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June 29, 2015

Ms. Addie Walker, Project Manager
SC Department of Health and Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Re: Post Remedial Investigation Work Plan
Delavan Spray Technologies Site
Bamberg, South Carolina
SCDHEC VCC Number 13-4762-RP
SCDHEC File Number 51778
AECOM Project Number 60314964

Dear Ms. Walker:

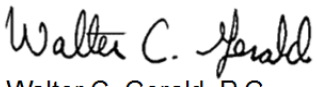
On behalf of United Technologies Corporation (UTC), AECOM is providing you one (1) hard copy and one (1) electronic copy of the Post Remedial Investigation Work Plan for the Delavan Spray Technologies Site. This work plan is being submitted to the Department in accordance with your comments and request, which were dated May 6, 2015.

Upon your review and approval of this work plan, and receipt of a monitoring well installation permit, AECOM will schedule to field activities to be performed.

If you have any questions or require further information, please feel free to contact me.

Sincerely,

AECOM Technical Services, Inc.



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Ms. Evelyn Rogers, PE – AECOM
Ms. Leslee Alexander, PG – AECOM
Project File 60314964

Post Remedial Investigation Work Plan

United Technologies Corporation
Delavan Spray Technologies Site
4334 Main Highway
US Highway 301 South
Bamberg, South Carolina

VCC 13-4762-RP

Prepared by:

AECOM Technical Services, Inc.
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Building 6, Suite 500
Greenville, South Carolina

June 29, 2015

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1.0 INTRODUCTION

The Delavan Spray Technologies site is located at 4334 Main Highway (US Highway 301 South in the town of Bamberg, South Carolina (Figure 1). Previous assessments have documented chlorinated volatile organic compounds (VOCs) in soil and groundwater related to their historic use at the facility. Additional site background and history were reported in detail in Section 2.0 of the RI Report (AECOM, July 2014).

In 2014 a Remedial Investigation (RI) was completed at the site to assess soils, surface water, groundwater and vapor intrusion pathways. As part of the RI, a Baseline Risk Assessment (BRA) was performed to evaluate potential risks to human and ecological receptors.

Based on comments received from the SC Department of Health and Environmental Control (SCDHEC) to the RI Report and to the subsequent Fall 2014 Semi-Annual Groundwater Monitoring Report (AECOM January 2915), additional assessment was deemed necessary to address some data gaps (SCDHEC, correspondence of May 6 and May 7, 2015). These comments are outlined below:

- *The groundwater contamination appears to be delineated in all directions except the southeast [southwest] off-site. Further assessment in the deep limestone aquifer is recommended in this direction.*
- *Further soil assessment is needed in the areas of both degreasers.*
- *The Department recommends installing an additional shallow monitoring well toward the western corner of the property.*

The purpose of this post-RI work plan is to present the proposed approach, and methods to acquire the additional environmental quality data to address SCDHEC concerns.

On June 3, a site walk was held with Delavan Spray Technologies, United Technologies Corporation (UTC), AECOM, and SCDHEC representatives to discuss the proposed scope of work and come to an agreement on the level of effort required to meet the intent of the SCDHEC comments. The outcome from the meeting is incorporated into this work plan.

2.0 ADDITIONAL ASSESSMENT

Field data acquisition methodologies are designed to be in general accordance with the Environmental Protection Agency (EPA) Region 4 Science and Ecosystem Support Division (SESD) Field Branches Quality System and Technical Procedures document (http://www.epa.gov/region4/sesd/fbqstp/) (most recent version). To be consistent with the RI, those specific field methods, analytical procedures, and quality assurance/quality control (QA/QC) procedures applicable to the scope of work will follow those presented in Section 1 (Field Sampling and Analysis) and Section 2 (Field Quality Assurance Samples) of Appendix B to the RI Work Plan (Hart & Hickman, August 2013).

2.1 Pre-Investigation Activities/Subsurface Utility Locating

The monitoring wells proposed for the deep limestone aquifer will be located off-site; therefore, an updated access agreement will need to be obtained from the property owner prior to the installation of the monitoring wells. Upon obtaining off-site property access and prior to conducting intrusive sampling activities, the South Carolina One-Call public utility service will be contacted to mark public utilities at the site and vicinity. A private utility locator will also be contracted to confirm the one-call markings and to mark the location of potential private subsurface utilities in the area of the proposed sampling locations.

2.2 Additional Groundwater Assessment

In accordance with SCDHEC's correspondence of May 6 and 7, 2015 for further groundwater assessment, an additional shallow Type II monitoring well (estimated to be up to 20 ft deep) and two additional deeper Type III limestone aquifer monitoring wells (estimated to be up to 50 ft deep) are proposed to be drilled and installed using sonic drilling techniques. However, other technologies may be used, if necessary, such as: direct push technology (DPT), hollow-stem auger or mud rotary.

For the purposes of this work plan, tetrachloroethylene (PCE) was chosen as a surrogate compound for the other chlorinated VOCs based on its occurrence and concentration in each of the groundwater aquifers beneath the site vicinity. PCE concentrations detected during the RI are illustrated on Figure 2 for the shallow aquifer and on Figure 3 for the deep limestone aquifer. The approximate locations of the proposed monitoring wells, therefore, are based on likely down-gradient locations that would represent the leading edge of chlorinated VOCs in each of the groundwater aquifer units. The proposed monitoring well locations are illustrated on Figure 4.

These locations may be adjusted in the field due to the presence of utilities, drill rig accessibility, etc. The proposed monitoring well construction details including total depth, surface casing depths (for the deeper wells), and estimated screen intervals are listed on Table 1.

Prior to well installation, monitoring well permits will be obtained from SCDHEC and property access for the proposed off-site monitoring wells will be obtained from the property owner. A monitoring well permit application and proposed well construction details are included in Appendix A.

Borehole Drilling

For both the shallow and deeper monitoring wells, sonic drilling techniques will be used to advance the boring to the target depth. It is expected that the sonic rig will utilize an 8-inch diameter outer casing and a 6-inch diameter inner core barrel. Soil samples will be extruded from the inner core barrel into plastic sleeves for lithological logging and soil sampling (if needed) by an AECOM geologist. Per the site walk with SCDHEC on June 3, 2015, a permanent surface casing will not be needed for the deeper limestone aquifer monitoring wells if sonic techniques are used – the temporary drill casing will be sufficient to seal the upper aquifer during drilling and well installation. Soil cuttings will be containerized in 55-gallon drums and temporarily stored on-Site as investigation-derived waste (IDW) until they are profiled and disposed as described in Section 2.6 below.

Monitoring Well Installation

All monitoring wells will be installed through the center of the sonic core barrel and will be constructed of 2-inch diameter Schedule 40 PVC casing and 10 to 15 feet of 0.010-inch machine slotted PVC screen. Filter sand will be placed into the annular space of each well to approximately two-feet above the top of the well screens. A pelletized bentonite clay seal approximately 2 feet thick will be placed in the annular space above the filter sand and hydrated with potable water, as necessary. As the filter sand and bentonite clay are added, the core barrels will be pulled from the borehole to ensure the annulus is completely filled. Depths to sand and bentonite will be monitored with a weighted tape measure as the installation progresses. A neat cement-bentonite grout will then be injected from above the bentonite seal to land surface via a tremie pipe.

The surface completions for the shallow and deep monitoring wells will consist of an 8-inch diameter cast-iron vault with a bolt down lid. Each vault will be set flush-mounted into a two-foot by two-foot square pad of high strength concrete, which will act as a surface seal.

Well Development

Upon installation, the groundwater monitoring wells will be developed so that they produce representative groundwater samples. The monitoring wells will be developed by AECOM personnel by surging and purging with an electric submersible pump. Groundwater indicator parameters [e.g. temperature, specific conductivity, dissolved oxygen (DO), pH, oxygen reduction potential (ORP) and turbidity] will be measured using a water quality meter and recorded on AECOM Monitoring Well Development logs.

Development of monitoring wells continued until parameters have stabilized and turbidity of the water is reduced as much as possible.

Purge water from well development will be containerized in 55-gallon drums and stored at a designated location on-Site as IDW.

Surveying

Following well installation, the top of casing and land surface elevations and the horizontal locations of the new wells will be surveyed by a professional surveyor licensed in South Carolina. Horizontal locations will be reported in South Carolina State Plane Coordinates referenced to the North American Datum of 1983 (NAD-83) to the nearest 0.01 foot. Ground surface elevations and well top of casing elevations will be referenced to the North American Vertical Datum of 1988 (NAVD-88) to the nearest 0.01 foot. The survey information will be updated to summary tables and the site base map.

Water Level Measurements

The depth to water from a top of casing measuring point from the three newly installed monitoring wells and all existing monitoring wells will be measured during one day and recorded. It is anticipated that this will take place on the first day of the next semi-annual groundwater monitoring event (currently scheduled for October 2015). An electric water level indicator will be used to collect water level measurements in general accordance with the USEPA Region 4 SESD Groundwater Level and Well Depth Measurement Operating Procedure (January 2013). Depth to water will be corrected to groundwater elevations to provide a thorough evaluation of groundwater levels and flow directions across the Site.

Groundwater Sampling

As part of the additional assessment activities, groundwater samples will be collected from the newly installed monitoring wells. Per the June 3, 2015 meeting with SCDHEC, this is anticipated to take place during the next semi-annual groundwater monitoring event (currently scheduled for October 2015). Groundwater samples will be collected using low flow/low stress sampling methods in accordance with the RI Work Plan (Hart & Hickman, August 2013) and EPA's Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (EPA/540/S-95/504 dated April 1996) and as described in Appendix B of the RI Work Plan. Groundwater sampling will be completed using a peristaltic pump and flow-through cell for field parameter measurement.

A summary of the analytes is provided below:

- All of the monitoring well samples will be analyzed for VOCs by EPA method 8260B.

- Field measurements of DO, pH, conductivity, temperature, and ORP will be collected from the sampled monitoring wells using a flow through cell.

As requested by SCDHEC, the entire network of monitoring wells will be sampled during the planned semi-annual groundwater monitoring event, scheduled for October 2015. The current sampling plan is summarized in Table 2. As part of this semi-annual effort, a site-wide round of water level measurements will be collected from the existing wells and newly installed wells. Data from this event will be used to update groundwater potentiometric and flow maps of each aquifer unit.

Groundwater quality data from the semi-annual monitoring event will then be used to evaluate the occurrence and distribution of chlorinated VOCs in the two aquifer units beneath the site.

2.3 Additional Soil Sampling

Former Degreasers

The results of the RI indicated that impact from chlorinated VOCs was present in soils and groundwater beneath each of the degreasers. In order to further understand the concentration and occurrence of chlorinated VOCs beneath the manufacturing facility, SCDHEC requested additional assessment in the area of both former degreasers (SCDHEC, correspondence of May 6 and May 7, 2015). However, during the June 6, 2015 Site Walk, SCDHEC agreed that the previous sampling was sufficient in the vicinity of the southern former degreaser, which was located in the Pack and Stamp Room. Due to the significantly higher concentrations of chlorinated VOCs in the vicinity of the northern former degreaser, located in the Wickman Room, four additional soil borings were identified to be installed in this area to collect soils samples for field screening and laboratory analyses (Figure 5). Due to the limited accessibility caused by active manufacturing, these locations may be modified based on current field observations (i.e., utilities, accessibility and manufacturing schedules). The proposed soil sampling activities are summarized on Table 3.

Because the depth of groundwater in the vicinity of the degreaser areas is estimated to be approximately 13 ft below ground surface (bgs), the soil borings are planned to be advanced up to depths of 10 to 15 ft bgs. Based on field screening (i.e., elevated photoionization detector [PID] readings, visual methods, olfactory observations, etc.), a minimum of one soil sample per boring will be collected from the interval with highest suspected impacts for laboratory analysis. If field screening results indicate zones of potential impact are present in a given boring, an additional soil sample from the vadose zone may be collected from the interval beneath the suspected impacted interval to characterize the vertical extent of impacts. If field screening does not indicate evidence of significant impacts in a given boring, one sample from each boring will be collected at the depth consistent with previously identified impacts at historic location DPT-3 or as otherwise selected in the field.

Soil boring may be installed using a Geoprobe® rig or using a hand auger, depending on the accessibility of the final soil sample locations. Soil samples from the selected intervals will be submitted for laboratory analysis of VOCs by EPA method 8260B in accordance with the procedures in the RI Work Plan (Hart & Hickman, August 2013).

Following soil sampling, the borings will be converted to monitoring points for potential future monitoring or remediation. Monitoring points will be constructed using 1-inch PVC with a pre-packed well screen. The annulus around the well screen will be filled with a clean filter sand, if needed, and filter sand will be emplaced to approximately 1 to 2 feet above the top of the well screen. Pelletized bentonite clay will be used to seal the monitoring point and will be hydrated with potable water, as necessary. A neat cement-bentonite grout will then be emplaced from above the bentonite seal to within approximately 6-inches below the finished concrete floor. The surface completions for the 1-inch shallow monitoring points will consist of a 4- inch or a 6-inch diameter cast-iron vault with a bolt down lid. The vaults will be flush-mounted into the core holes and grouted in place flush with the floor with high strength concrete.

Background

In order to determine the background oxidant demand for potential future remedial planning, additional soil samples will be collected in the vicinity of RI soil sample locations BG-3 and BG-5 (see Figure 3-2 of the RI Report; AECOM, July 2014) for analysis of total oxidant demand (TOD). Soil borings will be installed in the vicinity of BG-3 and BG-5 using either a Geoprobe® rig or a hand auger. Samples will be collected by compositing the 4-6 foot and 8-10 foot intervals from each location to get a representative sample for TOD analysis (Table 3). The TOD analyses will be performed by a treatability lab using a standard quantitative method to be determined by the lab.

Surveying

Following the soil sampling and installation of the monitoring points, the ground surface elevations and the horizontal locations of the boring will be surveyed by a professional surveyor licensed in South Carolina. Horizontal locations will be reported in South Carolina State Plane Coordinates referenced to the North American Datum of 1983 (NAD-83) to the nearest 0.01 foot. Ground surface elevations will be referenced to the North American Vertical Datum of 1988 (NAVD-88) to the nearest 0.01 foot. The survey information will be updated to summary tables and the site base map.

2.4 Slug Testing

Slug tests will be conducted on select wells in order to evaluate hydrologic properties of the aquifers beneath the Site. Slug tests are planned for shallow monitoring wells MW-1, MW-5 and MW-21 and deeper monitoring wells MW-21D and MW-22D (Figure 4).

Slug tests may be conducted by two methods, falling head or rising head tests. Falling head tests will be conducted by inserting a decontaminated, solid PVC cylinder (aka, "slug") into the well and monitoring the water levels as they decline downward toward the static level. Rising head tests will be conducted by removing the slug from a well and monitoring the water levels as they rise up toward the static level. Falling head slug tests will not be performed in wells with partially saturated screens.

Initially, the static water level in the well will be measured and recorded. A decontaminated pressure transducer will then be lowered at least 5 feet below the static water level (or more if the slug is greater than 5-foot long) or within one foot of the bottom of the well. The static water level will again be measured and recorded and the measurement will be repeated until water level equilibrium is verified (i.e., two equal readings taken at least 5 minutes apart). The slug will then be attached to clean, new synthetic rope. The falling head test will be initiated by instantaneously lowering the cylinder into the well which will result in an immediate water level rise. The data logger will be activated to measure the declining (falling) water levels. When the water level has returned to static conditions, the rising head slug test will be conducted. For the rising head test, the data logger will be activated as the cylinder is instantaneously removed from the well (resulting in an immediate water level decline) and the rising water levels will be measured. Water levels will be monitored until they are within 10 percent of their original static level.

Multiple tests will be conducted on each well to ensure a good test result.

2.5 Assessment Quality Control Samples

As detailed in Appendix B of the RI Work Plan (Hart & Hickman, August 2013) and in Tables 2 and 3, quality control samples for soil and/or groundwater will include trip blanks, rinseate blanks, field duplicates and matrix spike/matrix spike duplicates. These samples will be collected as part of the additional assessment activities to assure that the means and methods are performed adequately to generate definitive environmental quality data.

2.6 IDW Management

Investigation-derived waste (IDW) consisting of decontamination water, well development/purge water, and soils from drilling activities will be containerized in 55-gallon steel drums, labeled, and temporarily staged on-Site until receipt of characterization analysis. For characterization and disposal purposes, drums of IDW soil will be sampled for Toxicity Characteristic Leaching Procedure (TCLP) VOCs, TCLP SVOCs, and TCLP Priority Pollutant Metals. Drums of IDW decontamination water will be sampled for VOCs. Drums of well development/purge water will be characterized using sampling results from the monitoring wells. Following receipt of characterization and monitoring well sampling data, the IDW materials will be property disposed. Because some of the proposed soil borings/monitoring wells are

located in areas of the site which have historically been used for manufacturing activities, IDW from these locations will be drummed separately from IDW generated during off-site monitoring well installations.

2.7 Post RI Assessment Report

After completion of the field activities and receipt of the analytical data, a brief post RI assessment report will be prepared in the form of a Technical Memorandum. The report will include a summary and evaluation of previous and current assessment activities conducted to determine the source and nature of contamination and delineate the extent of chlorinated VOCs at the site. Specifically, the report will include a description of the monitoring well installation activities; soil sampling methods; soil boring and well logs; laboratory analytical data sheets; tabular summaries of the soil quality data; and conclusions. The new wells will be sampled during the next semi-annual groundwater monitoring event to provide a contemporaneous evaluation of the aquifer units and chlorinated VOC impact. The subsequent semi-annual monitoring report will include groundwater sampling datasheets, groundwater analytical data sheets, tabular summaries of the groundwater quality and QA/QC data, and figures depicting contaminant concentrations and potentiometric maps.

3.0 REFERENCES

AECOM, January 8, 2015, Fall 2014 Semi-Annual Groundwater Monitoring Report, Delavan Spray Technologies Site, Bamberg, South Carolina.

AECOM, July 3, 2014, Remedial Investigation Report, United Technologies Corporation, Delavan Spray Technologies Site, 4334 Main Highway, US Highway 301 South, Bamberg, South Carolina, VCC 12-4762-RP.

USEPA's Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures (EPA/540/S-95/504 dated April 1996.

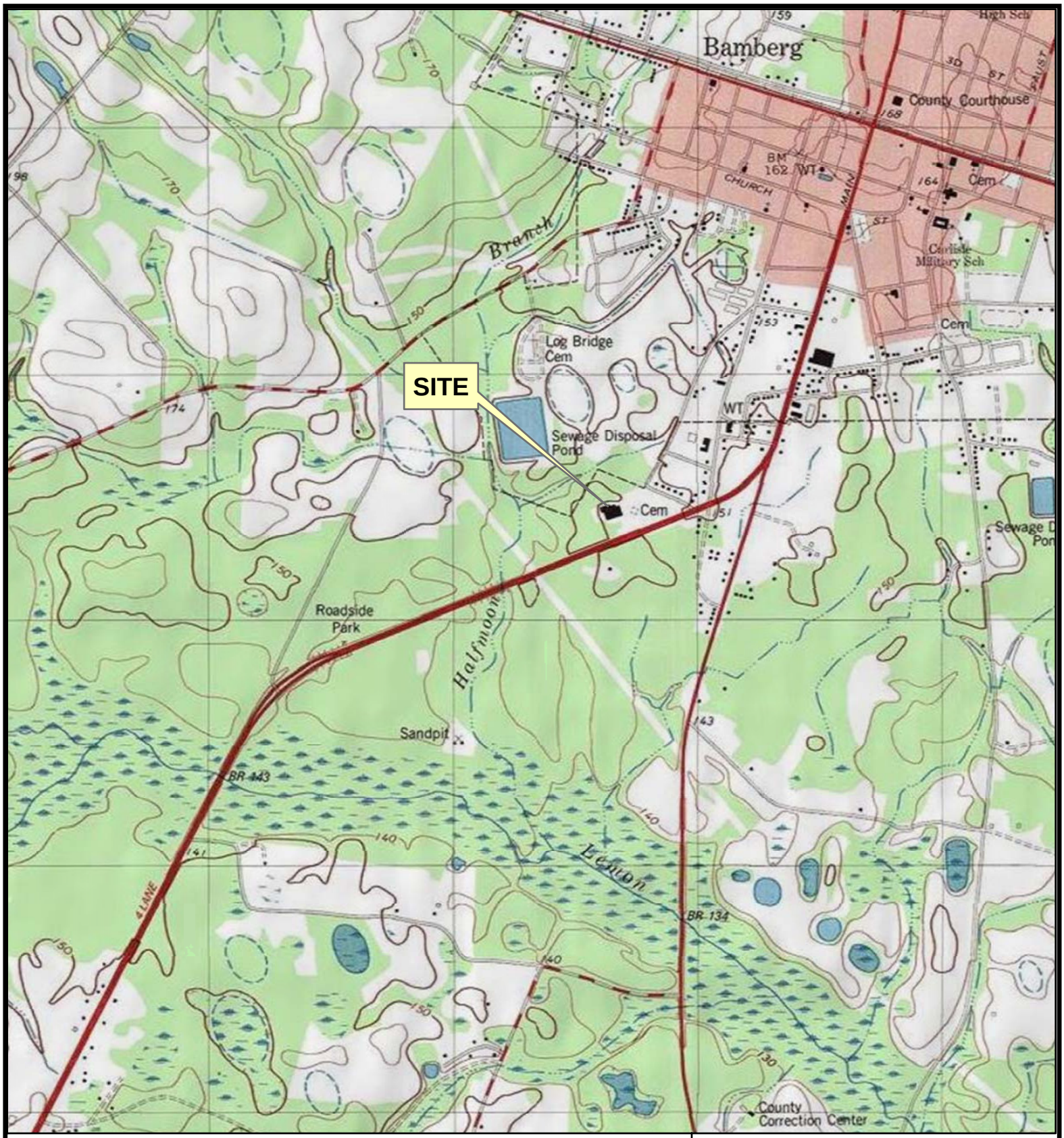
USEPA Region 4 SESD Groundwater Level and Well Depth Measurement Operating Procedure (January 2013).

Hart & Hickman, August 1, 2013, Remedial Investigation Work Plan, Delavan Spray Technologies Site, Bamberg, South Carolina, VCC 12-4762-RP.

SCDHEC, May 6, 2015, Correspondence regarding Remedial Investigation Report dated July 3, 2014, Goodrich Delavan Spray Technology Site, Bamberg County, VCC #13-4762-RP, File #51778 (Former Site ID ##02211).

SCDHEC, May 7, 2015, Correspondence regarding Fall 2014 Semi-Annual Groundwater Monitoring Report, Goodrich Delavan Spray Technology Site, Bamberg County, VCC #13-4762-RP, File #51778 (Former Site ID ##02211).

FIGURES



0 500 1,000 2,000 3,000 4,000 Feet

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U.S.G.S. QUADRANGLE MAP

BAMBERG, SC 1979 (PHOTO REVISED 1987)

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

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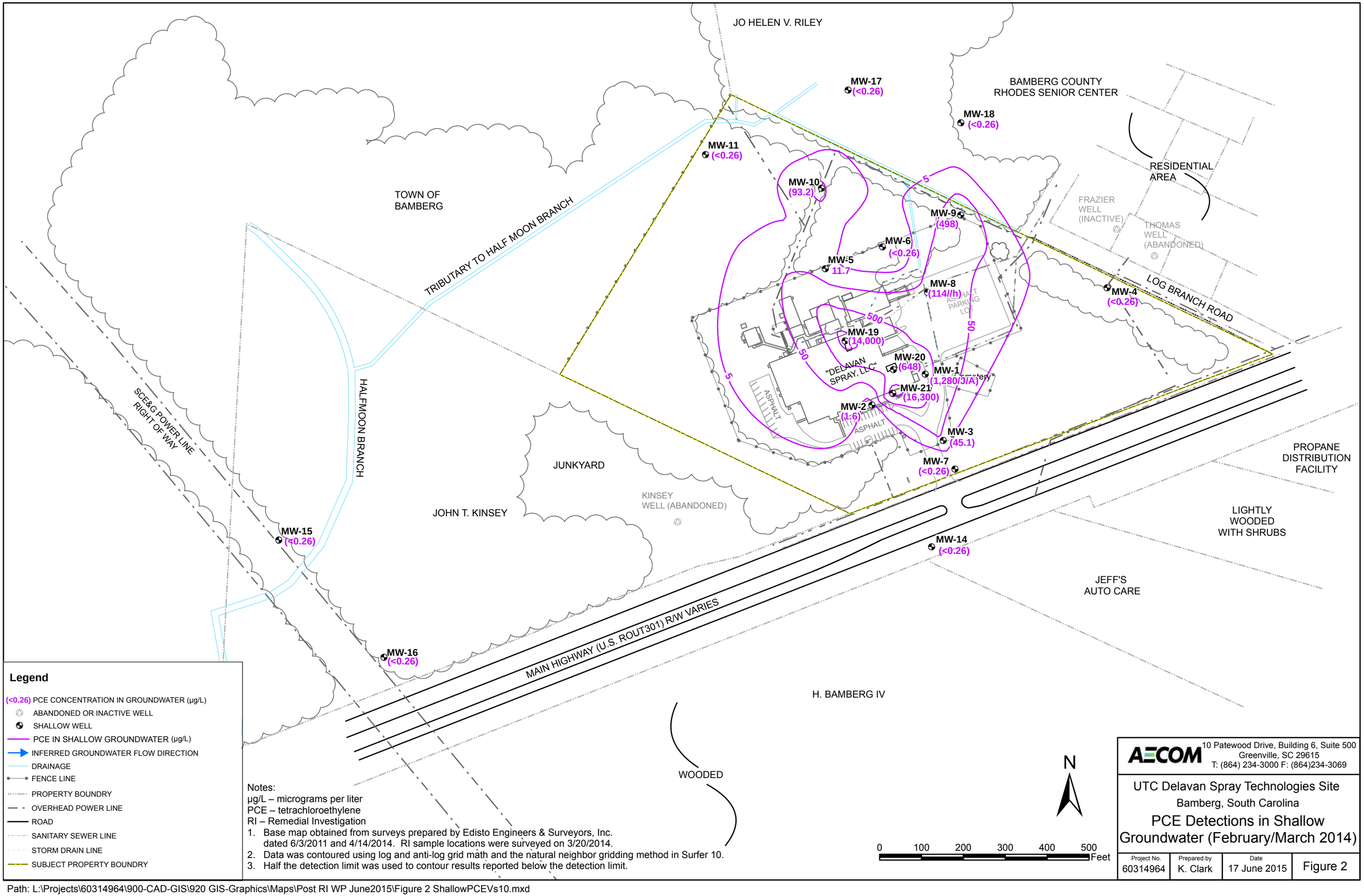
UTC Delavan Spray Technologies Site
Bamberg, South Carolina

Site Location Map

Project No.	Prepared by	Date	
60314964	K. Clark	17 June 2015	Figure 1

Path: L:\Projects\60314964\900-CAD-GIS\920 GIS-Graphics\Maps\Post RI WP June2015\Figure 1 Site Location MapVx10.mxd



Legend

- (<0.26) PCE CONCENTRATION IN GROUNDWATER (µg/L)
- ABANDONED OR INACTIVE WELL
- SHALLOW WELL
- PCE IN SHALLOW GROUNDWATER (µg/L)
- INFERRED GROUNDWATER FLOW DIRECTION
- DRAINAGE
- FENCE LINE
- PROPERTY BOUNDRY
- OVERHEAD POWER LINE
- ROAD
- SANITARY SEWER LINE
- STORM DRAIN LINE
- SUBJECT PROPERTY BOUNDRY

Notes:
µg/L – micrograms per liter
PCE – tetrachloroethylene
RI – Remedial Investigation

1. Base map obtained from surveys prepared by Edisto Engineers & Surveyors, Inc. dated 6/3/2011 and 4/14/2014. RI sample locations were surveyed on 3/20/2014.
2. Data was contoured using log and anti-log grid math and the natural neighbor gridding method in Surfer 10.
3. Half the detection limit was used to contour results reported below the detection limit.

N

0 100 200 300 400 500 Feet

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UTC Delavan Spray Technologies Site
Bamberg, South Carolina

PCE Detections in Shallow Groundwater (February/March 2014)

Project No.	Prepared by	Date	
60314964	K. Clark	17 June 2015	Figure 2

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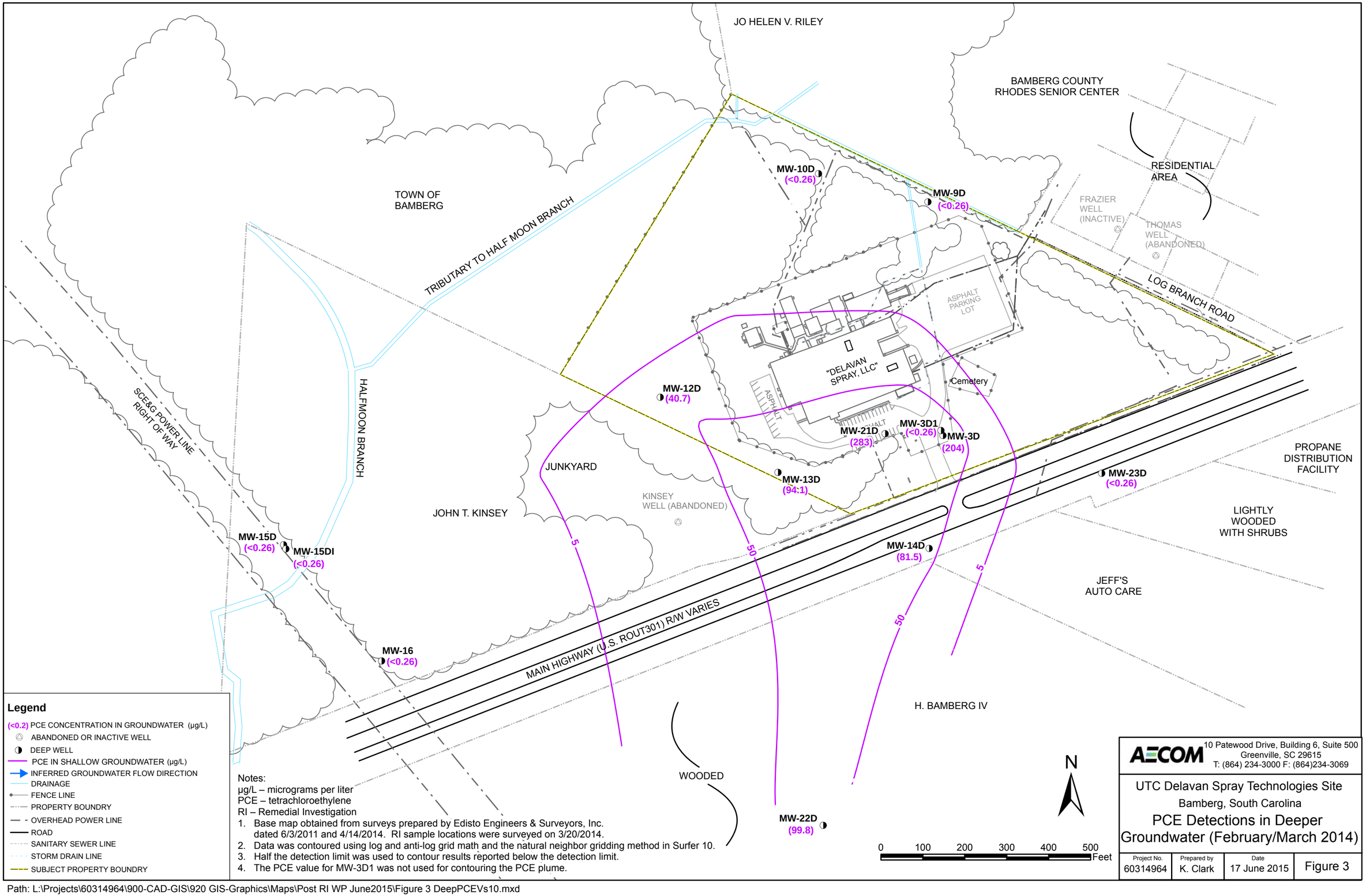

Legend

- (<0.2) PCE CONCENTRATION IN GROUNDWATER (µg/L)
- ABANDONED OR INACTIVE WELL
- DEEP WELL
- PCE IN SHALLOW GROUNDWATER (µg/L)
- INFERRED GROUNDWATER FLOW DIRECTION
- DRAINAGE
- FENCE LINE
- PROPERTY BOUNDRY
- OVERHEAD POWER LINE
- ROAD
- SANITARY SEWER LINE
- STORM DRAIN LINE
- SUBJECT PROPERTY BOUNDRY

Notes:
µg/L – micrograms per liter
PCE – tetrachloroethylene
RI – Remedial Investigation

1. Base map obtained from surveys prepared by Edisto Engineers & Surveyors, Inc. dated 6/3/2011 and 4/14/2014. RI sample locations were surveyed on 3/20/2014.
2. Data was contoured using log and anti-log grid math and the natural neighbor gridding method in Surfer 10.
3. Half the detection limit was used to contour results reported below the detection limit.
4. The PCE value for MW-3D1 was not used for contouring the PCE plume.

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UTC Delavan Spray Technologies Site
Bamberg, South Carolina

PCE Detections in Deeper Groundwater (February/March 2014)

Project No.	Prepared by	Date	
60314964	K. Clark	17 June 2015	Figure 3

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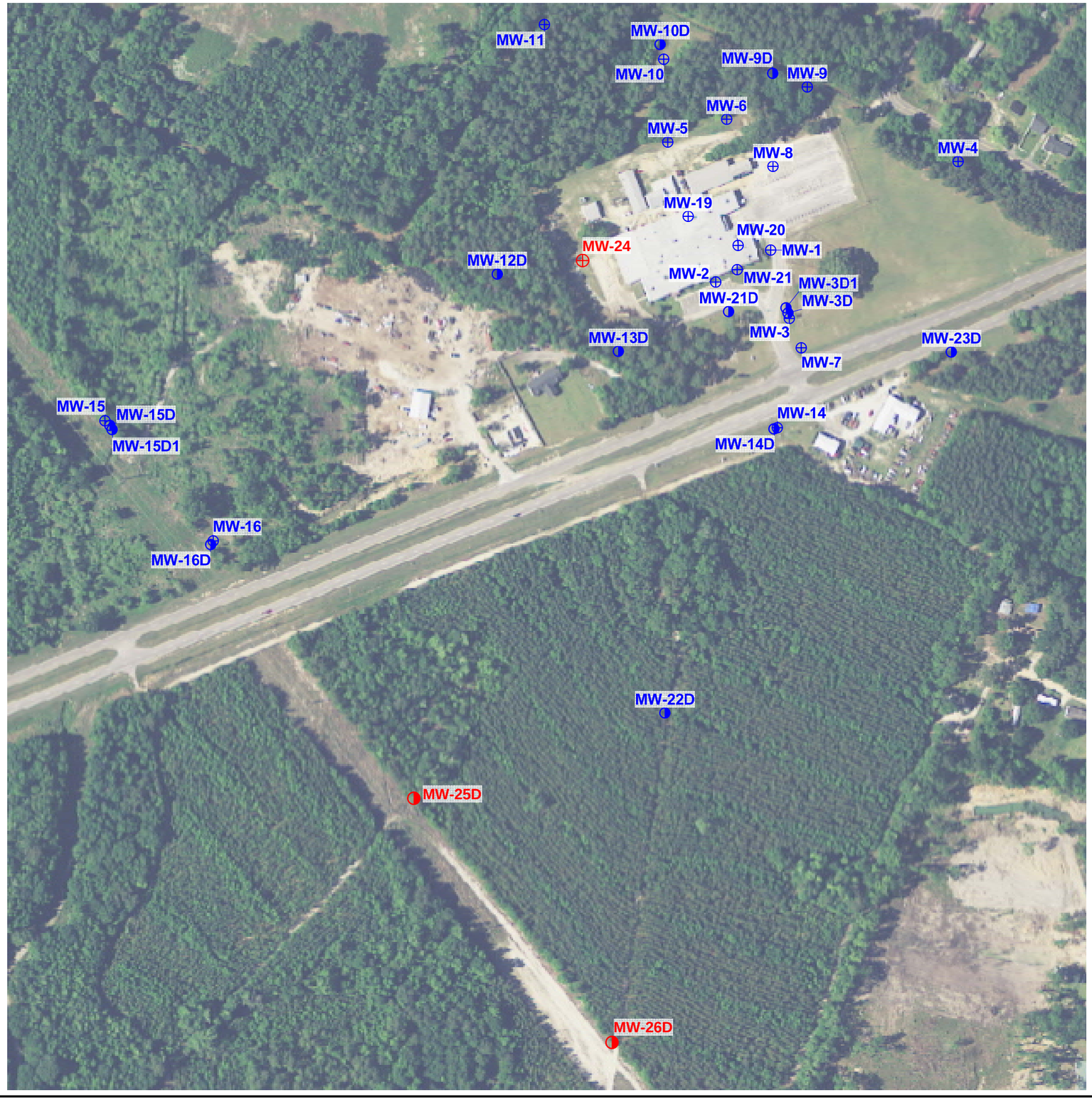

LEGEND

- PROPOSED SHALLOW MONITORING WELL
- PROPOSED DEEP MONITORING WELL
- EXISTING SHALLOW MONITORING WELL
- EXISTING DEEP MONITORING WELL

0 250 500

FEET

N

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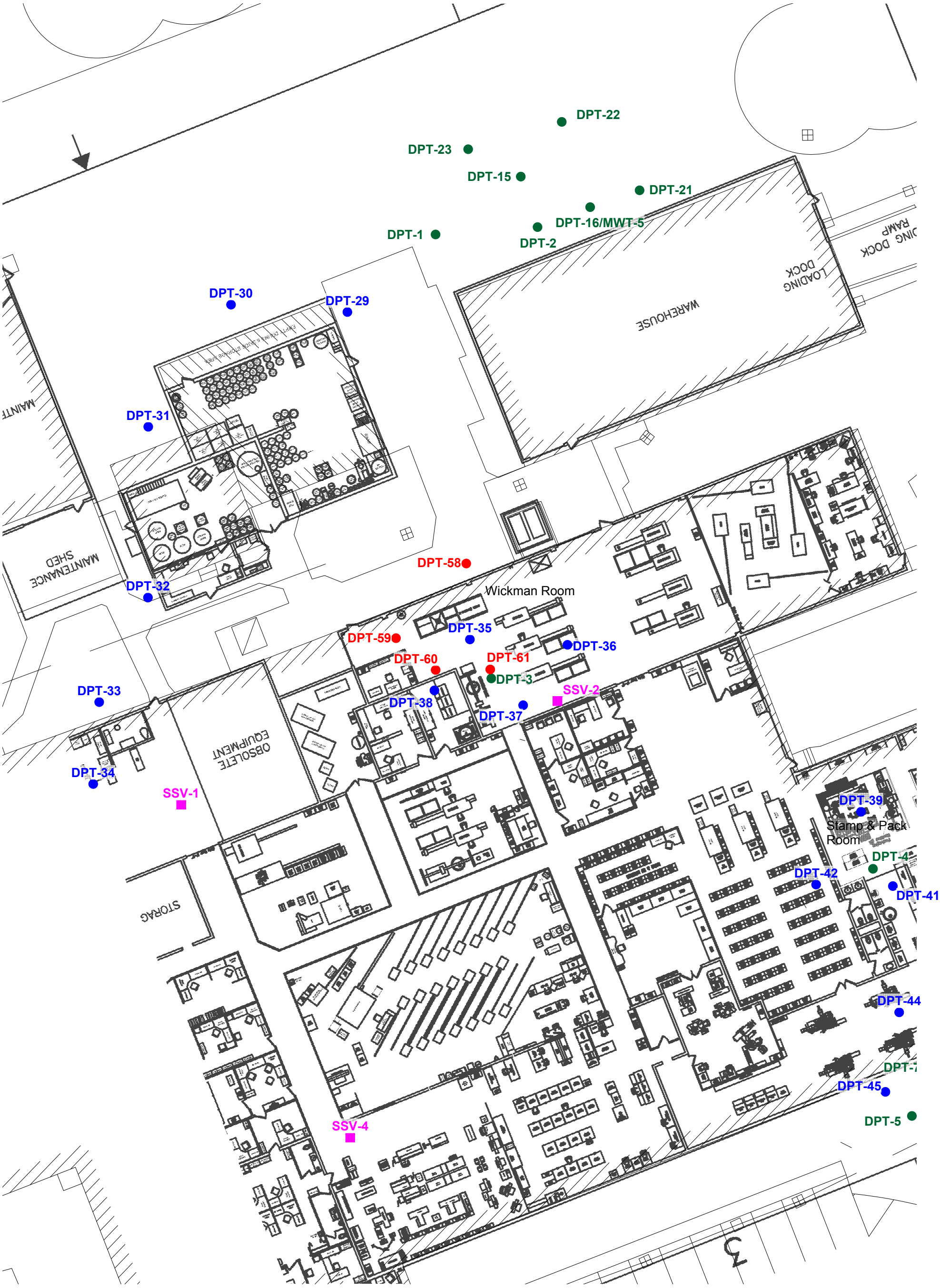
UTC Delavan Spray Technologies Site
Bamberg, South Carolina

Proposed Monitoring Well Locations

PROJECT NO.	PREPARED BY:	DATE:	
60314964	LJA	June 16, 2015	**Figure 4**

L:/Projects/60314964/400-Technical/406 Surfer/For Post RI Work Plan/F5_Proposed Interior Soil Sampling Locations.srf



LEGEND

- PROPOSED SOIL BORING
- RI SOIL BORING
- HISTORIC SOIL BORING (PRE-RI)
- RI SSV POINT

Notes:
RI - Remedial Investigation
SSV - Sub-Slab Vapor

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UTC Delavan Spray Technologies Site
Bamberg, South Carolina

Proposed Soil Sample Locations

PROJECT NO.	PREPARED BY:	DATE:	
60314964	LJA	June 16, 2015	**Figure 5**

L:/Projects/60314964/400-Technical/406 Surfer/For Post RI Work Plan/F5_Proposed Interior Soil Sampling Locations.srf

TABLES

Table 1
Proposed Monitoring Well Details
Delavan Spray Technologies Site
Bamberg, South Carolina
AECOM Project No. 60314964

Well No.	Total Depth	Temporary Surface Casing Depth (ft bgs)	Screen Interval (ft bgs)
MW-24	20	--	5-20
MW-25D	50	30	40-50
MW-26D	50	30	40-50

Notes:
bgs = below ground surface
Wells are proposed to be installed;
therefore, well construction details are estimated.

Table 2
Proposed Monitoring Well Sampling Plan
Delavan Spray Technologies Site
Bamberg, South Carolina
AECOM Project No. 60314964

Well No.	Total Depth	Surface Casing Depth (ft bgs)	Screen Interval (ft bgs)	Analyses
				VOCs
MW-1	18	--	3-18	X
MW-2	18	--	3-18	X
MW-3	18	--	3-18	X
MW-3D	49	24	44-49	X
MW-3D1	85	65	75-85	X
MW-4	14	--	4-14	X
MW-5	14	--	4-14	X
MW-6	14	--	4-14	X
MW-7	20	--	5-20	X
MW-8	20	--	5-20	X
MW-9	20	--	5-20	X
MW-9D	49	24	44-49	X
MW-10	18	--	3-18	X
MW-10D	48	30	43-48	X
MW-11	18	--	3-18	X
MW-12D	50	30	40-50	X
MW-13D	50	30	40-50	X
MW-14	20	--	5-20	X
MW-14D	50	29	40-50	X
MW-15	19	--	4-19	X
MW-15D	45	30	35-45	X
MW-15D1	85	65	75-85	X
MW-16	19	--	4-19	X
MW-16D	45	29	35-45	X
MW-17	28.4	--	13-28	X
MW-18	26.4	--	11-26	X
MW-19	20.15	--	5-20	X
MW-20	15.15	--	5-15	X
MW-21	34.4	--	19-34	X
MW-21D	53.4	31.5	43-53	X
MW-22D	48.4	36	38-48	X
MW-23D	50.4	34	40-50	X
MW-24*	50	30	40-50	X
MW-25D*	50	30	40-50	X
MW-26D*	50	30	40-50	X
QA/QC Samples [1]				
Duplicate	one per 10 samples			3
MS/MSD	one per 20 samples			2
Trip Blank	one per shipped cooler			4

Notes:
Groundwater sampling will be performed during the scheduled Fall 2015 Semi-annual Monitoring Event.
1 - Details of the QA/QC sampling requirements are provided in Appendix B of the RI Work Plan.
* Well is proposed to be installed; therefore, well construction details are estimated
bgs = below ground surface
VOCs = Volatile organic compounds by EPA Method 8260B
MS/MSD = Matrix Spike/Matrix Spike Duplicate

Table 3
Proposed Soil Sampling Plan
Delavan Spray Technologies Site
Bamberg, South Carolina
AECOM Project No. 60314964

Sample ID	Description of Sampling	Estimated Total Boring Depth (ft)	Area of Interest	Analytes	
				VOCs (Method 8260B)	TOD (TBD)
SOIL SAMPLES:					
DPT-58	Minimum of 4 and up to 8 soil samples to be collected based on field screening	10-15 ft	Former PCE Degreaser located in the Wickman Room	8	-
DPT-59					
DPT-60					
DPT-61					
BG-6	Two borings will be installed near RI soil boring BG-5; samples from each boring will be composited for each sample interval	4-6 ft 8-10 ft	Background for TOD screening	-	4
BG-7	Two borings will be installed near RI soil boring BG-3; samples from each boring will be composited for each sample interval	4-6 ft 8-10 ft			
Subtotal				8	4
Rinseate Blank (One Blank Every 20 Samples) [1]				1	0
Field Duplicate (One Per Every 20 Samples)			QA/QC	1	0
Matrix Spike/Matrix Spike Duplicate (One Per Every 20 Samples)			QA/QC	1	0
Soil and Soil QA/QC Samples [2]				11	4

Notes:
[1] - One Rinseate Blank will be collected every 20 samples, per each piece of sampling equipment.
[2] - Total number of samples are estimates and may be modified based upon field conditions and field screening results
TOD - Total Oxidant Demand
TBD - To be determined
VOCs - Volatile Organic Compounds

APPENDIX A

MONITORING WELL PERMIT APPLICATION AND PROPOSED CONSTRUCTION DETAILS

Monitoring Well Application

1. Proposed Location of Monitoring Well(s):

Street Address: **4334 Main Highway (US Highway 301 South)**

City (including Zip): **Bamberg 29003**

County: **Bamberg**

Please attach Scaled Map or Plat

2. Well Owner's Information:

Name (Last then First):

Company: **United Technology Corp.**

Complete Address: **9 Farm Springs Rd Farmington, CT 06032**

Telephone Number: **(860) 728-6542**

3. Property Owner's Information:

☐ Check if same as Well Owner

Name (Last then First):

Company: **Delavan Spray Technologies**

Address: **P.O. Box 969 Bamberg, SC 29003**

Telephone Number: **(803) 245-4347**

4. Proposed Drilling Date: **09/21/2015**

5. Intended Purpose of Well(s):

Pre-Purchase ☐

Investigation ☑

NOTE: If this request is for an existing DHEC project, please enter the Program area and ID number below.

Program Area: **Land and Waste Management**
Project or Site ID #: **51778**

6. Proposed number of monitoring wells: **3**

7. Proposed parameters to be analyzed (check all that apply), please specify analytical method beside check box:

VOCs	☑	8260B
BTEX	☐	
MtBE	☐	
Naphthalene	☐	
PAHs	☐	
Metals	☐	
Nitrates	☐	
Base, Neutral & Acid Ex.	☐	
Pesticides/Herbicides	☐	
Phenols	☐	
Radionuclides	☐	
PCBs	☐	
Other (specify below)	☐	

MNA Parameters

8. Proposed construction details (complete and attach proposed monitoring well schematics):

One Type II & 2 Type III Monitoring Wells. See Attached Figs A-2 and A-3 for additional details.

South Carolina Department of Health and Environmental Control (SCDHEC) summary of standards for monitoring well construction (per South Carolina Well Standards and Regulations R. 61-71)

Approval and License Requirements

Prior Department approval is required for the installation or abandonment of all monitoring wells including direct push, geoprobe or other temporary type monitoring wells. The attached monitoring well approval document should be completed, submitted and approved prior to construction of any monitoring well. A monitoring well is any well used to obtain water samples for water quality analyses or to measure groundwater levels. There are no fees for approvals. All monitoring wells must be drilled by a driller that is registered in South Carolina with the Board of Certification of the Environmental Systems Operators. If any of the information on the application including the proposed drilling date, well construction details or well placement changes, the Department (i.e. project manager issuing the well approval) must be notified 24 hours prior to well construction.

Location

Due to the nature and purpose of a monitoring well, the depth and location requirements in respect to surface water bodies, potential contamination sources, etc., are variable, and shall be approved on a case by case basis by the Department.

Construction and Material

Casing should be of sufficient strength to withstand normal forces encountered during and after well installation and be composed of material so as to minimally affect water quality analyses. Casing should have a sufficient diameter to allow for efficient sample collection (i.e., to provide access for sampling equipment). The diameter of the drilled hole needs to be large enough on all sides (1.5 inches of annular space) to allow forced injection of grout through a tremie pipe. All monitoring wells should have a cement pad or aggregate reinforced concrete at the ground surface which extends at least six inches beyond the bore hole diameter and six inches below ground surface to prevent infiltration between the surface casing and the bore hole. All monitoring wells should be grouted from the top of the bentonite seal to the surface with a neat cement, high solids bentonite or neat cement, bentonite mixture approved by the Department. A hydrated bentonite seal with a minimum thickness of 12 inches is to be placed above the filter pack to prevent infiltration of grout if the well has a filter pack. The monitoring well intake or screen design should minimize the amount of formational materials entering the well. The gravel
pack should be utilized opposite the well screen as appropriate so that parameters analyses will be minimally affected. All monitoring wells should have a locking cap or other security device to prevent damage and/or vandalism. Any monitoring well which is destroyed, rendered unusable or is abandoned should be reported to the Department and be properly abandoned, revitalized or replaced as appropriate or required by permit or regulation.

Development

Monitoring wells shall be properly developed. Development shall include the removal of
formation cuttings and drilling fluids from the well bore hole. Development shall be complete when the well produces water typical of the aquifer being monitored.

Reporting Requirements

A monitor well record form (1903) or equivalent to include the following should be completed and submitted to the Department within 30 days after completion of the monitoring wells:

Name and address of facility/owner;
Surveyed or global positioning system location of monitor well(s) on a scaled map or plat;
Driller and certification number;
Date drilled;
Driller's or Geologist's log;
Total depth;
Screened interval;
Diameter and construction details;
Depth to water table with date and time measured;
Surveyed elevation of measuring point with respect to established benchmark;
Monitoring well approval number issued by the Department.

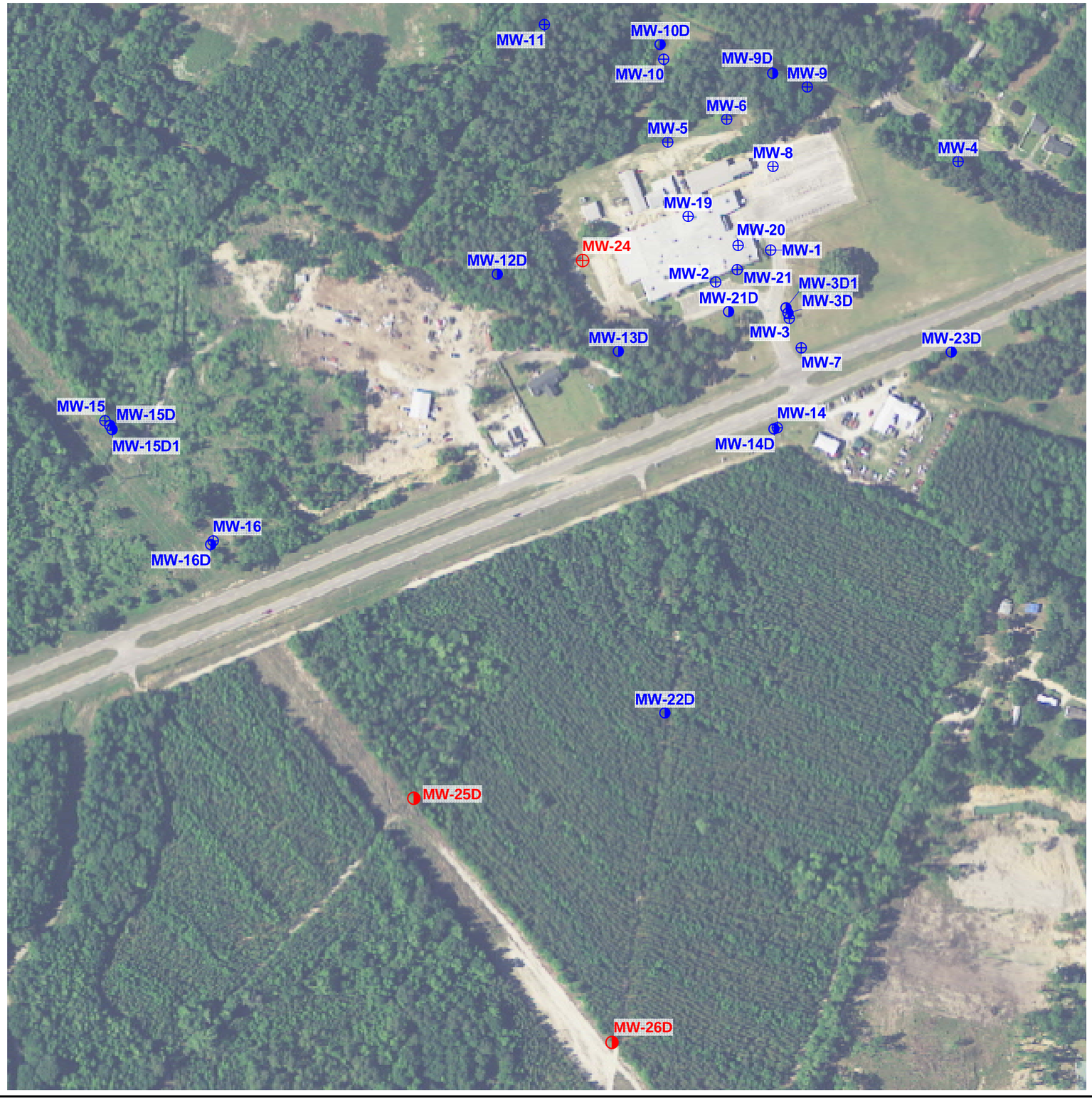
Additionally, the groundwater and soil (if taken) analytical results should be submitted to the Department within 30 days of receipt from the laboratory.

Abandonment

All monitoring wells shall be properly abandoned, when deemed appropriate by the Department. Any well that acts as a source of contamination shall be repaired or permanently abandoned immediately after receipt of notice from the Department. Abandonment shall be by forced injection of grout or pouring through a tremie pipe starting at the bottom of the well and proceeding to the surface in one continuous operation. The well shall be filled with either neat cement, bentonite-cement, or 20% high solids sodium bentonite grout, from the bottom of the well to the land surface.

* This summary of standards for monitoring well construction may not include a listing of all information necessary to obtain an approval to install monitoring wells. Final approval of monitoring well installation will be dependant upon the regulatory requirements for the Department program area for which the monitoring wells are to be installed.

* Some areas of the Department may require a detailed justification of the placement of monitoring wells and the depth of monitoring well screened zones prior to granting installation approval.



LEGEND

- PROPOSED SHALLOW MONITORING WELL
- PROPOSED DEEP MONITORING WELL
- EXISTING SHALLOW MONITORING WELL
- EXISTING DEEP MONITORING WELL

0 250 500

FEET

N

AECOM
10 Patewood Drive, Building 6, Suite 500
Greenville, SC 29615
T: (864)234-3000 F: (864)234-3069

UTC Delavan Spray Technologies Site
Bamberg, South Carolina

Proposed Monitoring Well Locations

PROJECT NO.	PREPARED BY:	DATE:	
60314964	LJA	June 16, 2015	**Figure A-1**

L:/Projects/60314964/400-Technical/406 Surfer/For Post RI Work Plan/F5_Proposed Interior Soil Sampling Locations.srf

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FIGURE A-2

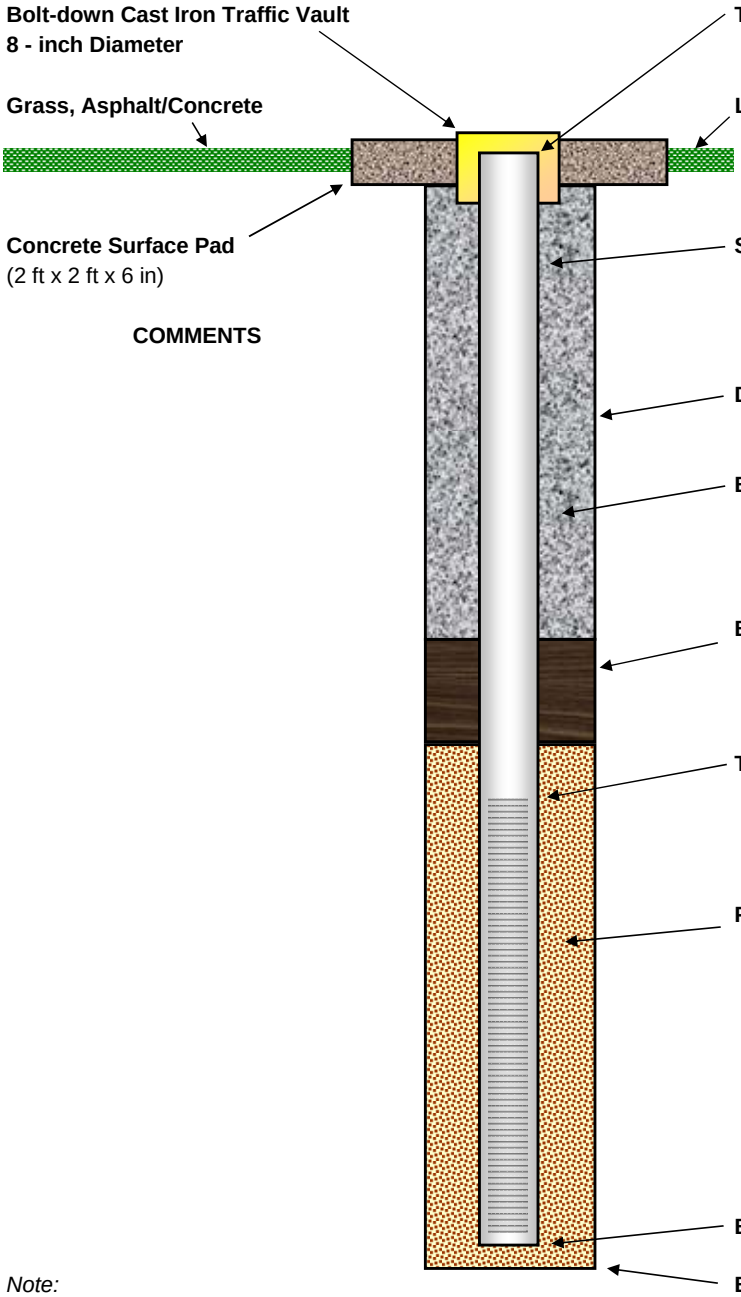
TYPE II GROUNDWATER MONITORING WELL INSTALLATION DETAIL

Project Name: UTC Delavan Spray Site **Drilling Co:** _____ **Well Number:** _____

Location: Bamberg, South Carolina **Driller:** _____ **Job Number:** _____

Client: United Technology Corporation **Drilling Method:** Sonic **Date Completed:** _____

Geologist: _____ **Static Water Level** _____ **b.TOC** **Survey Datum:** _____



Bolt-down Cast Iron Traffic Vault
8 - inch Diameter

Grass, Asphalt/Concrete

Concrete Surface Pad
(2 ft x 2 ft x 6 in)

COMMENTS

Top Of Casing Elevation _____ ft _____ ft Stickup

Land Surface Elevation _____ ft

Surface Casing From _____ ft to _____ ft

Casing Type: _____
Inside Diameter: _____

Diameter of Borehole (nominal)
6 in

Bentonite/Cement Grout
From _____ ft to _____ ft

Bentonite Pellet Seal
Type: _____
From _____ ft to _____ ft

Top of Screen Depth _____ ft
Screen Type: SCH-40 PVC
Screen Slot Size: 0.010-in ID 2 in
Screen Length: 15 ft

Filter Sand for Screen
Sand Type: _____
From _____ ft to _____ ft

Bottom of Well Depth _____ ft

Bottom of Boring (estimated) Depth 20 ft

Total Depth of Well, b. Top of Casing Depth _____ ft

Note:
Drawing Not to Scale
All Depths are Referenced to Ground Surface

AECOM

FIGURE A-3

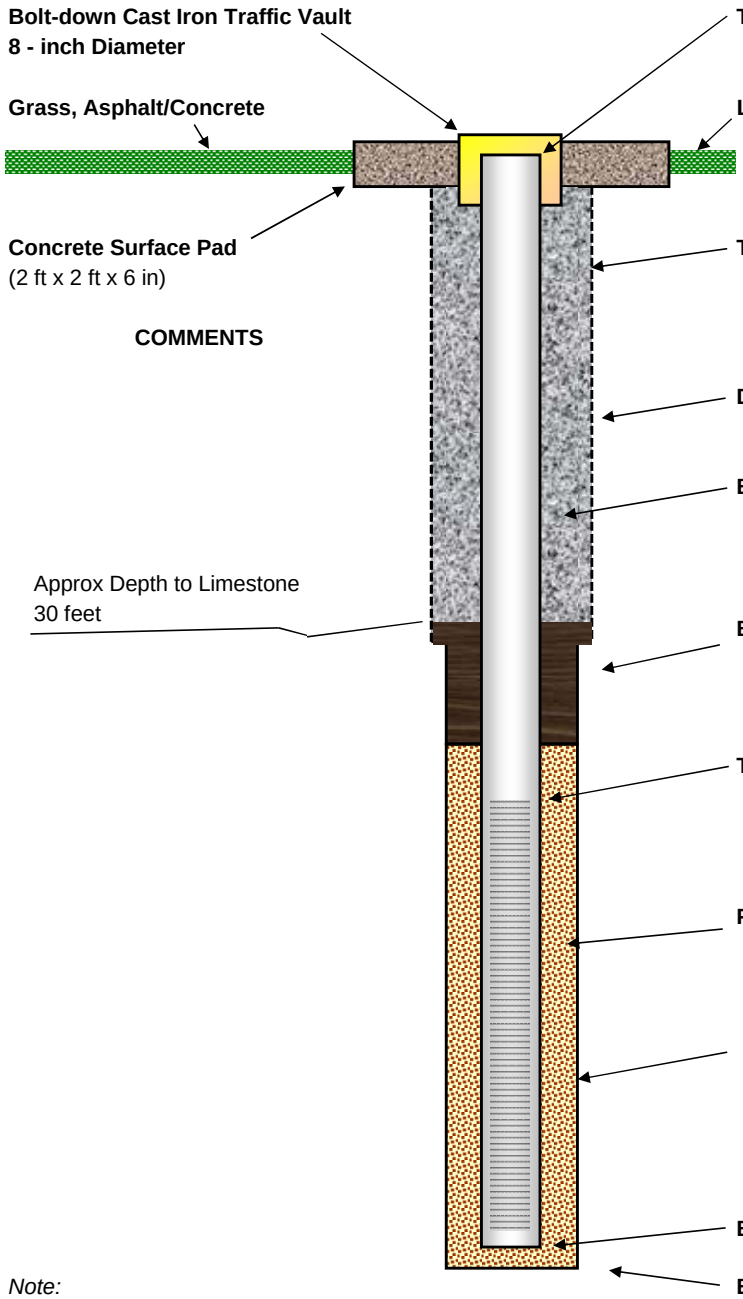
TYPE III GROUNDWATER MONITORING WELL INSTALLATION DETAIL

Project Name: UTC Delavan Spray Site **Drilling Co:** _____ **Well Number:** _____

Location: Bamberg, South Carolina **Driller:** _____ **Job Number:** _____

Client: United Technology Corporation **Drilling Method:** Sonic **Date Completed:** _____

Geologist: _____ **Static Water Level** _____ **b.TOC** **Survey Datum:** _____



Bolt-down Cast Iron Traffic Vault
8 - inch Diameter

Grass, Asphalt/Concrete

Concrete Surface Pad
(2 ft x 2 ft x 6 in)

COMMENTS

Approx Depth to Limestone
30 feet

Top Of Casing Elevation _____ ft _____ ft Stickup

Land Surface Elevation _____ ft

Temp Surf Casing From _____ ft to _____ ft

Casing Type: **Temporary Steel**
Inside Diameter: **8** in

Diameter of Borehole (nominal)
8 in

Bentonite/Cement Grout
From _____ ft to _____ ft

Bentonite Pellet Seal
Type: _____
From _____ ft to _____ ft

Top of Screen Depth _____ ft
Screen Type: **SCH-40 PVC**
Screen Slot Size: **0.010-in** ID **2** in
Screen Length: **10** ft

Filter Sand for Screen
Sand Type: _____
From _____ ft to _____ ft

Diameter of Borehole (nominal)
6 in

Bottom of Well Depth _____ ft

Bottom of Boring (estimated) Depth **50** ft

Total Depth of Well, b. Top of Casing Depth _____ ft

Note:
Drawing Not to Scale
All Depths are Referenced to Ground Surface