

**PRELIMINARY SITE ASSESSMENT  
FOR  
PARCEL #51 HAROLD R. DRAUGHON PROPERTY**

**STATE PROJECT: R-2303A  
WBS ELEMENT: 34416.1.1  
NC 24 FROM WEST OF SR 1006 (MAXWELL RD./CLINTON RD.) IN  
CUMBERLAND COUNTY TO SR 1853 (JOHN NUNNERY RD.)**

**PREPARED FOR:**



**NCDOT GEOTECHNICAL ENGINEERING UNIT  
GEOENVIRONMENTAL SECTION  
1589 MSC  
RALEIGH, NORTH CAROLINA 27699-1589**

**JANUARY 7, 2011  
REVISED JANUARY 12, 2011**

**PREPARED BY:**

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**CATLIN PROJECT NO. 210124**

**CORPORATE GEOLOGY LICENSE CERTIFICATION NO. C-118  
CORPORATE LICENSURE NO. FOR ENGINEERING SERVICES C-0585**

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**Preliminary Site Assessment  
for  
Parcel #51 Harold R. Draughon Property**

**State Project: R-2303A  
WBS Element: 34416.1.1  
NC 24 from West of SR 1006 (Maxwell Rd./Clinton Rd.) in Cumberland County  
to SR 1853 (John Nunnery Rd.)**

**January 7, 2011  
Revised January 12, 2011**

**1.0 PURPOSE OF INVESTIGATION AND DESCRIPTION**

CATLIN Engineers and Scientists (CATLIN) were retained by the North Carolina Department of Transportation (NCDOT) Geotechnical Engineering Unit to provide a field investigation concluding with a Preliminary Site Assessment (PSA) for the above referenced properties. In response to a Request for Technical and Cost Proposal (RFP) dated October 22, 2010, and subsequent site reconnaissance and discussions with NCDOT GeoEnvironmental Project Manager Mr. Ethan Caldwell, PE, LG, CATLIN submitted a proposal for conducting an investigation at nine (9) parcels near Stedman, North Carolina. Figure 1 illustrates the general location and the State Project is illustrated on Figure 2.

This report documents our activities and findings at Parcel #51, Harold R. Draughon Property. The following specific parcel information was provided by NCDOT:

Parcel #51 Harold R. Draughon Property

Draughon's Super Market  
6652 Clinton Rd.  
Stedman, NC 28391  
Plan Sheet 16

**Property Owner:**  
Harold Draughon  
3121 Brechin Rd.  
Fayetteville, NC 28303

Facility ID: 0-012082  
Groundwater Incidents: None Identified

**UST Owner:**  
Cary Oil Company  
PO Box 5189  
Cary, NC 27512

Currently this site is a gas station and convenience store. The site is located on the south side of Clinton Road across from the intersection of Windwood Drive. According to NCDENR's UST Section registry two (2) tanks are currently in use. No groundwater incidents have been identified associated with this property. The site is illustrated on Figure 3.

According to the RFP:

Acquisition of the right-of-way is necessary for NC 24 roadway construction (above referenced State Project R-2303A) and specifically at the above referenced parcel. A site investigation is necessary to determine the presence of USTs and/or contaminated soil in the proposed right-of-way and/or easement.

The work scope as requested includes:

- Notify property owners/occupants of intent as applicable.
- Locate all USTs and determine approximate size and contents (if any). Locate all USTs and determine approximate size and contents (if any).
- Locate monitoring wells that may be impacted during construction.
- Determine if contaminated soils are present.
- If contamination is evident, estimate the quantity of impacted soils and indicate the approximate area of soil contamination on a site map.
- Prepare and submit one report of findings including field activities, findings, and recommendations for each site in triplicate and electronically to the NCDOT GeoEnvironmental Section.

In addition to the RFP, NCDOT provided plan sheets associated with the roadway construction. CATLIN and NCDOT personnel agreed to approximate proposed boring and sample locations within the right-of-way and/or easement for soil sample collection and total petroleum hydrocarbons (TPH) diesel and gasoline range organics (DRO and GRO) laboratory analysis during a October 26, 2010 site reconnaissance meeting.

## **2.0 METHODS**

Approximate proposed borings were indicated in the field with NCDOT personnel during initial site reconnaissance and before final Workplan submittal. Per NCDOT request, borings (soil samples) were located near known or suspect UST systems and proposed drainage features (as indicated on NCDOT provided plan sheets).

CATLIN coordinated geophysical activities concurrently with soil boring and sampling. Final sampling activities were completed after the geophysical survey. CATLIN's field activities concluded on November 22, 2010.

### **2.1 FIELD METHODS**

All field work was conducted in general accordance with state and federal guidelines and industry standards.

Underground utility locating was coordinated by CATLIN personnel. The North Carolina One Call Center (NC-1-Call) was contacted for underground utility location. Proposed boring locations were marked before NC-1-Call personnel were on-site. The areas around the proposed boring locations were checked and found to be clear of any underground utilities or alternate locations were indicated by NC-1-Call personnel.

CATLIN personnel gathered subsurface soil data at the site by Direct Push Technology (DPT) boring advancement using an AMS PowerProbe™ 9600D (PowerProbe). The borings were advanced to depth by static force and a 90-pound hydraulic percussion hammer. Two and one-quarter inch diameter by four-foot length steel is used as casing. Soil samples were continuously collected in four-foot long and one and one-half inch diameter clear liners. Liners are removed from the casing and then cut in half longitudinally to allow for visual/manual classification utilizing the Unified Soil Classification System (USCS). Borings were identified by the parcel number (as indicated by NCDOT) followed by "DPT" and consecutive numbers starting with "01" at each parcel (example: 51DPT-01). Soil samples were collected continuously from near the surface to boring termination. Soils were removed from the liners in two-foot intervals and placed in sealable polyethylene bags for organic vapor analysis (OVA) headspace screening utilizing a photo ionization detector (PID). The USCS and OVA/PID information was recorded on field logs and has been transferred to the Boring Logs provided in Appendix A.

Soil samples were collected for laboratory analysis above the water table using roughly a one-foot interval of the two-foot sample revealing the highest OVA/PID reading. Sample identification was based on the boring identification followed by sample depth in parentheses (example: 51DPT-01 (2-3')). In some cases of elevated OVA/PID readings, additional borings were advanced for soil sample collection in an attempt to delineate suspected soil contamination.

New disposable nitrile gloves were worn during sampling activities. All samples were placed into laboratory provided glassware and packed on ice in an insulated cooler for transportation to the laboratory. Sample integrity was maintained by following proper Chain of Custody procedures. A copy of the Chain of Custody is provided following the analytical report in Appendix B.

Boreholes were abandoned to just below the surface using three-eighth inch bentonite chips. Bentonite and water were poured into the borehole simultaneously to facilitate hydration. Borings located in asphalt or

gravel were topped with asphalt cold patch. Final borehole and sample locations were surveyed utilizing a Trimble® GPS survey instrument.

## **2.2 LABORATORY TESTING**

Following boring advancement, selected soils were placed in the appropriately labeled glassware. In an attempt to provide information regarding petroleum impact to soils and groundwater with reasonable analytical expense, soil samples were analyzed for TPH DRO and GRO by Environmental Protection Agency (EPA) Methods 5030 and 3550 with analysis by modified 8015.

A total of 15 soil samples were submitted to SGS North America Inc. (NC Certification # 481). Chain of Custody documentation is included in Appendix B.

## **3.0 RESULTS**

In the event a cut is required for roadway construction or utility installation, any soil samples revealing detectable TPH concentrations will be considered petroleum impacted for handling and disposal purposes. The complete laboratory analytical reports are provided in Appendix B. Results of Schnabel's geophysical investigation including site photographs were submitted directly to NCDOT and a copy is provided in Appendix C. Schnabel's investigation results will be generally discussed in the following section.

One (1) known 10,000-gallon UST and one (1) known 4,000-gallon UST are located at the site and were identified during the geophysical survey. No other geophysical anomalies indicative of a potential UST were revealed. The UST locations and active dispenser canopy location are illustrated on Figure 3. Photographs of the site including the known UST locations are included in the geophysical report provided in Appendix C. A kerosene AST is also located at the site adjacent to the USTs.

Seventeen (17) borings were advanced for soil sample collection and one sample was collected from each boring for laboratory analysis except for borings 51DPT-11 and 51DPT-12. Borings were advanced near the suspected UST, dispenser, and near the proposed drainage feature along the eastern property line. Boring/sample locations are illustrated on Figure 3. Borings 51DPT-11 and 51DPT-12 were advanced near the active dispenser island and soils were assumed "hot" based on elevated OVA/PID readings and field indications (staining and odor).

Borings were terminated at four (4) feet BLS. Predominately sands were encountered with a mix of clays and sands. Damp to saturated soils were encountered across the site approximately four (4) feet BLS. Soil samples were

collected for laboratory analysis from within the two (2) foot interval with the highest OVA/PID reading. Soil samples for laboratory analysis were generally collected from within one (1) to three (3) feet BLS. Boring logs including USCS classification and OVA/PID screening results are provided in Appendix A. Summarized analytical results are provided on Table 1 and Figure 3.

The soil samples collected near the USTs, dispenser island, and near the western end of the proposed drainage feature revealed detectable TPH GRO and/or TPH DRO concentrations. No TPH concentrations were detected in the soil samples collected near the proposed drainage feature along the eastern property line. The estimated extent of TPH impacted soil is illustrated on Figure 3. This area encompasses approximately 4,400 ft<sup>2</sup>. Based on an assumed zone of contamination from one (1) foot BLS to the assumed water table depth of four (4) feet, approximately 490 yds<sup>3</sup> of TPH impacted soils may be in the area. However, it should be noted (as illustrated on Figure 3), there is not a clean soil sample location to the south of the 51DPT-13 and 51DPT-14 borings but only minor TPH DRO concentrations (less than 9 mg/kg) were detected in soil samples collected from the 51DPT-13 and 51DPT-14 borings.

#### **4.0 SUMMARY AND RECOMMENDATIONS**

A preliminary site assessment was conducted at the subject site as requested by NCDOT. Right-of-Way acquisition for NC 24 roadway construction is proposed at the site. In the event a cut is required for roadway construction or utility installation, any soil samples revealing detectable TPH concentrations will be considered petroleum impacted for handling and disposal purposes.

Two (2) known USTs and an active dispenser island are located at the site. A kerosene AST is also located at the site adjacent to the USTs.

Seventeen (17) borings were advanced for soil sample collection. Obvious petroleum impacts were noted in the field around the dispenser island/canopy and confirmed by laboratory analytical results. Additional petroleum impacts were detected in soil samples collected near the USTs and the proposed drainage feature southeast of the dispenser island/canopy and southwest of the USTs. This area encompasses approximately 4,400 ft<sup>2</sup> (+/- 490 yds<sup>3</sup>); however, clean soil sample locations do not completely define this estimated extent of petroleum impact soils to south. Numerous soil sample results were above the NCDENR Action Level of 10 mg/kg TPH DRO or TPH GRO.

No TPH concentrations were detected in the soil samples collected near the proposed drainage feature along the eastern property line.


CATLIN recommends forwarding a copy of this report to the NCDENR Fayetteville Regional Office UST Section with a cover letter indicating the presence of TPH impacted soils above NCDENR Action Level at this site. The

existing UST system should be removed with efforts to remove all petroleum impacted soils before roadway construction.

## 5.0 LIMITATIONS

This report is based on the agreed work scope and a review of available data from limited sampling. It is possible that this investigation may have failed to reveal the presence of contamination in the project area where such contamination may exist. Although CATLIN has used accepted methods appropriate for soil and groundwater sampling, CATLIN cannot guarantee that additional soil and/or groundwater contamination does not exist.

## 6.0 SIGNATURES



Benjamin J. Ashba  
Project Manager



G. Richard Garrett, P.G.  
Senior Project Manager



## **TABLES**

**TABLE 1  
SUMMARY OF SOIL LABORATORY RESULTS  
EPA METHOD 8015**

Parcel #51  
Harold R. Draughon Property  
Draughon's Super Market  
6652 Clinton Road  
Facility ID: 0-012082

Sample ID	Contaminant of Concern →	Diesel Range Organics	Gasoline Range Organics
	Date Collected		
51 DPT-01 (2-3')	11/16/2010	<6.67	<4.74
51 DPT-02 (2-3')	11/16/2010	<6.54	<4.71
51 DPT-03 (2-3')	11/16/2010	<8.42	<7.89
51 DPT-04 (2.5-3.5')	11/16/2010	<b>111</b>	<b>8.72</b>
51 DPT-05 (2-3')	11/16/2010	<b>12.0</b>	<b>37.4</b>
51 DPT-06 (2-3')	11/16/2010	<6.92	<4.91
51 DPT-07 (3-4')	11/16/2010	<6.83	<5.19
51 DPT-08 (2.5-3.5')	11/16/2010	<6.50	<4.77
51 DPT-09 (2-3')	11/19/2010	<b>23.5</b>	<b>133</b>
51 DPT-10 (2-3')	11/19/2010	<b>18.5</b>	<b>30.1</b>
51 DPT-11	11/19/2010	Not Analyzed	
51 DPT-12	11/19/2010	Not Analyzed	
51 DPT-13 (1-2')	11/19/2010	<b>7.15</b>	<5.06
51 DPT-14 (2-3')	11/19/2010	<b>8.39</b>	<5.63
51 DPT-15 (2-3')	11/19/2010	<6.36	<5.44
51 DPT-16 (2-3')	11/19/2010	<b>37.6</b>	<b>81.4</b>
51 DPT-17 (1-2')	11/19/2010	<6.87	<5.01



All results in milligrams per kilogram (mg/kg).

Sample depth in feet provide in parenthesis ( ) as part of the Sample ID.

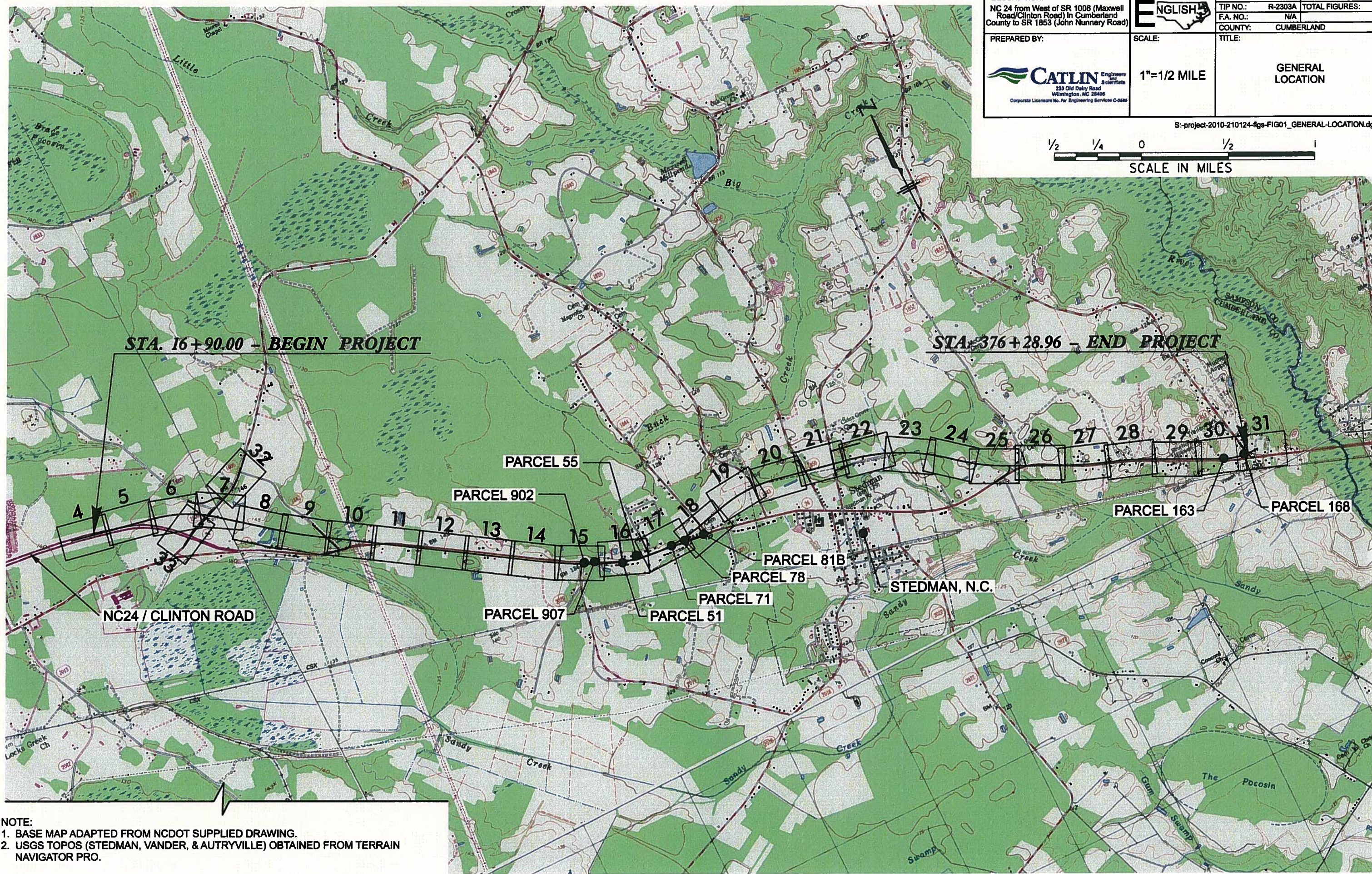
< = Less than reporting limit

Results in bold exceed the reporting limit.



## FIGURES

DESCRIPTION: NC 24 from West of SR 1006 (Maxwell Road/Clinton Road) in Cumberland County to SR 1853 (John Nunnery Road)	ENGLISH	WBS ELEM.: 34416.1.1	FIGURE NO. 1
		TIP NO.: R-2303A	TOTAL FIGURES: 3
PREPARED BY:	SCALE: 1"=1/2 MILE	TITLE: GENERAL LOCATION	
			

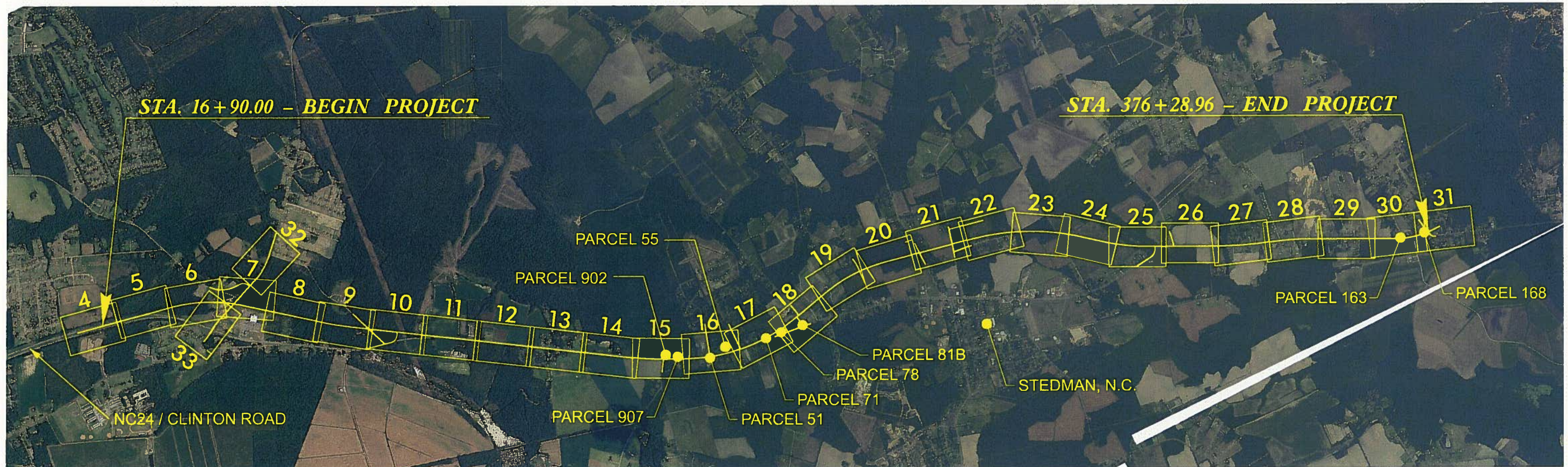
S:\project-2010-210124-figs-FIG01\_GENERAL-LOCATION.dgn



NOTE:  
 1. BASE MAP ADAPTED FROM NCDOT SUPPLIED DRAWING.  
 2. USGS TOPOS (STEDMAN, VANDER, & AUTRYVILLE) OBTAINED FROM TERRAIN NAVIGATOR PRO.

DESCRIPTION: NC 24 from West of SR 1006 (Maxwell Road/Clinton Road) in Cumberland County to SR 1853 (John Nunnery Road)		WBS ELEM.: 34416.1.1	FIGURE NO. 2
		TIP NO.: R-2303A	TOTAL FIGURES: 3
PREPARED BY:	SCALE:  1"=1/2 MILE	F.A. NO.: N/A	COUNTY: CUMBERLAND
		TITLE:  STATE PROJECT R-2303A STA 16+90.00 TO 376+28.96	

S:-project-2010-210124-figs-FIG02\_AERIAL-LAYOUT.dgn



- NOTE:
1. BASE MAP ADAPTED FROM NCDOT SUPPLIED DRAWING.
  2. AERIAL PHOTOS OBTAINED FROM TERRAIN NAVIGATOR PRO.

-L- POC Sta. 178+59.64 =  
 -Y4- POT Sta. 18+82.95

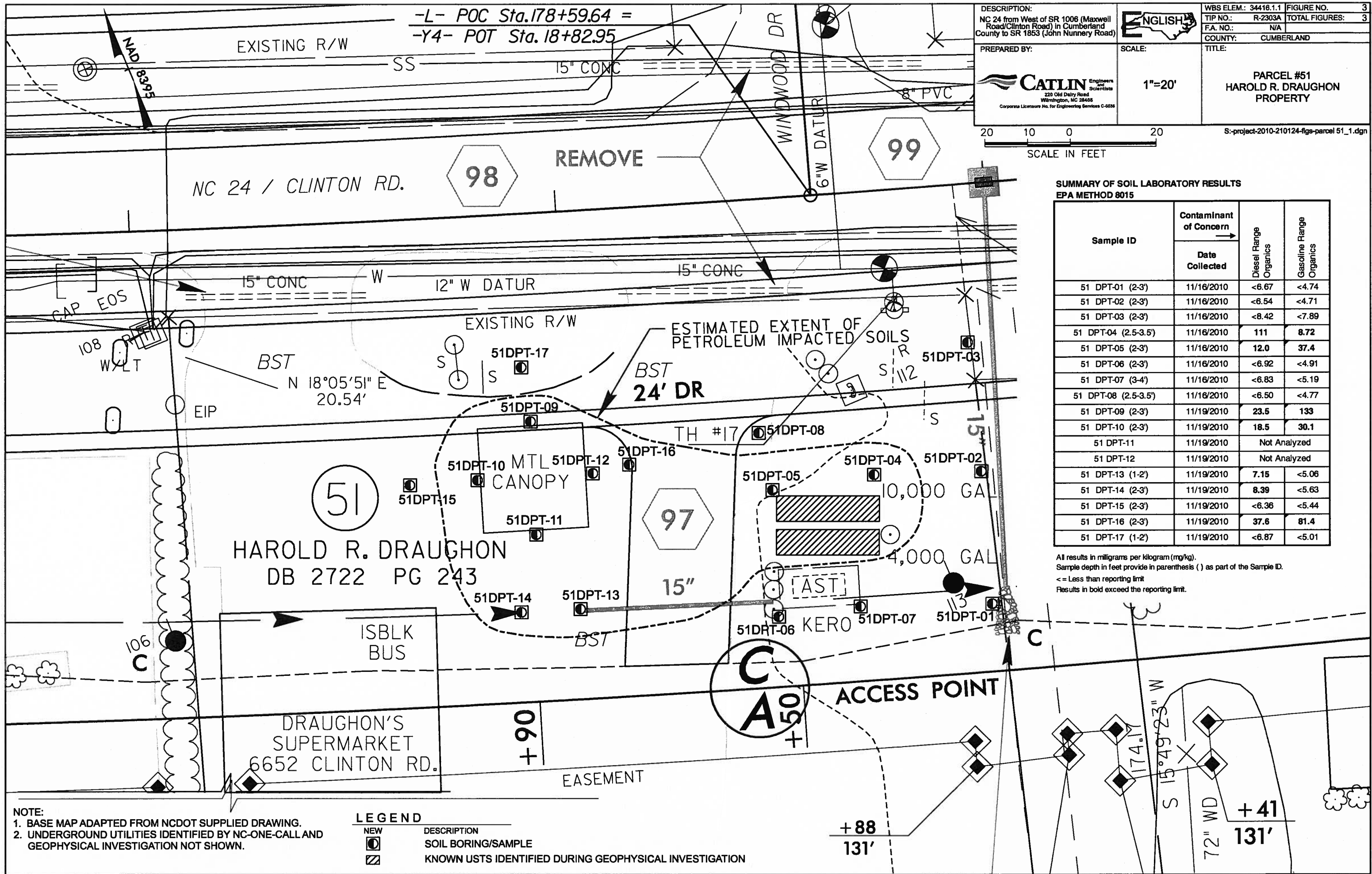
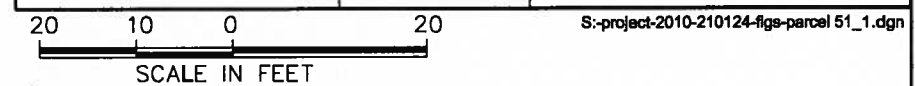
DESCRIPTION:  
 NC 24 from West of SR 1006 (Maxwell Road/Clinton Road) in Cumberland County to SR 1853 (John Nunberry Road)

WBS ELEM.: 34418.1.1 FIGURE NO. 3  
 TIP NO.: R-2303A TOTAL FIGURES: 3  
 FA. NO.: N/A  
 COUNTY: CUMBERLAND

PREPARED BY: **CATLIN** Engineers and Scientists  
 220 Old Dairy Road  
 Wilmington, NC 28405  
 Corporate License No. for Engineering Services C-0535

SCALE: 1"=20'

TITLE: **PARCEL #51 HAROLD R. DRAUGHON PROPERTY**



**SUMMARY OF SOIL LABORATORY RESULTS  
 EPA METHOD 8015**

Sample ID	Contaminant of Concern Date Collected	Range	
		Diesel Range Organics	Gasoline Range Organics
51 DPT-01 (2-3')	11/16/2010	<6.67	<4.74
51 DPT-02 (2-3')	11/16/2010	<6.54	<4.71
51 DPT-03 (2-3')	11/16/2010	<8.42	<7.89
51 DPT-04 (2.5-3.5')	11/16/2010	111	8.72
51 DPT-05 (2-3')	11/16/2010	12.0	37.4
51 DPT-06 (2-3')	11/16/2010	<6.92	<4.91
51 DPT-07 (3-4')	11/16/2010	<6.83	<5.19
51 DPT-08 (2.5-3.5')	11/16/2010	<6.50	<4.77
51 DPT-09 (2-3')	11/19/2010	23.5	133
51 DPT-10 (2-3')	11/19/2010	18.5	30.1
51 DPT-11	11/19/2010	Not Analyzed	
51 DPT-12	11/19/2010	Not Analyzed	
51 DPT-13 (1-2')	11/19/2010	7.15	<5.06
51 DPT-14 (2-3')	11/19/2010	8.39	<5.63
51 DPT-15 (2-3')	11/19/2010	<6.36	<5.44
51 DPT-16 (2-3')	11/19/2010	37.6	81.4
51 DPT-17 (1-2')	11/19/2010	<6.87	<5.01

All results in milligrams per kilogram (mg/kg).  
 Sample depth in feet provide in parenthesis ( ) as part of the Sample ID.  
 <= Less than reporting limit  
 Results in bold exceed the reporting limit.

**NOTE:**  
 1. BASE MAP ADAPTED FROM NCDOT SUPPLIED DRAWING.  
 2. UNDERGROUND UTILITIES IDENTIFIED BY NC-ONE-CALL AND GEOPHYSICAL INVESTIGATION NOT SHOWN.

**LEGEND**

NEW	DESCRIPTION
●	SOIL BORING/SAMPLE
▨	KNOWN USTS IDENTIFIED DURING GEOPHYSICAL INVESTIGATION

## APPENDICES

**APPENDIX A**  
**BORING LOGS**



# BORING LOG



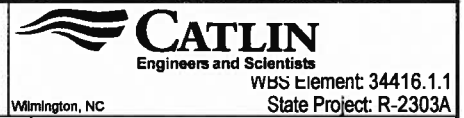
PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-01
NORTHING: 461,564.00		EASTING: 2,085,065.00	CREW:
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Near prop. line @ South end of drainage.		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/16/10	FINISH DATE: 11/16/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION	
							DEPTH	ELEVATION
0.0							0.0	LAND SURFACE
2.0	DIRECT PUSH				SP			F. SAND w/tr. silt/clay. Sub-rounded. Brown. Damp @ 3ft. Sat. @ 3.5ft.
3.0	DIRECT PUSH			51 DPT-01 (2-3)				
4.0							4.0	Boring Terminated at Depth 4.0 ft

CATLIN ENVIRO. LOG - 210124\_51\_NC24-DRAUGHON.GPJ - CATLIN.GDT - 12/28/10

▽ = 0hr. DTW      ▼ = 24hr. DTW

# BORING LOG



PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-02
NORTHING: 461,594.00		EASTING: 2,085,075.00	CREW:
SYSTEM: NCSP NAD 83 (USft)		BORING LOCATION: East of USTs near prop. line @ drainage.	LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/16/10	FINISH DATE: 11/16/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK		
							DEPTH	DESCRIPTION	ELEVATION
0.0							0.0	LAND SURFACE	
					SM		0.5	Topsoil	
2.0	DIRECT PUSH		▲0.6		SM			Silty, v.f. to f. SAND. Grades to clean f. to med. Sand. Varying brown. Sat. @ 3.5ft.	
3.0	DIRECT PUSH		▲0.6	51 DPT-02 (2-3)					
4.0							4.0	Boring Terminated at Depth 4.0 ft	

CATLIN.ENVIRO.LOG.210124\_51\_NC24-DRAUGHON.GPJ.CATLIN.GDT\_12/28/10

▽ = 0hr. DTW

▼ = 24hr. DTW

# BORING LOG



WBS Element: 34416.1.1  
State Project: R-2303A

Wilmington, NC

PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-03
DRILLER: Michael D. Mason			
NORTHING: 461,624.00	EASTING: 2,085,084.00	CREW:	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: Near E. prop. line & N. end of drainage.	LAND ELEV.: NM	
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/16/10	FINISH DATE: 11/16/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK		
							DEPTH	DESCRIPTION	ELEVATION
0.0							0.0	LAND SURFACE	
					SM		0.5	Topsoil	
	DIRECT PUSH		▲0.4						
2.0					SM			Silty, v.f. to f. SAND. Damp @ 3.5ft.	
				51 DPT-03 (2-3)					
3.0	DIRECT PUSH		▲1.1						
4.0							4.0	Boring Terminated at Depth 4.0 ft	

CATLIN ENVIRO. LOG 210124\_51\_NC24-DRAUGHON.GPJ CATLIN.GDT 12/28/10

▽ = 0hr. DTW

▼ = 24hr. DTW

# BORING LOG

PROJECT NO.:	210124	STATE:	NC	COUNTY:	Cumberland	LOCATION:	Stedman
PROJECT NAME:	NC 24 from West of SR 1006 in Cumberland County to SR 1853			LOGGED BY:	Ben Ashba	BORING ID:	51DPT-04
NORTHING:	461,603.00	EASTING:	2,085,052.00	DRILLER:	Michael D. Mason	CREW:	
SYSTEM:	NCSP NAD 83 (USft)	BORING LOCATION:	NE corner of UST basin.			LAND ELEV.:	NM
DRILL MACHINE:	Power Probe	METHOD:	Direct Push	0 HOUR DTW:	Dry	BORING DEPTH:	4.0
START DATE:	11/16/10	FINISH DATE:	11/16/10	24 HOUR DTW:	N/A	ROCK DEPTH:	--

DEPTH	BLOW COUNT				MOI.	PID RESULTS (ppm)					LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION		ELEVATION
	0.5	0.5	0.5	0.5		0	1000	2000	3000	4000				DEPTH	DESCRIPTION	
0.0														0.0	LAND SURFACE	
												SM		0.5	Topsoil	
												SM		1.5	Silty, v.f. to f. SAND. Brown.	
2.0												SC		2.5	Clayey, f. SAND. Orangish brown.	
2.5												SC		3.0	Black and gray staining.	
3.5												CL		4.0	Sandy CLAY. Orangish brown. Damp at base.	
4.0															Boring Terminated at Depth 4.0 ft	

▽ = 0hr. DTW

▼ = 24hr. DTW

# BORING LOG



PROJECT NO.:	210124	STATE:	NC	COUNTY:	Cumberland	LOCATION:	Stedman
PROJECT NAME:	NC 24 from West of SR 1006 in Cumberland County to SR 1853			LOGGED BY:	Ben Ashba		BORING ID:
				DRILLER:	Michael D. Mason		<b>51DPT-05</b>
NORTHING:	461,609.00	EASTING:	2,085,028.00	CREW:			
SYSTEM:	NCSP NAD 83 (USft)	BORING LOCATION:	NW corner of UST basin.			LAND ELEV.:	NM
DRILL MACHINE:	Power Probe	METHOD:	Direct Push	0 HOUR DTW:	Dry	BORING DEPTH:	4.0
START DATE:	11/16/10	FINISH DATE:	11/16/10	24 HOUR DTW:	N/A	ROCK DEPTH:	--

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK DESCRIPTION	
							DEPTH	ELEVATION
0.0							0.0	LAND SURFACE
							0.2	Asphalt
					GW		0.5	Gravel Sub-base.
	DIRECT PUSH		▲25.5		SW		1.5	V.f. to cse. SAND. Brown.
2.0					SC/ CL		2.5	Clayey SAND to Sandy CLAY. Gray.
				51 DPT-05 (2-3)				
3.0	DIRECT PUSH		▲111		SC		4.0	Clayey, f. SAND. Dark gray @ 3ft. grading back to gray. Possible staining. HCO.
4.0								Boring Terminated at Depth 4.0 ft

CATLIN ENVIRO. LOG\_210124\_51\_NC24-DRAUGHON.GPJ.CATLIN.GDT\_12/28/10

▽ = 0hr. DTW

▼ = 24hr. DTW

# BORING LOG



**CATLIN**  
Engineers and Scientists

WBS Element: 34416.1.1  
State Project: R-2303A

Wilmington, NC

PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-06
DRILLER: Michael D. Mason			
NORTHING: 461,581.00	EASTING: 2,085,018.00	CREW:	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: SW corner of Kerosene AST.		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 8.0
START DATE: 11/16/10	FINISH DATE: 11/16/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION	
							DEPTH	ELEVATION
0.0							0.0	LAND SURFACE
2.0	DIRECT PUSH							
3.0	DIRECT PUSH		▲0.9		51 DPT-06 (2-3)	SP		F. SAND w/tr. clay/silt. Sand grades to med. Brown to lt. brown. Sat. below 4ft.
4.0	DIRECT PUSH		▲0.9					
6.0	DIRECT PUSH		▲0.5		SC/CL		6.0	Clayey, f. SAND to f. Sandy CLAY. Orange brown.
8.0							8.0	Boring Terminated at Depth 8.0 ft

CATLIN ENVIRONMENTAL LOG 210124\_51\_NC24-DRAUGHON.GPJ\_CATLIN.GDT\_12/28/10

▽ = 0hr. DTW

▼ = 24hr. DTW

# BORING LOG



Wilmington, NC WBS Element: 34416.1.1 State Project: R-2303A

PROJECT NO.:	210124	STATE:	NC	COUNTY:	Cumberland	LOCATION:	Stedman
PROJECT NAME:	NC 24 from West of SR 1006 in Cumberland County to SR 1853			LOGGED BY:	Ben Ashba	BORING ID:	51DPT-07
				DRILLER:	Michael D. Mason		
NORTHING:	461,576.00	EASTING:	2,085,037.00	CREW:			
SYSTEM:	NCSP NAD 83 (USft)	BORING LOCATION:	SE corner of Kerosene AST.			LAND ELEV.:	NM
DRILL MACHINE:	Power Probe	METHOD:	Direct Push	0 HOUR DTW:	Dry	BORING DEPTH:	4.0
START DATE:	11/16/10	FINISH DATE:	11/16/10	24 HOUR DTW:	N/A	ROCK DEPTH:	--

DEPTH	BLOW COUNT				MOI.	PID RESULTS (ppm)				LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION	
	0.5	0.5	0.5	0.5		0	1000	2000	3000				4000	DEPTH
0.0													0.0	LAND SURFACE
											SM		0.5	Topsoil
	DIRECT PUSH				▲0.5									
2.0											SP			F. SAND w/tr. silt/clay. Dry.
	DIRECT PUSH				▲1.0									
3.0														
											51 DPT-07 (3-4)			
4.0													4.0	Boring Terminated at Depth 4.0 ft

CATLIN ENVIRO. LOG. 210124\_51\_NC24-DRAUGHON.GPJ.CATLIN.GDT 12/28/10

▽ = 0hr. DTW      ▼ = 24hr. DTW

# BORING LOG

PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-08
NORTHING: 461,622.00	EASTING: 2,085,031.00	DRILLER: Michael D. Mason	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: ~15ft. North of 51DPT-05		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/16/10	FINISH DATE: 11/16/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK		
							DEPTH	DESCRIPTION	ELEVATION
0.0							0.0	LAND SURFACE	
							0.2	Asphalt	
							0.5	Gravel Sub-base	
	DIRECT PUSH	▲0.1							
2.0									
2.5					SC/ SM			Silty, f. SAND grading to Clayey, f. SAND. Varying grays. Sat. @ 4ft.	
	DIRECT PUSH	▲0.9		51 DPT-08 (2.5-3.5)					
3.5									
4.0							4.0	Boring Terminated at Depth 4.0 ft	

CATLIN ENVIRO. LOG 210124\_51\_NC24-DRAUGHON.GPJ CATLIN.GDT 12/28/10

▽ = 0hr. DTW

▼ = 24hr. DTW



# BORING LOG



PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-09
NORTHING: 461,645.00		EASTING: 2,084,982.00	CREW:
SYSTEM: NCSP NAD 83 (USft)		BORING LOCATION: North side of canopy.	LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/19/10	FINISH DATE: 11/19/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK DESCRIPTION	
							DEPTH	ELEVATION
0.0							0.0	LAND SURFACE
0.0	DIRECT					GW	0.2	Asphalt
							0.5	Gravel Sub-base
1.0	PUSH		▲82.7			SW	1.0	F. to med. SAND w/some cse. Brown.
							2.0	F. to med. SAND. Black staining. HCO.
3.0	DIRECT		▲310	51 DPT-09 (2-3)		SP	3.0	F. to med. SAND. Grayish brown grading to orangish brown. Wet @ 3ft. Strong HCO.
							4.0	Boring Terminated at Depth 4.0 ft
4.0	PUSH		▲2,200					

CATLIN ENVIRO. LOG. 210124\_51\_NC24-DRAUGHON.GPJ\_CATLIN.GDT\_12/28/10

# BORING LOG



PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-10
NORTHING: 461,637.00		EASTING: 2,084,966.00	CREW:
SYSTEM: NCSP NAD 83 (USft)		BORING LOCATION: West side of canopy.	LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/19/10	FINISH DATE: 11/19/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
0.0							0.0	LAND SURFACE	
							0.2	Asphalt	
	DIRECT						0.5	Gravel Sub-base	
1.0									
	PUSH		▲116						
2.0									
	DIRECT		▲220	51 DPT-10 (2-3)	SW			F. to med. SAND w/some Cse. Varying brown w/thin staining layers from 1.5ft. to 3.5ft. Wet @ 3ft. Strong HCO.	
3.0									
	PUSH		▲351						
4.0							4.0	Boring Terminated at Depth 4.0 ft	

CATLIN ENVIRO. LOG\_210124\_51\_NC24-DEALIGHON.GPJ\_CATLIN.GDT\_12/28/10

▽ = 0hr. DTW      ▼ = 24hr. DTW

# BORING LOG



PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-11
DRILLER: Michael D. Mason			
NORTHING: 461,620.00	EASTING: 2,084,973.00	CREW:	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: South side of canopy.	LAND ELEV.: NM	
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/19/10	FINISH DATE: 11/19/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK DESCRIPTION	
							DEPTH	ELEVATION
0.0							0.0	LAND SURFACE
							0.2	Asphalt
	DIRECT				GW		0.5	Gravel Sub-base
1.0								
	PUSH		206					
2.0					SW			F. to med. SAND w/some Cse. Varying brown w/thin staining layers from 1.5ft. to 4ft. Wet @ 3ft. Strong HCO. No soil sample collected. Assumed "hot".
	DIRECT		3,000					
3.0								
	PUSH		3,100					
4.0							4.0	Boring Terminated at Depth 4.0 ft

CATLIN ENVIRO. LOG 210124\_51\_NC24-DRAUGHON.GPJ\_CATLIN.GDT\_12/28/10

▽ = 0hr. DTW

▼ = 24hr. DTW

# BORING LOG

PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853	LOGGED BY: Ben Ashba	BORING ID: 51DPT-12	
NORTHING: 461,629.00	EASTING: 2,084,991.00	DRILLER: Michael D. Mason	CREW:
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: East side of canopy.		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/19/10	FINISH DATE: 11/19/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK		
							DEPTH	DESCRIPTION	ELEVATION
0.0							0.0	LAND SURFACE	
							0.2	Asphalt	
	DIRECT					GW	0.5	Gravel Sub-base	
1.0									
	PUSH		▲160						
2.0						SW			
	DIRECT		▲2,700					F. to med. SAND w/some Cse. Tr. gravel @ 3ft. Varying brown w/thin staining layers (black) from 3ft. to 4ft. Wet @ 3ft. Strong HCO. No soil sample collected. Assumed "hot".	
3.0									
	PUSH		▲3,100						
4.0							4.0		
									Boring Terminated at Depth 4.0 ft

CATLIN\ENWIBO.LOG\_210124\_51\_NC24-DRAUGHON.GPJ.CATLIN.GDT\_12/28/10

# BORING LOG

PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-13
DRILLER: Michael D. Mason			
NORTHING: 461,600.00	EASTING: 2,084,976.00	CREW:	
SYSTEM: NCSP NAD 83 (Usft)	BORING LOCATION: S. of canopy, E. of bld. @ proposed drainage.		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/19/10	FINISH DATE: 11/19/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK		
							DEPTH	DESCRIPTION	ELEVATION
0.0							0.0	LAND SURFACE	
							0.2	Asphalt	
	DIRECT					GW	0.5	Gravel Sub-base	
1.0						SW	1.0	F. to cse. SAND w/tr. gravel. Brown.	
2.0	PUSH		▲107	51 DPT-13 (1-2)					
3.0	DIRECT		▲23.2		SP			F. SAND. Orangish brown. Wet @ 3ft.	
4.0	PUSH		▲0.0						
							4.0	Boring Terminated at Depth 4.0 ft	

CATLIN ENVIRO. LOG\_210124\_51\_NC24-DRAUGHON.GPJ\_CATLIN.GDT\_12/28/10

# BORING LOG

PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-14
DRILLER: Michael D. Mason			
NORTHING: 461,605.00	EASTING: 2,084,963.00	CREW:	
SYSTEM: NCSP NAD 83 (USft)		BORING LOCATION: South of canopy and 51DPT-11.	
LAND ELEV.: NM			
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/19/10	FINISH DATE: 11/19/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT				MOI.	PID RESULTS (ppm)				LAB.	USCS	LOG	DEPTH	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5	0.5	0.5	0.5		0	1000	2000	3000						
0.0													0.0	LAND SURFACE	
													0.2	Asphalt	
	DIRECT											GW	0.5	Gravel Sub-base	
1.0												SW		Gravelly, f. SAND. Brown.	
	PUSH				▲135								1.5		
2.0															
	DIRECT				▲138					51 DPT-14 (2-3)	SP			F. SAND. Brown grading to orangish brown. Wet @ 3ft.	
3.0															
	PUSH				▲91.2										
4.0													4.0	Boring Terminated at Depth 4.0 ft	

▽ = 0hr. DTW

▼ = 24hr. DTW

CATLIN ENVIRO. LOG. 210124\_51\_NC24-DRAUGHON.GPJ.CATLIN.GDT\_12/28/10

# BORING LOG



Wilmington, NC WBS Element: 34416.1.1 State Project: R-2303A

PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-15
DRILLER: Michael D. Mason			
NORTHING: 461,642.00	EASTING: 2,084,950.00	CREW:	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: West of canopy and 51DPT-10.		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/19/10	FINISH DATE: 11/19/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK DESCRIPTION	
							DEPTH	ELEVATION
0.0							0.0	LAND SURFACE
							0.2	Asphalt
	DIRECT				GW		0.5	Gravel Sub-base
1.0					SW		1.5	Gravelly, f. SAND. Brown.
	PUSH		▲15.5					
2.0								
	DIRECT		▲35.9	51 DPT-15 (2-3)	SP			F. SAND. Brown w/some gray staining from 3.5-4ft. Wet @ 3ft.
3.0								
	PUSH		▲65.4					
4.0							4.0	Boring Terminated at Depth 4.0 ft

CATLIN ENVIRO. LOG\_210124\_51\_NC24-DRAUGHON.GPJ\_CATLIN.GDT\_12/28/10

▽ = 0hr. DTW      ▼ = 24hr. DTW

# BORING LOG



PROJECT NO.: 210124	STATE: NC	COUNTY: Cumberland	LOCATION: Stedman
PROJECT NAME: NC 24 from West of SR 1006 in Cumberland County to SR 1853		LOGGED BY: Ben Ashba	BORING ID: 51DPT-16
DRILLER: Michael D. Mason			
NORTHING: 461,627.00	EASTING: 2,085,000.00	CREW:	
SYSTEM: NCSP NAD 83 (USft)	BORING LOCATION: East of canopy and 51DPT-12.	LAND ELEV.: NM	
DRILL MACHINE: Power Probe	METHOD: Direct Push	0 HOUR DTW: Dry	BORING DEPTH: 4.0
START DATE: 11/19/10	FINISH DATE: 11/19/10	24 HOUR DTW: N/A	ROCK DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	U S C S	L O G	SOIL AND ROCK DESCRIPTION	
							DEPTH	ELEVATION
0.0							0.0	LAND SURFACE
							0.2	Asphalt
	DIRECT				GW		0.5	Gravel Sub-base
1.0					SW			Gravelly, f. to med. SAND. Brown.
	PUSH		▲53.0				1.5	
2.0								
	DIRECT		▲146	51 DPT-16 (2-3)	SP			F. SAND. Top 2in. of strata black grading to grayish brown w/dark gray staining @ 4ft.
3.0								
	PUSH		▲166					
4.0							4.0	Boring Terminated at Depth 4.0 ft

▽ = 0hr. DTW

▼ = 24hr. DTW

CATLIN.ENVIRO.LOG.210124.51.NC24DRAUGHON.GPJ.CATLIN.GDT.12/28/10



# BORING LOG

PROJECT NO.:	210124	STATE:	NC	COUNTY:	Cumberland	LOCATION:	Stedman
PROJECT NAME:	NC 24 from West of SR 1006 in Cumberland County to SR 1853			LOGGED BY:	Ben Ashba	BORING ID:	51DPT-17
				DRILLER:	Michael D. Mason		
NORTHING:	461,658.00	EASTING:	2,084,985.00	CREW:			
SYSTEM:	NCSP NAD 83 (USft)	BORING LOCATION:	North of canopy and 51DPT-09.			LAND ELEV.:	NM
DRILL MACHINE:	Power Probe	METHOD:	Direct Push	0 HOUR DTW:	Dry	BORING DEPTH:	4.0
START DATE:	11/19/10	FINISH DATE:	11/19/10	24 HOUR DTW:	N/A	ROCK DEPTH:	--

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	PID RESULTS (ppm) 0 1000 2000 3000 4000	LAB.	USCS	LOG	SOIL AND ROCK DESCRIPTION	
							DEPTH	ELEVATION
0.0							0.0	LAND SURFACE
							0.2	Asphalt
	DIRECT				GW		0.5	Gravel Sub-base
1.0					SW			Gravelly, f. to med. SAND. Brown.
	PUSH		▲298	51 DPT-17 (1-2)			1.5	
2.0								
	DIRECT		▲228		SP			F. SAND. Top 2in. of strata black grading to grayish brown w/dark gray staining @ 4ft.
3.0								
	PUSH		▲7.5					
4.0							4.0	Boring Terminated at Depth 4.0 ft

CATLIN ENVIRO. LOG. 210124\_51\_NC24-DRAUGHON.GPJ.CATLIN.GDT. 12/28/10

**APPENDIX B**  
**LABORATORY REPORT AND CHAIN OF CUSTODY RECORD**



Ben Ashba  
Richard Catlin & Associates  
P.O. Box 10279  
Wilmington, NC 28404-0279

Report Number: G128-2819

Client Project: NCDOT Stedman PSAs

Dear Ben Ashba,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of five years in the event they are required for future reference. Any samples submitted to our laboratory will be retained for a maximum of thirty (30) days from the date of this report unless other arrangements are requested.

If there are any questions about the report or services performed during this project, please call Barbara Hager at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America, Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America, Inc.

*Barbara Hager*  
Project Manager  
Barbara Hager

*12/2/10*  
Date

List of Reporting Abbreviations  
And Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantification Limit (RL or MDL)

DF = Dilution Factor

Dup = Duplicate

D = Detected, but RPD is > 40% between results in dual column method.

E = Estimated concentration, exceeds calibration range.

J = Estimated concentration, below calibration range and above MDL

LCS(D) = Laboratory Control Spike (Duplicate)

MDL = Method Detection Limit

MS(D) = Matrix Spike (Duplicate)

PQL = Practical Quantitation Limit

RL/CL = Reporting Limit / Control Limit

RPD = Relative Percent Difference

UJ = Target analytes with recoveries that are  $10\% < \%R < LCL$ ; # of MEs are allowable and compounds are not detected in the sample.

mg/kg = milligram per kilogram, ppm, parts per million

ug/kg = micrograms per kilogram, ppb, parts per billion

mg/L = milligram per liter, ppm, parts per million

ug/L = micrograms per liter, ppb, parts per billion

% Rec = Percent Recovery

% solids = Percent Solids

**Special Notes:**

- 1) Metals and mercury samples are digested with a hot block; see the standard operating procedure document for details.
- 2) Uncertainty for all reported data is less than or equal to 30 percent.

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-01 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-9A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 11/16/2010 8:15  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 90.87

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.74	mg/Kg	1	11/22/10 18:02

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	98.6	98.6		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112210  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.97 g  
 Final Volume: 5 mL

Analyst: WML

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-02 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-10A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 11/16/2010 10:00  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 89.66

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.71	mg/Kg	1	11/22/10 18:28

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	94.1	94.1		70-130

Comments:

**Batch Information**

Analytical Batch: VP112210  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 7.11 g  
 Final Volume: 5 mL

Analyst: WML

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-03 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-11A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 11/16/2010 9:30  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 73.39

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.89	mg/Kg	1	11/23/10 04:45

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	94.1	94.1		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112210  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 5.18 g  
 Final Volume: 5 mL

Analyst:     *ml*

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-04 (2.5-3.5')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-12A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 11/16/2010 9:15  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 85.47

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	8.72	4.51	mg/Kg	1	11/23/10 05:11

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	96.5	96.5		70-130

Comments:

**Batch Information**

Analytical Batch: VP112210  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 7.78 g  
 Final Volume: 5 mL

Analyst: uml



**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-05 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-13A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 11/16/2010 9:00  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 91.95

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	37.4	4.68	mg/Kg	2	11/23/10 12:41

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	101.0	101.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.97 g  
 Final Volume: 5 mL

Analyst: LMC

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-06 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-14A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 11/16/2010 8:45  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 90.26

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.91	mg/Kg	1	11/23/10 06:05

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	99.6	99.6		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112210  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.77 g  
 Final Volume: 5 mL

Analyst:     *wml*

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-07 (3-4')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-15A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 11/16/2010 8:30  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 91.55

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.19	mg/Kg	1	11/23/10 13:08

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	98.8	98.8		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.31 g  
 Final Volume: 5 mL

Analyst: LMC

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-08 (2.5-3.5')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-16A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 11/16/2010 9:45  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 90.37

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	4.77	mg/Kg	1	11/23/10 06:32

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	96.6	96.6		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112210  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.96 g  
 Final Volume: 5 mL

Analyst: WML

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-09 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-17A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 11/19/2010 7:45  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 89.29

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	133	5.73	mg/Kg	10	11/23/10 20:19

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	92.5	92.5		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 5.86 g  
 Final Volume: 5 mL

Analyst: LMC

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-10 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-18A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 11/19/2010 8:00  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 92.99

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	30.1	4.95	mg/Kg	1	11/23/10 14:02

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	116.0	116.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.52 g  
 Final Volume: 5 mL

Analyst: LMC

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-13 (1-2')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-19A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 11/19/2010 8:50  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 92.71

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.06	mg/Kg	1	11/23/10 14:29

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	99.0	99.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.4 g  
 Final Volume: 5 mL

Analyst: LMC

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-14 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-20A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 11/19/2010 9:05  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 93.90

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.63	mg/Kg	1	11/23/10 14:58

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	98.1	98.1		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 5.67 g  
 Final Volume: 5 mL

Analyst: LMC



**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-15 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-21A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 11/19/2010 9:20  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 94.21

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.44	mg/Kg	1	11/23/10 15:23

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	98.8	98.8		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112310  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 5.85 g  
 Final Volume: 5 mL

Analyst: LMC

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-16 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-22A  
 Lab Project ID: G128-2619  
 Report Basis: Dry Weight

Analyzed By: LMC  
 Date Collected: 11/19/2010 9:40  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 92.45

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	81.4	4.77	mg/Kg	5	11/29/10 06:39

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	93.4	93.4		70-130

Comments:

**Batch Information**

Analytical Batch: VP112810  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: LMC

Prep Method: 5035  
 Initial Wt/Vol: 6.8 g  
 Final Volume: 5 mL

Analyst: LMC

Results for Total Petroleum Hydrocarbons  
by GC/FID 8015

Client Sample ID: 51 DPT-17 (1-2')  
Client Project ID: NCDOT Stedman PSAs  
Lab Sample ID: G128-2619-23A  
Lab Project ID: G128-2619  
Report Basis: Dry Weight

Analyzed By: LMC  
Date Collected: 11/19/2010 10:00  
Date Received: 11/19/2010  
Matrix: Soil  
Solids 89.73

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.01	mg/Kg	1	11/23/10 16:17

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	100.0	100.0		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP112310  
Analytical Method: 8015  
Instrument ID: GC4  
Analyst: LMC

Prep Method: 5035  
Initial Wt/Vol: 6.68 g  
Final Volume: 5 mL

Analyst: LMC

**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: 51 DPT-01 (2-3')  
Client Project ID: NCDOT Stedman PSAs  
Lab Sample ID: G128-2619-9D  
Lab Project ID: G128-2619

Date Collected: 11/16/2010 8:15  
Date Received: 11/19/2010  
Matrix: Soil  
Solids 90.87  
Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.67	mg/Kg	1	11/23/10 02:50
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	30.5	76.2

Comments:

**Batch Information**

Analytical Batch: EP112210  
Analytical Method: 8015  
Instrument: GC6  
Analyst: DTF

Prep batch: 17794  
Prep Method: 3541  
Prep Date: 11/22/10  
Initial Prep Wt/Vol: 32.99 G  
Prep Final Vol: 10 mL

Analyst: FA

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N.C. Certification #481

Reviewed By: CPD  
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**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: 51 DPT-02 (2-3')  
Client Project ID: NCDOT Stedman PSAs  
Lab Sample ID: G128-2619-10D  
Lab Project ID: G128-2619

Date Collected: 11/16/2010 10:00  
Date Received: 11/19/2010  
Matrix: Soil  
Solids 89.66  
Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.54	mg/Kg	1	11/23/10 03:19
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	31.5	78.7

Comments:


**Batch Information**

Analytical Batch: EP112210  
Analytical Method: 8015  
Instrument: GC6  
Analyst: DTF

Prep batch: 17794  
Prep Method: 3541  
Prep Date: 11/22/10  
Initial Prep Wt/Vol: 34.1 G  
Prep Final Vol: 10 mL

Analyst: FK

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N.C. Certification #481

Reviewed By:   
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**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-03 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-11D  
 Lab Project ID: G128-2619

Date Collected: 11/16/2010 9:30  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 73.39  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	8.42	mg/Kg	1	11/23/10 03:47
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	22.1	55.2

**Comments:**

**Batch Information**

Analytical Batch: EP112210  
 Analytical Method: 8015  
 Instrument: GC8  
 Analyst: BAO

Prep batch: 17794  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 32.37 G  
 Prep Final Vol: 10 mL

Analyst: FA

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 N.C. Certification #481

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**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: 51 DPT-04 (2.5-3.5')  
Client Project ID: NCDOT Stedman PSAs  
Lab Sample ID: G128-2619-12D  
Lab Project ID: G128-2619

Date Collected: 11/16/2010 9:15  
Date Received: 11/19/2010  
Matrix: Soil  
Solids 85.47  
Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	111	71.2	mg/Kg	10	11/23/10 04:15
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	NA	NA #

**Comments:**  
NA : Surrogates diluted out

**Batch Information**

Analytical Batch: EP112210  
Analytical Method: 8015  
Instrument: GC8  
Analyst: BAO

Prep batch: 17794  
Prep Method: 3541  
Prep Date: 11/22/10  
Initial Prep Wt/Vol: 32.86 G  
Prep Final Vol: 10 mL

Analyst: FX

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-05 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-13D  
 Lab Project ID: G128-2619

Date Collected: 11/16/2010 9:00  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 91.95  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	12.0	6.71	mg/Kg	1	11/23/10 04:43
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	32.9	82.3

Comments:

**Batch Information**

Analytical Batch: EP112210  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 17794  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 32.43 G  
 Prep Final Vol: 10 mL

Analyst: FX

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**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-06 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-14D  
 Lab Project ID: G128-2619

Date Collected: 11/16/2010 8:45  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 90.26  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.92	mg/Kg	1	11/23/10 05:11
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	30.7	76.7

Comments:

**Batch Information**

Analytical Batch: EP112210  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BAO

Prep batch: 17794  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 32 G  
 Prep Final Vol: 10 mL

Analyst: FX

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**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-07 (3-4')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-15D  
 Lab Project ID: G128-2619

Date Collected: 11/16/2010 8:30  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 91.55  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.83	mg/Kg	1	11/23/10 06:35
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	32	80

**Comments:**

**Batch Information**

Analytical Batch: EP112210  
 Analytical Method: 8015  
 Instrument: GC8  
 Analyst: DTF

Prep batch: 17794  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 31.98 G  
 Prep Final Vol: 10 mL

Analyst: FX

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 N.C. Certification #481

Reviewed By: [Signature]  
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**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-08 (2.5-3.5')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-16D  
 Lab Project ID: G128-2619

Date Collected: 11/16/2010 9:45  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 90.37  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.50	mg/Kg	1	11/23/10 07:04
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	31.3	78.3

Comments:

**Batch Information**

Analytical Batch: EP112210  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: BAO

Prep batch: 17794  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 34.06 G  
 Prep Final Vol: 10 mL

Analyst: FX

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-09 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-17D  
 Lab Project ID: G128-2619

Date Collected: 11/19/2010 7:45  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 89.29  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	23.5	6.86	mg/Kg	1	11/23/10 07:32
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	31.7	79.1

Comments:

**Batch Information**

Analytical Batch: EP112210  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 17794  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 32.64 G  
 Prep Final Vol: 10 mL

Analyst: FX

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 N.C. Certification #481

Reviewed By: BA  
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**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: 51 DPT-10 (2-3')  
Client Project ID: NCDOT Stedman PSAs  
Lab Sample ID: G128-2619-18D  
Lab Project ID: G128-2619

Date Collected: 11/19/2010 8:00  
Date Received: 11/19/2010  
Matrix: Soil  
Solids 92.99  
Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	18.5	6.68	mg/Kg	1	11/23/10 08:00
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	31.9	79.8

Comments:

**Batch Information**

Analytical Batch: EP112210  
Analytical Method: 8015  
Instrument: GC6  
Analyst: DTF

Prep batch: 17794  
Prep Method: 3541  
Prep Date: 11/22/10  
Initial Prep Wt/Vol: 32.19 G  
Prep Final Vol: 10 mL

Analyst: FA

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N.C. Certification #481

Reviewed By: [Signature]  
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**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-13 (1-2')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-19D  
 Lab Project ID: G128-2619

Date Collected: 11/19/2010 8:50  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 92.71  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	7.15	6.54	mg/Kg	1	11/23/10 12:13
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	33	82.5

Comments:

**Batch Information**

Analytical Batch: EP112310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 17794  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 32.98 G  
 Prep Final Vol: 10 mL

Analyst: FR

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 N.C. Certification #481

Reviewed By: DA  
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**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-14 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-20D  
 Lab Project ID: G128-2619

Date Collected: 11/19/2010 9:05  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 93.90  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	8.39	6.49	mg/Kg	1	11/23/10 14:34
<b>Surrogate Spike Results</b>					
		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	34	85

Comments:

**Batch Information**

Analytical Batch: EP112310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 17795  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 32.81 G  
 Prep Final Vol: 10 mL

Analyst: FK

**Results for Total Petroleum Hydrocarbons  
by GC/FID 8015**

Client Sample ID: 51 DPT-15 (2-3')  
 Client Project ID: NCDOT Stedman PSAs  
 Lab Sample ID: G128-2619-21D  
 Lab Project ID: G128-2619

Date Collected: 11/19/2010 9:20  
 Date Received: 11/19/2010  
 Matrix: Soil  
 Solids 94.21  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.36	mg/Kg	1	11/23/10 15:03
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	31.1	77.6

Comments:

**Batch Information**

Analytical Batch: EP112310  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 17795  
 Prep Method: 3541  
 Prep Date: 11/22/10  
 Initial Prep Wt/Vol: 33.39 G  
 Prep Final Vol: 10 mL

Analyst: FA

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Reviewed By: [Signature]  
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**Results for Total Petroleum Hydrocarbons**  
by GC/FID 8015

Client Sample ID: 51 DPT-18 (2-3')  
Client Project ID: NCDOT Stedman PSAs  
Lab Sample ID: G128-2619-22D  
Lab Project ID: G128-2619

Date Collected: 11/19/2010 9:40  
Date Received: 11/19/2010  
Matrix: Soil  
Solids 92.45  
Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	37.6	6.71	mg/Kg	1	11/23/10 15:30
Surrogate Spike Results		Spike Added	Control Limits	Spike Result	Percent Recovery
OTP		40	40-140	31.3	78.2

Comments:


**Batch Information**

Analytical Batch: EP112310  
Analytical Method: 8015  
Instrument: GC6  
Analyst: DTF

Prep batch: 17795  
Prep Method: 3541  
Prep Date: 11/22/10  
Initial Prep Wt/Vol: 32.22 G  
Prep Final Vol: 10 mL

Analyst: FX

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Reviewed By:   
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Results for Total Petroleum Hydrocarbons  
by GC/FID 8015

Client Sample ID: 51 DPT-17 (1-2')  
Client Project ID: NCDOT Stedman PSAs  
Lab Sample ID: G128-2619-23D  
Lab Project ID: G128-2619

Date Collected: 11/19/2010 10:00  
Date Received: 11/19/2010  
Matrix: Soil  
Solids 89.73  
Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	6.87	mg/Kg	1	11/23/10 15:58
<b>Surrogate Spike Results</b>		<b>Spike Added</b>	<b>Control Limits</b>	<b>Spike Result</b>	<b>Percent Recovery</b>
OTP		40	40-140	30.6	76.5

Comments:

**Batch Information**

Analytical Batch: EP112310  
Analytical Method: 8015  
Instrument: GC6  
Analyst: DTF

Prep batch: 17795  
Prep Method: 3541  
Prep Date: 11/22/10  
Initial Prep Wt/Vol: 32.43 G  
Prep Final Vol: 10 mL

Analyst: FDL

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Reviewed By: MSL  
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1 CLIENT: CATLIN / NCDOT  
 CONTACT: Ben Ashba @ CATLIN PHONE NO: 910 1452-5861  
 PROJECT: NCDOT Stedman PSAs STATE PROJ# R-2303A WBS: 34416.1  
 REPORTS TO: Ben @ CATLIN NCDOT email: ben.ashba@catlinusa.com  
 INVOICE TO: NCDOT Geo Enviro Cumberland County P.O. NUMBER: 6300025660

SGS Reference: G128-2619 PAGE 1 OF 9

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE	Preservatives Used	Analysis Required	REMARKS	
									C= COMP	G= GRAB
907	DPT-01 (2-3')	11-15-10	1330	SOIL	3	G	None	None	✓	
907	DPT-02 (2-3')		1400						✓	
907	DPT-03 (1-2')		1415						✓	
907	DPT-04 (2-3')		1430						✓	
907	DPT-05 (2-3')		1445						✓	
907	DPT-06 (1-2')		1500						✓	
907	DPT-07 (1-2')		1515						✓	
907	DPT-08 (2-3')	✓	1530						✓	
51	DPT-01 (2-3')	11-16-10	815						✓	
51	DPT-02 (2-3')	✓	1000						✓	

2

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Shipping Carrier: Samples Received Cold? (Circle) YES NO  
 Shipping Ticket No: Temperature °C: 5.8, 5.8, 5.5, 5.6  
 Special Deliverable Requirements: Summary EDD Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT  
 Special Instructions:  
 Requested Turnaround Time:  RUSH  STD 2 Week

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099554

1 CLIENT: CATLIN / NCDOT

CONTACT: Ben Ashba@CATLIN PHONE NO: (910) 452-5861

PROJECT: NCDOT Stedman STATE PROJECT: R-2303A WBS: 34416.1.1

REPORTS TO: Ben @ CATLIN email: ben.ashba@catlinusa.com

INVOICE TO: NCDOT Geo Enviro QUOTE#: Cumberland County DoT P.O. NUMBER: 6300025660

SGS Reference: G(28-2619) PAGE 2 OF 9

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE	Preservatives Used		Analysis Required	REMARKS
							Meat	ICE		
✓	SI DPT-03 (2-3')	11.16.10	930	SOIL	3	G	✓	✓		
✓	SI DPT-04 (2.5-3.5')		915							
✓	SI DPT-05 (2-3')		900							HOT
✓	SI DPT-06 (2-3')		845							
✓	SI DPT-07 (3-4')		830							
✓	SI DPT-08 (2.5-3.5')	✓	945							
✓	SI DPT-09 (2-3')	11.19.10	745							HOT
✓	SI DPT-10 (2-3')		800							HOT
✓	SI DPT-13 (1-2')		850							maybe hot
5	SI DPT-14 (2-3')	✓	905							maybe hot

2

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Collected/Relinquished By: (1) Ben Ashba Date 11/19/10 Time 1455 Received By: [Signature]

Relinquished By: (2) Date Time Received By:

Relinquished By: (3) Date Time Received By:

Relinquished By: (4) Date Time Received By:

Shipping Carrier: Samples Received Cold? (Circle) YES NO

Shipping Ticket No: Temperature°C: 58, 58, 55, 56

Special Deliverable Requirements: Summary EDD Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Special Instructions:

Requested Turnaround Time:  RUSH  STD 2 week

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099556

1 CLIENT: **CATLIN/ NCDOT**

CONTACT: **Ben Ashba @ CATLIN** PHONE NO: **(910) 452-5861**

PROJECT: **NCDOT Steadman PSAS** STATE Proj. # **R-2303A** WBS: **34416.1.1**

REPORTS TO: **Ben @ CATLIN** email: **ben.ashba@catlin.usg.com**

INVOICE TO: **NCDOT Geo Enviro** QUOTE # **Cumberland County** P.O. NUMBER: **6300025660**

SGS Reference: **G 128-2619** PAGE **3** OF **9**

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	CONTAINERS	SAMPLE TYPE	Preservatives Used		ANALYSIS REQUIRED	REMARKS
							C= COMP	G= GRAB		
✓	51 DPT-15 (2-3')	11-19-10	920	SOIL	3	G	✓	✓		maybe Hot
✓	51 DPT-16 (2-3')	11-19-10	940							maybe Hot
✓	51 DPT-17 (1-2')	11-19-10	1000							maybe Hot
✓	71 DPT-01 (4-5')	11-16-10	1125							
✓	71 DPT-02 (6-7')		1145							
✓	71 DPT-03 (6-7')		1215							
✓	71 DPT-04 (6-8')		1240							
✓	71 DPT-05 (4-6')		1300							
✓	71 DPT-06 (3-4')		1315							
✓	71 DPT-07 (5-6')		1400							

2

3

4

5

Shipping Carrier: \_\_\_\_\_ Samples Received Cold? (Circle) YES NO

Shipping Ticket No: \_\_\_\_\_ Temperature °C: **5.8, 5.8, 5.5, 5.6**

Special Deliverable Requirements: **Summary EDD** Chain of Custody Seal: (Circle) INTACT BROKEN **ABSENT**

Special Instructions: \_\_\_\_\_

Requested Turnaround Time:  RUSH \_\_\_\_\_  STD **2 week**

Date Needed: \_\_\_\_\_

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<b>1</b> CLIENT: <u>CATLIN / NCDOT</u> CONTACT: <u>Ben Ashba @ CATLIN</u> PHONE NO: <u>910 452-5861</u> PROJECT: <u>NCDOT Stedman PSAs</u> STATE # <u>R-2303A</u> REF # <u>WAS: 34416.1.1</u> REPORTS TO: <u>Ben @ CATLIN</u> <u>NCDOT</u> FAX NO: ( ) INVOICE TO: <u>NCDOT</u> QUOTE # <u>Cumberland County</u> <u>Geo Enviro</u> DIST P.O. NUMBER: <u>6300025660</u>					SGS Reference: <u>G128-2619</u>			PAGE <u>4</u> OF <u>9</u>			
<b>2</b> LAB NO. SAMPLE IDENTIFICATION DATE TIME MATRIX					No CONTAINERS SAMPLE TYPE C= COMP G= GRAB	Preservatives Used: <u>None</u> <u>ICE</u>		Analysis Required: <u>(3)</u>		REMARKS	
✓	71 DPT-08 (7-8')	11-16-10	1420	SPIL		3	G	✓	✓		
✓	71 DPT-09 (5-6')		1440								
✓	71 DPT-10 (3-4')	✓	1500								
✓	78 DPT-01 (7-8')	11-17-10	815								
✓	78 DPT-02 (7-8')		840								maybe Hot
✓	78 DPT-03 (6-7')		930								
✓	78 DPT-04 (7-8')		1000								
✓	78 DPT-05 (6-7')		900								HOT
✓	78 DPT-06 (1-2')		1020								
✓	78 DPT-07 (7-8')	✓	1040								
<b>5</b> Collected/Relinquished By: (1) <u>Ben Ashba</u> Date <u>11/19/10</u> Time <u>1455</u>			Received By: <u>[Signature]</u>			Shipping Carrier:		Samples Received Cold? (Circle) <u>YES</u> NO			
Relinquished By: (2)			Date Time Received By:			Shipping Ticket No:		Temperature °C: <u>5.8, 5.8, 5.5, 5.6</u>			
Relinquished By: (3)			Date Time Received By:			Special Deliverable Requirements: <u>Summary EDD</u>		Chain of Custody Seal: (Circle) INTACT BROKEN <u>ABSENT</u>			
Relinquished By: (4)			Date Time Received By:			Special Instructions:					
Requested Turnaround Time:						<input type="checkbox"/> RUSH _____ Date Needed					
						<input checked="" type="checkbox"/> STD <u>2 week</u>					

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1 CLIENT: **CATUN / NCDOT**

CONTACT: **Ben Ashba @ CATUN** PHONE NO: (910) 452-5861

PROJECT: **NCDOT Steadman PSAs** SITE # **PSA R-2303A** WBS: 344 bl.1

REPORTS TO: **Ben Ashba @ CATUN** email: **ben.ashba@catun.usa.com**

INVOICE TO: **NCDOT** QUOTE #: **Camdenland County**

2 **Geo ENVIRO** DOTPO. NUMBER: **6300025660**

SGS Reference: **G128-2619** PAGE **5** OF **9**

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE C=COMP G=GRAB	Preservatives Used	Analysis Required	REMARKS	
✓	81B DPT-01 (7-8')	11-18-10	1130	SOIL	3	G	✓	✓		HOT
✓	81B DPT-02 (6-7')		1210							maybe HOT
✓	81B DPT-03 (4-5')		1230							maybe HOT
✓	81B DPT-04 (1-2')		1250							
✓	81B DPT-05 (1-2')		1315							
✓	81B DPT-06 (1-2')		1340							maybe HOT
✓	81B DPT-07 (2-3')		1400							maybe HOT
✓	81B DPT-08 (1-2')		1420							maybe HOT
✓	81B DPT-09 (1-2')		1440							
✓	81B DPT-10 (1-2')		1500							

3 **Geo DPT**

4 Shipping Carrier: \_\_\_\_\_ Samples Received Cold? (Circle) YES NO

Shipping Ticket No: \_\_\_\_\_ Temperature °C: **58, 58, 55, 56**

Special Deliverable Requirements: **Summary EDD** Chain of Custody Seal: (Circle) INTACT BROKEN **ABSENT**

Special Instructions: \_\_\_\_\_

Requested Turnaround Time:  RUSH \_\_\_\_\_  **2 Week**

5 Collected/Relinquished By: (1) **Ben Ashba** Date: **11-19-10** Time: **1455** Received By: **John Plann**

Relinquished By: (2) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (3) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (4) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

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<b>1</b> CLIENT: <u>CATLIN/NCDOT</u>					SGS Reference: <u>6128-2619</u>			PAGE <u>6</u> OF <u>9</u>		
CONTACT: <u>Ben Ashby@CATLIN</u> PHONE NO: <u>910 452-5861</u>					<b>C O N T A I N E R S</b>			Preservatives Used: <u>meth ice</u> Analysis Required: <u>(3)</u> C=CGMP G=GRAB		
PROJECT: <u>NCDOT Stedman PSAs</u> <u>STATE #12-2303A</u> <u>WBS: 3446.1.1</u>										
REPORTS TO: <u>Ben@CATLIN</u> <u>NCDOT</u> email: <u>ben.ashby@catlin.usg.com</u>										
INVOICE TO: <u>NCDOT</u> QUOTE #: <u>Cumberland County</u> <u>Geo Enviro</u> DPT. NO. NUMBER: <u>630025660</u>										
LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	CONTAINERS	C	G	PRESERV	ANALYSIS	REMARKS
	<u>81B DPT-11 (1-2')</u>	<u>11-18-10</u>	<u>1520</u>	<u>SOIL</u>	<u>3</u>	<u>G</u>	<u>✓</u>	<u>✓</u>		
	<u>81B DPT-12 (1-2')</u>		<u>1530</u>							
	<u>81B DPT-13 (2-3')</u>		<u>1545</u>							
	<u>81B DPT-14 (1-2')</u>		<u>1600</u>							
	<u>81B DPT-15 (1-2')</u>		<u>1620</u>							
	<u>81B DPT-16 (2-3')</u>		<u>1640</u>							
	<u>81B DPT-17 (2-3')</u>		<u>1700</u>							
	<u>163 DPT-01 (3-4')</u>	<u>11-17-10</u>	<u>1230</u>							
	<u>163 DPT-02 (4-5')</u>		<u>1245</u>							
	<u>163 DPT-03 (5-6')</u>		<u>1310</u>							
<b>5</b> Collected/Relinquished By: (1) <u>Ben Ashby</u>		Date	Time	Received By: <u>John Alan</u>		Shipping Carrier:		Samples Received Cold? (Circle) YES NO		
Relinquished By: (2)		Date	Time	Received By:		Shipping Ticket No:		Temperature °C: <u>5.8, 5.8, 5.5, 5.6</u>		
Relinquished By: (3)		Date	Time	Received By:		Special Deliverable Requirements: <u>Summary EDD</u>		Chain of Custody Seal: (Circle) INTACT BROKEN <u>ABSENT</u>		
Relinquished By: (4)		Date	Time	Received By:		Special Instructions:		Requested Turnaround Time: <u>RUSH</u> <u>2 Week</u>		

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1 CLIENT: **CATLIN / NCDOT**

CONTACT: **Ben Ashbar @ CATLIN** PHONE NO: **(910) 452-5861**

PROJECT: **NCDOT Stedman PSAs** SITE/PROJECT: **State Hwy # R-2303A** WBS: **34416.1.1**

REPORTS TO: **Ben @ CATLIN** email: **ben.ashbar@catlin.usa.com**

INVOICE TO: **NCDOT** QUOTE#: **Cumberland County**

2 **Geo Enviro** DOT P.O. NUMBER: **6300025660**

SGS Reference: **G128-2619** PAGE **7** OF **9**

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	SAMPLE TYPE	Preservatives Used	Analysis Required	C=COMP	G=GRAB	REMARKS
✓	163 DPT-04 (2-3')	11-17-10	1330	Soil	3	G	✓	✓			
✓	163 DPT-05 (1-2')		1400								
✓	163 DPT-06 (1-2')		1420								maybe Hot
✓	163 DPT-07 (2-3')		1440								maybe Hot
✓	163 DPT-08 (2-3')		1530								Hot
✓	163 DPT-09 (1-2')		1600								Hot
✓	163 DPT-10 (1-2')		1610								maybe Hot
✓	163 DPT-11 (3-4')		1620								maybe Hot
	163 DPT-12 (6-7')	11-17-10	1645								
	163 DPT-13 (6-7')	11-18-10	715								

3 **GRAB DPT**

4 Shipping Carrier: \_\_\_\_\_ Samples Received Cold? (Circle YES NO) **NO**

Shipping Ticket No: \_\_\_\_\_ Temperature °C: **5.8, 5.8, 5.5, 5.6**

Special Deliverable Requirements: **Summary EDD** Chain of Custody Seal: (Circle) INTACT BROKEN **ABSENT**

Special Instructions: \_\_\_\_\_

Requested Turnaround Time:  RUSH \_\_\_\_\_  **STD 2 week**

Date Needed: \_\_\_\_\_

5 Collected/Relinquished By: (1) **Ben Ashbar** Date: **11-19-10** Time: **1455** Received By: **John Planer**

Relinquished By: (2) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (3) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (4) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Received By: \_\_\_\_\_

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1 CLIENT: **CATLIN/NCDOT**  
 CONTACT: **Ben Ashbar@CATLIN** PHONE NO: **(910) 452-5861**  
 PROJECT: **NCDOT Stedman PSA State Project # R-2303A**  
 REPORTS TO: **Ben@CATLIN** **NCDOT** email: **ben.g.ashbar@catlinusa.com**  
 INVOICE TO: **NCDOT Geo Enviro** QUOTE: **Cumberland County**  
 P.O. NUMBER: **6300025662**

SGS Reference: **6128-2619** PAGE **8** OF **9**

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No CONTAINERS	Preserved Used	Analysis Required	REMARKS
TS ✓	163 DPT-14 (6-7')	11-18-10	740	SOIL	3	G	✓	
(3-4) ✓	163 DPT-15 (2-3') or (3-4')		805				✓	
✓	163 DPT-16 (1-2')		820					check sample label
✓	163 DPT-17 (5-6')		850					maybe Hot
✓	163 DPT-18 (6-7')		920					
✓	163 DPT-19 (6-7')	✓	940					Maybe Hot
✓	168 DPT-01 (3-4')	11-15-10	1630					maybe Hot
✓	168 DPT-02 (3-4')		1645					} check sample label ID maybe (2-4') not (3-4')
✓	168 DPT-03 (3-4')		1700					
✓	168 DPT-04 (3-4')	✓	1715					

5

Collected/Relinquished By: (1) <i>Ben Ashbar</i>	Date 11-19-10	Time 1455	Received By: <i>John Glenn</i>
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received By:

4

Shipping Carrier: \_\_\_\_\_  
 Shipping Ticket No: \_\_\_\_\_  
 Special Deliverable Requirements: **Summary EPP**  
 Special Instructions: \_\_\_\_\_

Samples Received Cold? (Circle) **YES** NO  
 Temperature °C: **5.8, 5.8, 5.5, 5.6**  
 Chain of Custody Seal: (Circle) INTACT BROKEN **ABSENT**

Requested Turnaround Time: **X STD 2 weeks**  
 RUSH \_\_\_\_\_ Date Needed \_\_\_\_\_

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210 124

1 CLIENT: CARLIN/NC DOT

CONTACT: Ben Ashbae CARLIN PHONE NO: 910 452-5861

PROJECT: NC DOT Stedman PSAs STATE PROJ # R-2303A WBS: 34416.1.1

REPORTS TO: Ben@CARLIN email: ben.ashbae@carlinusa.com

INVOICE TO: NC DOT Geo FAVIRO DOT P.O. NUMBER: 630025660

SGS Reference: G128-2619 PAGE 9 OF 9

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	CONTAINERS	SAMPLE TYPE	Preservatives Used	Analysis Required				REMARKS
								Met	IC	He	ice	
✓ 168	DPT-05 (3-4')	11-15-10	1730	SOIL	3	G	3	✓	✓			
✓ 168	DPT-06 (0-2')	11-15-10	1735	SOIL	3	G	✓	✓				
✓ 813	DPT-02	11-18-10	1730	H2O	4	G			X	X		NO LABELS maybe HOT

2

3

4

5

Collected/Relinquished By: (1) Ben Ashbae Date 11-19-10 Time 1455 Received By: Julie Plon

Relinquished By: (2) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (3) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By: \_\_\_\_\_

Relinquished By: (4) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received By: \_\_\_\_\_

Shipping Carrier: \_\_\_\_\_ Samples Received Cold? (Circle) YES NO

Shipping Ticket No: \_\_\_\_\_ Temperature °C: 5.8, 5.8, 5.5, 5.6

Special Deliverable Requirements: Summary EOP Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Special Instructions: Please report any 8260/8270 Low Runs, screening OK

Requested Turnaround Time:  RUSH \_\_\_\_\_ Date Needed \_\_\_\_\_  STD 2 week

N.C. Certification #481

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SGS NORTH America, Inc.

**APPENDIX C**  
**SCHNABEL GEOPHYSICAL REPORT**



December 14, 2010

Mr. Richard Garrett, LG  
Catlin Engineers and Scientists, Inc.  
P.O. Box 10279  
Wilmington, NC 28404-0279

RE:           State Project: R-2303A  
              WBS Element: 34416.1.1  
              County: Cumberland  
              Description: Stedman – NC 24 from West of SR 1006 (Maxwell Road/Clinton Road)  
                                  in Cumberland County to SR 1853 (John Nunnery Road)

**Subject:       Project 09210013.31 Report on Geophysical Surveys  
                  Parcel 51, Cumberland County, North Carolina**

Dear Mr. Garrett:

**SCHNABEL ENGINEERING SOUTH, PC** (Schnabel) is pleased to present this report on the geophysical surveys we conducted on the subject property. We understand this letter report will be included as an appendix in your report to the NCDOT. The report includes two 11x17 color figures and three 8.5x11 color figures.

## **INTRODUCTION**

The work described in this report was conducted on November 9, 10, 18, and 19, 2010, by Schnabel under our 2009 contract with the NCDOT. The work was conducted over the accessible areas of the parcel as indicated by the NCDOT to support their environmental assessment of the subject property. Photographs of the parcel are included on Figure 1. The property is located on the south side of Clinton Road across from the intersection of Windwood Drive in Stedman, NC. The purpose of the geophysical surveys was to locate possible metal underground storage tanks (UST's) in the accessible areas of the right-of-way and/or easement.

The geophysical investigation consisted of electromagnetic (EM) induction surveys using a Geonics EM61-MK2 instrument. The EM61 metal detector is used to locate metal objects buried up to about eight feet below ground surface. Ground-penetrating radar (GPR) investigations of selected EM61 anomalies, including areas of reinforced concrete, were conducted using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna. Photographs of the equipment used are shown on Figure 2.

## **FIELD METHODOLOGY**

Locations of geophysical data points were obtained using a sub-meter Trimble Pro-XRS DGPS system. 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. The locations of existing site features (monitoring wells, signs, etc.) were recorded for later correlation with the geophysical data and for location references to the NCDOT drawings.

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 one to two feet apart in orthogonal directions over areas of reinforced concrete and anomalous EM readings not attributed to cultural features. The GPR data were reviewed in the field to evaluate the possible presence of UST's. 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 51 are shown on Figures 3 and 4. The EM61 early time gate results are plotted on Figure 3. The early time gate data provide the more sensitive detection of metal objects. Figure 4 shows the difference between the response of the top and bottom coils of the EM61 instrument (differential response). The difference is taken to remove the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as UST's.

The early time gate and differential results show anomalies apparently caused by reinforced concrete, buried utilities, or known site features (Figures 3 and 4). The GPR data collected near the southeastern side of the canopy on Parcel 51 indicated the presence of two known UST's located approximately 40 to 50 feet east of the southernmost canopy corner. The UST's are inside the limits of the planned right-of-way and/or easement. An example GPR image showing the reflections from the known UST's on Parcel 51 is shown on Figures 3 and 4. Figures 3 and 4 also include the location of the known UST's as marked in the field. The GPR data indicate that the known UST's on Parcel 51 are buried approximately 2.5 to 3.5 feet below ground surface. The GPR data indicate that the northern UST is about 8 feet in diameter and about 27 feet long, equivalent to a capacity of about 10,000 gallons. The GPR data indicate that the southern known UST on Parcel 51 is about 5 feet in diameter and about 24 feet long, equivalent to a capacity of about 4,000 gallons. Photographs of the known UST locations, as marked in the field, are included on Figure 5.

## **CONCLUSIONS**

Our evaluation of the geophysical data collected on the subject property on Project R-2303A in Stedman, NC indicates the following:

The geophysical data indicate the presence of two known UST's on Parcel 51 located approximately 40 to 50 feet east of the southernmost canopy corner. The UST's are inside the planned right-of-way and/or easement. The northern known UST is about 10,000-gallon capacity and is buried about 2.5 to 3.5 feet

below ground surface. The southern known UST is about 4,000-gallon capacity and is buried about 2.5 to 3.5 feet below ground surface.

**LIMITATIONS**

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

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

Sincerely,

**SCHNABEL ENGINEERING SOUTH, PC**



Jeremy S. Strohmeyer, LG  
Project Manager



Edward D. Billington, LG  
Senior Vice President

JW:JS:NB

**Attachments: Figures (5)**

FILE: G:\2009 PROJECTS\09210013 (NCDOT 2009 GEOTECH UNIT SERVICES)\09210013.31 (R-2303A, CUMBERLAND CO.)\REPORT\PARCEL 51\SCHNABEL GEOPHYSICAL REPORT ON PARCEL 51 (R-2303A).DOCX



Parcel 51 – Harold R. Draughon Property, looking southwest



Parcel 51 – Harold R. Draughon Property, looking northwest

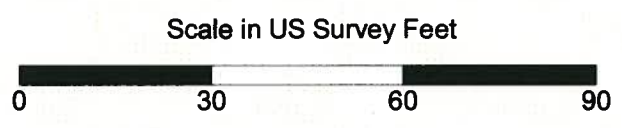
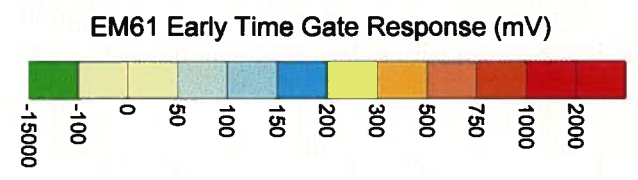
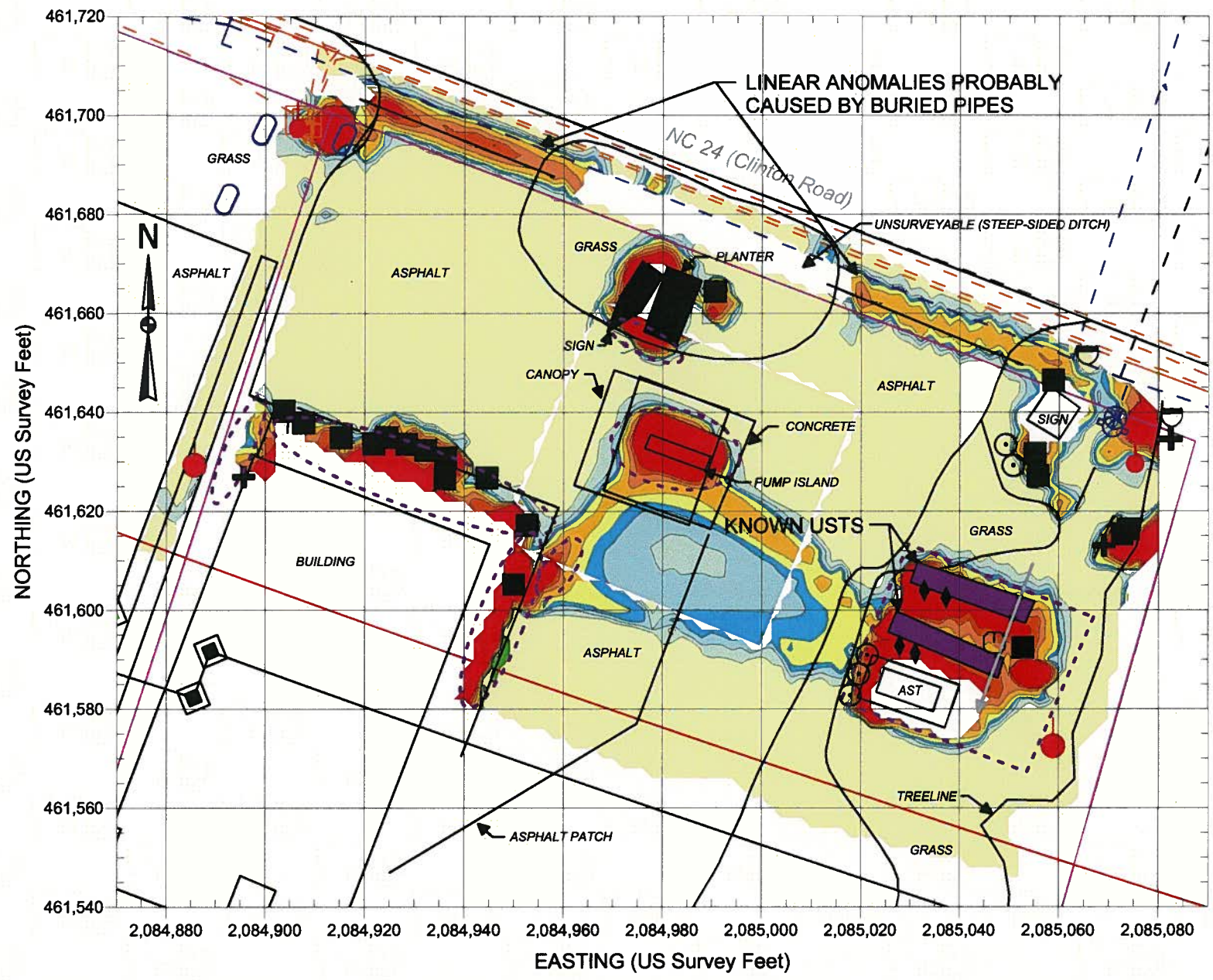




Geonics EM61-MK2



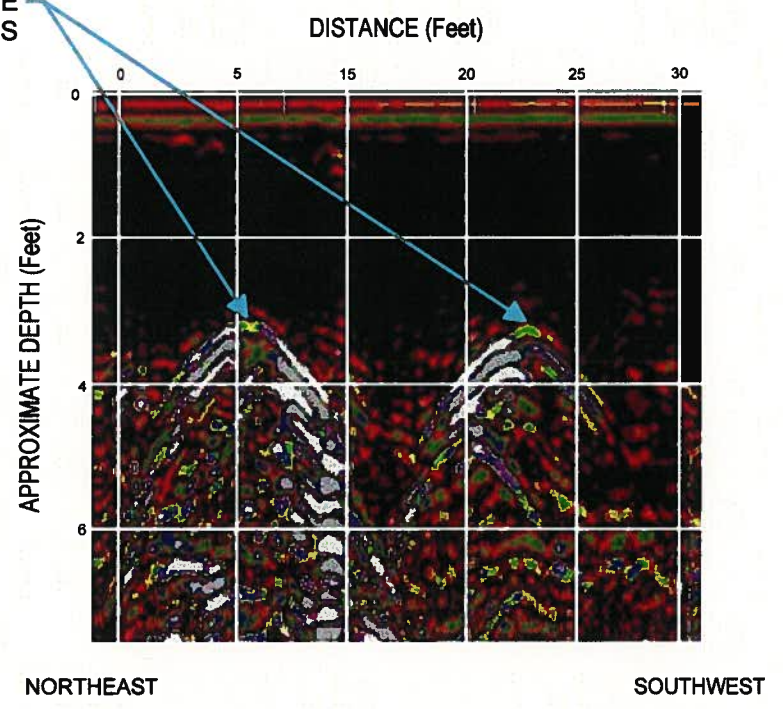
GSSI SIR-3000



EXPLANATION	
	SIGN
	UTILITY POLE
	GUY WIRE
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	LIGHT POLE
	STORM SEWER INLET
	UST LID
	DOT PROPOSED RW
	DOT PROPOSED UTILITY EASEMENT
	PROPERTY LINE
	UTILITY (AS MARKED BY OTHERS OR AS PROVIDED BY NCDOT [VARIOUS COLORS])
	EXAMPLE GPR LINE LOCATION
	GPR SURVEY AREA
	LOCATION OF KNOWN UST MARKED ON SITE

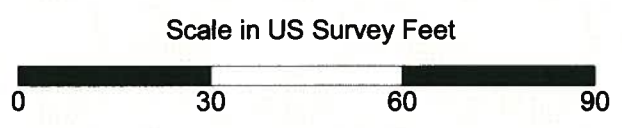
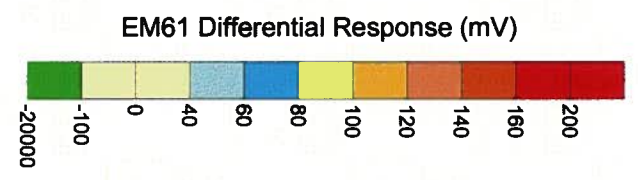
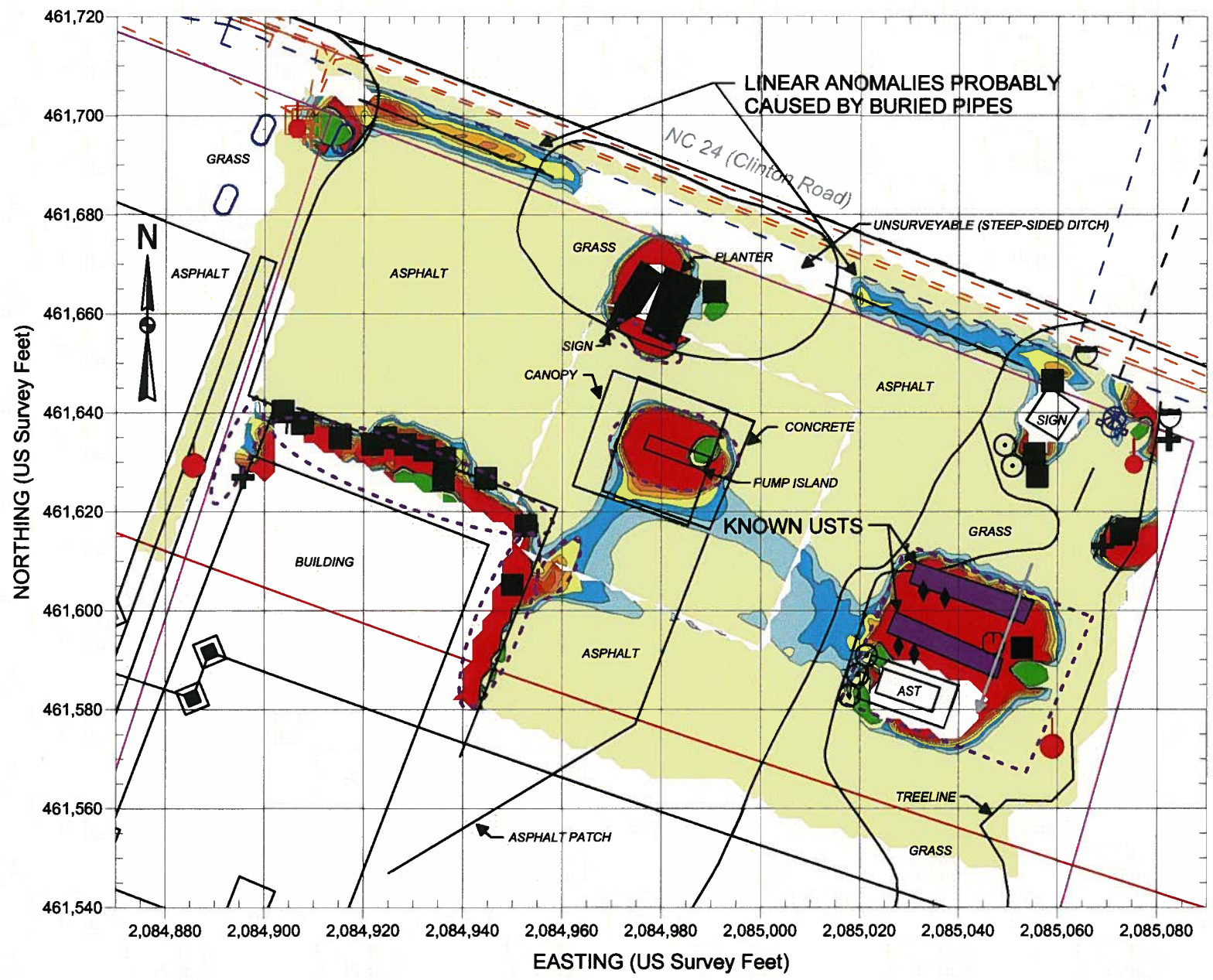
REF.: NCDOT FILE: r2303a\_rdy\_psh\_16.dgn  
(FOR SOME SITE FEATURES)

EXAMPLE GPR RESPONSE FROM KNOWN USTS



Note: The contour plot shows the earliest and most sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on November 9 & 10, 2010, 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 November 18 and 19, 2010, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

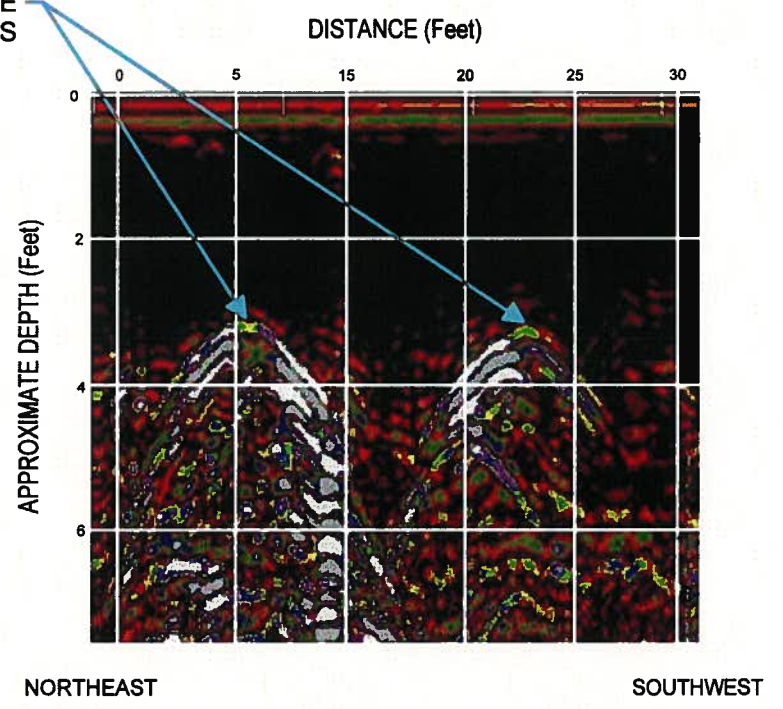
	STATE PROJECT R-2303A CUMBERLAND COUNTY, NC NC DEPARTMENT OF TRANSPORTATION PROJECT NO. 09210013.31	PARCEL 51 EM61 EARLY TIME GATE RESPONSE
	FIGURE 3	
	© Schnabel Engineering 2010 All Rights Reserved	



EXPLANATION	
	SIGN
	UTILITY POLE
	GUY WIRE
	MISCELLANEOUS METALLIC OBJECT
	UTILITY MANHOLE, METER, BOX, ETC.
	LIGHT POLE
	STORM SEWER INLET
	UST LID
	DOT PROPOSED R/W
	DOT PROPOSED UTILITY EASEMENT
	PROPERTY LINE
	UTILITY (AS MARKED BY OTHERS OR AS PROVIDED BY NCDOT [VARIOUS COLORS])
	EXAMPLE GPR LINE LOCATION
	GPR SURVEY AREA
	LOCATION OF KNOWN UST MARKED ON SITE

REF.: NCDOT FILE: r2303a\_rdy\_psh\_16.dgn  
(FOR SOME SITE FEATURES)

EXAMPLE GPR RESPONSE FROM KNOWN USTS



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 November 9 & 10, 2010, 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 November 18 and 19, 2010, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

	STATE PROJECT R-2303A CUMBERLAND COUNTY, NC NC DEPARTMENT OF TRANSPORTATION PROJECT NO. 09210013.31	PARCEL 51 EM61 DIFFERENTIAL RESPONSE
	FIGURE 4	



Parcel 51 – Harold R. Draughon Property, looking northwest. Photo shows approximate marked location of the known UST's near the southeastern side of the canopy.



Parcel 51 – Harold R. Draughon Property, looking southwest. Photo shows approximate marked location of the known UST's near the southeastern side of the canopy.