

# Preliminary Site Assessment

**US 221 South of US 74 Business (Charlotte Road) to North of  
SR 1366 (Roper Loop Road)  
Parcel 243 – Heath and Erin McSwain  
174 US Highway 64, Rutherfordton, North Carolina**

State Project No. R-2233BB

WBS Element: 34400.1.S5

December 1, 2017

Terracon Project No. 71177323



**Prepared for:**

North Carolina Department of Transportation  
Raleigh, North Carolina

**Prepared by:**

Terracon Consultants, Inc.  
Charlotte, North Carolina

[terracon.com](http://terracon.com)

**Terracon**

Environmental



Facilities



Geotechnical



Materials

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December 1, 2017

North Carolina Department of Transportation  
Attention: Mr. Craig Haden  
GeoEnvironmental Engineering Unit  
Century Center Complex  
Building B  
1020 Birch Ridge Drive  
Raleigh, North Carolina 27610

Re: Preliminary Site Assessment (PSA)  
US 221 South of US 74 Business (Charlotte Road) to North SR 1366 (Roper Loop Road)  
Parcel 243 – Heath and Erin McSwain  
174 US Highway 64, Rutherfordton, North Carolina  
State Project No. R-2233BB  
WBS Element: 34400.1.S5

Dear Mr. Haden:

Terracon Consultants, Inc. (Terracon) is pleased to submit a Preliminary Site Assessment (PSA) report for the above referenced site. This assessment was performed in accordance with our Proposal for Preliminary Site Assessment (Terracon Proposal No. P71177323) dated June 2, 2017. This report includes the findings of the investigation, and provides our conclusions and recommendations.

Terracon appreciates the opportunity to provide these services to the North Carolina Department of Transportation (NCDOT). If you have any questions concerning this report or need additional information, please contact us at 919-873-2211.

Sincerely,

**Terracon Consultants, Inc.**

Prepared by:

DocuSigned by:

*S. Alex Chinery*

F3F142104F4941D...

S. Alex Chinery, E.I.  
Senior Staff Environmental Engineer

Reviewed by:

DocuSigned by:

*Christopher L. Corbitt*

D334903BD0324DE...

Christopher L. Corbitt, P.G.  
Senior Geologist

# PRELIMINARY SITE ASSESSMENT

US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH SR 1366 (ROPER LOOP ROAD)

RUTHERFORDTON, RUTHERFORD COUNTY, NORTH CAROLINA

STATE PROJECT NO. R-2233BB

WBS ELEMENT: 34400.1.S5

PARCEL 243 – HEATH AND ERIN MCSWAIN

174 US HIGHWAY 64, RUTHERFORDTON, NORTH CAROLINA

## 1.0 INTRODUCTION

### 1.1 Site Description

<b>Site Name</b>	US 221 South of US 74 Business (Charlotte Road) to North SR 1366 (Roper Loop Road) in Rutherfordton
<b>Site Location/Address</b>	174 US Highway 64, Rutherfordton, NC 27834 (Rutherford County Tax PIN: 1628243)
<b>General Site Description</b>	The site is occupied by a commercial building that is currently operating as D&J Used Cars.

### 1.2 Site History

The site is located at 174 US Highway 64 in Rutherfordton, Rutherford County, North Carolina (site). At the time of the PSA, the site was developed as a one-story commercial building occupied by D&J Used Cars. According to the property owner, the facility operates as a vehicle sales lot and conducts auto detailing activities. According to available regulatory information, the site does not appear in the UST registry and there are no known release incidents associated with the site.

### 1.3 Scope of Work

Terracon conducted the following Preliminary Site Assessment (PSA) scope of work in accordance with Terracon's Proposal No. P71177323 dated June 2, 2017. This PSA is being completed prior to planned roadway improvements along US Highway 221 in Rutherfordton, North Carolina. The scope of work included a geophysical investigation, collection of two soil samples and preparation of a report documenting the investigation activities. The PSA is not intended to delineate potential impacts. The PSA was performed within the proposed right-of-way (ROW) as indicated by North Carolina Department of Transportation (NCDOT) provided plan sheets.

## Preliminary Site Assessment

Parcel 243 – Heath and Erin McSwain ■ Rutherfordton, North Carolina  
December 1, 2017 ■ Terracon Project No. 71177323



### 1.4 Standard of Care

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. Terracon makes no warranties, either expressed or implied, regarding the findings, conclusions or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report. These services were performed in accordance with Terracon Proposal No. P71177323 dated June 2, 2017 and were not conducted in accordance with ASTM E1903-11.

### 1.5 Additional Scope Limitations

Findings, conclusions and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, undetectable or not present during these services; thus, we cannot represent that the site is free of hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this PSA. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

### 1.6 Reliance

This report has been prepared for the exclusive use of the NCDOT. Authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the expressed written authorization of the client and Terracon.

## 2.0 FIELD ACTIVITIES

The following PSA activities are presented in the order that they were conducted in the field.

**Exhibit 1** presents the topography of the site on a portion of the USGS topographic quadrangle map of Rutherfordton North, NC 2002. **Exhibit 2** is a site layout plan that indicates the approximate locations of the site features and soil boring locations.

## Preliminary Site Assessment

Parcel 243 – Heath and Erin McSwain ■ Rutherfordton, North Carolina  
December 1, 2017 ■ Terracon Project No. 71177323



### 2.1 Geophysical Survey

On July 28 and August 2, 2017, Geophysical Survey Investigations, conducted a geophysical investigation at the site in an effort to evaluate and detect potentially unknown, metallic underground storage tanks and buried utilities beneath the proposed ROW area. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM61-MK2A metal detection instrument with a Hemisphere A101 GPS unit and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-3000 unit equipped with a 400 MHz antenna.

The geophysical investigation detected evidence of an unknown subsurface metallic conduit which was identified as a potential UST on the site. The metal detection and GPR scans also identified underground utility lines reinforced concrete pavement and metallic conduits. A copy of the geophysical report is included in **Appendix A**.

### 2.2 Soil Sampling

Based on the findings of the geophysical investigation and Terracon's site observations, Terracon provided oversight for the advancement of two soil borings (B-243-1 and B-243-2) within the NCDOT ROW of Parcel 243. The borings were completed by a North Carolina Certified Well Contractor (Innovative Environmental Technologies) using a track-mount Geoprobe® direct-push drill rig.

Soil samples were collected in 5-foot, disposable, Macro-Core® sampler tubes to document soil lithology, color, moisture content, and sensory evidence of impacts. Each soil sample was screened for organic vapors using an 11.7 eV photoionization detector (PID). The PID data were collected in order to corroborate laboratory data and assist in selection of sample intervals for laboratory analysis. PID readings from the borings ranged from 1.3 parts per million (ppm) to 9.8 ppm.

Based on the proposed disturbance depths and discussions with the NCDOT, each of the soil borings was advanced to a depth of approximately 15 feet bls. Two soil samples, one from each boring, were collected from depths of approximately 5 feet bls, placed in laboratory provided sample containers and sent to RED Lab, LLC (RED) for UVF analysis of gasoline range organics (GRO) and diesel range organics (DRO). Soil samples were collected in the depth interval that was most likely to be impacted based on PID readings and field observations.

Soils generally consisted of dark brown to reddish orange sandy silty clay. Groundwater was not encountered in the on-site borings. The soil boring logs are included in **Appendix B**. Sample locations were measured relative to site features and the locations depicted on **Exhibit 2** are approximate.

## Preliminary Site Assessment

Parcel 243 – Heath and Erin McSwain ■ Rutherfordton, North Carolina  
December 1, 2017 ■ Terracon Project No. 71177323



The drilling equipment used at the site was decontaminated prior to use and between the advancement of each boring. Non-dedicated sampling equipment was decontaminated using a Liquinox®/water wash followed by a distilled water rinse. Each of the boreholes was backfilled with hydrated bentonite pellets and investigation derived waste (IDW).

## 3.0 DATA EVALUATION

### 3.1 Soil Analytical Results

Laboratory analyses reported the following constituent detections in soil borings B-243-1 and B-243-2.

Boring B-243-1:

- n DRO (24.4 milligrams per kilogram [mg/kg])
- n total aromatics (11.7 mg/kg)
- n PAHs (1.3 mg/kg)
- n BaP (0.031 mg/kg)

Boring B-243-2:

- n GRO (0.91 mg/kg)
- n DRO (8.7 mg/kg)
- n Total aromatics (4.2 mg/kg)
- n PAHs (0.46 mg/kg)

The identified constituents were detected at concentrations below their respective NCDEQ regulatory action levels (50 mg/kg for GRO and 100 mg/kg for DRO). **Table 1** summarizes the results of the UVF analyses of the soil samples.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this investigation are discussed below.

- n The geophysical investigation revealed evidence of an unknown subsurface metallic conduit which was identified as a potential UST within the survey area at a depth interval of zero to six feet bls. Underground utility lines and steel reinforced concrete were also detected in the survey area.
- n Petroleum compounds were detected in the two borings above their respective laboratory reporting limits but laboratory analyses did not identify petroleum constituents above regulatory action levels in the on-site borings (B-243-1 and B-243-2).

## Preliminary Site Assessment

Parcel 243 – Heath and Erin McSwain ■ Rutherfordton, North Carolina  
December 1, 2017 ■ Terracon Project No. 71177323



- n Based on the analytical results, Terracon does not recommend additional assessment of the ROW at Parcel 243 at this time. The detection of petroleum constituents (below regulatory standards) in the two borings is an indication that future roadway construction activities at the site could encounter petroleum impacted soils within other areas of the ROW.

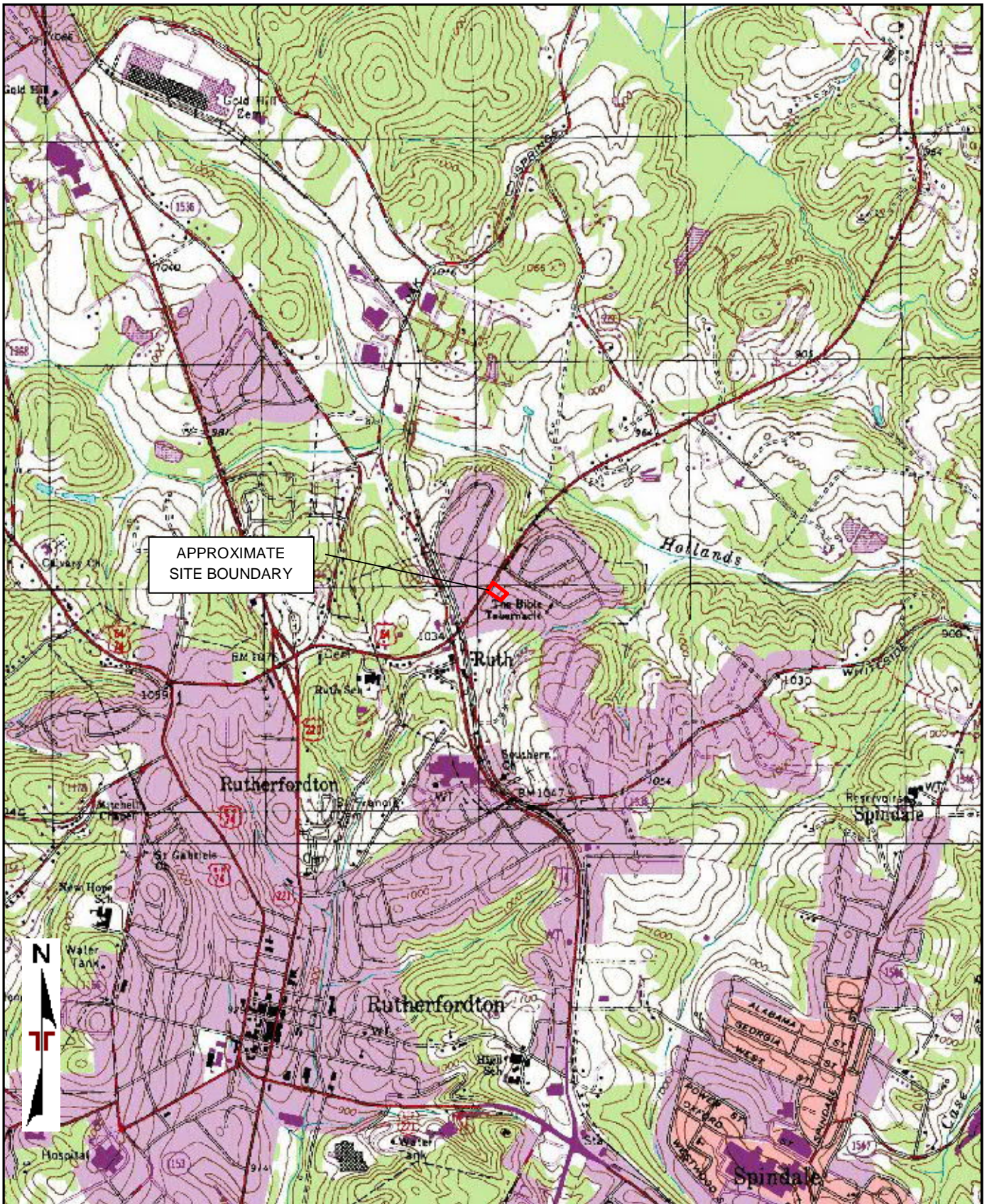


**FIGURES**

**EXHIBIT 1 - TOPOGRAPHIC MAP**

**EXHIBIT 2A – SITE DIAGRAM WITH SOIL BORING LOCATIONS**

**EXHIBIT 2B – SITE DIAGRAM WITH SOIL BORING LOCATIONS  
AND ANALYTICAL DATA**



TOPOGRAPHIC MAP IMAGE COURTESY OF THE U.S. GEOLOGICAL SURVEY  
 QUADRANGLES INCLUDE: RUTHERFORDTON NORTH, NC (1/1/2002) and RUTHERFORDTON SOUTH, NC (1/1/1993).

Project Manager:	SAC
Drawn by:	SAC
Checked by:	CLC
Approved by:	CLC
Project No.:	71177323
Scale:	1"=2,000'
File Name:	PARCEL243
Date:	SEPT. 2017

**Terracon**  
 2020 Starita Rd Ste E  
 Charlotte, NC 28206-1298

**TOPOGRAPHIC VICINITY MAP**  
 Parcel 243 – Heath and Erin McSwain  
 174 US Highway 64  
 Rutherfordton, NC

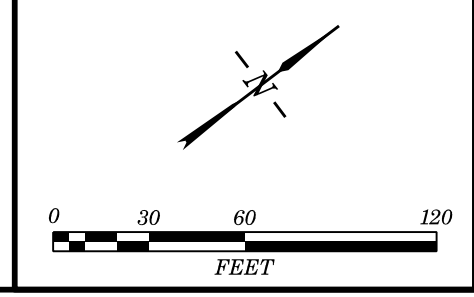
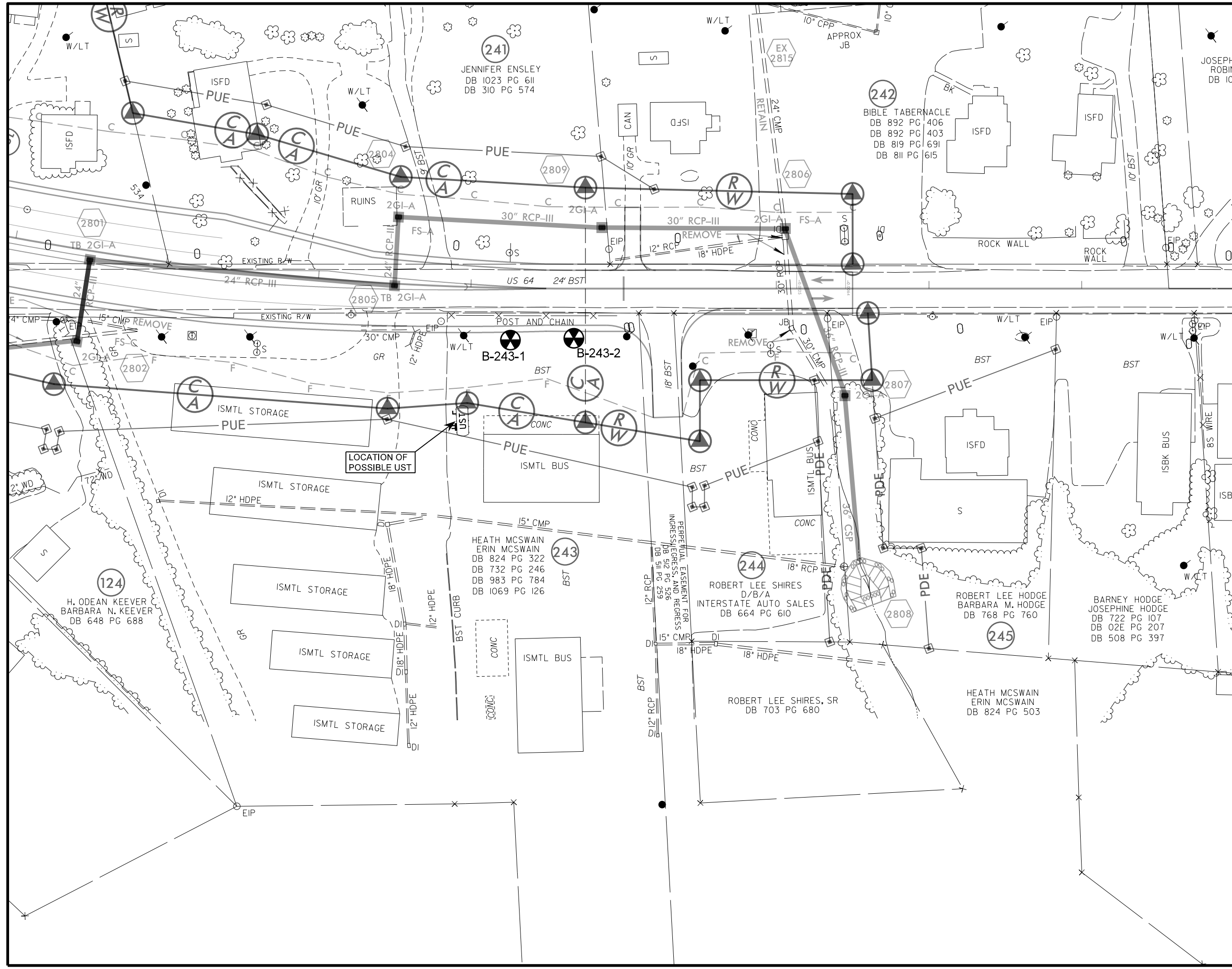
Exhibit  
**1**

**PROJECT REFERENCE NO.** 34400.1.S5 (R-2233BB) **EXHIBIT** 2A

**SITE DIAGRAM WITH BORING LOCATIONS AND ANALYTICAL DATA**

**PARCEL 243 - HEATH & ERIN MCSWAIN PROPERTY**  
174 US 64  
RUTHERFORDTON, RUTHERFORD COUNTY

- LEGEND**
- PROPERTY LINE
  - - - EXISTING RIGHT OF WAY LINE
  - ⊕ PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
  - ⊕ PROPOSED RIGHT OF WAY WITH MARKER
  - - - EXISTING EDGE OF PAVEMENT
  - - - PROPOSED EDGE OF TRAVEL
  - E - C - PROPOSED CUT / FILL LINE
  - PUE - PROPOSED PERMANENT UTILITY EASEMENT
  - PROPOSED CATCH BASIN
  - PROPOSED DRAINAGE PIPING
  - UST PROBABLE UST LOCATION
  - ⊗ BORING LOCATION



**LEGEND**

- PROPERTY LINE
- - - EXISTING RIGHT OF WAY LINE
- ⊕ PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
- ⊕ PROPOSED RIGHT OF WAY WITH MARKER
- - - EXISTING EDGE OF PAVEMENT
- - - PROPOSED EDGE OF TRAVEL
- - - PROPOSED CUT / FILL LINE
- PUE - PROPOSED PERMANENT UTILITY EASEMENT
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE PIPING
- UST - PROBABLE UST LOCATION
- ⊗ BORING LOCATION

**NOTES:**  
SOIL SAMPLES WERE COLLECTED ON AUGUST 15, 2017

DETECTED COMPOUNDS ARE SHOWN IN TABLE

SOIL CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER KILOGRAMS (mg/kg)

ft bls - FEET BELOW LAND SURFACE

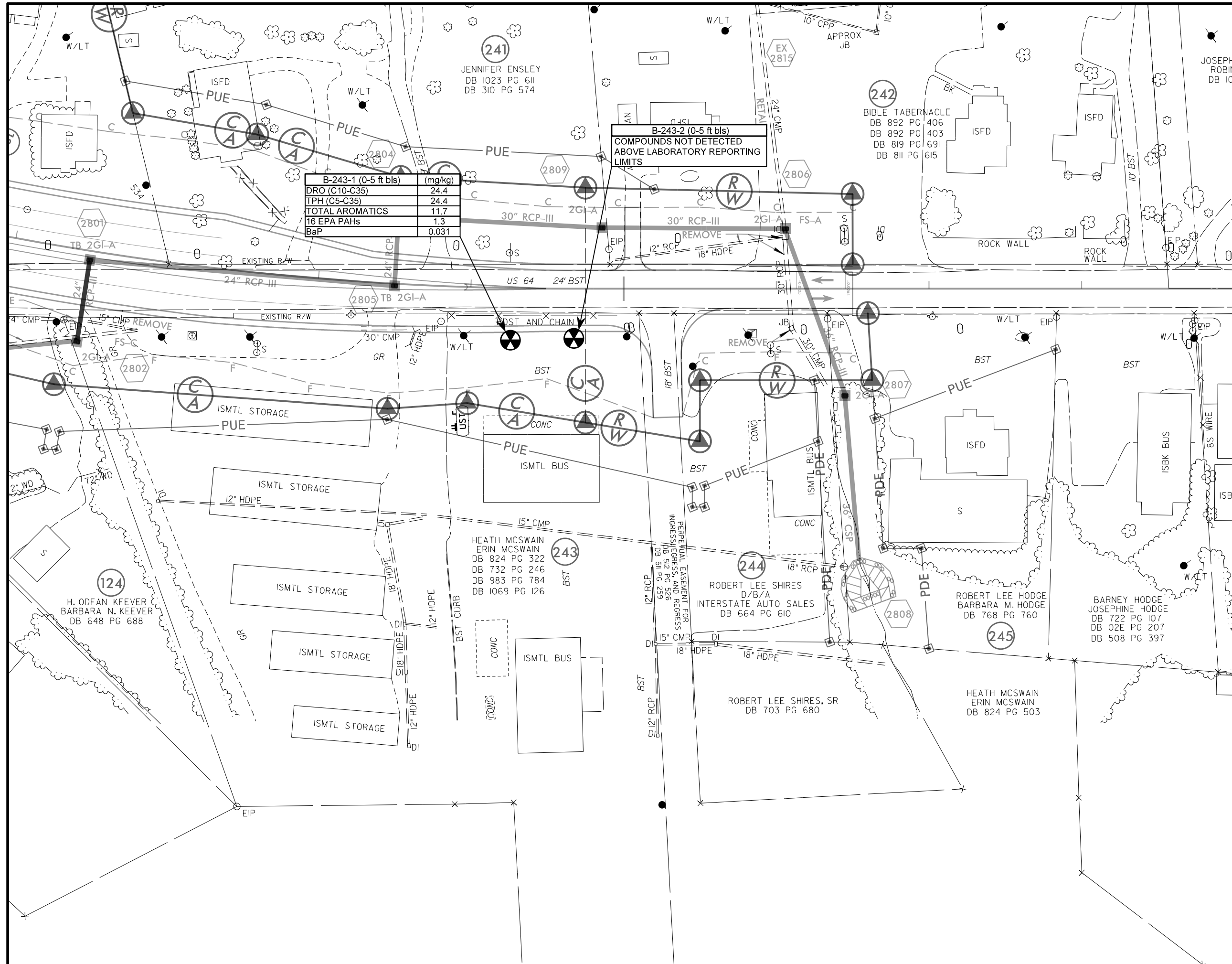
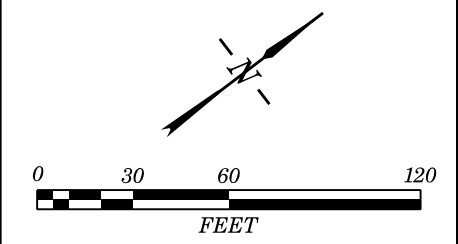
DRO (C10-C35) - DIESEL RANGE ORGANICS

TPH (C5-C35) - TOTAL PETROLEUM HYDROCARBONS

16 EPA PAHs - ENVIRONMENTAL PROTECTION AGENCY POLYCYCLIC AROMATIC HYDROCARBONS

BaP - BENZO(A)PYRENE

LABORATORY ANALYTICAL RESULTS DID NOT REPORT CONTAMINANTS OF CONCERN AT CONCENTRATIONS IN EXCESS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY (NCDEQ) ACTION LEVELS AND / OR CLEAN-UP STANDARDS.



**TABLES**

**TABLE 1 - FIELD SCREENING RESULTS**

**SUMMARY**

**TABLE 2 – SOIL SAMPLING ANALYTICAL RESULTS**

**SUMMARY (UVF)**

Table 1  
 Summary of Field Screening Results  
 Preliminary Site Assessment  
 Parcel 243 - Heath & Erin McSwain  
 Rutherfordton, Rutherford County, North Carolina  
 Terracon Project No. 71177323

Sample ID	Screened Interval	PID Value
B-243-1	0-5	9.8*
	5-10	1.3
	10-15	3.5
B-243-2	0-5	2.2*
	5-10	1.4
	10-15	1.4

Notes:

Soil screening was conducted on August 15, 2017.

\*indicates sampled interval.

Concentrations are reported in parts per million (ppm).

Table 2  
 Summary of Soil Analytical Results  
 Preliminary Site Assessment  
 Parcel 243 - Heath & Erin McSwain  
 Rutherfordton, Rutherford County, North Carolina  
 Terracon Project No. 71177323

Sample ID:	B-243-1	B-243-2	TPH Action Level
Sample Depth (ft bls):	0-5	0-5	
<b>UVF Analysis</b>			
BTEX (C6-C9)	<0.49	<0.92	NE
GRO (C5-C10)	<0.49	<0.92	50
DRO (C10-C35)	24.4	<0.92	100
TPH (C5-C35)	24.4	<0.92	NE
Total Aromatics	11.7	<0.18	NE
16 EPA PAHs	1.3	<0.29	NE
BaP	0.031	<0.037	NE

Notes:

Soil samples were collected on August 15, 2017.

Detected compounds are shown in the table.

Concentrations are reported in milligrams per kilogram (mg/kg).

ft bls - feet below land surface.

**Bold:** Constituent concentration reported above the method detection limit.

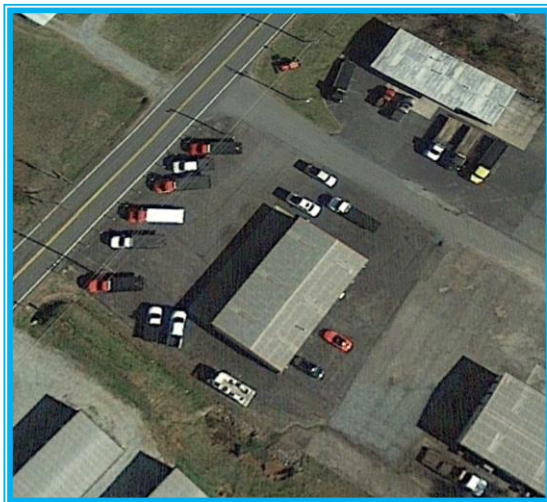
**APPENDIX A**  
**GEOPHYSICAL SURVEY REPORT**



**Terracon Consultants, Inc.**

**GEOPHYSICAL INVESTIGATION  
TO LOCATE METALLIC USTS**

**Heath & Erin McSwain Property  
(Parcel 243) 174 US Highway 64  
Rutherford County, North Carolina**



November 27, 2017

Geophysical Survey Investigations, PLLC Project No. 2017-22



4 Willimantic Drive, Greensboro, NC 27455  
Office Tel: (336) 286-9718  
denilm@bellsouth.net

**Terracon Consultants, Inc.**  
**GEOPHYSICAL INVESTIGATION**  
**TO LOCATE METALLIC USTS**  
**Heath & Erin McSwain Property**  
**(Parcel 243) 174 US Highway 64**  
**Rutherford County, North Carolina**

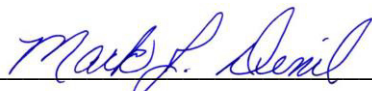
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FIGURES

Figure 1	Geophysical Equipment & Site Photographs
Figure 2	EM61-MK2A Metal Detection – Early Time Gate Results
Figure 3	EM61-MK2A Metal Detection – Differential Results
Figure 4	GPR Image & Photograph Across Probable Conduits or Possible UST
Figure 5	NCDOT Map – EM61 Early Time Gate Results
Figure 6	NCDOT Map – EM61 Differential Results

Report prepared for: Christopher L. Corbitt, PG  
Terracon Consultants, Inc.  
2020 Starita Road, Suite E  
Charlotte, North Carolina 28206

Prepared by:   
Mark J. Denil, P.G.  
Geophysical Survey Investigations, PLLC

## **1.0 INTRODUCTION**

Geophysical Survey Investigations, PLLC (GSI) conducted an electromagnetic (EM) metal detection survey, ground penetrating radar (GPR) scanning and utility line clearance search for Terracon Consultants, Inc. on July 28 and August 2, 2017 across the northwesterly portion of the Heath & Erin McSwain property (Parcel 243) located at 174 US Highway 64 in Rutherford County, North Carolina. The geophysical investigation was performed as part of the North Carolina Department of Transportation (NCDOT) preliminary site assessment for State Project R-2233BB (WBS Element 34400.1.S1) US 221 south of US 74 Business (Charlotte Rd) to north of SR 1366.

The geophysical investigation was conducted to determine if buried, metallic, underground, storage tanks (USTs) are present beneath the proposed Right-of-Way (ROW) and PUE areas of the site. The perimeter of the geophysical survey area (approximate ROW & PUE areas) is shown as a red polygon in the aerial photograph presented in **Figure 1**. The property consists of a commercial building surrounded by grass and asphalt-covered surfaces.

Terracon representative Mr. Christopher L. Corbitt, PG provided guidance and site maps to Geophysical Survey Investigations, PLLC personnel prior to conducting the geophysical field work. The geophysical survey area at Parcel 243 has a maximum length and width of 145 feet and 80 feet, respectively. Please note that the ROW and PUE areas at this site were not marked in the field or the survey markers were not visible at the time the geophysical investigation was conducted.

## **2.0 FIELD METHODOLOGY**

The EM investigation was performed across the geophysical survey area (proposed ROW and PUE areas) using a Geonics EM61-MK2A metal detection instrument with a Hemisphere A101 GPS unit. EM61 metal detection data and GPS coordinates were digitally collected in latitude and longitude geodetic format (NAD83) using a Juniper data recorder at approximately 1.0 foot intervals along survey lines spaced approximately five feet apart. The Trackmaker NAV61MK2 software program was used with the data recorder to view the relative positions of the survey lines in real time during data acquisition.

According to the instrument specifications, the EM61-MK2A can detect a metal drum down to a maximum depth of approximately 8 to 10 feet. Objects less than one foot in size can be detected to a maximum depth of 4 or 5 feet. The EM61 and GPS data were downloaded to a computer and processed in the field using the Trackmaker61 and Surfer for Windows software programs. GPS coordinates were converted during data processing to Universal Transverse Mercator (UTM) coordinates (in feet) which are used as location control in this report.

GPR scans were performed along northerly-southerly and easterly-westerly directions spaced primarily 3 to 5 feet apart across selected EM61 differential anomalies and areas containing steel reinforced concrete using the Geophysical Survey Systems SIR-3000 unit equipped with a 400 MHz antenna. GPR data were viewed in real time in a continuous mode using a vertical scan of 512 samples, at a sampling rate of 48 scans per second. A 70 MHz high pass filter and an 800 MHz low pass filter were used during data acquisition with the 400 MHz antenna. GPR data were viewed to a maximum investigating depth of approximately 6.0 feet based on an estimated two-way travel time of 8.0 nanoseconds per foot.

Following the UST investigation, areas around the proposed Terracon soil borings were scanned with the GPR unit and a DitchWitch 910 utility locator for buried utility line clearance and no further discussion regarding the utility clearance work will be made in this report. Photographs of the geophysical equipment used for the investigation and of the site are presented in Figure 1.

### **3.0 DISCUSSION OF RESULTS**

Contour plots of the EM61 early time gate results and the EM61 differential results are presented in **Figures 2 and 3**, respectively. The early time gate results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The early time gate response can be used to delineate metallic conduits or utility lines, small, isolated, metal objects and areas containing insignificant metal debris. The differential results are obtained from the difference between the early time gate channel and late time gate channel of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST-size objects and ignore the smaller, insignificant, metal objects or debris.

The linear, EM61 early time gate anomalies intersecting UTM coordinates 1358411-E 12848323-N and 1358473-E 12848330-N are probably in response to buried utility lines. The early time gate anomalies at 1358431-E 12848337-N and 1358413-E 12848228-N are probably in response to buried, miscellaneous metal debris or objects.

GPR scanning suggests that the large, high-amplitude, EM61 anomaly centered near UTM coordinates 1358463-E 12848272-N is in response to steel reinforced concrete pavement that runs along the edge of the building. GPR data suggest the EM61 differential anomalies centered near coordinates 1358399-E 12848272-N are in response to the tractor that was present during data acquisition.

GPR scanning suggests that the EM61 differential anomaly centered near UTM coordinates 1358427-E 12848230-N is probably in response to two short segments of metallic conduits or a possible (low confidence) UST oriented in a northwest-southeast direction. Based on the GPR data, the probable conduits or possible UST is approximately 5.0 feet long, 2.5 feet wide and buried 2.0 feet below present grade. A GPR image across the buried object and a photograph showing the location of the buried object are presented in **Figure 4**. An intrusive investigation is recommended to determine the identity of the buried object.

Excluding the aforementioned probable buried conduits or possible UST, the EM61 and GPR investigation suggests the remaining portion of the geophysical survey area (proposed ROW/PUE area) at Parcel 243 does not contain metallic USTs. Please refer to Figures 2 through 4 for additional (detailed) information regarding the geophysical findings at this site. The EM61 results are also shown on NCDOT base maps in **Figures 5 and 6**.

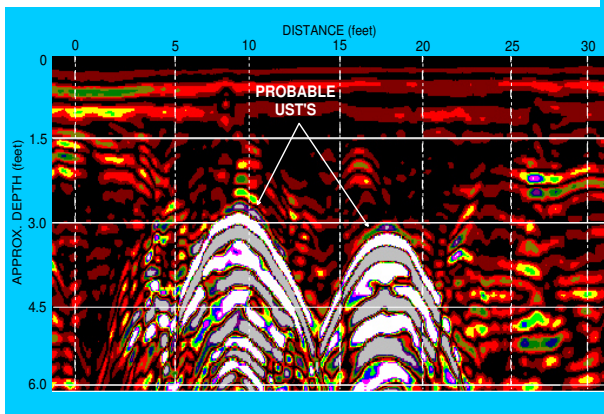
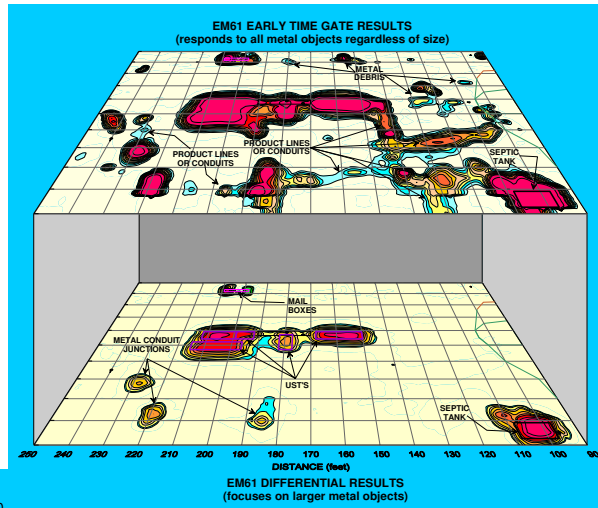
#### **4.0 SUMMARY & CONCLUSIONS**

Our evaluation of the EM61 and GPR data collected across the geophysical survey area at the Heath & Erin McSwain property (Parcel 243) located at 174 US Highway 64 in Rutherford County, North Carolina provides the following summary and conclusions:

- The combination of EM61 and GPR surveys provided reliable results for the detection of metallic USTs across the survey area within the depth interval of 0 to 8 feet.
- The linear, EM61 early time gate anomalies intersecting UTM coordinates 1358411-E 12848323-N and 1358473-E 12848330-N are probably in response to buried utility lines.
- GPR scanning suggests that the large, high-amplitude EM61 anomaly centered near coordinates 1358463-E 12848272-N is in response to steel reinforced concrete pavement that runs along the edge of the building.
- GPR scanning suggests that the EM61 differential anomaly centered near UTM coordinates 1358427-E 12848230-N is probably in response to two short segments of metallic conduits or a possible (low confidence) UST oriented in a northwest-southeast direction. An intrusive investigation is recommended to determine the identity of the buried object.
- The EM61 and GPR investigation suggests the remaining portion of the geophysical survey area (proposed ROW/PUE area) does not contain metallic USTs.

## **5.0 LIMITATIONS**

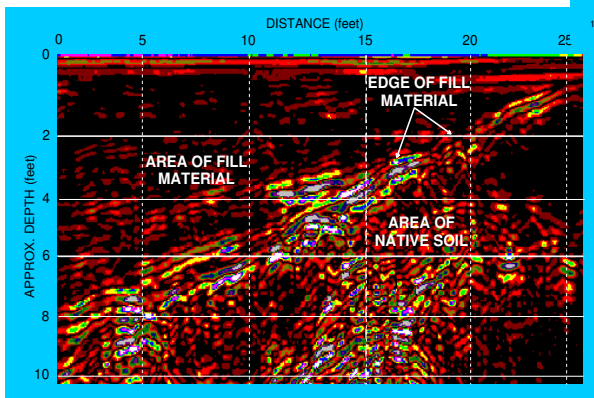
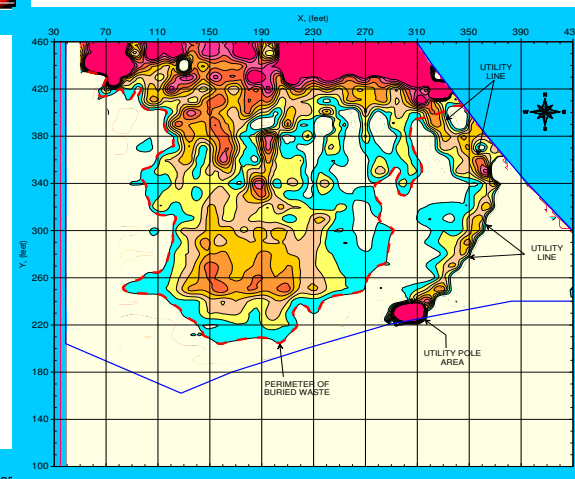
EM61 and GPR surveys have been performed and this report prepared for Terracon Consultants, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the geophysical surveys are non-unique and may not represent actual subsurface conditions. Some of the EM61 and GPR anomalies interpreted as possible/probable USTs, utility lines, conduits, steel reinforced concrete, or miscellaneous, metal debris may be attributed to other surface or subsurface features and/or interference from cultural features.

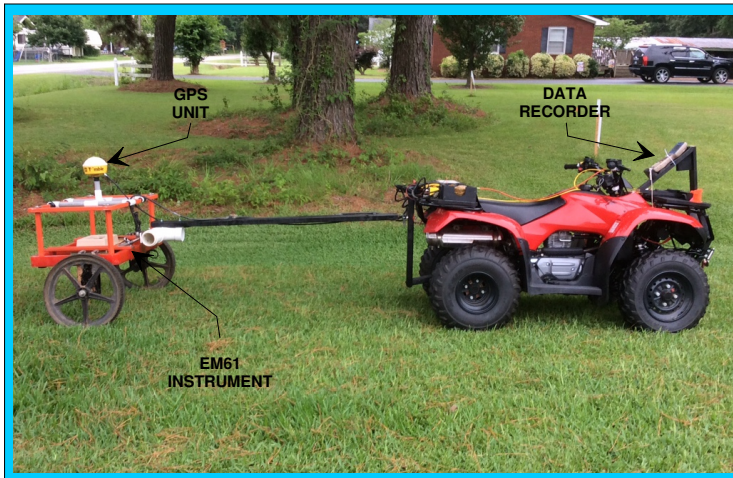


## REPORT FIGURES

(on the following pages)

Figures shown on this page are for  
esthetic purposes only and are not  
related to the site discussed in this report





**EM61 METAL DETECTOR**

The photograph shows the Geonics EM61-MK2A metal detector, a Hemisphere A101 GPS unit, a Juniper data recorder, and a Honda Recon ATV which were used to conduct the metal detection survey across the Heath & Erin McSwain property.

**GROUND PENETRATING RADAR UNIT**

The photograph shows the Geophysical Survey Systems SIR-3000 ground penetrating radar (GPR) unit equipped with a 400 MHz antenna that were used to conduct the GPR scanning across selected portions of the site.



**DITCHWITCH UTILITY LOCATOR**

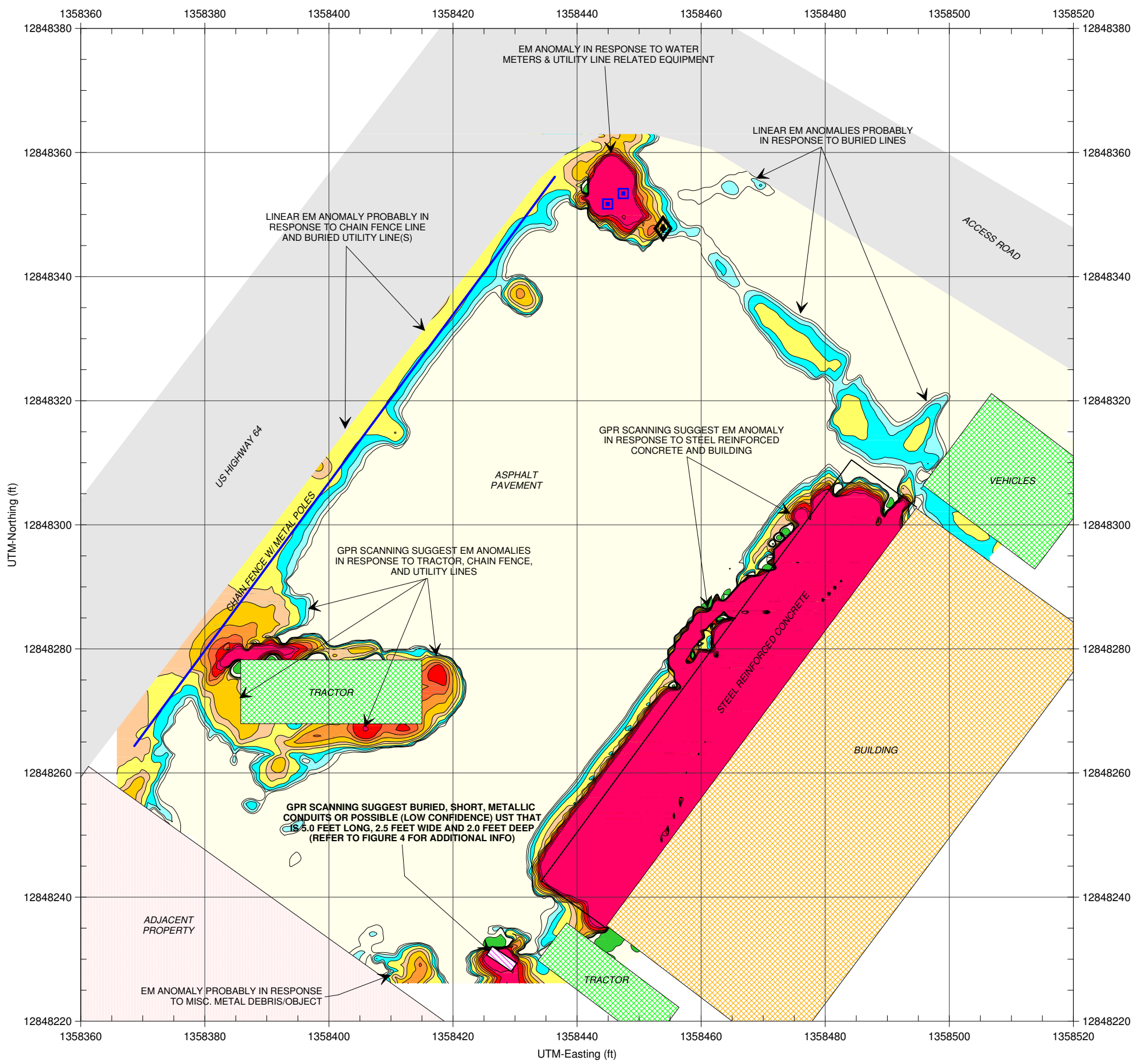
The photograph shows the DitchWitch 910 utility locator which was used to detect buried lines across the proposed boring locations.



**GEOPHYSICAL SURVEY AREA**

The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at the Heath & Erin McSwain property (Parcel 243). The geophysical investigation was conducted on July 28 and August 2, 2017.

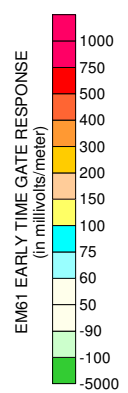




The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 243.

LEGEND	
	SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
	BUILDING
	VEHICLES
	WATER METER COVER
	UTILITY POLE & BOX
	CHAIN FENCE LINE
	PROBABLE BURIED, SHORT CONDUITS OR POSSIBLE (LOW CONFIDENCE) UST, AS SUGGESTED BY GEOPHYSICAL INVESTIGATION

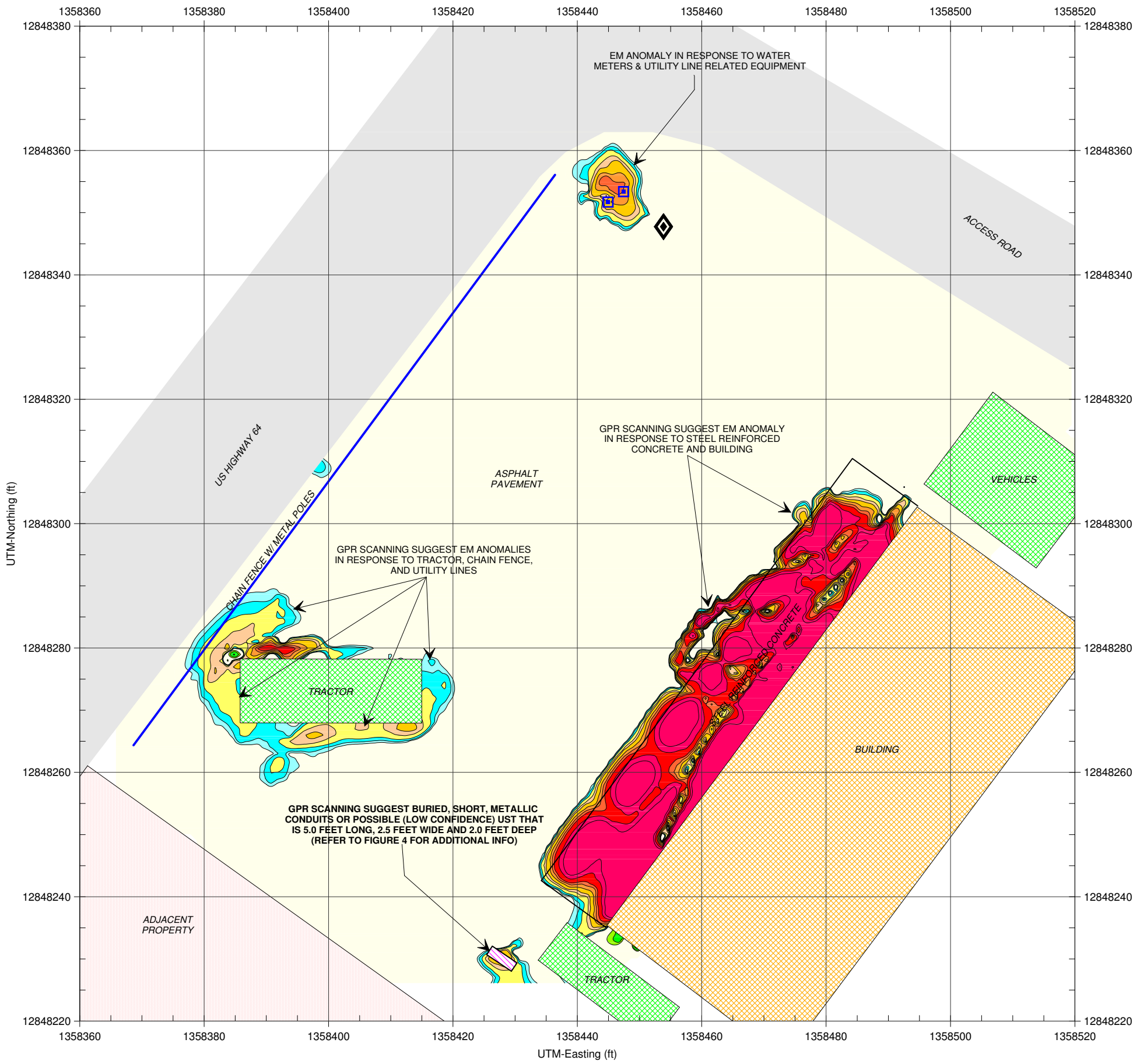
The contour plot shows the early time gate (most sensitive) response of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The early time gate response shows buried, metallic objects, lines and conduits regardless of size. GPR scans were conducted across selected EM61 anomalies and steel reinforced concrete using a Geophysical Survey Systems SIR 3000 instrument with a 400 MHz antenna. The geophysical investigation was conducted on July 28 and August 2, 2017.



**EM61-MK2A METAL DETECTION (EARLY TIME GATE RESULTS)**

**TERRACON, INC.**  
 Heath & Erin McSwain Property  
 (Parcel 243) 174 US Highway 64  
 Rutherford County, North Carolina



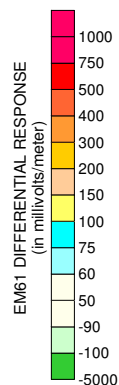


The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 243.

**LEGEND**

- SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
- BUILDING
- VEHICLES
- WATER METER COVER
- UTILITY POLE & BOX
- CHAIN FENCE LINE
- PROBABLE BURIED, SHORT CONDUITS OR POSSIBLE (LOW CONFIDENCE) UST, AS SUGGESTED BY GEOPHYSICAL INVESTIGATION

Note: The contour plot shows the differential response between the early time gate and the late time gate channels of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The differential response focuses on larger, buried, metallic objects such as drums and USTs and ignores smaller miscellaneous, metal debris. Ground penetrating radar (GPR) scans were conducted across selected EM61 anomalies and areas containing reinforced concrete using a Geophysical Survey Systems SIR 3000 unit with a 400 MHz antenna. The geophysical investigation was conducted on July 28 and August 2, 2017.

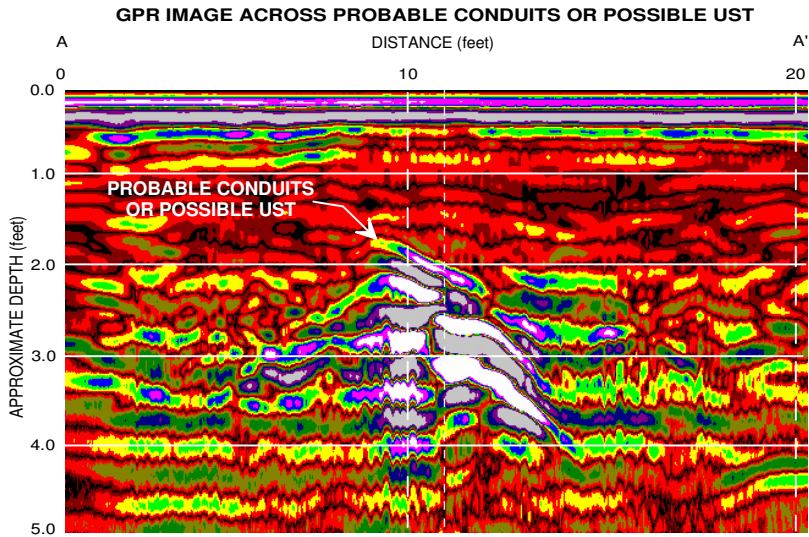


**EM61-MK2A METAL DETECTION  
(DIFFERENTIAL RESULTS)**

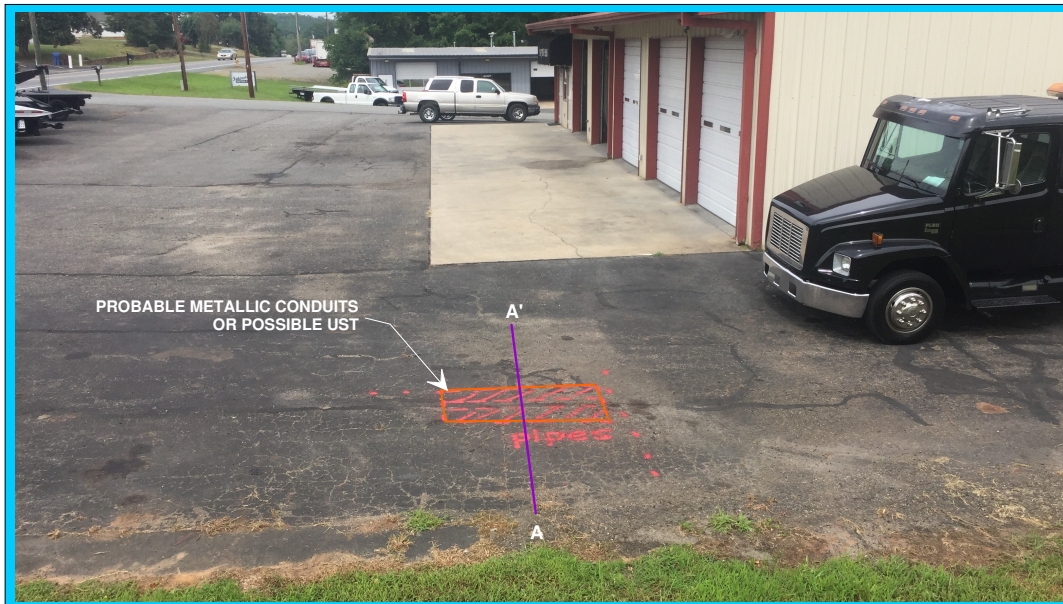
**TERRACON, INC.**  
Heath & Erin McSwain Property  
(Parcel 243) 174 US Highway 64  
Rutherford County, North Carolina

**GEOPHYSICAL**  
SURVEY INVESTIGATIONS

11/27/17      336-286-9718      FIGURE 3

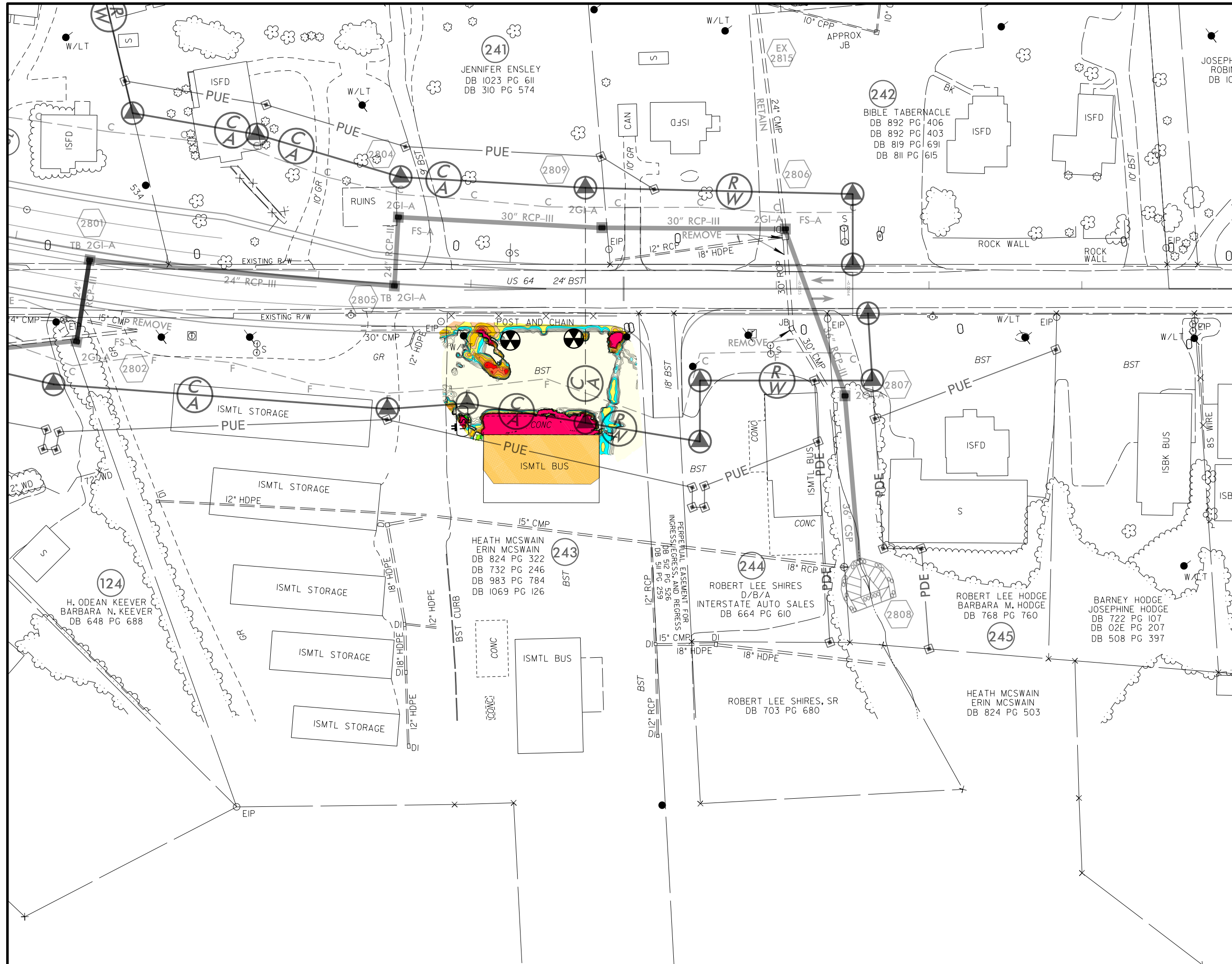
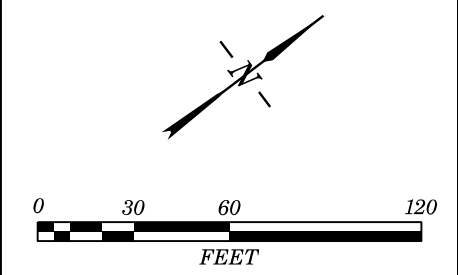
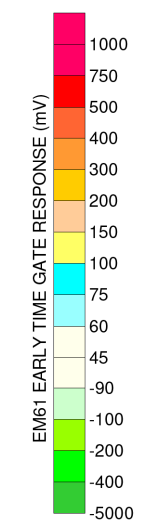


The high amplitude, hyperbolic reflections in the GPR image (above) are probably in response to two short metallic conduits or a possible UST buried approximately 2.0 feet below present grade. The purple line labeled AA' in the photograph shown below represents the approximate location of the GPR image.



The orange rectangle in the photograph represents the approximate foot print of probable two short pieces of metallic conduits or a possible (low confidence) UST that were/was detected by the geophysical investigation. Based on the GPR data, the buried object(s) is approximately 5.0 feet long, 2.5 feet wide and buried 2.0 feet below present grade. The solid purple line labeled AA' in the photograph represents the approximate location of GPR image AA' shown above. The photograph is viewed in a northeasterly direction.

- LEGEND**
- PROPERTY LINE
  - - - EXISTING RIGHT OF WAY LINE
  - ⊕ PROPOSED CONTROL OF ACCESS LINE WITH CONCRETE MARKER
  - ⊕ PROPOSED RIGHT OF WAY WITH MARKER
  - - - EXISTING EDGE OF PAVEMENT
  - - - PROPOSED EDGE OF TRAVEL
  - - - PROPOSED CUT / FILL LINE
  - PUE - PROPOSED PERMANENT UTILITY EASEMENT
  - PROPOSED CATCH BASIN
  - PROPOSED DRAINAGE PIPING
  - UST PROBABLE UST LOCATION
  - ⊗ BORING LOCATION





**APPENDIX B  
BORING LOGS**







**APPENDIX C**  
**LABORATORY ANALYTICAL REPORT AND CHAIN OF**  
**CUSTODY**



### Hydrocarbon Analysis Results

**Client:** TERRACON  
**Address:** 2020-E STARITA ROAD  
 CHARLOTTE NC

**Samples taken** Tuesday, August 15, 2017  
**Samples extracted** Tuesday, August 15, 2017  
**Samples analysed** Thursday, August 17, 2017

**Contact:** ALEX CHINERY

**Operator** NICK HENDRIX

**Project:** #71177323

U00902

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	
s	B-116-1	24.5	<0.61	1.1	2.6	3.7	1.3	<0.2	<0.025	51.8	39.7	8.6	Road Tar 77.9%,(FCM)
s	B-116-2	23.2	<0.58	<0.58	0.58	0.58	0.33	<0.19	<0.023	0	80.2	19.8	Deg.PHC 78.1%,(FCM),(BO)
s	B-116-3	19.7	<0.49	<0.49	60.2	60.2	29.6	3.2	0.056	0	82.2	17.8	V.Deg.PHC 71.8%,(FCM),(BO),(OCR)
s	B-116-4	20.5	<0.51	<0.51	0.51	0.51	0.41	<0.16	<0.02	91.1	6.8	2	V.Deg.PHC 76.9%,(FCM),(P)
s	B-116-5	20.5	<0.51	<0.51	<0.51	<0.51	<0.1	<0.16	<0.02	0	0	0	PHC not detected,(BO)
s	B-116-6	19.3	<0.48	<0.48	1.6	1.6	0.8	<0.15	<0.019	0	81.8	18.2	Road Tar 77.8%,(FCM)
s	B-116-7	11.0	<0.55	1	<0.28	1	0.14	<0.09	<0.011	92.1	6.3	1.6	Deg.PHC 77.4%,(FCM)
s	B-244-1	20.6	<0.52	<0.52	<0.52	<0.52	<0.1	<0.17	<0.021	0	0	0	PHC not detected,(BO),(P)
s	B-244-2	36.8	<0.92	<0.92	<0.92	<0.92	<0.18	<0.29	<0.037	0	0	0	PHC not detected,(P)
s	B-243-1	19.4	<0.49	<0.49	24.4	24.4	11.7	1.3	0.031	0	86.3	13.7	Road Tar 91.8%,(FCM),(BO)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK** 98.7 %

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**



### Hydrocarbon Analysis Results

**Client:** TERRACON CONSULTANTS  
**Address:** 2020-E STARITA RD  
 CHARLOTTE, NC 28206

**Samples taken** Tuesday, August 15, 2017  
**Samples extracted** Tuesday, August 15, 2017  
**Samples analysed** Thursday, August 17, 2017

**Contact:** ALEX CHINERY

**Operator** PANTESCO

**Project:** # 71177323

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	
s	B-243-2	21.1	<1.1	0.91	8.7	9.6	4.2	0.46	<0.021	21.4	67.3	11.4	Road Tar 66%,(FCM)
s	B-212-1	22.0	<0.55	1.5	5.8	7.3	2.8	0.31	<0.022	38.7	49.5	11.8	Road Tar 76.8%,(FCM)
s	B-212-2	22.6	<0.57	<0.57	<0.57	<0.57	<0.11	<0.18	<0.023	0	100	0	PHC not detected,(BO)
s	B-155-1	21.5	<0.54	<0.54	<0.54	<0.54	<0.11	<0.17	<0.021	0	0	0	PHC not detected
s	B-155-2	26.3	<0.66	<0.66	<0.66	<0.66	<0.13	<0.21	<0.026	0	0	0	PHC not detected,(BO)

Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

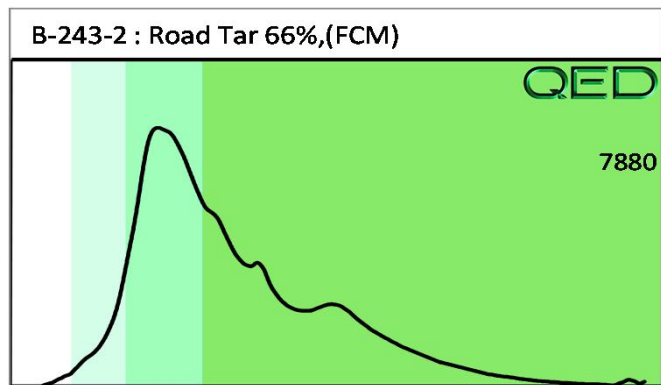
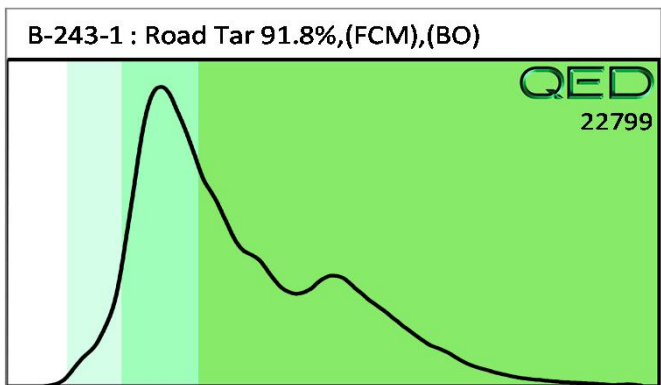
**97.6 %**

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**



Batch 52

Client Name: TERRACON CONSULTANTS  
 2020-E STRETTA ROAD  
 CHARLOTTE, NC 28206  
 Contact: ALEX CHINERY  
 Project Ref.: 71177323  
 Email: alex.chinery@terracon.com  
 Phone #: 704-509-1777  
 Collected by: ALEX CHINERY

# RED LAB™

RAPID ENVIRONMENTAL DIAGNOSTICS  
 CHAIN OF CUSTODY AND ANALYTICAL  
 REQUEST FORM

RED Lab, LLC  
 5598 Marvin K Moss Lane  
 MARBIONC Bldg, Suite 2003  
 Wilmington, NC 28409

Each sample will be analyzed for  
 BTEX, GRO, DRO, TPH, PAH total  
 aromatics and BaP

Sample Collection Date/Time	TAT Requested		Matrix (S/W)	Sample ID	UVF	GC BTEX	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour							
8/15/17 10:15		X	S	B-116-1	X		55.3	44.7	10.6
10:13		X	S	B-116-2	X		55.8	44.6	11.2
10:10		X	S	B-116-3	X		57.9	44.7	13.2
10:03		X	S	B-116-4	X		57.3	44.6	12.7
10:55		X	S	B-116-5	X		58.2	45.5	12.7
10:58		X	S	B-116-6	X		58.4	44.9	13.5
11:02		X	S	B-116-7	X		56.9	44.2	12.7
12:35		X	S	B-244-1	X		57.0	44.4	12.6
12:38		X	S	B-244-2	X		48.3	44.5	3.8
12:42		X	S	B-243-1	X		57.8	44.4	13.4
12:55		X	S	B-243-2	X		56.4	44.1	12.3
15:30		X	S	B-212-1	X		56.3	44.5	11.8
15:33		X	S	B-212-2	X		56.4	44.7	11.5
15:56		X	S	B-155-1	X		57.0	44.9	12.1
15:59		X	S	B-155-2	X		54.8	44.7	9.9

Comments:

Relinquished by: Alex Chinery Date/Time: 8/17 11:30

Relinquished by: TERRACON Date/Time: 8/17 11:30

Accepted by: NTF Date/Time: 8/17 11:30

Accepted by: NTF Date/Time: 8/17 11:30

RED Lab USE ONLY

(15)