



SUPPLEMENTAL PRELIMINARY SITE ASSESSMENT

HOKE SMITH TRUST PROPERTY (PARCEL #12)

6586 US Highway 401

Kipling, NC

State Project: R-5523

WBS Element: 45548.1.1

F&R Project #66R-3222

July 14, 2014

Prepared for:

North Carolina Department of Transportation

Geotechnical Engineering Unit

1020 Birch Ridge Drive

Raleigh, NC 27610



FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

310 Hubert Street
Raleigh, North Carolina 27603-2302
T 919.828.3441 | F 919.828.5751
NC License #F-0266

July 14, 2014

**North Carolina Department of Transportation
Geotechnical Engineering Unit**
1020 Birch Ridge Drive
Raleigh, North Carolina 27610

Attn.: Mr. Craig Haden
GeoEnvironmental Project Manager

Re: State Project: R-5523
WBS Element: 45548.1.1
Realignment of Harnett Central Road at US 401 and Extension of
Smith Road (SR 1575)

**Subject: Supplemental Preliminary Site Assessment
Hoke Smith Trust Property (Parcel #12)
6586 US Hwy 401
Kipling, North Carolina
F&R Project #66R-3222**

Dear Mr. Haden:

Froehling and Robertson, Inc. (F&R) has completed the authorized Supplemental Preliminary Site Assessment at the Hoke Smith Trust Property in Kipling, North Carolina. The work was performed in general accordance with F&R's Supplemental Proposal No. 1466-00642, dated June 12, 2014. Notice to Proceed was issued to F&R on June 18, 2014. This report documents our field activities, presents the results of laboratory analysis and provides recommendations regarding the property.

Please do not hesitate to contact us if you should have any questions regarding this report.

Sincerely,

FROEHLING & ROBERTSON, INC.

Benjamin A. Whitley, P.E.
Project Engineer

Christopher J. Burkhardt
Senior Environmental Professional



TABLE OF CONTENTS

	<u>PAGE</u>
1.0 INTRODUCTION.....	1
2.0 GEOPHYSICAL SURVEY.....	2
3.0 SITE ASSESSMENT ACTIVITIES.....	2
4.0 SUBSURFACE CONDITIONS.....	3
5.0 ANALYTICAL RESULTS.....	3
6.0 CONCLUSIONS AND RECOMMENDATIONS.....	4
7.0 LIMITATIONS.....	5
APPENDIX I	FIGURE No. 1 – Site Vicinity Map FIGURE No. 2 – Topographic Map FIGURE No. 3 – Laboratory Results & Boring Location Plan
APPENDIX II	GEOPHYSICAL REPORT PREPARED BY SCHNABEL ENGINEERING
APPENDIX III	GEOPROBE LOGS
APPENDIX IV	SITE PHOTOS
APPENDIX V	LABORATORY ANALYTICAL RESULTS



**Supplemental Preliminary Site Assessment Report
Hoke Smith Trust Property (Parcel #12)
Kipling, Harnett County, North Carolina
F&R Project No. 66R-3222**

1.0 Introduction

Froehling and Robertson, Inc. (F&R) has prepared this Supplemental Preliminary Site Assessment Report (PSA) to document additional soil assessment activities performed at the Hoke Smith Trust Property (currently undeveloped land) addressed as 6586 US Highway 401 in Kipling, Harnett County, North Carolina. The site is located on the east side of US Highway 401, on the north and south sides of Harnett Central Road (Appendix I, Figures 1 and 2). As indicated in the Request for Proposal (RFP), the parcel is currently a vacant parcel of land. The history of the parcel is unknown. According to DENR's UST Registry, there are no known USTs, facility IDs or groundwater incidents associated with the property.

This work was performed in general accordance with F&R's Proposal Supplemental No. 1466-00642, dated June 12, 2014, with Notice to Proceed issued to F&R by the NCDOT on June 18, 2014. The purpose of this report is to document additional field activities, present the results of laboratory analysis, and provide recommendations regarding the property.

F&R conducted a previous PSA at the project site, which was submitted under separate cover and dated June 9, 2014. The previous PSA was performed within the NCDOT proposed right-of-way on the southern remnant of the project site. As part of the previous PSA, a geophysical investigation was performed by Schnabel Engineering to investigate the existence of unknown/known USTs at the site. Based on the results of the geophysical survey, it was determined that USTs were not likely present at the site, within the surveyed area. Two Geoprobe borings were advanced during the assessment inside the proposed right-of-way, where grading activities are proposed to realign the existing highway. Based on the results of laboratory testing and observed PID readings, it was determined that petroleum impacted soils existed in the vicinity of Boring B-1 at concentrations above the NC DENR Action Level of 10 mg/kg.

Based on conversations and information provided by the NCDOT, a Supplemental Preliminary Site Assessment was requested to perform additional assessment on the remaining portions of the project site. NCDOT requested four additional borings – two borings on the southern remnant outside the right-of-way, and two borings on the northern remnant. The property is currently undeveloped, grass covered open land, and is bisected by Central Harnett Road. The site is bordered by Kipling Church Road to the north, an existing tree service business (Snell Tree Experts) to the south, railroad tracks to the east and



US Highway 401 to the west. Access to the site is provided by a gravel covered drive off of Harnett Central Road. Photos detailing existing site features are attached as Appendix IV of this report.

2.0 Geophysical Survey

Prior to F&R's supplemental soil assessment activities, Schnabel Engineering conducted an additional geophysical survey of the project site to locate suspect metal underground storage tanks (USTs) on the previously unevaluated portions of the project site. The geophysical work was conducted on May 20 and 21, 2014 under Schnabel's June 2, 2011 contract with NCDOT.

The geophysical investigation consisted of electromagnetic (EM) induction surveys using a Geonics EM61-MK2 instrument. Ground-penetrating radar (GPR) investigations of selected EM61 anomalies were investigated using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna. The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart, while the GPR data were collected along survey lines spaced 1 to 2 feet apart in orthogonal directions. The data was reviewed in the field to evaluate the possible presence of USTs and later transferred to a desktop computer for further review. Data was collected over most of the planned survey site, with the exception of the southeastern portion of the site, where areas of heavy vegetation, large piles of mulch and other obstacles were present. The EM data include responses from several obvious metallic objects at grade (e.g. signs and guy wires from utility poles), buried utilities, and reinforced concrete.

Based on the EM data collected at the site, Schnabel did not observe anomalies that were interpreted to be the results of metallic USTs within about 6 feet of the ground surface. The complete geophysical report is attached as Appendix II.

3.0 Site Assessment Activities

F&R visited the site on June 24, 2014 to perform the Supplemental Preliminary Site Assessment. The assessment consisted of advancing two borings (B-3 and B-4) into the soils outside of the NCDOT right-of-way at the southern remnant of the project site, and two borings (B-5 and B-6) along the right-of-way at the northern remnant of the project site (Appendix I, Figure 3).

The borings were advanced using direct-push technology (Geoprobe) to depths of 10 feet below ground surface (bgs). Boring locations were determined by F&R staff based on the results of the geophysical survey, site features and proposed construction activities.



Soil sample cores from the borings (B-3 through B-6) were collected in disposable, 4-foot long acetate sleeves. The soil samples were visually/manually classified and screened in the field using a photo-ionization detector (PID) for evidence of petroleum hydrocarbons. Evaluation of VOC concentrations were performed using a MiniRae 2000 PID which produces results in parts per million (ppm). A representative soil sample was collected from one foot sections of each sleeve and placed in a re-sealable plastic bag and the vapors were then allowed to equilibrate in the headspace of the bag for approximately ten minutes prior to measurement with the PID. The measurements were collected by placing the probe tip into the headspace of the bag. PID measurements can be found in the Geoprobe Logs in Appendix III.

The soil sample which exhibited the highest PID concentration or the sample at boring termination was submitted for laboratory analysis for diesel range organics (DRO), gasoline range organics (GRO), Total BTEX (benzene, toluene, ethylbenzene and xylenes), 16 PAHs (polycyclic aromatic hydrocarbons) and BaP (Benzo(a)pyrene) by Ultraviolet Fluorescence (UVF) technology.

The samples were collected in laboratory-supplied sample containers, placed in a cooler with ice, and delivered by courier to QROS in Wilmington, North Carolina following standard chain-of custody procedures.

4.0 Subsurface Conditions

As indicated in the attached Geoprobe Logs (Appendix III), subsurface conditions from existing ground surface to boring termination at a depth of 10 feet included various layers of dry to moist, tan or red-gray, silty fine to medium sand (USCS – SM) and moist, red/tan sandy silt (USCS – ML). The borings were terminated in moist, red-tan sandy silts (USCS – ML). It is not believed the groundwater table was encountered within the borings advanced during the assessment.

5.0 Analytical Results

As shown in the following table, compounds identified as DRO were detected in the four samples collected at the project site at the depths indicated. However, the concentrations of DRO were found to be below the NCDENR Action Level of 10 mg/kg for DRO. In addition, 16 PAHs were encountered at boring locations B-3, B-4 and B-6; however, the levels of 16 PAHs were found to be below the NCDENR Action Level of 7,041.41 mg/kg. The laboratory analytical results can be found in the attached Appendix V of this report.



Table 1
Soil Sampling Analytical Results
Hoke Smith Trust Property (Parcel #12)
Kipling, Harnett County, North Carolina

Sample ID	Sample Date	Sample Depth (ft bgs)	PID Reading (ppm)	DRO (mg/kg)	GRO (mg/kg)	Total BTEX (mg/kg)	16 EPA PAHs (mg/kg)	BaP (mg/kg)
B-3	6/24/14	1-2	4.7	0.43	<0.5	<0.5	0.1	<0.011
B-4	6/24/14	5-6	1.9	1.68	<1	<1	0.4	<0.02
B-5	6/24/14	7-8	1.5	1.34	<0.9	<0.9	<0.02	<0.019
B-6	6/24/14	4-5	1.6	0.99	<0.9	<0.9	0.27	<0.019
NC DENR Action Level				10	10	13.8	7,041.41	.096

Notes:

ft bgs = feet below ground surface

ppm = parts per million

mg/kg = milligrams/kilogram

ND = Not Detected

NCDENR standard for Total BTEX and 16 PAHs presented as the sum of the individual compounds

Bold indicates soil analytical results above NCDENR Action Levels

6.0 Conclusions and Recommendations

F&R conducted a Supplemental PSA at the Hoke Smith Trust Property located at 6586 US Highway 401 in Kipling, Harnett County, North Carolina. A geophysical investigation was performed by Schnabel Engineering to investigate the existence of unknown/known USTs at the site. Based on the results of the geophysical survey, it was determined that USTs were not likely present at the site, within the surveyed area.

Four Geoprobe borings were advanced during the additional assessment – two borings outside the right-of-way on the southern remnant of the property, and two borings within the right-of-way on the northern remnant of the property. Based on the results of laboratory testing and observed PID readings, petroleum impacted soils were not found at concentrations above the NC DENR Action Level of 10 mg/kg within the areas evaluated.

Based on the PID readings, analytical results and our experience, it does not appear that contaminated soil above NC DENR Action limits exists at the locations assessed during this Supplemental PSA.



It should be noted that a delineation of soil contamination was not performed, as this was not included in the proposed scope of work. The conclusions above are based on interpretations of soil analytical results, PID readings and our experiences with similar site assessments. The amount of impacted soil (if any) can only be determined after excavation or by advancing additional borings at the site to possibly delineate the extents (horizontal and vertical) of contamination.

7.0 Limitations

These services have been performed under authorization of the North Carolina Department of Transportation for specific application on this project. These services have been performed in accordance with generally accepted environmental and hydrogeological practices. No other warranty, expressed or implied is made. As with any subsurface investigation, actual conditions exist only at the precise locations from which samples were taken. Certain inferences are based on the results of sampling and related testing to form a professional opinion of conditions in areas beyond those from which samples were taken. Our conclusions and recommendations are based upon information provided to us by others, our sampling and testing results and our site observations. We have not verified the completeness or accuracy of the information provided by others, unless otherwise noted. Our observations are based upon conditions readily visible at the site at the time of our site visits.

Froehling & Robertson, Inc. by virtue of providing the services described in this report, does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state or federal public agencies any conditions at the site that may present a potential danger to public health, safety or the environment. In areas that require notification of local, state, or federal public agencies as required by law, it is the Client's responsibility to so notify.



APPENDIX I

Figure No. 1 – SITE VICINITY MAP

Figure No. 2 – TOPOGRAPHIC MAP

Figure No. 3 – LABORATORY RESULTS & BORING LOCATION PLAN

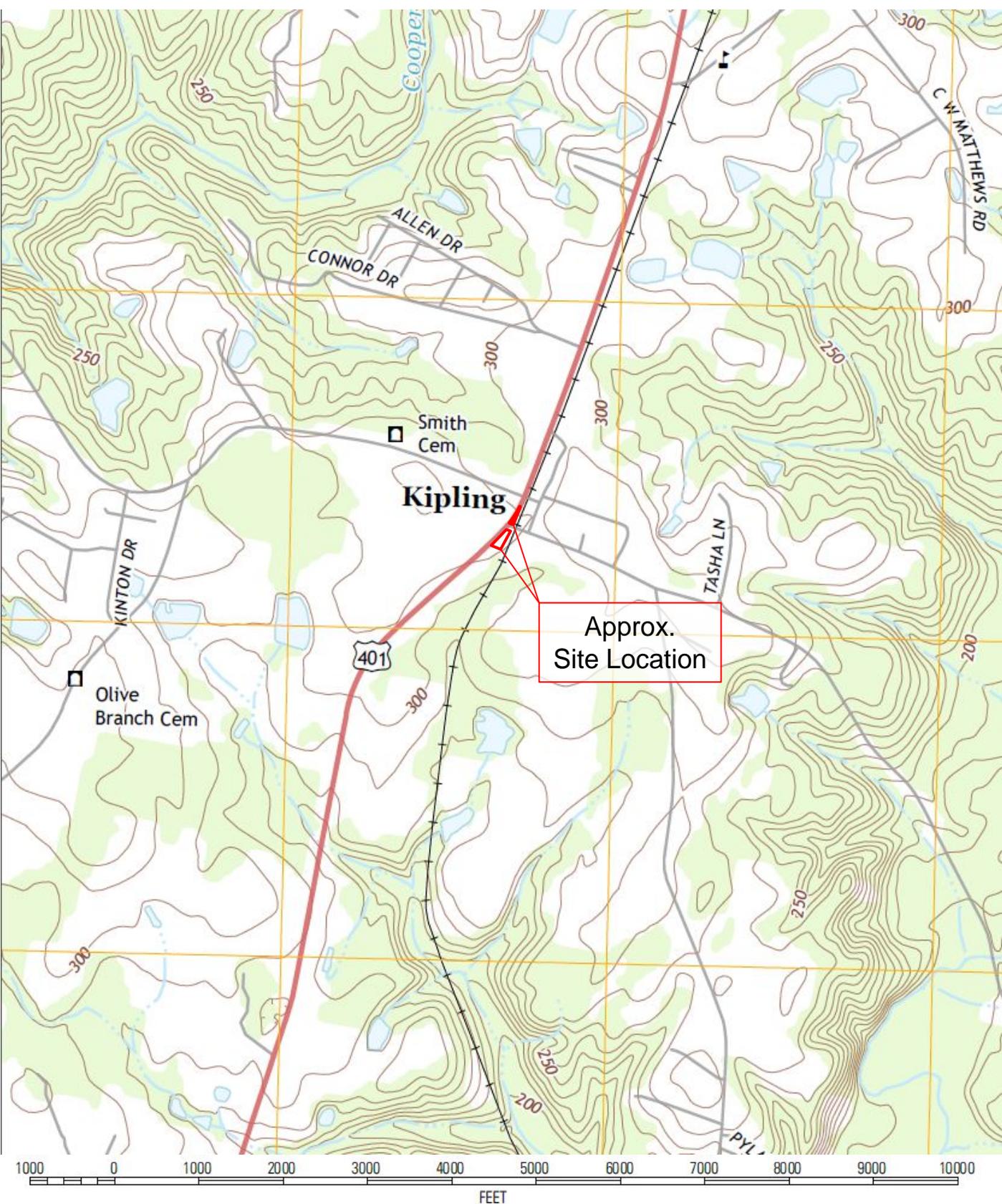


SITE VICINITY MAP

North

SINCE
FROEHLING & ROBERTSON, INC.
 Engineering • Environmental • Geotechnical
 310 Hubert Street
 Raleigh, North Carolina 27603-2302 | USA
 T 919.828.3441 | F 919.828.5751
 www.fandr.com

CLIENT: NCDOT	
PROJECT: Hoke Smith Trust Property (Parcel #12) Supplemental PSA	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.: 66R-3222	
DRAWN BY: B. Whitley	
DATE: July 2014	SCALE: Not to scale
FIGURE No.:	1



TOPOGRAPHIC MAP – 2013 “Lillington, NC” Quadrangle

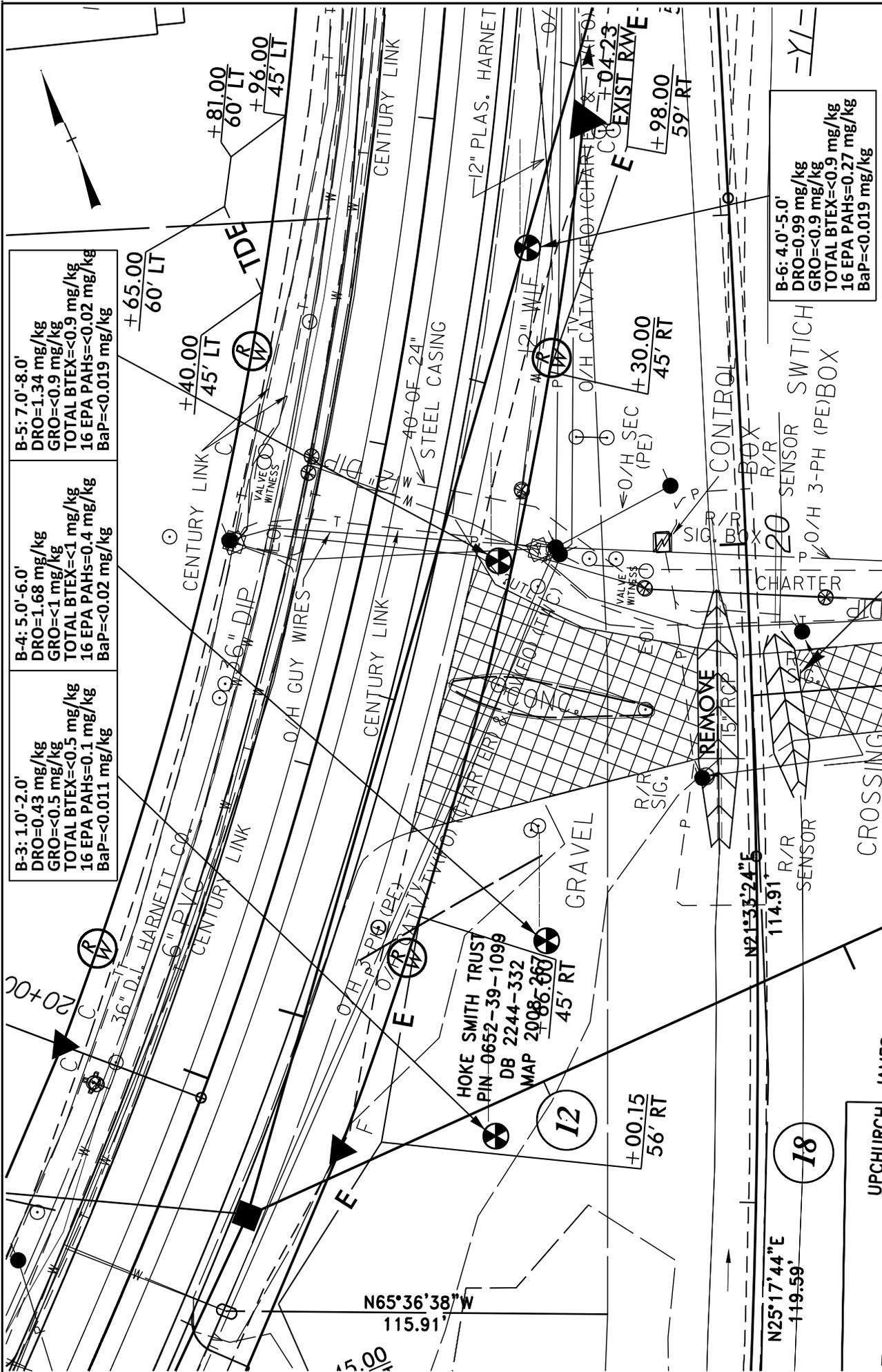
North ▲

FROEHLING & ROBERTSON, INC.
 Engineering • Environmental • Geotechnical
 310 Hubert Street
 Raleigh, North Carolina 27603-2302 | USA
 T 919.828.3441 | F 919.828.5751
 www.fandr.com

CLIENT: NCDOT
 PROJECT: Hoke Smith Trust Property (Parcel #12) Supplemental PSA
 LOCATION: Kipling, Harnett County, North Carolina
 F&R PROJECT No.: 66R-3222
 DRAWN BY: B. Whitley
 DATE: July 2014

FIGURE No.: **2**

SCALE as shown



LABORATORY RESULTS & BORING LOCATION PLAN	
CLIENT: NCDOT	LABORATORY RESULTS & BORING LOCATION PLAN CLIENT: NCDOT PROJECT: Hoke Smith Trust Property (Parcel #12) LOCATION: Kipling, Harnett County, North Carolina F&R PROJECT No.: 66R-3222 DRAWN BY: D. Racey CHECKED BY: B. Whitley, P.E. DATE: July 2014
PROJECT: Hoke Smith Trust Property (Parcel #12)	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.: 66R-3222	
FIGURE No.: 3	DRAWN BY: D. Racey CHECKED BY: B. Whitley, P.E. DATE: July 2014 SCALE: 1"=40'



APPENDIX II

GEOPHYSICAL REPORT PREPARED BY SCHNABEL ENGINEERING



May 27, 2014

Mr. Michael Sabodish, Ph.D, PE
Froehling & Robertson, Inc.
310 Hubert Street
Raleigh, NC 27603-2302

RE: State Project: R-5523
 WBS Element: 45548.1.1
 County: Harnett
 Description: Realignment of Harnett Central Road at US 401 and Extension of Smith Road (SR 1575)

**Subject: Project 11821014.35, Report on Additional Geophysical Surveys
 Parcel 12; Smith, Hoke Trust Property; Kipling, North Carolina**

Dear Dr. Sabodish:

SCHNABEL ENGINEERING SOUTH, PC (Schnabel) is pleased to present this report on the geophysical surveys we performed on the subject property. The report includes two 11x17 inch color figures and two 8.5x11 inch color figures. This study was performed in accordance with our proposal to Craig Haden (NCDOT) for Geophysical Surveys to Locate Possible USTs, dated May 15, 2014, as approved by Craig Haden via electronic mail on May 19, 2014, and our existing NCDOT limited services agreement dated June 2, 2011.

INTRODUCTION

The field work described in this report was performed on May 20, 2014 and May 21, 2014, by Schnabel. A previous phase of geophysical surveys was completed within the accessible areas of the NCDOT right-of-way and/or easement over the portion of Parcel 12 that is south of Harnett Central Road on April 2, 2014, by Schnabel. Our report on the previous geophysical surveys was sent to you on April 23, 2014. The purpose of the additional geophysical surveys was to evaluate the potential presence of metal underground storage tanks (USTs) in the accessible areas of additional portions of Parcel 12 that were not surveyed in our previous phase of work, as requested by Craig Haden. Photographs of the property are included on Figure 1. The property is located in the southeast quadrant of US 401 and Harnett Central Road intersection in Kipling, NC.

The geophysical surveys consisted of an electromagnetic (EM) induction survey and a ground penetrating radar (GPR) survey. The EM survey was performed using a Geonics EM61-MK2 (EM61) instrument. The EM61 is a time domain metal detector that stores data digitally for later processing and review. Sensitivity to metallic objects is dependent on the size, depth, and orientation of the buried object and the amount of noise (i.e. response from spurious metallic objects) in the area. The EM61 can generally observe a single buried 55 gallon drum at a depth of 10 feet or less. The EM61 makes measurements by creating an electromagnetic pulse and then measuring the response from metallic objects over time after the pulse is generated. We measured and recorded the response at several time increments after the pulse to help evaluate relative size and depth of metallic objects in the subsurface.

The GPR survey was performed over selected EM61 anomalies using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna to further investigate and evaluate EM responses that could indicate a potential UST. The depth penetration of the GPR signal, when using a 400 MHz antenna, is normally limited to 6 feet or less.

Photographs of the equipment used are shown on Figure 2.

FIELD METHODOLOGY

We obtained locations of geophysical data points using a sub-meter Trimble Pro-XRS differential global positioning system (DGPS). References to direction and location in this report are based on the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 83 datum, with units in US survey feet. We also recorded the locations of existing site features (signs, guy wires, etc.) with the DGPS for later correlation with the geophysical data and a site plan provided by the NCDOT.

The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart. The EM61 and DGPS data were recorded digitally using a field computer and later transferred to a desktop computer for data processing. The GPR data were primarily collected along survey lines spaced approximately one to two feet apart in orthogonal directions over anomalous EM readings not attributed to cultural features. The GPR data were reviewed in the field to evaluate the possible presence of USTs. The GPR data also were recorded digitally and later transferred to a desktop computer for further review.

DISCUSSION OF RESULTS

The contoured EM61 data collected over Parcel 12 and the GPR survey locations are shown on Figure 3, EM61 Early Time Gate Response, and Figure 4, EM61 Differential Response. Areas outside the colored, contoured EM61 data were not surveyed during this phase of work. Early time data refer to the response measured at a short time after the initial EM pulse is generated. Early time data typically contain responses from all metal objects, small or large and shallow or deep, within the sensitivity range of the instrument. Differential data represent the difference in response between the top and bottom coils of the EM61 instrument at a later time after the initial pulse than early time data. Differential data naturally tend to filter out the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as USTs.

We were not able to access an area in the southeast corner of the planned survey due to the presence of thick vegetation, large piles of mulch, and other obstacles. The EM data contain multiple anomalies that

we investigated with GPR (as shown on Figures 3 and 4), all of which appear to be the result of buried utilities, reinforced concrete, or other metal objects at the ground surface or at shallow depths. The geophysical data collected at the site do not indicate the presence of metallic USTs within the areas surveyed.

CONCLUSIONS

As shown in Figures 3 and 4, the EM data we collected over Parcel 12 did not cover a portion of the planned survey area due to the presence of thick vegetation, large piles of mulch, and other obstacles within the planned survey area. The EM data include responses from visible metallic objects at grade (e.g. signs, utilities, etc.). We did not observe anomalies in the EM or the GPR geophysical data at the subject property that we interpret to be the results of metallic USTs within about 6 feet of the ground surface.

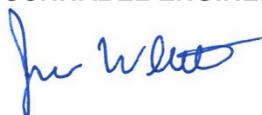
LIMITATIONS

These services have been performed and this report prepared for Froehling & Robertson, Inc. and the North Carolina Department of Transportation in accordance with generally accepted guidelines for conducting geophysical surveys. It is generally recognized that the results of geophysical surveys are non-unique and may not represent actual subsurface conditions.

We appreciate the opportunity to have provided these services. Please call if you need additional information or have any questions.

Sincerely,

SCHNABEL ENGINEERING SOUTH, PC



James W. Whitt, LG
Senior Staff Geophysicist



Joel C. Daniel, LG
Senior Geophysicist

JWW:JCD

Attachments: Figures (4)

CC: Craig Haden - NCDOT

FILE: G:\2011-SDE-JOBS\11821014_00_NCDOT_2011_GEOTECHNICAL_UNIT_SERVICES\11821014_35_R-5523_HARNETT_COUNTY\REPORT\PARCEL 12 (TOTAL TAKE)\SCHNABEL ADDITIONAL GEOPHYSICAL REPORT ON PARCEL 12 (R-5523).DOCX

**NCDOT, Geotechnical Engineering Unit
Parcel 12, State Project R-5523, Harnett County**

Attachments:

- Figure 1 - Parcel 8 Site Photos
- Figure 2 - Photos of Geophysical Equipment Used
- Figure 3 - EM61 Early Time Gate Response
- Figure 4 - EM61 Differential Response



Parcel 12 (Smith, Hoke Trust Property), looking southwest



Parcel 12 (Smith, Hoke Trust Property), looking east



STATE PROJECT R-5523
NC DEPT. OF TRANSPORTATION
HARNETT CO., NORTH CAROLINA
PROJECT NO. 11821014.35

PARCEL 12
SITE PHOTOS

FIGURE 1



Geonics EM61-MK2 Metal Detector with Trimble DGPS Unit



GSSI SIR-3000 Ground-Penetrating Radar with 400 MHz Antenna

Note: Stock photographs – not taken on site.

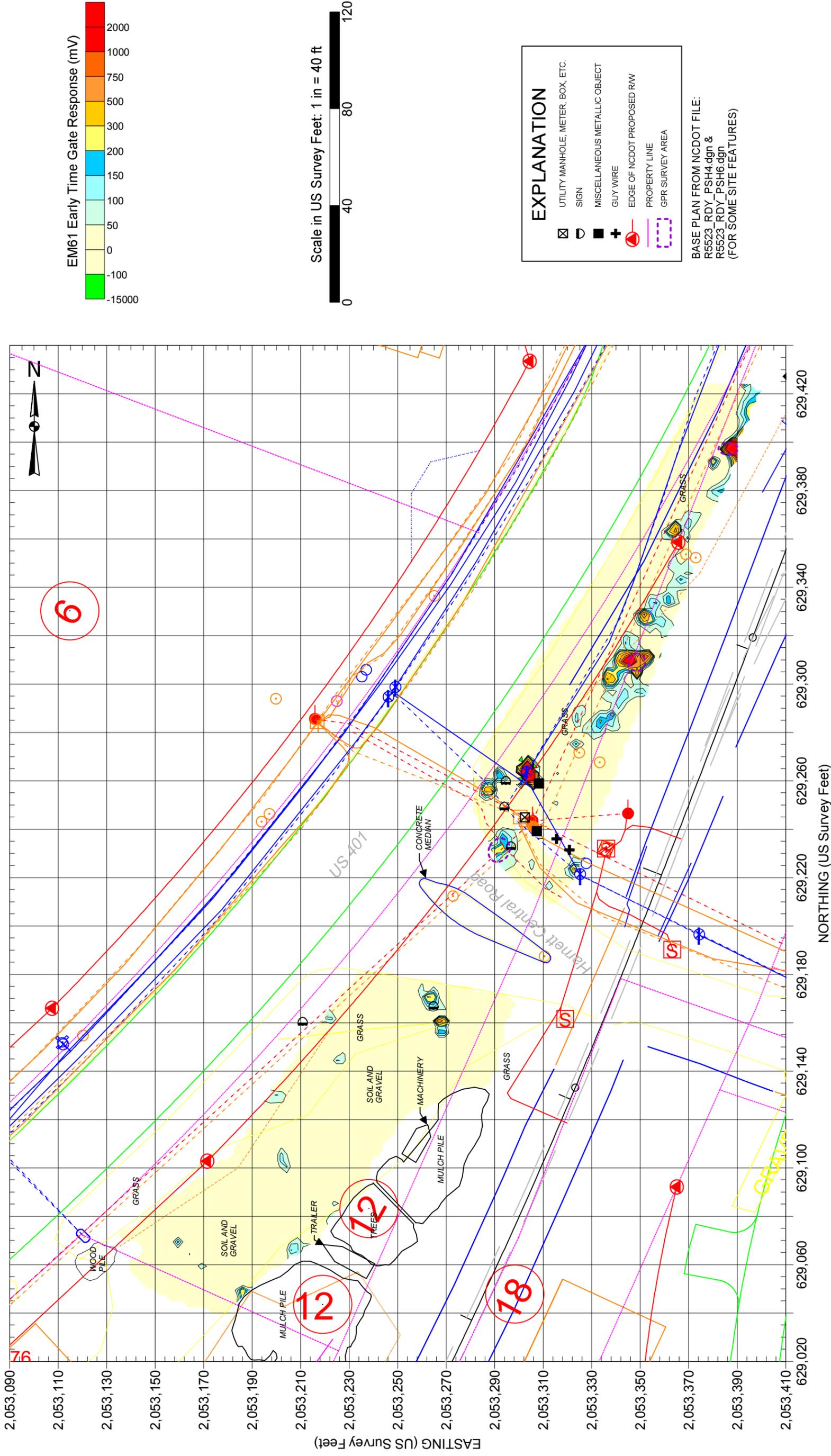


STATE PROJECT R-5523
NC DEPT. OF TRANSPORTATION
HARNETT CO., NORTH CAROLINA
PROJECT NO. 11821014.35

PHOTOS OF
GEOPHYSICAL
EQUIPMENT USED

FIGURE 2

PARCEL 12



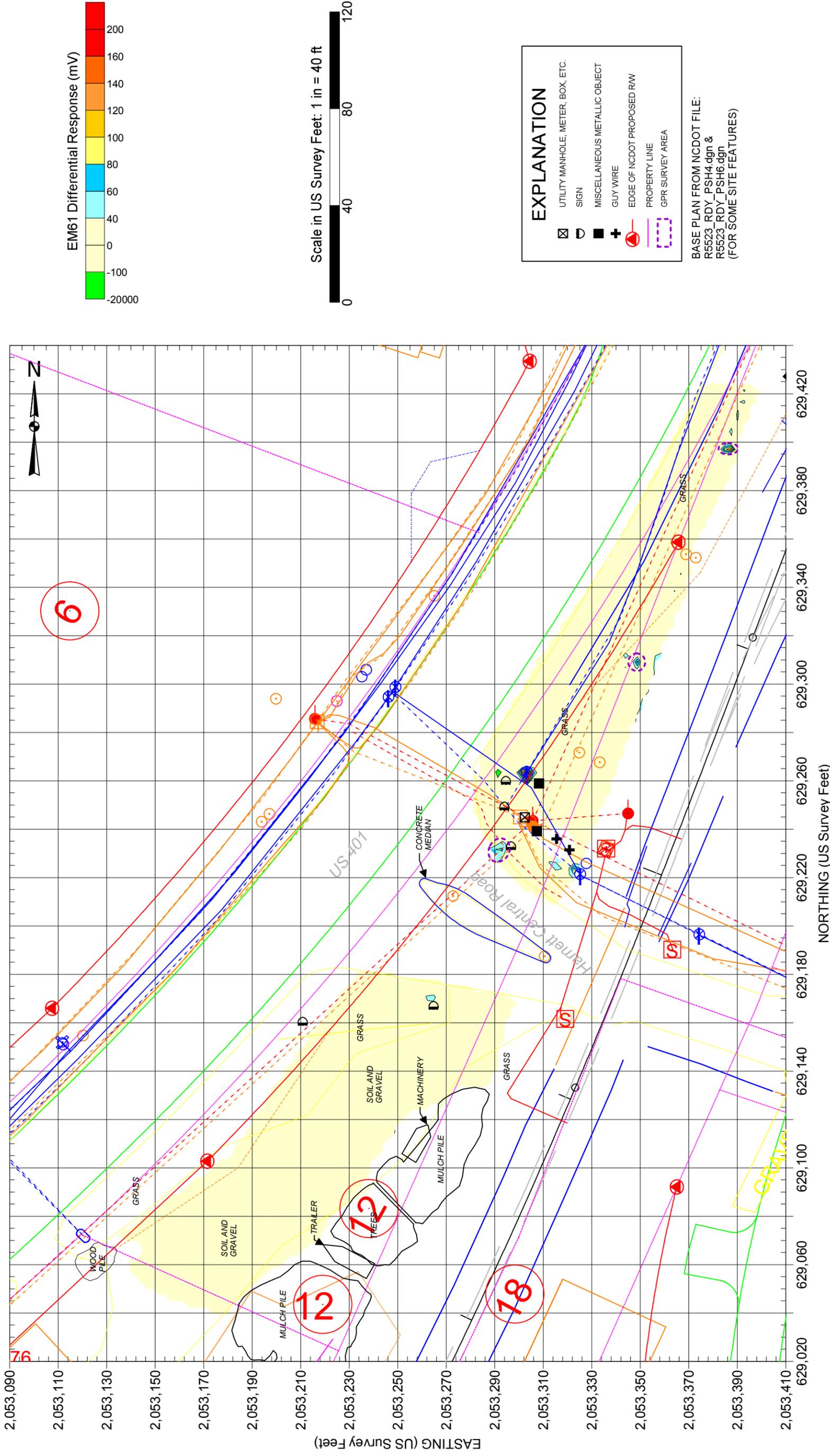
Note: The contour plot shows the earliest and more sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on May 20, 2014, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina Zone 3200, using the NAD 1983 datum. GPR data were acquired on May 21, 2014, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.



STATE PROJECT R-5523
 NC DEPARTMENT OF TRANSPORTATION
 HARNETT COUNTY, NC
 PROJECT NO. 11821014.35

EM61
 EARLY TIME GATE
 RESPONSE
 FIGURE 3

PARCEL 12



Note: The contour plot shows the difference, in millivolts (mV), between the readings from the top and bottom coils of the EM61. The difference is taken to reduce the effect of shallow metal objects and emphasize anomalies caused by deeper metallic objects, such as drums and tanks. The EM data were collected on May 20, 2014, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum. GPR data were acquired on May 21, 2014, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.



STATE PROJECT R-5523
NC DEPARTMENT OF TRANSPORTATION
HARNETT COUNTY, NC
PROJECT NO. 11821014.35

EM61
DIFFERENTIAL
RESPONSE



APPENDIX III
GEOPROBE LOGS



Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 12)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 6/24/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan to orange-tan, silty fine SAND (SM).	0.0	2.0	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			1.0	4.7*	
			2.0	1.5	
	3.0	Dry to moist, red-tan to red-gray, sandy SILT (ML).	3.0	3.7	
			4.0	1.6	
			5.0	1.3	
	6.0	Dry to moist, red-gray, silty fine SAND (SM).	6.0	1.3	
			7.0	1.5	
			8.0	1.6	
	9.0	Dry, red-gray, sandy SILT (ML).	9.0	1.5	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

GEOPROBE_LOG_R5523_GEOENV_GEOPROBELOGS_PARCEL12.GPJ F&R.GDT 7/7/14

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.



Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 12)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 6/24/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Dry to moist, gray-tan, orange-tan & tan, silty fine to medium SAND (SM).	0.0	1.2	
			1.0	1.4	
			2.0	1.4	
			3.0	1.4	
	4.0	Dry, tan to red-tan, sandy SILT (ML).	4.0	1.7	
			5.0	1.9*	
			6.0	1.6	
			7.0	1.2	
			8.0	1.3	
			9.0	1.3	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP

GEOPROBE_LOG_R5523_GEOENV_GEOPROBELOGS_PARCEL12.GPJ F&R.GDT 7/7/14

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.



Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 12)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 6/24/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Dry to moist, tan, silty fine SAND (SM).	0.0	0.1	
			1.0	0.7	
	2.0	Moist, tan to red-tan, clayey silty fine SAND (SM).	2.0	1.0	
			3.0	1.3	
			4.0	1.3	
	5.0	Dry to moist, red-gray, sandy SILT (ML).	5.0	1.2	
			6.0	1.3	
			7.0	1.5*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			8.0	0.8	
			9.0	0.9	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

GEOPROBE_LOG_R5523_GEOENV_GEOPROBELOGS_PARCEL12.GPJ F&R.GDT 7/7/14

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.



Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 12)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 6/24/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Dry to moist, tan, silty fine SAND (SM).	0.0	0.6	
			1.0	1.2	
	2.0	Moist to wet, tan, clayey silty fine SAND (SM).	2.0	1.5	
			3.0	1.5	
	4.0	Moist to wet, tan, sandy silty CLAY (CL).	4.0	1.6*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			5.0	1.4	
	6.0	Moist to dry, red-tan to tan, sandy SILT (ML).	6.0	1.4	
			7.0	1.3	
			8.0	1.2	
			9.0	1.3	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

GEOPROBE_LOG_R5523_GEOENV_GEOPROBELOGS_PARCEL12.GPJ F&R.GDT 7/7/14

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.



APPENDIX IV

SITE PHOTOS



Photo #1: Boring location B-3, facing southwest.



Photo #2: Boring location B-4, facing northeast.

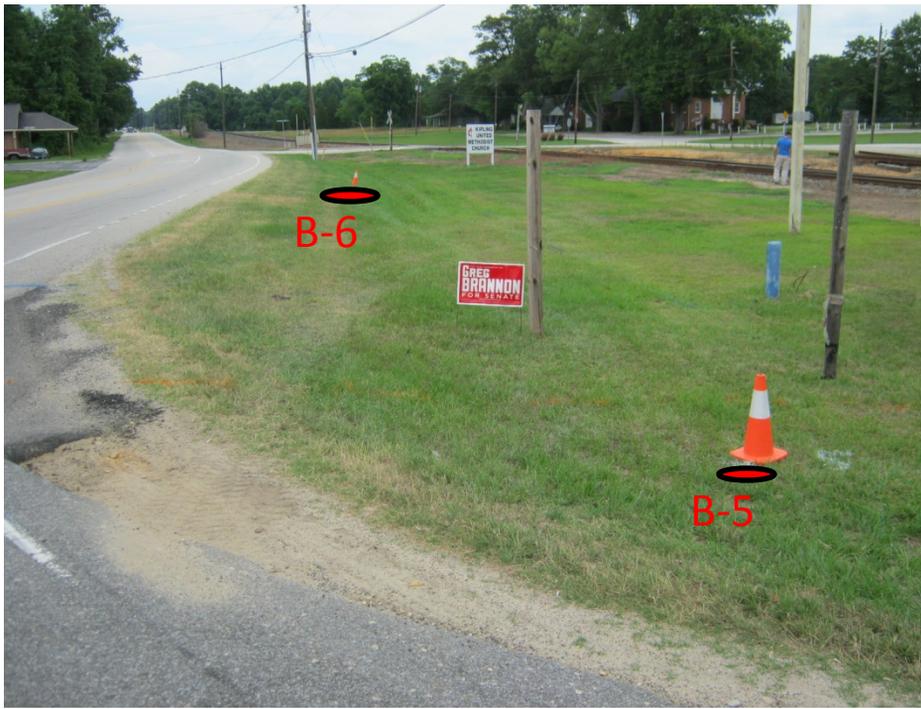


Photo #3: Boring locations B-5 and B-6, facing northeast.



Photo #4: Boring locations B-5 and B-6, facing southwest.



APPENDIX V

LABORATORY ANALYTICAL RESULTS



Hydrocarbon Analysis Results

Client: F&R
Address: Raleigh

Samples taken Tuesday, June 24, 2014
Samples extracted Tuesday, June 24, 2014
Samples analysed Wednesday, June 25, 2014

Contact: Ben Whitley

Operator Rachel Menoher

Project: NCDOT R-5523

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	P8 B-8 0-1	23.0	<1.1	<1.1	35.93	35.93	32.85	5.14	0.037	37.7	45.1	17.2	V.Deg.PHC 80.2%
s	P8 B-10 6-7	21.0	<1	1.31	1.31	2.62	1.19	0.13	<0.021	81.6	16.2	2.2	Deg Gas (FCM) 63.4%
s	P8 B-11 1-2	19.0	<0.9	<0.9	14.34	14.34	13.13	2.23	<0.019	53.7	35.8	10.5	V.Deg.PHC 76.9%
s	P8 B-12 6-7	154.0	<7.7	<7.7	187.7	187.7	173.6	67.8	4.99	19.4	52.2	28.4	V.Deg.PHC 51.4%
s	P8 B-13 6-7	19.0	<1	17.43	8.7	26.13	3.44	0.54	<0.019	97.4	1.8	0.8	Deg Gas (FCM) 42.5%
s	P12 B-3 1-2	11.0	<0.5	<0.5	0.43	0.43	0.39	0.1	<0.011	51.8	26.1	22.1	V.Deg.PHC 72.7%
s	P12 B-4 5-6	20.0	<1	<1	1.68	1.68	1.54	0.4	<0.02	56.7	22.1	21.2	V.Deg.PHC 67.1%
s	P12 B-5 7-8	19.0	<0.9	<0.9	1.34	1.34	<0.19	<0.02	<0.019	0	36.7	63.3	Deg.Fuel (FCM) 71.6%
s	P12 B-6 4-5	19.0	<0.9	<0.9	0.99	0.99	0.91	0.27	<0.019	38.2	37.2	24.6	V.Deg.PHC 60.8%

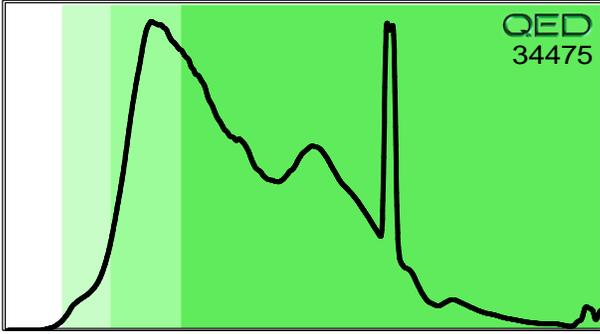
Initial Calibrator QC check **OK**

Final FCM QC Check **OK**

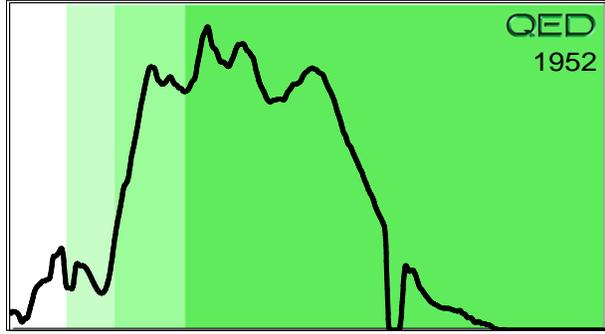
90.8%

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

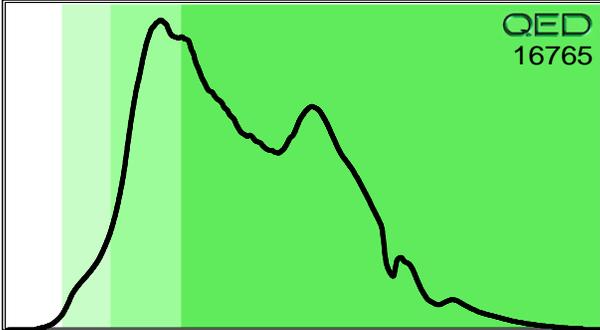
V.Deg.PHC 80.2% P8 B-8 0-1



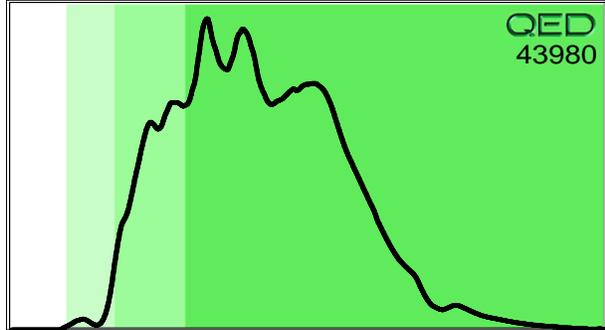
Deg Gas (FCM) 63.4% P8 B-10 6-7



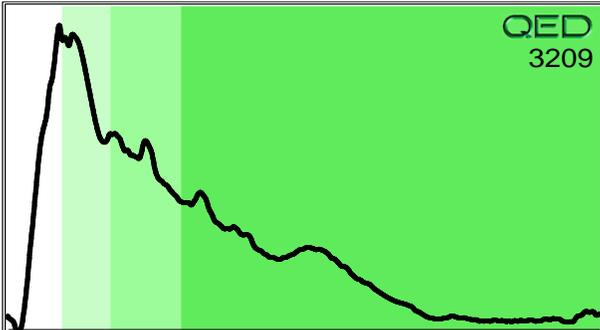
V.Deg.PHC 76.9% P8 B-11 1-2



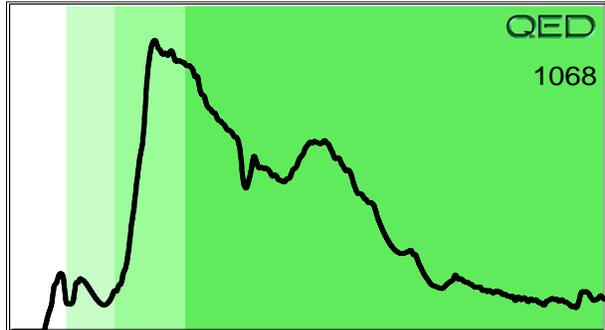
V.Deg.PHC 51.4% P8 B-12 6-7



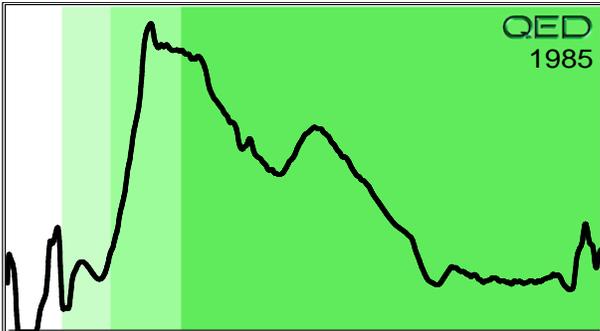
Deg Gas (FCM) 42.5% P8 B-13 6-7



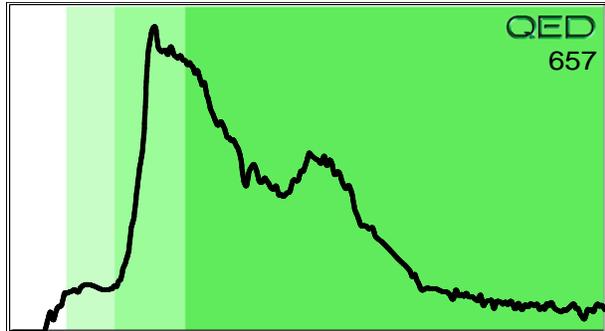
V.Deg.PHC 72.7% P12 B-3 1-2



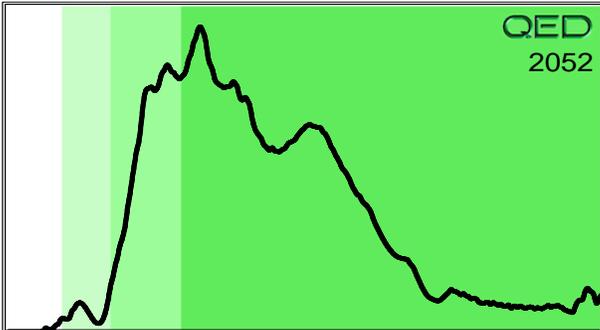
V.Deg.PHC 67.1% P12 B-4 5-6



Deg.Fuel (FCM) 71.6% P12 B-5 7-8



V.Deg.PHC 60.8% P12 B-6 4-5



SINCE



1881

