



**North Carolina Department of Transportation  
Preliminary Site Assessment  
State Project: R-2707E  
WBS Element: 34497.1.2  
Cleveland County**

**Parcel 643  
Cassandra Everhart  
5040 East Dixon Boulevard  
Kings Mountain, North Carolina  
May 17, 2019**

**Wood Environment and Infrastructure Solutions, Inc.  
Project: 1883R2707**

Andrew Frantz, REM  
Senior Scientist

  
John Maas, LG  
Senior Geologist

DocuSigned by:

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## 1.0 INTRODUCTION

In response to the North Carolina Department of Transportation (NCDOT) Request for Proposal, dated March 27, 2019, Wood Environment & Infrastructure Solutions, Inc. (Wood) has performed a Preliminary Site Assessment (PSA) for Parcel 643. The investigation was conducted in accordance with Wood’s Technical and Cost proposal dated April 5, 2019 and revised April 11, 2019. NCDOT contracted Wood to perform the PSA at the parcel, within the area to be affected by future road construction activities, in order to identify potential impacts from the former use of the property.

The parcel is located at 5040 East Dixon Road along the southern side of East Dixon Road as shown on the Vicinity Map, **Figure 1**. At the time of this PSA, the parcel was occupied with several junk automobiles and equipment. The Site also contained three pipes extending from the ground surface to a height of approximately six to eight inches. It is identified as Parcel 643, Cassandra Everhart property, (the Site) within the NCDOT R-2707E design file. The parcel is in Kings Mountain of Cleveland County, North Carolina. The area of investigation within the parcel is shown on **Figure 2**. Please note, the Site is incorrectly identified as Parcel 043 in the proposal.

The following report describes our subsurface field investigation at the Site and presents on-site UVF soil analyses to evaluate soil contamination within the Site.

### 1.1 Site History

Based on our historical review, the Site has been developed since at least 1963 and was occupied by farmland prior to the early 1960s. The property appears to have been associated with a former service garage. The Site is not identified on the North Carolina Department of Environmental Quality (NCDEQ) Underground Storage Tank (UST) Facility Database registry and no known groundwater incidents are identified at the Site.

### 1.2 Site Description

The Site is located in a mixed-use commercial and residential area of Kings Mountain in Cleveland County and covers approximately 12.8 acres. The majority of the site is occupied by wooded land with an approximately 6,335-square foot former service garage building

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(currently used as storage) and an approximately 828-square foot residence located on the northern portion of the site. A photographic log of the property is included as **Appendix A**.

## **2.0 GEOLOGY**

### **2.1 Regional Geology**

The Site is located within the Inner Piedmont Belt of the Piedmont Physiographic Province of North Carolina. According to the 1985 State Geologic Map of North Carolina, the area is underlain by Cherryville granite.

### **2.2 Site Geology**

Site geology was observed through the advancement of four shallow hand augered soil borings (P643-SB1 to P643-SB4). Figure 2 presents the boring locations and site layout. Boring depth targeted a total depth of three feet below ground surface (bgs) for the borings at the Site. Soils encountered in the borings consisted mostly of red to orange to brown clayey sandy silts. Petroleum odor and staining was observed in the boring P643-SB1 from 0 to 0.5 feet bgs. Groundwater was not encountered. Based on observations of topography of the Site vicinity, the groundwater flow direction is inferred to be generally to the southeast. Boring logs are presented in **Appendix B**.

## **3.0 FIELD ACTIVITIES**

### **3.1 Preliminary Activities**

Prior to commencing field sampling activities at the Site, several tasks were accomplished in preparation for the subsurface investigation. A Health and Safety Plan (HASP) was created including the Site-specific health and safety information necessary for the field activities. North Carolina 811 was contacted on April 9, 2019 to report the proposed sampling activities and subsequently notify affected utilities for the parcel. Probe Utility Locating (PUL) was retained by Wood to perform utility locating at the Site and GEL Solutions (GEL)

was procured by would to perform a geophysical survey of the area of investigation. RED Lab instrumentation was scheduled for the use in the on-site UVF analysis.

Wood understands that acquisition of the right-of-way is necessary for the construction of the US 74 – Shelby Bypass. Boring locations were strategically placed within the parcel to maximize the opportunity to encounter potential contaminated soil.

### **3.2 Site Reconnaissance**

Wood personnel performed a Site reconnaissance with property owner notification on April 9, 2019. During the Site reconnaissance, the area was visually examined for the presence of any areas/obstructions that could potentially affect the subsurface investigation. During the Site reconnaissance, three pipes extending from the ground surface to a height of approximately six to eight inches, a heavily stained area located near a lawn mower and farm equipment, a former service garage building (currently used as storage), and a residence were observed on the northern portion of the Site.

### **3.3 Geophysical Survey Results**

The geophysical survey of the Site occurred between April 15 and 18, 2019. GEL performed a time-domain electromagnetic (TDEM) survey of the Site with a ground penetrating radar (GPR) survey conducted across select EM anomalies. The GEL geophysical report is presented as **Appendix C**. GEL reported six anomalies within the area of investigation with five attributed to visible cultural features at the ground surface including a sign, cars, a lawn mower, and farm equipment. The remaining anomaly was attributed to a buried stormwater culvert traversing the Site. No subsurface geophysical anomalies indicating the presence of USTs were detected by GEL within the limits of the area of investigation at the Site. Please note, the Site is incorrectly identified as Parcel 043 in the geophysical report.

### **3.4 Soil Sampling**

In advance of sampling activities, PUL performed utility locating at the Site on April 17, 2019. On April 24, 2019, Wood personnel advanced soil borings at the Site via a stainless-steel hand auger. Since the geophysical survey did not identify subsurface geophysical anomalies within the area of investigation, the soil boring placement was focused in the vicinity of the heavily stained area identified during the site reconnaissance. Boring P643-

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SB1 was advanced in the center of the stained area, with borings P643-SB2 to P643-SB4 advanced along the exterior of the stained area.

The purpose of the soil sampling was to determine if a petroleum release had impacted the Site and if so, to estimate the volume of impacted soil that might require special handling during NCDOT construction activities. Soil sampling was performed utilizing a stainless-steel hand auger accompanied by field screening. The hand auger was decontaminated between boring locations using a Liquinox® wash and distilled water rinse. Wood conducted field screening for volatile organic compounds (VOCs) of the soil borings with a photoionization detector (PID). The soil borings were screened with the PID at approximate six-inch to one-foot intervals. A portion of the interval of the soil boring exhibiting the highest PID reading was retained for analysis of total petroleum hydrocarbons (TPH), diesel range organics (DRO), gasoline range organics (GRO), benzene, toluene, ethylbenzene, and xylene (BTEX), total aromatics, and polycyclic aromatic hydrocarbons (PAH) soil via ultraviolet fluorescence (UVF).

## 4.0 SOIL SAMPLING RESULTS

Based on PID field screening and UVF hydrocarbon analysis from April 24, 2019, evidence of petroleum hydrocarbon impact was identified within the area of investigation.

### 4.1 Soil Screening and UVF Analyses

PID readings for the four borings ranged from 7.9 parts per million (ppm) in sample P643-SB4-0.5 collected between the ground surface and six inches bgs to 15.4 ppm in sample P643-SB2-0.5 collected between the ground surface and six inches bgs. The PID field screening results are summarized in **Table 1** and provided on the boring logs in Appendix B.

Results from the UVF petroleum soil analyses are presented in **Table 2**, with instrument generated tables in **Appendix D**. Several categories of analyses were measured such as: DRO, GRO, TPH, PAHs, and total aromatics. **Figure 3** presents the GRO and DRO results at each boring. Please note, the Site is incorrectly identified as Parcel 043 in the UVF fingerprint data charts.

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Elevated TPH values above the NCDEQ Action Limit of 50 milligrams per kilogram (mg/kg) for GRO were not detected in the four samples collected from the borings advanced at the Site. An Elevated TPH value above the NCDEQ Action Limit of 100 mg/kg was detected in sample P643-SB1-0-0.5 (883.9 mg/kg); however, the concentration of TPH DRO detected the sample collected from a depth of one foot bgs in the same boring (P643-SB1-1 at 57.3 mg/kg) did not exceed the NCDEQ Action Limit. Elevated TPH DRO values were not identified in the remaining soil samples collected at the Site. The hydrocarbon results from the QED QROS Hydrocarbon Analyzer are provided in Appendix D.

## **5.0 CONCLUSIONS**

Based on the Site observations and UVF analysis, and laboratory analysis, petroleum-impacted soil contamination was identified in boring P643-SB1 as defined by the exceedance of the NCDEQ Action Limit of 100 mg/kg for TPH DRO. Boring P643-SB1 was located in the center of the heavily stained area at the Site and based on the UVF analysis the impacted soil appears to extend to approximately 0.5 feet below the surface.

The estimated area of impacted soil is shown on Figure 4. Estimated impacted soil volume for the heavily stained area near boring P643-SB1 is 8 cubic feet (0.3 cubic yards) based on an unsaturated soil thickness of 0.5 feet.

## **6.0 RECOMMENDATIONS**

Based on these PSA results, Wood does not recommend further assessment in the area of investigation. It is understood the area of impacted soils are located in areas to be impacted by construction activities. Special handling should be performed during excavation in this area and impacted soil should be disposed properly offsite.



## **TABLES**

**Table 1: Summary of PID Screening Results**  
**Parcel 643 - Cassandra Everhart**  
**Kings Mountain, North Carolina**  
**Wood Project: 1883R2707E**

<b>Boring ID</b>	<b>Depth of Sample Interval</b>	<b>PID Reading</b>
P643-SB1	0-0.5	12.8
	0.5-1	10.3
P643-SB2	0-0.5	15.4
P643-SB3	0-0.5	9.0
P643-SB4	0-0.5	7.9

**Notes:**

1. Samples collected on April 24, 2019
2. Depths shown in feet below ground surface (bgs)
3. PID = Photoionization Detector
4. PID readings shown in parts per million (ppm)

Prepared By/Date: RPD 4/26/2019  
Checked By/Date: DRH 5/2/2019

**Table 2: Summary of UVF Petroleum Soil Results**  
**Parcel 643 - Cassandra Everhart**  
**Kings Mountain, North Carolina**  
**Wood Project: 1883R2707E**

<b>Sample ID Number</b>	<b>Sample Depth</b>	<b>BTEX</b>	<b>GRO</b>	<b>DRO</b>	<b>PAHs</b>
P643-SB1-0-0.5	0-0.5	<0.68	<0.68	<b>883.9</b>	32.8
P643-SB1-1	0.5-1	<0.36	8.8	57.3	2.1
P643-SB2-0.5	0-0.5	<0.6	<0.6	2.2	0.07
P643-SB3-0.5	0-0.5	<0.54	<0.54	0.7	0.06
P643-SB4-0.5	0-0.5	<0.36	<0.36	2.9	<0.0
<b>NC State Action Level</b>		<b>N/A</b>	<b>50</b>	<b>100</b>	<b>N/A</b>

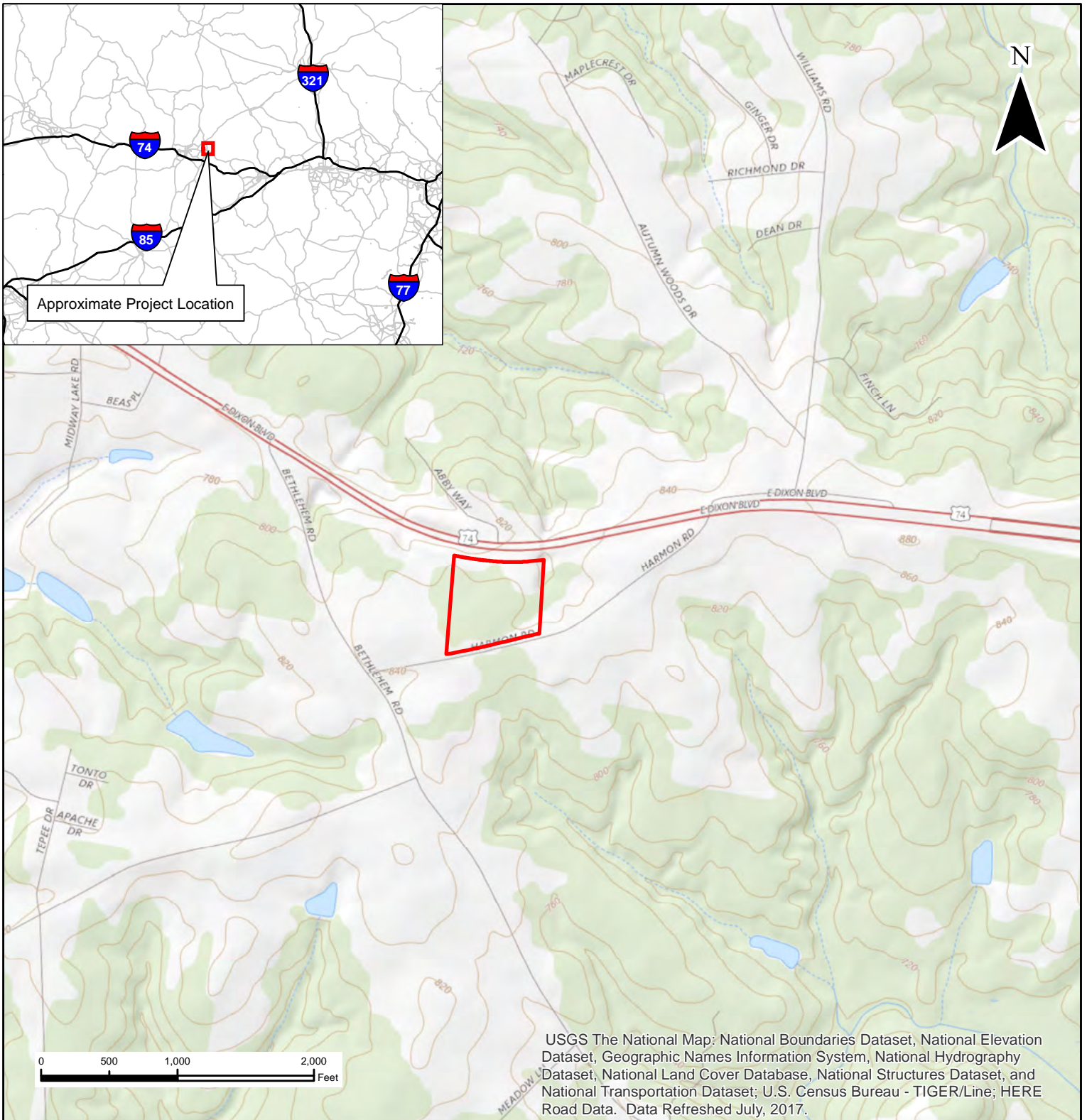
**Notes:**

1. Samples collected on April 24, 2019
2. Depths shown in feet below ground surface (bgs)
3. Concentrations shown in milligrams per kilogram (mg/kg)
4. BTEX = Benzene, toluene, ethylbenzene, xylene
5. GRO = Gasoline Range Organics
6. DRO = Diesel Range Organics
7. PAHs = Polycyclic aromatic hydrocarbons
8. N/A = Not applicable
9. Bold values exceed respective NC State Action Level

Prepared By/Date: RPD 4/26/2019

Checked By/Date: DRH 5/2/2019

## **FIGURES**



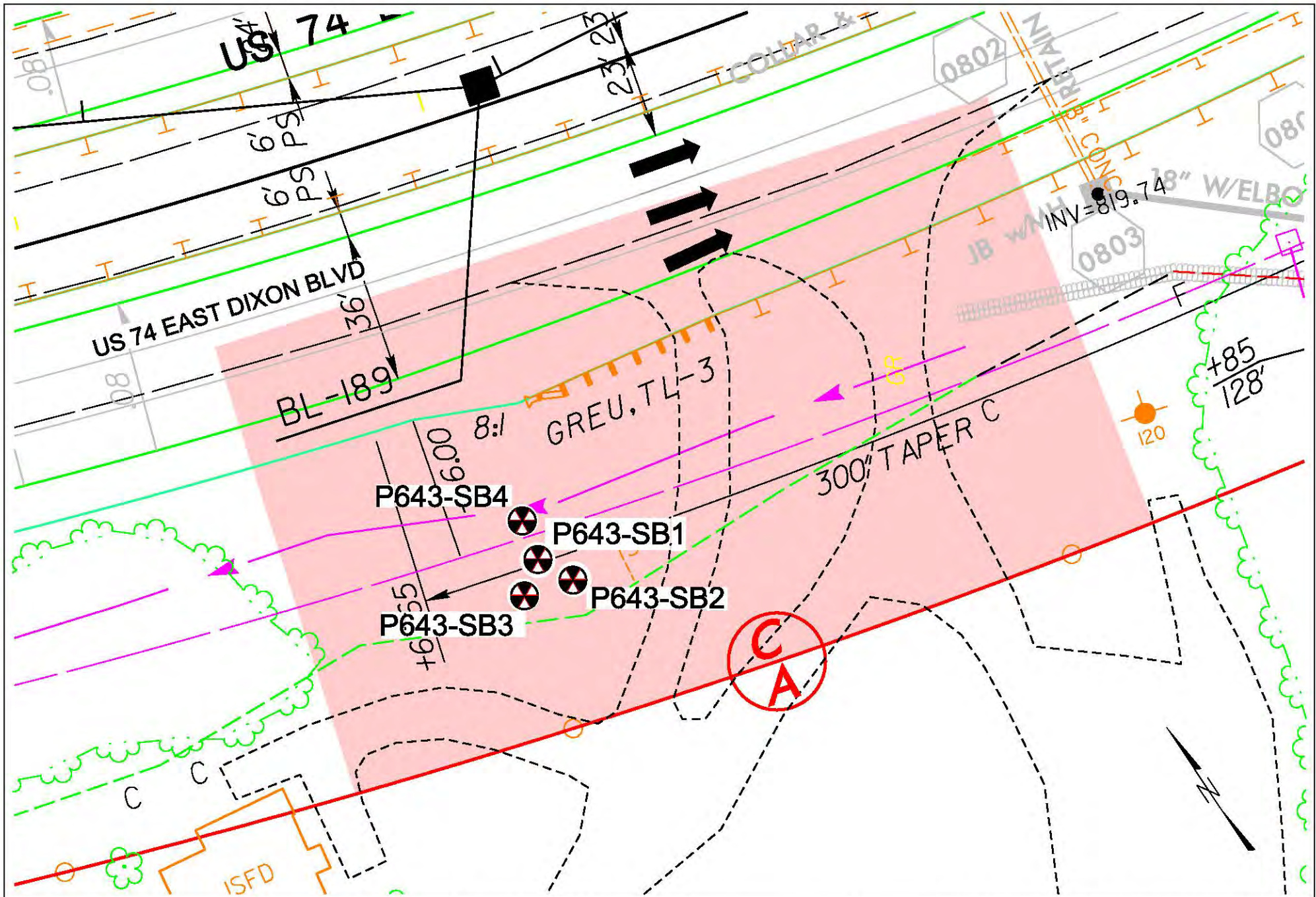
USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data. Data Refreshed July, 2017.



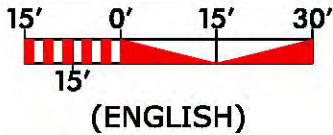
**SITE VICINITY**  
**R2707E - Parcel 643**  
**Cassandra Everhart**  
**5040 East Dixon Boulevard**  
**Kings Mountain, North Carolina 28086**

 Site Boundary





 BORING LOCATION  
 AREA OF INVESTIGATION

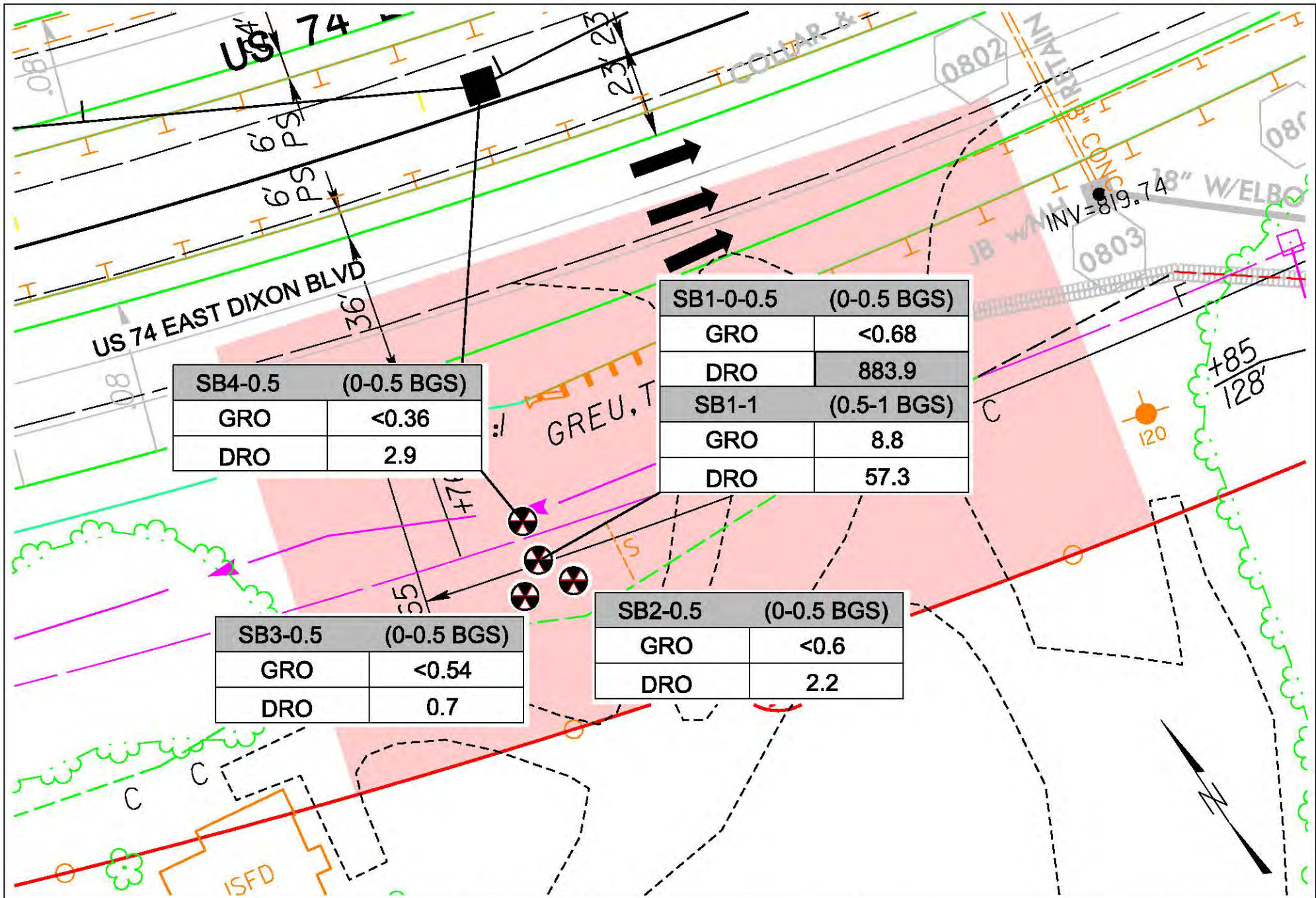


**wood.**

AREA OF INVESTIGATION WITH SOIL BORING LOCATIONS- PARCEL 643  
 EVERHART PROPERTY  
 STATE PROJECT: R-2707E  
 WBS ELEMENT: 34497.1.2  
 CLEVELAND COUNTY, KINGS MOUNTAIN, NORTH CAROLINA

PREPARED BY: LMM	DATE: 5/13/19	CHECKED BY: HPC	DATE: 5/13/19	JOB NUMBER 188322707	FIGURE 2
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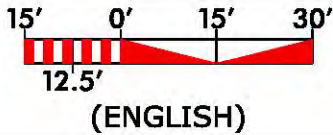
SB4-0.5 (0-0.5 BGS)	
GRO	<0.36
DRO	2.9

SB1-0-0.5 (0-0.5 BGS)	
GRO	<0.68
DRO	883.9
SB1-1 (0.5-1 BGS)	
GRO	8.8
DRO	57.3

SB3-0.5 (0-0.5 BGS)	
GRO	<0.54
DRO	0.7

SB2-0.5 (0-0.5 BGS)	
GRO	<0.6
DRO	2.2

● BORING LOCATION  
 ■ AREA OF INVESTIGATION  
 GRO-GASOLINE RANGE ORGANICS  
 DRO-DIESEL RANGE ORGANICS  
 CONCENTRATIONS SHOWN IN MILLIGRAMS PER KILOGRAM (mg/kg)  
 SHADED CONCENTRATIONS EXCEED NCDEQ STATE ACTION LIMITS  
 BGS-FEET BELOW GROUND SURFACE

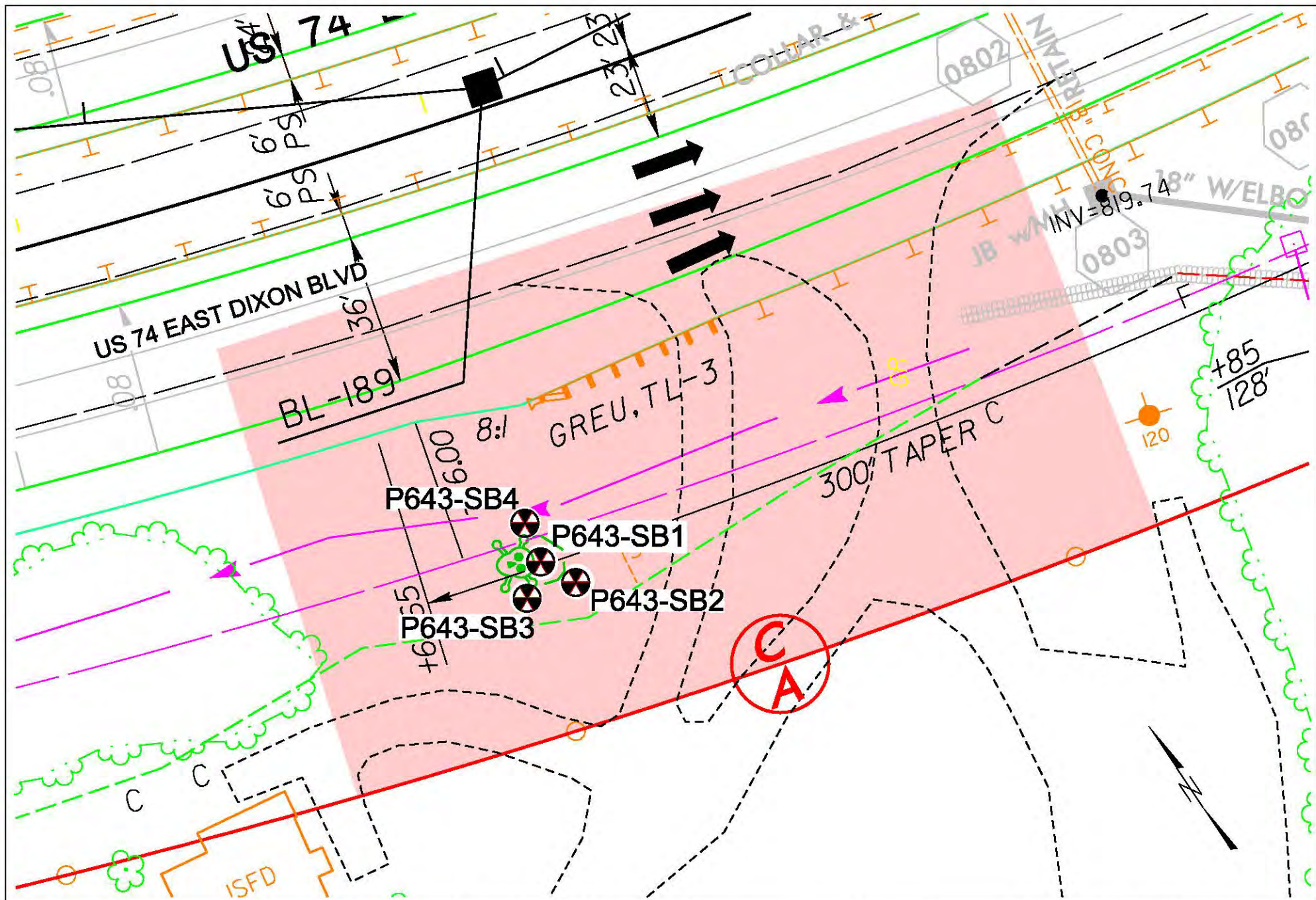


**wood.**

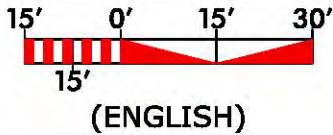
UVF PETROLEUM RESULTS- PARCEL 643  
 EVERHART PROPERTY  
 STATE PROJECT: R-2707E  
 WBS ELEMENT: 34497.1.2  
 CLEVELAND COUNTY, KINGS MOUNTAIN, NORTH CAROLINA

PREPARED BY: LMM	DATE: 5/13/19	CHECKED BY: HPC	DATE: 5/13/19	JOB NUMBER: 188322707	FIGURE: 3
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- BORING LOCATION
- AREA OF INVESTIGATION
- - - KNOWN CONTAMINATION - SOIL



**wood.**

KNOWN CONTAMINATION AREA - PARCEL 643  
 EVERHART PROPERTY  
 STATE PROJECT: R-2707E  
 WBS ELEMENT: 34497.1.2  
 CLEVELAND COUNTY, KINGS MOUNTAIN, NORTH CAROLINA

PREPARED BY:	DATE:	CHECKED BY:	DATE:	JOB NUMBER	FIGURE
LMM	5/13/19	HPC	5/13/19	188322707	4



**APPENDIX A**  
**PHOTOGRAPHIC LOG**



**PHOTO 1:**

View of a suspect pipe protruding from the ground surface on Site.

Photo date: 4/24/2019



**PHOTO 2:**

View of a suspect pipe protruding from the ground surface on Site.

Photo date: 4/24/2019





**PHOTO 3:**  
View of the Area of Investigation, facing west.

Photo date: 4/24/2019



**PHOTO 4:**  
View of vehicles, equipment, and a located unknown utility line within the Area of Investigation on Site, facing south.

Photo date: 4/24/2019



**PHOTO 5:**

View of ground surface staining at the area of impacted soil identified on Site.

Photo date: 4/24/2019

**APPENDIX B**  
**BORING LOGS**

### SOIL BORING FIELD WORKSHEET

BORING #	P643-SB1	BORING DEPTH (ft)	3	NUMBER OF PAGES	1
PROJECT #	1883R2707	PROJECT NAME	NCDOT Shelby R-2707E		
DATE DRILLED	4/24/2019	WEATHER CONDITIONS	86°F Sunny		
DRILLING SUB-CONTRACTOR	N/A	DRILL RIG	Hand Auger		

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	12.8	Black, sandy CLAY, oil odor	
	10.3		
2	8.1	Red, orange and brown, clayey sandy SILT	
3	8.2		
4			
5		Boring terminated at 3ft. UVF sample taken at 0-0.5 and 0.5-1ft.	
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
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19			
20			
21			

Log Completed By:           JRM          

Page:           1

### SOIL BORING FIELD WORKSHEET

BORING #	P643-SB2	BORING DEPTH (ft)	3	NUMBER OF PAGES	1
PROJECT #	1883R2707	PROJECT NAME	NCDOT Shelby R-2707E		
DATE DRILLED	4/24/2019	WEATHER CONDITIONS	86°F Sunny		
DRILLING SUB-CONTRACTOR	N/A	DRILL RIG	Hand Auger		

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	15.4	Red, orange and brown, clayey sandy SILT	
2			
3			
4		Boring terminated at 3ft. UVF sample taken at 0-0.5ft.	
5			
6			
7			
8			
9			
10			
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### SOIL BORING FIELD WORKSHEET

BORING #	P643-SB3	BORING DEPTH (ft)	3	NUMBER OF PAGES	1
PROJECT #	1883R2707	PROJECT NAME	NCDOT Shelby R-2707E		
DATE DRILLED	4/24/2019	WEATHER CONDITIONS	86°F Sunny		
DRILLING SUB-CONTRACTOR	N/A	DRILL RIG	Hand Auger		

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	9.0	Red, orange and brown, clayey sandy SILT	
2			
3			
4		Boring terminated at 3ft. UVF sample taken at 0-0.5ft.	
5			
6			
7			
8			
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### SOIL BORING FIELD WORKSHEET

BORING #	<b>P643-SB4</b>	BORING DEPTH (ft)	<b>3</b>	NUMBER OF PAGES	<b>1</b>
PROJECT #	<b>1883R2707</b>	PROJECT NAME	<b>NCDOT Shelby R-2707E</b>		
DATE DRILLED	<b>4/24/2019</b>	WEATHER CONDITIONS	<b>86°F Sunny</b>		
DRILLING SUB-CONTRACTOR	<b>N/A</b>	DRILL RIG	<b>Hand Auger</b>		

DEPTH (ft bgs)	PID (ppm)	SOIL DESCRIPTION	SAMPLE INFO
1	7.9	Red, orange and brown, clayey sandy SILT	
2			
3			
4		Boring terminated at 3ft. UVF sample taken at 0-0.5ft.	
5			
6			
7			
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**APPENDIX C**  
**GEOPHYSICAL REPORT**

April 29, 2019

Mr. John Maas, PG  
Wood, PLC  
2801 Yorkmont Road, Suite 100  
Charlotte, NC 28208

Re: Report for Geophysical Survey to Identify Underground Storage Tanks  
Parcel #043  
5040 E. Dixon Blvd.  
Kings Mountain, North Carolina

Dear Mr. Maas,

GEL Solutions appreciates the opportunity to provide Wood with this report of our geophysical investigation for the referenced project. This investigation was designed to determine the potential presence of underground storage tanks (USTs) at the site and underground utilities that would obstruct drilling activities at the site. The geophysical field investigation was successfully performed on April 15, 2019 through April 18, 2019.

## 1.0 Summary of Results

No subsurface anomalies were identified in the geophysical data that indicated the presence of USTs. The anomalies represented in Figure 1 are consistent with known metallic surface objects, utilities, and/or cultural interference. Although geophysical methods provide a high level of assurance for the location of subsurface objects, the possibility exists that not all features can or will be identified. Therefore, due caution should be used when performing any subsurface excavation, and GEL Solutions, LLC will not be liable for any damages that may occur. Descriptions of the technologies employed during this geophysical investigation are provided below.

## 2.0 Overview of Geophysical Investigation

The geophysical evaluation included the deployment of ground penetrating radar (GPR) and time-domain electromagnetic (TDEM) technologies to the site. These technologies were used in concert with one another in order to identify the presence of potential USTs at the site. A brief description of each technology is presented in the following paragraphs.

### Ground Penetrating Radar Methodology

An Impulse Radar digital radar control system configured with a 160-Megahertz and 600-Megahertz (MHz) antenna array was used in this investigation. GPR is an electromagnetic geophysical method that detects interfaces between subsurface materials with differing dielectric constants. The GPR system consists of an antenna which houses the transmitter and receiver, a digital control unit which both generates and digitally records the GPR data, and a color video monitor to view data as it is collected in the field.

The transmitter radiates repetitive short-duration electromagnetic waves (at radar frequencies) into the earth from an antenna moving across the ground surface. These radar waves are reflected back to the receiver from the interface of materials with different dielectric constants. The intensity of the reflected signal is a function of the contrast in the dielectric constant between the materials, the conductivity of the material through which the wave is traveling, and the frequency of the signal.

Subsurface features that commonly cause such reflections are: 1) natural geologic conditions, such as changes in sediment composition, bedding, and cementation horizons and voids; or 2) unnatural changes to the subsurface such as disturbed soils, soil backfill, buried debris, tanks, pipelines, and utilities. The digital control unit processes the signal from the receiver and produces a continuous cross-section of the subsurface interface reflection events.

GPR data profiles were collected along transects covering the entire rights of ways. Depth of investigation of the GPR signal is highly site-specific and is limited by signal attenuation (absorption) in the subsurface materials. Signal attenuation is dependent upon the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivities such as clays, brackish groundwater, or groundwater with a high dissolved solid content from natural or manmade sources. Signal attenuation is lowest in relatively low conductivity materials such as dry sand or rock. Depth of investigation is also dependent on the antenna's transmitting frequency. Depth of investigation generally increases as transmitting frequency decreases; however, the ability to resolve smaller subsurface features is diminished as frequency is decreased. The average depth of penetration at this site was approximately 2-5 feet below the surface.

The GPR antenna used at this site is internally shielded from aboveground interference sources. Accordingly, the GPR response is not affected by overhead power lines, metallic buildings, or nearby objects.

#### Time Domain Electromagnetic Methodology

TDEM methods measure the electrical conductivity of subsurface materials. The conductivity is determined by inducing (from a transmitter) a time or frequency-varying magnetic field and measuring (with a receiver) the amplitude and phase shift of an induced secondary magnetic field. The secondary magnetic field is created by subsurface conductive materials behaving as an inductor as the primary magnetic field is passed through them.

The Geonics EM-61 system used in this investigation operates within these principles. However, the EM-61 TDEM system can discriminate between moderately conductive earth materials and very conductive metallic targets. The EM-61 consists of a portable coincident loop time domain transmitter and receiver with a 1.0-meter by 0.5-meter coil system. The EM-61 generates 150 pulses per second and measures the response from the ground after transmission or between pulses. The secondary EM responses from metallic targets are of longer duration than those created by conductive earth materials. By recording the later time EM arrivals, only the response from metallic targets is measured, rather than the field generated by the earth material.

### **3.0 Field Procedures and Results**

The geophysical field investigation was successfully performed on April 15 through April 18, 2019 at the referenced site located in the immediate vicinity of E. Dixon Blvd. in Kings Mountain, NC. Interpretation of the GPR data was conducted in the field and any potential anomalies were marked in the field. TDEM was also used to scan the project site with a spacing of 2.5 feet. Any electromagnetic anomalies detected during field activities that were indicative of buried metallic objects were also marked in the field.

There were no subsurface geophysical anomalies detected within the limits of Parcel #043 during this investigation that indicated the presence of USTs. The anomalies represented in the data shown on Figure 1 are indicative of known metallic surface features and/or cultural interference.

#### 4.0 Closing

GEL Solutions appreciates the opportunity to assist Wood with this project. If you have any questions or need further information regarding the project, please do not hesitate to call me at (828) 782-3523.

Yours very truly,

A handwritten signature in blue ink that reads "Jeff Tallent". The signature is written in a cursive style and is contained within a thin black rectangular border.

Jeff Tallent  
Director of Western NC Operations

Enclosures  
fc: 043.AMEC00419.Report.pdf

**Site Photos**



Photo 1: Looking South showing surface metal and obstructions



Photo 2: Looking West

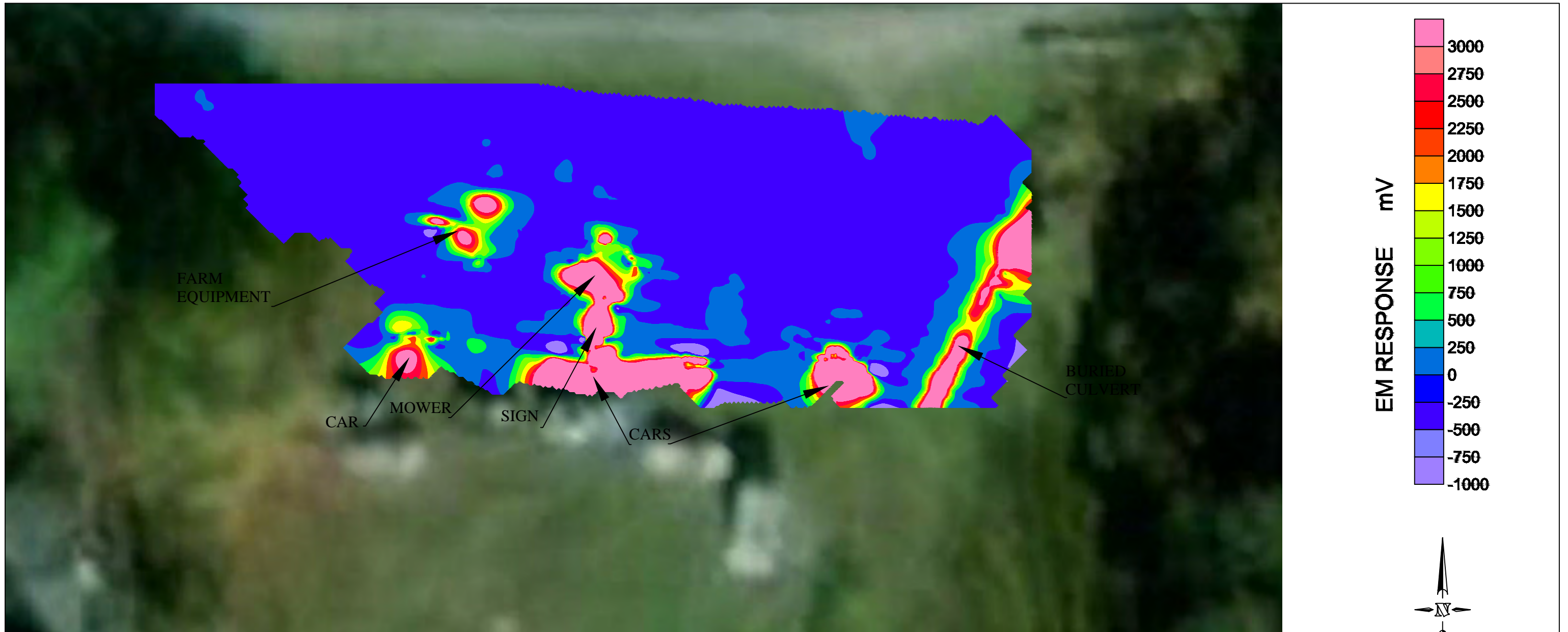




Photo 3: Looking North

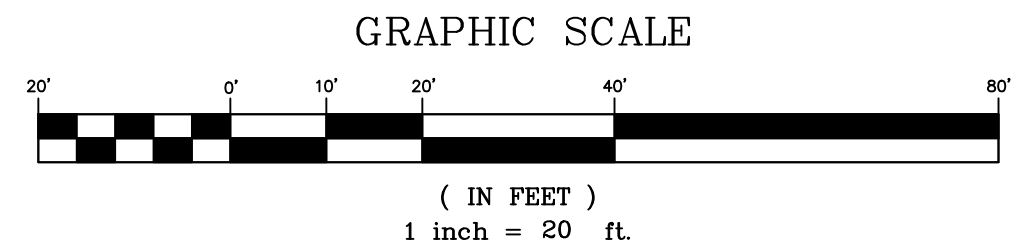


Photo 4: Looking South showing surface metal and obstructions



### NOTES

- 1) UNDERGROUND FEATURES WERE LOCATED USING VISUAL EVIDENCE, GROUND PENETRATING RADAR (GPR), AND TIME DOMAIN ELECTROMAGNETIC (TDEM) METHODS. OTHER BURIED FEATURES MAY EXIST BUT WERE NOT DETECTED DUE TO LIMITATIONS OF THE GEOPHYSICAL METHODS, SITE ACCESS, AUTHORIZED SCOPE-OF-WORK, AND/OR HIGH TARGET CONGESTION. THEREFORE, DUE CAUTION SHOULD BE USED WHEN PERFORMING SUBSURFACE EXCAVATION ACTIVITIES WHERE POTENTIAL CONFLICTS EXIST. GEL SOLUTIONS IS NOT RESPONSIBLE FOR DAMAGES THAT MAY OCCUR. IDENTIFYING THE LOCATION OF SOME FEATURES MAY ONLY BE POSSIBLE WITH VACUUM OR OTHER EXCAVATION METHODS.
- 2) FIELD SURVEY CONDUCTED ON 04.15.2019 - 04.18.2019.
- 3) GEOPHYSICAL DATA GENERATED USING AN IMPULSE RADAR CROSSOVER GPR SYSTEM CONFIGURED WITH A 170MHZ AND 600MHZ ANTENNA AND A GEONICS EM-61 TDEM SYSTEM. APPROXIMATE POSITIONING WAS PROVIDED USING TRIMBLE RTK/GPS.
- 4) GEL SOLUTIONS IS NOT LIABLE FOR ACCURACY OF BASE MAP PROVIDED BY WOOD.



GEL ENGINEERING OF NC, INC. DBA

**GEL SOLUTIONS**

an Affiliate of THE GEL GROUP, INC.

55 SHILOH ROAD, SUITE E

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PROJECT: AMEC00419

GEOPHYSICAL INVESTIGATION FOR USTs  
PARCEL 43  
5040 E. DIXON BLVD.  
KINGS MOUNTAIN, NORTH CAROLINA

DATE: 4/25/19

RESULTS OF GEOPHYSICAL INVESTIGATION

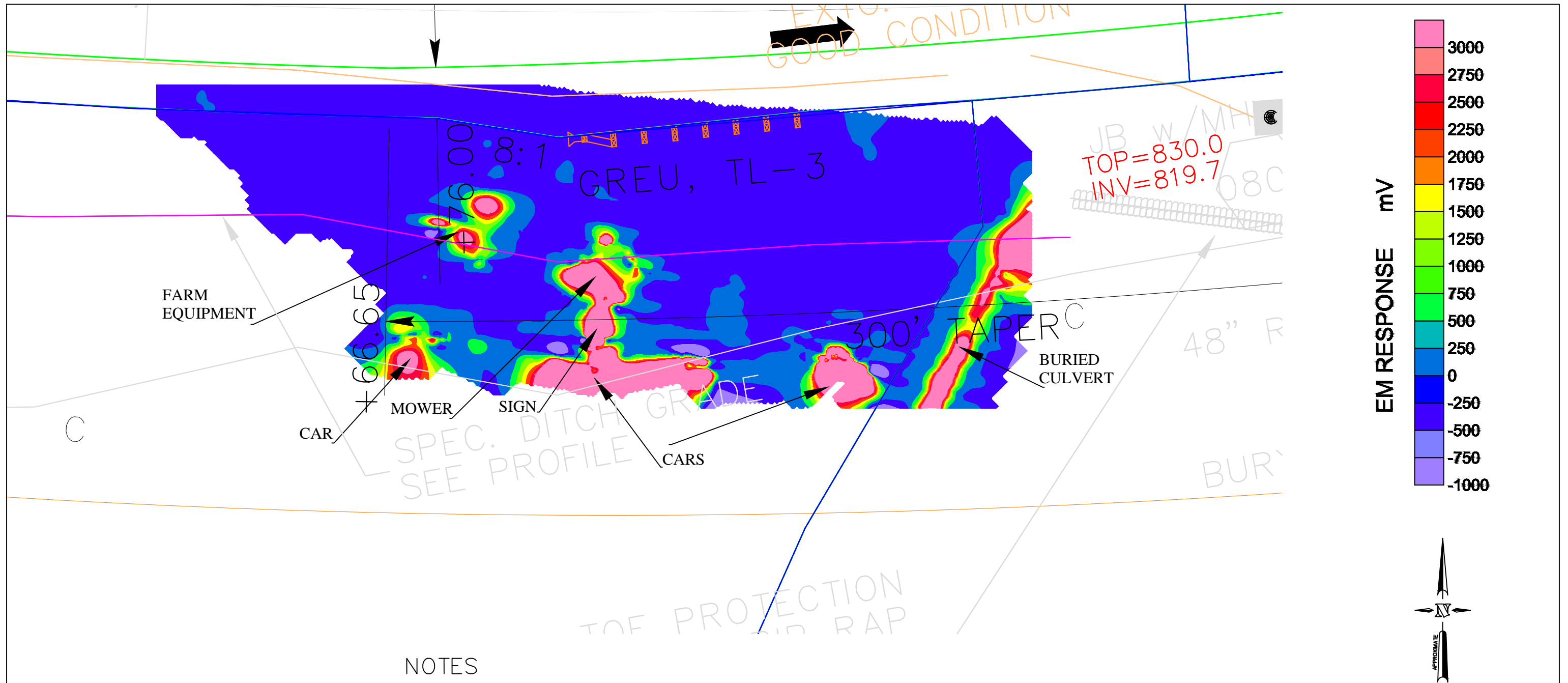
FIGURE

1

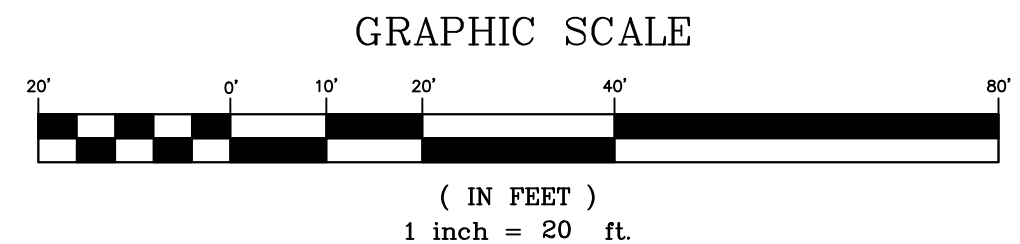
DRAWN BY: JAT

APPRV. BY: WRA





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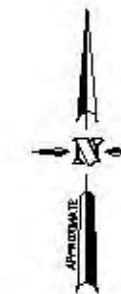
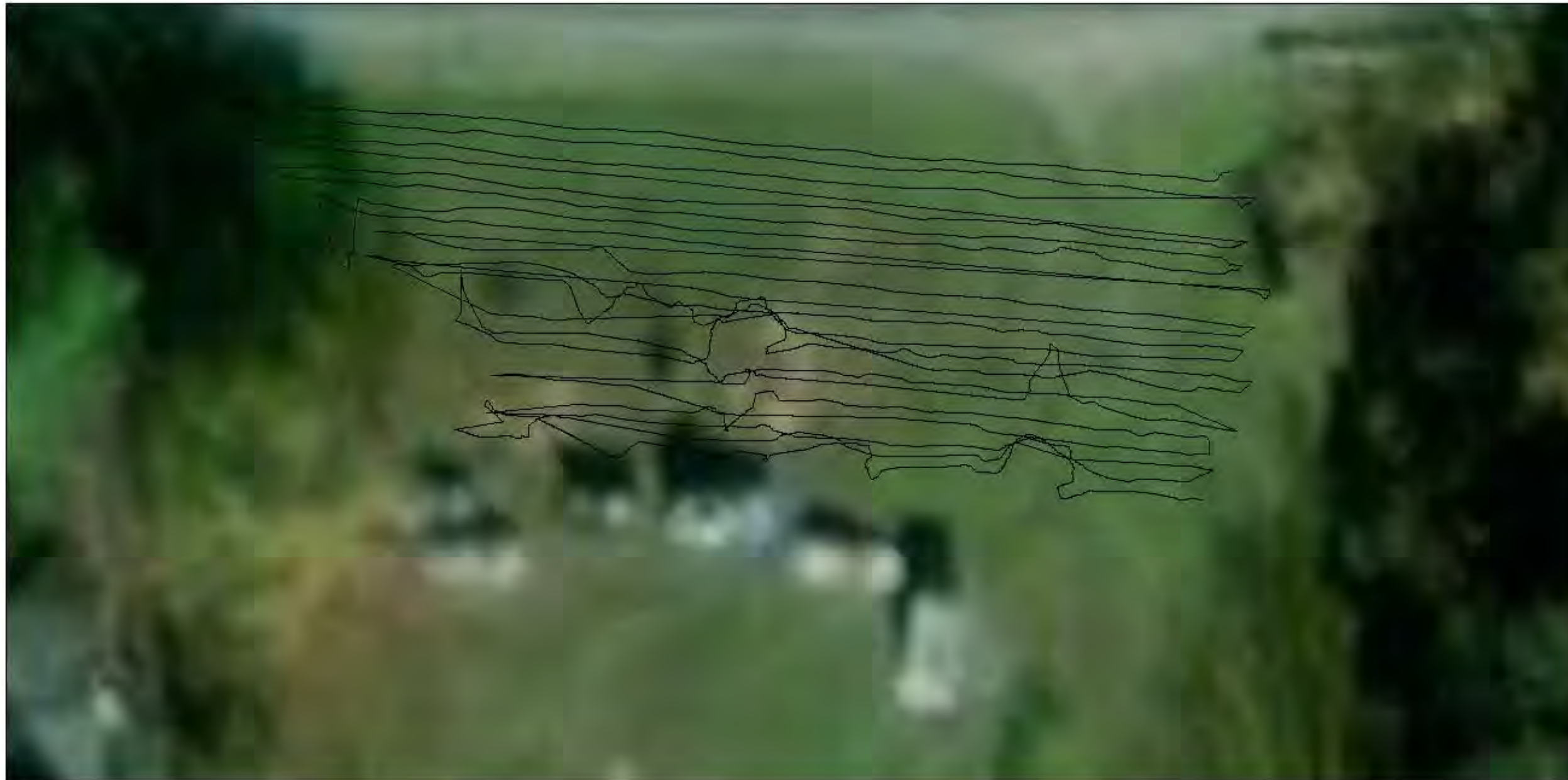
RESULTS OF GEOPHYSICAL INVESTIGATION

FIGURE

1

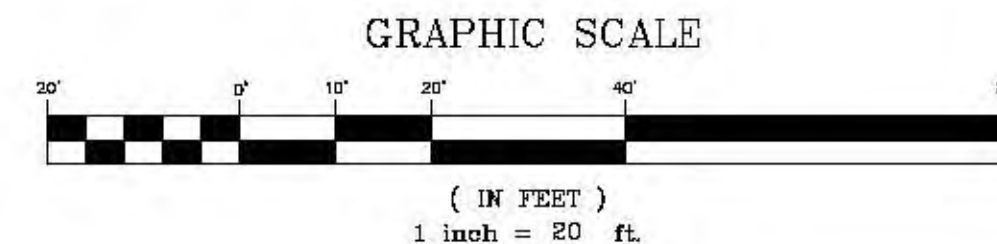
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GEOPHYSICAL INVESTIGATION FOR USTs  
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RESULTS OF GEOPHYSICAL INVESTIGATION

FIGURE  
2

DATE: 4/25/19

DRAWN BY: JAT

APPRV. BY: WRA

**APPENDIX D**  
**RESULTS FROM ON-SITE UVF SOIL ANALYSES**



### Hydrocarbon Analysis Results

**Client:** Wood  
**Address:** 2801 Yorkmont Road  
 Charlotte, NC

**Samples taken** Wednesday, April 24, 2019  
**Samples extracted** Wednesday, April 24, 2019  
**Samples analysed** Wednesday, April 24, 2019

**Contact:** Helen Corley

**Operator** Derick Haydin

**Project:** NCDOT Shelby

H09382

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	% Ratios			HC Fingerprint Match
										C5 - C10	C10 - C18	C18	
Soil	P643-SB1-0-0.5	27.1	<0.68	<0.68	883.9	883.9	479.8	32.8	0.019	0	99.5	0.5	Deg.Fuel 76.5%,(FCM)
Soil	P643-SB1-1	14.4	<0.36	8.8	57.3	66.1	36.7	2.1	0.002	22.4	77.1	0.6	Deg.Fuel 64.4%,(FCM)
Soil	P643-SB2-0.5	24.1	<0.6	<0.6	2.2	2.2	1.2	0.07	0.001	0	99.4	0.6	Deg.PHC 85.4%,(FCM)
Soil	P643-SB3-0.5	21.7	<0.54	<0.54	0.7	0.7	0.58	0.06	<0.007	0	100	0	PHC ND,(FCM)
Soil	P643-SB4-0.5	14.2	<0.36	<0.36	2.9	2.9	1.9	<0.0	<0.004	0	99.6	0.4	Degraded Oil 74.9%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK

100.1%

Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modified Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**



