



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

June 9, 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

June 9, 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: 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 Preliminary Site Assessment at the Hoke Smith Trust Property in Kipling, North Carolina. The work was performed in general accordance with with F&R's Proposal No. 1466-00642, Revision 3, dated March 6, 2014. Notice to Proceed was issued to F&R on March 17, 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.

Michael S. Sabodish, Jr., Ph.D., P.E.
Engineering and Remediation Services Manager



Christopher J. Burkhardt
Senior Environmental Professional



TABLE OF CONTENTS

	<u>PAGE</u>
1.0 INTRODUCTION.....	1
2.0 GEOPHYSICAL SURVEY.....	1
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 FIGURE No. 4 – Estimated Extents of Soil Contamination
APPENDIX II	GEOPHYSICAL REPORT PREPARED BY SCHNABEL ENGINEERING
APPENDIX III	GEOPROBE LOGS
APPENDIX IV	SITE PHOTOS
APPENDIX V	LABORATORY ANALYTICAL RESULTS



**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 Preliminary Site Assessment Report (PSA) to document 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 in the southeast quadrant of the US Highway 401 and the Harnett Central Road Intersection. (Appendix I, Figures 1 and 2). As indicated in the Request for Proposal (RFP), the parcel is currently a vacant piece 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 No. 1466-00642, Revision 3, dated March 6, 2014 with Notice to Proceed issued to F&R by the NCDOT on March 17, 2014. The purpose of this report is to document field activities, present the results of laboratory analysis, and provide recommendations regarding the property.

Based on conversations and information provided by the NCDOT, it has been determined that the proposed utility installation and roadway construction will impact the project site (See Figure No.3). As such, the NCDOT requested a Preliminary Site Assessment be performed to assess the possibility of encountering petroleum impacted soil from known or unknown USTs which may exist/existed at the project site. The property is currently undeveloped, grass covered open land. The site is bordered by Harnett Central 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 gained from 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 soil assessment activities, Schnabel Engineering conducted a geophysical survey of the project site to locate suspect metal underground storage tanks (USTs) in the accessible areas of the right-of-way and/or easement. The geophysical work was conducted on April 2, 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. Due to the lack of differential EM61 anomalies, ground-penetrating radar (GPR) investigation was not performed. The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart. 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 a very small area at the southwestern edge of the site where a wood pile was located. The EM data include responses from several obvious metallic objects at grade (e.g. signs and water meter).

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 April 9, 2014 to perform the Preliminary Site Assessment. The assessment consisted of advancing 2 borings into the soils at the project site. Boring B-1 was advanced on the west side of the site adjacent to US Highway 401, while Boring B-2 was advanced on the north side of the site adjacent to Harnett Central Road. Both borings were advanced within the existing NCDOT right-of-way (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-1 and B-2) 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 moist, brown, clayey fine to medium sand (USCS – SC) and moist, red/tan fine sandy clay and clayey silt (USCS – CL & ML). The borings were terminated in moist, red-tan clayey silts (USCS – ML) and sandy clays (USCS – CL). It is not believed the groundwater table was encountered within the borings advanced during the assessment; however perched water conditions were observed at Boring B-1 at a depth of 2 to 3 feet below ground surface as soil samples were observed to be wet to saturated.

5.0 Analytical Results

As shown in the following table, compounds identified as DRO, 16 PAHs and BaP were encountered at one of the boring locations (B-1) at a depth of two to three feet below ground surface. The laboratory results indicate the soil samples collected from Borings B-1 exceed the NC DENR Action level of 10 mg/kg for DRO. The laboratory results for 16 PAHs and BaP were below the NC DENR Action Level. The laboratory analytical results for the soil sample collected at B-2 did not identify compounds above their respective method detection limits. 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-1	4/9/14	2-3	2.5	17.8	<0.1	<0.1	0.88	0.011
B-2	4/9/14	8-9	0.9	<0.4	<0.2	<0.2	<0.1	<0.01
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 19 PAHs presented as the sum of the individual compounds

Bold indicates soil analytical results above NCDENR Action Levels

ft bgs = feet below ground surface

6.0 Conclusions and Recommendations

F&R conducted a 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.

Two geoprobe borings were advanced during the assessment inside the 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 has been determined that petroleum impacted soils exist in the vicinity of Boring B-1 at concentrations above the NC DENR Action Level of 10 mg/kg.

In regards to the proposed construction, it is estimated that petroleum impacted soils exist from existing ground surface to a depth of at least four feet below existing ground surface in the vicinity of Boring B-1 based on laboratory analysis and PID readings at various borings advanced during this assessment.

Without knowing the existing ground surface elevations and proposed cut/fill depths, it is difficult to accurately calculate the volume of petroleum impacted soil which may be encountered during construction. For the purpose of this assessment, we have estimated grading activities will extend approximately 20 feet from the existing roadway.

Based on the depths at which soil contamination was observed, PID readings and our experience, it appears one area of contaminated soil exists at the site as shown in Figure 4. Using the dimensions in the below table, it can be approximated that the quantity of petroleum impacted soil which may be encountered during construction to be approximately 336 tons. Petroleum impacted soils that are removed should be properly managed and disposed of in accordance with all NCDENR rules and regulations.



Table 2
Approximate Volume of Petroleum Impacted Soil
Hoke Smith Trust Property (Parcel #12)
Kipling, Harnett County, North Carolina

Excavation Location (As Shown on Figure 5)	L x W x D (feet)	Soil Volume (cubic feet)	Soil Volume (tons)
40' west of B-1 to 30' east of B-1	70 x 20 x 4	5,600	336
Soil Volume (assuming a soil density of 120 pcf)			

It should be noted that a delineation of the soil contamination was not performed, as this was not included in the proposed scope of work. The above estimates are based on interpretations of soil analytical results, PID readings and our experience with similar petroleum UST releases. The amount of impacted soil 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

Figure No. 4 – ESTIMATED EXTENTS OF SOIL CONTAMINATION



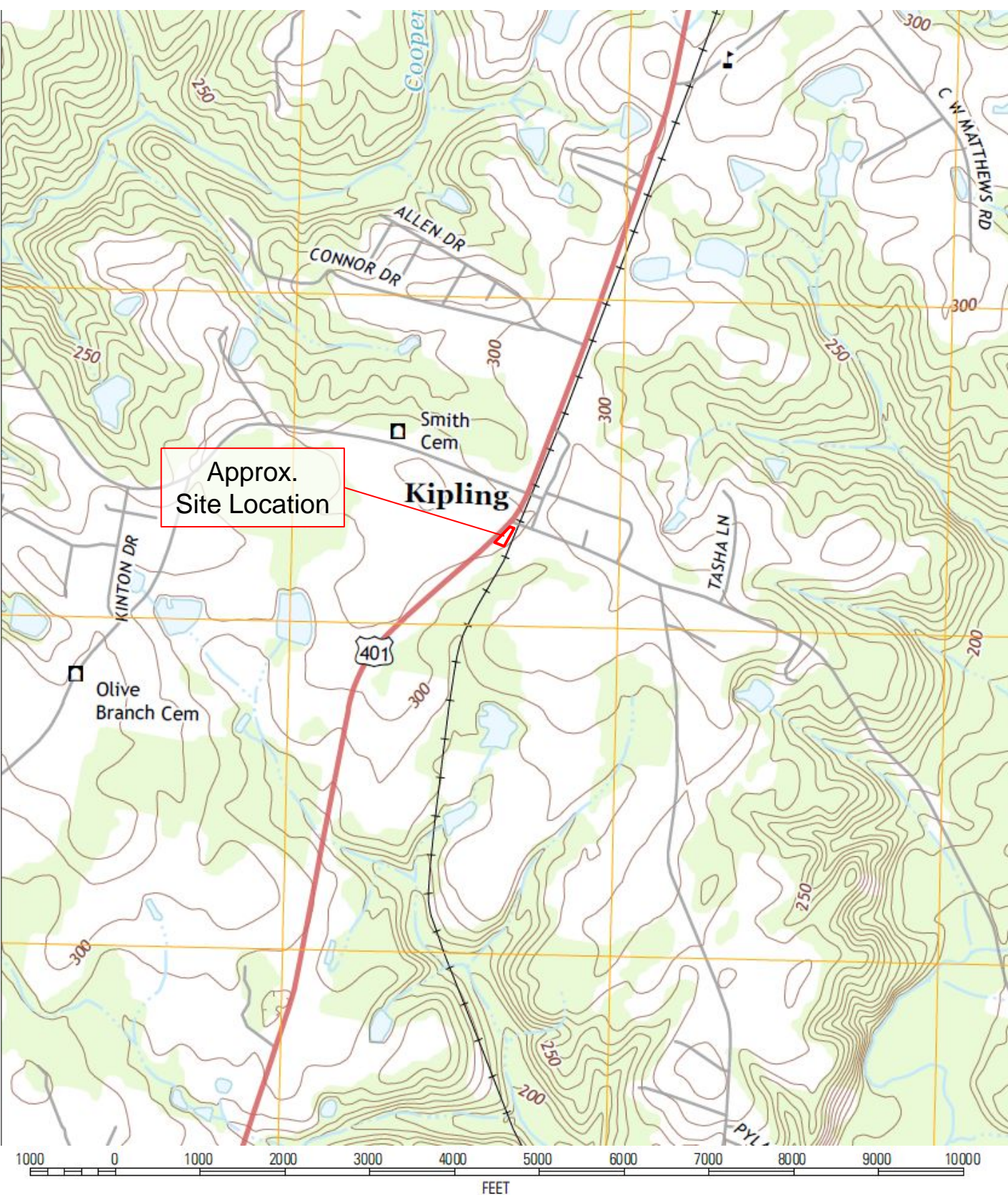
SITE VICINITY MAP

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)	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.: 66R-3222	
DRAWN BY: M. Sabodish	
DATE: June 2014	SCALE: Not to scale
FIGURE No.:	1



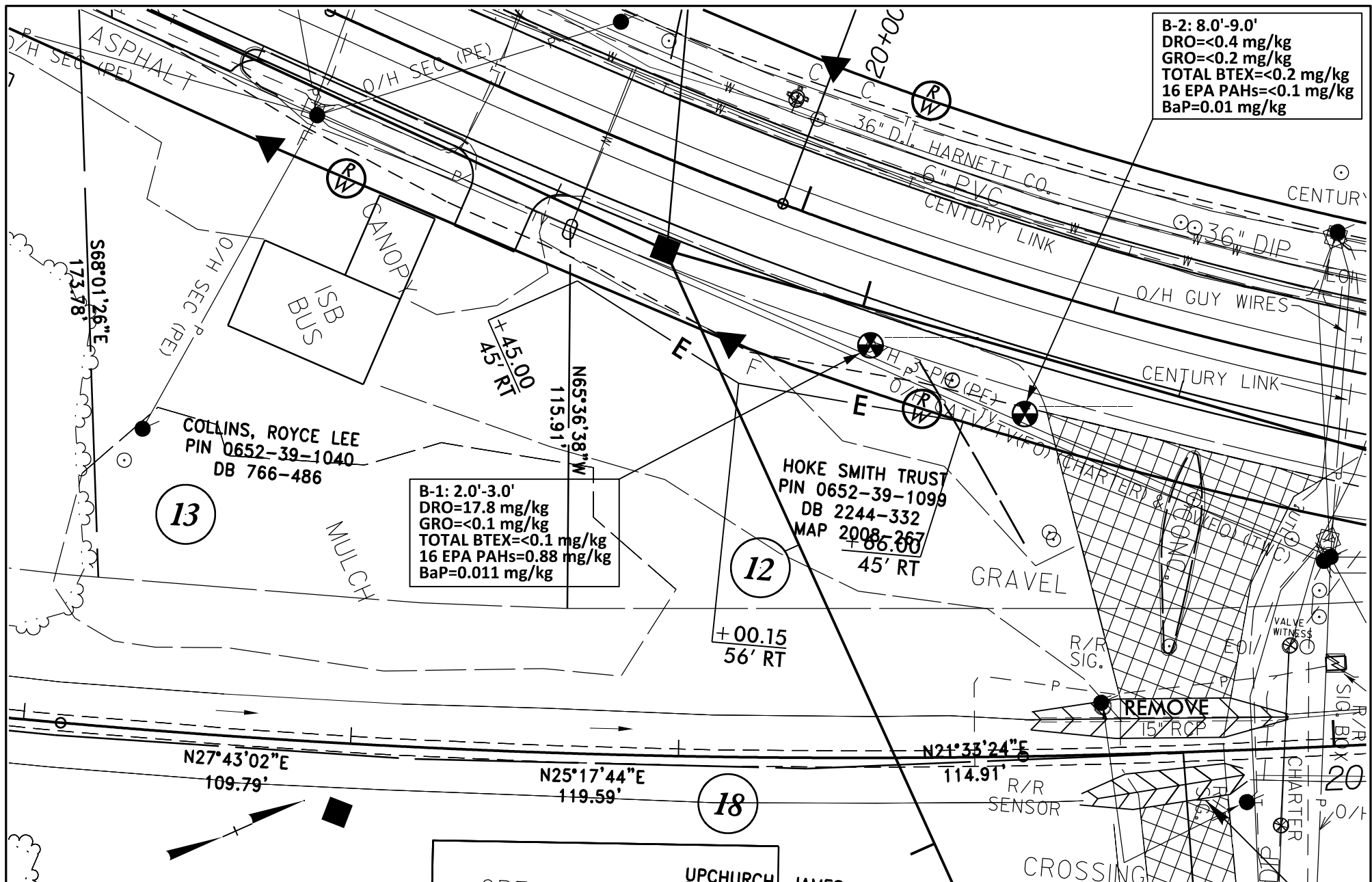
TOPOGRAPHIC MAP – 2013 “Lillington, NC” Quadrangle

North ▲

SINCE
F&R
 1881

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		FIGURE No.: 2
PROJECT: Hoke Smith Trust Property (Parcel #12)		
LOCATION: Kipling, Harnett County, North Carolina		
F&R PROJECT No.: 66R-3222		
DRAWN BY: M. Sabodish		
DATE: June 2014	SCALE as shown	



SINCE **FROEHLING & ROBERTSON, INC.**
 Engineering Stability Since 1881

 310 Hubert Street
 Raleigh, North Carolina 27603-2302 | USA
 T 919.828.3441 | F 919.828.5751
 www.fandr.com

LEGEND

 Approximate Geoprobe Boring Location

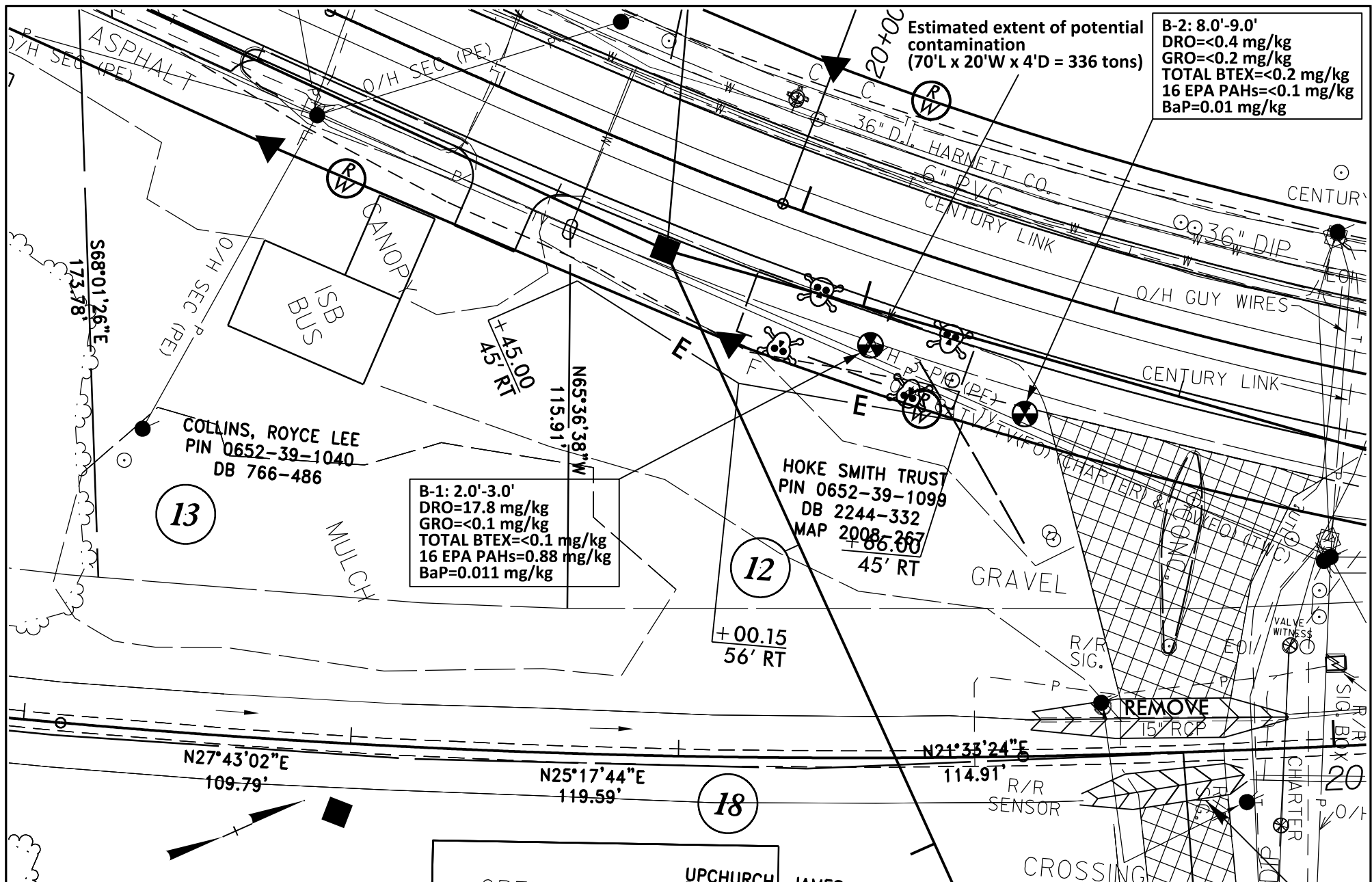
SCALE (FEET)
 0 20' 40'
 1"=40'

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: M. Sabodish, P.E.
DATE: June 2014	SCALE: 1"=40'

FIGURE No.: **3**



SINCE 1881 **FROEHLING & ROBERTSON, INC.**
 Engineering Stability Since 1881
 310 Hubert Street
 Raleigh, North Carolina 27603-2302 | USA
 T 919.828.3441 | F 919.828.5751
 www.fandr.com

LEGEND

Approximate Geoprobe Boring Location

SCALE (FEET)
 0 20' 40'
 1"=40'

EXISTING EXTENTS OF CONTAMINATION

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: M. Sabodish, P.E.
DATE: June 2014	SCALE: 1"=40'

FIGURE No.: 4



APPENDIX II

GEOPHYSICAL REPORT PREPARED BY SCHNABEL ENGINEERING



April 23, 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 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 NCDOT for Geophysical Surveys to Locate Possible USTs, dated March 14, 2014, as approved by Terry Farr (NCDOT) on March 18, 2014, and our existing NCDOT limited services agreement dated June 2, 2011.

INTRODUCTION

The field work described in this report was performed on April 2, 2014, by Schnabel. The purpose of the geophysical surveys was to evaluate the potential presence of metal underground storage tanks (USTs) in the accessible areas of the NCDOT right-of-way and/or easement at Parcel 12. 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. 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.

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 (sign, obstacles, 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.

DISCUSSION OF RESULTS

The contoured EM61 data collected over Parcel 12 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. 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 able to access nearly all of the planned survey with the exception of a very small area at the southwestern end of the site where a wood pile was located. GPR data were not collected at the site due to a lack of differential EM61 anomalies that suggest a potential presence of previously unknown USTs. 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 very small portion of the planned survey area due to the presence of a wood pile. The EM data include responses from visible metallic objects at grade (e.g. water meter, sign, etc.). We did not observe anomalies in the EM 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\SCHNABEL GEOPHYSICAL REPORT ON PARCEL 12 (R-5523).DOCX

Attachments:

- Figure 1 - Parcel 12 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 northeast



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.

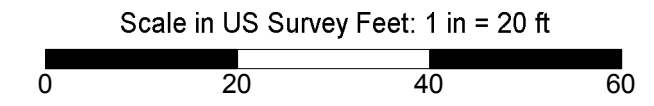
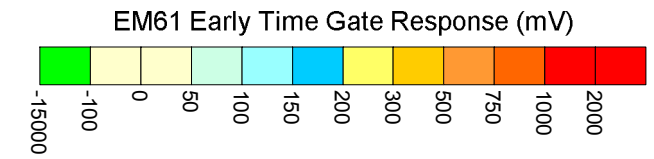
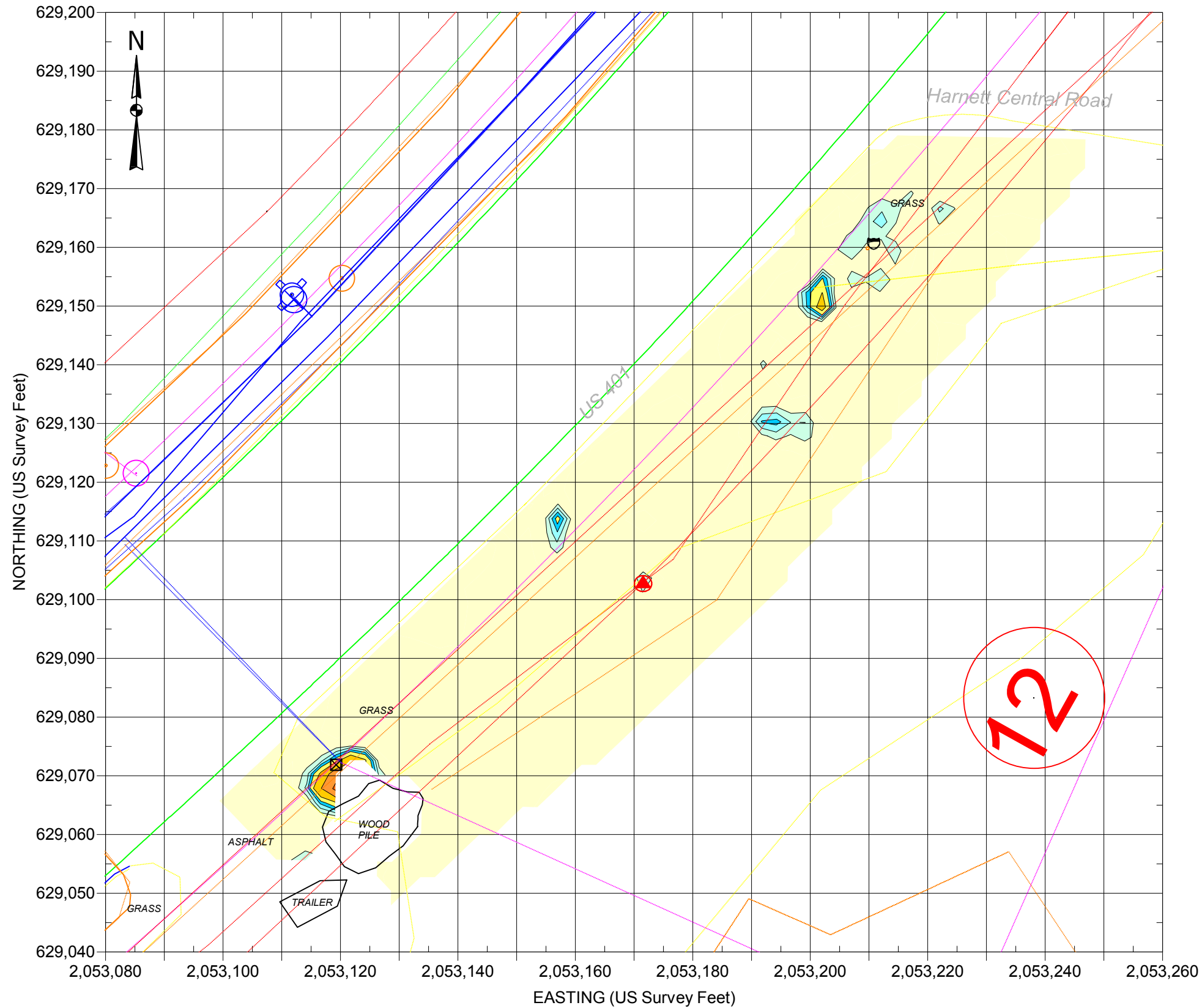


STATE PROJECT R-5523
NC DEPT. OF TRANSPORTATION
HARNETT CO., NORTH CAROLINA
PROJECT NO. 11821014.35

PHOTOS OF
GEOPHYSICAL
EQUIPMENT USED

FIGURE 2

PARCEL 12



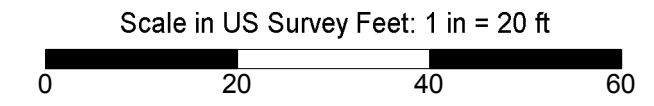
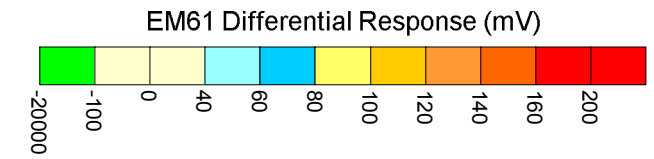
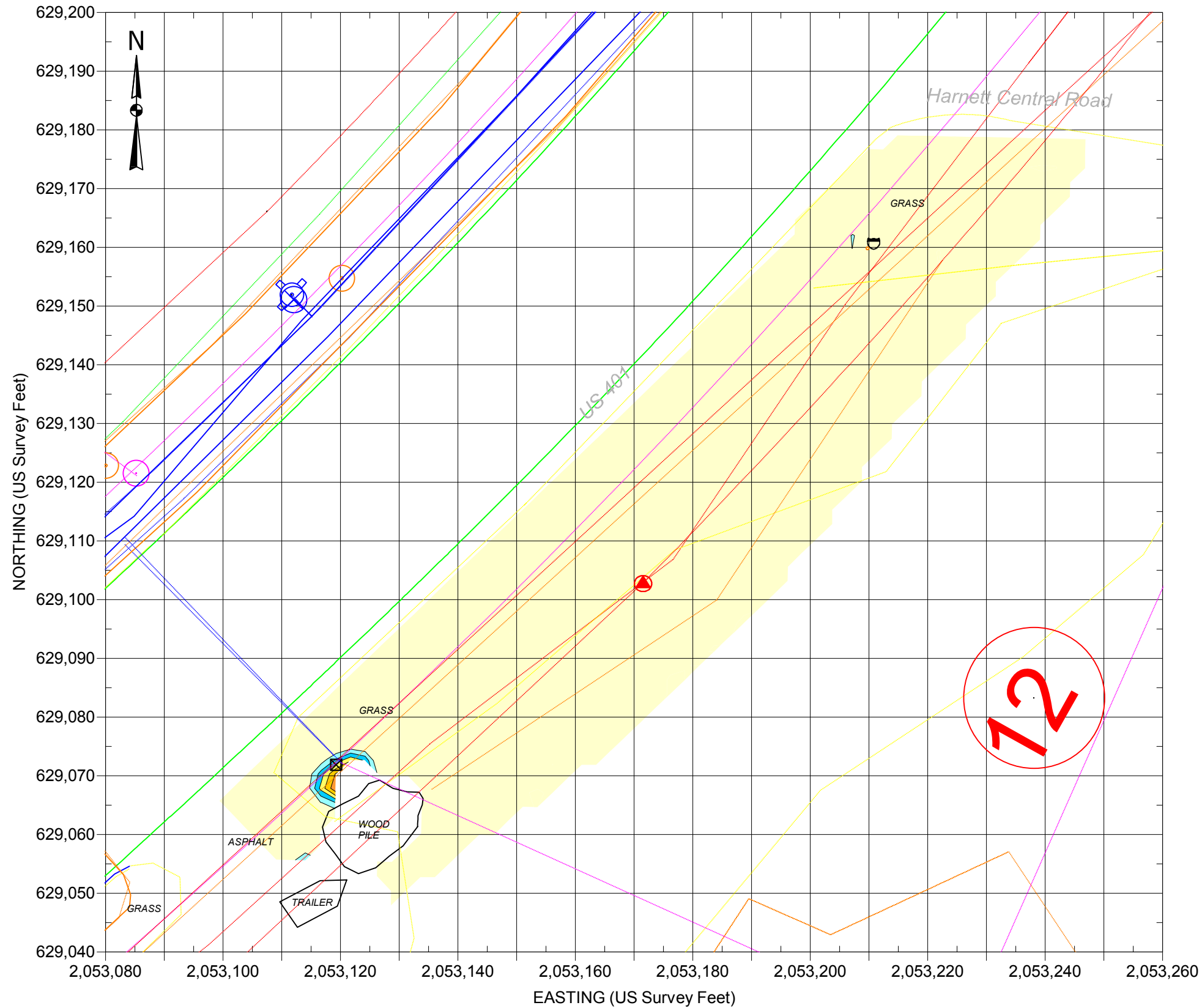
EXPLANATION	
	UTILITY MANHOLE, METER, BOX, ETC.
	SIGN
	EDGE OF NCDOT PROPOSED R/W
	PROPERTY LINE

BASE PLAN FROM NCDOT FILE:
R5523_RDY_PSH4.dgn &
R5523_RDY_PSH6.dgn
(FOR SOME SITE FEATURES)

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 April 2, 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.

	STATE PROJECT R-5523 NC DEPARTMENT OF TRANSPORTATION HARNETT COUNTY, NC PROJECT NO. 11821014.35	EM61 EARLY TIME GATE RESPONSE FIGURE 3
--	--	---

PARCEL 12



EXPLANATION	
	UTILITY MANHOLE, METER, BOX, ETC.
	SIGN
	EDGE OF NCDOT PROPOSED RW
	PROPERTY LINE

BASE PLAN FROM NCDOT FILE:
R5523_RDY_PSH4.dgn &
R5523_RDY_PSH6.dgn
(FOR SOME SITE FEATURES)

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 April 2, 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.

	STATE PROJECT R-5523 NC DEPARTMENT OF TRANSPORTATION HARNETT COUNTY, NC PROJECT NO. 11821014.35	EM61 DIFFERENTIAL RESPONSE FIGURE 4
--	--	--



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: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Dry to wet, brown, clayey fine to medium SAND (SM), with trace organics.	0.0	1.3	
			1.0	2.4	
	2.0	Wet to saturated, tan to red-tan, sandy silty CLAY (CL).	2.0	2.5*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			3.0	1.1	
			4.0	1.0	
	5.0	Dry to moist, red-tan, silty SAND (SM).	5.0	0.8	
	6.0	Dry to moist, red-tan, sandy SILT (ML).	6.0	0.9	
			7.0	0.8	
	8.0	Moist, red-tan, sandy clayey SILT (ML).	8.0	0.6	
			9.0	0.7	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

GEOPROBE_LOG_R5523_GEOENV_GEOPROBELOGS_PARCEL12.GPJ F&R.GDT 6/6/14

*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

Elevation: Existing Ground Surface

Drilling Method: Geoprobe

Client: NCDOT

Total Depth: 10.0'

Hammer Type: N/A

Project: R-5523 (Parcel 12)

Boring Location: See Plan

Date Drilled: 4/9/14

City/State: Harnett County, NC

Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan, clayey silty fine SAND (SM).	0.0	0.4	
			1.0	0.6	
	2.0	Moist, tan, silty clayey SAND (SC).	2.0	0.6	
	3.0	Dry to moist, tan-orange to red-tan, sandy clayey SILT (ML).	3.0	0.6	
			4.0	0.7	
			5.0	0.6	
			6.0	0.7	
			7.0	0.8	
	8.0	Dry to moist, red-tan, sandy CLAY (CL).	8.0	0.9*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			9.0	0.7	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

GEOPROBE_LOG_R5523_GEOENV_GEOPROBELOGS_PARCEL12.GPJ F&R.GDT 6/6/14

*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-1, facing southwest.



Photo #2: Boring location B-1, facing northeast.



Photo #3: Boring location B-2 facing southwest.



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



APPENDIX V

LABORATORY ANALYTICAL RESULTS



Hydrocarbon Analysis Results

Client: F&R

Address:

Samples taken

Wednesday, April 09, 2014

Samples extracted

Wednesday, April 09, 2014

Samples analysed

Tuesday, April 15, 2014

Contact: MIKE SABODISH

Operator

RACHEL MENOHER

Project: NCDOT R-5523 WBS 45548 1-1

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	PARCEL 14 B-10 9-10	12.0	<0.1	<0.1	<0.3	<0.3	0.15	<0.1	<0.01	0	20.5	79.5	Deg.Fuel (P) 7%
s	PARCEL 14 B-11 1-2	13.0	<0.1	<0.1	2	2	1.8	0.12	<0.01	35.1	29.4	35.5	V.Deg.PHC 73.6%
s	PARCEL 14 B-12 7-8	13.0	<0.1	<0.1	<0.3	<0.3	0.04	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 28.4%
s	PARCEL 14 B-13 5-6	12.0	<0.1	<0.1	<0.3	<0.3	0.04	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 33.1%
s	PARCEL 14 B-14 5-6	13.0	<0.1	<0.1	<0.3	<0.3	0.05	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 21.3%
s	PARCEL 14 B-15 5-6	11.0	<0.1	<0.1	<0.3	<0.3	0.06	0.02	0.011	0	0	100	Deg.Fuel (P) 12.8%
s	PARCEL 14 B-16 5-6	12.0	<0.1	<0.1	<0.3	<0.3	0.06	<0.1	<0.01	0	15.8	84.2	Deg.Fuel Residue (P) 13.7%
s	PARCEL 12 B-1 2-3	13.0	<0.1	<0.1	17.8	17.8	16.3	0.88	0.011	38.1	44.1	17.9	V.Deg.PHC 89.5%
s	PARCEL 12 B-2 8-9	15.0	<0.2	<0.2	<0.4	<0.4	0.05	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 37.4%
			Initial Calibrator QC check OK										

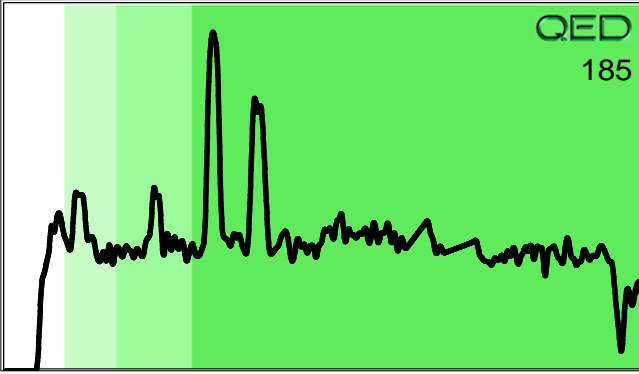
Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

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

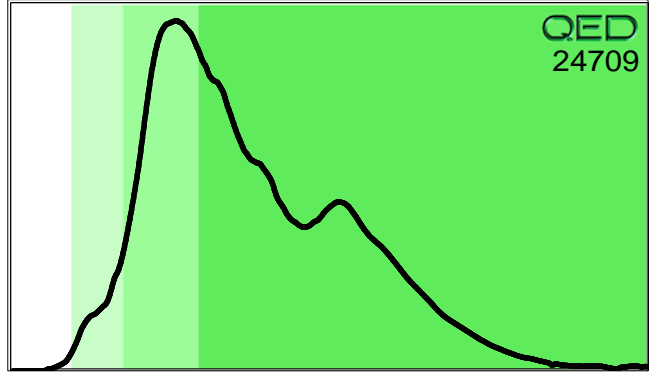
Deg.Fuel Residue (P) 37.4%

PARCEL 12 B-2 8-9



V.Deg.PHC 89.5%

PARCEL 12 B-1 2-3



SINCE



1881

