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**Via Federal Express**

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South Carolina Department of Health and Environmental Control  
AST Petroleum Restoration & Site Environmental Investigations Section  
Land Revitalization Division  
Bureau of Land and Waste Management  
2600 Bull Street  
Columbia, South Carolina 29201

# 3675

Attention: Ms. Addie Walker

Re: Additional Ground Water Assessment Work Plan  
Delavan Spray Technologies Site  
Bamberg, South Carolina  
Site ID #02211  
H&H Job No. GDR-006

Dear Ms. Walker:

On behalf of Delavan Spray Technologies, Hart & Hickman, PC (H&H) is providing SCDHEC with the attached work plan for additional ground water assessment activities at the Delavan site in Bamberg, Bamberg County, South Carolina.

Should you have any questions or require any additional information, please feel free to contact me at (704) 586-0007.

Very truly yours,

**Hart & Hickman, PC**

Steven C. Hart, PG  
Principal

Shannon Cottrill  
Project Manager

cc: Mr. Richard Kearse (Via U.S. Mail)  
Mr. Bruce Amig (Via U.S. Mail)

(A10)

**Additional Ground Water  
Assessment Work Plan  
Delavan Spray Technologies  
Bamberg, South Carolina  
DHEC Site ID #02211**

**H&H Job No. GDR-006**

**February 16, 2009**

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Raleigh, NC 27607  
919-847-4241



## Table of Contents

<u>Section No.</u>	<u>Page</u>
<b>1.0 Introduction .....</b>	<b>1</b>
<b>2.0 Background Information .....</b>	<b>3</b>
<b>3.0 Proposed Ground Water Assessment .....</b>	<b>5</b>
3.1 Additional Monitor Wells .....	5
3.2 General Field Procedures .....	7
3.3 Investigation-Derived Waste Management .....	7
<b>4.0 Ground Water Monitoring and Reporting .....</b>	<b>8</b>
4.1 Ground Water Monitoring.....	8
4.2 General Field Procedures .....	8
4.3 Reporting.....	9
<b>5.0 Proposed Project Schedule.....</b>	<b>11</b>

## List of Figures

Figure 1	Site Location Map
Figure 2	Site Layout
Figure 3	Shallow Potentiometric Surface Map (January 8, 2008)
Figure 4	Deeper Potentiometric Surface Elevations (January 8, 2008)
Figure 5	PCE Detections in Shallow Ground Water (January 8, 2008)
Figure 6	PCE Detections in Deeper Ground Water (January 8, 2008)
Figure 7	Proposed Monitor Well Locations

## List of Appendices

Appendix A	Monitoring Well Application
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**Additional Ground Water Assessment Work Plan  
Delavan Spray Technologies  
Bamberg, South Carolina  
DHEC Site ID #02211  
H&H Job No. GDR-006**

**1.0 Introduction**

On behalf of Delavan Spray Technologies (Delavan), Hart & Hickman, PC (H&H) has prepared this work plan for additional ground water assessment activities at the Delavan facility on US Highway 301 South in Bamberg, Bamberg County, South Carolina (Figure 1). Delavan manufactures fuel metering equipment and various spray-type nozzles at the facility. A site layout is provided as Figure 2. The additional ground water assessment activities were requested by the South Carolina Department of Health and Environmental Control (DHEC) in a letter dated August 6, 2008. The objective of the proposed activities is to further delineate the presence of chlorinated volatile organic compounds (VOCs) in ground water at the Delavan facility through the installation of additional monitor wells. In addition, this work plan includes proposed semi-annual ground water monitoring to monitor compound concentrations with time.

The proposed work includes:

- Installing one deeper Type III monitor well near existing wells MW-3 and MW-3D in the southern portion of the site to evaluate the vertical extent of compounds in ground water;
- Installing one deeper Type III monitor well near the western site property boundary between the Delavan facility and the off-site Kinsey water supply well southwest of the facility building;
- Installing one deeper Type III monitor well between the Delavan facility and the off-site Kinsey property west of the facility building;

- Installing one shallow and one deeper Type III monitor wells (nested well pair) in the southern right-of-way of US Highway 301 South in a location regionally downgradient (south) of deeper monitor well MW-3D; and
- Conducting semi-annual ground water monitoring of site monitor wells, one surface water body located northwest of the Delavan facility, and one water supply well (off-site Kinsey well, if permission is granted).

This work plan briefly summarizes the most recent ground water assessment activities (Section 2.0), proposes additional ground water assessment activities (Section 3.0), describes our proposed ground water monitoring and reporting plan (Section 4.0), and presents a proposed project schedule (Section 5.0).

## 2.0 Background Information

Previous assessment activities indicate the presence of chlorinated VOCs in ground water at the Delavan facility. The primary constituent of concern is tetrachloroethene (PCE). Other analytes historically detected in ground water samples include trichloroethene (TCE), cis-1,2-dichloroethene (DCE), 1,1-dichloroethene (1,1-DCE), and vinyl chloride which are biodegradation products of PCE.

Ground water elevation data indicate that the shallow ground water flow direction is generally toward a north-south trending ground water trough located in the center of the site. Deeper ground water flow direction is generally toward the south in the direction of regional surface topography. Shallow and deeper ground water flow maps are provided as Figures 3 and 4, respectively.

Recent assessment data from the January 2008 comprehensive ground water monitoring event were presented in H&H's *Ground Water Assessment* report dated June 13, 2008. As part of this previous assessment, H&H installed three deeper Type III monitor wells at the site to evaluate the vertical extent of VOCs in ground water. The deeper wells were installed in locations regionally downgradient of monitor wells MW-1 (MW-3D), MW-9 (MW-D), and MW-10 (MW-10D). Following installation of these wells, H&H sampled both new and existing monitoring wells.

The results of the ground water sampling indicate that PCE was detected in shallow monitoring wells MW-1 (5,390 µg/l), MW-2 (2.50 µg/l), MW-3 (59.8 µg/l), MW-5 (97.6 µg/l), MW-8 (159 µg/l), MW-9 (2,410 µg/l), MW-10 (3,250 µg/l). Other compounds detected in shallow monitoring wells included TCE (up to 297 µg/l), cis-1,2-DCE (up to 271 µg/l), 1,1-DCE (up to 24.1 µg/l), and vinyl chloride (up to 8.37 µg/l).

PCE (432 µg/l) was also detected in the newly installed deeper monitor well in the southern portion of the site (MW-3D), and a low concentration of PCE (4.09 µg/l) was detected in deeper well MW-10D. PCE was not detected in deeper well MW-9D. Other analytes were detected in MW-3D only included TCE, cis-1,2-DCE, and 1,1-DCE. No other target analytes were detected in MW-9D or MW-10D. The distributions of PCE in the shallow and deeper ground water monitoring zones are shown on Figures 5 and 6, respectively.

During the ground water assessment activities in January 2008, H&H discovered the presence of a newly installed off-site domestic well on an adjacent property owned by Mr. John Kinsey. Mr. Kinsey had the domestic well installed in September 2007 to service his residence which was under construction at that time. The results of a water sample collected from his well indicated the presence of PCE (37 µg/l), vinyl chloride (5.21 µg/l), and methyl ethyl ketone (MEK) (220 µg/l). Following receipt of the laboratory data, H&H notified Mr. Kinsey of the sampling results by telephone and recommended that the water from his well not be used for any purpose. A written notification of the results and an offer to connect the property to the municipal water supply and abandon the well were forwarded to Mr. Kinsey on March 24, 2008. Mr. Kinsey's attorney indicated in June 2008 that the Kinsey residence is now connected to the Bamberg Board of Public Works municipal supply.

In a letter dated August 6, 2008, DHEC requested that a work plan be submitted to delineate the vertical and horizontal extent of VOCs in ground water at the Delavan site. Due to an administrative issue at DHEC, this letter was not received by Delavan or H&H until early October 2008. Following receipt of this letter, H&H contacted Ms. Addie Walker of DHEC to discuss the additional assessment activities and the work plan submittal. During discussions with Ms. Walker, DHEC agreed that quarterly sampling could be discontinued, but requested that semi-annual ground water monitoring conducted. As such, H&H has proposed semi-annual ground water monitoring for the site in this work plan.

### 3.0 Proposed Ground Water Assessment

#### 3.1 Additional Monitor Wells

To further delineate the vertical and horizontal extent of VOCs in ground water as requested by DHEC, H&H proposes to install and sample four additional deeper Type III monitor wells and one additional shallow monitor well using either hollow-stem auger and/or mud rotary techniques. The locations of the proposed wells are indicated in Figure 7. The additional wells are proposed in the following locations:

- One deeper Type III monitor well (MW-3D1) will be installed near existing wells MW-3 and MW-3D in the southern portion of the site to evaluate the vertical extent of compounds in ground water.
- One deeper Type III monitor well (MW-13D) will be installed near the western site property boundary between the Delavan facility and the off-site Kinsey water supply well southwest of the facility building.
- One deeper Type III monitor well (MW-12D) will be installed between the Delavan facility and the off-site Kinsey property west of the facility building.
- One shallow and one deeper Type III monitor wells (nested well pair) (MW-14/MW-14D) will be installed in the southern right-of-way of US Highway 301 South in a location regionally downgradient (south) of deeper monitor well MW-3D.

For ease of understanding, each of these wells is discussed separately below.

#### Deeper Well Near MW-3/MW-3D

Based on the compound detections in well MW-3D (approximately 50 ft bgs) and the depth of the off-site Kinsey well (approximately 100 ft bgs), H&H anticipates that the deeper well (MW-3D1) proposed next to MW-3D will be drilled to an approximate depth of 85 ft with a 6-inch



diameter PVC surface casing of approximately 65 ft. Then, one 2-inch diameter monitor well with a screen interval from 75 to 85 ft bgs will be placed in this borehole.

#### Deeper Well Southwest of Building

According to the water well record and follow-up discussions with the water well driller, the off-site Kinsey well is constructed as an open-hole bedrock well in limestone with approximately 55 ft of 6-inch diameter PVC surface casing. Based on the off-site Kinsey well construction information and lithological information obtained from our previous on-site stratigraphic boring STB-1 (which indicates that sand is present to an approximate depth of 60 ft bgs), H&H anticipates that the deeper well (MW-13D) proposed between the Delavan facility and the off-site Kinsey well will be drilled to an approximate depth of 50 ft with a 6-inch diameter PVC surface casing of 30 ft. Then, one 2-inch diameter monitor well with a screen interval from 40 to 50 ft bgs will be placed in this borehole.

#### Deeper Well West of Building

In accordance with DHEC's request, H&H will install a deeper Type III monitor well (MW-12D) between the Delavan facility and the off-site Kinsey property west of the facility building. This proposed deeper well will be drilled to an approximate depth of 50 ft with a 6-inch diameter PVC surface casing of 30 ft. Then, one 2-inch diameter monitor well with a screen interval from 40 to 50 ft bgs will be placed in this borehole.

#### Shallow and Deeper Nested Well Pair in DOT Right-of-Way

To delineate the vertical and horizontal extent of compounds in ground water downgradient (south) of deeper monitor well MW-3D, H&H will install a shallow and deeper Type III monitor well (nested well pair) (MW-14/MW-14D) in the southern right-of-way of US Highway 301 South. H&H anticipates that the proposed shallow well will be drilled to an approximate depth of 20 ft with a screen interval from 5 to 20 ft bgs and the deeper Type III monitor well will be drilled to an approximate depth of 50 ft with a 6-inch diameter PVC surface casing of 30 ft.

Then, one 2-inch diameter monitor well with a screen interval from 40 to 50 ft bgs will be placed in this borehole.

Because the proposed additional monitor wells are located in the South Carolina Department of Transportation (DOT) right-of-way of US Highway 301 South, H&H will prepare and submit an encroachment permit to the DOT prior to the drilling activities.

### **3.2 General Field Procedures**

During well installation, split-spoon soil samples will be collected at approximately 5-ft intervals above rock (limestone) for soil lithology classification. Boring logs and well construction records will be prepared to update cross-sections for the site. Drilling equipment will be decontaminated between each boring by steam cleaning.

Following well installation, surveying techniques will be used to estimate monitoring well locations, monitoring well top of casing elevations, and monitoring well ground surface elevations to update potentiometric maps for the site.

### **3.3 Investigation-Derived Waste Management**

During the well installations, investigation-derived waste (IDW) consisting of decontamination water, well development water, and drill cuttings/fluids will be containerized in either 55-gallon drums or lined roll-off boxes. For characterization and disposal purposes, H&H will sample the IDW water drums and drill cuttings/fluids roll-off boxes for Toxicity Characteristic Leaching Procedure (TCLP) VOCs and TCLP metals. Following receipt of characterization data, the IDW materials will be properly disposed.

## **4.0 Ground Water Monitoring and Reporting**

### **4.1 Ground Water Monitoring**

Following installation of the additional monitor wells, H&H will conduct a ground water monitoring event (first-half 2009 semi-annual). The first-half semi-annual ground water monitoring event will consist of the following work tasks:

- gauging the depth to water in all site monitor wells (inclusive of the five proposed wells and the 14 existing site wells);
- purging and sampling of up to 19 monitor wells, one surface water sample in the previous location of surface water sample SW-1, and one water supply well sample (off-site Kinsey well, if permission is granted) for VOCs using EPA Method 8260B (reporting EPA 601 list only);
- collecting field geochemical parameters from all site-related monitor wells including pH, temperature, specific conductivity, dissolved oxygen, and oxidation-reduction potential (ORP);
- submitting one trip blank for VOC analysis by EPA Method 8260B (reporting EPA 601 list only) for quality assurance purposes; and
- containerizing and storing purge water from the monitor wells in labeled 55-gallon drums and collecting one composite water sample for TCLP VOC and TCLP metals analyses for characterization and disposal purposes

Following receipt of characterization data, the IDW purge water drums will be properly disposed.

### **4.2 General Field Procedures**

The monitoring wells will be purged until pH, temperature, and specific conductivity parameters are stable. Following well purging, ground water samples will be collected from each well for laboratory analysis using dedicated, disposable polyethylene bailers. Laboratory-supplied sample

bottles will be used for sample collection. A chain-of-custody record will be completed for samples collected and will include sample description, date collected, time collected, matrix, sample container information, and analyses required. The chain-of-custody will be signed by H&H field personnel prior to placement in an iced cooler for shipment to the laboratory. Prior to shipment, a custody seal will be placed on the cooler so that any tampering or opening of the cooler could be detected by the laboratory. The samples will be analyzed by a laboratory certified in South Carolina.

### **4.3 Reporting**

Upon completion of the field work and receipt of the laboratory analytical data, H&H will prepare a first-half Semi-Annual Ground Water Monitoring and Well Installation report for the site. The report will include a description of the monitor well installation activities, ground water sampling locations, sample methodology, ground water sampling datasheets, laboratory analytical data sheets, tabular summaries of the ground water data, and recommendations and conclusions. The report will also include updated potentiometric, cross-section, and VOC data maps for the site.

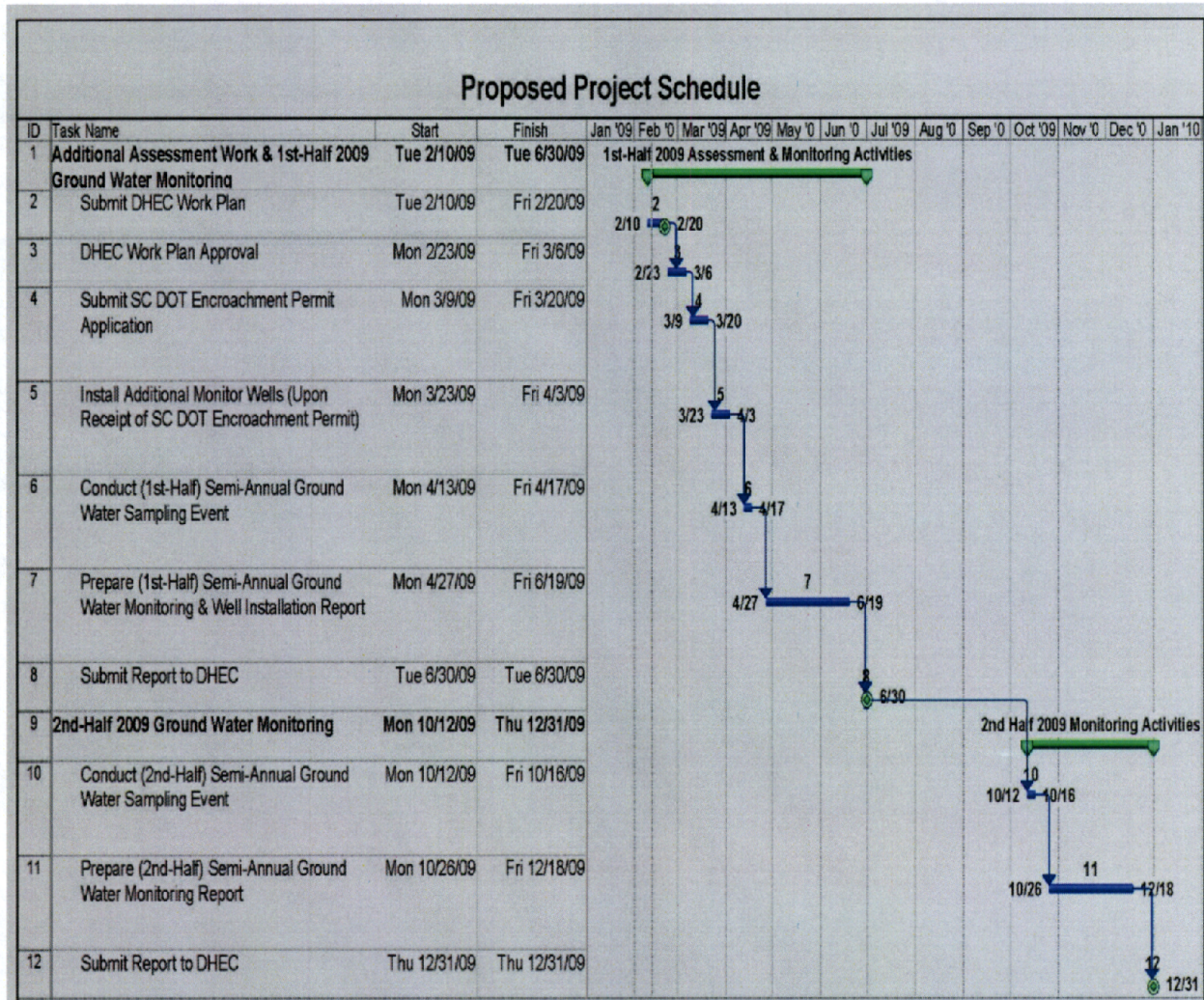
Because the additional ground water assessment and associated reporting will encompass the first-half of 2009, H&H proposes to conduct the second-half semi-annual ground water monitoring event in late 2009 (likely September or October 2009) in accordance with DHEC's request. The second-half semi-annual ground water monitoring event will consist of the same ground water sampling work tasks outlined in Section 4.1.

Upon completion of the field activities and receipt of analytical data, H&H will incorporate the data collected from the semi-annual ground water monitoring event into a second-half Semi-Annual Monitoring report. The report will include a description of ground water sample locations, sample methodology, ground water sampling datasheets, laboratory analytical data, and tabular summaries of the data. The report will also include updated potentiometric and VOC

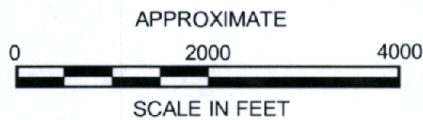
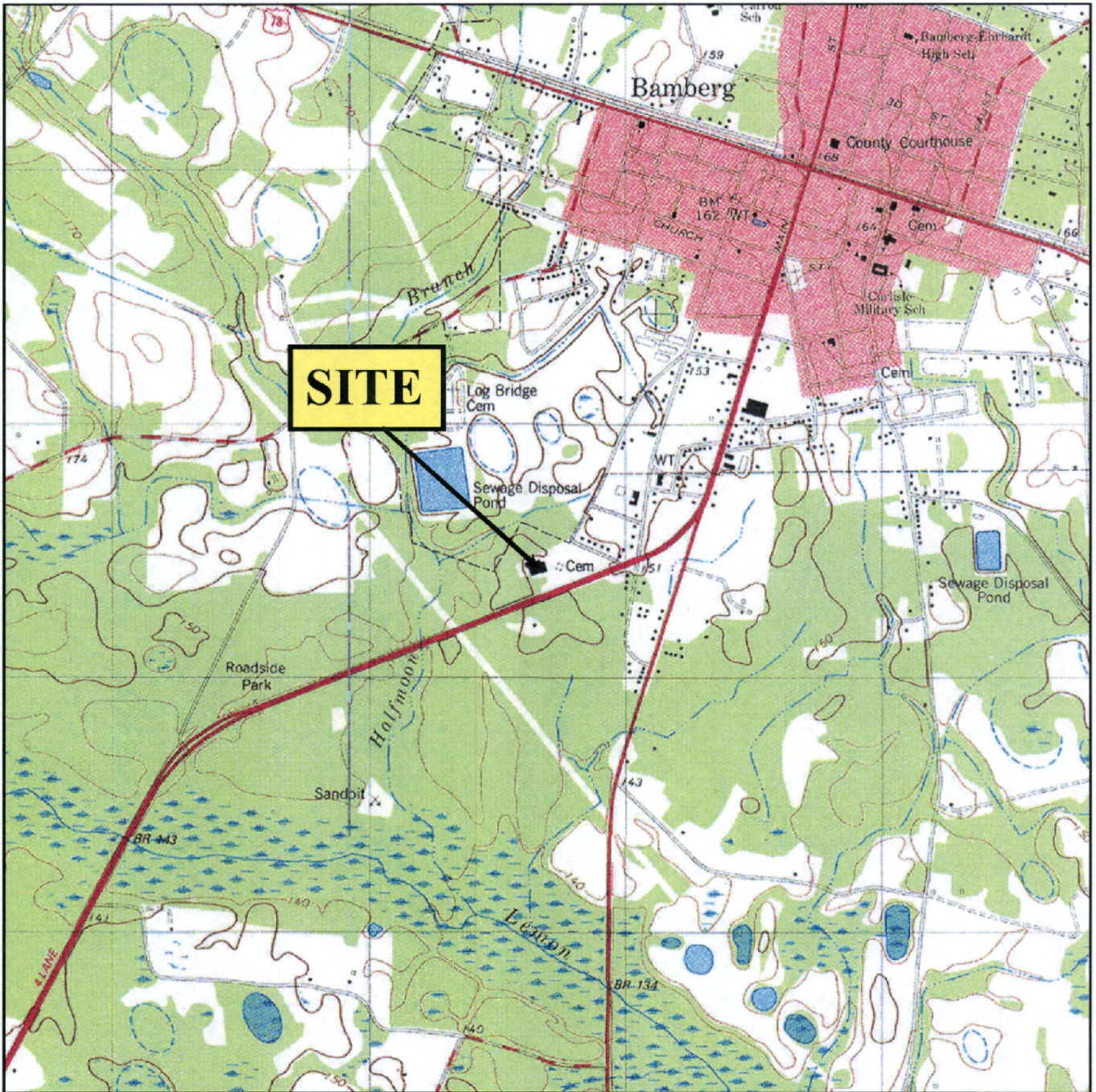
concentrations data for the site. H&H anticipates that the second-half Semi-Annual Ground Water Monitoring report will be submitted to DHEC by the end of December 2009.

## 5.0 Proposed Project Schedule

A proposed schedule for completion of the activities outlined in this work plan is provided below:




This schedule is dependent upon DHEC approval of the work plan and receipt of the DOT right-of-way encroachment permit.

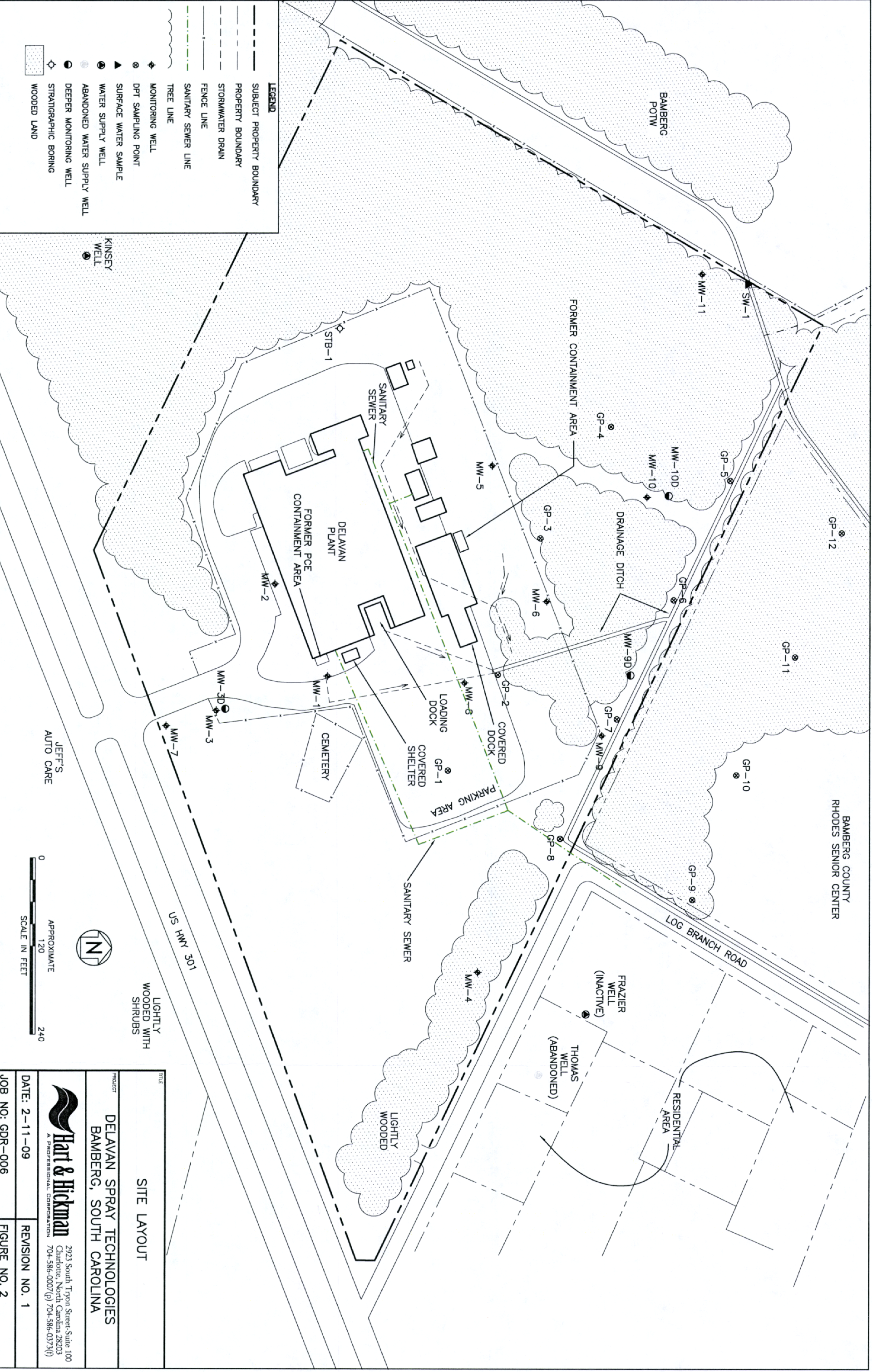


U.S.G.S. QUADRANGLE MAP

**BAMBERG, SC 1979 (PHOTO REVISED 1987)**

QUADRANGLE  
7.5 MINUTE SERIES (TOPOGRAPHIC)

TITLE	SITE LOCATION MAP	
PROJECT	DELAVAN SPRAY TECHNOLOGIES BAMBERG, SOUTH CAROLINA	
	 2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 A PROFESSIONAL CORPORATION 704-586-0007 (p) 704-586-0373 (f)	
DATE:	1-22-09	REVISION NO: 0
JOB NO:	GDR-006	FIGURE NO: 1



**SITE LAYOUT**

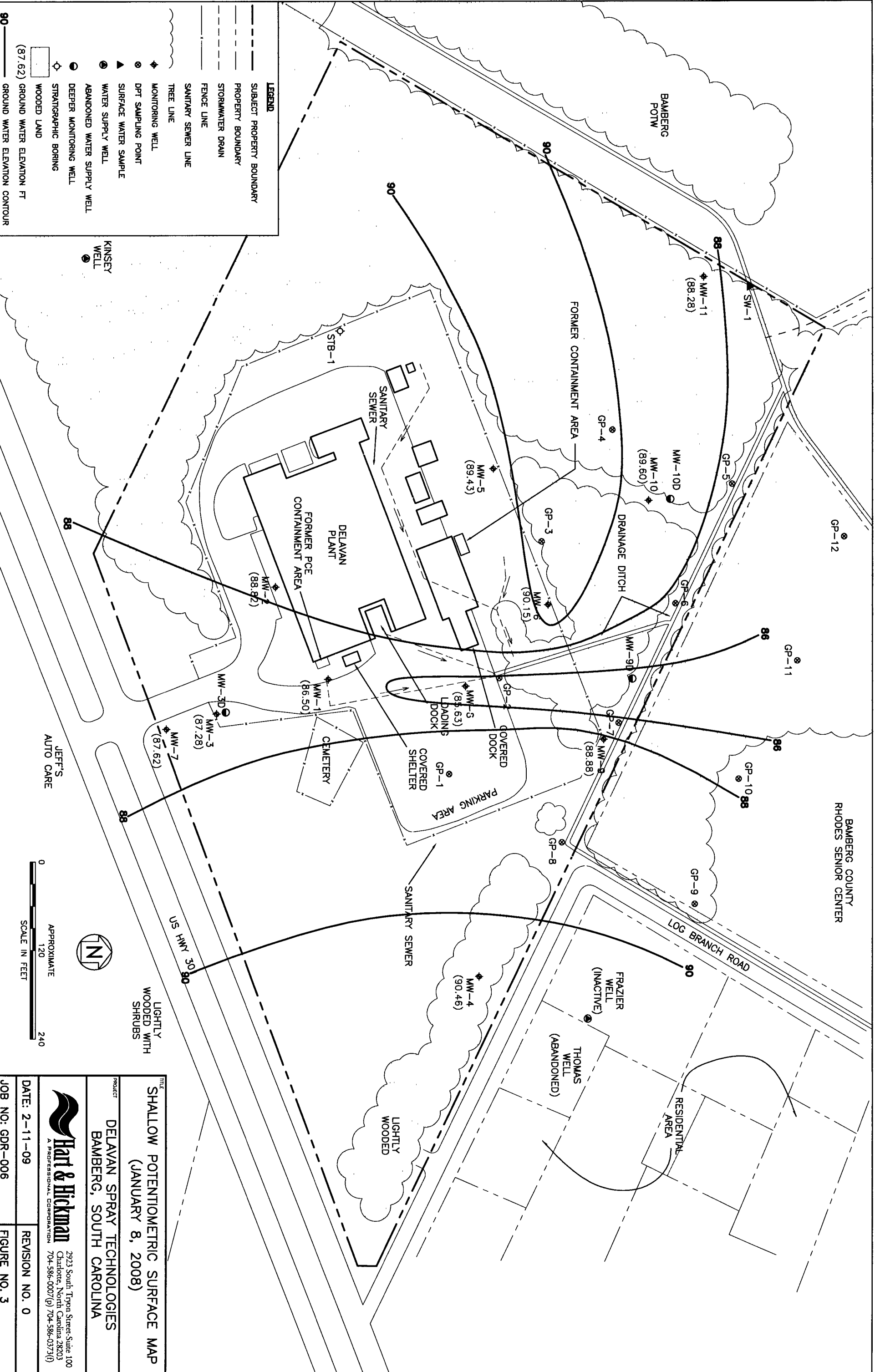
**DELAVAN SPRAY TECHNOLOGIES**  
**BAMBERG, SOUTH CAROLINA**



2923 South Tryon Street, Suite 100  
 Charlotte, North Carolina 28203  
 704-586-0007 (p) 704-586-0373 (f)

DATE: 2-11-09  
 REVISION NO. 1  
 JOB NO.: GDR-006  
 FIGURE NO. 2





**LEGEND**

- SUBJECT PROPERTY BOUNDARY
- PROPERTY BOUNDARY
- STORMWATER DRAIN
- FENCE LINE
- SANITARY SEWER LINE
- TREE LINE
- ◆ MONITORING WELL
- ⊕ DPT SAMPLING POINT
- ▲ SURFACE WATER SAMPLE
- WATER SUPPLY WELL
- ⊙ ABANDONED WATER SUPPLY WELL
- ⊕ DEEPER MONITORING WELL
- ⊕ STRATIGRAPHIC BORING
- WOODED LAND
- (87.62) GROUND WATER ELEVATION FT
- GROUND WATER ELEVATION CONTOUR

0 120 240  
 APPROXIMATE  
 SCALE IN FEET

▲ NORTH

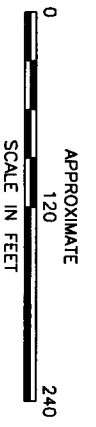
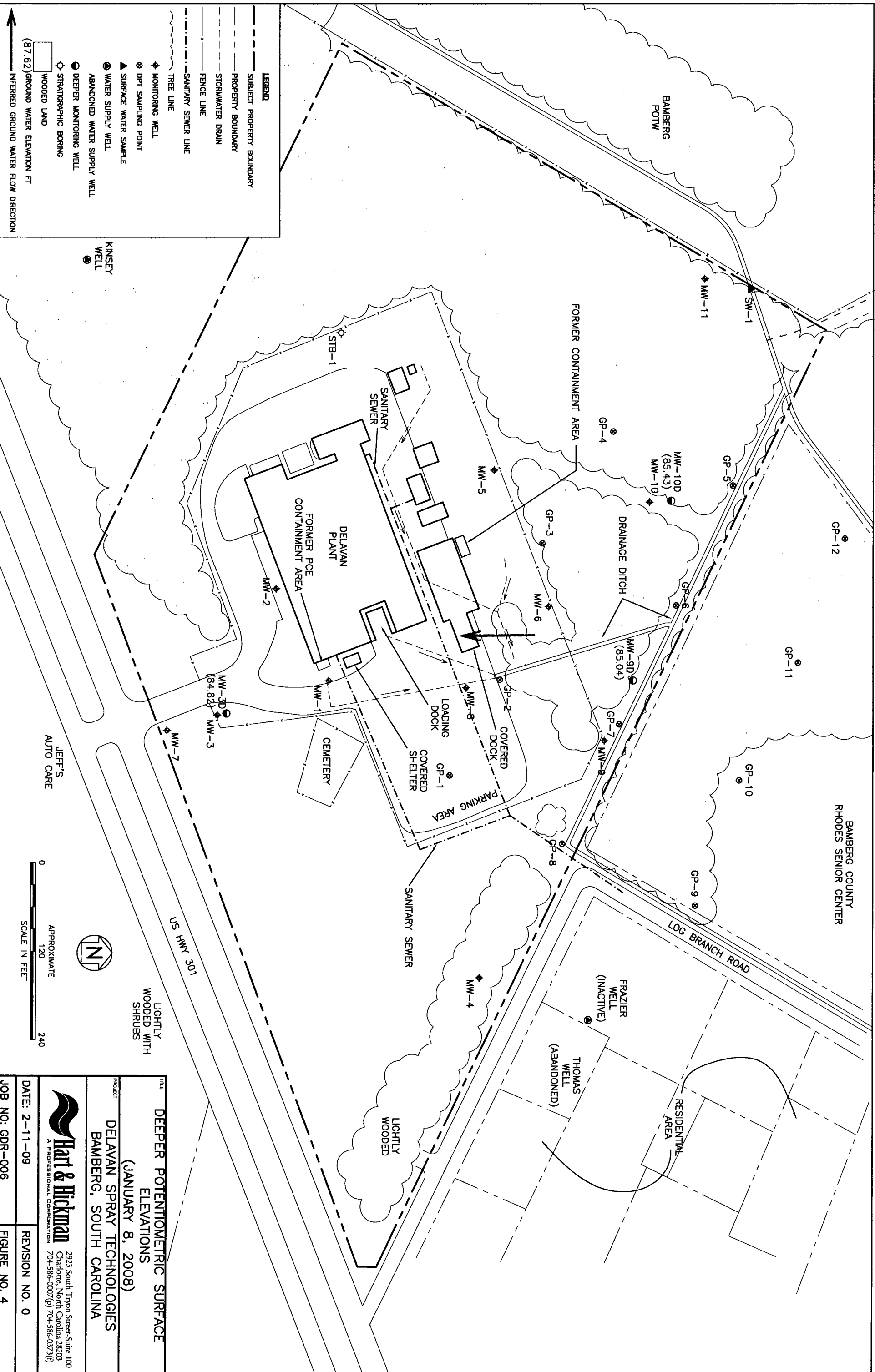
**TITLE**  
 SHALLOW POTENTIOMETRIC SURFACE MAP  
 (JANUARY 8, 2008)

**PROJECT**  
 DELAVAN SPRAY TECHNOLOGIES  
 BAMBERG, SOUTH CAROLINA

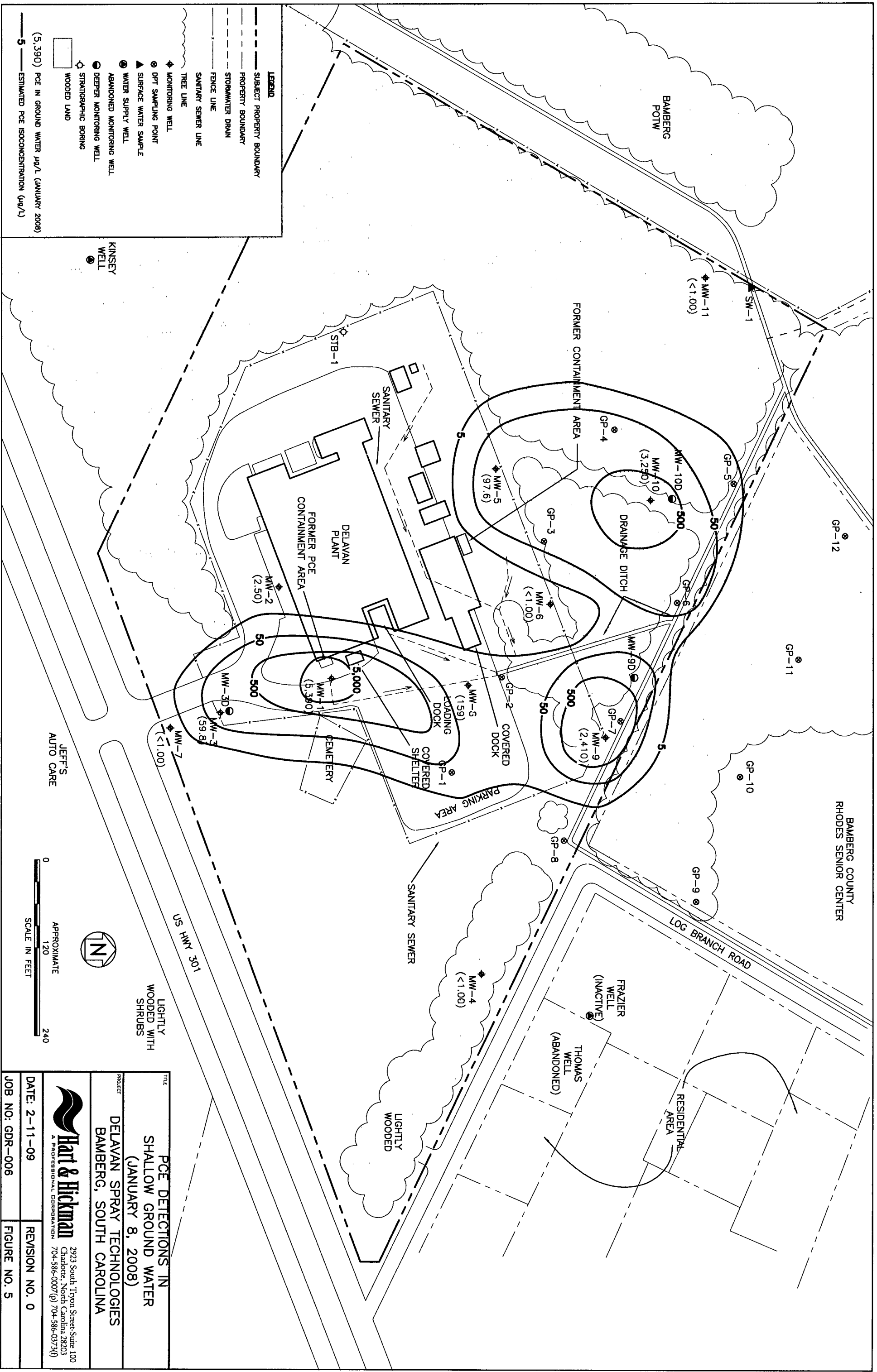
**Hart & Hickman**  
 A PROFESSIONAL CORPORATION  
 2923 South Tryon Street, Suite 100  
 Charlotte, North Carolina 28203  
 704-586-0007 (p) 704-586-0373 (f)

**DATE:** 2-11-09  
**REVISION NO. 0**

**JOB NO.:** GDR-006  
**FIGURE NO. 3**



<b>TITLE</b> DEEPER POTENTIOMETRIC SURFACE ELEVATIONS (JANUARY 8, 2008)	
<b>PROJECT</b> DELAVAN SPRAY TECHNOLOGIES BAMBERG, SOUTH CAROLINA	
2923 South Tryon Street, Suite 100 Charlotte, North Carolina 28203 704-586-0007 (p) 704-586-0331 (f)	
<b>DATE:</b> 2-11-09	<b>REVISION NO. 0</b>
<b>JOB NO.:</b> GDR-006	<b>FIGURE NO. 4</b>



**LEGEND**

- SUBJECT PROPERTY BOUNDARY
- PROPERTY BOUNDARY
- STORMWATER DRAIN
- FENCE LINE
- SANITARY SEWER LINE
- TREE LINE
- ⊕ MONITORING WELL
- ⊕ DPT SAMPLING POINT
- ▲ SURFACE WATER SAMPLE
- ⊕ WATER SUPPLY WELL
- ⊕ ABANDONED MONITORING WELL
- ⊕ DEEPER MONITORING WELL
- ⊕ STRATIGRAPHIC BORING
- WOODED LAND

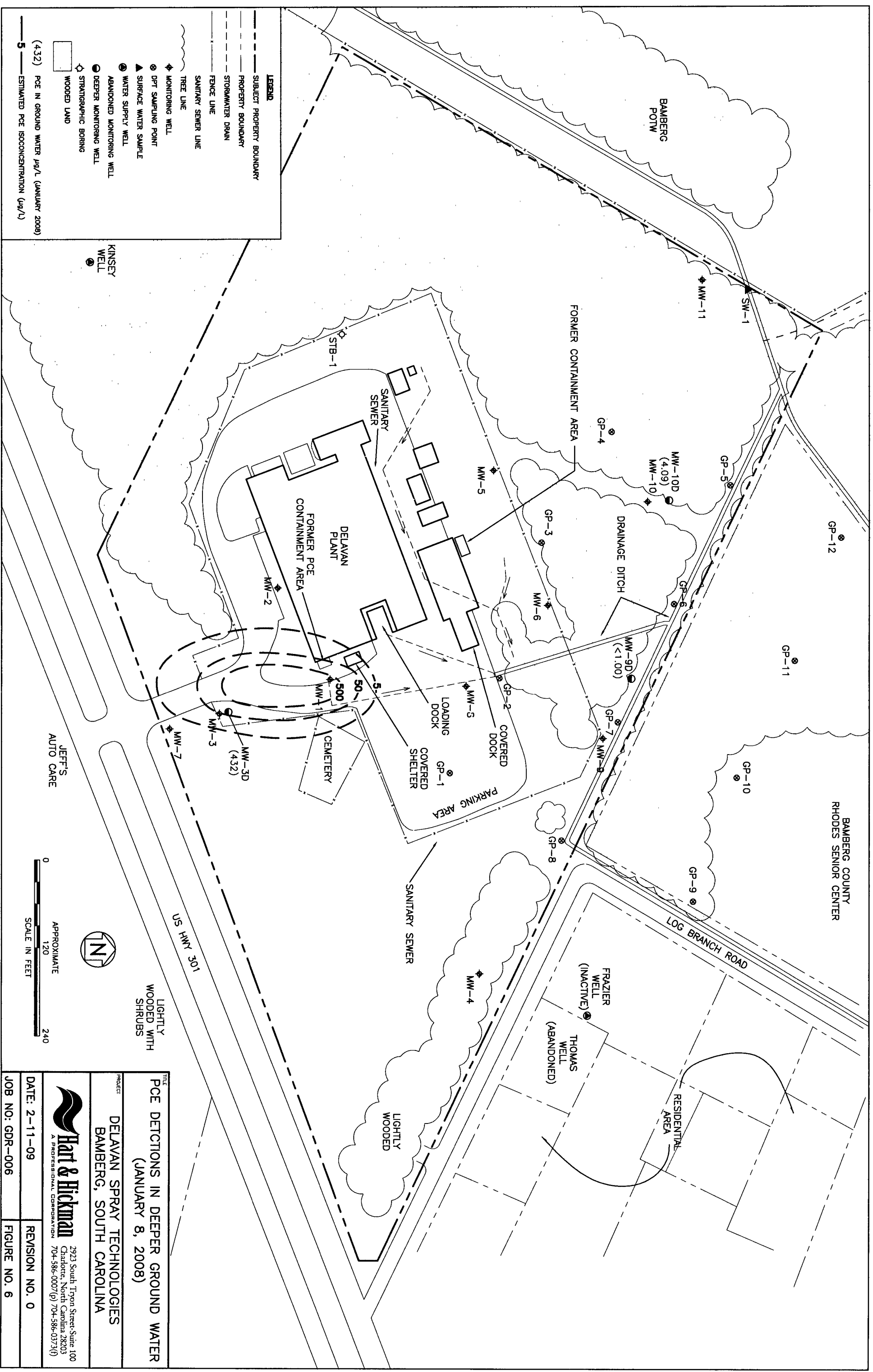
(5,390) PCE IN GROUND WATER  $\mu\text{g/L}$  (JANUARY 2008)  
 5 ESTIMATED PCE ISOCONCENTRATION ( $\mu\text{g/L}$ )

0 120 240  
 APPROXIMATE  
 SCALE IN FEET

⊕ N

TITLE	PCE DETECTIONS IN SHALLOW GROUND WATER (JANUARY 8, 2008)
PROJECT	DELAVAN SPRAY TECHNOLOGIES BAMBERG, SOUTH CAROLINA
DATE: 2-11-09	REVISION NO. 0
JOB NO: GDR-006	FIGURE NO. 5

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 A PROFESSIONAL CORPORATION  
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 Charlotte, North Carolina 28203  
 704-586-0007 (p) 704-586-0374 (f)



**LEGEND**

- SUBJECT PROPERTY BOUNDARY
- - - PROPERTY BOUNDARY
- - - STORMWATER DRAIN
- - - FENCE LINE
- - - SANITARY SEWER LINE
- TREE LINE
- ◆ MONITORING WELL
- ⊙ DPT SAMPLING POINT
- ▲ SURFACE WATER SAMPLE
- WATER SUPPLY WELL
- ⊖ ABANDONED MONITORING WELL
- ⊙ DEEPER MONITORING WELL
- ⊙ STRATIGRAPHIC BORING
- WOODED LAND

(432) PCE IN GROUND WATER μg/L (JANUARY 2008)

5 ESTIMATED PCE ISOCONCENTRATION (μg/L)

APPROXIMATE  
SCALE IN FEET

0 120 240



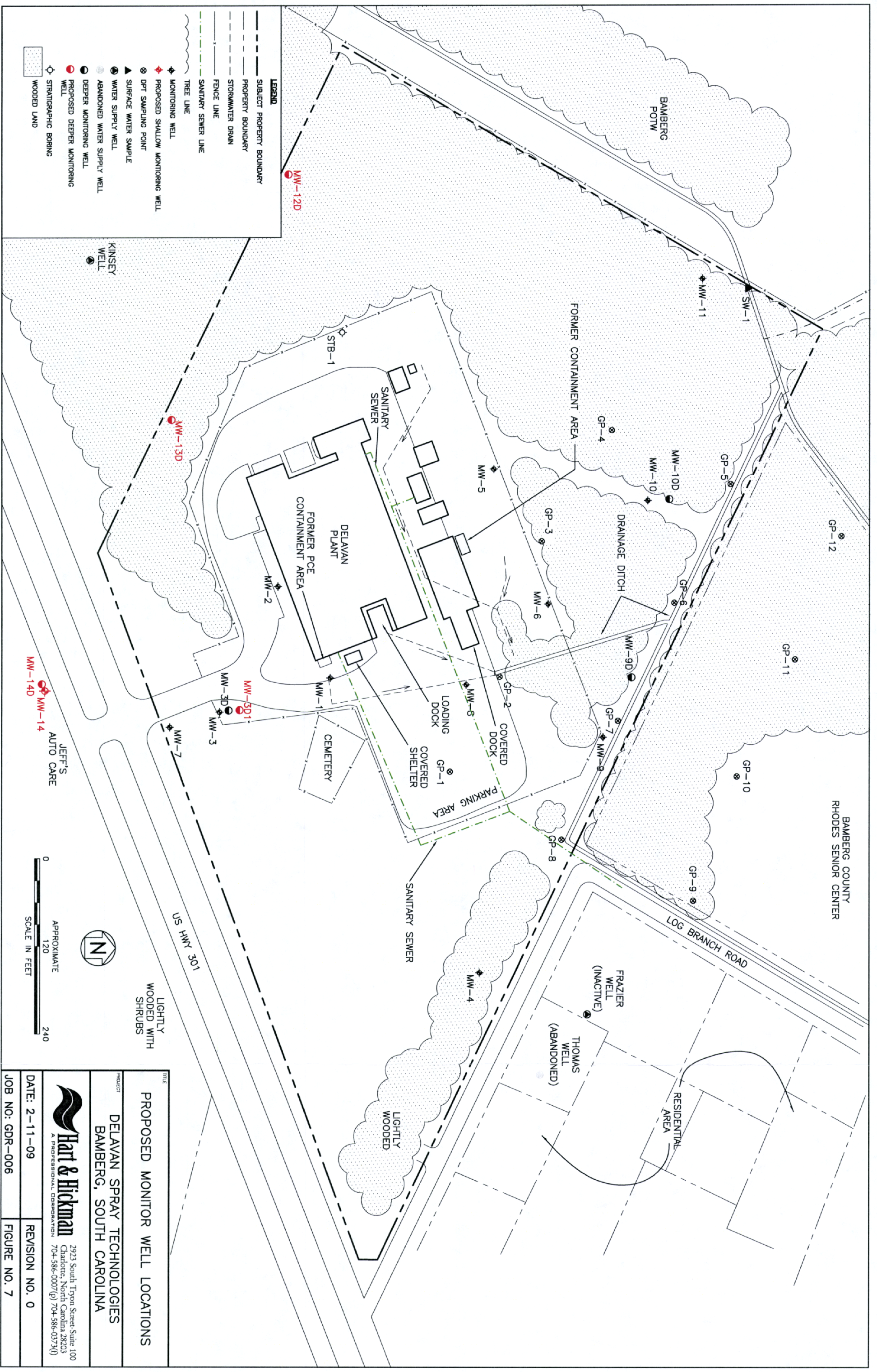
**PROJECT**  
DELAVAN SPRAY TECHNOLOGIES  
BAMBERG, SOUTH CAROLINA

**TITLE**  
PCE DETECTIONS IN DEEPER GROUND WATER  
(JANUARY 8, 2008)

**DATE:** 2-11-09  
**REVISION NO. 0**

**JOB NO.:** GDR-006  
**FIGURE NO. 6**

**Hart & Hickman**  
A PROFESSIONAL CORPORATION  
2923 South Tryon Street, Suite 100  
Charlotte, North Carolina 28203  
704-586-0007 (p) 704-586-0373 (f)



**PROPOSED MONITOR WELL LOCATIONS**

**DELAVAN SPRAY TECHNOLOGIES**  
**BAMBERG, SOUTH CAROLINA**



DATE: 2-11-09	REVISION NO. 0
JOB NO: GDR-006	FIGURE NO. 7

## **Appendix A**

### **Monitoring Well Application**



# Monitoring Well Application

1. Proposed Location of Monitoring Well(s):

Street Address: **US Highway 301 South**

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

County: **Bamberg**

Please attach Scaled Map or Plat

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:

Project or Site ID #: **Ground Water Quality/#02211**

6. Proposed number of monitoring wells: **5**

2. Well Owner's Information:

Name (Last then First):

Company: **Delavan Spray Technologies**

Complete Address: **US Highway 301 South  
Bamberg, SC 29003**

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

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

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

**EPA Method 8260 (601 Reporting List Only)**

3. Property Owner's Information:

Check if same as Well Owner

Name (Last then First):

Company: **SC DOT (Right-of-Way)**

Address: **PO Box 545  
Bamberg, SC 29003**

Telephone Number: **(803) 245-5181**

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

4. Proposed Drilling Date: **03/01/2009**

**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.

2 FT BY 2 FT HS-20 LOAD BEARING CONCRETE PAD

LOCKABLE WATER TIGHT PVC WELL CAP

PROTECTIVE STEEL COVER (FLUSH MOUNTED)

GROUND SURFACE

STEEL PROTECTIVE CASING

6" DIAMETER SCH. 40 PVC SURFACE CASING

CEMENT/BENTONITE GROUT

BOTTOM OF OUTER BOREHOLE & 6" DIAMETER SURFACE CASING

85'

65'

CEMENT/BENTONITE GROUT

2" DIAMETER SCH. 40 PVC RISER

TOP OF BENTONITE SEAL

TOP OF SAND PACK


TOP OF WELL SCREEN  
0.010 SLOT PVC

2'

3'

10'

NOTE: NOT TO SCALE

TITLE	
PROPOSED MONITOR WELL MW-3D1 CONSTRUCTION	
PROJECT	
DELAVAN SPRAY TECHNOLOGIES BAMBERG, SOUTH CAROLINA	
	
2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f)	
DATE: 2-12-09	REVISION NO. 0
JOB NO: GDR-006	FIGURE NO. 1

2 FT BY 2 FT HS-20 LOAD BEARING CONCRETE PAD

LOCKABLE WATER TIGHT PVC WELL CAP

PROTECTIVE STEEL COVER (FLUSH MOUNTED)

GROUND SURFACE

STEEL PROTECTIVE CASING

6" DIAMETER SCH. 40 PVC SURFACE CASING

CEMENT/BENTONITE GROUT

BOTTOM OF OUTER BOREHOLE & 6" DIAMETER SURFACE CASING

50'

30'

CEMENT/BENTONITE GROUT

2" DIAMETER SCH. 40 PVC RISER

TOP OF BENTONITE SEAL

TOP OF SAND PACK

TOP OF WELL SCREEN  
0.010 SLOT PVC

2'

3'

10'

NOTE: NOT TO SCALE

TITLE

**PROPOSED MONITOR WELL  
MW-12D CONSTRUCTION**

PROJECT

**DELANAN SPRAY TECHNOLOGIES  
BAMBERG, SOUTH CAROLINA**



2923 South Tryon Street-Suite 100  
Charlotte, North Carolina 28203  
704-586-0007(p) 704-586-0373(f)

DATE: 2-12-09

REVISION NO. 0

JOB NO: GDR-006

FIGURE NO. 2

2 FT BY 2 FT HS-20 LOAD BEARING CONCRETE PAD

LOCKABLE WATER TIGHT PVC WELL CAP

PROTECTIVE STEEL COVER (FLUSH MOUNTED)

GROUND SURFACE

STEEL PROTECTIVE CASING

6" DIAMETER SCH. 40 PVC SURFACE CASING

CEMENT/BENTONITE GROUT

BOTTOM OF OUTER BOREHOLE & 6" DIAMETER SURFACE CASING

50'

30'

CEMENT/BENTONITE GROUT

2" DIAMETER SCH. 40 PVC RISER

TOP OF BENTONITE SEAL

TOP OF SAND PACK

TOP OF WELL SCREEN  
0.010 SLOT PVC

2'

3'

10'

NOTE: NOT TO SCALE

TITLE

PROPOSED MONITOR WELL  
MW-13D CONSTRUCTION

PROJECT

DELAVAN SPRAY TECHNOLOGIES  
BAMBERG, SOUTH CAROLINA



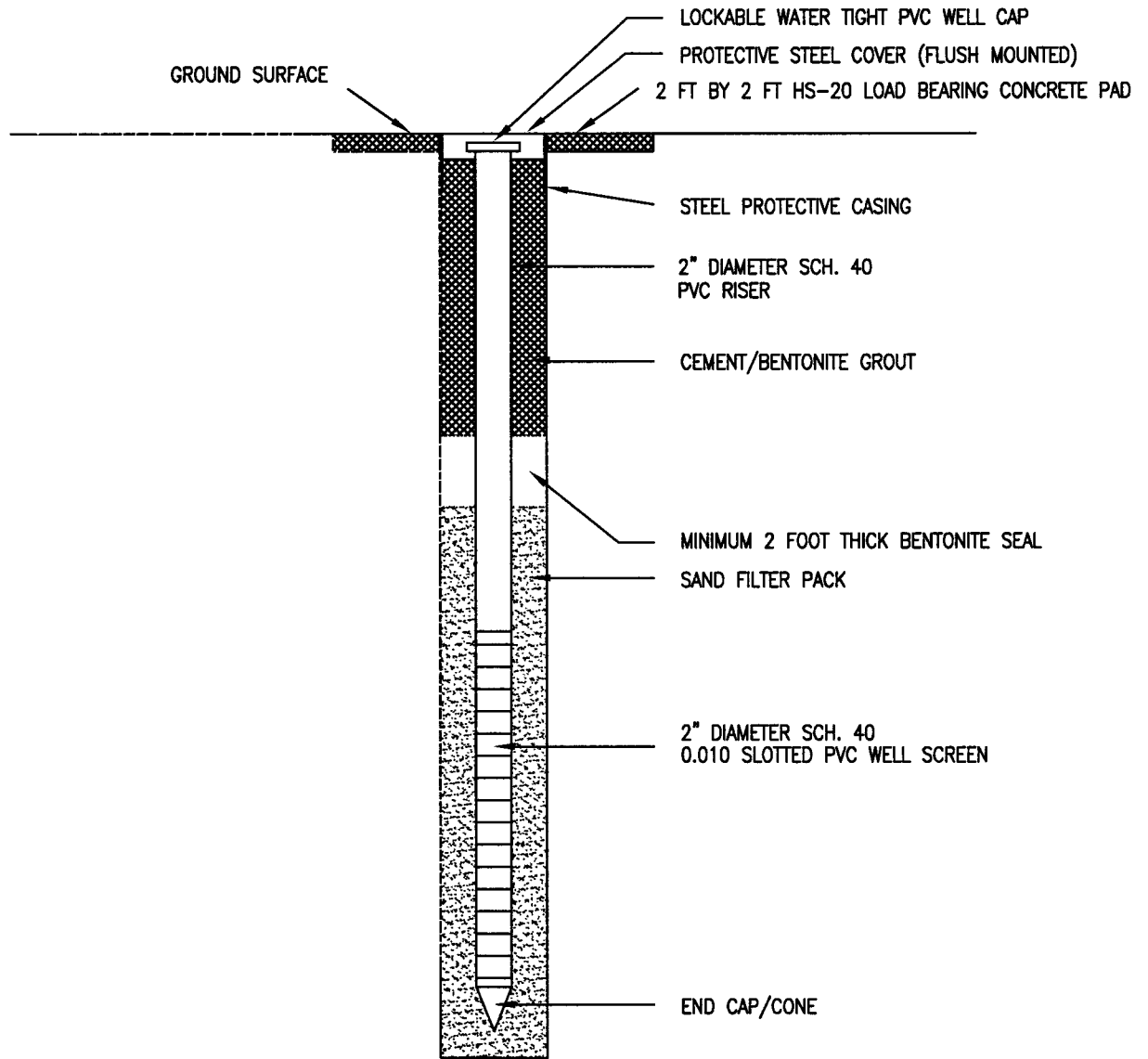
2923 South Tryon Street-Suite 100  
Charlotte, North Carolina 28203  
704-586-0007(p) 704-586-0373(f)


DATE: 2-12-09

REVISION NO. 0

JOB NO: GDR-006

FIGURE NO. 3



TITLE		PROPOSED MONITOR WELL MW-14 CONSTRUCTION	
PROJECT		DELAVAN SPRAY TECHNOLOGIES BAMBERG, SOUTH CAROLINA	
		2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f)	
DATE: 2-12-09		REVISION NO. 0	
JOB NO: GDR-006		FIGURE NO. 4	

2 FT BY 2 FT HS-20 LOAD BEARING CONCRETE PAD

LOCKABLE WATER TIGHT PVC WELL CAP

PROTECTIVE STEEL COVER (FLUSH MOUNTED)

GROUND SURFACE

STEEL PROTECTIVE CASING

6" DIAMETER SCH. 40 PVC SURFACE CASING

CEMENT/BENTONITE GROUT

BOTTOM OF OUTER BOREHOLE & 6" DIAMETER SURFACE CASING

50'

30'

3'

2'

10'

CEMENT/BENTONITE GROUT


2" DIAMETER SCH. 40 PVC RISER

TOP OF BENTONITE SEAL

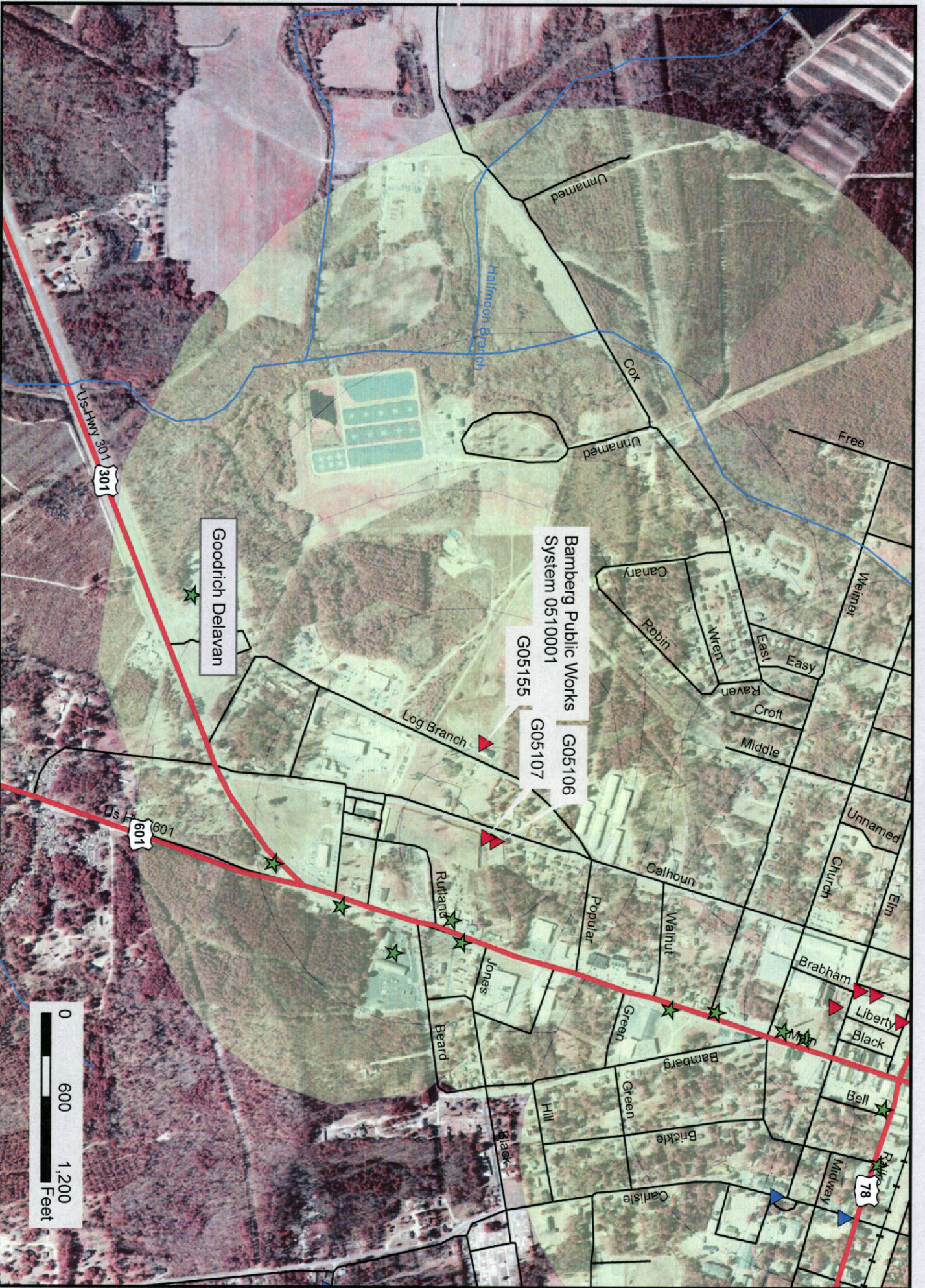
TOP OF SAND PACK

TOP OF WELL SCREEN  
0.010 SLOT PVC

NOTE: NOT TO SCALE

TITLE	
<b>PROPOSED MONITOR WELL MW-14D CONSTRUCTION</b>	
PROJECT	
<b>DELAVAN SPRAY TECHNOLOGIES BAMBERG, SOUTH CAROLINA</b>	
	
2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f)	
DATE: 2-12-09	REVISION NO. 0
JOB NO: GDR-006	FIGURE NO. 5

# Goodrich Delavan - Site #02211



GOS155

open hole bedrock  
1,030' deep

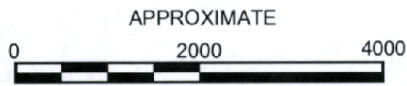
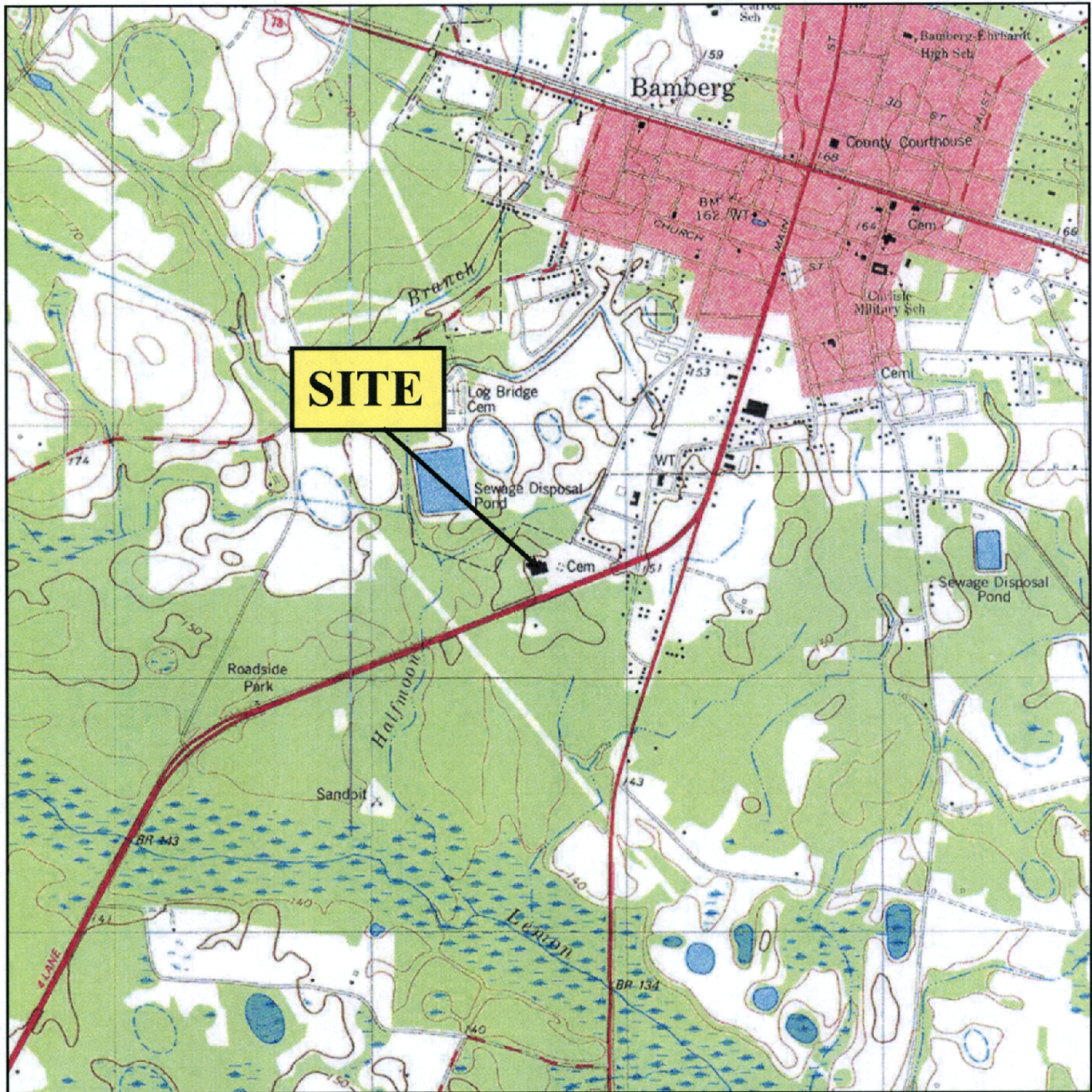
GOS106

capped + disconnected  
from system in 2006 ↗  
drycleaners?

GOS107

"emergency" well  
550' deep




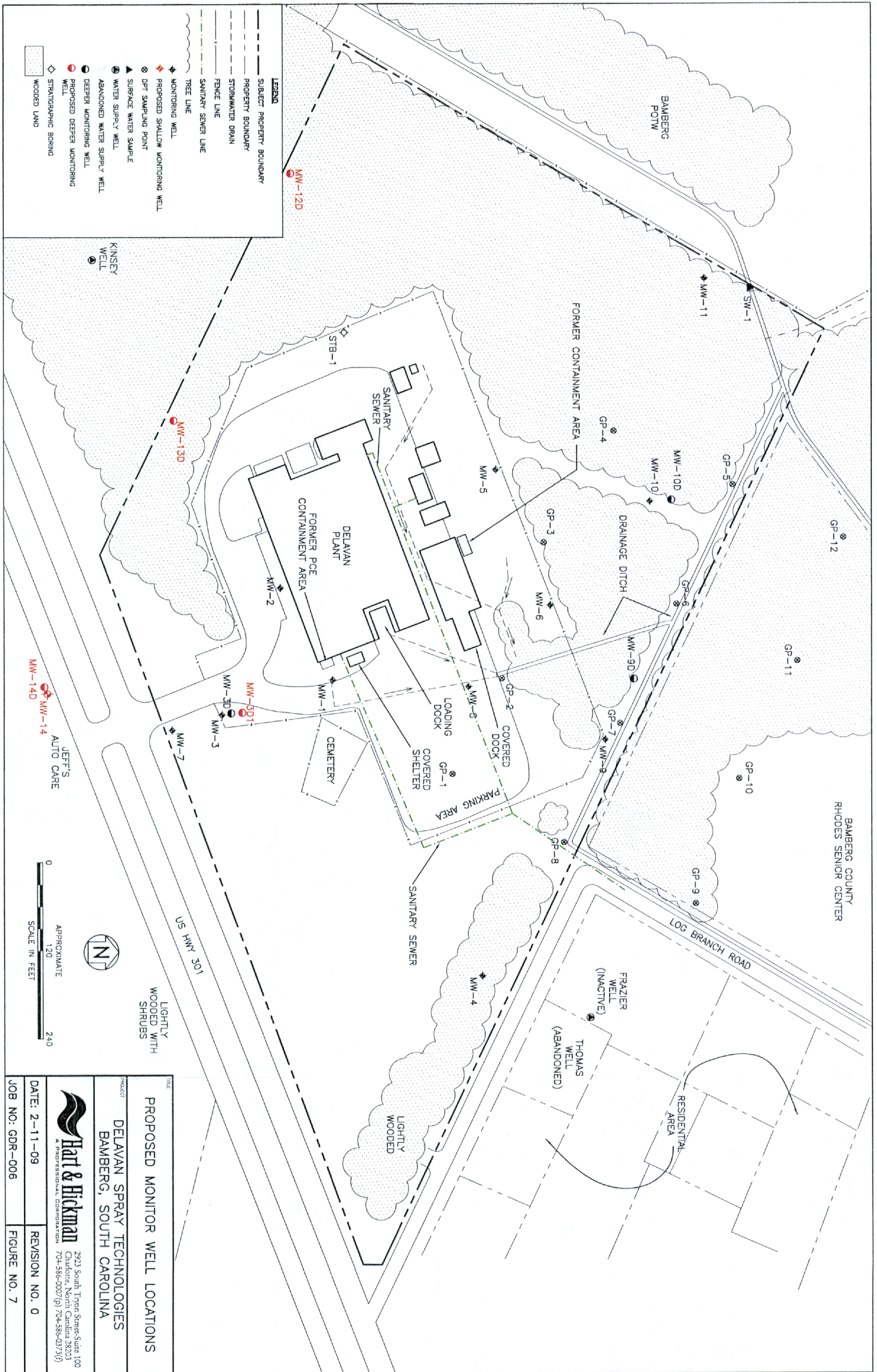


U.S.G.S. QUADRANGLE MAP

**BAMBERG, SC 1979 (PHOTO REVISED 1987)**

QUADRANGLE  
7.5 MINUTE SERIES (TOPOGRAPHIC)

TITLE		SITE LOCATION MAP	
PROJECT		DELAVAN SPRAY TECHNOLOGIES BAMBERG, SOUTH CAROLINA	
		2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007 (p) 704-586-0373 (f)	
DATE:	1-22-09	REVISION NO:	0
JOB NO:	GDR-006	FIGURE NO:	6



<p><b>PROPOSED MONITOR WELL LOCATIONS</b></p>	
<p><b>DELAVAN SPRAY TECHNOLOGIES</b> BAMBERG, SOUTH CAROLINA</p>	
<p><b>Hart &amp; Hickman</b> A PROFESSIONAL CORPORATION</p>	
<p>2923 South Tryon Street, Suite 100 Charlotte, North Carolina 28205 704-586-0007 (p) 704-586-0313 (f)</p>	
<p>DATE: 2-11-09</p>	<p>REVISION NO. 0</p>
<p>JOB NO: GDR-006</p>	<p>FIGURE NO. 7</p>