

Preliminary Site Assessment Report Lee Ray Bergman, LLC Property

**Parcel 198
Durham
Durham County, North Carolina**

**H&H Job No. ROW-416
State Project U-0071
WBS Element #34745.1.1
August 15, 2013**



SMARTER ENVIRONMENTAL SOLUTIONS

**Preliminary Site Assessment Report
Lee Ray Bergman, LLC Property Parcel #198
Durham, Durham County, North Carolina
H&H Project ROW-416**

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**Preliminary Site Assessment Report
Lee Ray Bergman, LLC Property Parcel #198
Durham, Durham County, North Carolina
H&H Project ROW-416**

1.0 Introduction

Hart & Hickman, PC (H&H) has prepared this Preliminary Site Assessment (PSA) report documenting assessment activities performed at the Lee Ray Bergman, LLC property (Parcel 198) located at 947 S. Miami Blvd (US Highway 70), in Durham, Durham County, North Carolina. This assessment was conducted on behalf of the North Carolina Department of Transportation (NC DOT) in accordance with H&H's May 8, 2013 proposal.

The purpose of this assessment was to collect data to evaluate the potential for underground storage tank (UST) systems and the presence or absence of impacted soil in proposed right-of-way and construction easement areas on the subject property related to the proposed widening of US Highway 70 (State Project U-0071). Because the Parcel 198 property is a potential total take, PSA activities were conducted on the entire property. The Parcel 198 property currently operates as a lawn equipment repair shop, apparel printing shop, and an auto detailing shop. A site location map is included as Figure 1, and a site map is presented as Figure 2. The NC DOT preliminary plan of the proposed road widening area near the Parcel 198 property is attached as Appendix A.

H&H contacted the North Carolina Department of Environment and Natural Resources (DENR) Raleigh and Central Offices and searched for UST incident files for the Parcel 198 property to better target UST system areas and to find locations of previously reported petroleum impacts. No UST incident files were available for review.

The PSA activities conducted by H&H on the Parcel 198 property are discussed below.

2.0 Site Assessment

Soil Assessment Field Activities

H&H mobilized to the Parcel 198 property on July 8, 2013 and advanced seven soil borings (198-1 through 198-7) by direct push technology (DPT). Prior to advancing the soil borings, H&H reviewed the results of a geophysical survey performed at the subject site by Schnabel Engineering (Schnabel) in June 2013. Schnabel utilized electromagnetic (EM) induction technology and ground penetrating radar (GPR) to identify potential geophysical anomalies and potential USTs at the site. The EM results indicated the presence of anomalies attributed to buried utilities, metal objects near the ground surface, and reinforced concrete; however, follow up with GPR did not indicate the presence of USTs. Based on the Schnabel EM and GPR results, no potential USTs were identified in the survey area. Please note that some portions of the property could not be surveyed due to the presence of vehicles that could not be moved. Schnabel's report, including a site map depicting the results of the EM and GPR survey, is provided in Appendix B.

Prior to conducting soil borings, utilities were marked by NC One Call and a private utility locator. Borings were also cleared up to a five foot depth by hand auger. H&H utilized Probe Technology, Inc. (PTI) of Concord, North Carolina to advance the soil borings (Figure 2). During soil sampling activities, H&H attempted to advance all borings to a total depth of 12 ft bgs. DPT refusal was encountered at depths ranging from 3 ft bgs to 9 ft bgs in borings 198-1, 198-2, and 198-5 through 198-7. A rock outcrop was identified between borings 198-1 and 198-2 in a gravel parking area to the west of the site building. To facilitate the selection of soil samples for laboratory analysis, soil from each boring was screened continuously for the presence of volatile organic compounds (VOCs) with an organic vapor analyzer (OVA). Additionally, H&H observed the soil for visual and olfactory indications of petroleum impacts. During soil screening, there were moderate indications of impacts in boring 198-1. There were no significant indications of impacts in soil borings 198-2 through 198-7. Soil samples were collected at depths ranging from 0 to 1 ft bgs to 3 ft to 4 ft bgs from each boring location. Wood and rubber debris were identified between 2 ft and 3 ft in boring 198-6, indicating potential buried debris in this area. Soil boring logs are included in Appendix C.

Soil borings 198-1 through 198-3 were advanced in the gravel and asphalt parking areas in the western portion of the property along US Highway 70. Soil borings 198-4 and 198-5 were advanced in unpaved parking areas in the southeast and central portions of the property. Soil boring 198-6 was advanced near household trash and debris piled in the northeast portion of the property. Soil boring 198-7 was advanced near a septic tank in the northern portion of the property. During PSA activities, H&H identified a monitoring well and a water supply well on the property. The monitoring well is located in the southeast portion of the property and the water supply well is located on the southern side of the site building (Figure 2). GPS coordinate data for soil borings, the monitoring well, and the water supply well are included in Table 1.

H&H submitted a total of seven soil samples (198-1 through 198-7) for laboratory analysis. Samples were sent to Pace Analytical Services, Inc. using standard chain-of-custody protocol for analysis of total petroleum hydrocarbons (TPH) for gasoline-range organics (GRO) and diesel-range organics (DRO) by EPA Method 8015. Sample depths and analytical results are summarized in Table 2. Laboratory analytical data sheets for the Parcel 198 soil samples and chain-of-custody documentation are provided in Appendix D. The analytical results are discussed below.

3.0 Analytical Results

Widespread petroleum impacts were detected in the soil on Parcel 198. Target petroleum analytes were detected in six soil samples collected from Parcel 198. Concentrations of TPH DRO (up to 318 mg/kg) were detected in soil samples 198-1 through 198-5 and 198-7 above the DENR Action Level of 10 mg/kg. No TPH GRO concentrations were detected above the laboratory detection limits.

The TPH DRO impacted soils are located in the parking areas in the western, central, and east-central portions of the property and near the septic tank in the northern portion of the property.

- H&H estimates that there are roughly 1,000 cubic yards (1,500 tons) of petroleum impacted soil between the surface and 4 ft in the parking areas on the west side of the site building near soil borings 198-1 through 198-3.

- There are roughly 500 cubic yards (750 tons) of petroleum impacted soil between the surface and 4 ft in the unpaved parking area in the east and central portions of the property near soil borings 198-4 and 198-5.
- There are roughly 80 cubic yards (120 tons) of petroleum impacted soil between the surface and 3 ft near the northeast side of site building near a septic tank and soil boring 198-7.

The estimated depth of impacted soils is based on field screening results. However, field screening and lab results did not provide information that defines the impacted soil interval or extent in most locations. Therefore, impacts may extend beyond the depths and amounts indicated above. The approximate areas of petroleum impacted soils are shown on Figure 2.

4.0 Summary and Regulatory Considerations

H&H has reviewed geophysical survey results and analytical results of soil samples collected on the Parcel 198 property. Based on Schnabel's EM/GPR survey, no potential USTs were identified on Parcel 198. H&H identified a monitoring well in the southeast portion of the property and water supply well near the southern side of the site building. These wells appear to be located outside of proposed NC DOT work areas.

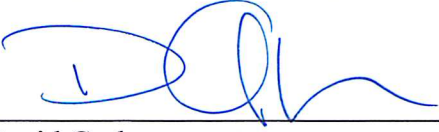
Analytical results of soil samples collected by H&H indicate TPH DRO above the DENR Action Levels in six soil samples collected on Parcel 198.

- H&H estimates that there are roughly 1,000 cubic yards (1,500 tons) of petroleum impacted soil between the surface and 4 ft in the parking areas on the west side of the site building near soil borings 198-1 through 198-3.
- There are roughly 500 cubic yards (750 tons) of petroleum impacted soil between the surface and 4 ft in the unpaved parking area in the southeast and central portions of the property near soil borings 198-4 and 198-5.
- There are roughly 80 cubic yards (120 tons) of petroleum impacted soil between the surface and 3 ft near the northeast side of site building near a septic tank and soil boring 198-7.

H&H estimates there are roughly 1,580 cubic yards of impacted soil on the Parcel 198 property. NC DOT plans indicate a proposed cut and installation of drainage ditches in NC DOT work areas. Impacted soil that is removed during road construction activities should be properly managed and disposed at a permitted facility. If road construction activities will disturb or cover the monitoring well and/or water supply well, these wells should be properly abandoned in accordance with DENR regulations.

5.0 Signature Page

This report was prepared by:



David Graham
Senior Project Geologist for
Hart and Hickman, PC

This report was reviewed by:



Matt Bramblett, PE
Principal and Project Manager for
Hart and Hickman, PC

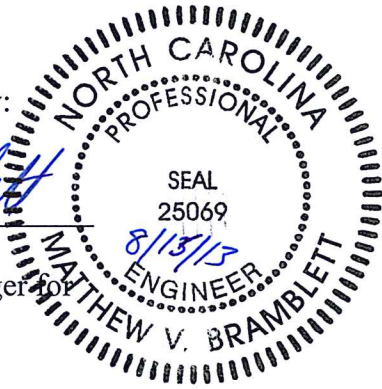


Table 1
Soil Boring GPS Coordinate Data
Lee Ray Bergman, LLC Property (Parcel 198)
Durham, Durham County, North Carolina
H&H Job No. ROW-416

Sample ID	Latitude	Longitude
198-1	35.966991662	-78.847334018
198-2	35.966774293	-78.847210426
198-3	35.966608193	-78.847114710
198-4	35.966700917	-78.846799968
198-5	35.966823987	-78.847009987
198-6	35.967093735	-78.846702047
198-7	35.967037984	-78.846996310
MW	35.966800288	-78.846716306
WSW	35.966874523	-78.846993367

Notes:

GPS coordinate data points collected using a Trimble GeoExplorer 6000 series unit with external satellite for increased accuracy.

MW = Monitoring Well

WSW = Water Supply Well

Table 2
Soil Analytical Results
Lee Ray Bergman, LLC Property (Parcel 198)
Durham, Durham County, North Carolina
H&H Job No. ROW-416

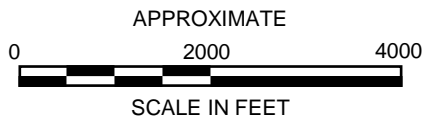
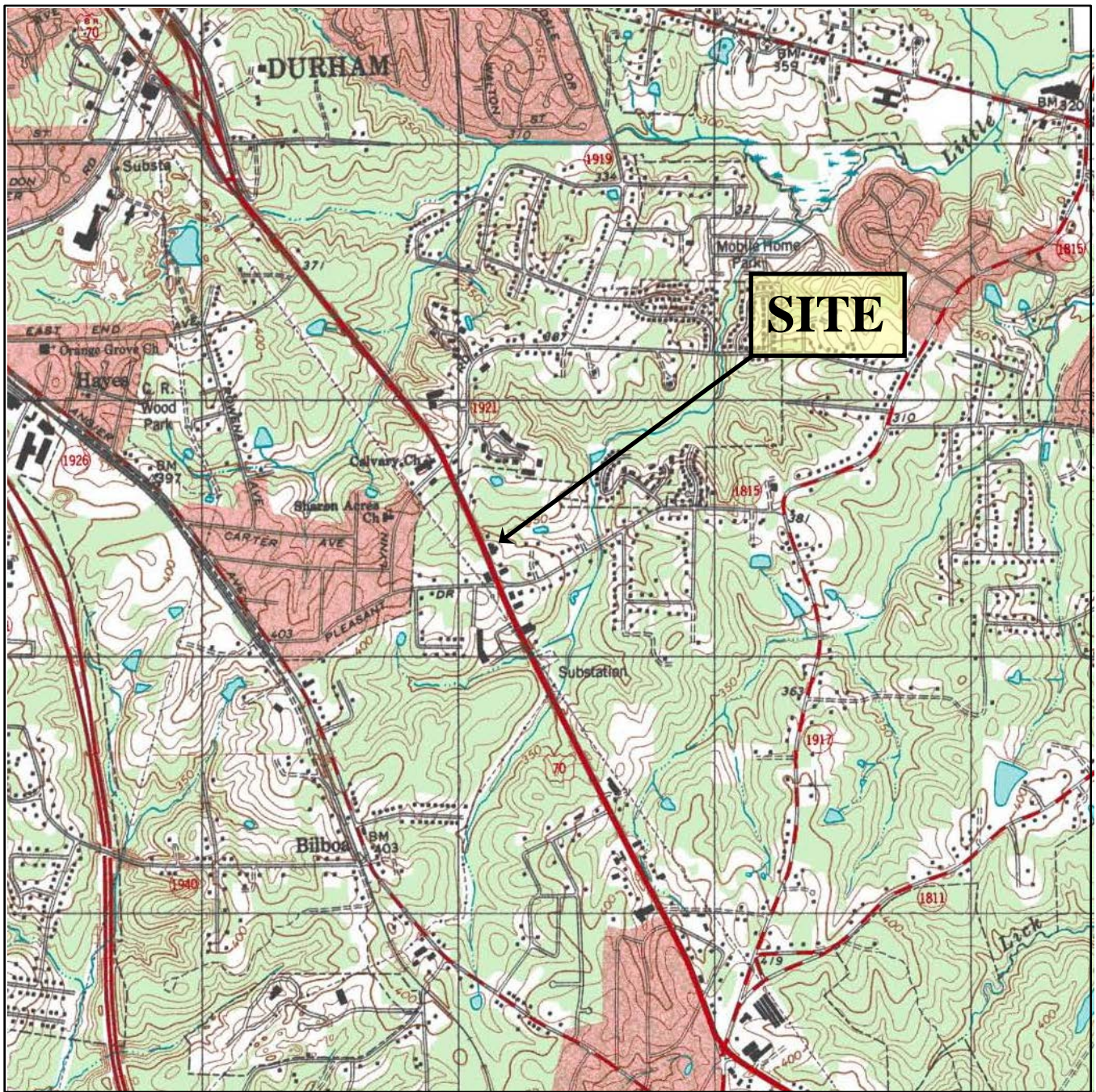
Sample ID	198-1	198-2	198-3	198-4	198-5	198-6	198-7	Regulatory Standard
Sample Depth (ft)	0-1	0-1	0-1	1-2	1-2	3-4	0-1	
Sample Date	7/8/2013	7/8/2013	7/8/2013	7/8/2013	7/8/2013	7/8/2013	7/8/2013	
<u>TPH-DRO/GRO (8015)</u> <u>(mg/kg)</u>								NCDENR Action Level (mg/kg)
Diesel-Range Organics (DRO)	318	16.4	63.1	23.6	14.1	<5.2	20	10
Gasoline-Range Organics (GRO)	<6.0	<5.6	<4.7	<5.4	<5.9	<4.8	<5.3	10

Notes:

EPA Method follows parameter in parenthesis

TPH = total petroleum hydrocarbons


Bold indicates above DENR Action Level.



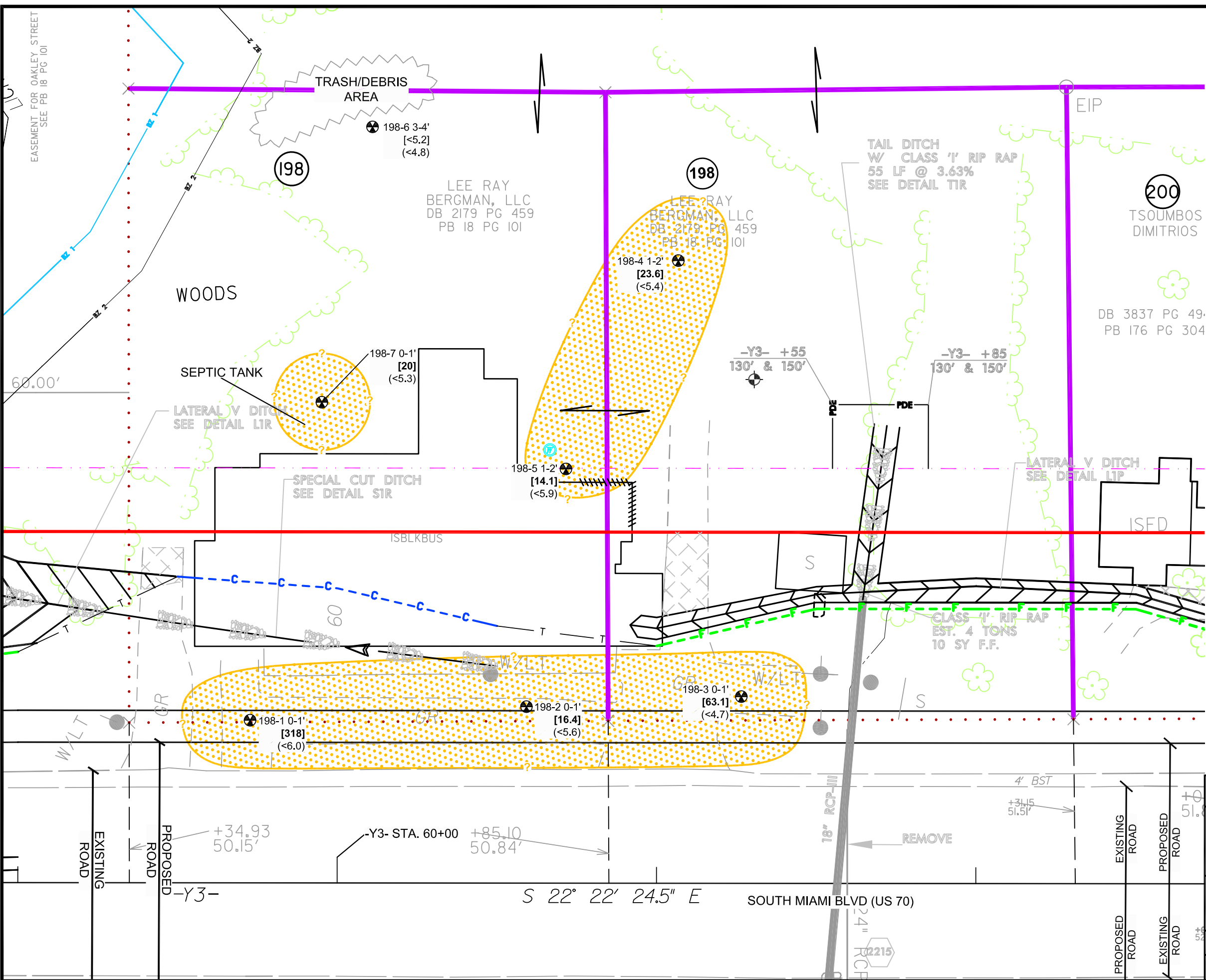
U.S.G.S. QUADRANGLE MAP

SOUTHEAST DURHAM, NORTH CAROLINA 2002

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

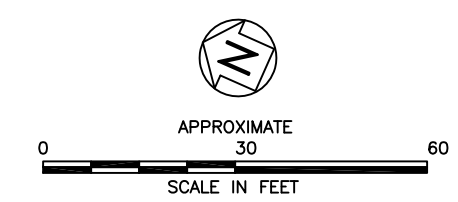
TITLE	SITE LOCATION MAP	
PROJECT	LEE RAY BERGMAN, LLC PROPERTY PARCEL 198 947 S. MIAMI BLVD, DURHAM, NC	
 2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007 (p) 704-586-0373 (f)		
DATE:	7-8-2013	REVISION NO: 0
JOB NO:	ROW-416	FIGURE: 1

S:\AAA-Master Projects\NC DOT Right-of-Way -ROW\ROW-416 U-0071 Durham P5As\DOT Files\CADD\CONVERTED\ROW-416.dwg, 198, 8/14/2013 4:08:55 PM.



LEGEND

- PROPERTY LINE
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- PROPOSED CUT LINE
- PROPOSED FILL LINE
- PROPOSED TRANSITION LINE
- PROPOSED DRAINAGE PIPE
- PROPOSED UTILITY EASEMENT
- PROPOSED DRAINAGE EASEMENT
- PROPOSED CATCH BASIN
- PARCEL ID
- SOIL SAMPLE LOCATION
- MONITORING WELL LOCATION
- WATER SUPPLY WELL
- 198-4 1-2' [23.6] TPH DRO (mg/kg) (<5.4)
198-5 1-2' [14.1] TPH GRO (mg/kg) (<5.9)
BOLD INDICATES EXCEEDANCE OF DENR ACTION LEVEL
- ESTIMATED AREA OF IMPACTED SOIL ABOVE DENR ACTION LEVEL
- PORTION OF BUILDING REMOVED



TITLE SITE MAP AND SOIL ANALYTICAL RESULTS	
PROJECT LEE RAY BERGMAN PROPERTY - PARCEL 198 947 SOUTH MIAMI BLVD DURHAM, DURHAM COUNTY, NORTH CAROLINA	
2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f) License # C-1269 / #C-245 Geology SMARTER ENVIRONMENTAL SOLUTIONS	
DATE: 8-1-13	REVISION NO. 0
JOB NO. ROW-416	FIGURE NO. 2

Appendix A

NC DOT Preliminary Plan

EASEMENT FOR OAKLE
SEE PB 18 PG 1

LEE RAY BERGMAN, LLC
DB 2179 PG 459
PB 18 PG 101

S 21°58'39" E
149.36'

198
LEE RAY BERGMAN, LLC
DB 2179 PG 459
PB 18 PG 101

198
LEE RAY BERGMAN, LLC
DB 2179 PG 459
PB 18 PG 101

S 23°04'55" E
144.35'

TAIL DITCH
W/ CLASS 'I' RIP RAP
55 LF @ 3.63%
SEE DETAIL TIR

S 22°31'11" E
59.56'

200
TSOUMBOS DIMITRIOS
DB 3837 PG 494
PB 176 PG 304

N 83°35'29" E
85.22'

W. V. DOR01
DB F

N 08
19.77'

202

BZ 2

WOODS

LATERAL V DITCH
SEE DETAIL LIR

SPECIAL CUT DITCH
SEE DETAIL SIR

S 67°19'19" W
196.93'

-Y3- +55
130' & 150'

-Y3- +85
130' & 150'

LATERAL V DITCH
SEE DETAIL LIP

S 66°41'47" W
178.86'

CLASS 'I'
EST. 3 TONS
7 SY F.F.

PUE

PUE

PUE

PUE

PUE

PUE

ISBLIBUS

60

C

S

ISEB

RW

W/LT
570

W/LT
573

572

574

CLASS 'I' RIP RAP
EST. 4 TONS
10 SY F.F.

+34.93
50.15'

+85.10
50.84'

+31.15
51.51'

+06.65
51.86'

-Y3-

S 22°22'24.5" F

18" RCP-III

REMOVE

PROP CONC

2210

2211

2GI

Appendix B

Schnabel Engineering Geophysical Survey Report



July 25, 2013

Mr. Matt Bramblett
Hart & Hickman, PC
2923 South Tryon Street, Suite 100
Charlotte, NC 28203

RE: State Project: U-0071
 WBS Element: 34745.1.1
 County: Durham
 Description: Durham East End Connector from NC 147 (Buck Dean Freeway) to
 North of NC 98

**Subject: Project 11821014.28, Report on Geophysical Surveys
 Parcel 198, Lee Ray Bergman LLC Property, Durham, North Carolina**

Dear Mr. Bramblett:

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 color figures and two 8.5x11 color figures. This study was performed in accordance with our proposal for Geophysical Surveys to Locate Possible USTs dated May 21, 2013, as approved by Cathy Houser on May 30, 2013, and our agreement dated June 2, 2011. Terry Fox provided a verbal notice to proceed on May 24, 2013.

INTRODUCTION

The field work described in this report was performed on June 19 and June 28, 2013, by Schnabel under our 2011 contract with the NCDOT. The purpose of the geophysical surveys is to evaluate the potential presence of metal underground storage tanks (USTs) in the accessible areas of the NCDOT right-of-way and/or easement and a perimeter around the building at Parcel 198. Photographs of the property are included on Figure 1. The property is located on the east side of US 70 (S. Miami Boulevard) approximately 450 feet northwest of Pleasant Road in Durham, NC (947 S. Miami Boulevard).

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 with time after the pulse is generated. We recorded the response at several times after the pulse to help evaluate relative size and depth of metallic objects in the earth.

The GPR survey was performed over selected EM61 anomalies (see figures) 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.

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 (metal objects, thick vegetation, 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 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 198 and the GPR survey area 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. 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 small portions of the planned survey area due to the presence of several vehicles that were not able to be moved by the tenants. 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 198 did not cover small portions of the planned survey area due to the presence of several vehicles within the planned survey area. The EM data include responses from several visible metallic objects at grade (e.g. reinforced concrete, surface metal, 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.

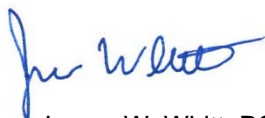
LIMITATIONS

These services have been performed and this report prepared for Hart & Hickman, PC 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, PG
Senior Staff Geophysicist



Gary D. Rogers, PG
Senior Associate

JWW:MAP:GDR

Attachments: Figures (4)

CC: NCDOT, Terry Fox

FILE: G:\2011-SDE-JOBS\11821014_00_NCDOT_2011_GEOTECHNICAL_UNIT_SERVICES\11821014_28_U-0071_DURHAM_COUNTY\REPORT\PARCEL 198\SCHNABEL GEOPHYSICAL REPORT ON PARCEL 198 (U-0071).DOCX

Attachments:

- Figure 1 - Parcel 198 Site Photos
- Figure 2 - Photos of Geophysical Equipment Used
- Figure 3 - Parcel 198 Early Time Gate Response
- Figure 4 - Parcel 198 Differential Response



Parcel 198 (Lee Ray Bergman LLC Property), looking northeast



Parcel 198 (Lee Ray Bergman LLC Property), looking north



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.

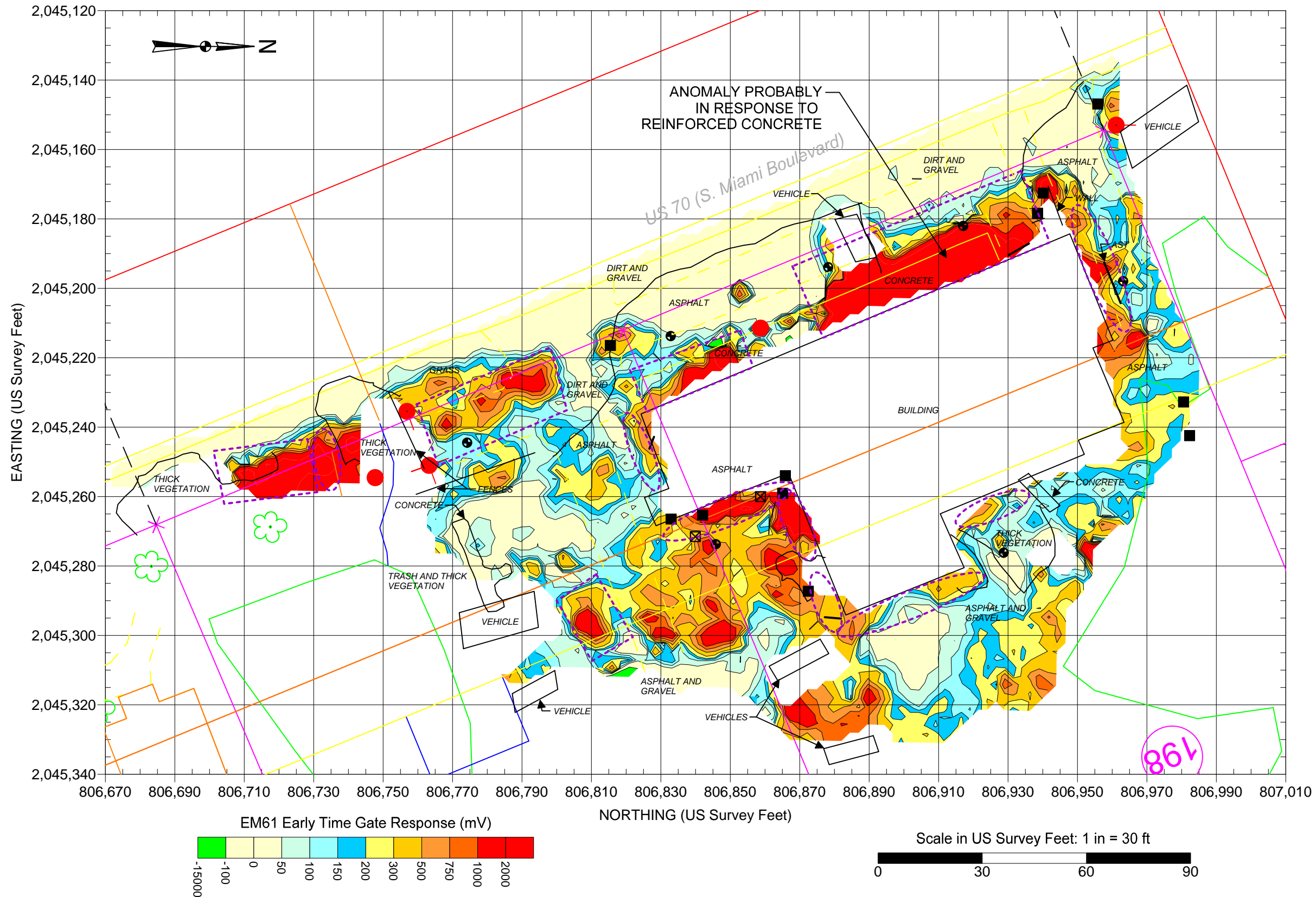


STATE PROJECT U-0071
NC DEPT. OF TRANSPORTATION
DURHAM COUNTY, NC
PROJECT NO. 11821014.28

PHOTOS OF
GEOPHYSICAL
EQUIPMENT USED

FIGURE 2

PARCEL 198



EXPLANATION

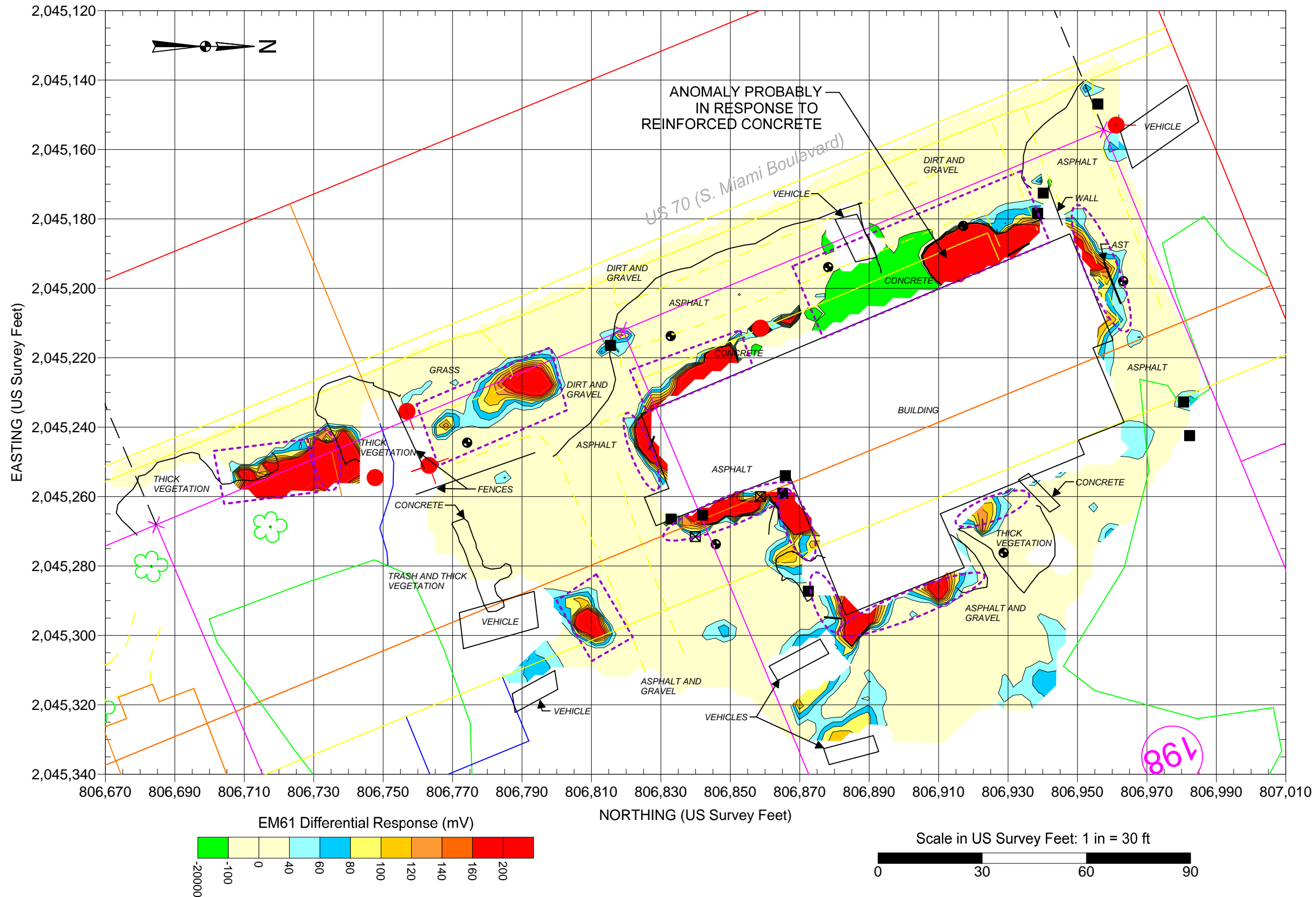
- PROPOSED BORING LOCATION (HART & HICKMAN)
- MISCELLANEOUS METALLIC OBJECT
- ⊠ UTILITY MANHOLE, METER, BOX, ETC.
- ⬢ EDGE OF NCDOT PROPOSED RW
- ⋯ GPR SURVEY AREA

BASE PLAN FROM NCDOT FILE:
u0071_rdy_psh22.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 June 19 and June 28, 2013, 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 June 28, 2013, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	<p>STATE PROJECT U-0071 NC DEPARTMENT OF TRANSPORTATION DURHAM COUNTY, NC PROJECT NO. 11821014.28</p>	<p>EM61 EARLY TIME GATE RESPONSE FIGURE 3</p>
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PARCEL 198



EXPLANATION	
	PROPOSED BORING LOCATION (HART & HICKMAN)
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	EDGE OF NCDOT PROPOSED RW
	GPR SURVEY AREA

BASE PLAN FROM NCDOT FILE:
u0071_rdy_psh22.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 June 19 and June 28, 2013, 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 June 28, 2013, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	STATE PROJECT U-0071 NC DEPARTMENT OF TRANSPORTATION DURHAM COUNTY, NC PROJECT NO. 11821014.28	EM61 DIFFERENTIAL RESPONSE FIGURE 4
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Appendix C
Soil Boring Logs



BORING NUMBER 198-1

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)

3334 Hillsborough Street
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)

PROJECT: NC DOT State Project U-0071 - Parcel 198

JOB NUMBER: ROW-416

LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm)		LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)		
			BKG.	SAMP.						
0.0						Asphalt		0.0		
		GB	0	33.1		Orange brown, clayey SILT				
			0	19.2						
2.5			0	3.2						2.5
			0	1						
			0	1.4		Tan orange, clayey SILT				
5.0			0	0						5.0
			0	0						
			0	0		Red brown, sandy SILT				
7.5			0	0						7.5
						Refusal at 8.0 feet. Bottom of borehole at 8.0 feet.				

BORING LOG - HART HICKMAN.GDT - 7/26/13 15:11 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 198.GPJ

DRILLING CONTRACTOR: Probe Technology
DRILL RIG/ METHOD: Geoprobe
SAMPLING METHOD: Macro-Core
LOGGED BY: MJG
DRAWN BY: TCD

BORING STARTED: 7/8/13
BORING COMPLETED: 7/8/13
TOTAL DEPTH: 8 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil samples collected from 0 to 1 ft bgs.



BORING NUMBER 198-2

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)

3334 Hillsborough Street
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)

PROJECT: NC DOT State Project U-0071 - Parcel 198

JOB NUMBER: ROW-416

LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm)		LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)
			BKG.	SAMP.				
0.0						Asphalt		0.0
		GB	0	0		Brown, sandy SILT		
			0	0				
2.5			0	0				2.5
			0	0		Orange brown, clayey SILT		
			0	0				
5.0			0	0				5.0
			0	0				
			0	0				
7.5			0	0				7.5
			0	0				
			0	0				
10.0						Refusal at 9.0 feet. Bottom of borehole at 9.0 feet.		10.0

BORING LOG - HART HICKMAN.GDT - 7/26/13 15:11 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 198.GPJ

DRILLING CONTRACTOR: Probe Technology
DRILL RIG/ METHOD: Geoprobe
SAMPLING METHOD: Macro-Core
LOGGED BY: MJG
DRAWN BY: TCD

BORING STARTED: 7/8/13
BORING COMPLETED: 7/8/13
TOTAL DEPTH: 9 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil samples collected from 0 to 1 ft bgs.



BORING NUMBER 198-3

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)

3334 Hillsborough Street
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)

PROJECT: NC DOT State Project U-0071 - Parcel 198

JOB NUMBER: ROW-416

LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm)		LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)
			BKG.	SAMP.				
0.0		GB	0	0	Asphalt			0.0
			0	0	Brown, sandy SILT			
2.5			0	0	Orange brown, silty CLAY			2.5
			0	0				
5.0			0	0				5.0
			0	0				
7.5			0	0				7.5
			0	0				
10.0			0	0				10.0
			0	0				
12.5			0	0				12.5
						Bottom of borehole at 12.0 feet.		

BORING LOG - HART HICKMAN.GDT - 7/26/13 15:11 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 198.GPJ

DRILLING CONTRACTOR: Probe Technology
DRILL RIG/ METHOD: Geoprobe
SAMPLING METHOD: Macro-Core
LOGGED BY: MJG
DRAWN BY: TCD

BORING STARTED: 7/8/13
BORING COMPLETED: 7/8/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
 Soil samples collected from 0 to 1 ft bgs.



BORING NUMBER 198-4

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)

3334 Hillsborough Street
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)

PROJECT: NC DOT State Project U-0071 - Parcel 198

JOB NUMBER: ROW-416

LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm)		LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)
			BKG.	SAMP.				
0.0								0.0
			0	4.9	Gravel			
		GB	0	6.5	Brown, sandy SILT			
2.5			0	0.8	Orange brown, clayey SILT			2.5
			0	1.4				
			0	0.4				
5.0			0	0				5.0
			0	0				
			0	0				
7.5			0	0				7.5
			0	0	Orange brown, sandy SILT			
			0	0				
			0	0				
10.0			0	0				10.0
			0	0				
			0	0				
12.5						Bottom of borehole at 12.0 feet.		12.5

BORING LOG - HART HICKMAN.GDT - 7/26/13 15:11 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 198.GPJ

DRILLING CONTRACTOR: Probe Technology
DRILL RIG/ METHOD: Geoprobe
SAMPLING METHOD: Macro-Core
LOGGED BY: MJG
DRAWN BY: TCD

BORING STARTED: 7/8/13
BORING COMPLETED: 7/8/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil samples collected from 1 to 2 ft bgs.



BORING NUMBER 198-5

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)

3334 Hillsborough Street
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)

PROJECT: NC DOT State Project U-0071 - Parcel 198
JOB NUMBER: ROW-416
LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm)		LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)
			BKG.	SAMP.				
0.0					Gravel			0.0
			0	5.3	Red brown, sandy SILT			
		GB	0	8.7				
2.5			0	2.1				2.5
			0	2	Orange brown, clayey SILT			
			0	1.1				
5.0			0	0				5.0
			0	0	Tan brown, sandy SILT			
			0	0				
7.5			0	0				7.5
			0	0				
10.0					Refusal at 9.0 feet. Bottom of borehole at 9.0 feet.			10.0

BORING LOG - HART HICKMAN.GDT - 7/26/13 15:11 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 198.GPJ

DRILLING CONTRACTOR: Probe Technology
DRILL RIG/ METHOD: Geoprobe
SAMPLING METHOD: Macro-Core
LOGGED BY: MJG
DRAWN BY: TCD

BORING STARTED: 7/8/13
BORING COMPLETED: 7/8/13
TOTAL DEPTH: 9 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil samples collected from 1 to 2 ft bgs.



BORING NUMBER 198-6

2923 South Tryon Street-Suite 100
 Charlotte, North Carolina 28203
 704-586-0007(p) 704-586-0373(f)

3334 Hillsborough Street
 Raleigh, North Carolina 27607
 919-847-4241(p) 919-847-4261(f)

PROJECT: NC DOT State Project U-0071 - Parcel 198

JOB NUMBER: ROW-416

LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm)		LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)
			BKG.	SAMP.				
0					Gravel			0
1								1
2					Gravel, wood debris and rubber debris			2
3					Red brown, sandy SILT			3
4		GB	0	0				4
5						Refusal at 4.0 feet. Bottom of borehole at 4.0 feet.		5

BORING LOG - HART HICKMAN.GDT - 7/29/13 16:41 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 198.GPJ

DRILLING CONTRACTOR: Probe Technology
DRILL RIG/ METHOD: Hand Auger
SAMPLING METHOD: Hand Auger
LOGGED BY: MJG
DRAWN BY: TCD

BORING STARTED: 7/8/13
BORING COMPLETED: 7/8/13
TOTAL DEPTH: 4 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
 Soil samples collected from 3 to 4 ft bgs.



BORING NUMBER 198-7

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)

3334 Hillsborough Street
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)

PROJECT: NC DOT State Project U-0071 - Parcel 198

JOB NUMBER: ROW-416

LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm)		LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)
			BKG.	SAMP.				
0								0
0.5		GB	0	0	Gravel			0.5
1.0					Red brown, sandy SILT			1.0
2.0			0	0				2.0
3.0			0	0				3.0
3.0					Refusal at 3.0 feet. Bottom of borehole at 3.0 feet.			3.0
4.0								4.0

BORING LOG - HART HICKMAN.GDT - 7/26/13 15:12 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 198.GPJ

DRILLING CONTRACTOR: Probe Technology
DRILL RIG/ METHOD: Hand Auger
SAMPLING METHOD: Hand Auger
LOGGED BY: MJG
DRAWN BY: TCD

BORING STARTED: 7/8/13
BORING COMPLETED: 7/8/13
TOTAL DEPTH: 3 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil samples collected from 0 to 1 ft bgs.

Appendix D

Laboratory Analytical Report



Pace Analytical Services, Inc.
 205 East Meadow Road - Suite A
 Eden, NC 27288
 (336)623-8921

Pace Analytical Services, Inc.
 2225 Riverside Dr.
 Asheville, NC 28804
 (828)254-7176

Pace Analytical Services, Inc.
 9800 Kinsey Ave. Suite 100
 Huntersville, NC 28078
 (704)875-9092

July 12, 2013

Chemical Testing Engineer
 NCDOT
 Materials & Tests Unit
 1801 Blue Ridge Road
 Raleigh, NC 27607

RE: Project: NCDOT ROW-416 WBS#34745.1.1
 Pace Project No.: 92164402

Dear Chemical Engineer:

Enclosed are the analytical results for sample(s) received by the laboratory on July 09, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kevin Godwin

kevin.godwin@pacelabs.com
 Project Manager

Enclosures

cc: David Graham, NCDOT East Central



REPORT OF LABORATORY ANALYSIS

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205 East Meadow Road - Suite A
Eden, NC 27288
(336)623-8921

Pace Analytical Services, Inc.
2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

Pace Analytical Services, Inc.
9800 Kinsey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

CERTIFICATIONS

Project: NCDOT ROW-416 WBS#34745.1.1
Pace Project No.: 92164402

Charlotte Certification IDs

9800 Kinsey Ave. Ste 100, Huntersville, NC 28078
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001

Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
West Virginia Certification #: 357
Virginia/VELAP Certification #: 460221

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 205 East Meadow Road - Suite A
 Eden, NC 27288
 (336)623-8921

Pace Analytical Services, Inc.
 2225 Riverside Dr.
 Asheville, NC 28804
 (828)254-7176

Pace Analytical Services, Inc.
 9800 Kinsey Ave. Suite 100
 Huntersville, NC 28078
 (704)875-9092

SAMPLE ANALYTE COUNT

Project: NCDOT ROW-416 WBS#34745.1.1

Pace Project No.: 92164402

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92164373013	198-1 @ 0-1	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	JEA	1	PASI-C
92164373014	198-2 @ 0-1	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	JEA	1	PASI-C
92164373015	198-3 @ 0-1	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164373016	198-4 @ 1-2	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164373017	198-5 @ 1-2	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164373018	198-6 @ 3-4	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164373019	198-7 @ 0-1	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: NCDOT ROW-416 WBS#34745.1.1
Pace Project No.: 92164402

Method: EPA 8015 Modified
Description: 8015 GCS THC-Diesel
Client: NCDOT East Central
Date: July 12, 2013

General Information:

7 samples were analyzed for EPA 8015 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3546 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

QC Batch: OEXT/22922

S5: Surrogate recovery outside control limits due to matrix interferences (not confirmed by re-analysis).

- 198-1 @ 0-1 (Lab ID: 92164373013)
- n-Pentacosane (S)

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: NCDOT ROW-416 WBS#34745.1.1
Pace Project No.: 92164402

Method: EPA 8015 Modified
Description: Gasoline Range Organics
Client: NCDOT East Central
Date: July 12, 2013

General Information:

7 samples were analyzed for EPA 8015 Modified. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 5035A/5030B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1

Pace Project No.: 92164402

Sample: 198-1 @ 0-1 **Lab ID: 92164373013** Collected: 07/08/13 16:00 Received: 07/09/13 16:21 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	318	mg/kg	6.0	1	07/09/13 19:16	07/10/13 18:32	68334-30-5	
Surrogates								
n-Pentacosane (S)	140	%	41-119	1	07/09/13 19:16	07/10/13 18:32	629-99-2	S5
Gasoline Range Organics		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	6.0	1	07/11/13 12:04	07/11/13 13:09	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	83	%	70-167	1	07/11/13 12:04	07/11/13 13:09	460-00-4	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	17.3	%	0.10	1		07/10/13 14:01		

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
 205 East Meadow Road - Suite A
 Eden, NC 27288
 (336)623-8921

Pace Analytical Services, Inc.
 2225 Riverside Dr.
 Asheville, NC 28804
 (828)254-7176

Pace Analytical Services, Inc.
 9800 Kinsey Ave. Suite 100
 Huntersville, NC 28078
 (704)875-9092

ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1
 Pace Project No.: 92164402

Sample: 198-2 @ 0-1 **Lab ID: 92164373014** Collected: 07/08/13 16:35 Received: 07/09/13 16:21 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	16.4	mg/kg	5.3	1	07/09/13 19:16	07/10/13 18:32	68334-30-5	
Surrogates								
n-Pentacosane (S)	71	%	41-119	1	07/09/13 19:16	07/10/13 18:32	629-99-2	
Gasoline Range Organics		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	5.6	1	07/11/13 12:04	07/11/13 18:56	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	89	%	70-167	1	07/11/13 12:04	07/11/13 18:56	460-00-4	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	4.8	%	0.10	1		07/10/13 14:01		

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 Eden, NC 27288
 (336)623-8921

Pace Analytical Services, Inc.
 2225 Riverside Dr.
 Asheville, NC 28804
 (828)254-7176

Pace Analytical Services, Inc.
 9800 Kinsey Ave. Suite 100
 Huntersville, NC 28078
 (704)875-9092

ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1
 Pace Project No.: 92164402

Sample: 198-3 @ 0-1 Lab ID: 92164373015 Collected: 07/08/13 16:20 Received: 07/09/13 16:21 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	63.1	mg/kg	5.9	1	07/09/13 19:16	07/10/13 18:56	68334-30-5	
Surrogates								
n-Pentacosane (S)	77	%	41-119	1	07/09/13 19:16	07/10/13 18:56	629-99-2	
Gasoline Range Organics		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	4.7	1	07/11/13 12:04	07/11/13 13:32	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	85	%	70-167	1	07/11/13 12:04	07/11/13 13:32	460-00-4	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	14.7	%	0.10	1		07/10/13 13:49		

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 Eden, NC 27288
 (336)623-8921

Pace Analytical Services, Inc.
 2225 Riverside Dr.
 Asheville, NC 28804
 (828)254-7176

Pace Analytical Services, Inc.
 9800 Kinsey Ave. Suite 100
 Huntersville, NC 28078
 (704)875-9092

ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1
 Pace Project No.: 92164402

Sample: 198-4 @ 1-2 **Lab ID: 92164373016** Collected: 07/08/13 16:50 Received: 07/09/13 16:21 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	23.6	mg/kg	5.9	1	07/09/13 19:16	07/10/13 18:56	68334-30-5	
Surrogates								
n-Pentacosane (S)	81	%	41-119	1	07/09/13 19:16	07/10/13 18:56	629-99-2	
Gasoline Range Organics		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	5.4	1	07/11/13 12:04	07/11/13 13:55	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	92	%	70-167	1	07/11/13 12:04	07/11/13 13:55	460-00-4	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	15.6	%	0.10	1		07/10/13 13:49		

REPORT OF LABORATORY ANALYSIS

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 Eden, NC 27288
 (336)623-8921

Pace Analytical Services, Inc.
 2225 Riverside Dr.
 Asheville, NC 28804
 (828)254-7176

Pace Analytical Services, Inc.
 9800 Kinsey Ave. Suite 100
 Huntersville, NC 28078
 (704)875-9092

ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1
 Pace Project No.: 92164402

Sample: 198-5 @ 1-2 Lab ID: 92164373017 Collected: 07/08/13 17:15 Received: 07/09/13 16:21 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	14.1	mg/kg	6.4	1	07/09/13 19:16	07/10/13 19:20	68334-30-5	
Surrogates								
n-Pentacosane (S)	74	%	41-119	1	07/09/13 19:16	07/10/13 19:20	629-99-2	
Gasoline Range Organics		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	5.9	1	07/11/13 12:04	07/11/13 14:18	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	97	%	70-167	1	07/11/13 12:04	07/11/13 14:18	460-00-4	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	21.3	%	0.10	1		07/10/13 13:49		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1

Pace Project No.: 92164402

Sample: 198-6 @ 3-4 **Lab ID: 92164373018** Collected: 07/08/13 17:30 Received: 07/09/13 16:21 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	ND	mg/kg	5.2	1	07/09/13 19:16	07/10/13 19:20	68334-30-5	
Surrogates								
n-Pentacosane (S)	73	%	41-119	1	07/09/13 19:16	07/10/13 19:20	629-99-2	
Gasoline Range Organics		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	4.8	1	07/11/13 12:04	07/11/13 14:41	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	86	%	70-167	1	07/11/13 12:04	07/11/13 14:41	460-00-4	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	4.5	%	0.10	1		07/10/13 13:49		

REPORT OF LABORATORY ANALYSIS

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Pace Analytical Services, Inc.
 205 East Meadow Road - Suite A
 Eden, NC 27288
 (336)623-8921

Pace Analytical Services, Inc.
 2225 Riverside Dr.
 Asheville, NC 28804
 (828)254-7176

Pace Analytical Services, Inc.
 9800 Kinsey Ave. Suite 100
 Huntersville, NC 28078
 (704)875-9092

ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1
 Pace Project No.: 92164402

Sample: 198-7 @ 0-1 Lab ID: 92164373019 Collected: 07/08/13 17:50 Received: 07/09/13 16:21 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	20.0	mg/kg	5.9	1	07/09/13 19:16	07/10/13 19:44	68334-30-5	
Surrogates								
n-Pentacosane (S)	78	%	41-119	1	07/09/13 19:16	07/10/13 19:44	629-99-2	
Gasoline Range Organics		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	5.3	1	07/11/13 12:04	07/11/13 15:04	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	86	%	70-167	1	07/11/13 12:04	07/11/13 15:04	460-00-4	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	15.8	%	0.10	1		07/10/13 13:49		

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QUALITY CONTROL DATA

Project: NCDOT ROW-416 WBS#34745.1.1
Pace Project No.: 92164402

QC Batch: GCV/7066 Analysis Method: EPA 8015 Modified
QC Batch Method: EPA 5035A/5030B Analysis Description: Gasoline Range Organics
Associated Lab Samples: 92164373013, 92164373014, 92164373015, 92164373016, 92164373017, 92164373018, 92164373019

METHOD BLANK: 1007926 Matrix: Solid
Associated Lab Samples: 92164373013, 92164373014, 92164373015, 92164373016, 92164373017, 92164373018, 92164373019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	5.9	07/11/13 10:52	
4-Bromofluorobenzene (S)	%	89	70-167	07/11/13 10:52	

LABORATORY CONTROL SAMPLE: 1007927

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	mg/kg	49.5	50.6	102	70-165	
4-Bromofluorobenzene (S)	%			86	70-167	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1007955 1007956

Parameter	Units	92164373011 Result	MS		MSD		% Rec		% Rec Limits	RPD	Qual
			Spike Conc.	MS Result	MSD Result	% Rec	% Rec				
Gasoline Range Organics	mg/kg	ND	42.6	41.2	49.5	96	116	47-187	18		
4-Bromofluorobenzene (S)	%					83	85	70-167			

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QUALITY CONTROL DATA

Project: NCDOT ROW-416 WBS#34745.1.1
Pace Project No.: 92164402

QC Batch: OEXT/22922 Analysis Method: EPA 8015 Modified
QC Batch Method: EPA 3546 Analysis Description: 8015 Solid GCSV
Associated Lab Samples: 92164373013, 92164373014, 92164373015, 92164373016, 92164373017, 92164373018, 92164373019

METHOD BLANK: 1006978 Matrix: Solid
Associated Lab Samples: 92164373013, 92164373014, 92164373015, 92164373016, 92164373017, 92164373018, 92164373019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Components	mg/kg	ND	5.0	07/10/13 15:21	
n-Pentacosane (S)	%	84	41-119	07/10/13 15:21	

LABORATORY CONTROL SAMPLE: 1006979

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Components	mg/kg	66.7	48.9	73	49-113	
n-Pentacosane (S)	%			72	41-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1006980 1006981

Parameter	Units	92164373001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Diesel Components	mg/kg	137	76.2	76.2	194	226	76	117	10-146	15	
n-Pentacosane (S)	%						67	77	41-119		

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QUALITY CONTROL DATA

Project: NCDOT ROW-416 WBS#34745.1.1
 Pace Project No.: 92164402

QC Batch: PMST/5660 Analysis Method: ASTM D2974-87
 QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
 Associated Lab Samples: 92164373013, 92164373014

SAMPLE DUPLICATE: 1007043

Parameter	Units	92164287003 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	23.1	22.8	2	

SAMPLE DUPLICATE: 1007044

Parameter	Units	92164373014 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	4.8	4.6	4	

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QUALITY CONTROL DATA

Project: NCDOT ROW-416 WBS#34745.1.1
 Pace Project No.: 92164402

QC Batch: PMST/5661 Analysis Method: ASTM D2974-87
 QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
 Associated Lab Samples: 92164373015, 92164373016, 92164373017, 92164373018, 92164373019

SAMPLE DUPLICATE: 1007058

Parameter	Units	201103708 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	1.6	1.6	4	

SAMPLE DUPLICATE: 1007059

Parameter	Units	92164218002 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	37.7	36.7	3	

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QUALIFIERS

Project: NCDOT ROW-416 WBS#34745.1.1

Pace Project No.: 92164402

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Acid preservation may not be appropriate for 2-Chloroethylvinyl ether, Styrene, and Vinyl chloride.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-C Pace Analytical Services - Charlotte

ANALYTE QUALIFIERS

S5 Surrogate recovery outside control limits due to matrix interferences (not confirmed by re-analysis).

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NCDOT ROW-416 WBS#34745.1.1
Pace Project No.: 92164402

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92164373013	198-1 @ 0-1	EPA 3546	OEXT/22922	EPA 8015 Modified	GCSV/15047
92164373014	198-2 @ 0-1	EPA 3546	OEXT/22922	EPA 8015 Modified	GCSV/15047
92164373015	198-3 @ 0-1	EPA 3546	OEXT/22922	EPA 8015 Modified	GCSV/15047
92164373016	198-4 @ 1-2	EPA 3546	OEXT/22922	EPA 8015 Modified	GCSV/15047
92164373017	198-5 @ 1-2	EPA 3546	OEXT/22922	EPA 8015 Modified	GCSV/15047
92164373018	198-6 @ 3-4	EPA 3546	OEXT/22922	EPA 8015 Modified	GCSV/15047
92164373019	198-7 @ 0-1	EPA 3546	OEXT/22922	EPA 8015 Modified	GCSV/15047
92164373013	198-1 @ 0-1	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164373014	198-2 @ 0-1	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164373015	198-3 @ 0-1	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164373016	198-4 @ 1-2	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164373017	198-5 @ 1-2	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164373018	198-6 @ 3-4	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164373019	198-7 @ 0-1	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164373013	198-1 @ 0-1	ASTM D2974-87	PMST/5660		
92164373014	198-2 @ 0-1	ASTM D2974-87	PMST/5660		
92164373015	198-3 @ 0-1	ASTM D2974-87	PMST/5661		
92164373016	198-4 @ 1-2	ASTM D2974-87	PMST/5661		
92164373017	198-5 @ 1-2	ASTM D2974-87	PMST/5661		
92164373018	198-6 @ 3-4	ASTM D2974-87	PMST/5661		
92164373019	198-7 @ 0-1	ASTM D2974-87	PMST/5661		

REPORT OF LABORATORY ANALYSIS

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Document Number:
F-CHR-CS-03-rev.11

Issuing Authority:
Pace Huntersville Quality Office

Client Name: Hart Hochman

Where Received: Huntersville Asheville Eden Raleigh

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Packing Material: Bubble Wrap Bubble Bags None Other _____

Thermometer Used: IR Gun T1102 T1301 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Temp Correction Factor T1102: No Correction T1301: No Correction

Corrected Cooler Temp.: 3.9 C Biological Tissue is Frozen: Yes No N/A

Temp should be above freezing to 6°C

Date and Initials of person examining contents: 7/10/13

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>SC</u>		
All containers needing preservation have been checked.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Samples checked for dechlorination:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.
Trip Blank Present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	16.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:

Field Data Required? Y / N

Person Contacted: David Graham Date/Time: 7/10/13

Comments/ Resolution: After receipt, client requested all samples beginning with "198-" be placed on a separate project. KG.

SCURF Review: [Signature] Date: 7/9/13
SRF Review: [Signature] Date: 7/10/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

WO#: 92164402

92164402

CHAIN-OF-CUSTODY / Analytical Request Document
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: <u>Hart & Hickman</u>		Report To: <u>David Graham</u>		Attention: <u>Cynthia Wells</u>	
Address: <u>203 S. Tyson Street</u>		Copy To:		Company Name: <u>Hart & Hickman</u>	
Email To: <u>Suite 100 Charlotte, NC</u>		Purchase Order No.: <u>NBS # 34745.1.1</u>		Address: <u>cvells@hart-hickman.com</u>	
Phone: <u>704-887-4630</u>		Project Name: <u>NC DOT - ROW-416</u>		Pace Quote Reference: <u>Pace Project Manager: Pace Profile #:</u>	
Requested Due Date/TAT:		Project Number: <u>ROW-416</u>		Requested Analysis Filtered (Y/N)	
Matrix Codes		COLLECTED		Preservatives	
Required Client Information		COMPOSITE START		H ₂ SO ₄	
Matrix Codes		COMPOSITE END/GRAB		HNO ₃	
MATRIX / CODE		DATE		HCl	
Drinking Water		TIME		NaOH	
Water		DATE		Na ₂ S ₂ O ₃	
Waste Water		TIME		Methanol	
Product		DATE		Other	
Soil/Solid		TIME		↓ Analysis Test ↓	
Oil		DATE		TPH - GRO	
Wipe		TIME		TPH - DRO	
Air		DATE		Y/N	
Tissue		TIME		Requested Analysis Filtered (Y/N)	
Other		DATE		Residual Chlorine (Y/N)	
OT		TIME		Pace Project No./ Lab I.D.	

ITEM #	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	DATE	TIME	DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	Analysis Test	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	198-1 @ 0-1	SL G	7/8/13	1600	7/8/13	1600	4	4		TPH - GRO TPH - DRO			013
2	198-2 @ 0-1			1635									014
3	198-3 @ 0-1			1620									015
4	198-4 @ 1-2			1650									016
5	198-5 @ 1-2			1715									017
6	198-6 @ 3-4			1730									018
7	198-7 @ 0-1			1750									019
8													
9													
10													
11													
12													

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION		DATE		TIME		ACCEPTED BY / AFFILIATION		DATE		TIME		SAMPLE CONDITIONS	
		<u>Matthew</u>		7/6/13		0346		<u>Julie Wells</u>		7/9/13		0946			
		<u>Julie Wells</u>		7/9/13		1621		<u>Matthew</u>		9/9/10		1621		377 4 0 4	

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER:	<u>Matthew</u>	DATE Signed (MM/DD/YY):	<u>7/5/13</u>
SIGNATURE of SAMPLER:	<u>Matthew</u>	DATE Signed (MM/DD/YY):	<u>7/5/13</u>
Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)