC-impacted Site groundwater during the FS process.

1.2 Facility and Site Setting

The Site is located on US Highway 76, approximately 1 mile northwest of Newberry, South Carolina **(Figure 1-1**). The Site is centered on the Valmont Composite Structures facility (the Facility, formerly known as Shakespeare Composite Structures, and includes several surrounding properties (**Figure 1-2**). The facility was originally opened to produce fiberglass products and has continued to be used for this process. Operations at the facility include the design and manufacture of large fiberglass utility poles and cross arms, and a variety of other fiberglass outdoor products such as posts, signs, sheet piling, and sign posts. Manufacturing is conducted inside two separate buildings – the Main Building and the Pole Winder building.

In addition to the Facility property, the Site includes several surrounding properties (**Figure 1-2**). General land use surrounding the facility consists of agricultural, residential, undeveloped and commercial/light industrial properties (AECOM Technical Services, Inc. [AECOM], 2018).

Topography of the Site is generally flat on the Facility property. Land surface elevations generally decrease to the southwest, west, and north moving away from the Facility property. Surface elevations range from approximately 562 ft mean sea level (msl) on the east side of the Facility to less than 520 ft msl along an unnamed intermittent stream located to the north of the Facility.

A more detailed description of the facility's operation, surrounding property usage, and site topographic setting information is included in the RI Report (AECOM, 2018).

1.3 Previous Investigations

Several phases of investigative efforts have been performed at the Site. This includes multiple efforts prior to execution of the VCC. The pre-VCC investigative efforts are as follows:

- Phase II Environmental Site Assessment – collection of initial soil and groundwater samples from the Shakespeare facility (February through April 2014);
- Site Investigation – Collection of additional soil and groundwater samples from the Shakespeare facility along with several groundwater samples from surrounding private parcels (May 2014 through August 2014); and
- Expanded Investigation - Collection of additional shallow groundwater samples and evaluation of shallow bedrock for impacted groundwater on surrounding properties (August – September 2014).

An RP-VCC between the SCDHEC and Philips Electronics North America Corporation (PENAC) was executed in September 2014. Once this VCC was executed, investigative efforts were performed as part of the RI process.

The RI was implemented in two phases, beginning in 2014 after execution of the VCC. The RI was conducted to further evaluate the vertical and/or horizontal extent of previously identified CVOCs in soil and groundwater; assess additional potential areas of interest for either secondary sources of VOCs that could be contributing to soil and/or groundwater impacts; evaluate potential vapor intrusion pathways; determine risk to potential human and ecological receptors; and provide additional data needed to develop a remedial strategy for the Site.

- Phase I RI - Evaluation of intermediate water quality and delineation of CVOCs to east, south, and west; and

- Phase II RI - Additional evaluation of subsurface soil quality on the former Shakespeare property and delineation of CVOCs in the shallow groundwater zone to the north and the bedrock interval across the Site.

Investigative efforts have determined that the source areas for CVOCs present in groundwater originated from historical operational practices that impacted groundwater beneath the western portions of the Main and Pole Winder Buildings located on the Facility property. CVOCs subsequently migrated both

horizontally and vertically within groundwater away from the identified source areas and impacted multiple aquifer depth intervals beyond the Facility property. CVOCs have migrated within the water table and saprolite zones primarily through natural dispersion. Vertical migration downgradient of the source areas within the saprolite and into underlying granitic bedrock was influenced by numerous privately operated water supply wells located to the west and southwest of the Facility.

The investigative efforts defined the extent of CVOC-impacted groundwater at multiple aquifer depth intervals. Analytical results were screened against United States Environmental Protection Agency maximum contaminant levels (MCLs) to identify compounds of interest in groundwater beneath the Site. Concentrations of trichloroethene (TCE), cis-1,2 Dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) exceeded their respective MCLs in several groundwater samples collected from the Site. Of these, TCE was detected most frequently in the collected groundwater samples. The elevated concentrations of CVOCs are most widespread in the shallow zone (upper portion of the water table aquifer).

TCE and cis-1,2-DCE also exceeded their respective MCLs in one or more samples collected in the intermediate (saprolite) zone. Of these, TCE was again detected most frequently above its MCL in groundwater samples collected from several private water supply wells screened in the underlying granitic bedrock and in monitoring wells installed in the bedrock.

Because TCE was detected most frequently and at the highest concentrations at the Site, this compound has been used to represent the extent of impact in groundwater in each groundwater zone beneath the Site. **Figures 1-3** through **1-5** depict the extent of TCE in groundwater beneath the Site.

A more detailed discussion of the results of the investigative efforts performed at the Site to date in included in the RI Report (AECOM, 2018).

1.4 FS Work Plan

The RI Report for the Site was submitted to the SCDHEC in November 2018 and approved in March 2019. Following approval of the RI Report, SCDHEC requested that Signify develop an FS Work Plan for the Site. The purpose of the FS Work Plan was to outline the proposed information that would be included in the Site FS. The FS Work Plan was submitted to SCDHEC on May 15, 2019. SCDHEC approved the FS Work Plan on June 4, 2019.

In their June 4, 2019 approval letter, SCDHEC requested that Signify submit a BSTS Work Plan by July 31, 2019. The BSTS is detailed in the following sections of this work plan.

Section 2. Field Activities

The BSTS will require collection of both soil and groundwater samples from the Site. AECOM field personnel and a drilling contractor will be on-site to conduct the required sampling activities. All field personnel will follow appropriate procedures and guidelines as specified in the Health and Safety Plan for the project Site (AECOM, 2017a).

The BSTS field effort will include collection of soil and groundwater samples by AECOM from an area of elevated TCE concentrations. Based on recent concentrations and ease of access for drilling and sampling efforts, these samples will be collected from an area between MW-10 and MW-10I, located just north of the Facility property on the Dickert property (**Figure 2-1**). The sampling efforts will include advancement of multiple soil borings at locations between MW-10 and MW-10I. It will also include purging and collection of groundwater samples from wells MW-10 and MW-10I. **Table 1** provides monitoring well construction details for wells MW-10 and MW-10I and other well pairs located in the near vicinity of the proposed BSTS study area.

Prior to mobilization for the field effort, in accordance with South Carolina State Law, AECOM personnel will notify SC 811 requesting a utility location/clearance effort. Once the SC 811 utility locate effort has been completed, AECOM will contract a private utility location contractor (Reed Tech, Inc.) based in Columbia, South Carolina to also scan the proposed drilling location between MW-10 and MW-10I for underground utilities and/or other obstructions.

Once the private utility location contractor has completed scanning of the area, AECOM will oversee advancement of multiple soil borings. The soil borings will be advanced at locations approximately mid-way between MW-10 and MW-10I. Soil borings will be advanced to allow collection of at least two four-foot long soil cores from each boring. The soil cores will be collected from depths equivalent to the center depth of the well screen intervals (23 to 27 ft below ground surface [bgs]) in MW-10 and 34 to 38 ft bgs in MW-10I) for each well.

Soil borings will be advanced using a Geoprobe^{TM} direct push drill rig. Borings will be advanced using a 2.25 outside diameter (O.D.) stainless steel core barrel fitted with a disposable acetate liner to the desired depth. A slightly larger (3 inch OD) over-ride casing will then be advanced over the core barrel, to the same depth. Once the over-ride casing is advanced to the bottom of the sample interval, the core barrel will be retrieved from the borehole, allowing removal of the disposable acetate liner containing the soil core. The core liners will then be sealed at both ends using a flexible cap wrapped with tape and prepared for shipment to the laboratory performing the BSTS. The soil cores collected for the BSTS will be identified as MC-01S-# and MC-01I-# and will be collected from the shallow and intermediate aquifer depths, respectively. The # will represent the bottom depth of the collected soil core.

In addition to the soil cores, approximately six (6) liters of groundwater (three liters per well) will be collected from the MW-10 and MW-10I for use with the BSTS. Each of these wells will be purged and sampled in accordance with the procedures described in the Phase II RI Work Plan (AECOM, 2017).

The collected soil and groundwater samples will be containerized and shipped to SIREM Laboratories (SIREM) in Ontario, Canada for BSTS analysis. **Table 2** summarizes sample locations and the associated laboratory analyses.

In addition to the collection of the BSTS soil and groundwater samples, soil and groundwater samples will be collected for TOD permanganate testing. Similar to the BSTS soil sample collection process previously described, one soil boring will be advanced to allow for the collection of two four-foot long soil cores from each boring. The soil cores will again be collected from depths equivalent to the center depth of the well screen intervals (23 to 27 ft below ground surface [bgs]) in MW-10 and 34 to 38 ft bgs in MW-10I) for each well. Only 200 grams of soil is required to be collected for TOD permanganate analysis so the bottom two feet from each collected soil core will be used. The core liners will be sealed at both ends using a flexible cap wrapped with tape and prepared for shipment to the laboratory performing the TOD permanganate testing. These soil cores will be identified as MC-02S-# and MC-02I-# (**Table 2**).

In addition to the soil cores, approximately one (1) liter of groundwater (500 milliliters per well) will be collected from the MW-10 and MW-10I for use with TOD testing. These soil and groundwater samples will be shipped to Redox-Tech, LLC in Cary, North Carolina for testing (**Table 2**).

All soil and groundwater samples will be appropriately managed from the time of collection through the time of relinquishment to ensure sample quality and representativeness. Each sample will be assigned a unique sample ID (as previously described) for tracking purposes. Sample labels will be affixed to each sample container to identify the sample, the date and time of collection, site name, the lab analyses, preservative if any, sample type, and the field personnel who collected the sample. Samples will be placed on ice immediately after collection. Chain of custody forms and samples will be packed in coolers with ice. Custody seals will be affixed to the lid interface of each cooler to ensure that the samples have not been tampered with. Coolers will be shipped to the appropriate analytical laboratory.

A limited amount of investigative derived waste (IDW) is expected to be generated during this field effort. Any IDW that is generated will be containerized in 55 gallon DOT approved drums that will be staged on the Facility property until disposal can be arranged at a later date.

All re-usable, non-disposable field equipment utilized during this sampling effort will be cleaned/decontaminated between sample locations in accordance with procedures described in the Phase II RI Work Plan (AECOM, 2017b).

Section 3. Bench-Scale Treatability Study Approach and Methodology

The BSTS will evaluate natural and enhanced anaerobic biodegradation processes for TCE using geologic materials and groundwater collected from the Site as described in Section 2.0. The BSTS study will consist of the following four tasks:

- Initial Buffering Assay;
- Microcosm construction;
- Microcosm incubation, sampling, and analysis; and
- Reporting.

3.1 Initial Buffering Assay

In an anaerobic glove box, homogenized Site geologic materials and groundwater will be back titrated with a saturated sodium bicarbonate ($NaHCO_3$) solution to provide an estimate of how much base will be required to adjust the groundwater/solids slurry to a pH of 7.0±0.5 for 5 days. Treatment and control reactors will be prepared in duplicate in 110 milliliter (mL; nominal volume) glass bottles with Site geologic material and groundwater to yield an approximate 1:4 ratio by weight as outlined in **Table 3**.

Table 3: Base Titration Controls and Treatment

	samples
Control (Geologic material and groundwater)	2
Treatment (Geologic material and groundwater + sodium bicarbonate)	2
Total	4

The control reactors will not receive any amendments and the pH will be monitored at 24, 48, 72 and 120 hours. The treatments will be titrated with a saturated $NaHCO_3$ solution (concentration to be determined) to a pH of 7.0±0.5. The pH will be monitored initially after each incremental addition of $NaHCO_3$ to pH 7.0 and daily for 5 days thereafter. The information obtained regarding the amount of buffer required will be used to adjust the pH during subsequent experiments as described below.

3.2 Microcosm Construction

Anaerobic microcosms will be constructed by filling 250 mL; nominal volume) glass bottles with approximately 200 mL of site groundwater and 60 grams (g) of geologic materials, leaving a nominal headspace for gas production (e.g., carbon dioxide [CO_2] and/or methane). To maintain anaerobic conditions the microcosms will be constructed in a disposable anaerobic glove-bag and will be stored and sampled in an anaerobic chamber. The treatment microcosms will be amended with the Site-specific contaminants to reach desired target concentrations (MCLs; TCE- 5 ug/L, Cis-1,2 DCE -70 ug/L, and VC – 2 ug/L).

The groundwater for the sterile control microcosms will be amended with mercuric chloride and sodium azide to inhibit microbial activity and the geologic materials will be autoclaved. Anaerobic intrinsic control microcosms will be used to measure intrinsic biodegradation activity and will not receive electron donor amendments. Treatment microcosms will be amended with EDS-ER™ (Tersus Environmental [Tersus], Wake Forest, NC), an emulsified vegetable oil (EVO) product and MicroEVO™ ISCR (Tersus), a zero valent iron (ZVI) product suspended in EVO. The concentrations of the amendments will be based on Tersus' recommendations and in consultation with AECOM. One of the EDS-ER™ amended treatments and one of the MicroEVO™ ISCR amended treatments will be buffered using $NaHCO_3$ to a pH of 7.0±0.5. The amount of buffer to be used will be based on the results of the initial buffering assay (Task 1). One replicate of each anaerobic control and treatment will be amended with resazurin to monitor redox conditions.

After reducing conditions are achieved (typically 2 to 4 weeks after electron donor addition), the buffered treatment microcosms will be amended with a dehalorespiring microbial consortium (KB-1® Plus) to assess the ability of this culture to promote or accelerate complete reductive dechlorination. KB-1® Plus is a natural microbial consortium containing *Dehalococcoides* (*Dhc*) bacteria that dechlorinate chlorinated ethenes to ethene. The formulation of KB-1® Plus for this application has demonstrated complete reductive dechlorination below pH 6.0 and has been pre- conditioned by SIREM at pH 5.8-6.0.

Controls and treatments will be constructed in triplicate as detailed in **Table 4**. Microcosms will be sealed with Mininert™ valves to allow repetitive sampling of each microcosm, and to allow addition of amendments to sustain metabolic/biodegradation activities.

Table 4 Treatments and Controls for Biotreatability Study

	Treatment/Control	Description	Number of
1	Anaerobic Sterile Control	Autoclaved and amended with mercuric chloride and sodium azide	3
2	Intrinsic Control	No amendments	3
3	KB-1® Plus Bioaugmented, pH buffered and MicroEVO® ISCR Amended	pH Buffered to neutral, amended with EDS-ER™ and bioaugmented with KB-1® Plus	3

4	MicroEVO® ISCR Amended With optional KB-1® Plus Bioaugmentation	Amended with MicroEVO™ ISCR and optionally bioaugmented with KB-1® Plus	3
5	KB-1® Plus Bioaugmented, pH Buffered and EDS-ER® Amended	pH Buffered to neutral, amended with EDS-ER™ and bioaugmented with KB-1® Plus	3
		Total Microcosms	15

3.3 Microcosm Incubation, Sampling and Analysis

Biotreatability microcosms will be incubated for a period of four to six months. Aqueous samples will be collected from the control and treatment microcosms every two to three weeks for analysis of chlorinated VOCs (TCE, cis-,1,2-DCE, and V]) and dissolved hydrocarbon gases (DHGs, e.g., ethene, ethane or methane). In addition, at three selected time points, the electron donor amended microcosms will be sampled for analysis of volatile fatty acids (e.g., lactate, acetate, and propionate) to permit evaluation of electron donor fermentation and longevity. Anions (i.e., sulfate, nitrate, chloride, and phosphate) will be evaluated at four selected time points to assess the onset of reducing conditions, and pH will be measured as required.

Table 5 provides a summary of the sampling parameters and frequency. Sampling intervals for individual treatments may be modified (either shorter or longer intervals) during the BSTS based on observed microbial activity, chlorinated VOC degradation rates, and depletion of electron donors/acceptors.

Table 5 Microcosm Sampling and Analysis

Analyte	Applicable Microcosms	Sample Events	Total Number of Analyses
Chlorinated VOCs and DHGs	15	7 + 3 baseline	108
VFAs	9	3	27
Anions	15	4 + 3 baseline	63
pH	15	As required	to be determined

3.4 Reporting

SiREM will provide monthly updates to AECOM via email. SiREM will tabulate the study data and will prepare a report containing the methodology, all data generated, and an interpretation of the results produced from the BSTS. A draft report will be provided to AECOM for review and comment, and a final report will be provided after receipt of comments on the draft version.

Section 4. Schedule and Reporting

Information collected from the BSTS may be used to determine the most appropriate injection product(s) for a proposed field-scale pilot study to be conducted in the vicinity of the MW-10/MW-10I well cluster. The anticipated duration of the TS is between four and six months. Once the BSTS is complete, AECOM will prepare a brief letter report summarizing the BSTS activities and associated results. The final summary report provided by SIREM will be included as an appendix to the BSTS summary report. If the BSTS demonstrates success at meeting the MCLs for the Site-related contaminants of concern (COC), the report may include recommendations for materials to be used for injection during a future field-scale pilot study.

Section 5. References

AECOM, 2017a. Health and Safety Plan, Remedial Investigation - Shakespeare Composite Structures, Newberry, South Carolina. August 2017.

AECOM, 2017b. Phase II Remedial Investigation Work Plan - Shakespeare Composite Structures, Newberry, South Carolina. August 2017.

AECOM, 2018. Remedial Investigation Report, Shakespeare Composite Structures, Newberry, South Carolina. November 2018.

AECOM, 2019. Feasibility Study Work Plan, Shakespeare Composite Structures, Newberry, South Carolina. May 2019

FIGURES

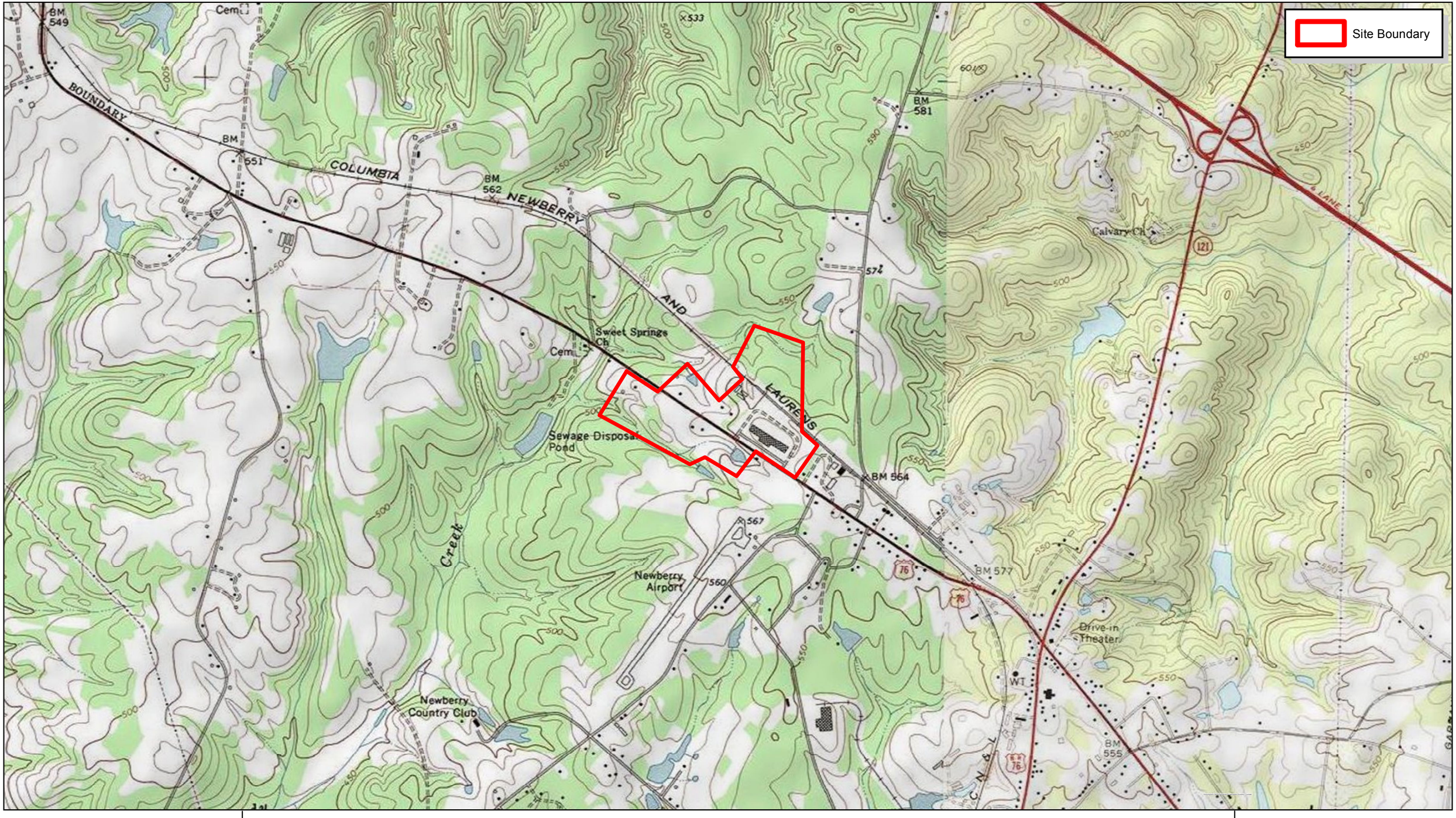

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Figure 1-1: Site Location Map

Shakespeare Composition Structures
Newberry, South Carolina

Project No.: 60534283; Prepared by: JG; Date: 5/10/2018.

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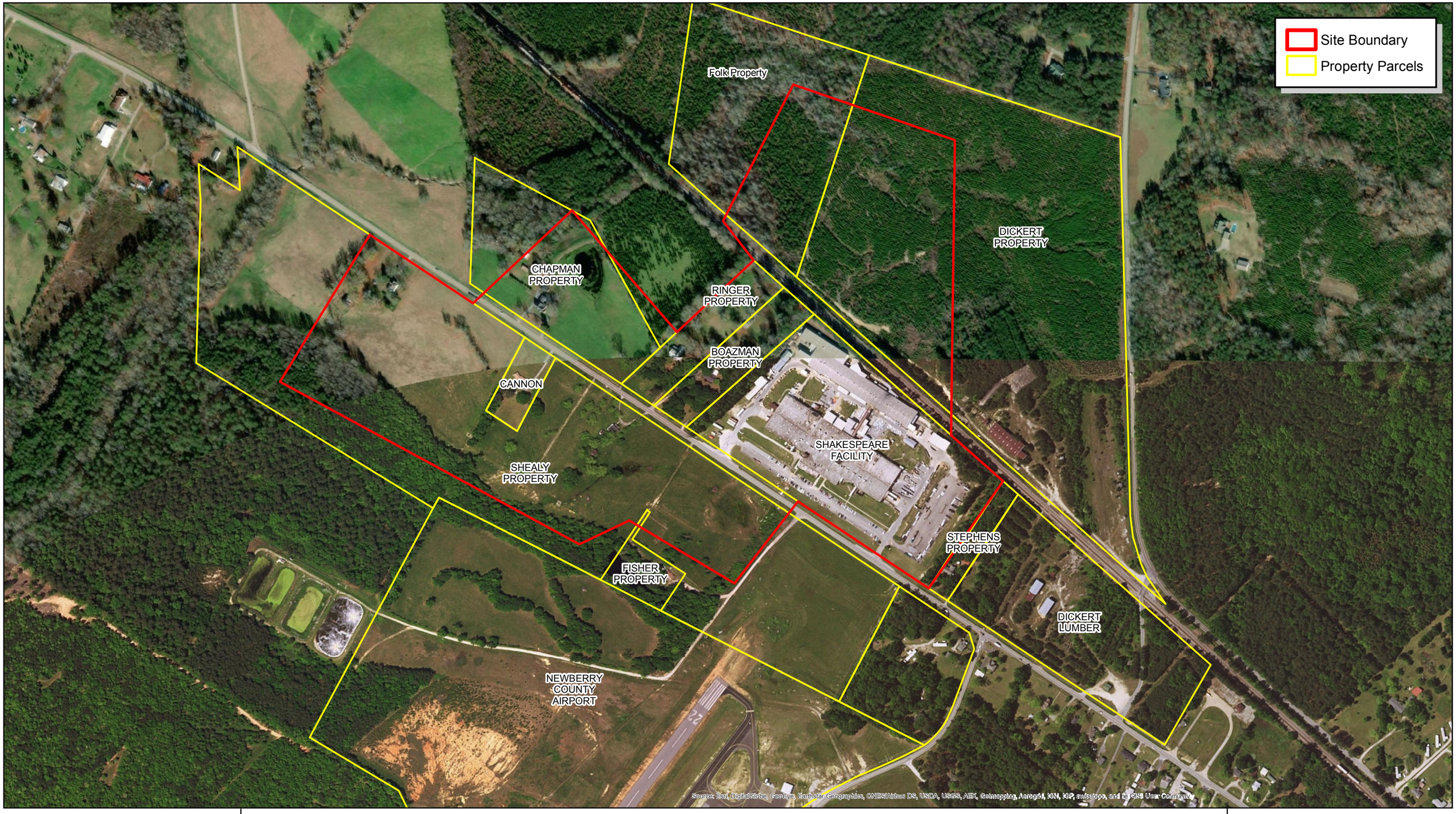

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Figure 1-2: Site Plan

Shakespeare Composition Structures
Newberry, South Carolina

Project No.: 60534283; Prepared by: JG; Date: 5/10/2018.

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0 225 450 900 Feet

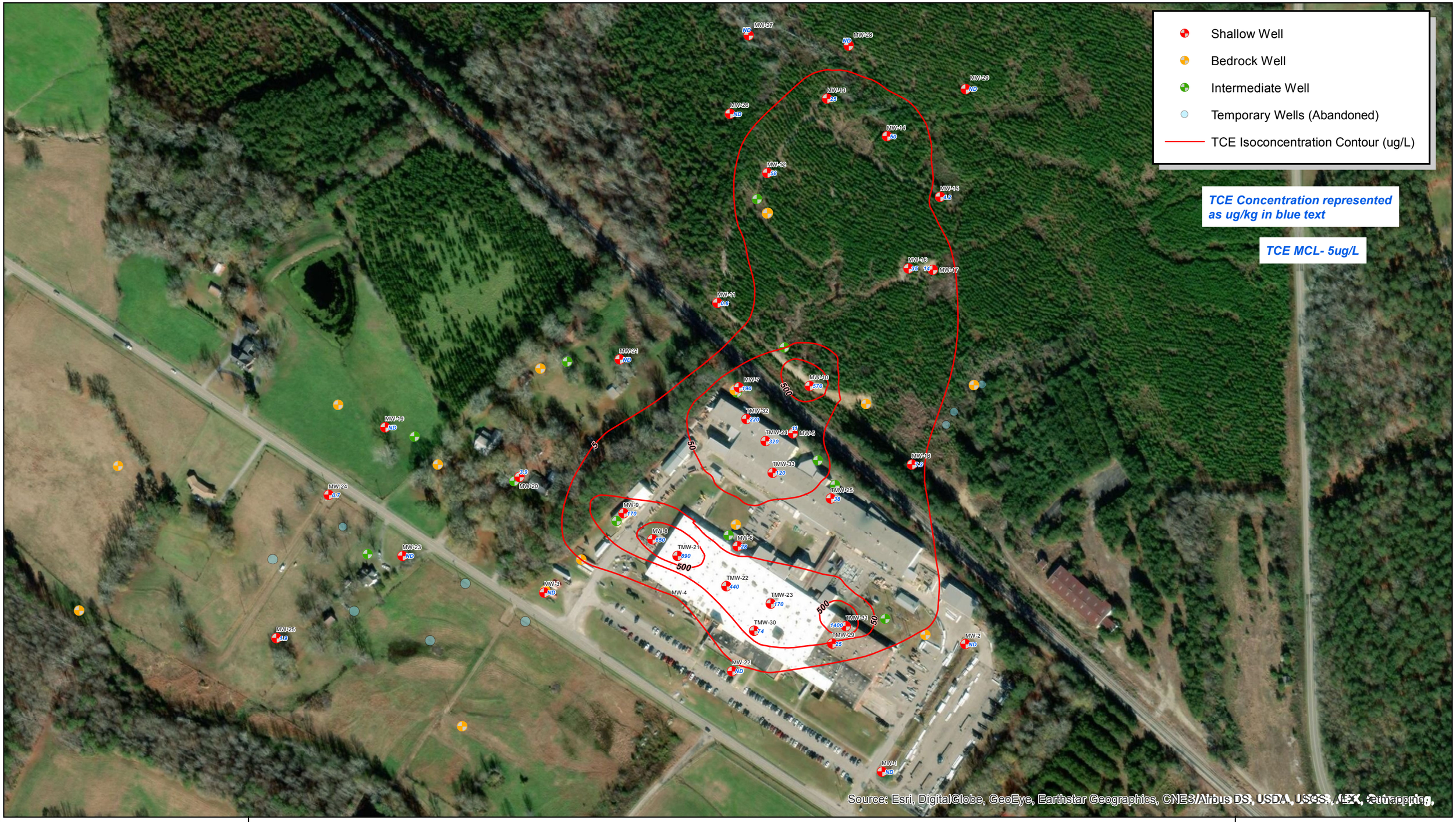

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Figure 1-3: TCE Concentration in Shallow Zone

Shakespeare Composition Structures
Newberry, South Carolina

Project No.: 60534283; Prepared by: JG; Date: 6/11/2018.

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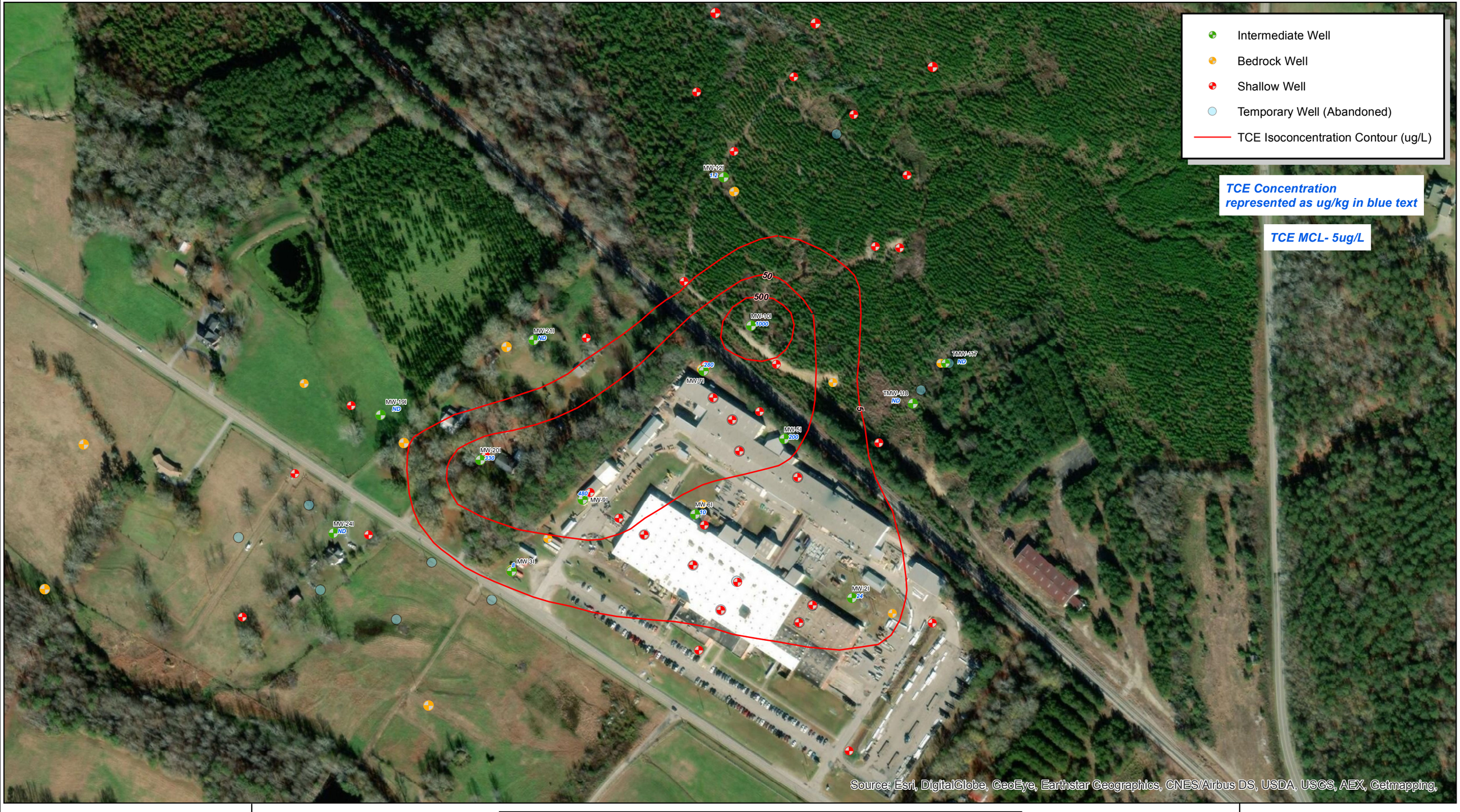

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Figure 1-4: TCE Concentration in Intermediate Zone

Shakespeare Composition Structures
Newberry, South Carolina

Project No.: 60534283; Prepared by: JG; Date: 6/11/2018.

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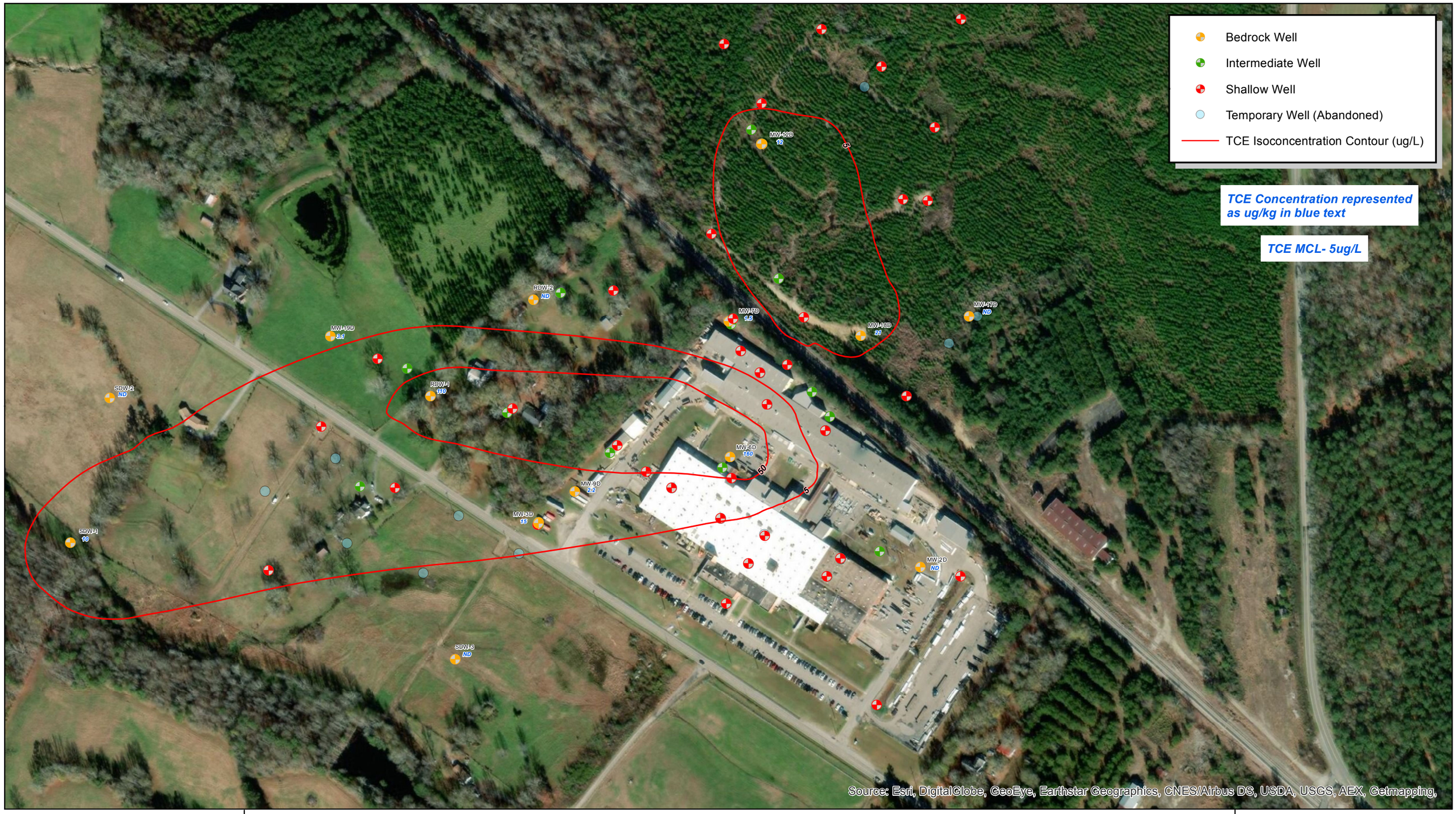

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Figure 1-5 : TCE Concentration in Bedrock

Shakespeare Composition Structures
Newberry, South Carolina

Project No.: 60534283; Prepared by: JG; Date: 6/11/2018.

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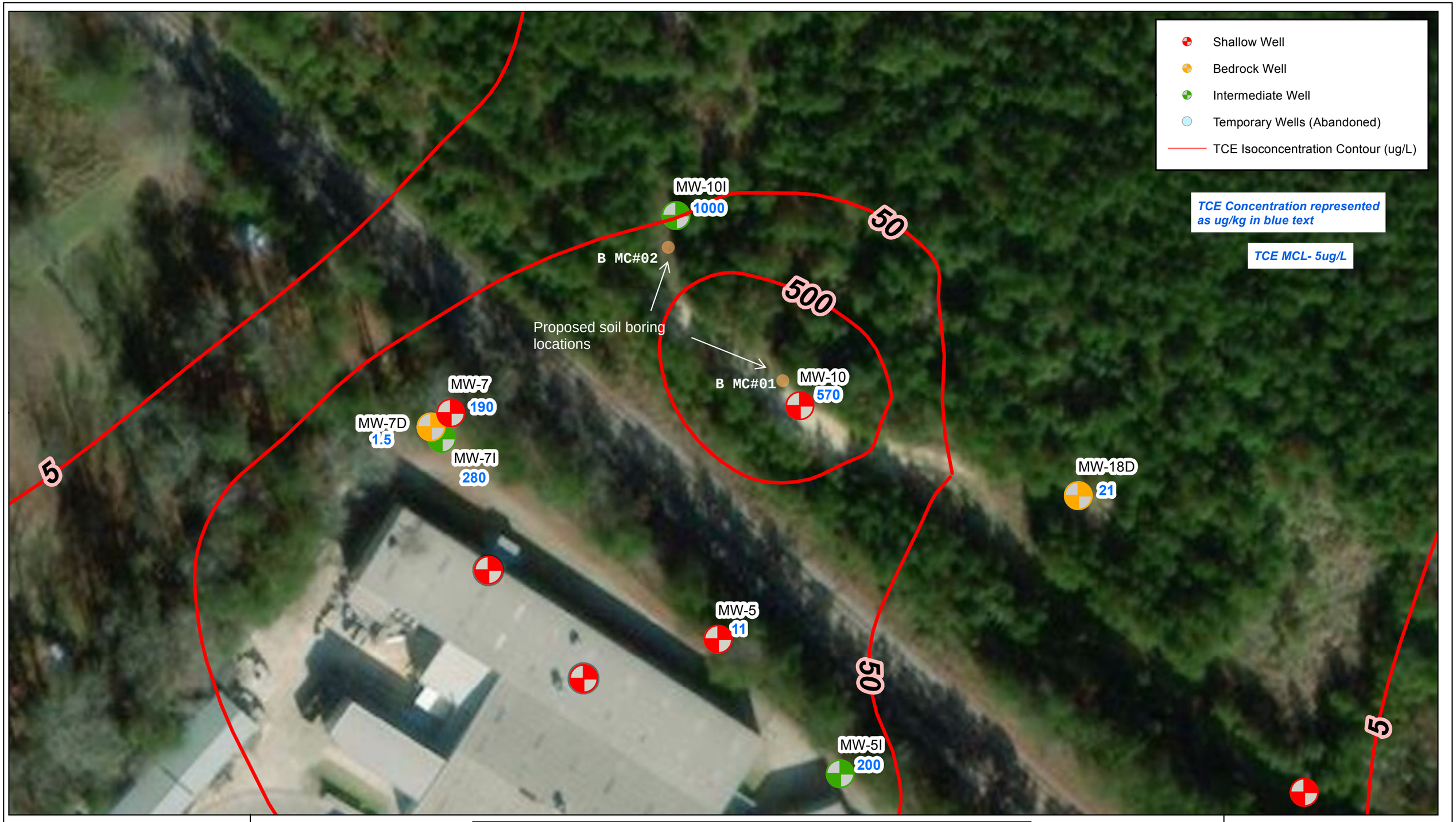

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Figure 2-1: Proposed BSTS Sample Collection Locations

Shakespeare Composition Structures
Newberry, South Carolina

Project No.: 60534283; Prepared by: JG; Date: 7/23/2018.

N
W E
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0 50 100 Feet

Document Path: G:\Projects\Active\60328308_Shakespeare\map\524201812_1 TCE Concentrations in BSTS Collection Area.mxd

TABLES

Table 1
Permanent Well Summary Table
Bench Scale Treatability Study Area
Shakespeare Composite Structures Site
RP-VCC-14-6271-RP
Newberry, SC

Well ID	Location and Purpose	TD	Screen Interval	Diameter	Material	TOC Elevation	Ground Elevation	Depth to Bedrock	Top of Bedrock Elevation	TD Elevation
Shallow Wells										
MW-5	Former Shakespeare property. Permanent well installed at former location of TMW-11	26	15.8-25.8	2 inch	Sch 40 PVC	557.74	557.74	----	-----	531.74
MW-7	Former Shakespeare property. Permament well installed at former location of TMW-16	26	14.8-24.8	"	"	554.72	554.72	----	----	528.72
MW-10	Dickert property - Former Location of TMW-42	30.32	20.3 - 30.3	"	"	550.96	550.96	42	508.96	520.64
Intermediate Wells										
MW-5I	Fomer Shakespeare property - east of MW-5	57	47 - 57	2 inch	Sch 40 PVC	559.70	559.6	56	503.60	502.6
MW-7I	Fomrer Shakespeare property - adjacent to MW-7	47.1	37.1 - 47.1	"	"	560.07	555.3	----	----	508.2
MW-10I	Dickert property - northeast of MW-10	41	31 - 41	"	"	548.4	548.5	----	----	507.5

TABLE 2
Analytical and Testing Program
Bench-Scale Treatability Work Plan
Shakespeare Composite Structures Site
Newberry, South Carolina

Monitoring Well and IDW Samples				
Sample ID	TCL VOCs (8260B)	SiREM	TOD Permanganate	Comments
MW-10		X		Three liters of water
MW-10I		X		Three liters of water
MW-10			X	500 mL of water in non-preserved glass container
MW-10I			X	500 mL of water in non-preserved glass container
IDW Aqueous-01	X			
Geoprobe Macro-Core (MC) Soil Samples				
ID		SiREM	TOD Permanganate	Comments
MC-01S-#		X		4 feet of soil core (~23-27 feet bgs)
MC-01I-#		X		4 feet of soil core (~34-38 feet bgs)
MC-02S-#			X	Bottom 2 feet of soil core (~25 to 27 feet bgs)
MC-02I-#			X	Bottom 2 feet of soil core (~36 to 38 feet bgs)

Notes:
- Depth of the base of sample interval
bgs - below ground surface
ID - Identification
IDW - Investigation-derived Waste
TCL - Target compound list
TOD - Total Oxidant Demand
VOCs - Volatile Organic Compounds

About AECOM

AECOM (NYSE: ACM) is built to deliver a better world. We design, build, finance and operate infrastructure assets for governments, businesses and organizations in more than 150 countries.

As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges.

From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM companies had revenue of approximately US$19 billion during the 12 months ended June 30, 2015.

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