

# Preliminary Site Assessment Report John Tubiolo/J&V Rental Property

**Parcel 201  
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**  
**John Tubiolo/J&V Rental Property Parcel #201**  
**Durham, Durham County, North Carolina**  
**H&H Project ROW-416**

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**Preliminary Site Assessment Report**  
**John Tubiolo/J&V Rental Property Parcel #201**  
**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 John Tubiolo/J&V Rental property (Parcel 201) located at 948 S. Miami Blvd, 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 201 property is a potential total take, PSA activities were conducted on the entire property. The subject property currently operates as a furniture store. Based on conversations with adjacent property owners, the subject property reportedly operated as a gasoline station in the 1950s and 1960s. 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 201 property is attached as Appendix A.

H&H contacted the North Carolina Department of Environment and Natural Resources (DENR) Regional and Central Offices to search for UST incident files for the Parcel 201 property to better target UST system areas and to find locations of previously reported petroleum impacts. No UST files were available for review.

The PSA activities conducted by H&H on the Parcel 201 property are discussed below.

## 2.0 Site Assessment

### Soil Assessment Field Activities

H&H mobilized to the Parcel 201 property on July 9, 2013 and advanced eight soil borings (201-1 through 201-8) 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 data include responses from several visible metallic objects at grade (reinforced concrete, surface metal, etc.); 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 portions of the property were not surveyed due to thick vegetation, trailers, vehicles, etc. 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 to a five ft depth by hand auger. H&H utilized Probe Technology, Inc. (PTI) of Concord, NC 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 below ground surface (bgs). DPT refusal was encountered at depths ranging from 4.5 ft bgs to 11 ft bgs in soil borings 201-3, 201-5, 201-7, and 201-8. 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 no indications of potential impacts in soil borings 201-1 through 201-8. Soil samples were collected from 0 to 1 ft bgs from each soil boring location. Soil boring logs are included in Appendix C.

Soil borings 201-1 through 201-4 were advanced in the asphalt parking area in the eastern portion of the property near US Highway 70. Soil borings 201-5 through 201-7 were advanced in the gravel parking area located on the southern portion of the property near Pleasant Road and

soil boring 201-8 was advanced near the northern side of the site building. During PSA activities, H&H identified a water supply well near the center of the property. The water supply well is located outside of proposed NC DOT work areas (Figure 2). GPS coordinate data for soil borings 201-1 through 201-8 are included in Table 1.

H&H submitted a total of eight soil samples (201-1 through 201-8) for laboratory analysis. Samples were sent to Pace Analytical Services, Inc. using standard chain-of-custody protocol for analysis of total petroleum hydrocarbons (TPH) as 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 Parcel 201 soil samples and chain-of-custody documentation are provided in Appendix D. The analytical results are discussed below.

### **3.0 Analytical Results**

Widespread TPH impacts were detected on Parcel 201. Low level TPH DRO concentrations were detected in six of the eight soil samples collected from Parcel 201. Concentrations of TPH DRO (up to 123 mg/kg) were detected in soil samples 201-1 through 201-3, 201-6, and 201-7 above the DENR Action Level (10 mg/kg). TPH DRO (5.4 mg/kg) was detected in soil sample 201-5 below the DENR Action Level. No TPH GRO concentrations were detected above the laboratory detections limits in soil samples 201-1 through 201-8.

TPH DRO impacted soils are located in the asphalt and gravel parking areas near US Highway 70 and Pleasant Road.

- H&H estimates that there are roughly 500 cubic yards (750 tons) of petroleum impacted soil between the surface and 4 ft in the eastern portion of the property near soil borings 201-1 through 201-3.
- There are roughly 40 cubic yards (80 tons) of petroleum impacted soil below the DENR Action Level between the surface and 2 ft in the southeast portion of the property near soil boring 201-5.

- There are roughly 40 cubic yards (80 tons) of petroleum impacted soil between the surface and 2 ft near soil boring 201-6 and 40 cubic yards (80 tons) of petroleum impacted soil between the surface and 2 ft near soil boring 201-7 located in the southern portion of the property.

Field screening and lab results did not provide information that defines the impacted soil interval or extent in all locations. Therefore, impacts may extend beyond the depths and amounts indicated above. Although the TPH DRO impacts are below the Action Level near boring 201-5, these soils should also be managed as impacted if they are disturbed or excavated by site work. 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 at the Parcel 201 property. Based on Schnabel's GPR survey, no potential USTs were identified in the surveyed portions of Parcel 201. H&H identified a water supply well near the center of the property. The water supply well is located outside of proposed NC DOT work areas.

Widespread TPH DRO impacts were detected on Parcel 201. Analytical results of soil samples collected by H&H indicate the presence of low levels of TPH DRO in six of the eight soil samples collected on Parcel 201.

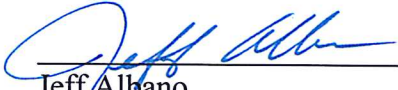
- H&H estimates that there are roughly 500 cubic yards (750 tons) of petroleum impacted soil between the surface and 4 ft in the eastern portion of the property near soil borings 201-1 through 201-3.
- There are roughly 40 cubic yards (80 tons) of petroleum impacted soil below the DENR Action Level between the surface and 2 ft in the southeast portion of the property near soil boring 201-5.
- There are roughly 40 cubic yards (80 tons) of petroleum impacted soil between the surface and 2 ft near soil boring 201-6 and 40 cubic yards (80 tons) of petroleum impacted soil

between the surface and 2 ft near soil boring 201-7 located in the southern portion of the property.

H&H estimates there are a total of 620 cubic yards of impacted soil on the Parcel 201 property. NC DOT plans indicate proposed cuts 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 are conducted near the water supply well, this well should be properly abandoned in accordance with DENR regulations.

## 5.0 Signature Page

This report was prepared by:

  
\_\_\_\_\_  
Jeff Albano  
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**  
**John Tubiolo/J&V Rental Property (Parcel 201)**  
**Durham, Durham County, North Carolina**  
**H&H Job No. ROW-416**

Sample ID	Latitude	Longitude
201-1	35.966049408	-78.847303466
201-2	35.965960023	-78.847246967
201-3	35.965886624	-78.847207079
201-4	35.965797252	-78.847125055
201-5	35.965721814	-78.847266647
201-6	35.965745138	-78.847482999
201-7	35.965715533	-78.847738753
201-8	35.966056908	-78.847432608
WSW	35.965969473	-78.847576010

**Notes:**

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

WSW = Water Supply Well

**Table 2**  
**Soil Analytical Results**  
**John Tubiolo/J&V Rental Property (Parcel 201)**  
**Durham, Durham County, North Carolina**  
**H&H Job No. ROW-416**

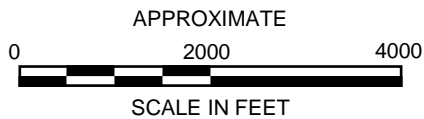
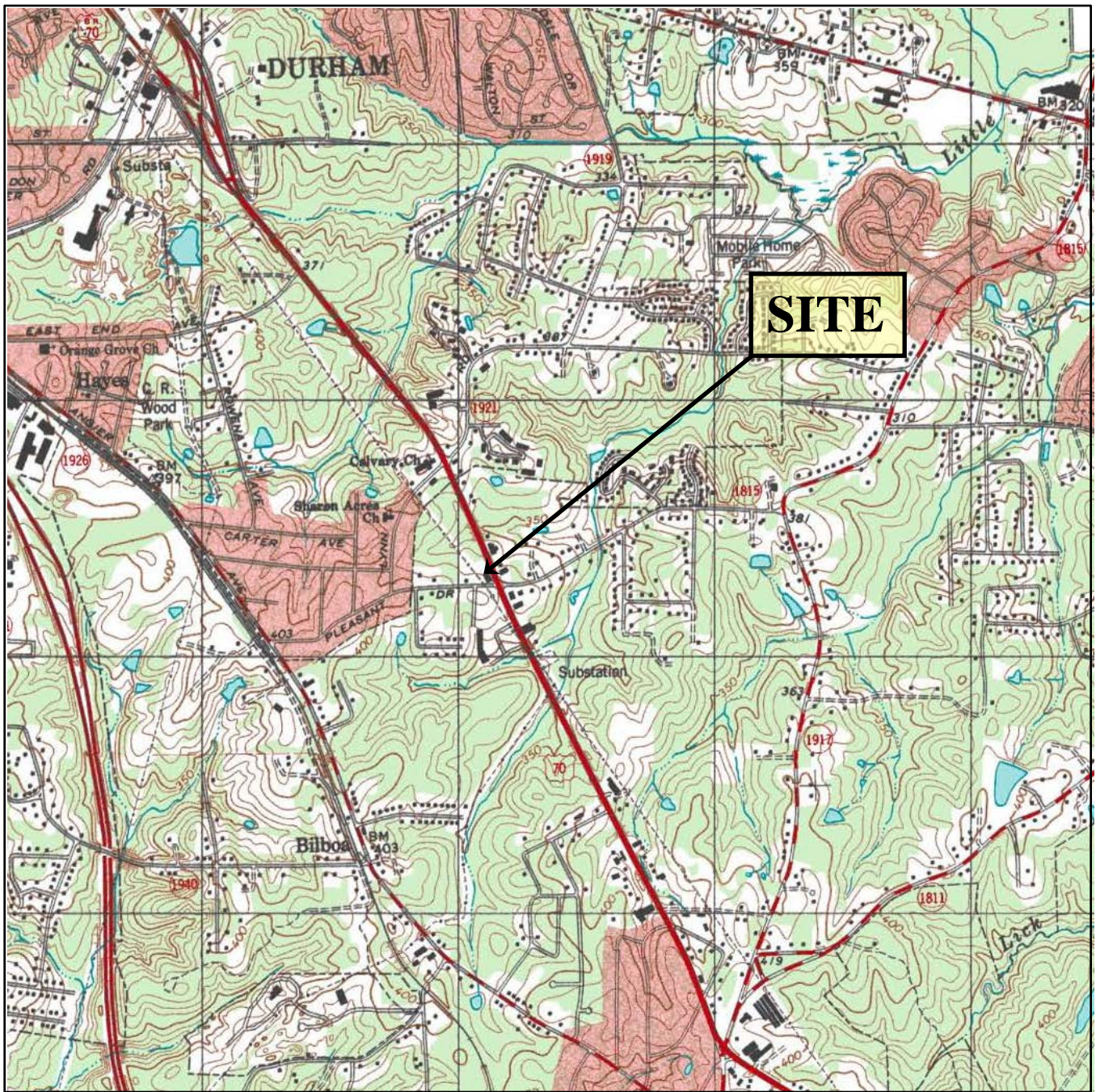
Sample ID	201-1	201-2	201-3	201-4	201-5	201-6	201-7	201-8	Regulatory Standard
Sample Depth (ft)	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	
Sample Date	7/9/2013	7/9/2013	7/9/2013	7/9/2013	7/9/2013	7/9/2013	7/9/2013	7/9/2013	
<b><u>TPH-DRO/GRO (8015)</u></b> <b><u>(mg/kg)</u></b>									<b>NCDENR Action Level (mg/kg)</b>
Diesel-Range Organics (DRO)	<b>55.9</b>	<b>123</b>	<b>30.2</b>	<5.6	5.4	<b>10</b>	<b>17</b>	<6.6	10
Gasoline-Range Organics (GRO)	<5.6	<4.9	<5.6	<5.7	<5.0	<5.1	<6.1	<6.2	10

**Notes:**

EPA Method follows parameter in parenthesis

TPH = total petroleum hydrocarbons

**Bold** indicates at or above DENR Action Level.



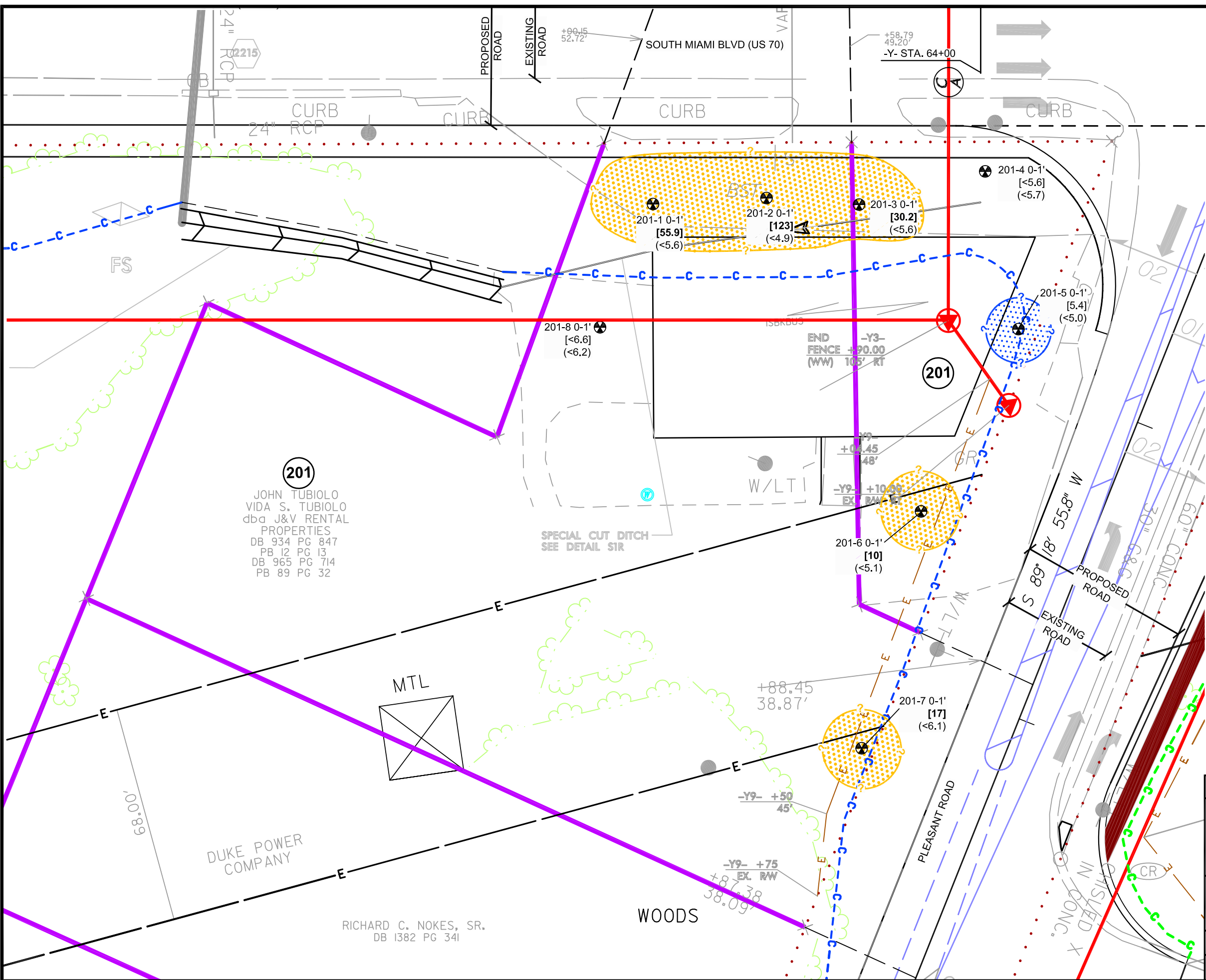
U.S.G.S. QUADRANGLE MAP

**SOUTHEAST DURHAM, NORTH CAROLINA 2002**

QUADRANGLE  
7.5 MINUTE SERIES (TOPOGRAPHIC)

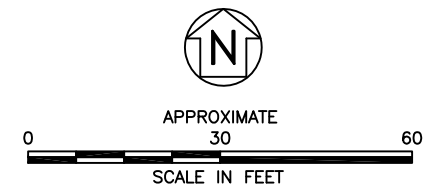
TITLE	<b>SITE LOCATION MAP</b>		
PROJECT	JOHN TUBIOLLO / J&V RENTAL PROPERTY PARCEL 201 948 S. MIAMI BLVD, DURHAM, NC		
		2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007 (p) 704-586-0373 (f)	
SMARTER ENVIRONMENTAL SOLUTIONS			
DATE:	7-8-2013	REVISION NO:	0
JOB NO:	ROW-416	FIGURE:	1

S:\AAA-Master Projects\NC DOT Right-of-Way -ROW\ROW-416 U-0071 Durham PSAs\DOT Files\CADD\CONVERTED\ROW-416.dwg, 201\_8/14/2013 4:09:17 PM, noster



**LEGEND**

- PROPERTY LINE
- - - EXISTING RIGHT-OF-WAY
- ▲ PROPOSED RIGHT-OF-WAY
- - - C - - - PROPOSED CUT LINE
- - - F - - - PROPOSED FILL LINE
- T — PROPOSED TRANSITION LINE
- PROPOSED DRAINAGE PIPE
- E — PROPOSED CONSTRUCTION EASEMENT
- PROPOSED CATCH BASIN
- 201 PARCEL ID
- SOIL SAMPLE LOCATION
- ⊕ WATER SUPPLY WELL
- 201-4 0-1' [**<5.6**] TPH DRO (mg/kg)
- 201-4 0-1' [**<5.7**] TPH GRO (mg/kg)
- BOLD INDICATES EXCEEDANCE OF DENR ACTION LEVEL**
- ESTIMATED AREA OF IMPACTED SOIL AT OR ABOVE DENR ACTION LEVEL
- ESTIMATED AREA OF IMPACTED SOIL BELOW DENR ACTION LEVEL



<b>TITLE</b> SITE MAP AND SOIL ANALYTICAL RESULTS	
<b>PROJECT</b> JOHN TUBIOLLO / J&V RENTAL PROPERTY PARCEL 201 948 SOUTH MIAMI BLVD DURHAM, DURHAM COUNTY, NORTH CAROLINA	
<b>hart hickman</b> 2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f) License # C-1269 / #C-245 Geology	
DATE: 8-7-13	REVISION NO. 0
JOB NO. ROW-416	FIGURE NO. 2

**Appendix A**  
**NC DOT Preliminary Plan**

JOHN TUBIOLA  
VIDA S. TUBIOLA  
dba J&V RENTAL  
PROPERTIES  
DB 934 PG 847  
PB 12 PG 13  
DB 965 PG 714  
PB 89 PG 32

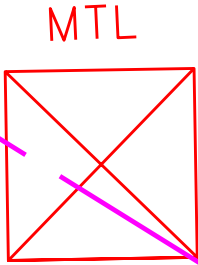
RICHARD C. NOKES, SR.  
DB 1382 PG 341  
PR 12

DUKE POWER  
COMPANY

(201)

(201)

(RW)



SPECIAL CUT DITCH  
SEE DETAIL SIR

WOODS

N  $89^{\circ}44'51''$  E  
100.00'  
S  $02^{\circ}09'33''$  W  
247.55'  
68.00'

S  $02^{\circ}22'50''$  W  
100.05'  
97.98'  
87.36'01" E

END  
FENCE +90.00  
(WW) 105' RT

-Y9- +10.00  
EX. RW RT

-Y9- +75  
EX. RW

-Y9- +2  
50

-Y9- +

-Y9- +45.9  
W/LT

+88.45  
38.87'

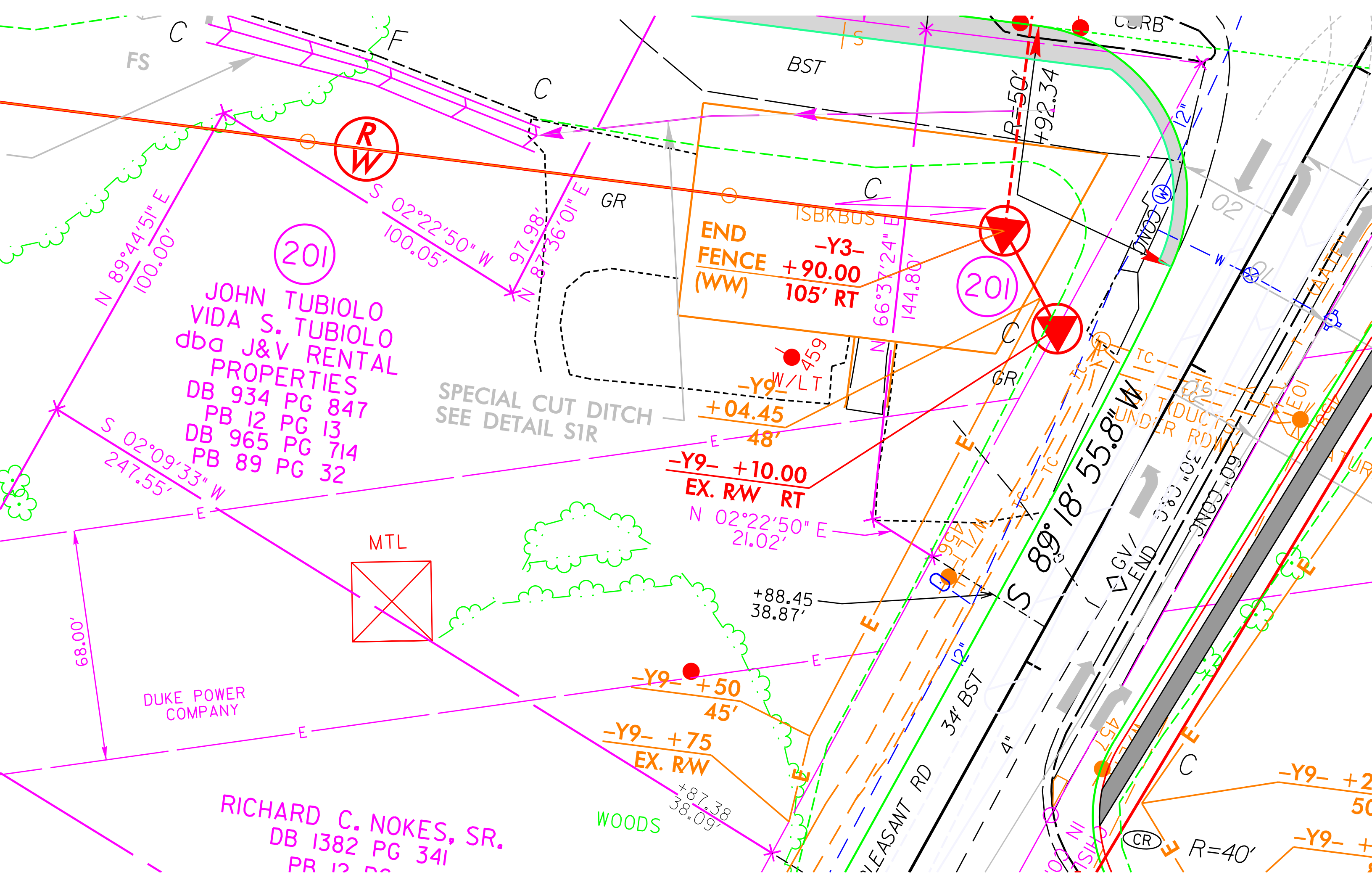
-Y9- +50  
45'

+87.38  
38.09'

S  $89^{\circ}18'55.8''$  W

(CR) R=40'

UNDER RD  
CONC  
60"



## **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 201, John & Vida Tubiolo/J&V Rental 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 18, June 26, and June 27, 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 Parcel 201. This parcel was added to our scope after a site visit by Hart & Hickman and a subsequent discussion with Terry Fox of the NCDOT. Photographs of the property are included on Figure 1. The property is located in the northwest quadrant of US 70 (S. Miami Boulevard) and Pleasant Road in Durham, 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 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 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 201 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 significant portions of the planned survey area due to the presence of thick vegetation in the northern and western portions of the site and the presence of trailers and vehicles. 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 201 did not cover significant portions of the planned survey area due to the presence of thick vegetation, trailers, and 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.

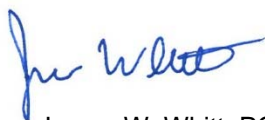
## **LIMITATIONS**

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 201\SCHNABEL GEOPHYSICAL REPORT ON PARCEL 201 (U-0071).DOCX

Attachments:

- Figure 1 - Parcel 201 Site Photos
- Figure 2 - Photos of Geophysical Equipment Used
- Figure 3 - Parcel 201 Early Time Gate Response
- Figure 4 - Parcel 201 Differential Response



Parcel 201 (John & Vida Tubiolo/J&V Rental Property), looking southwest



Parcel 201 (John & Vida Tubiolo/J&V Rental Property), looking west



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.

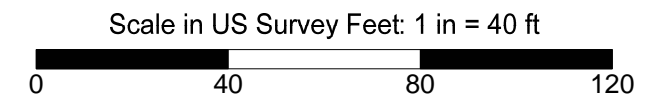
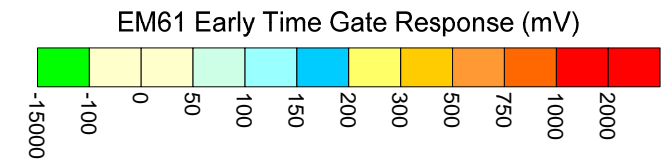
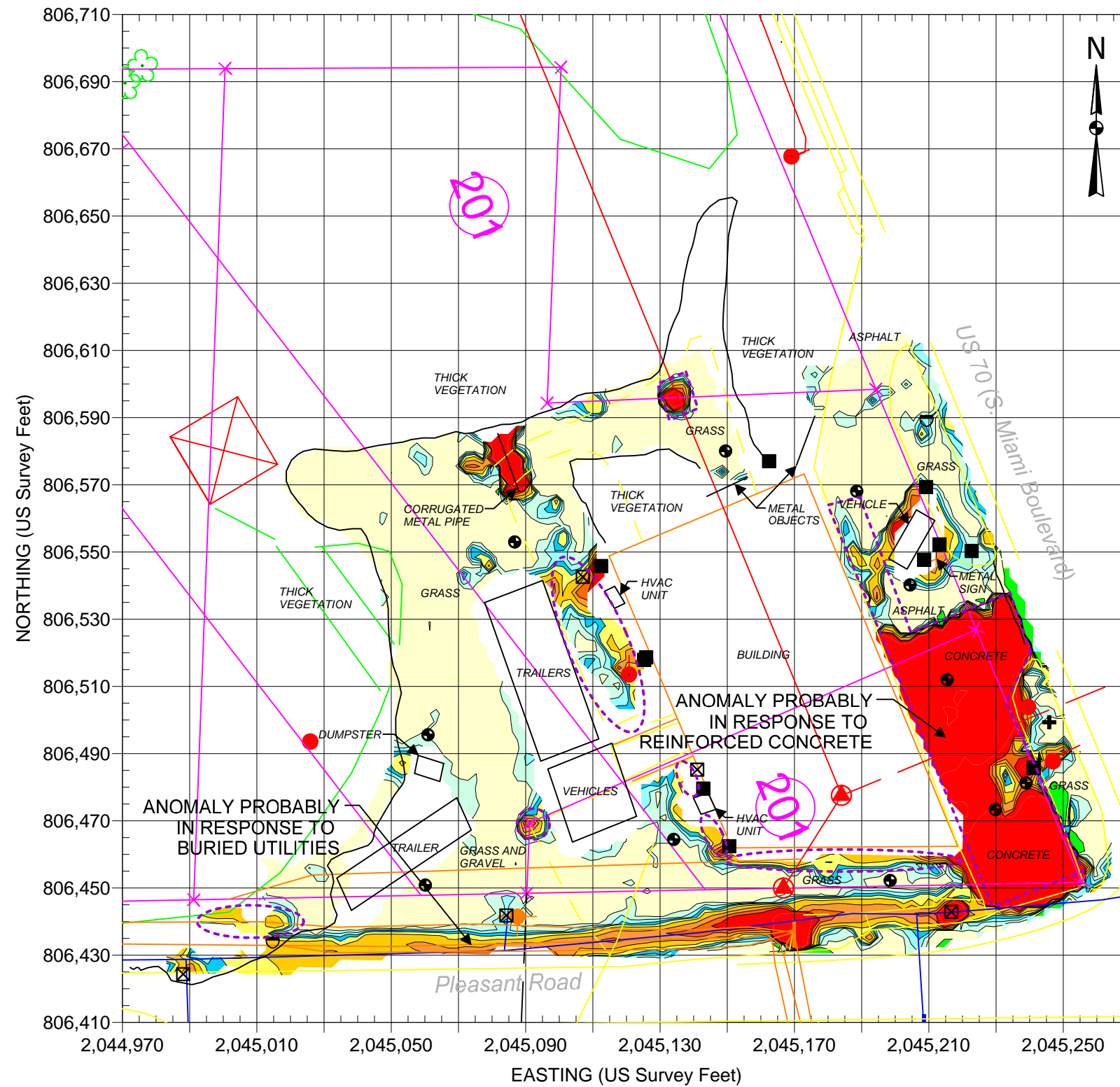


STATE PROJECT U-0071  
NC DEPT. OF TRANSPORTATION  
DURHAM COUNTY, NC  
PROJECT NO. 11821014.28

PHOTOS OF  
GEOPHYSICAL  
EQUIPMENT USED

FIGURE 2

PARCEL 201



EXPLANATION	
	PROPOSED BORING LOCATION (HART & HICKMAN)
	SIGN
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	GUY WIRE
	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 18, 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 26 and June 27, 2013, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

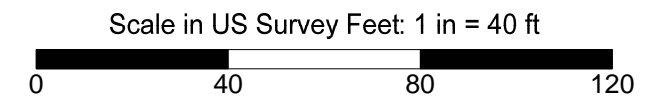
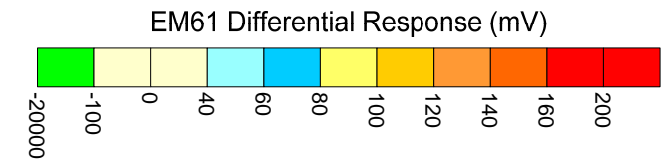
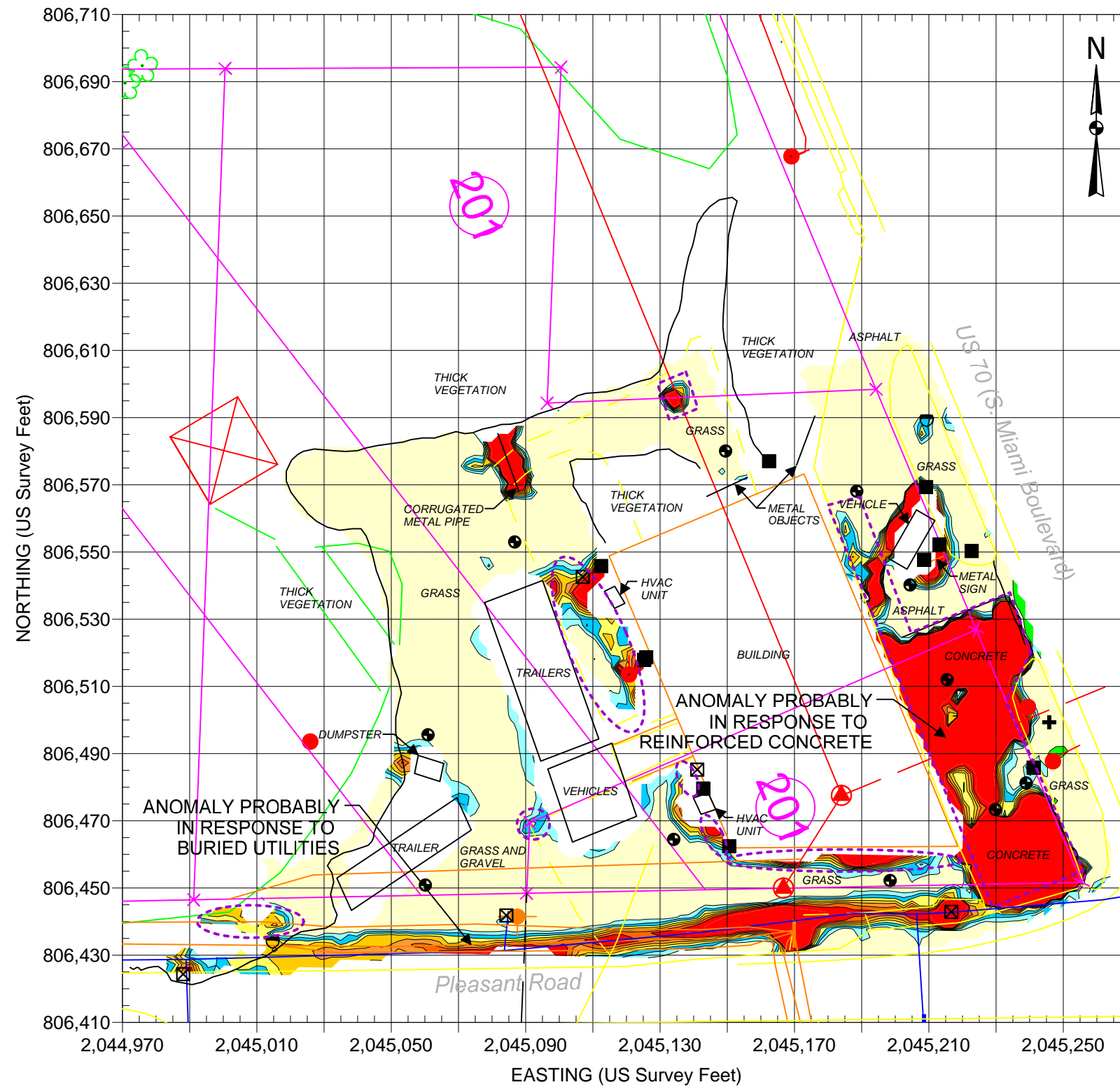


STATE PROJECT U-0071  
NC DEPARTMENT OF TRANSPORTATION  
DURHAM COUNTY, NC  
PROJECT NO. 11821014.28

EM61  
EARLY TIME GATE  
RESPONSE

FIGURE 3

PARCEL 201



EXPLANATION	
	PROPOSED BORING LOCATION (HART & HICKMAN)
	SIGN
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	GUY WIRE
	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 18, 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 26 and June 27, 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

**Appendix C**  
**Soil Boring Logs**



# BORING NUMBER 201-1

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 201  
**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	Tan brown, clayey SILT			2.5
			0	0				
5.0			0	0	Orange gray, silty CLAY			5.0
			0	0				
7.5			0	0				7.5
			0	0				
10.0			0	0				10.0
			0	0				
12.5						Bottom of borehole at 12.0 feet.		12.5

BORING LOG - HART HICKMAN.GDT - 8/13/13 10:59 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 201.GPJ

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

**BORING STARTED:** 7/9/13  
**BORING COMPLETED:** 7/9/13  
**TOTAL DEPTH:** 12 ft.  
**TOP OF CASING ELEV:**  
**DEPTH TO WATER:**

**Remarks:**  
Soil sample collected from 0 to 1 ft bgs





# BORING NUMBER 201-2

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 201

**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				2.5
			0	0	Brown, silty CLAY			
5.0			0	0				5.0
			0	0				
7.5			0	0				7.5
			0	0	Blue gray, silty CLAY			
10.0			0	0				10.0
			0	0				
12.5						Bottom of borehole at 12.0 feet.		12.5

BORING LOG - HART HICKMAN.GDT - 8/13/13 10:59 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 201.GPJ

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

**BORING STARTED:** 7/9/13  
**BORING COMPLETED:** 7/9/13  
**TOTAL DEPTH:** 12 ft.  
**TOP OF CASING ELEV:**  
**DEPTH TO WATER:**

**Remarks:**  
Soil sample collected from 0 to 1 ft bgs



# BORING NUMBER 201-3

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 201

**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					Asphalt			0
0.5		GB	0	0	Brown, sandy SILT			0.5
1			0	0				1
2			0	0				2
3			0	0	Tan brown, clayey SILT			3
4			0	0				4
4.5					Refusal at 4.5 feet. Bottom of borehole at 4.5 feet.			4.5
5								5

BORING LOG - HART HICKMAN.GDT - 8/13/13 10:59 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 201.GPJ

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

**BORING STARTED:** 7/9/13  
**BORING COMPLETED:** 7/9/13  
**TOTAL DEPTH:** 4.5 ft.  
**TOP OF CASING ELEV:**  
**DEPTH TO WATER:**

**Remarks:**  
Soil sample collected from 0 to 1 ft bgs



# BORING NUMBER 201-4

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 201

**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	Moist, tan brown, clayey SILT			2.5
			0	0				
5.0			0	0	Moist, orange gray, silty CLAY			5.0
			0	0				
7.5			0	0				7.5
			0	0				
10.0			0	0				10.0
			0	0				
12.5						Bottom of borehole at 12.0 feet.		12.5

BORING LOG - HART HICKMAN.GDT - 8/13/13 10:59 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 201.GPJ

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

**BORING STARTED:** 7/9/13  
**BORING COMPLETED:** 7/9/13  
**TOTAL DEPTH:** 12 ft.  
**TOP OF CASING ELEV:**  
**DEPTH TO WATER:**

**Remarks:**  
Soil sample collected from 0 to 1 ft bgs



# BORING NUMBER 201-5

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 201  
**JOB NUMBER:** ROW-416  
**LOCATION:** Durham, NC

BORING LOG - HART HICKMAN.GDT - 8/13/13 10:59 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 201.GPJ

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm)		LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)
			BKG.	SAMP.				
0.0		GB	0	0	Gravel			0.0
			0	0	Brown, sandy SILT			
			0	0	Orange brown, sandy SILT			
2.5			0	0				2.5
			0	0	Moist, tan orange, sandy SILT			
5.0			0	0				5.0
			0	0	Moist, tan orange, silty SAND			
7.5			0	0				7.5
			0	0	Wet, tan orange, silty SAND			
10.0			0	0				10.0
					Refusal at 11.0 feet. Bottom of borehole at 11.0 feet.			

<b>DRILLING CONTRACTOR:</b> Probe Technology <b>DRILL RIG/ METHOD:</b> Geoprobe <b>SAMPLING METHOD:</b> Macro-Core <b>LOGGED BY:</b> MJG <b>DRAWN BY:</b> TCD	<b>BORING STARTED:</b> 7/9/13 <b>BORING COMPLETED:</b> 7/9/13 <b>TOTAL DEPTH:</b> 11 ft. <b>TOP OF CASING ELEV:</b> <b>DEPTH TO WATER:</b>	<b>Remarks:</b> Soil sample collected from 0 to 1 ft bgs
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# BORING NUMBER 201-6

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 201

**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	Gravel			0.0
			0	0	Brown, sandy SILT			
2.5			0	0				2.5
			0	0	Orange tan, sandy SILT			
5.0			0	0				5.0
			0	0				
7.5			0	0				7.5
			0	0				
10.0			0	0	Orange brown, silty SAND			10.0
			0	0				
			0	0	Wet, orange brown, silty SAND			
12.5					Bottom of borehole at 12.0 feet.			12.5

BORING LOG - HART HICKMAN.GDT - 8/13/13 10:59 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 201.GPJ

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

**BORING STARTED:** 7/9/13  
**BORING COMPLETED:** 7/9/13  
**TOTAL DEPTH:** 12 ft.  
**TOP OF CASING ELEV:**  
**DEPTH TO WATER:**

**Remarks:**  
Soil sample collected from 0 to 1 ft bgs



# BORING NUMBER 201-7

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 201

**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
		GB	0	0	Gravel			
			0	0	Brown, sandy SILT			
2.5			0	0				2.5
			0	0				
5.0			0	0	Orange tan, silty CLAY			5.0
			0	0				
7.5			0	0				7.5
						Refusal at 8.0 feet. Bottom of borehole at 8.0 feet.		

BORING LOG - HART HICKMAN.GDT - 8/13/13 10:59 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 201.GPJ

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

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

**Remarks:**  
Soil sample collected from 0 to 1 ft bgs



# BORING NUMBER 201-8

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 201

**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	Gravel			0.0
			0	0	Brown, sandy SILT			
			0	0	Orange tan, clayey SILT			
2.5			0	0				2.5
			0	0				
			0	0				
5.0			0	0	Wet, orange gray, silty CLAY			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 - 8/13/13 10:59 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 201.GPJ

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

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

**Remarks:**  
Soil sample collected from 0 to 1 ft bgs

**Appendix D**  
**Laboratory Analytical Report**





Pace Analytical Services, Inc.  
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(828)254-7176

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

July 17, 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.: 92164610

Dear Chemical Engineer:

Enclosed are the analytical results for sample(s) received by the laboratory on July 10, 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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(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.: 92164610

---

### 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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 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.: 92164610

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92164610001	201-1 @ 0-1'	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164610002	201-2 @ 0-1'	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164610003	201-3 @ 0-1'	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164610004	201-4 @ 0-1'	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164610005	201-5 @ 0-1'	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164610006	201-6 @ 0-1'	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164610007	201-7 @ 0-1'	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164610008	201-8 @ 0-1'	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C

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## PROJECT NARRATIVE

Project: NCDOT ROW-416 WBS#34745.1.1  
Pace Project No.: 92164610

---

**Method:** EPA 8015 Modified  
**Description:** 8015 GCS THC-Diesel  
**Client:** NCDOT East Central  
**Date:** July 17, 2013

**General Information:**

8 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.

**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.: 92164610

---

**Method:** EPA 8015 Modified  
**Description:** Gasoline Range Organics  
**Client:** NCDOT East Central  
**Date:** July 17, 2013

**General Information:**

8 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.

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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.: 92164610

Sample: 201-1 @ 0-1' Lab ID: 92164610001 Collected: 07/09/13 08:40 Received: 07/10/13 15:50 Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8015 GCS THC-Diesel</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	55.9	mg/kg	5.4	1	07/10/13 18:35	07/11/13 15:14	68334-30-5	
<b>Surrogates</b>								
n-Pentacosane (S)	53	%	41-119	1	07/10/13 18:35	07/11/13 15:14	629-99-2	
<b>Gasoline Range Organics</b>		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 17:23	8006-61-9	
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	87	%	70-167	1	07/11/13 12:04	07/11/13 17:23	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	7.0	%	0.10	1		07/11/13 13:05		

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### ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1  
 Pace Project No.: 92164610

Sample: 201-2 @ 0-1' Lab ID: 92164610002 Collected: 07/09/13 08:50 Received: 07/10/13 15:50 Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8015 GCS THC-Diesel</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	123	mg/kg	5.3	1	07/10/13 18:35	07/11/13 15:38	68334-30-5	
<b>Surrogates</b>								
n-Pentacosane (S)	57	%	41-119	1	07/10/13 18:35	07/11/13 15:38	629-99-2	
<b>Gasoline Range Organics</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	4.9	1	07/11/13 12:04	07/11/13 17:46	8006-61-9	
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	83	%	70-167	1	07/11/13 12:04	07/11/13 17:46	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	6.4	%	0.10	1		07/11/13 13:06		

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 Huntersville, NC 28078  
 (704)875-9092

### ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1  
 Pace Project No.: 92164610

Sample: 201-3 @ 0-1' Lab ID: 92164610003 Collected: 07/09/13 09:05 Received: 07/10/13 15:50 Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8015 GCS THC-Diesel</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	30.2	mg/kg	5.7	1	07/10/13 18:35	07/11/13 15:38	68334-30-5	
<b>Surrogates</b>								
n-Pentacosane (S)	90	%	41-119	1	07/10/13 18:35	07/11/13 15:38	629-99-2	
<b>Gasoline Range Organics</b>		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 18:09	8006-61-9	
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	84	%	70-167	1	07/11/13 12:04	07/11/13 18:09	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	12.2	%	0.10	1		07/11/13 13:06		

### REPORT OF LABORATORY ANALYSIS

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 (704)875-9092

### ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1  
 Pace Project No.: 92164610

Sample: 201-4 @ 0-1' Lab ID: 92164610004 Collected: 07/09/13 09:15 Received: 07/10/13 15:50 Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8015 GCS THC-Diesel</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	ND	mg/kg	5.6	1	07/10/13 18:35	07/11/13 16:02	68334-30-5	
<b>Surrogates</b>								
n-Pentacosane (S)	92	%	41-119	1	07/10/13 18:35	07/11/13 16:02	629-99-2	
<b>Gasoline Range Organics</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	5.7	1	07/11/13 12:04	07/11/13 18:32	8006-61-9	
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	82	%	70-167	1	07/11/13 12:04	07/11/13 18:32	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	10.6	%	0.10	1		07/11/13 13:06		

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## ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1

Pace Project No.: 92164610

**Sample: 201-5 @ 0-1'      Lab ID: 92164610005      Collected: 07/09/13 09:55      Received: 07/10/13 15:50      Matrix: Solid**

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8015 GCS THC-Diesel</b>		Analytical Method: EPA 8015 Modified    Preparation Method: EPA 3546						
Diesel Components	<b>5.4</b>	mg/kg	5.3	1	07/10/13 18:35	07/11/13 16:25	68334-30-5	
<b>Surrogates</b>								
n-Pentacosane (S)	78	%	41-119	1	07/10/13 18:35	07/11/13 16:25	629-99-2	
<b>Gasoline Range Organics</b>		Analytical Method: EPA 8015 Modified    Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	5.0	1	07/12/13 15:58	07/12/13 19:50	8006-61-9	
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	82	%	70-167	1	07/12/13 15:58	07/12/13 19:50	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>5.9</b>	%	0.10	1		07/11/13 13:06		

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### ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1  
 Pace Project No.: 92164610

Sample: 201-6 @ 0-1' Lab ID: 92164610006 Collected: 07/09/13 10:10 Received: 07/10/13 15:50 Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8015 GCS THC-Diesel</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	10.0	mg/kg	5.3	1	07/10/13 18:35	07/11/13 16:49	68334-30-5	
<b>Surrogates</b>								
n-Pentacosane (S)	86	%	41-119	1	07/10/13 18:35	07/11/13 16:49	629-99-2	
<b>Gasoline Range Organics</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	5.1	1	07/12/13 15:58	07/12/13 20:13	8006-61-9	
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	80	%	70-167	1	07/12/13 15:58	07/12/13 20:13	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	5.8	%	0.10	1		07/11/13 13:06		

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### ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1  
 Pace Project No.: 92164610

Sample: 201-7 @ 0-1' Lab ID: 92164610007 Collected: 07/09/13 10:25 Received: 07/10/13 15:50 Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8015 GCS THC-Diesel</b>		Analytical Method: EPA 8015 Modified		Preparation Method: EPA 3546				
Diesel Components	17.0	mg/kg	5.4	1	07/10/13 18:35	07/11/13 16:49	68334-30-5	
<b>Surrogates</b>								
n-Pentacosane (S)	76	%	41-119	1	07/10/13 18:35	07/11/13 16:49	629-99-2	
<b>Gasoline Range Organics</b>		Analytical Method: EPA 8015 Modified		Preparation Method: EPA 5035A/5030B				
Gasoline Range Organics	ND	mg/kg	6.1	1	07/12/13 15:58	07/12/13 20:36	8006-61-9	
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	83	%	70-167	1	07/12/13 15:58	07/12/13 20:36	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	8.2	%	0.10	1		07/11/13 13:07		

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### ANALYTICAL RESULTS

Project: NCDOT ROW-416 WBS#34745.1.1  
 Pace Project No.: 92164610

Sample: 201-8 @ 0-1' Lab ID: 92164610008 Collected: 07/09/13 10:45 Received: 07/10/13 15:50 Matrix: Solid

**Results reported on a "dry-weight" basis**

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8015 GCS THC-Diesel</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546						
Diesel Components	ND	mg/kg	6.6	1	07/10/13 18:35	07/11/13 17:13	68334-30-5	
<b>Surrogates</b>								
n-Pentacosane (S)	82	%	41-119	1	07/10/13 18:35	07/11/13 17:13	629-99-2	
<b>Gasoline Range Organics</b>		Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B						
Gasoline Range Organics	ND	mg/kg	6.2	1	07/12/13 15:58	07/12/13 20:59	8006-61-9	
<b>Surrogates</b>								
4-Bromofluorobenzene (S)	83	%	70-167	1	07/12/13 15:58	07/12/13 20:59	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	23.7	%	0.10	1		07/11/13 13:07		

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: NCDOT ROW-416 WBS#34745.1.1  
Pace Project No.: 92164610

QC Batch: GCV/7066 Analysis Method: EPA 8015 Modified  
QC Batch Method: EPA 5035A/5030B Analysis Description: Gasoline Range Organics  
Associated Lab Samples: 92164610001, 92164610002, 92164610003, 92164610004

METHOD BLANK: 1007926 Matrix: Solid  
Associated Lab Samples: 92164610001, 92164610002, 92164610003, 92164610004

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

### REPORT OF LABORATORY ANALYSIS

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**QUALITY CONTROL DATA**

Project: NCDOT ROW-416 WBS#34745.1.1  
Pace Project No.: 92164610

QC Batch: GCV/7072 Analysis Method: EPA 8015 Modified  
QC Batch Method: EPA 5035A/5030B Analysis Description: Gasoline Range Organics  
Associated Lab Samples: 92164610005, 92164610006, 92164610007, 92164610008

METHOD BLANK: 1009045 Matrix: Solid  
Associated Lab Samples: 92164610005, 92164610006, 92164610007, 92164610008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	6.0	07/12/13 15:39	
4-Bromofluorobenzene (S)	%	90	70-167	07/12/13 15:39	

LABORATORY CONTROL SAMPLE: 1009046

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	mg/kg	50	49.2	98	70-165	
4-Bromofluorobenzene (S)	%			90	70-167	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1009173 1009174

Parameter	Units	92164612003		1009173		1009174		% Rec Limits	RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec			
Gasoline Range Organics	mg/kg	ND	49.7	49.7	60.6	58.7	122	118	47-187	3
4-Bromofluorobenzene (S)	%						87	92	70-167	

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**QUALITY CONTROL DATA**

Project: NCDOT ROW-416 WBS#34745.1.1  
Pace Project No.: 92164610

QC Batch: OEXT/22938 Analysis Method: EPA 8015 Modified  
QC Batch Method: EPA 3546 Analysis Description: 8015 Solid GCSV  
Associated Lab Samples: 92164610001, 92164610002, 92164610003, 92164610004, 92164610005, 92164610006, 92164610007, 92164610008

METHOD BLANK: 1007804 Matrix: Solid  
Associated Lab Samples: 92164610001, 92164610002, 92164610003, 92164610004, 92164610005, 92164610006, 92164610007, 92164610008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Components	mg/kg	ND	5.0	07/11/13 14:51	
n-Pentacosane (S)	%	89	41-119	07/11/13 14:51	

LABORATORY CONTROL SAMPLE: 1007805

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Components	mg/kg	66.7	50.9	76	49-113	
n-Pentacosane (S)	%			90	41-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1007806 1007807

Parameter	Units	92164610004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Diesel Components	mg/kg	ND	74.6	74.6	55.1	49.8	69	62	10-146	10	
n-Pentacosane (S)	%						74	76	41-119		

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**QUALITY CONTROL DATA**

Project: NCDOT ROW-416 WBS#34745.1.1  
Pace Project No.: 92164610

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QC Batch: PMST/5663                                  Analysis Method: ASTM D2974-87  
 QC Batch Method: ASTM D2974-87                                  Analysis Description: Dry Weight/Percent Moisture  
 Associated Lab Samples: 92164610001, 92164610002, 92164610003, 92164610004, 92164610005, 92164610006, 92164610007, 92164610008

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SAMPLE DUPLICATE: 1007871

Parameter	Units	92164610001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	7.0	6.2	13	

SAMPLE DUPLICATE: 1007872

Parameter	Units	92164586001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	6.3	6.0	6	

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## QUALIFIERS

Project: NCDOT ROW-416 WBS#34745.1.1  
Pace Project No.: 92164610

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### 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.

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TNI - The NELAC Institute.

### LABORATORIES

PASI-C Pace Analytical Services - Charlotte

## 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.: 92164610

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92164610001	201-1 @ 0-1'	EPA 3546	OEXT/22938	EPA 8015 Modified	GCSV/15057
92164610002	201-2 @ 0-1'	EPA 3546	OEXT/22938	EPA 8015 Modified	GCSV/15057
92164610003	201-3 @ 0-1'	EPA 3546	OEXT/22938	EPA 8015 Modified	GCSV/15057
92164610004	201-4 @ 0-1'	EPA 3546	OEXT/22938	EPA 8015 Modified	GCSV/15057
92164610005	201-5 @ 0-1'	EPA 3546	OEXT/22938	EPA 8015 Modified	GCSV/15057
92164610006	201-6 @ 0-1'	EPA 3546	OEXT/22938	EPA 8015 Modified	GCSV/15057
92164610007	201-7 @ 0-1'	EPA 3546	OEXT/22938	EPA 8015 Modified	GCSV/15057
92164610008	201-8 @ 0-1'	EPA 3546	OEXT/22938	EPA 8015 Modified	GCSV/15057
92164610001	201-1 @ 0-1'	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164610002	201-2 @ 0-1'	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164610003	201-3 @ 0-1'	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164610004	201-4 @ 0-1'	EPA 5035A/5030B	GCV/7066	EPA 8015 Modified	GCV/7068
92164610005	201-5 @ 0-1'	EPA 5035A/5030B	GCV/7072	EPA 8015 Modified	GCV/7076
92164610006	201-6 @ 0-1'	EPA 5035A/5030B	GCV/7072	EPA 8015 Modified	GCV/7076
92164610007	201-7 @ 0-1'	EPA 5035A/5030B	GCV/7072	EPA 8015 Modified	GCV/7076
92164610008	201-8 @ 0-1'	EPA 5035A/5030B	GCV/7072	EPA 8015 Modified	GCV/7076
92164610001	201-1 @ 0-1'	ASTM D2974-87	PMST/5663		
92164610002	201-2 @ 0-1'	ASTM D2974-87	PMST/5663		
92164610003	201-3 @ 0-1'	ASTM D2974-87	PMST/5663		
92164610004	201-4 @ 0-1'	ASTM D2974-87	PMST/5663		
92164610005	201-5 @ 0-1'	ASTM D2974-87	PMST/5663		
92164610006	201-6 @ 0-1'	ASTM D2974-87	PMST/5663		
92164610007	201-7 @ 0-1'	ASTM D2974-87	PMST/5663		
92164610008	201-8 @ 0-1'	ASTM D2974-87	PMST/5663		

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Client Name: HQH

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.: 28 C Biological Tissue is Frozen: Yes No N/A

Temp should be above freezing to 6°C

Date and Initials of person examining contents: mm/1/10

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 type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" 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 type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix:		
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 type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
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 type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:

Field Data Required? Y / N

Person Contacted: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Comments/ Resolution: \_\_\_\_\_

SCURF Review:	<u>[Signature]</u>	Date:	<u>7/10/13</u>
SRF Review:	<u>[Signature]</u>	Date:	<u>7/11/13</u>

WO#: 92164610



92164610

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)

**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:  
Company: Hart & Hickman  
Address: 2923 S. Tryon Street  
Suite 100 Charlotte, NC  
Phone: 704-887-4630 Fax: \_\_\_\_\_  
Requested Due Date/TAT: \_\_\_\_\_

**Section B** Required Project Information:  
Report To: David Graham  
Copy To: \_\_\_\_\_  
Purchase Order No.: WBS# 34745.1.1  
Project Name: PCDOT - ROW-416  
Project Number: ROW-416

**Section C** Invoice Information:  
Attention: Cynthia Wells  
Company Name: Hart & Hickman  
Address: CWells@hartandhickman.com  
Purchase Order Reference: \_\_\_\_\_  
Pace Project Manager: \_\_\_\_\_  
Pace Profile #: 52279-2

**REGULATORY AGENCY**  
 NPDES  GROUND WATER  DRINKING WATER  
 UST  RCRA  OTHER \_\_\_\_\_  
 Site Location STATE: NC

Page: 1 of 1  
**1686029**

ITEM #	Section D Required Client Information SAMPLE ID (A-Z, 0-9, /, -) Sample IDs MUST BE UNIQUE	Matrix Codes MATRIX / CODE Drinking Water DW Water WWT Waste Water WW Product P Soil/Solid SL Oil OL Wipe WP Air AR Tissue TS Other OT	COLLECTED		DATE	TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives Unpreserved H <sub>2</sub> SO <sub>4</sub> HNO <sub>3</sub> HCl NaOH Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> Methanol Other	Analysis Test ↓	Requested Analysis Filtered (Y/N)		Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB							Y	N		
1	201-1 @ 6-1'		SL	G	7/9/13	7/9/13	850	4			X	X		001
2	201-2 @ 0-1'						905				X	X		002
3	201-3 @ 0-1'						905				X	X		003
4	201-4 @ 0-1'						955				X	X		004
5	201-5 @ 0-1'						1010				X	X		005
6	201-6 @ 0-1'						1025				X	X		006
7	201-7 @ 0-1'						1025				X	X		007
8	201-8 @ 0-1'						1045				X	X		008
9														
10														
11														
12														

**ADDITIONAL COMMENTS**  
\* Separate report for each site

**RELINQUISHED BY / AFFILIATION**  
Matthew 7/10/13 1025 15:50

**ACCEPTED BY / AFFILIATION**  
David 7/10/13 1025 15:50

**SAMPLE CONDITIONS**  
Temp in °C: 25  
Received on Ice (Y/N): Y  
Custody Sealed Cooler (Y/N): Y  
Samples Intact (Y/N): Y

**SAMPLER NAME AND SIGNATURE**  
PRINT Name of SAMPLER: Matthew  
SIGNATURE of SAMPLER: Matthew DATE Signed (MM/DD/YY): 7/10/13

**ORIGINAL**

\*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.  
F-ALL-Q-020 rev. 07.15-May-2007