

Preliminary Site Assessment

**US 401 (Raeford Road) from West Hampton Oaks Drive to East of
Fairway Drive in Fayetteville**

**Parcel 265 – M.M. Fowler, Inc. Property
3215 Raeford Road, Fayetteville, North Carolina**

State Project No. U-4405

WBS Element: 39049.1.1

December 16, 2016

Terracon Project No. 70167490



Prepared for:

North Carolina Department of Transportation
Raleigh, North Carolina

Prepared by:

Terracon Consultants, Inc.
Raleigh, North Carolina

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

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December 16, 2016

North Carolina Department of Transportation
Attention: Mr. Terry W. Fox, LG,
GeoEnvironmental Engineering Unit
Century Center Complex
Building B
1020 Birch Ridge Road
Raleigh, North Carolina 27610

Re: Preliminary Site Assessment (PSA)
US 401 (Raeford Road) from West Hampton Oaks Drive to East of Fairway Drive in
Fayetteville
Parcel 265 – M.M. Fowler Inc. Property
3215 Raeford Road, Fayetteville, North Carolina
State Project No. U-4405
WBS Element: 39049.1.1

Dear Mr. Fox:

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. P70167490) dated September 27, 2016. 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. 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:

Ethan H. Smith
Field Geologist

Reviewed by:

Michael T. Jordan, P.G.
Environmental Department Manager

Terracon Consultants, Inc. 2401 Brentwood Road, Suite 107 Raleigh, NC 27604
P [919] 873 2211 F [919] 873 9555 terracon.com

Environmental



Facilities



Geotechnical



Materials

PRELIMINARY SITE ASSESSMENT

US 401 (RAEFORD ROAD) FROM WEST HAMPTON OAKS DRIVE TO EAST OF FAIRWAY
DRIVE IN FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA
STATE PROJECT NO. U-4405
WBS ELEMENT: 39049.1.1
PARCEL 265 – M.M. FOWLER INC. PROPERTY
3215 RAEFORD ROAD, FAYETTEVILLE, NORTH CAROLINA

1.0 INTRODUCTION

1.1 Site Description

Site Name	US 401 (Raeford Road) from West Hampton Oaks Drive to East of Fairway Drive in Fayetteville
Site Location/Address	3215 Raeford Road, Fayetteville, NC 28303 (Cumberland County Tax PIN: 0417-90-6917)
General Site Description	The site consists of a one-story commercial building that is currently operated as a BP Gas Station. The site is further improved with a paved access drive, parking areas, and pump islands.

1.2 Site History

The site is located at 3215 Raeford Road in Fayetteville, Cumberland County, North Carolina. At the time of the Preliminary Site Assessment (PSA), the site was operating as a BP gas station. This facility is listed as currently operating two (2) underground storage tanks (USTs) (NCDOT, 2016). According to the North Carolina Department of Environmental Quality (NCDEQ) – Division of Waste Management UST Section Registered Tank Database, the facility operates one 10,000-gallon gasoline UST and one 6,000-gallon gasoline UST reportedly installed in February 1990. Eight USTs have been removed from the site; seven USTs were removed from the site in 1989 and one other UST was removed in 1997. Groundwater incident #5707 was assigned to this property in February 1990 and was closed out in August 2007. However, during the assessment activities, groundwater monitoring wells were observed on the property. The observed monitoring wells did not appear to fall within the NCDOT right-of-way (ROW).

1.3 Scope of Work

Terracon conducted the following PSA scope of work (SOW) in accordance with Terracon's Proposal for PSA (Proposal No. P70167490) dated September 27, 2016. This PSA is being completed prior to planned median improvements and lane widening along US 401 (Raeford

Preliminary Site Assessment

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December 16, 2016 ■ Terracon Project No. 70167490



Road) in Fayetteville, North Carolina (site). The scope of work included a geophysical investigation, collection of five soil samples, and preparation of a report documenting our investigation activities. The PSA is not intended to delineate potential impacts. The PSA was performed within the proposed ROW as indicated by NCDOT provided plan sheets.

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 our proposal for PSA (Terracon Proposal No. P70167490) dated September 27, 2016 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 Fayetteville, NC 1997. **Exhibit 2** is a site layout plan that indicates the approximate locations of the site features, soil boring locations, and analytical results.

2.1 Geophysical Survey

On October 20, October 27, and November 8, 2016, Geophysical Survey Investigations, PLLC conducted a geophysical investigation at the site in an effort to determine if unknown, metallic USTs were present beneath the proposed ROW area. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM61-MK2A metal detection instrument and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-3000 unit.

The geophysical investigation revealed three known metallic USTs across the survey area within the depth interval of 0 to 6 feet below land surface (bls). The USTs occur outside of the existing and proposed ROW, but inside of the proposed public utility easement (PUE). In addition to metal detection and GPR scans, NC One Call public utility locator identified several underground utility lines. 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 four soil borings (SB-42 through SB-45) along the northern and western portion of Parcel 265 and within the NCDOT ROW. One of the proposed five soil borings could not be safely advanced in the proposed location due to high traffic and a high density of subsurface utilities in that area and therefore was omitted. The borings were completed by a North Carolina Certified Well Contractor (Regional Probing Services) using a truck-mount Geoprobe® 5410 direct-push drill rig.

Soil samples were collected in 4-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 less than 0.1 to 7.0 parts per million (ppm).

Preliminary Site Assessment

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December 16, 2016 ■ Terracon Project No. 70167490



Based on the proposed disturbance depths and discussion with the NCDOT, each of the soil borings was advanced to a depth of approximately 15 feet bls. Four soil samples, one from each boring, were collected from depths ranging between 5 to 15 feet bls and placed in laboratory provided sample containers and shipped to REDLAB/QROS, LLC – Environmental Testing for analysis by UVF. Soil samples were collected in the depth interval that was most likely to be impacted.

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) was containerized in a 55-gallon DOT approved drum. The drum was staged beside the dumpster north of the Dunkin Donuts located at 2628 Raeford Road, Fayetteville, NC 28303 (Dunkin Donuts contact - Matt Ellsworth [910-920-1992] for subsequent disposal by the NCDOT).

Soil generally consisted of clay and sandy clay. Groundwater was not encountered in the four 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.

3.0 LABORATORY ANALYSES

Soil samples were submitted to QROS for analysis of the following:

- TPH-gasoline range organics (C₅-C₁₀) (GRO);
- TPH-diesel range organics (C₁₀-C₃₅) (DRO);
- Total petroleum hydrocarbons (C₅-C₃₅) (TPH);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX);
- Total aromatics (C₁₀-C₃₅);
- 16 EPA Polycyclic Aromatic Hydrocarbons (16 EPA PAHs); and
- Benzo(a)pyrene (BaP).

Please refer to **Appendix C** for the laboratory analytical reports.

4.0 DATA EVALUATION

4.1 Soil Analytical Results

Laboratory analysis reported the following detections above the laboratory reporting limits in soil borings SB-42 through SB-45:

- TPH-GRO (C₅-C₁₀) was not detected above laboratory reporting limits;

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- TPH-DRO (C₁₀-C₃₅) was reported between 1.9 and 2.8 milligrams per kilogram (mg/kg);
- TPH (C₅-C₃₅) was reported between 1.9 and 2.8 mg/kg;
- BTEX was not detected above laboratory reporting limits;
- Total aromatics (C₁₀-C₃₅) was reported between 1.3 and 1.6 mg/kg;
- 16 EPA PAHs was reported between 0.07 and 0.18 mg/kg; and
- BaP was not detected above laboratory reporting limits.

Laboratory analysis revealed that concentrations were not detected above the NCDEQ Action Levels for TPH in soil borings SB-42 through SB-45.

Table 1 summarizes the results of the analyses of the soil samples. **Exhibit 2** depicts the boring locations and detected compounds.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this investigation are discussed below.

- The geophysical investigation revealed three known metallic USTs across the survey area within the depth interval of 0 to 6 feet bls. The USTs occur outside of the existing and proposed ROW, but inside of the proposed public utility easement (PUE).
- Laboratory analysis reported that concentrations were not detected above the NCDEQ Action Levels for TPH in soil borings SB-42 through SB-45.
- Terracon recommends NCDOT provide a copy of the results to the owner and/or operator of the site.
- If USTs may be disturbed during construction activities, Terracon recommends that the USTs be abandoned.
- Terracon does not recommend further assessment of the ROW at this site. However, based on detections of petroleum compounds, construction workers should be alert for potential soil and/or groundwater impacts in other locations at the site.

Preliminary Site Assessment

Parcel 265– M.M. Fowler, Inc. Property ■ Fayetteville, North Carolina
December 16, 2016 ■ Terracon Project No. 70167490



6.0 REFERENCES

NCDOT, 2016. Revised GeoEnvironmental Report for Preliminary Site Assessments. “Hazardous Material Report.” August 30, 2016.

TABLES

Table 1
Summary of Soil Analytical Results
Preliminary Site Assessment
Parcel 265 - M.M. Fowler, Inc. Property
Fayetteville, Cumberland County, North Carolina
Terracon Project No. 70167490

Sample ID:	SB-42	SB-43	SB-44	SB-45	NCDEQ Action Level	MSCC Industrial/Commercial
Sample Depth (ft bls):	13-15	5-7	5-7	13-15		
GRO (C ₅ -C ₁₀)	<0.38	<0.97	<1.2	<0.16	100	NE
DRO (C ₁₀ -C ₃₅)	<0.38	1.9	2.8	<0.16	100	NE
TPH (C ₅ -C ₃₅)	<0.38	1.9	2.8	<0.16	NE	NE
BTEX	<0.38	<0.97	<1.2	<0.16	NE	NE
Total Aromatics (C ₁₀ -C ₃₅)	<0.08	1.6	1.3	<0.03	NE	NE
16 EPA PAHs	<0.01	0.18	0.07	<0.005	NE	NE
Benzo(a)pyrene	<0.002	<0.004	<0.005	<0.001	NE	0.78

Notes:

Soil samples were collected on November 10, 2016.

Detected compounds are shown in the table.

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

ft bls - feet below land surface.

GRO - Gasoline Range Organics.

DRO - Diesel Range Organics.

TPH - Total Petroleum Hydrocarbons.

BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes.

16 EPA PAHs - Environmental Protection Agency Polycyclic Aromatic Hydrocarbons (acenaphthene, acenaphthylene, antracene, benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo[a]pyrene, chrysene, dibenz[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-c,d]pyrene, naphthalene, phenanthrene, pyrene).

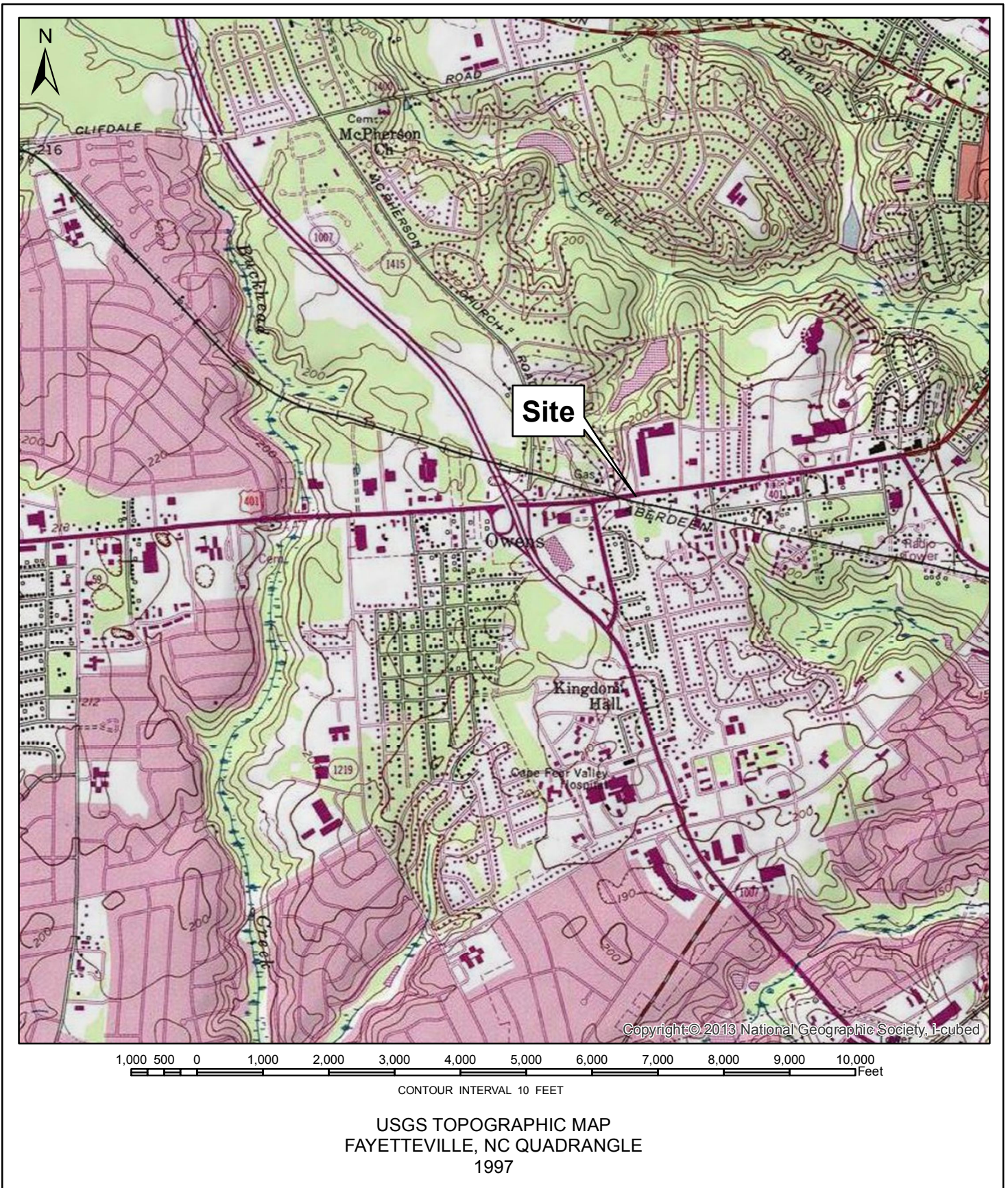
NE - Standard not established.

Detections shaded in gray exceed the North Carolina Department of Environmental Quality (NCDEQ) Action Level.

MSCC Industrial/Commercial - Maximum Soil Contaminant Concentration Levels Industrial/Commercial soil cleanup levels.

Bold: Constituent concentration reported above the method detection limit.

EXHIBITS



Project Number: 70167490
Scale: 1:24,000
Drawn By: EHS
Checked By: MTJ
Date Drawn: 11/21/16

Terracon

2401 Brentwood Road, Suite 107 Raleigh, NC 27604
Phone: (919) 873-2211 Fax: (919) 873-9555

Topographic Vicinity Map
U-4405 Parcel 265 - M.M. Fowler, Inc. Property 3215 Raeford Road Fayetteville, Cumberland County, NC

EXHIBIT NO.
1

- LEGEND**
- PROPERTY LINE
 - EXISTING RIGHT OF WAY LINE
 - PROPOSED RIGHT OF WAY LINE WITH IRON PIN AND CAP MARKER
 - PROPOSED EDGE OF TRAVEL
 - PROPOSED CONSTRUCTION EASEMENT
 - PUE - PROPOSED PERMANENT UTILITY EASEMENT
 - PROPOSED DRAINAGE PIPING
 - PROPOSED CATCH BASIN
 - F C - PROPOSED CUT / FILL LINE
 - ⊗ BORING LOCATION
 - APPROXIMATE LIMITS OF KNOWN UST

NOTES:

SOIL SAMPLES WERE COLLECTED ON NOVEMBER 10, 2016

DETECTED COMPOUNDS ARE SHOWN IN TABLE

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

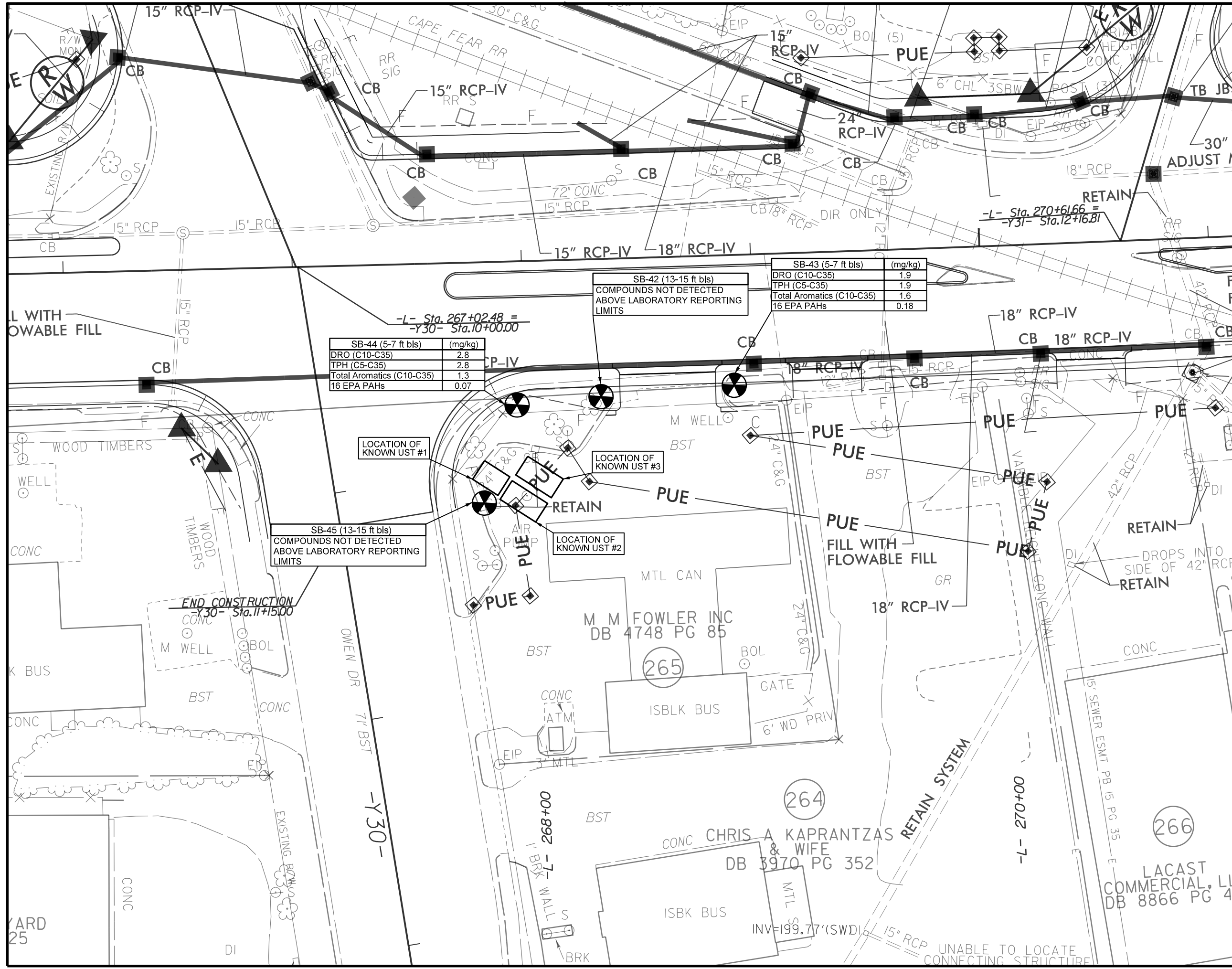
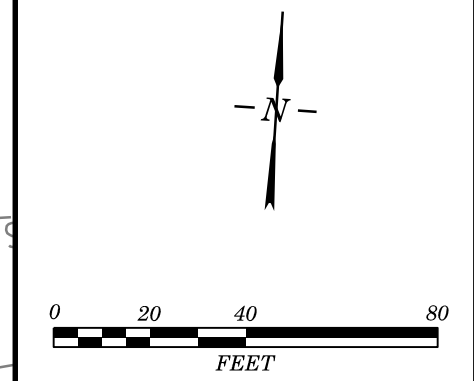
ft bls - FEET BELOW LAND SURFACE

GRO (C5-C10) - GASOLINE RANGE ORGANICS

DRO (C10-C35) - DIESEL RANGE ORGANICS

TPH (C5-C35) - TOTAL PETROLEUM HYDROCARBONS

16 EPA PAHs - ENVIRONMENTAL PROTECTION AGENCY POLYCYCLIC AROMATIC HYDROCARBONS



SB-44 (5-7 ft bls) (mg/kg)

DRO (C10-C35)	2.8
TPH (C5-C35)	2.8
Total Aromatics (C10-C35)	1.3
16 EPA PAHs	0.07

SB-42 (13-15 ft bls)

COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

SB-43 (5-7 ft bls) (mg/kg)

DRO (C10-C35)	1.9
TPH (C5-C35)	1.9
Total Aromatics (C10-C35)	1.6
16 EPA PAHs	0.18

SB-45 (13-15 ft bls)

COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

M M FOWLER INC
 DB 4748 PG 85

ISBLK BUS

CHRIS A KAPRANTZAS & WIFE
 DB 3970 PG 352

LACAST COMMERCIAL, LLC
 DB 8866 PG 49

APPENDIX A

GEOPHYSICAL SURVEY REPORT

Terracon Consultants, Inc.

**GEOPHYSICAL INVESTIGATION
TO LOCATE METALLIC USTS**

**M.M. Fowler, Inc. Property
(Parcel 265) 3215 Raeford Road
Fayetteville, North Carolina**



November 10, 2016

Geophysical Survey Investigations, PLLC Project No. 2016-37



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

Terracon Consultants, Inc.
GEOPHYSICAL INVESTIGATION
TO LOCATE METALLIC USTS
M.M. Fowler, Inc. Property
(Parcel 265) 3215 Raeford Road
Fayetteville, North Carolina

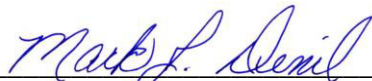
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FIGURES

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 Images Across Probable UST-1, UST-2 and UST-3

Report prepared for: Stephen J. Kerlin, PG
Terracon Consultants, Inc.
2401 Brentwood Road, Suite 107
Raleigh, North Carolina 27604

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 October 20, October 27 and November 8, 2016 across a portion of the M.M. Fowler, Inc. property (Parcel 265) located at 3215 Raeford Road in Fayetteville, North Carolina. The geophysical investigation was performed as part of the North Carolina Department of Transportation (NCDOT) preliminary site assessment for State Project U-4405 (WBS Element 39049.1.1) US 401 (Raeford Road) from West of SR-1409 to US 401 Business (Robeson Street).

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 ROW/PUE area is shown as a red polygon in the aerial photograph presented in **Figure 1**. Presently, the Owen Village BP gas station and convenient store operates on this property which has a large landscaped island consisting of dense bushes. The geophysical investigation could not be conducted across the landscaped island containing the bushes.

Terracon representative Mr. Stephen Kerlin, 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 265 has a maximum length and width of 150 feet and 140 feet, respectively. Please note that the ROW and PUE areas at this site were not marked 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 Trimble AG-114 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 Trackmaker61MK2 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 5.0 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 2258460-E 12729279-N, 2258482-E 12729299-N, 2258502-E 12729321-N, 2258525-E 12729325-N, and 2258553-E 12729327-N are probably in response to buried lines or conduits. The linear EM early time gate anomaly that intersects coordinates 2258484-E 12729327-N is probably in response to a metal landscape edging that runs along the perimeter of the landscaped (bushes) island.

GPR scanning suggest that the large, high amplitude, EM61 differential anomaly centered near coordinates 2258453-E 12729300-N is in response to three known (active) USTs (USTs-1, 2 and 3) oriented in a northwesterly-southeasterly direction. Based on the GPR data, UST-1, centered near coordinates 2258443-E 12729304-N, is approximately 11.0 feet long, 6.0 feet wide and buried 2.0 feet below present grade. Known UST-2, centered near coordinates 2258454-E 12729296-N, is approximately 19.0 feet long, 6.0 feet wide and buried 2.0 feet below present grade. UST-3 is centered near coordinates 2258459-E 12729302-N and is also approximately 19.0 feet long, 6.0 feet wide and buried 2.0 feet below present grade. Visible UST valve covers lie above each of the three USTs.

The three USTs lie immediately adjacent to or on the edge of the proposed ROW/PUE area. GPR images across the three known USTs and a photograph showing the location of the buried tanks are presented in **Figure 4**. The approximate foot prints of the three USTs, as defined by the GPR data, were marked in the field with orange marking paint.

The remaining EM61 anomalies are probably in response to known surface objects, buried miscellaneous objects or portions of conduits. Excluding the fore-mentioned three USTs and the area beneath the bushes (landscaped island), the EM61 and GPR investigation suggests the remaining proposed ROW/PUE area does not contain metallic USTs. Please refer to Figures 2, 3 and 4 for additional (detailed) information regarding the geophysical findings at this site.

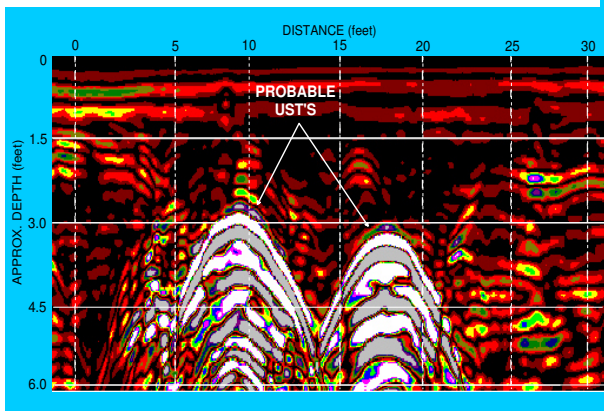
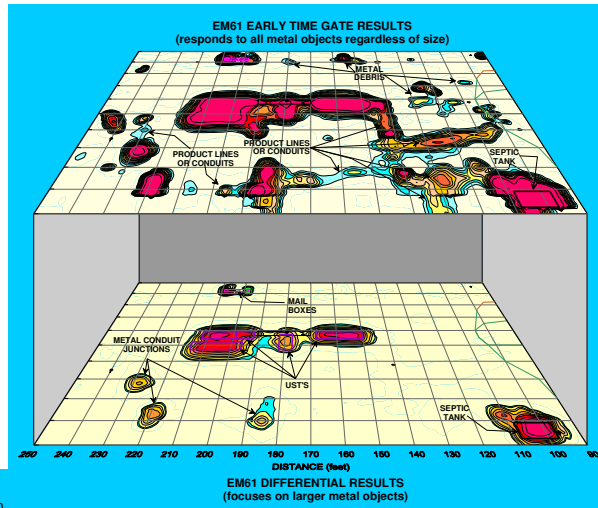
4.0 SUMMARY & CONCLUSIONS

Our evaluation of the EM61 and GPR data collected across the geophysical survey area at the M.M. Fowler, Inc. property (Parcel 265) located at 3215 Raeford Road in Fayetteville, 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 6 feet.
- The linear, EM61 early time gate anomalies intersecting UTM coordinates 2258460-E 12729279-N, 2258482-E 12729299-N, 2258502-E 12729321-N, 2258525-E 12729325-N, and 2258553-E 12729327-N are probably in response to buried lines or conduits.
- GPR scanning suggest that the large, high amplitude, EM61 differential anomaly centered near coordinates 2258453-E 12729300-N is in response to three known (active) USTs (UST's-1, 2 and 3) oriented in a northwesterly-southeasterly direction.
- Excluding the fore-mentioned three USTs, and the area beneath the landscaped (bushes) island, the EM61 and GPR investigation suggests the remaining proposed ROW/PUE area does not contain metallic USTs.

5.0 LIMITATIONS

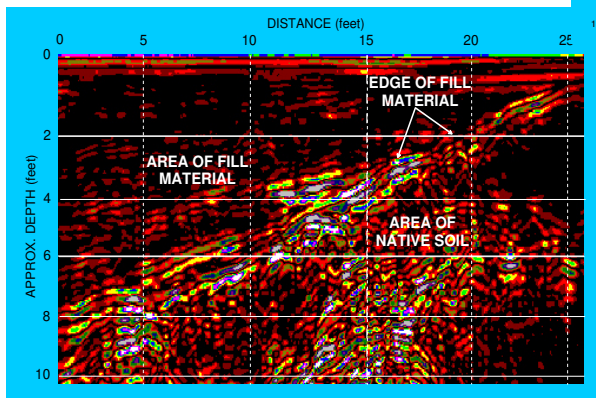
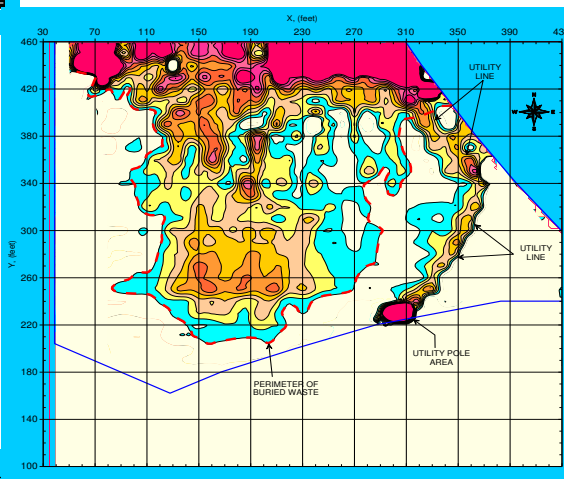
EM61 and GPR surveys have been performed and this report prepared for Terracon Consultants, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the geophysical surveys are non-unique and may not represent actual subsurface conditions. 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





DITCHWITCH UTILITY LOCATOR

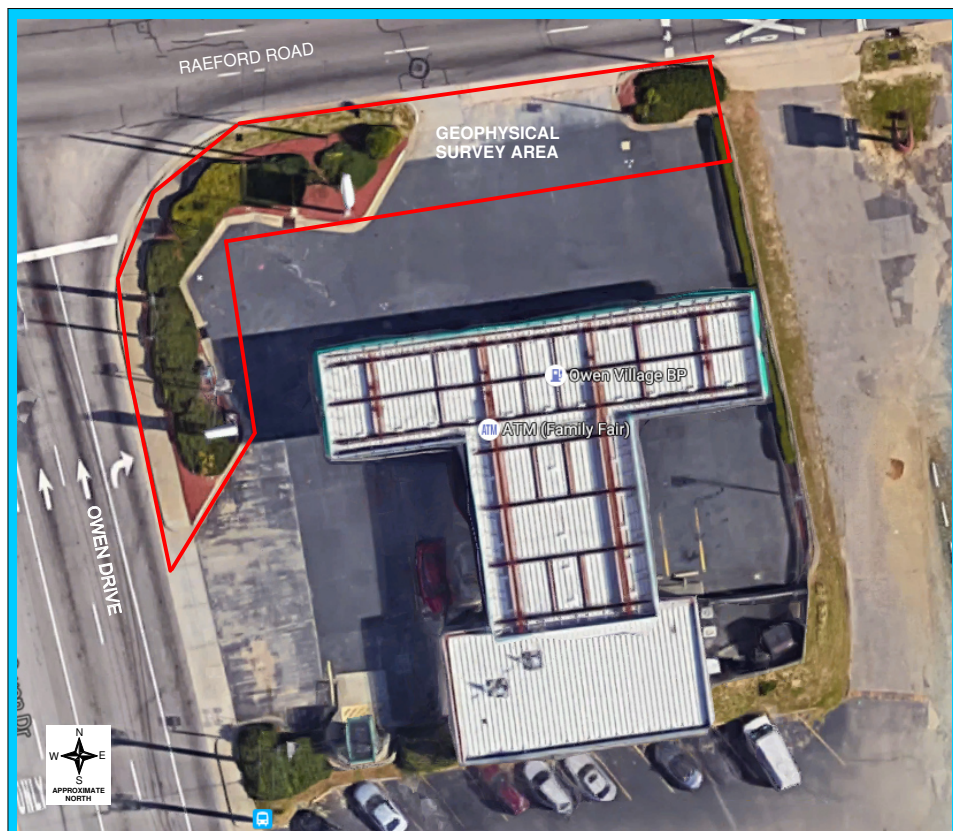


EM61 METAL DETECTOR

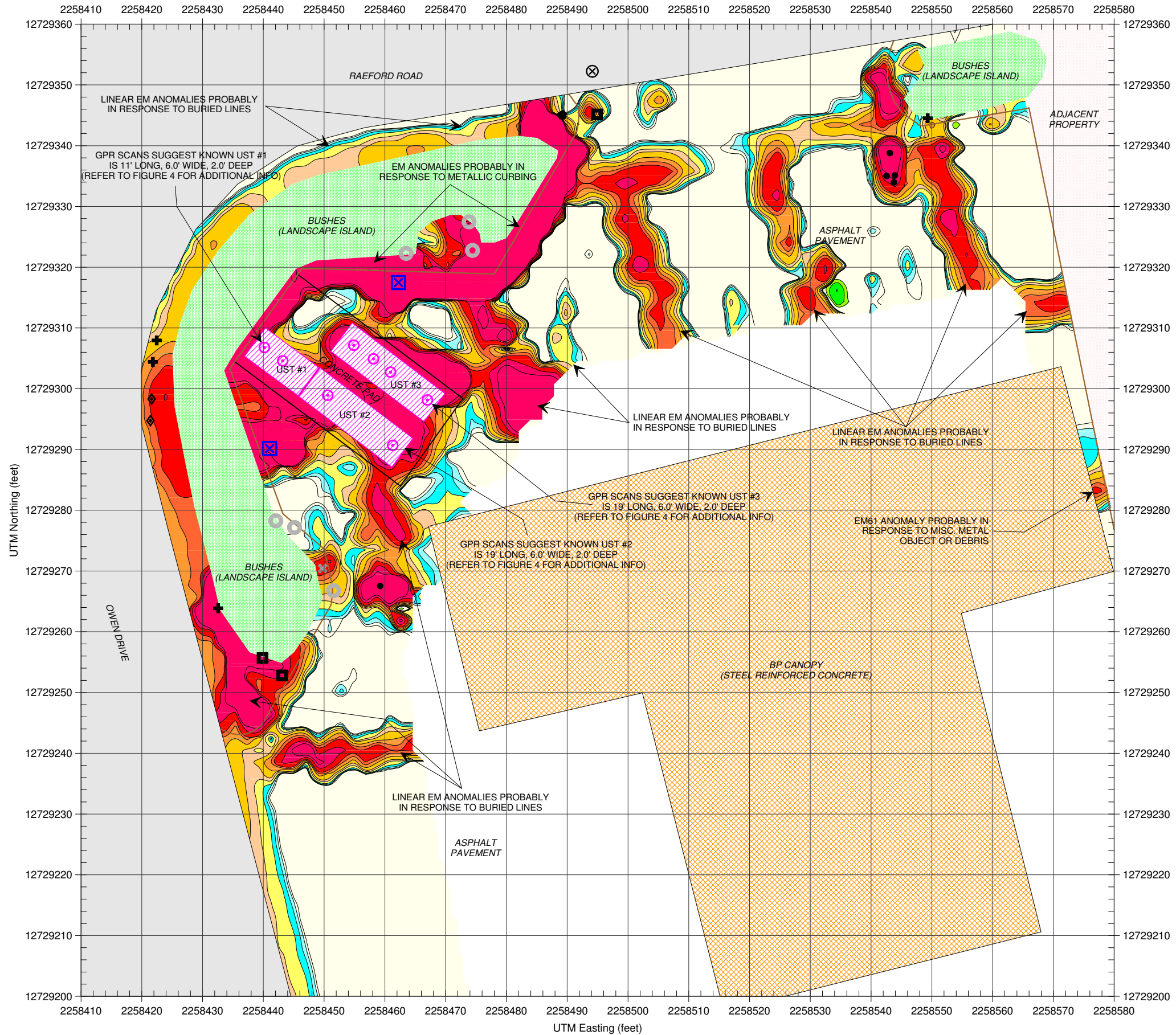


GROUND PENETRATING RADAR UNIT

The photographs show the DitchWitch 910 utility line locator, the Geonics EM61-MK2A metal detector and the GSSI SIR-3000 ground penetrating radar (GPR) unit that were used to conduct the geophysical investigation across the area of interest at Parcel 265.



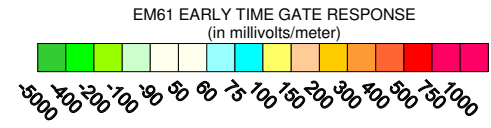
The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at the M.M. Fowler, Inc. property (Parcel 265) located along Raeford Road in Fayetteville, North Carolina.



The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 265.

LEGEND

	SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
	RAEFORD ROAD OR OWEN DRIVE
	MISC. METAL OBJECTS
	GUY WIRE
	UTILITY LINE RELATED BOXES
	METAL POLES
	STORM SEWER GRATE
	STORM SEWER COVER
	METAL SIGN
	UTILITY POLE
	MONITORING WELL COVER
	UST COVER
	CONCRETE AND METAL CURBING
	UNDERGROUND STORAGE TANK (UST)



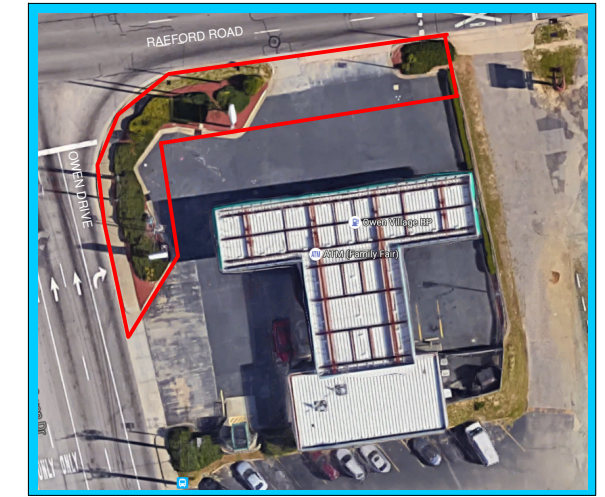
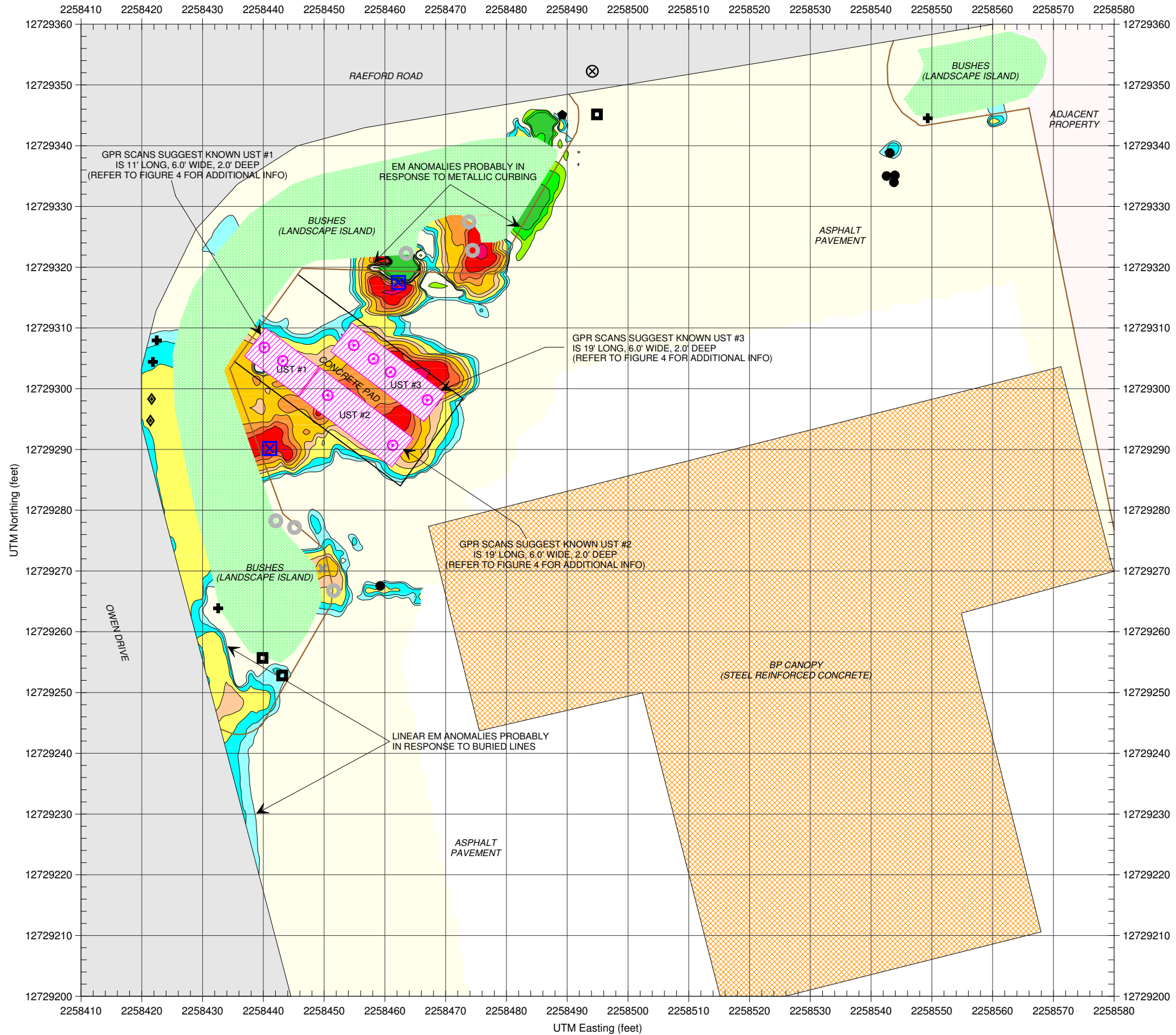
The contour plot shows the early time gate (most sensitive) response of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The early time gate response shows buried, metallic objects regardless of size. The EM61 survey was conducted on October 20, 2016. Ground penetrating radar (GPR) scans were conducted across selected EM61 anomalies and areas containing reinforced concrete on October 27, 2016 using a Geophysical Survey Systems SIR 3000 instrument with a 400 MHz antenna.



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

Terracon Consultants, Inc.
M.M. Fowler, Inc. Property
Parcel 265
Fayetteville, North Carolina

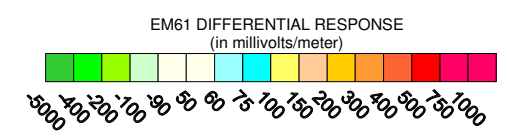




The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 265.

LEGEND

- SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
- RAEFORD ROAD OR OWEN DRIVE
- x MISC. METAL OBJECTS
- + GUY WIRE
- UTILITY LINE RELATED BOXES
- METAL POLES
- ⊠ STORM SEWER GRATE
- ⊗ STORM SEWER COVER
- ◆ METAL SIGN
- UTILITY POLE
- ◉ MONITORING WELL COVER
- UST COVER
- CONCRETE AND METAL CURBING
- UNDERGROUND STORAGE TANK (UST)



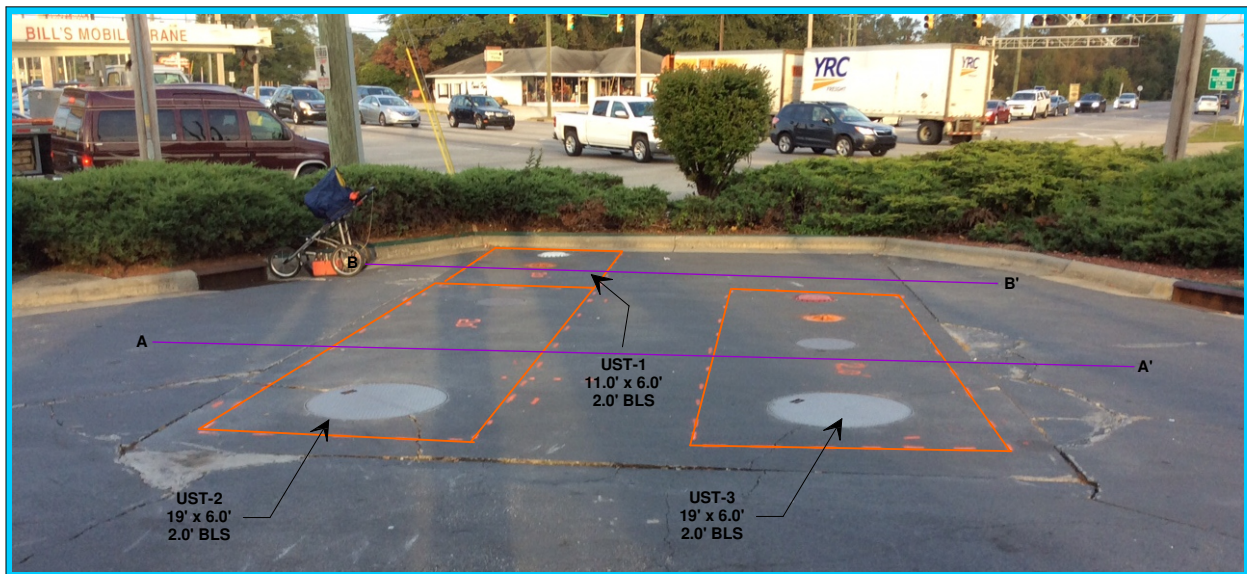
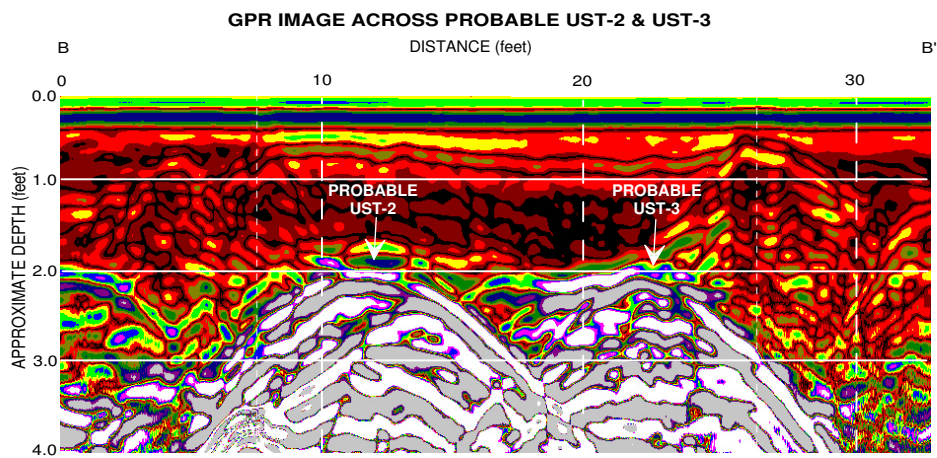
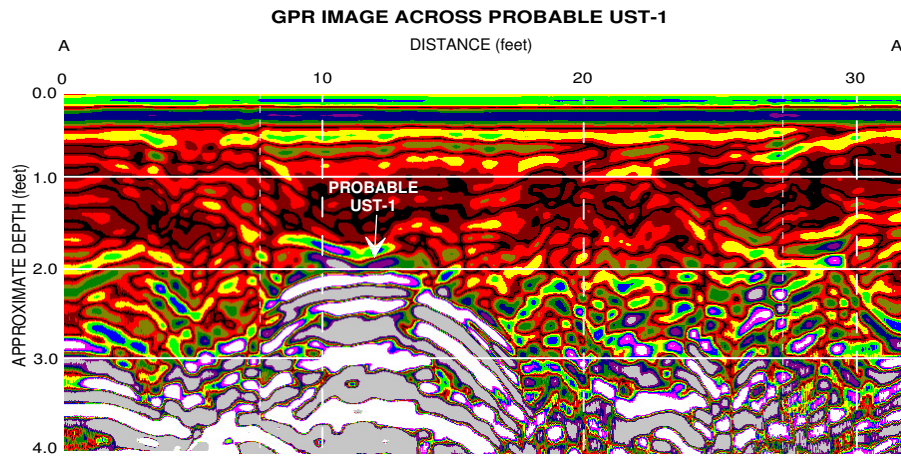
Note: The contour plot shows the differential response between the top coil and the late time gate channel of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The differential response focuses on larger, buried, metallic objects such as drums and USTs and ignores smaller miscellaneous, buried, metal debris. The EM61 survey was conducted on October 20, 2016. Ground penetrating radar (GPR) scans were conducted across selected EM61 anomalies and areas containing reinforced concrete on October 27, 2016 using a Geophysical Survey Systems SIR 3000 unit with a 400 MHz antenna.



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

Terracon Consultants, Inc.
M.M. Fowler, Inc. Property
Parcel 265
Fayetteville, North Carolina





The orange rectangles in the photograph represent the approximate foot prints of probable (active) USTs - 1, 2 and 3 that are located along the edge of the ROW/PUE area at parcel 265. Based on the GPR data, UST-1 is approximately 11.0 feet long, 6.0 feet. UST-2 and UST-3 are approximately 19 feet long, 6.0 feet wide. All three USTs lie 2.0 feet below present grade. The solid purple lines in the photograph labeled AA' and BB' represent the approximate locations of GPR images AA' and BB' shown above. The photograph is viewed in a northwesterly direction.

APPENDIX B

SOIL BORING LOGS

Lithology Log



Boring ID: SB-42

Project Number: 70167490		Start Date/Time: 11/10/16 1400		Sample Method		Drilling Method					
Site Location: Fayetteville, NC		End Date/Time: 11/10/16 1410		<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT						
Weather: 60, sunny		Boring Diameter: 2"		<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA						
Logged By: EHS		Total Depth: 15 fbls		<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary						
Drilling Sub: Regional Probing Services		Water Level: NA		<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary						
Drill Rig: SIMCK Mount Geoprobe 5410		Well Installed: NA		<input type="checkbox"/> Rock Core							
Depth (ft bls)	Recovery (inches)	Blow Counts (n)	PID ppm/ppb	CH ₄	CO ₂	O ₂	H ₂ S	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-1	12 1/2	-	<0.1					SM	(0-1) SAND. tan/orag/brown. moist		
1-3	12 24/24	-	<0.1					SM	(1-3) SAA		
3-5	24 24/24	-	<0.1					SM/CL	(3-4) SAA (4-5) CLAY. red/orange. moist.		
5-7	24 24/24	-	<0.1					CL	(5-7) SAA		
7-9	24 24/24	-	<0.1					CL	(7-9) SAA		
9-11	24 24/24	-	<0.1					CL	(9-11) SAA		
11-13	24 24/24	-	<0.1					CL	(11-13) SAA		
13-15	24 24/24	-	<0.1					CL	(13-15) SAA	sample QRO5 at 1415	
Boring terminated at 15 fbls											

Notes:

ppm: parts per million ppb: parts per billion NA= Not applicable bls = below land surface

Lithology Log



Boring ID: SB-43

Project Number: 70167490		Start Date/Time: 11/10/16 1430		Sample Method		Drilling Method					
Site Location: Fayetteville, NC		End Date/Time: 11/10/16 1440		<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT						
Weather: W, Sunny		Boring Diameter: 2"		<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA						
Logged By: EHS		Total Depth: 15 RLS		<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary						
Drilling Sub: Regional Probing Services		Water Level: Na		<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary						
Drill Rig: Truck Mount Geoprobe 5410		Well Installed: No		<input type="checkbox"/> Rock Core							
Depth (ft bls)	Recovery (inches)	Blow Counts (n)	PID ppm / ppb	CH ₄	CO ₂	O ₂	H ₂ S	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-1	12/12	-	<0.1					SM	(0-1) SAND + CONCRETE, tan orange, moist		
1-3	24/24	-	<0.1					SM	(1-3) SAND, tan/brown, moist, coarse-grained		
3-5	24/24	-	<0.1					SM	(3-5) SAA		
5-7	24/24	-	<0.1					CL	(5-7) CLAY, red/brown, fair, moist	Sample AR05 at 1445	
7-9	24/24	-	<0.1					CL	(7-9) SAA		
9-11	24/24	-	<0.1					CL	(9-11) SAA		
11-13	24/24	-	<0.1					SC	(11-13) SANDY CLAY, orange/tan, moist		
13-15	24/24	-	<0.1					SC	(13-15) SAA		
Boring terminated at 15 ft bls											

Notes:

ppm: parts per million

ppb: parts per billion

NA= Not applicable

bls = below land surface

Lithology Log



Boring ID: SB-44

Project Number: 70167490		Start Date/Time: 11/10/16 1450		Sample Method		Drilling Method					
Site Location: Fayetteville, NC		End Date/Time: 11/10/16 1500		<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT						
Weather: 50, SUNNY		Boring Diameter: 2"		<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA						
Logged By: EHS		Total Depth: 15 fbls		<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary						
Drilling Sub: Regional Probing Services		Water Level: NA		<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary						
Drill Rig: TRUCK MOUNT Geoprobe 5410		Well Installed: No				<input type="checkbox"/> Rock Core					
Depth (ft-bls)	Recovery (inches)	Blow Counts (n)	PID ppm/ppb	CH ₄	CO ₂	O ₂	H ₂ S	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-1	12/24	-	<0.1					SM	(0-1) SAND, tan/brown, moist, coarse.		↑
1-3	24/24	-	<0.1					SM	(1-3) SAA		
3-5	24/24	-	1.1					SM	(3-5) SAA		UST
5-7	24/24	-	7.0					SM	(5-7) SAA	sample Q205 at 1505	↑
7-9	24/24	-	4.3					SM	(7-9) SAA		Backfill for
9-11	24/24	-	2.5					SM	(9-11) SAA		↓
11-13	24/24	-	6.1					SM	(11-13) SAA		
13-15	24/24	-	1.2					CL	(13-15) CLAY, sand, tan/red, moist		
Boring terminated at 15 fbls											

Notes:

Lithology Log

Boring ID: SB-45



Project Number: 70167490		Start Date/Time: 1/10/16 1515		Sample Method		Drilling Method					
Site Location: Fayetteville, NC		End Date/Time: 1/10/16 1525		<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT						
Weather: 50, sunny		Boring Diameter: 2"		<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA						
Logged By: EHS		Total Depth: 15 fbbls		<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary						
Drilling Sub: Regional Probing Services		Water Level: NA		<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary						
Drill Rig: Truck Mount Geoprobe 5410		Well installed: No		<input type="checkbox"/> Rock Core							
Depth (ft bbls)	Recovery (inches)	Blow Counts (n)	PID ppm / ppb	CH ₄	CO ₂	O ₂	H ₂ S	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-1	12/12	-	<0.1					SM	(0-1) SAND, tan/brown, moist		
1-3	24/24	-	<0.1					SM	(1-3) SAA		
3-5	24/24	-	<0.1					CL	(3-5) CLAY, red, stiff, moist		
5-7	24/24	-	<0.1					CL	(5-7) SAA		
7-9	24/24	-	<0.1					CL	(7-9) SAA		
9-11	24/24	-	<0.1					CL	(9-11) SAA		
11-13	24/24	-	<0.1					CL	(11-13) SAA except tan		
13-15	24/24	-	<0.1					CL	(13-15) SAA	sample at 1530	
Boring terminated at 15 fbbls											

Notes:

ppm: parts per million

ppb: parts per billion

NA= Not applicable

bbls = below land surface

APPENDIX C

LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORMS



Hydrocarbon Analysis Results

Client: TERRACON
Address: 2401 BRENTWOOD ROAD
 RALEIGH NC

Samples taken Tuesday, November 8, 2016
Samples extracted Tuesday, November 8, 2016
Samples analysed Monday, November 14, 2016

Contact: STEVE KERLIN

Operator HENDRIX

Project: #70167490

										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
										% light	% mid	% heavy	
s	SB-33	8.8	<0.22	<0.22	<0.22	<0.22	<0.04	<0.007	<0.001	0	0	100	Residual.PHC (P)
s	SB-34	40.0	<1	<1	1	1	<0.31	<0.03	<0.004	0	41.3	58.7	V.Deg.PHC (FCM) (P) 56.1%
s	SB-35	56.5	<1.4	<1.4	4	4	3.3	0.38	0.012	0	60	40	Deg.PHC (FCM) (P) 44.6%
s	SB-36	43.3	<1.1	<1.1	6.1	6.1	5.2	0.29	0.022	0	65.9	34.1	Deg Fuel (FCM) (P) 44.3%
s	SB-37	22.6	<0.56	<0.56	2.1	2.1	1.9	0.19	<0.002	0	75.9	24.1	Deg.PHC (FCM) 68.4%
s	SB-38	8.8	<0.22	<0.22	<0.22	<0.22	<0.04	<0.007	<0.001	0	0	0	PHC not detected
s	SB-39	8.5	<0.21	<0.21	<0.21	<0.21	<0.04	<0.007	<0.001	0	0	0	PHC not detected
s	SB-40	8.2	<0.2	<0.2	<0.2	<0.2	<0.04	<0.007	<0.001	0	0	100	Residual.PHC (P) (BO)
s	SB-41	16.7	<0.42	<0.42	<0.42	<0.42	<0.08	<0.01	<0.002	0	0	0	PHC not detected (OCR)
s	SB-42	15.4	<0.38	<0.38	<0.38	<0.38	<0.08	<0.01	<0.002	0	0	0	PHC not detected (OCR)
			Initial Calibrator QC check				OK	Final FCM QC Check				OK	109.3 %

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content
 Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library
 (SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present



Hydrocarbon Analysis Results

Client: TERRACON
Address: 2401 BRENTWOOD ROAD
 RALEIGH NC

Samples taken Tuesday, November 8, 2016
Samples extracted Tuesday, November 8, 2016
Samples analysed Monday, November 14, 2016

Contact: STEVE KERLIN

Operator HENDRIX

Project: #70167490

											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
										% light	% mid	% heavy	
s	SB-43	38.8	<0.97	<0.97	1.9	1.9	1.6	0.18	<0.004	0	65.1	34.9	Residual.PHC (FCM) (P) 55.5%
s	SB-44	49.1	<1.2	<1.2	2.8	2.8	1.3	0.07	<0.005	0	68.7	31.3	Residual.PHC (FCM) 48.9%
s	SB-45	6.2	<0.16	<0.16	<0.16	<0.16	<0.03	<0.005	<0.001	0	0	0	Residual.PHC
s	SB-46	39.4	<0.98	<0.98	1.5	1.5	0.93	0.05	0.004	0	33	67	Deg.PHC (FCM) (P) 55.5%
s	SB-47	8.0	<0.2	<0.2	0.2	0.2	<0.04	<0.006	<0.001	0	10	90	Residual.PHC (FCM) (P) (BO) 39.3%
s	SB-48	7.1	<0.18	<0.18	0.32	0.32	<0.04	<0.006	<0.001	0	0	100	Residual.PHC (FCM) (P) 50.5%
s	SB-49	8.5	<0.21	<0.21	<0.21	<0.21	<0.04	<0.007	<0.001	0	0	0	Residual.PHC
s	SB-50	9.5	<0.48	<0.24	<0.24	<0.24	<0.05	<0.008	<0.001	0	0	0	Residual.PHC
s	SB-51	47.3	<1.2	<1.2	<1.2	<1.2	<0.24	<0.04	<0.005	0	15	85	Residual.PHC (P) (BO)
s	SB-52	7.3	<0.18	<0.18	0.32	0.32	0.28	0.03	<0.001	0	51.9	48.1	Residual.PHC (FCM) (P) 39.6%
			Initial Calibrator QC check				OK	Final FCM QC Check				OK	93.9 %

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content
 Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library
 (SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

Batch 22

Client Name: TENNCO
 Address: 2401 Brentwood Road Raleigh, NC
 Contact: Steve Kellin
 Project Ref.: 70167490
 Email: Steve.Kellin@Tennco.com
 Phone #: (919) 802-5091
 Collected by: Edmon Smith

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 Bar

Sample Collection Date/Time	TAT Requested 24 Hour	48 Hour	Matrix (S/W)	Sample ID	UVF	GC BTEX	Total Wt.	Tare Wt.	Sample Wt.
11/10 0855		✓	S	SR-33	✓		49.9	44.6	5.3
11/10 0915				SR-34			52.0	45.5	6.5
11/10 0940				SR-35			49.2	44.6	4.6
11/10 1025				SR-36			51.1	45.1	6.0
11/10 1045				SR-37			51.7	45.5	6.2
11/10 1115				SR-38			49.9	44.6	5.3
11/10 1135				SR-39			50.1	44.6	5.5
11/10 1210				SR-40			50.5	44.8	5.7
11/10 1235				SR-41			51.5	45.5	6.0
11/10 1415				SR-42			51.6	45.1	6.5
11/10 1445				SR-43			51.4	44.7	6.7
11/10 1505				SR-44			50.5	45.2	5.3
11/10 1530				SR-45			52.3	44.8	7.5
11/10 1620				SR-46			51.4	44.8	6.6
11/10 1645				SR-47			51.9	46.1	5.8
11/10 1710				SR-48			52.0	45.4	6.6
11/10 1738				SR-49			50.8	45.3	5.5
11/10 0835				SR-50			51.0	44.7	6.3
11/10 0900				SR-51			50.2	44.7	5.5
11/10 0930				SR-52			51.4	45.0	6.4

Comments:

Relinquished by: Edmon Smith Date/Time: 11/16/10 10:5

Relinquished by: _____ Date/Time: _____

Accepted by: Edmon Smith Date/Time: 11.14.16 0900

Accepted by: _____ Date/Time: _____

RED Lab USE ONLY

(20)