

51025



AECOM
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Greenville, SC 29615

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January 15, 2025

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SITE ASSESSMENT,
REMEDICATION, &
REVITALIZATION

Ms. Genevieve Keller-Milliken
South Carolina Department of Environmental Services
Division of Site Assessment, Remediation, and Revitalization
Bureau of Land and Waste Management
2600 Bull Street
Columbia, South Carolina 29201

Re: Work Plan for Geoprobe® Feasibility and ROI Field Injection Testing
Monitoring Well Installation Permit Request for Temporary Wells
Former Shakespeare Composite Structures Site
Newberry County
Voluntary Cleanup Contract 14-6271-RP
Site ID # 51025

Dear Ms. Keller-Milliken:

Signify North America (Signify) and AECOM Technical Services, Inc. (AECOM) recently completed a Feasibility Study (FS) for groundwater remediation at the former Shakespeare Composite Structures site (the Site). The Site is centered on what is now known as the Valmont Composite Structures (Valmont) facility in Newberry, South Carolina. The FS Report was submitted to the South Carolina Department of Health and Environmental Control (SCDHEC – now referred to as the South Carolina Department of Environmental Services – SCDES) and was subsequently approved by the Department in June 2024.

The preferred remedy from the FS Report is Alternative 5: in situ chemical oxidation (ISCO), in situ chemical reduction (ISCR), in situ adsorption (ISA), monitored natural attenuation (MNA), institutional controls (ICs), and containment via cover. In preparation for implementation of that remedy, AECOM wishes to conduct a Geoprobe® feasibility and radius of influence (ROI) field injection test in the next month or so. We plan to install six additional temporary groundwater injection points for evaluating the approved remedy. These points will be installed using a model 3230DT Geoprobe®, to determine if this style rig can drill to the target depths in the intermediate depth groundwater zone aquifer (saprolite). If this technology can achieve the desired depths, then use of rotasonic drilling technology will not be required for the full-scale injections, resulting in potentially significant cost savings. This injection field test has also been designed to evaluate the radius of influence that could be achieved with the injectant in the intermediate depth zone.

Injection Test Locations

The objective of the injection test is to determine and evaluate site-specific subsurface characteristics for the intermediate zone aquifer including the injection radius of influence (ROI) and optimal injection flowrates and pressures. **Figure 1** shows the location of the proposed injection test areas, which will include up to two injection points installed at each of the three locations near monitoring wells MW-5I, MW-7I, and MW-9I.

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Other location information is contained in the following figures:

Figure 3: Site Location Map

Figure 4: Site Plan

Figure 5: Full Scale Area of Review

Figure 6: Topographic Map

Figure 7: Wells and Elevation in Intermediate Zone

Well Installation Methods

The injection test will include installation of two temporary direct push technology (DPT) injection points into the intermediate depth groundwater zone aquifer adjacent to existing wells MW-5I, MW-7I, and MW-9I using a Geoprobe® 3230DT rig for a total of six injection points. Each injection point will be installed with the intent of delivering injection solution over a 10-foot interval. The depths of the injection borings will be equivalent to the adjacent intermediate monitoring wells, ranging between approximately 40 to 60 feet below ground surface (bgs). A typical injection point detail is shown in the attached **Figure 2A**. The injection design details which AECOM included in our underground injection control (UIC) permit application, are shown in **Table 1**. The drilling and installation of the temporary DPT injection points will be completed by a South Carolina licensed driller.

A groundwater remediation services contractor, Regenesi[®] Remediation Services, will facilitate the mixing of water, sodium chloride (NaCl), and fluorescein to form the tracer solution. Water will be obtained from a fire hydrant located at the front of the facility and transported to the injection areas. The tracer solution will be injected into each temporary DPT injection point at up to two points at a time using an injection manifold. Injection will be conducted across the 10 foot interval using a bottom-up or top-down approach depending on lithology, and Regenesi will monitor injection flowrates and pressures.

As the tracer solution is pumped into the intermediate zone aquifer, an AECOM representative will monitor the change in water level, specific conductivity, and visual water appearance in nearby wells screened within the intermediate zone.

The set up for the injection test will include the installation of up to six temporary piezometers (up to two at each injection area). The six piezometers will be installed at various distances from the injection points. These temporary piezometers will be constructed of one-inch diameter Schedule 40 polyvinyl chloride (PVC) blank riser casing attached to five-foot long, 0.020-inch PVC screens that are set within the targeted ten-foot injection depth interval. A typical temporary piezometer is shown in **Figure 2B**. A completed application for monitoring well installation, for the temporary piezometers, is attached to this work plan.

AECOM will install down-well dataloggers (or similar measuring devices) to continuously measure water levels, specific conductivity, and temperature in the existing intermediate monitoring wells (MW-5I, MW-7I, and MW-9I) and temporary piezometers installed in the three injection test areas. AECOM will also use grab samples collected from the adjacent monitoring wells and temporary piezometers to check for visual indications of the tracer solution. Additional operational details are found in the following attachments.

Well Development

The piezometers will be developed using a water pump or peristaltic pump. The intent of the development efforts is to remove fine particles that accumulate in the well and filter pack during installation. Water quality parameters including pH, specific conductance (SC), temperature, and turbidity will be monitored and recorded during the development process. Well development will be considered complete when water quality parameters have stabilized to within 10% or two well volumes have been reached, up to three gallons maximum per temporary piezometer.

All well development water will be containerized in 55 gallon drums and staged at a central location on Valmont property until adequate disposal quantities have been accumulated.

Well Sampling

No groundwater samples from the temporary piezometers or Site monitoring wells will be captured for laboratory analysis. The temporary piezometers and existing monitoring wells will only be used to monitor for the presence of the tracer solution. Groundwater collected from existing monitoring wells and temporary piezometers will be intermittently checked during and after injection for visual indications of tracer solution and changes to the specific conductivity. Additionally, down-well dataloggers will be used to monitor water levels, specific conductivity, and temperature in select monitoring wells adjacent to the injections.

Boring Abandonment

Upon completion of the field testing, the temporary injection borings and temporary piezometer borings will be abandoned using a bentonite-cement grout. The points will be grouted from the bottom of each injection point to the ground surface.

Reporting

Data collected during these additional activities will be included in the Remedial Design/ Remedial Action (RD/RA) Work Plan that will be developed in early 2025. Copies of field logs (e.g., well construction diagrams and field notes), will be included in the RD/RA Work Plan. The licensed driller will submit the monitoring well record form (1903) with the information required by SCDES, within 30 days after completion of field activities. The injection and temporary piezometer locations will be surveyed by a South Carolina licensed surveyor.

Schedule

The field schedule is currently being worked out with the AECOM subcontractor, but we anticipate being in the field within the next 4 to 5 weeks. Once the schedule is finalized, AECOM will notify SCDES. We anticipate that the field testing can be accomplished in a two- to three-day period.

Well Permit

We have attached a completed Monitoring Well Application form for your review. Please send the well permit to AECOM via email at your convenience, to the attention of Dave Oliphant of AECOM (dave.oliphant@aecom.com). AECOM has received a UIC permit from the SCDES

Bureau of Water; we currently are attempting to get a typographic error in the permit corrected by SCDES.

Should you have any questions regarding the information included in this package, please contact Dave Oliphant at 864-380-6950, or Scott Ross, P.G. at 803-201-9662, at your convenience.

Sincerely,

A handwritten signature in black ink, appearing to read "Dave Oliphant". The signature is fluid and cursive, with the first name "Dave" and last name "Oliphant" clearly distinguishable.

Dave Oliphant
AECOM Senior Project Manager

cc: Mr. Emil Filc - Signify North America
Mr. Tim Renn/Mr. Jacob Wortkoetter - AECOM
Mr. Scott Ross, P.G. - AECOM

FIGURES

Name: Figure 1 Intermediate Zone Injection Test Area
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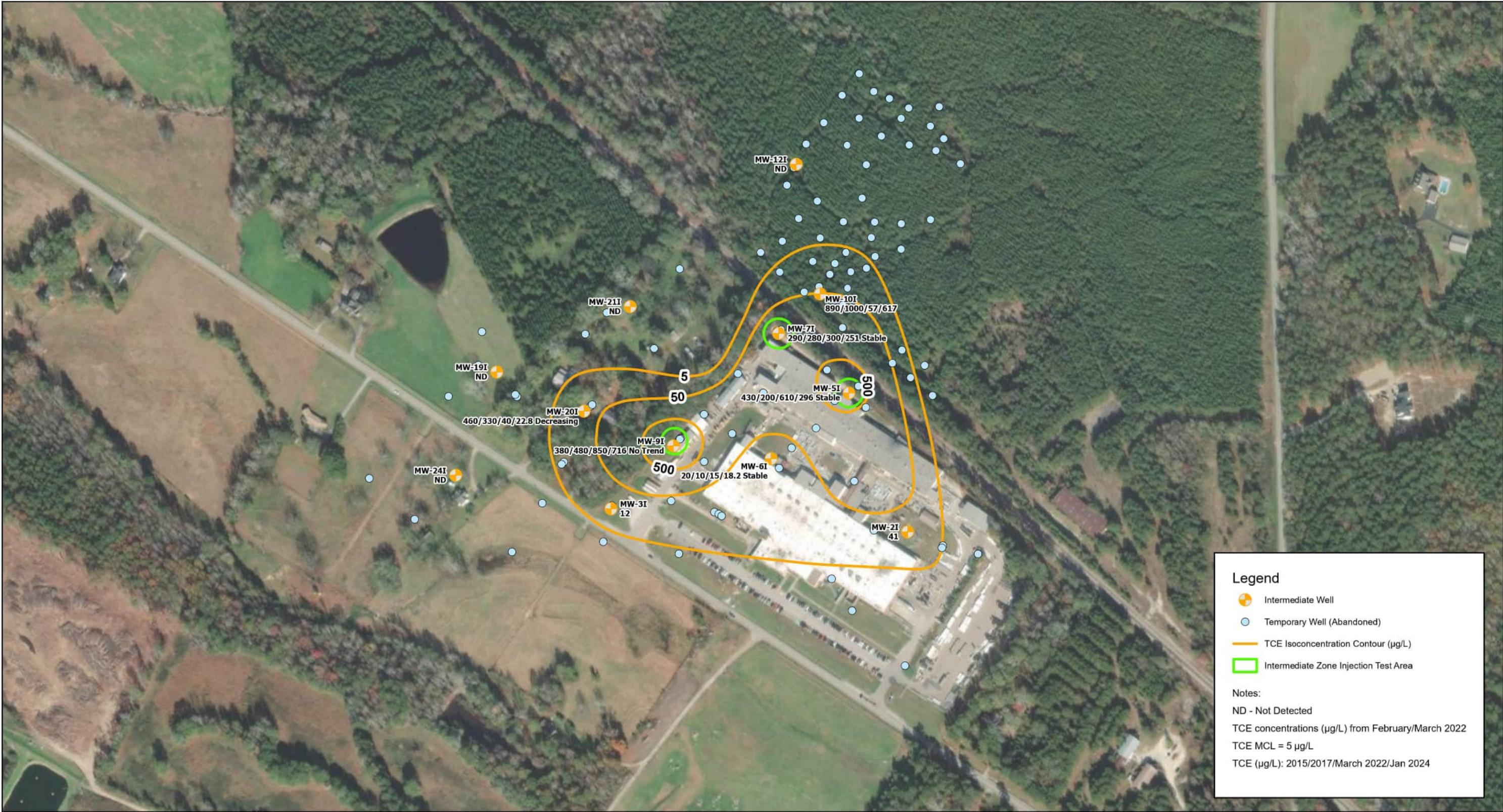
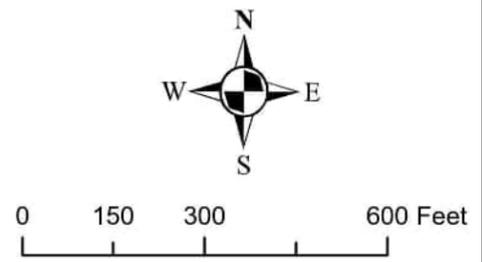
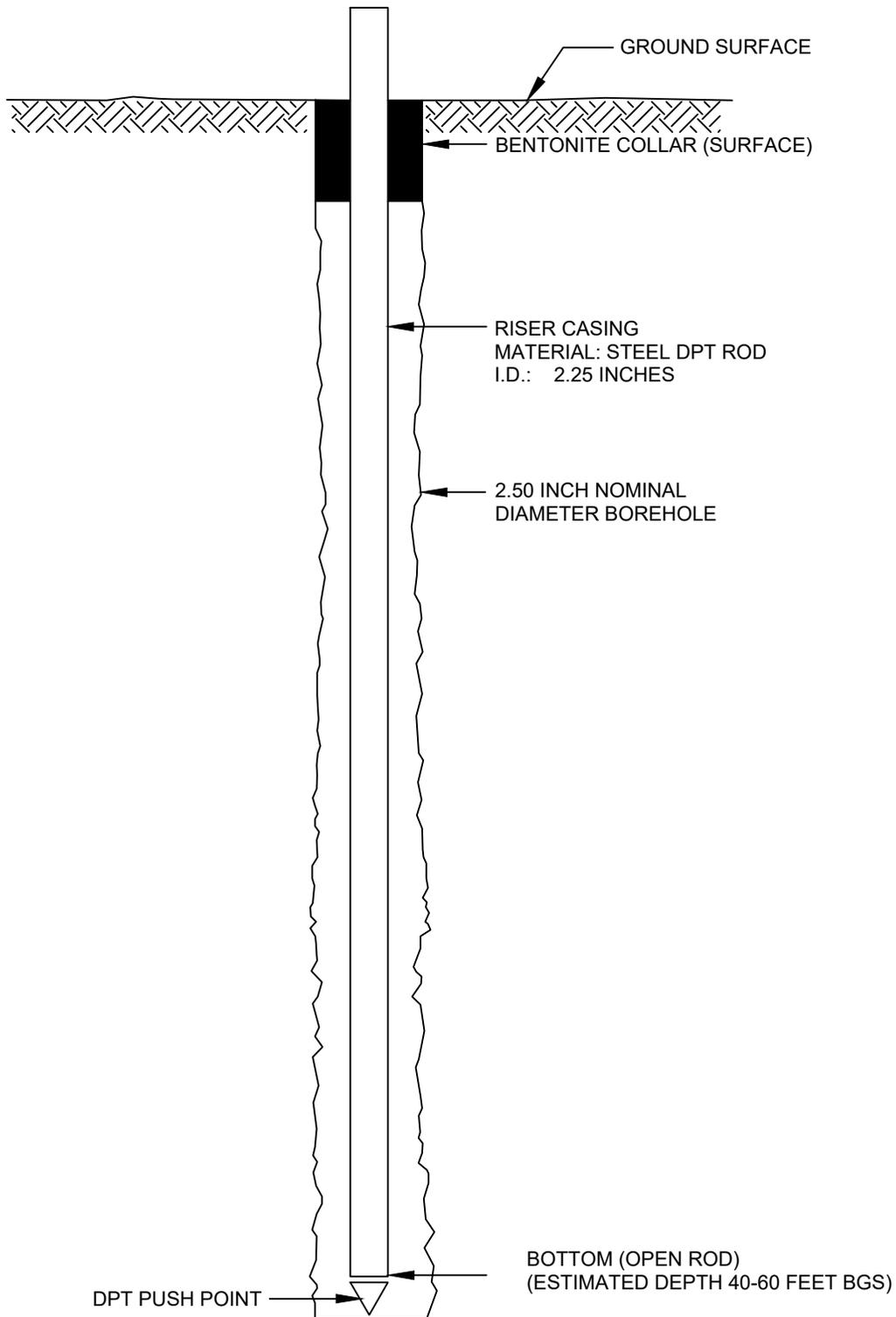


Figure 1
Intermediate Zone Injection Test Area



Shakespeare Composite Structures
Newberry, South Carolina
Project Number: 60735728





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TYPICAL DPT INJECTION POINT DETAIL
INTERMEDIATE ZONE INJECTION TEST

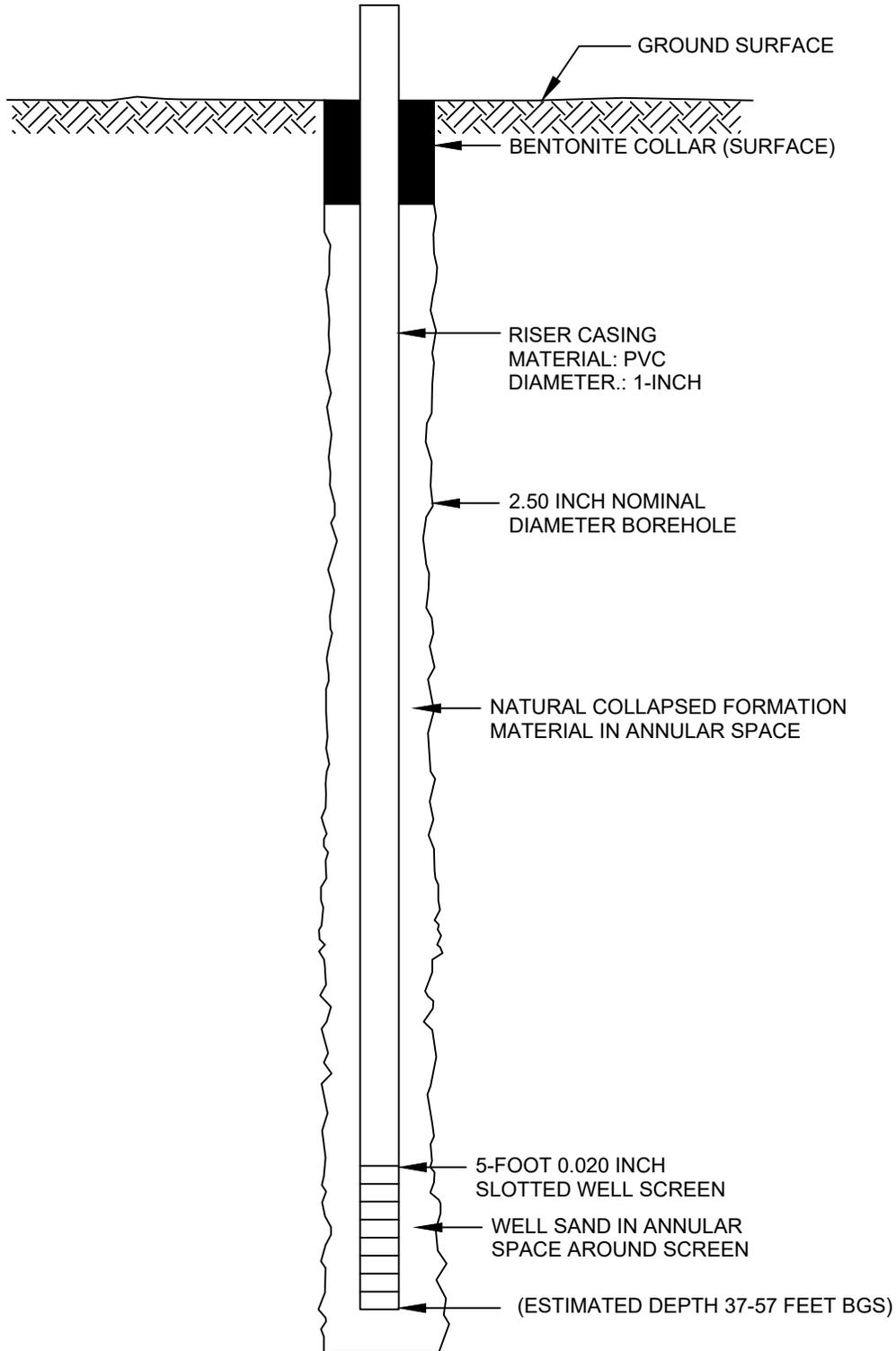
SHAKESPEARE COMPOSITE STRUCTURES SITE
NEWBERRY, SOUTH CAROLINA

PROJECT NO.
60735728

DRAWN BY:
RJS

DATE:
10/09/2024

FIGURE 2A



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TYPICAL TEMPORARY PIEZOMETER DE-
TAIL

SHAKESPEARE COMPOSITE STRUCTURES SITE
NEWBERRY, SOUTH CAROLINA

PROJECT NO.
60735728

DRAWN BY:
RJS

DATE:
10/09/2024

FIGURE 2B

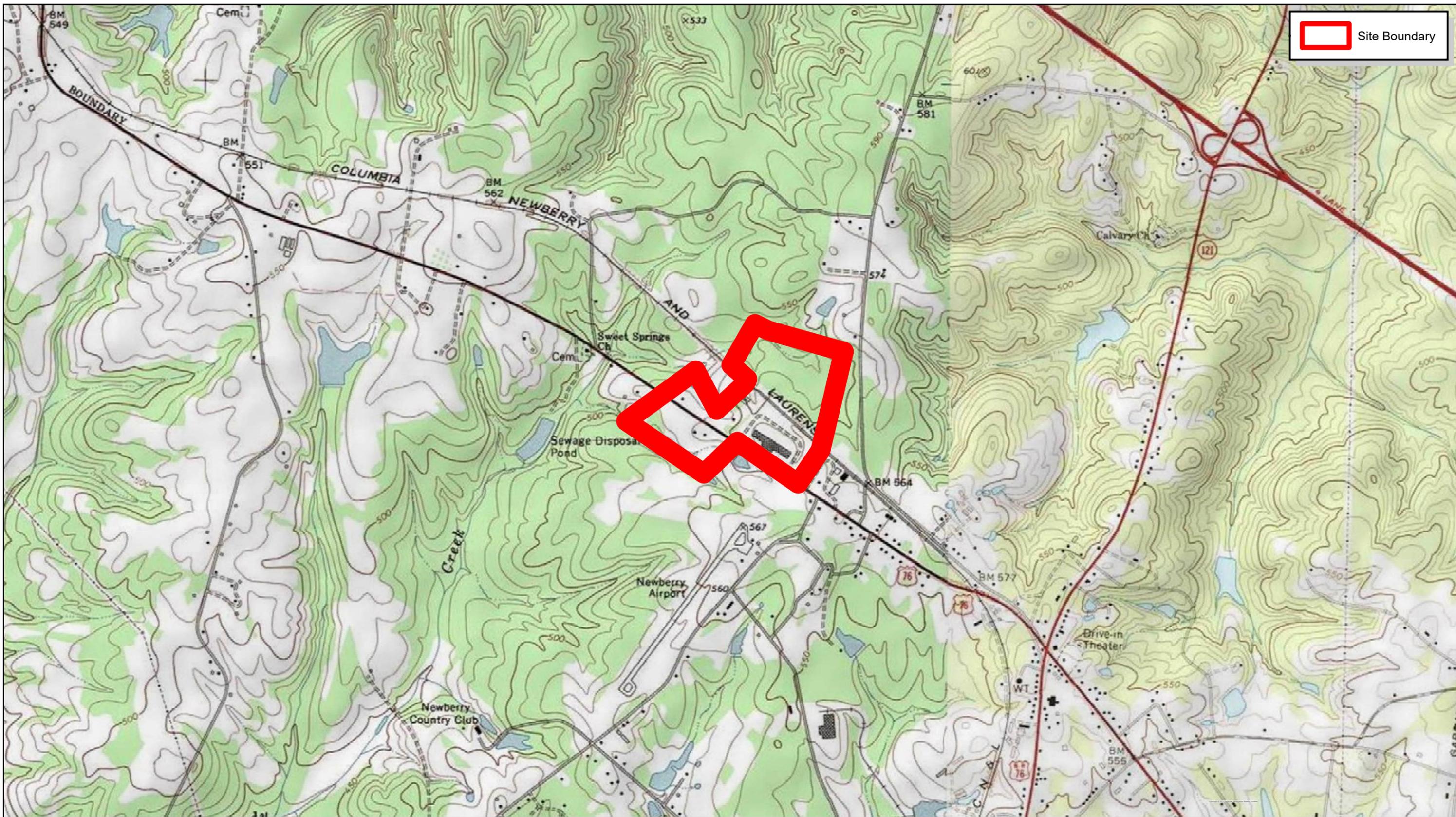
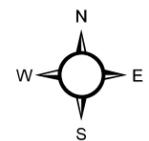


Figure 3: Site Location Map

Shakespeare Composition Structures
Newberry, South Carolina

Project No.: 60735728; Date: 10/09/2024



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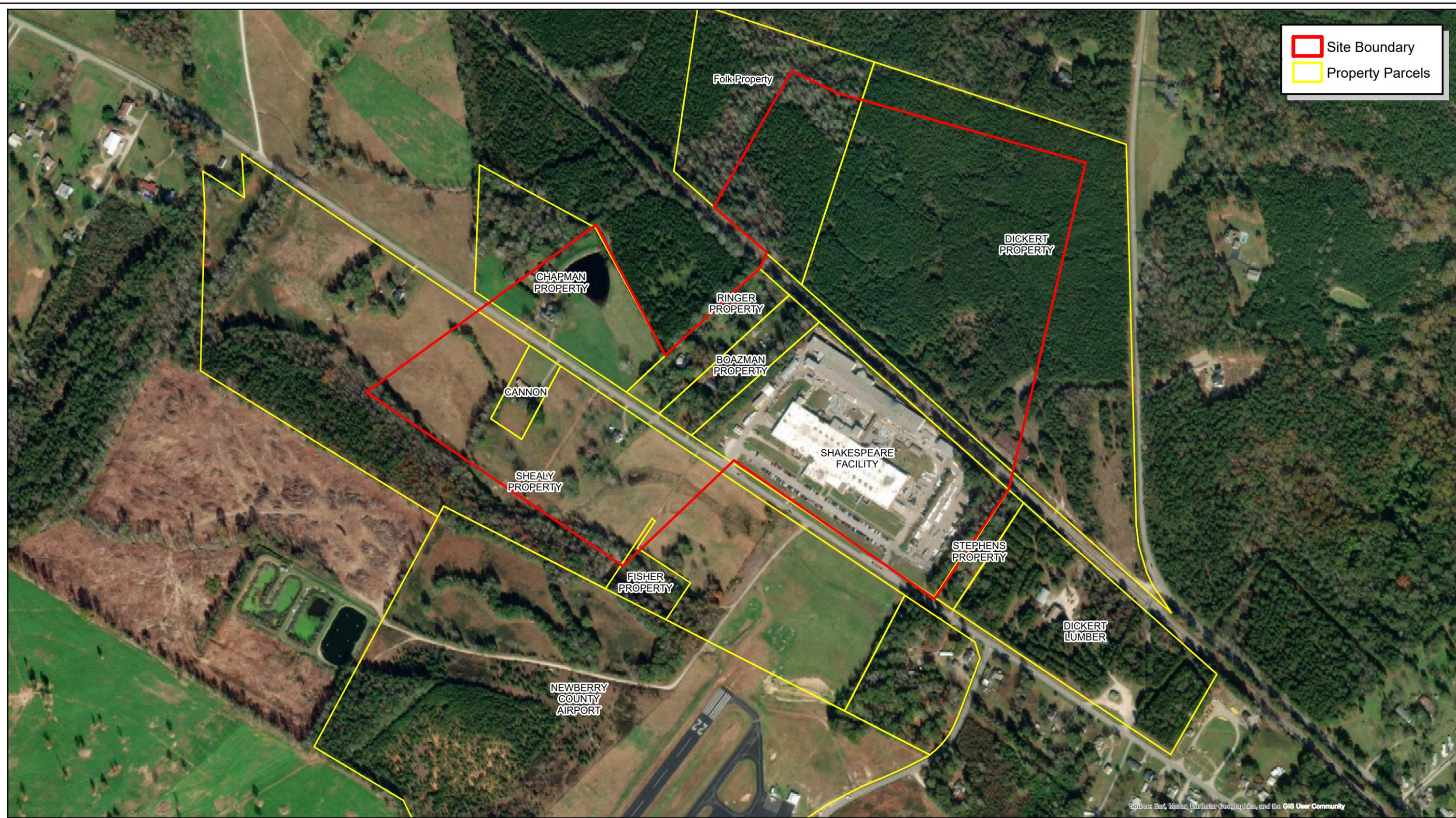
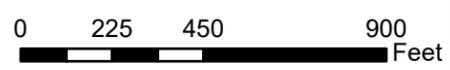
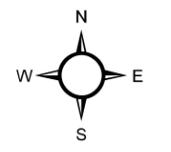


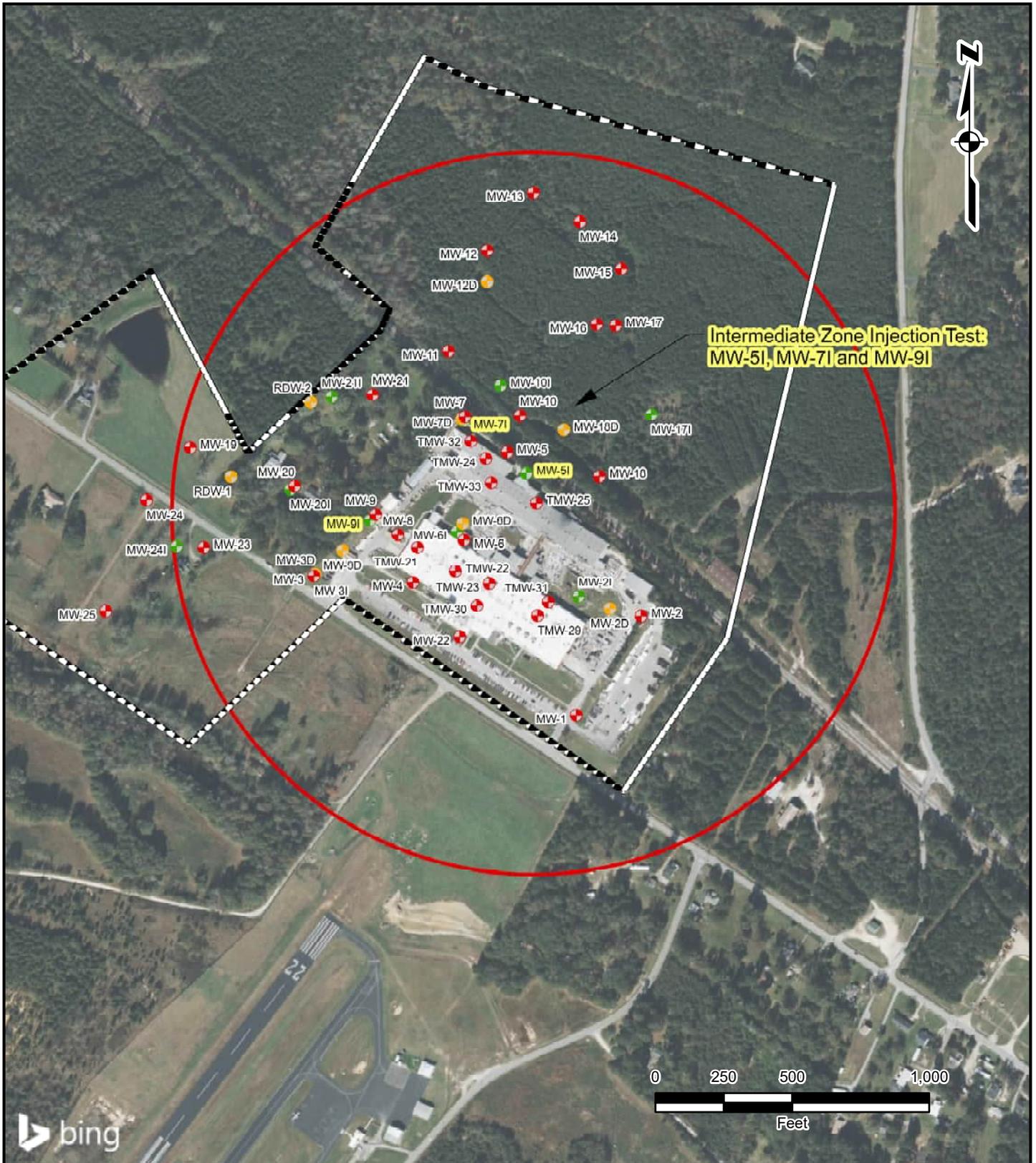
Figure 4: Site Plan

Shakespeare Composition Structures
Newberry, South Carolina

Project No.: 60735728; Date: 10/09/2024



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



- Shallow Well
- Intermediate Well
- Bedrock Well
- Site Boundary
- Area of Review

Service Layer Credits (Aerial):
 © 2024 Microsoft Corporation © 2024 Maxar ©CNES (2024) Distribution Airbus DS

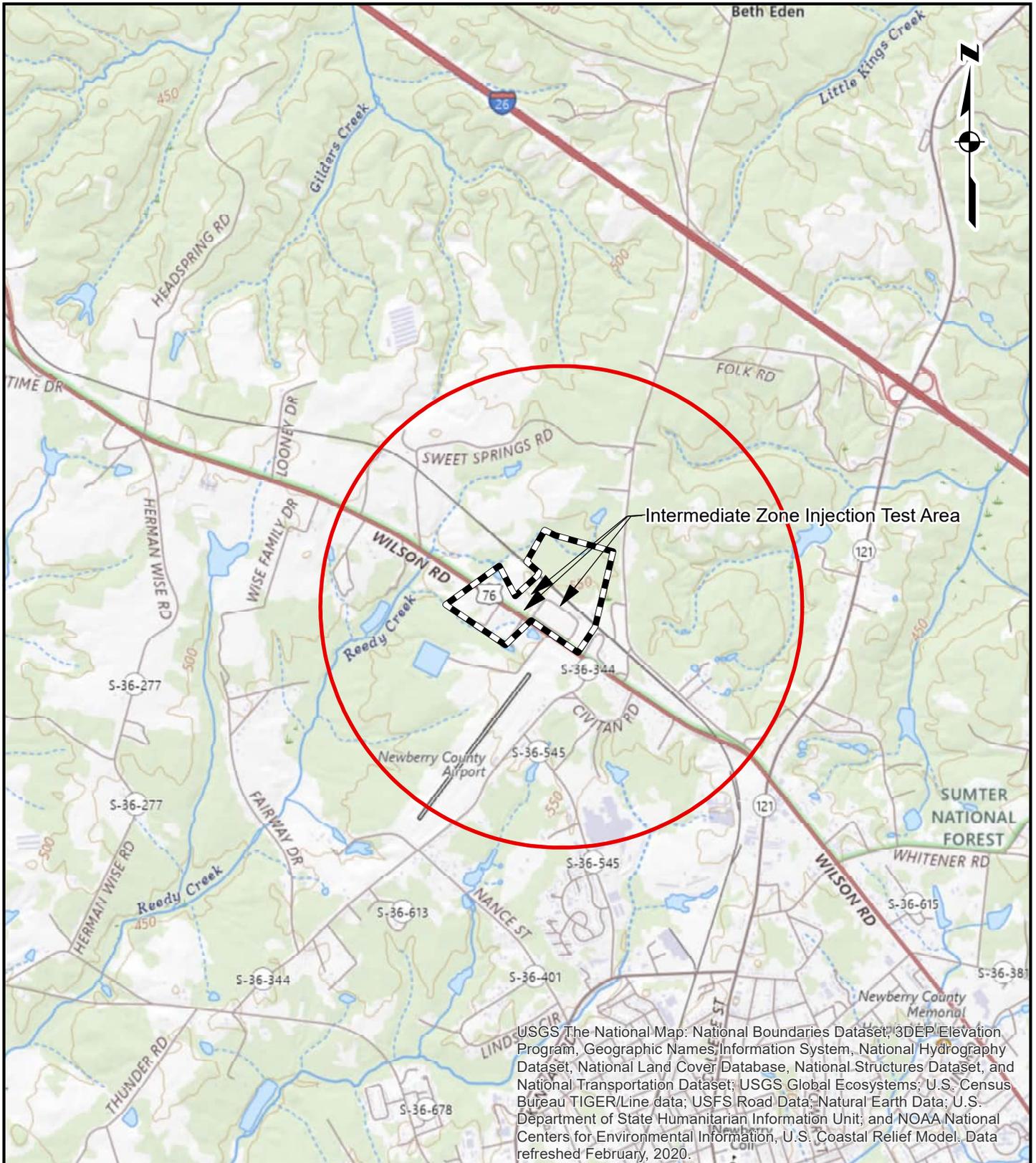
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FIGURE 5
 Full Scale Area of Review

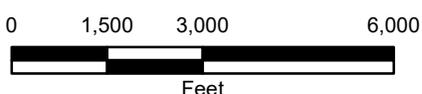
Shakespeare Composite Structures Site
 Newberry, South Carolina

60735728



USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed February, 2020.

-  1-Mile Radius
-  Site Boundary



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FIGURE 6
Topographic Map

Shakespeare Composite Structures Site
Newberry, South Carolina

Service Layer Credits (Topo):
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program.

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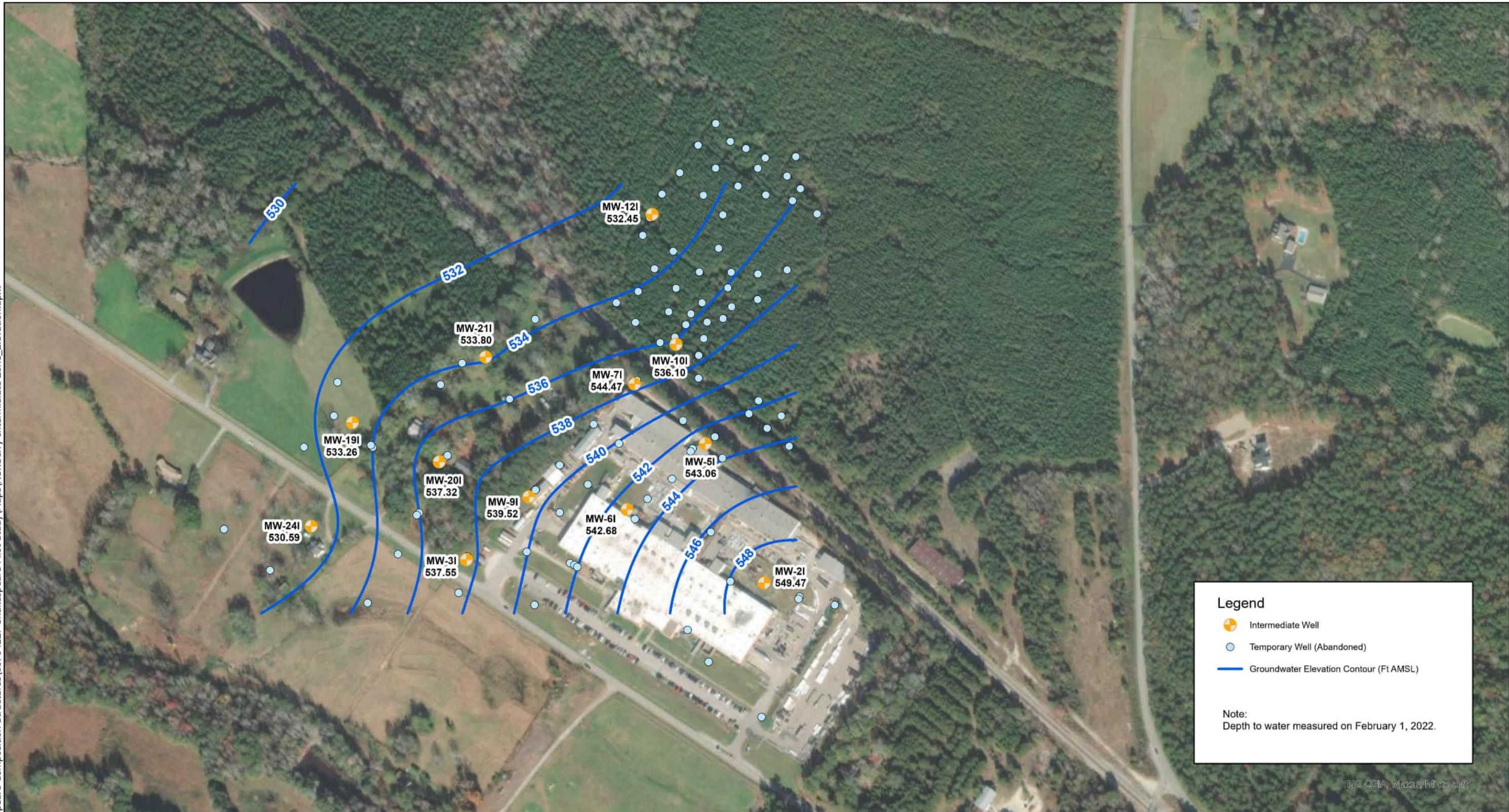
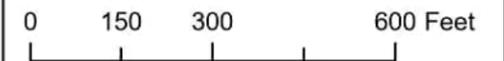


Figure 7
Wells and Elevations in Intermediate Zone

Shakespeare Composition Structures
Newberry, South Carolina
Project Number: 60735728



TABLES

**Table 1 - Injection Test Design Details
Underground Injection Control Permit
Shakespeare Composite Structure Site
Newberry, SC**

DPT Injection Point Details:	Intermediate Zone Aquifer Injection Test (MW-5I, MW-7I, and MW-9I Area)
Target Intermediate Zone (Depth 37 to 57 ft bgs) Injection Interval Length	10
Estimated Radius of Influence (feet)	10
Number of Injection Points	6
Average Horizontal Hydraulic Gradient (ft/ft)	0.015
Average Hydraulic Conductivity (ft/day)	0.72
Estimated Effective Porosity (unitless)	0.3
Groundwater Seepage Velocity (ft/day)	0.04
Estimated Injection Duration (days)	2.0
Estimated Volume of Tracer Solution per DPT injection point (gallons)	750
Approximate Concentration of Constituents in Tracer Solution:	
Fluorescein (mg/L)	2
NaCL (mg/L)	20,000
Notes: DPT - direct push technology ft bgs - feet below ground surface ft/day - feet per day ft/ft - feet per foot mg/L - milligrams per liter	

MONITORING WELL APPLICATION



Monitoring Well Application

<p>1. Proposed Location of Monitoring Well(s):</p> <p>Street Address: Valmont Composite Structures 19845 US Hwy 76</p> <p>City (including Zip): Newberry, SC 29108</p> <p>County: Newberry</p> <p>Please attach Scaled Map or Plat See Attached Figure 1.</p>	<p>5. Intended Purpose of Well(s):</p> <p>Pre-Purchase <input type="checkbox"/></p> <p>Investigation <input checked="" type="checkbox"/></p> <p>Program Area: Project or Site ID #: VCC No. 14-6271-RP</p> <p>NOTE: If this request is for an existing DHEC project, please enter the Program area and ID number below.</p>
<p>2. Well Owner's Information:</p> <p>Name (Last then First): Filc, Emil</p> <p>Company: Signify North America Corp.</p> <p>Complete Address: 400 Crossing Blvd Ste 600 Bridgewater, NJ 08807</p> <p>Telephone Number: (937) 241-1867</p>	<p>6. Proposed number of monitoring wells: 6</p> <p>7. Proposed parameters to be analyzed (check all that apply), please specify analytical method beside check box:</p> <p>VOCs <input type="checkbox"/></p> <p>BTEX <input type="checkbox"/></p> <p>MtBE <input type="checkbox"/></p> <p>Naphthalene <input type="checkbox"/></p> <p>PAHs <input type="checkbox"/></p> <p>Metals <input type="checkbox"/></p> <p>Nitrates <input type="checkbox"/></p> <p>Base, Neutral & Acid Ex. <input type="checkbox"/></p> <p>Pesticides/Herbicides <input type="checkbox"/></p> <p>Phenols <input type="checkbox"/></p> <p>Radionuclides <input type="checkbox"/></p> <p>PCBs <input type="checkbox"/></p> <p>Other (specify below) <input type="checkbox"/></p> <p>N/A. Temporary piezometers to observe tracer solution.</p>
<p>3. Property Owner's Information:</p> <p><input type="checkbox"/> Check if same as Well Owner</p> <p>Name (Last then First): Senn, Mike</p> <p>Company: Valmont Composite Structures</p> <p>Address: 19845 US Hwy 76 Newberry, SC 29108</p> <p>Telephone Number: (803) 276-5504</p>	<p>8. Proposed construction details (complete and attach proposed monitoring well schematics):</p> <p>See attached typical Figure 2B for temporary piezometer construction details.</p>
<p>4. Proposed Drilling Date:</p> <p>To be determined.</p>	