

## **PRELIMINARY SITE ASSESSMENT REPORT**

**SR 1406 (Piney Green Road) from NC 24 to US 17  
1070 Piney Green Road, Parcel #113  
Jacksonville, North Carolina  
State Project U-3810  
WBS Element # 35801.1.1  
Onslow County**

North Carolina Department of Transportation  
Geotechnical Engineering Unit  
1589 Mail Service Center  
Raleigh, North Carolina 27699-1589

April 16, 2010

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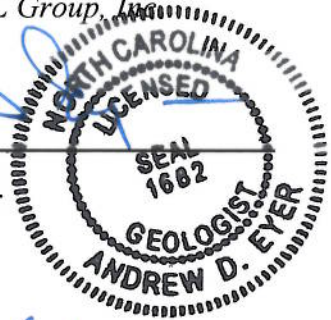
- I Soil Boring Lithologic Logs
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## Signature Page

This document, entitled "Preliminary Site Assessment Report," has been prepared for Parcel #113, located at 1070 Piney Green Road in Jacksonville, North Carolina (State Project U-3810, WBS Element # 35801.1.1, Onslow County). It has been prepared by GEL Engineering of NC, Inc. in accordance with the Notice to Proceed provided by the North Carolina Department of Transportation-GeoEnvironmental Section, Geotechnical Engineering Unit for the exclusive use of the North Carolina Department of Transportation. It has been prepared in accordance with accepted quality control practices and has been reviewed by the undersigned.

GEL ENGINEERING OF NC, INC.  
*an Affiliate of The GEL Group, Inc.*

  
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04 - 16 - 10  
\_\_\_\_\_  
Date

## **PRELIMINARY SITE ASSESSMENT REPORT**

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1070 Piney Green Road, Parcel #113  
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State Project U-3810  
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Onslow County**

### **Executive Summary**

The subject site is Parcel #113, located at 1070 Piney Green Road in Jacksonville, North Carolina. The primary purpose of this investigation was to determine the presence or absence of underground storage tanks (USTs) and constituents of concern in soil within the North Carolina Department of Transportation (NCDOT) proposed Rights-of-Way (ROWs) adjacent to Parcel #113. Currently, Parcel #113 contains an operating convenience store and service station.

GEL Engineering of NC, Inc. (GEL) performed a preliminary site assessment at Parcel #113 within the NCDOT proposed ROWs of White Oak Lane and Piney Green Road that included a geophysical survey, and the collection and analysis of soil samples. The geophysical investigation of the proposed ROWs of White Oak lane and Piney Green Road did not identify any “Known,” “Probable,” or “Possible” USTs within the proposed ROWs. However, it should be noted that Parcel #113 is an active service station with onsite petroleum USTs located outside the investigation area, in the southern portion of the site.

Soil samples were collected for analysis from ten borings constructed at Parcel #113 within the NCDOT proposed ROWs for White Oak lane and Piney Green Road. The soil samples were analyzed for diesel range organics (DRO) and gasoline range organics (GRO). Analytical results for a soil sample collected from one soil boring, S14-9, indicated that the detected DRO concentration exceeded the North Carolina Department of Environment and Natural Resources (NCDENR) recommended DRO action level of 10 mg/kg. Therefore, this analytical result is indicative of soil impact. However, analysis of the soil for petroleum hydrocarbon constituents such as volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) would be needed to confirm the soil impact. The total estimated quantity of impacted soil (DRO

>10 mg/kg) at the subject site is approximately 13 cubic yards in a localized area encompassing soil boring S14-9.

Based on the data generated from this investigation, there is no evidence that a significant release(s) of constituents of concern has occurred within the NCDOT proposed ROWs at the subject site. No additional environmental investigation of the site soil is recommended at this time. However, it is recommended that confirmation soil samples be collected and analyzed for petroleum hydrocarbon constituents (including VOCs and PAHs) following any planned excavation in the vicinity of boring S14-9 in order to confirm the presence or absence of soil impact from petroleum hydrocarbons.

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## **1.0 Introduction**

This document presents the details of a preliminary site assessment performed within the proposed North Carolina Department of Transportation (NCDOT) Rights-of-Way (ROWs) at Parcel #113 located at 1070 Piney Green Road in Jacksonville, North Carolina. Parcel #113 contains an operating convenience store and service station, with four petroleum underground storage tanks (USTs). The site location is shown on Figure 1, an excerpt from the United States Geological Survey (USGS) 7.5-minute quadrangle map of Camp Lejeune, North Carolina. The preliminary site assessment, which included a geophysical survey, was conducted by GEL Engineering of NC, Inc. (GEL) in accordance with the Notice to Proceed issued by NCDOT on February 9, 2010.

The primary purpose of this investigation was to determine the presence or absence of USTs and onsite constituents of concern in soil within the NCDOT proposed ROWs at the subject site as a result of current and/or former operations.

## **2.0 Background**

NCDOT is planning road improvements to SR 1406 (Piney Green Road) between NC 24 and US 17 in Onslow County, North Carolina. NCDOT wanted to assess the proposed ROWs adjacent to the site to evaluate the presence or absence of USTs and soil contamination related to the current and/or former onsite operations, and the impact (if any) of these operations on the proposed road improvements. Figures 2 and 3 show the general site layout for Parcel #113 and its location on Piney Green Road, respectively.

## **3.0 Local Geology and Surroundings**

Parcel #113 is in a developed area of Jacksonville in Onslow County, North Carolina. Surrounding land uses include residential and commercial activities.

The site is located approximately 5.5 miles east of the center of Jacksonville, North Carolina. This area is located in the Coastal Plain physiographic province of North Carolina. The land surface of the area is characterized by nearly level, and gently sloping, well drained soils. Coastal Plain geology in the vicinity of the site is characterized by

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undifferentiated post-Miocene interbedded sand and clay terrace deposits overlain by aqueous and aeolian deposits of marine and non-marine origin (USGS, 1955).

The United States Department of Agriculture's *Soil Survey of Onslow County, North Carolina* (1992) maps the area as Goldsboro Fine Sandy Loam (GoA), typically composed of fine sandy loam grading to sandy clay loam with depth. The soils encountered at the site during the preliminary site assessment consisted predominantly of orange/brown/grey silty sand and sandy clay to depths of 8 feet below land surface (bls).

Based on the moisture content of the subsurface soil encountered during the preliminary site assessment the water table is located at approximately 7 to 8 feet bls. Based on the USGS topographic map presented as Figure 1, the site is located approximately 30 feet above mean sea level. The topography in Figure 1 indicates that groundwater in the vicinity of Parcel #113 most likely flows in a southwesterly direction towards Northeast Creek.

#### **4.0 Subsurface Investigation**

To determine the presence or absence of USTs and impact to subsurface soil within the NCDOT ROWs at Parcel #113, GEL performed a limited site assessment that consisted of the following tasks:

- Performance of a geophysical investigation to identify the presence or absence of USTs and associated appurtenances within the proposed northerly ROW of White Oak Lane and the proposed westerly ROW of Piney Green Road.
- Soil vapor screening of soil samples collected from subsurface soil borings at Parcel #113 within the proposed ROWs of White Oak Lane and Piney Green Road to determine the potential presence or absence of soil impact from petroleum constituents of concern.
- Collection and laboratory analysis of soil samples from the proposed ROWs of White Oak lane and Piney Green Road at Parcel #113.

The details of these tasks are discussed in the following sections.

##### **4.1 Geophysical Evaluation at Parcel #113**

The geophysical investigation included the deployment of ground penetrating radar (GPR) technology and time domain electromagnetic technology (TDEM) to the site.

These technologies were used in concert with one another in order to identify subsurface metallic anomalies and, more specifically, to identify the potential presence of USTs on

site. A brief description of each technology is presented in the following paragraphs followed by a discussion of the results of the geophysical investigation.

#### **4.1.1 Ground Penetrating Radar Methodology**

A RAMAC digital radar control system configured with a 250 Megahertz (MHz) antenna array was used in this investigation. GPR is an electromagnetic geophysical method that detects interfaces between subsurface materials with differing dielectric constants. The GPR system consists of an antenna that houses the transmitter and receiver, a digital control unit that both generates and digitally records the GPR data, and a color video monitor to view data as they are collected in the field.

The transmitter radiates repetitive short-duration electromagnetic waves (at radar frequencies) into the earth from an antenna moving across the ground surface. These radar waves are reflected back to the receiver from the interface of materials with different dielectric constants. The intensity of the reflected signal is a function of the contrast in the dielectric constant between the materials, the conductivity of the material through which the wave is traveling, and the frequency of the signal. Subsurface features that commonly cause such reflections are: 1) natural geologic conditions, such as changes in sediment composition, bedding, and cementation horizons and voids; or 2) unnatural changes to the subsurface, such as disturbed soils, soil backfill, buried debris, tanks, pipelines, and utilities. The digital control unit processes the signal from the receiver and produces a continuous cross-section of the subsurface interface reflection events.

GPR data profiles are collected along transects, which are measured paths along which the GPR antenna is moved. During a survey, marks are placed in the data by the operator at designated points along the GPR transects or with a survey wheel odometer. These marks allow for a correlation between the GPR data and the position of the GPR antenna on the ground.

Depth of investigation of the GPR signal is highly site-specific and is limited by signal attenuation (absorption) in the subsurface materials. Signal attenuation is dependent on the electrical conductivity of the subsurface materials. Signal attenuation is greatest in materials with relatively high electrical conductivities, such as clays, brackish groundwater, or groundwater with a high dissolved solid content from natural or man-made sources. Signal attenuation is lowest in relatively low-conductivity materials, such as dry sand or rock. Depth of investigation is also dependent on the antenna's transmitting frequency. Depth of investigation generally increases as transmitting



frequency decreases; however, the ability to resolve smaller subsurface features is diminished as frequency is decreased.

The GPR antenna used at this site is internally shielded from aboveground interference sources. Accordingly, the GPR response is not affected by overhead power lines, metallic buildings, or nearby objects.

#### **4.1.2 Time Domain Electromagnetic Methodology**

The TDEM methods measure the electrical conductivity of subsurface materials. The conductivity is determined by inducing (from a transmitter) a time or frequency-varying magnetic field and measuring (with a receiver) the amplitude and phase shift of an induced secondary magnetic field. The secondary magnetic field is created by subsurface conductive materials behaving as an inductor as the primary magnetic field is passed through them.

The Geonics EM-61 system used in this investigation operates within these principles. However, the EM-61 TDEM system can discriminate between moderately conductive earth materials and very conductive metallic targets. The EM-61 consists of a portable coincident loop time domain transmitter and receiver with a 0.5-meter by 1.0-meter coil system. The EM-61 generates 150 pulses per second and measures the response from the ground after transmission or between pulses. The secondary EM responses from metallic targets are of longer duration than those created by conductive earth materials. By recording the later time EM arrivals, only the response from metallic targets is measured, rather than the field generated by the earth material.

#### **4.1.3 Field Procedures**

The GPR and TDEM field investigation was performed at Parcel #113 on March 16, 2010. The extent of the investigation covers only the proposed ROW indicated by NCDOT. A GPR system time range setting of 90 nanoseconds (ns) was used during the entire investigation. This range was determined after a series of test lines were conducted to evaluate the GPR response in the local geologic section. A preliminary interpretation of the GPR data was conducted in the field and potential USTs were marked on the ground. Following the completion of the fieldwork, the data were post-processed and analyzed in more detail. GPR data processing typically included band pass filtering, background removal, horizontal smoothing, and gain adjustments.

TDEM was also used to scan the project site. Electromagnetic anomalies indicative of buried metallic objects were marked in the field.

It should be noted that “One Call” underground utility locations had been performed within the westerly ROW of Piney Green Road and the northerly ROW of White Oak Lane at Parcel #113 prior to the initiation of the preliminary site assessment field activities at the site. Several underground utilities were marked by “One Call” within both ROWs at Parcel #113.

As shown on Figure 4, a large concrete slab in the northwest corner of the investigation area (within the proposed westerly ROW of Piney Green Road) shows a high level EM-61 response. However, GPR data over this area was inconsistent with the presence of USTs, and no other surface features or evidence suggest the presence of USTs in this area. The manager of the onsite convenience store stated that the slab has no known use and that there are no USTs beneath it. Therefore, the slab is not considered a “Known,” “Probable,” or “Possible” UST. It should be noted that Parcel #113 is an active service station with onsite petroleum USTs located outside the investigation area, in the southern portion of the site.

#### **4.2 Subsurface Soil Investigation at Parcel #113**

To determine the presence or absence of impact to subsurface soil by constituents of concern, GEL collected soil samples from ten subsurface soil borings, S14-1 through S14-10, at Parcel #113 on March 23, 2010, for analysis of total petroleum hydrocarbon indicator parameters. The soil borings were constructed within the NCDOT proposed ROWs for White Oak Lane and Piney Green Road, as shown on Figure 2 and in the photographs in Appendix III. The longitude and latitude coordinates for the boring locations are listed in the table below.

All borings were advanced to a total depth of 8 feet bls. Soil samples were collected at 3-4 feet and 7-8 feet bls from each borehole. All soil samples were inspected for indications of impact by constituents of concern, including petroleum hydrocarbons, such as odors, discoloration, or visible sheen. This sampling was accomplished using direct push technology (DPT) provided by Regional Probing Services of Wake Forest, North Carolina (Regional Probing). Soil boring lithologic logs are attached as Appendix I of this document.

The soil samples were screened for the presence of organic vapors using a portable photoionization detector (PID). The PID measures the concentration of organic compounds in the vapor space above a soil sample resulting from volatilization of organic compounds contained in the soil. To screen the soils, each sample was placed in a clean, resealable polyethylene bag. The bag was sealed, and the sample was allowed to

equilibrate for approximately 5 minutes, after which time a small opening was made in the bag. The probe of the PID was then inserted into the bag, and the airspace above the soil was screened for organic vapors.

To assess the subsurface soil quality, one soil sample was collected from each soil boring at the sampled depth interval with the highest PID reading and submitted for laboratory analysis. The depth intervals and PID measurements of the collected soil samples submitted to the laboratory for analysis are listed below.

**Summary of Location Data and PID Measurements  
for Soil Samples Collected for Analysis at Parcel No. 113**

<b>Soil Boring</b>	<b>Depth Interval of Soil Sample Collected for Analysis (feet bls)</b>	<b>PID Reading (ppm)</b>	<b>Latitude/Longitude (NAD83)</b>
S14-1	7-8	0.0	34°46'01.92"N / 77°20'51.42"W
S14-2	7-8	0.0	34°46'02.16"N / 77°20'51.24"W
S14-3	7-8	0.0	34°46'01.86"N / 77°20'51.12"W
S14-4	7-8	0.0	34°46'01.68"N / 77°20'50.04"W
S14-5	7-8	0.0	34°46'01.56"N / 77°20'50.52"W
S14-6	7-8	0.0	34°46'01.44"N / 77°20'49.92"W
S14-7	7-8	0.0	34°46'01.14"N / 77°20'49.86"W
S14-8	7-8	1.1	34°46'01.20"N / 77°20'49.62"W
S14-9	7-8	1.5	34°46'00.60"N / 77°20'50.10"W
S14-10	3-4	1.5	34°46'00.12"N / 77°20'50.40"W

Notes:

- 1) Coordinates are based on North American Datum of 1983 (NAD83)
- 2) bls = below land surface
- 3) PID = photoionization detector
- 4) ppm = parts per million
- 5) NS = not sampled, fill material to depth

Following completion of the soil sampling activities, all borings were abandoned by filling the boreholes with soil cuttings and hydrated bentonite. Soil samples were submitted to SGS Laboratories, Inc. in Wilmington, North Carolina (North Carolina Certification No. 481) for analysis of diesel range organics (DRO) by EPA Method 8015 with EPA Method 3545 sample preparation, and gasoline range organics (GRO) by EPA Method 8015 with EPA Method 5035A/5030B sample preparation. The analytical results are summarized in the following table and are included on the Certificates of Analysis provided in Appendix II.

**Summary of Analytical Results for Soil Samples**

<b>Soil Sample</b>	<b>Depth Interval of Soil Sample Collected for Analysis (feet bls)</b>	<b>DRO</b>	<b>GRO</b>
S14-1-8	7-8	BQL	BQL
S14-2-8	7-8	BQL	BQL
S14-3-8	7-8	BQL	BQL
S14-4-8	7-8	BQL	BQL
S14-5-8	7-8	BQL	BQL
S14-6-8	7-8	BQL	BQL
S14-7-8	7-8	BQL	BQL
S14-8-8	7-8	BQL	BQL
S14-9-8	7-8	<b>15.4</b>	BQL
S14-10-4	3-4	BQL	BQL
<b>NCDENR Action Level</b>		<b>10*</b>	<b>10</b>

Notes:

- 1) BQL = Below Quantitation Limit
- 2) Concentrations shown are in milligram per kilogram (mg/kg).
- 3) **Bold** = detected concentration above the NCDENR action level
- 4) \* = Recommended action level for DRO. Currently the enforced NCDENR action level is 40 mg/kg.

GRO was not detected in any of the ten soil samples collected at the site, and DRO was detected in only one sample, S14-9-8, at a concentration of 15.4 milligrams per kilogram (mg/kg), which slightly exceeds the recommended North Carolina Department of Environment and Natural Resources (NCDENR) action level for DRO (10 mg/kg). Analysis of the soil for petroleum hydrocarbon constituents, including volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs), would be needed to confirm the presence or absence of soil impact.

It is estimated that there is an approximate total volume of 21 cubic yards of impacted soil (DRO >10 mg/kg) in the vicinity of boring S14-9, based on the following assumed area (as shown on Figure 2) and depth of impacted soil:

- S14-9: 70 sq. feet x 8 feet (assumed depth to the water table) = 560 cubic feet = 21 cubic yards

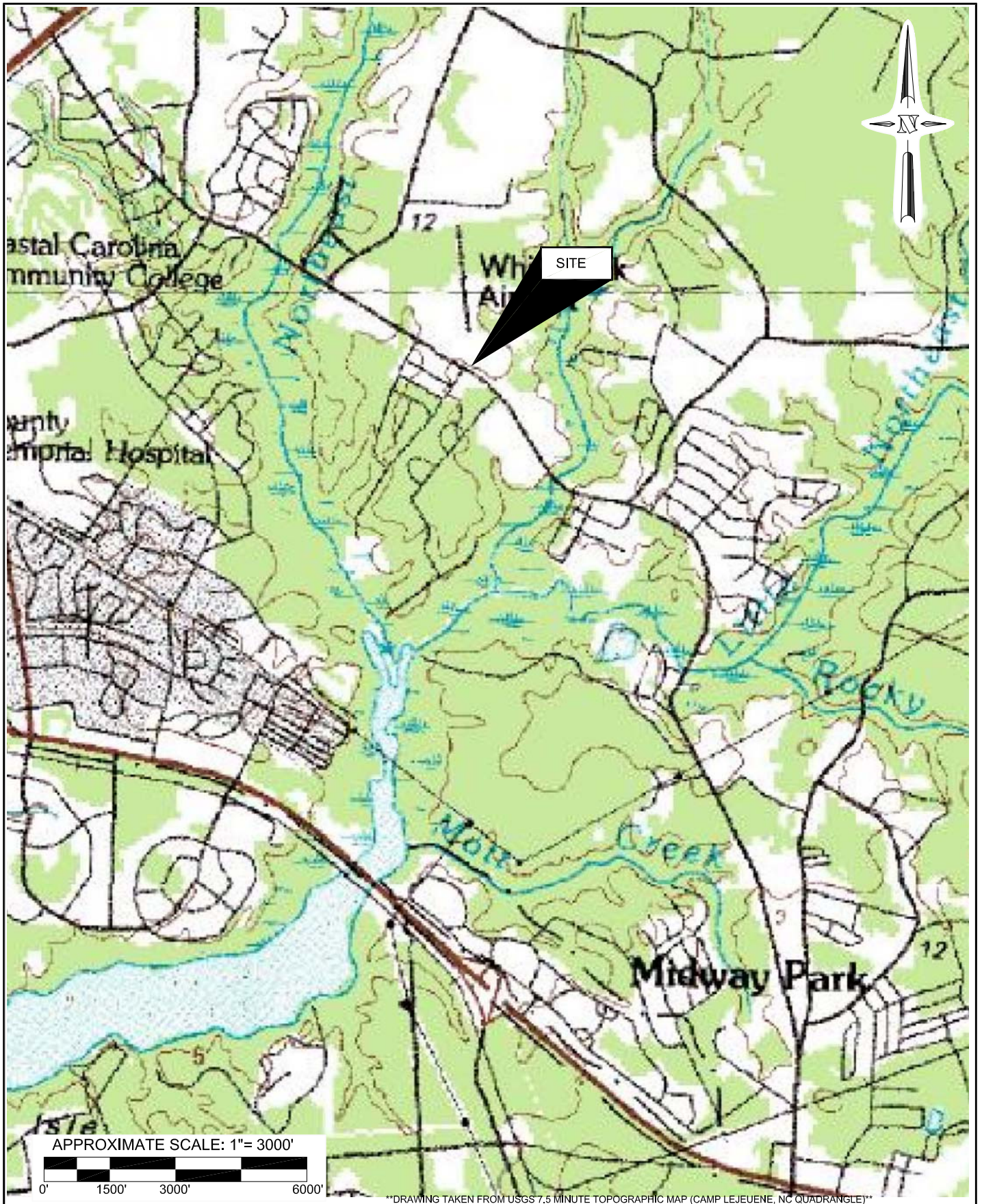
**5.0 Conclusions and Recommendations**

GEL performed a preliminary site assessment at Parcel #113 within the NCDOT proposed ROWs of White Oak Lane and Piney Green Road that included a geophysical survey, and the collection and analysis of soil samples. The geophysical investigation of

the proposed ROWs of White Oak Lane and Piney Green Road did not identify any “Known,” “Probable,” or “Possible” USTs within the proposed ROWs. However, it should be noted that Parcel #113 is an active gas station with onsite petroleum USTs located outside the investigation area, in the southern portion of the site.

Soil samples were collected for analysis from ten borings constructed at Parcel #113 within the NCDOT proposed ROWs for White Oak lane and Piney Green Road. The soil samples were analyzed for DRO and GRO. Analytical results for a soil sample collected from one soil boring, S14-9, indicated that the detected DRO concentration exceeded the NCDENR recommended DRO action level of 10 mg/kg. Therefore, this analytical result is indicative of soil impact. However, analysis of the soil for petroleum hydrocarbon constituents such as VOCs and PAHs would be needed to confirm the soil impact. The total estimated quantity of impacted soil (DRO >10 mg/kg) at the subject site is approximately 13 cubic yards in a localized area encompassing soil boring S14-9.

Based on the data generated from this investigation, there is no evidence that a significant release(s) of constituents of concern has occurred within the NCDOT proposed ROWs at the subject site. No additional environmental investigation of the site soil is recommended at this time. However, it is recommended that confirmation soil samples be collected and analyzed for petroleum hydrocarbon constituents (including VOCs and PAHs) following any planned excavation in the vicinity of boring S14-9 in order to confirm the presence or absence of soil impact from petroleum hydrocarbons.



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problem solved

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PRELIMINARY SITE ASSESSMENT REPORT  
 PARCEL 113  
 JACKSONVILLE, NORTH CAROLINA  
 STATE PROJECT U-3810, WBS# 35801.1.1

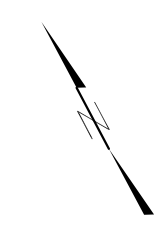
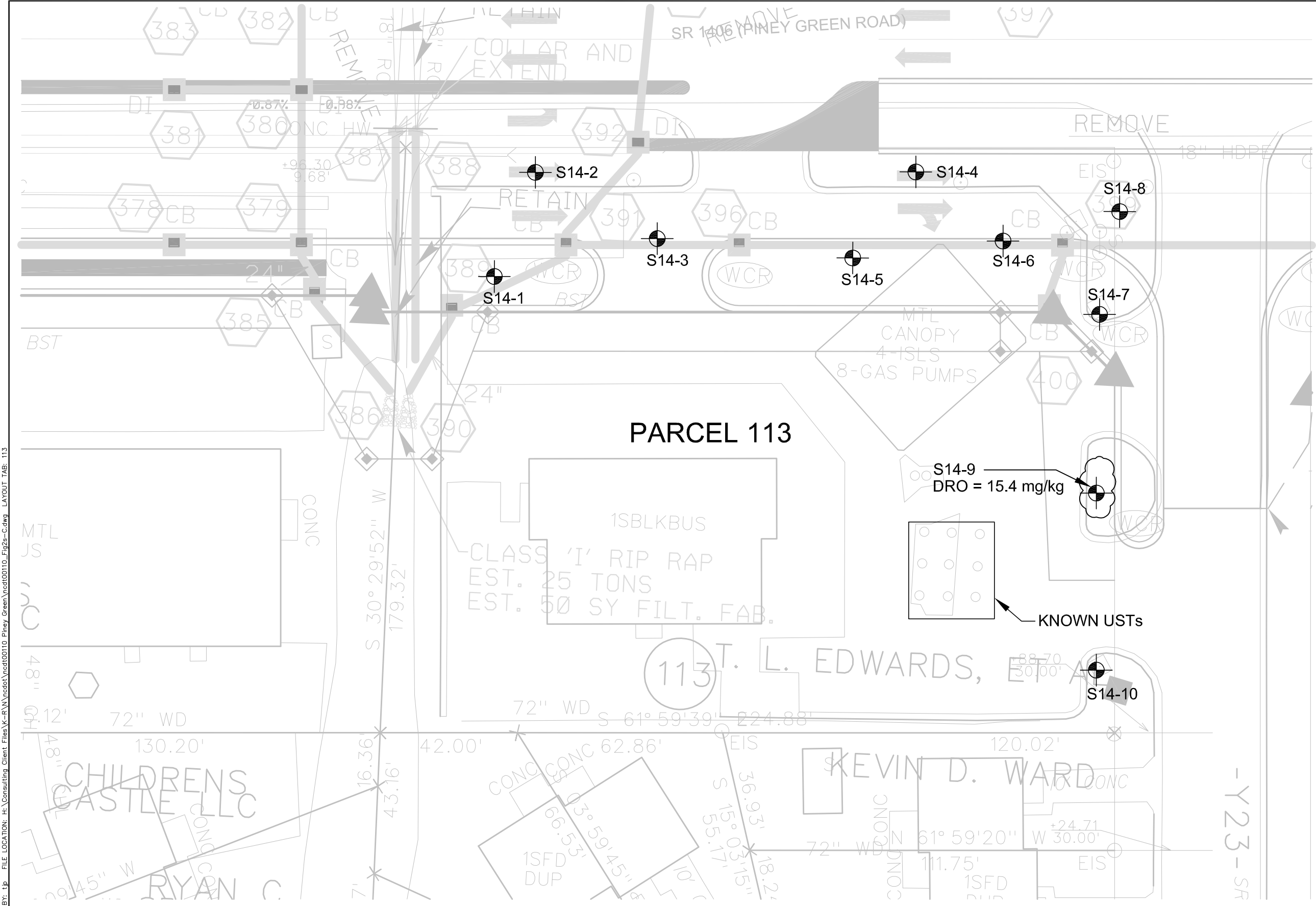
DATE: April 6, 2010

USGS TOPOGRAPHIC  
 LOCATION MAP

DRAWN BY: TJP APPRV. BY: ADE

FIGURE  
 1

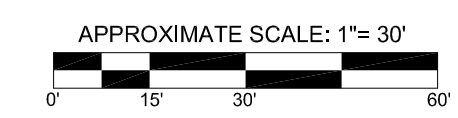
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**LEGEND**

- S14-2 SOIL BORING LOCATION
- DRO DIESEL RANGE ORGANICS  
mg/kg MILLIGRAMS PER KILOGRAM
- ESTIMATED AREA OF SOIL IMPACT

**NOTE:**  
SEE FIGURE 3 FOR KEY MAP  
SHOWING PARCEL LOCATIONS



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PRELIMINARY SITE ASSESSMENT REPORT  
PARCEL NO. 113, T.L. & MERLE EDWARDS  
1070 PINEY GREEN ROAD  
JACKSONVILLE, NORTH CAROLINA  
STATE PROJECT U-3810, WBS #35801.1.1

SITE SKETCH SHOWING  
SOIL BORING LOCATIONS

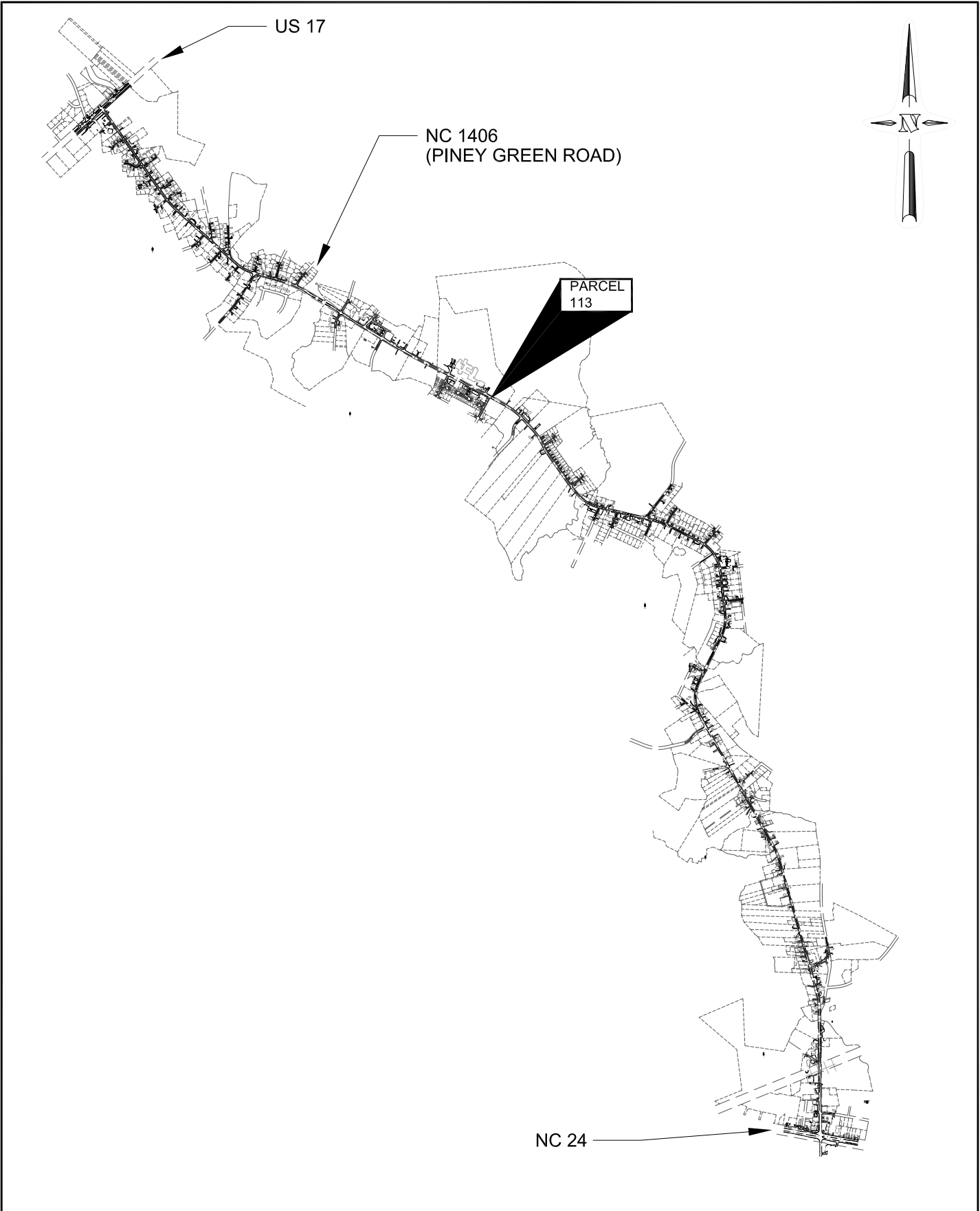
FIGURE  
2

problem solved

DATE: May 3, 2010

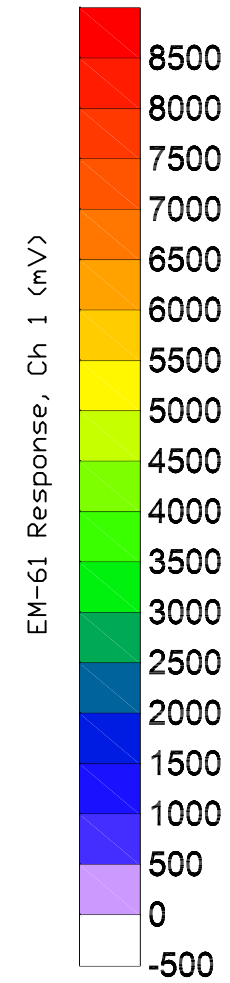
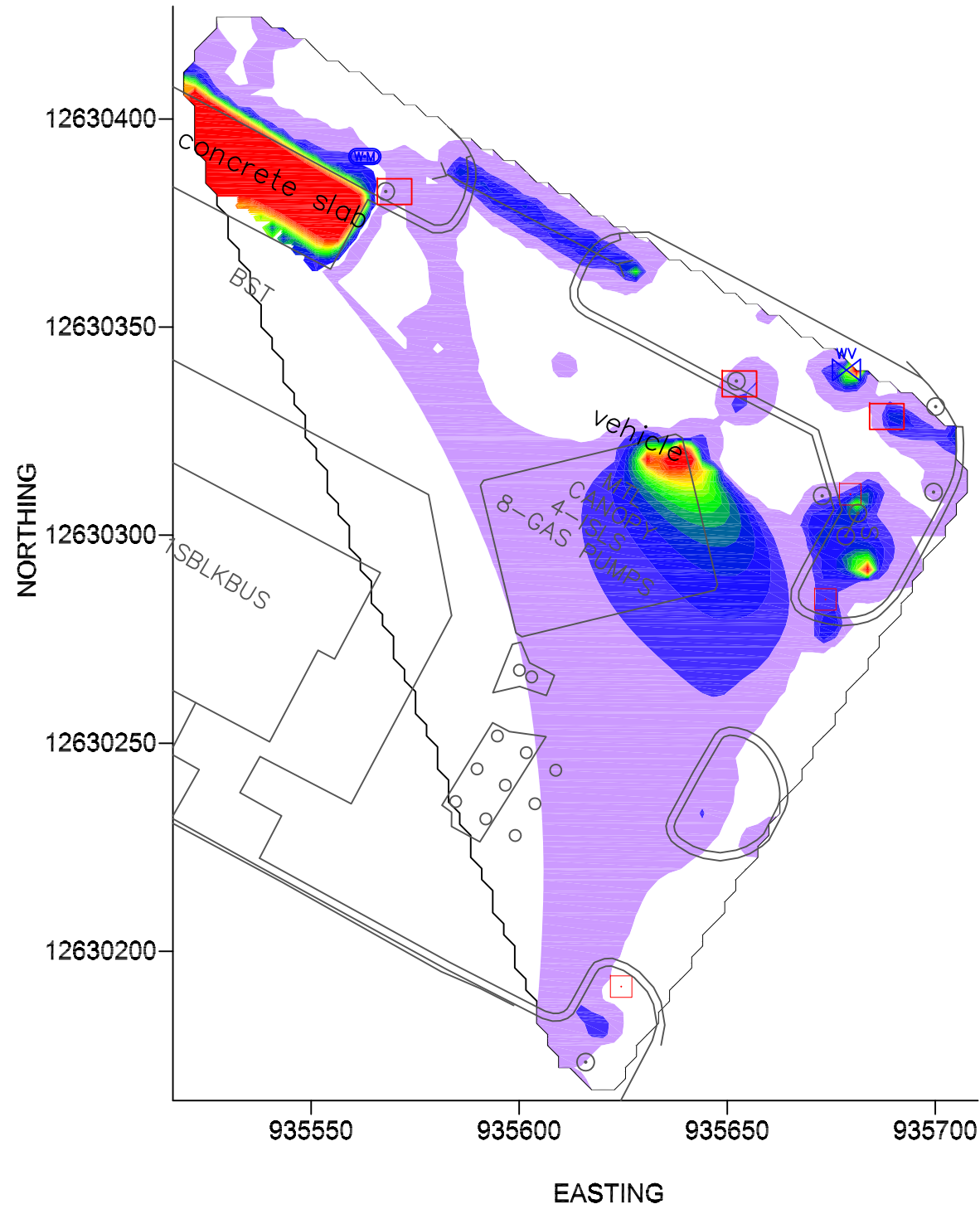
DRAWN BY: TJP

APPRV. BY: ADE






<b>GEL</b> Engineering of NC Inc. an Affiliate of THE GEL GROUP INC  problem solved	P.O. Box 14262 RTP, NC 27709 P: 919.544.1100 F: 919.406.1807 www.get.com	PROJECT: ncdt00110	KEY MAP SHOWING PARCEL LOCATION	FIGURE 3
		PRELIMINARY SITE ASSESSMENT REPORT PARCEL 113 JACKSONVILLE, NORTH CAROLINA STATE PROJECT U-3810, WBS# 35801.1.1		
		DATE: April 6, 2010	DRAWN BY: TJP	APPRV. BY: ADE

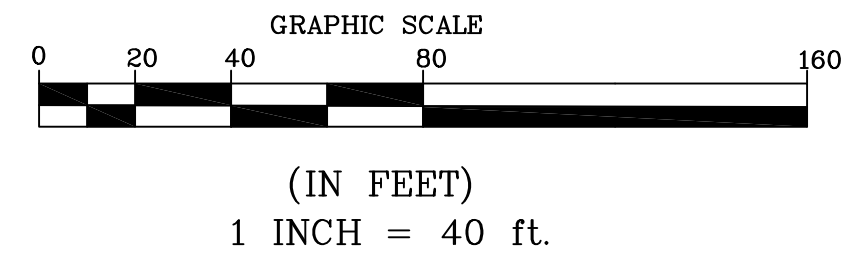




- NOTES**
- 1) UNDERGROUND FEATURES WERE LOCATED USING VISUAL EVIDENCE, GROUND PENETRATING RADAR (GPR), AND TIME DOMAIN ELECTROMAGNETIC (TDEM) METHODS. OTHER BURIED UTILITIES AND STRUCTURES MAY EXIST BUT WERE NOT DETECTED DUE TO LIMITATIONS OF THE GEOPHYSICAL METHODS, SITE ACCESS, AND/OR HIGH TARGET CONGESTION. THEREFORE, DUE CAUTION SHOULD BE USED WHEN PERFORMING SUBSURFACE EXCAVATION ACTIVITIES WHERE POTENTIAL CONFLICTS EXIST. GEL ENGINEERING OF NC INC. IS NOT RESPONSIBLE FOR DAMAGES THAT MAY OCCUR. IDENTIFYING THE LOCATION OF SOME UTILITIES AND/OR STRUCTURES MAY ONLY BE POSSIBLE WITH VACUUM OR OTHER EXCAVATION METHODS.
  - 2) DATA FROM GEONICS, LTD. EM-61 MKII AND MALA GEOSCIENCE GROUND PENETRATING RADAR.
  - 3) COORDINATES IN US STATE PLANE NAD 1983 DATUM.
  - 4) PROJECT MICROSTATION BASEMAPS PROVIDED BY NCDOT.
  - 5) **NO UNKNOWN UNDERGROUND STORAGE TANKS FOUND UNLESS NOTED IN DRAWING**

**LEGEND**

-  UNKNOWN UTILITY
-  WATER VALVE
-  WATER METER



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State Project U-3810, WBS# 35801.1.1  
March 11, 2010

Site Map Showing Results Of  
Geophysical Survey Investigation  
Parcel 113  
DRAWN BY: DEA      APPRV. BY: CMS

FIGURE  
4

**APPENDIX I**

**SOIL BORING LITHOLOGIC LOGS**

## SOIL BORING LOG

Boring/Well No.: 514-1  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

il:35

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.0	Asphalt, ROC, Brn Tan silty sand, Moist Orange Brn Gray Mottled sandy clay	
2	4-8	-	0.0	" , Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 46.032 N

77° 20.457 W

## SOIL BORING LOG

Boring/Well No.: 514-2  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

11:45  
 \*

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.0	Tan sandy clay - Mottled Orange Brn, Gray sandy clay, Moist	
2	4-8	-	0.0	Mottled, Orange Brn/ Gray Sandy, Clay	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 46.036 N  
 77° 20.854 W

## SOIL BORING LOG

Boring/Well No.: 514-3

Date Started: 3/23/10

Date Completed: 3/23/10

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.0	Asphalt, ROC, Mottled Sandy Clay Moist	
2	4-8	-	0.0	Orange Brn, Gray Mottled Sandy Clay, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

11:55 ✕

Notes:

- 1) 4-foot continuous cores using DPT..

340 46.031 N

77° 20.452 W

## SOIL BORING LOG

Boring/Well No.: 514-4  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

12:05

\*

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.0	Organic, Tan Sandy Clay. Moist Mottled Sandy Clay	
2	4-8	-	0.0	Orange Ben/Gray Mottled Sandy Clay	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

340 48 46.028 N  
 77° 20.834 W

## SOIL BORING LOG

Boring/Well No.: 514-45  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

12:15  
 \*

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.0	Asphalt, Pol, Mottled Sandy Clay, Moist	
2	4-8	-	0.0	Orange Brn Gray Mottled Sandy Clay, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 46.026 N  
 77° 20.842 W

## SOIL BORING LOG

Boring/Well No.: S14-6  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

12:25  
 \*

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.0	Asphalt/PCC, Mottled Sandy Clay, Moist	
2	4-8	-	0.0	Red, Brn, Gray Mottled Sandy Clay, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 46.024 N

77° 20.432 W



## SOIL BORING LOG

Boring/Well No.: 514-7  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.0	Asphalt, ROC Mottled Sandy Clay, Moist	
* 2	4-8	-	0.0	Red/Orange Brn, Gray Mottled Sandy Clay Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 46.77 46.019 N  
 77° 20.831 W

## SOIL BORING LOG

Boring/Well No.: 514-8  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

12:45

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	0.0	Bru Silty Sand, Dry → Tan, Gray Sandy Clay, Moist	
2	4-8	-	1.1	Red Iron, Gray Mottled Sandy Clay, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 46.020 N

77° 20.827 W

## SOIL BORING LOG

Boring/Well No.: S14-9  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

1255  
 \*

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	1.0	Grass Mat, Dk. Brn organic silty sand, Mottled Sandy Clay, Moist	
2	4-8	-	1.5	Orange Brn, Gray Mottled Sandy Clay, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

34° 46.010 N  
 77° 20.835 W

## SOIL BORING LOG

Boring/Well No.: 514-10  
 Date Started: 3/23/10  
 Date Completed: 3/23/10

13:05 \*

No.	Depth Interval	Blow Counts	PID (ppm)	Soil Description	Soil Type
1	0-4	-	1.5	Ben Organic silty sand, Orange Brown Sandy Clay, Moist	
2	4-8	-	0.9	Orange Ben, Gray Mottled Sandy Clay, Moist	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Notes:

- 1) 4-foot continuous cores using DPT..

$340 \cdot 46.002$   
 $77^\circ 20.457 \text{ W}$   
 $\cdot 840$

3

**APPENDIX II**

**CERTIFICATES OF ANALYSIS AND  
CHAIN OF CUSTODY RECORD FOR SOIL SAMPLES**



Mr. Andrew Eyer  
GEL Engineering of NC, Inc.  
PO Box 14262  
RTP NC 27709

Report Number: G341-617

Client Project: U-3810/NCDOT 001100

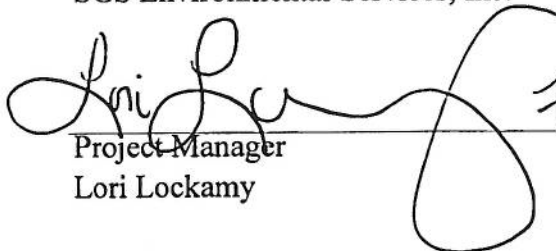
Dear Mr. Eyer:

Enclosed are the results of the analytical services performed under the referenced project. 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 the services performed during this project, please call SGS at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS Environmental Services for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,  
SGS Environmental Services, Inc.

  
Project Manager  
Lori Lockamy

7 APR 2010  
Date

SGS North America, Inc.  
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

$\mu\text{g}/\text{kg}$  = micrograms per kilogram, ppb, parts per billion

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

$\mu\text{g}/\text{L}$  = 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: S14-1-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-20A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 11:35  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 79.70

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.56	mg/Kg	1	03/30/10 01:34

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	94.4	94.4		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

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

Analyst: BAO

NC Certification #481

Reviewed By: BAO  
GRO.XLS



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

Client Sample ID: S14-1-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-20D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 11:35  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 79.70  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.48	mg/Kg	1	03/26/10 09:47
<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	38.3	95.9

**Comments:**


**Batch Information**

Analytical Batch: EP032610  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16275  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 33.55 G  
 Prep Final Vol: 10 mL

Analyst: FK

NC Certification #481

Reviewed By:   
 DRO.XLS

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

Client Sample ID: S14-2-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-21A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 11:45  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 80.75

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	6.05	mg/Kg	1	03/30/10 02:01

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	96.8	96.8		70-130

**Comments:**


**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.14 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By:   
 GRO.XLS

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

Client Sample ID: S14-2-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-21D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 11:45  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 80.75  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.22	mg/Kg	1	03/26/10 05:04
<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	35.3	88.2

**Comments:**

**Batch Information**

Analytical Batch: EP032510  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 34.3 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: S14-3-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-22A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 11:55  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 78.49

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.10	mg/Kg	1	03/30/10 02:28

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	96.2	96.2		70-130

**Comments:**


**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 7.5 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By:   
 GRO.XLS

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

Client Sample ID: S14-3-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-22D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 11:55  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 78.49  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.35	mg/Kg	1	03/26/10 05:32
<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	32.6	81.4

Comments:

**Batch Information**

Analytical Batch: EP032510  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 34.66 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: S14-4-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-23A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 12:05  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 79.56

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.61	mg/Kg	1	03/30/10 02:55

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	95.8	95.8		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.72 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: BAO  
GRO.XLS

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

Client Sample ID: S14-4-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-23D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 12:05  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 79.56  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.68	mg/Kg	1	03/26/10 06:00
<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	34.7	86.7

**Comments:**

**Batch Information**

Analytical Batch: EP032510  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 32.72 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: S14-5-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-24A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 12:15  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 78.65

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	8.01	mg/Kg	1	03/30/10 03:22

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	95.6	95.6		70-130

**Comments:**


**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 4.76 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By:   
GRO.XLS



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

Client Sample ID: S14-5-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-24D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 12:15  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 78.65  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.59	mg/Kg	1	03/26/10 06:28
<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	33.9	84.9

Comments:

**Batch Information**

Analytical Batch: EP032510  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 33.49 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: S14-6-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-25A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 12:25  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 78.20

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.96	mg/Kg	1	03/30/10 03:49

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	94.9	94.9		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.44 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: BAO  
GRO.XLS

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

Client Sample ID: S14-6-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-25D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 12:25  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 78.20  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.68	mg/Kg	1	03/26/10 06:56
<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	36.9	92.4

**Comments:**

**Batch Information**

Analytical Batch: EP032510  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 33.31 G  
 Prep Final Vol: 10 mL

Analyst: FK

NC Certification #481

Reviewed By:   
DRO.XLS

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

Client Sample ID: S14-7-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-26A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 12:35  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 77.36

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	6.04	mg/Kg	1	03/30/10 04:17

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	92.3	92.3		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.42 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By:   
GRO.XLS

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

Client Sample ID: S14-7-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-26D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 12:35  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 77.36  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.79	mg/Kg	1	03/26/10 07:25
<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	35.6	89.1

Comments:

**Batch Information**

Analytical Batch: EP032510  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 33.2 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: S14-8-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-27A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 12:45  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 76.51

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	6.39	mg/Kg	1	03/30/10 04:43

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	95.7	95.7		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.14 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: BAO  
GRO.XLS

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

Client Sample ID: S14-8-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-27D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 12:45  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 76.51  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.95	mg/Kg	1	03/26/10 10:15
<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	34.6	86.5

**Comments:**

**Batch Information**

Analytical Batch: EP032610  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 32.89 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: S14-9-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-28A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 12:55  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 78.09

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	6.31	mg/Kg	1	03/30/10 05:11

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	94.7	94.7		70-130

**Comments:**

**Batch Information**

Analytical Batch: VP032910  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 6.09 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By: BAO  
GRO.XLS



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

Client Sample ID: S14-9-8  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-28D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 12:55  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 78.09  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	15.4	7.97	mg/Kg	1	03/26/10 10:42
<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	31.4	78.6

Comments:

**Batch Information**

Analytical Batch: EP032610  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 32.12 G  
 Prep Final Vol: 10 mL

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

Client Sample ID: S14-10-4  
 Client Project ID: U-3810/NCDOT 001100  
 Lab Sample ID: G341-617-29A  
 Lab Project ID: G341-617  
 Report Basis: Dry Weight

Analyzed By: BAO  
 Date Collected: 3/23/2010 13:05  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 83.12

Analyte	Result	RL	Units	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	5.02	mg/Kg	1	03/30/10 11:40

**Surrogate Spike Results**

	Added	Result	Recovery	Flag	Limits
BFB	100	97.3	97.3		70-130

**Comments:**


**Batch Information**

Analytical Batch: VP033010  
 Analytical Method: 8015  
 Instrument ID: GC4  
 Analyst: BAO

Prep Method: 5035  
 Initial Wt/Vol: 7.19 g  
 Final Volume: 5 mL

Analyst: BAO

NC Certification #481

Reviewed By:   
GRO.XLS

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

Client Sample ID: S14-10-4  
 Client Project ID: U-3810/NC DOT 001100  
 Lab Sample ID: G341-617-29D  
 Lab Project ID: G341-617

Date Collected: 3/23/2010 13:05  
 Date Received: 3/24/2010  
 Matrix: Soil  
 Solids 83.12  
 Report Basis: Dry Weight

Parameter	Result	RL	Units	Dilution Factor	Date Analyzed
Diesel Range Organics	BQL	7.34	mg/Kg	1	03/26/10 11:10
<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	35.3	88.3

Comments:

**Batch Information**

Analytical Batch: EP032610  
 Analytical Method: 8015  
 Instrument: GC6  
 Analyst: DTF

Prep batch: 16276  
 Prep Method: 3541  
 Prep Date: 03/25/10  
 Initial Prep Wt/Vol: 32.79 G  
 Prep Final Vol: 10 mL



**SGS Environmental Services Inc.**  
**CHAIN OF CUSTODY RECORD**

- Locations Nationwide
- Alaska
  - Maryland
  - New Jersey
  - New York
  - North Carolina
  - Ohio
  - West Virginia
- www.us.sgs.com

1 CLIENT: GEL Engineering of NC, Inc  
 CONTACT: Andrew Eyer PHONE NO: 919-323-8828  
 PROJECT: U-3410/NC DOT 110 SITE/PWSID#: Duslow Co.  
 REPORTS TO: Andrew Eyer EMAIL: ade@gel.com  
 INVOICE TO: NC DOT QUOTE #:  
WBS # 35801.1.1 P.O. #:

SGS Reference #: G341-617 page 2 of 5

SGS NORTH AMERICA, INC.

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/ MATRIX CODE	# CONTAINERS	SAMPLE TYPE C= COMP G= GRAB MI= Multi Incremental Samples	Preservatives Used Analysis Required	Mg OH	Naby/ MUSH	REMARKS/ LOC ID
	S12-11-4	3/22/10	17:10	50	6	G	X	X	X	
	S12-12-4	3/22/10	17:30	50	6	G	X	X	X	
	S13-1-4	3/23/10	08:50	50	6	G	X	X	X	
	S13-2-8	3/23/10	09:10	50	6	G	X	X	X	
	S13-3-8		09:30	50	6	G	X	X	X	
	S13-4-4		09:45	50	6	G	X	X	X	
	S13-5-4		09:55	50	6	G	X	X	X	
	S13-6-4		10:20	50	6	G	X	X	X	
	S13-7-8		10:30	50	6	G	X	X	X	
	S14-1-8		11:35	50	3	G	X	X	X	

4

Collected/Relinquished By: (1) [Signature] Received By: [Signature]

Relinquished By: (2)

Relinquished By: (3)

Relinquished By: (4)

DOD Project? YES NO  
Cooler ID

Requested Turnaround Time and/or Special Instructions:

Special Deliverable Requirements:

Samples Received Cold? YES NO  
Cooler TB  
Temperature °C: 3.24.20C

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT



# SGS Environmental Services Inc. CHAIN OF CUSTODY RECORD

- Locations Nationwide
- Alaska
  - Maryland
  - New Jersey
  - New York
  - North Carolina
  - Ohio
  - West Virginia
- www.us.sgs.com

1 CLIENT: GEL Engineering of NC, Inc.  
 CONTACT: Andrew Eyer PHONE NO: 919-323-8828  
 PROJECT: U-3818/NC DOT 0110 SITE/PWSID#: Onslow Co.  
 REPORTS TO: Andrew Eyer EMAIL:  
 INVOICE TO: NC DOT QUOTE #:  
WPS # 35801.1.1 P.O. #:

SGS Reference #: 6341-617 page 3 of 5

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/MATRIX CODE	# CONTAINERS	SAMPLE TYPE C= COMP G= GRAB MI= Multi Incremental Samples	Preservatives Used Analysis Required	Meth	REMARKS/LOC ID
	S14-2-8	3/23/10	11:45	50	3	G	X		
	S14-3-8		11:55	50	3	G	X		
	S14-4-8		12:05	50	3	G	X		
	S14-5-8		12:15	50	3	G	X		
	S14-6-8		12:25	50	3	G	X		
	S14-7-8		12:35	50	3	G	X		
	S14-8-8		12:45	50	3	G	X		
	S14-9-8		12:55	50	3	G	X		
	S14-10-4		13:05	50	3	G	X		
	S15-1-6		14:45	50	3	G	X		

5 Collected/Relinquished By: (1) [Signature] Received By: [Signature]  
 Relinquished By: (2) [Signature] Received By: [Signature]  
 Relinquished By: (3) [Signature] Received By: [Signature]  
 Relinquished By: (4) [Signature] Received For Laboratory By: [Signature]

DOD Project? YES NO  
 Cooler ID \_\_\_\_\_  
 Requested Turnaround Time and/or Special Instructions:  
 Special Deliverable Requirements:  
 Samples Received Cold? YES NO  
 Cooler TB  
 Temperature °C: 3.2 4.2 1.0  
 Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

**APPENDIX III**

**PHOTOGRAPHS SHOWING SOIL BORING LOCATIONS**



KANGAROO  
1070 PINEY GREEN ROAD  
PARCEL NO. 113

PINEY GREEN  
ROAD

WHITE OAK BLVD.





