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NCDOT - Geotechnical Engineering Unit

**LIMITED PRELIMINARY SITE ASSESSMENT**

**Parcel 42  
Danny Hensley Property (Burnsville Independent)  
25W US Highway 19E  
Burnsville, NC 28714**

State Project No. R-2519A  
WBS Element No. 35609.1.1  
**EI Project No. ENMO060029.00**

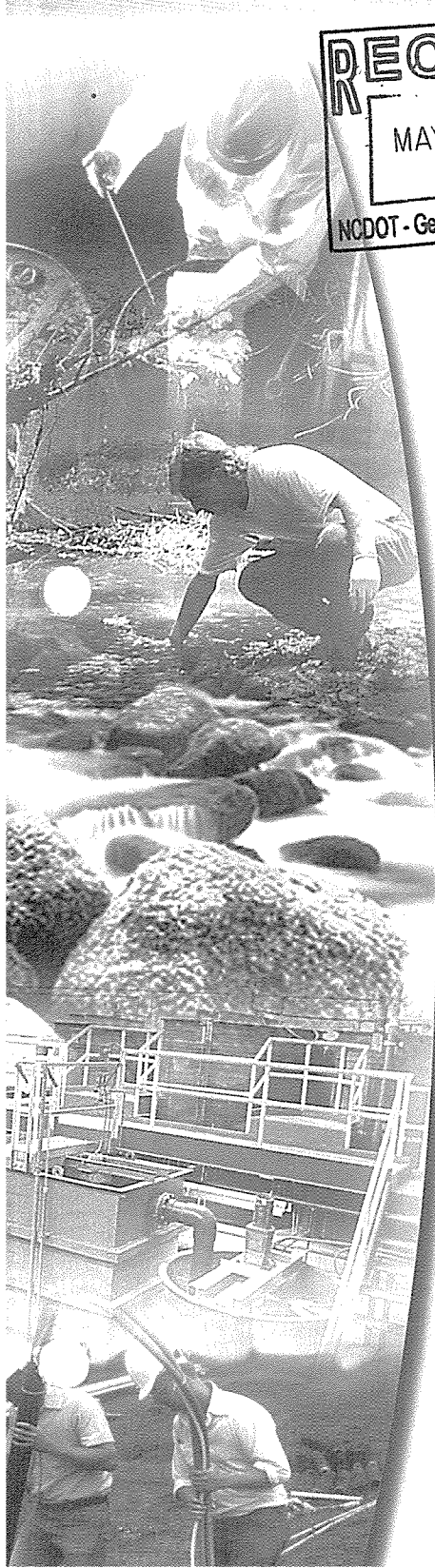
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May 2006



LIMITED PRELIMINARY SITE ASSESSMENT (PSA)

Conducted on

Parcel 42  
Danny Hensley Property  
25 W US Highway 19E  
Burnsville, NC 28714  
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For

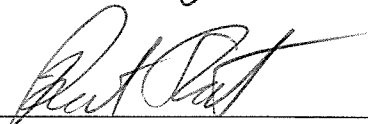
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Issue Date: May 12, 2006


Kevin D. Horton  
Project Geologist/Manager

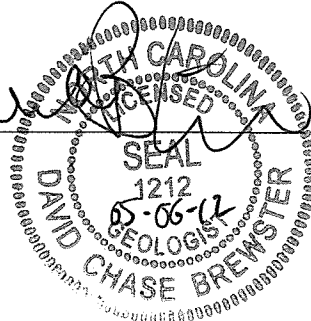
  
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## 1.0 INTRODUCTION

Environmental Investigations, Inc. (EI) conducted a *Limited Preliminary Site Assessment* (PSA) within the existing and/or proposed North Carolina Department of Transportation (NCDOT) *right-of-way* (ROW) adjacent to a parcel (identified by the NCDOT as Parcel 42) located at 25 W US Highway 19E, Burnsville, North Carolina 28714. A convenience store is currently located on the adjacent parcel. The report presented herein documents the findings of the PSA that was conducted within the described ROW. For purposes of this report, the terms subject site and/or site include the existing NCDOT ROW and the proposed ROW, and/or the abutting property/parcel.

### 1.1 Report Organization

Field activities were conducted by Mr. Kevin D. Horton, an Environmental Geologist with EI, on April 4, 2006. The report presented herein summarizes the scope of work conducted, discusses sampling procedures, and presents findings, conclusions and recommendations. A table entitled "Summary of Soil Analytical Results" is presented in **Table 1**, and a table entitled "Summary of Groundwater Analytical Results", is presented in **Table 2**. A "Site Location Map", a "Site Map" and "Impacted Soils Map" are presented in **Figures 1, 2, and 3**, respectively. A compilation of "Site Photographs" are presented in **Appendix A**, the "Standard Field Operating Procedures (SOP)" are presented in **Appendix B**, "Soil Boring Logs" are included in **Appendix C**, the "Analytical Laboratory Report" is presented in **Appendix D**, and a Geophysical Report conducted by Schnabel Engineering South is presented in **Appendix E**.

### 1.2 Background

Mr. Eugene Tarascio, GeoEnvironmental Project Manager with the NCDOT GeoTechnical Engineering Unit submitted to EI a "*Request for Supplemental Technical and Cost Proposal*" (RFP), dated February 24, 2006. The RFP solicited a technical and cost proposal to perform Limited PSAs on a total of 18 Parcels located within a NCDOT Highway Project, identified as WBS Element #35609.1.1, State Project #R-2519A, located in Burnsville, NC. The RFP outlined site information on each of the 18 parcels, some site photographs and NCDOT Figures (Plan Sheets) were attached to the RFP. Mr. Gregory A. Smith, LG, PE, GeoEnvironmental Supervisor with the NCDOT, GeoTechnical Engineering Unit, GeoEnvironmental Section authorized EI to perform the PSAs, as documented in a "Notice to Proceed" (NTP) dated March 13, 2006.

### 1.3 Objectives

The objective of performing the PSA was to determine if existing commercial USTs have impacted the subsurface of the existing and/or proposed ROW. The study (PSA) on the referenced parcel (Parcel 42 – Danny Hensley Property) included herein was performed with a reasonable effort to

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investigate and quantify potentially petroleum-hydrocarbon impacted subsurface soils. However, findings documented in the report do not constitute a guarantee that all potential sources of (petroleum) environmental contamination have been assessed and subsequently analyzed.

This report is provided for the sole use of the NCDOT on the project for which it was prepared. All materials and information used for this project were obtained by EI, Inc. Use of this report by any third parties other than the NCDOT will be at such party's sole risk. EI Inc. disclaims liability for any use of or reliance on this report by third parties.

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## 2.0 SCOPE OF WORK & ENVIRONMENTAL SERVICES

### 2.1 Requested Scope of Work

Documented in the RFP, dated February 24, 2006, the NCDOT requested the following scope of work:

- Determine if contaminated soils are present around any underground storage tanks (USTs) identified that are within the existing and/or proposed ROW;
- in addition, collect soil samples (every 15.24 meters (50 feet) to a maximum depth of 2.44 meters (8 feet)) along the proposed drainage (if there is no proposed drainage, collect samples at same interval along the edge of existing and/or proposed ROW within the "area of investigation");
- delineate and estimate the quantity of impacted soils and indicate the approximate area of soil contamination on a site map for each site;
- if groundwater is encountered and the project manager suspects the possibility of groundwater contamination, obtain a sample for analysis by converting one (1) of the borings to a temporary monitoring well;
- for each groundwater sample collected, also obtain a 24-hour groundwater depth;
- if groundwater sampled is collected for proposed drainage, perform aquifer testing to determine the recharge rate and use this to provide an estimated quantity of contaminated water that will have to be disposed of when de-watering occurs to install the proposed drainage; prepare a report including field activities, findings, and recommendations for the site and submit in quadruplet to the NCDOT office.

### 2.2 Scope of Services

To accomplish the scope-of-services, a field reconnaissance was performed to identify general site conditions, and Direct Push Technology (DPT) was utilized to collect soil samples on the subject parcel.

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To perform the requested Limited PSA, EI personnel supervised, oversaw and performed site reconnaissance activities and collected appropriate samples to complete the project objectives. To complete the study on the subject parcel, EI performed the following scope of services:

- Supervision, and oversight of the advancement of ten (10) soil test borings utilizing DPT methods to the respective depths of 3.05 – 6.1 meters (10-20 feet) below the land surface (bls) within the existing and/or the proposed ROW.
- Collection and submittal of ten (10) soil samples for laboratory analytical testing.
- Installation of one (1) temporary monitoring well (piezometer).
- Collection and submittal of one (1) groundwater sample for laboratory analyses.
- Photo documentation of pertinent site features.
- Preparation of the *Limited PSA Report*, presented herein that presents our findings and conclusions along with our recommendations.

---

### 3.0 SITE CHARACTERIZATION

#### 3.1 Site Location

A convenience store known as the Danny Hensley Property (Burnsville Independent) is currently located at 25 W US Highway 19E, in Burnsville, North Carolina 28714 (**Figure 1**). The subject property is currently located immediately adjacent to the existing ROW (**Photograph 1**) as identified in NCDOT's R-2519A Plan Sheet 12/13. Copies of digital site photographs are presented in **Appendix A**.

#### 3.2 Physical Setting

The subject site parcel currently consists of a convenience store and garage with a non-operational gasoline station. The parcel consists of a one-story building, fuel pump-island with canopy over six pumps, and asphalt parking. See **Figure 2** for the location of the business.

##### 3.2.1 Number and Capacities of USTs

Based on a geophysical investigation, and information provided by the NCDOT, one (1) 30,280-liter (8,000-gallon) gasoline UST and one (1) 22,710-liter (6,000-gallon) diesel UST are currently located on the northwest portion of the parcel approximately 33 meters (108 feet) south of the centerline of US 19E. The USTs appear to be situated south just beyond the NCDOT proposed ROW.

##### 3.2.2 Number and Capacities of ASTs

Based on information provided by the NCDOT, two (2) 37,854-liter (10,000-gallon) and one (1) 1,893-liter (500-gallon) diesel AST are currently located on the northeast portion of the parcel approximately 31.4 meters (103 feet) south of the centerline of US 19E. The ASTs appear to be situated south just beyond the NCDOT proposed ROW.

#### 3.3 Site Topography

Site observations and review of the Burnsville, NC United States Geological Survey (USGS) Topographic Quadrangle Map (1998) revealed that the subject site is located at an elevation of approximately 816.86 meters (2,680 feet) above mean sea level (msl) (**Figure 1**). Topographically, the site slopes gently to the northeast. Surface water runoff appears to flow directly north in the direction of Pine Swamp Branch Creek located adjacent (along property boundary) the site to the south.

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### **3.4 Land Use & Surrounding Properties**

The subject property is located inside the city limits of Burnsville, NC. Land use in the immediate vicinity of the site is characterized by commercial properties. The site is bounded to the north by US 19E, to the east by commercial properties, west by undeveloped properties and to the south by residential properties.

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## 4.0 SUBSURFACE INVESTIAGTION

### 4.1 Geophysical Survey

Schnabel Engineering South, locally based in Greensboro, North Carolina, was subcontracted to provide geophysical services on the subject site. The purpose of the geophysical survey was to locate potential UST systems within the existing and/or proposed ROW. The contractor conducted an electromagnetic (EM) induction survey utilizing a Geonics EM61-MK2 instrument. Ground penetrating radar (GPR) investigations of selected EM61 anomalies were conducted using a Geophysical Surveys System SIR-2000 system equipped with a 400 MHz antenna. The geophysical contractor surveyed an estimated 1,950 square meters (21,000 square feet) located on the subject site. Based on the Geophysical report, anomalies were identified probably due to insignificant buried metal objects, and known site features.

### 4.2 Geophysical Survey Results

A detailed report documenting the geophysical survey activities and results of the study is included in **Appendix D**.

### 4.3 Subsurface Soils Investigation

Subsurface Environmental Investigations (SEI), based in Statesville, North Carolina, was selected and subcontracted to provide Direct Push Technology (DPT) services. On April 4, 2006, EI directed and supervised the advancement of five (5) soil test borings (GP-1 through GP-5), in the vicinity of the proposed drainage pipe and five (5) borings (GP-6 though GP-10) in the vicinity of the tank pit and pump island.

In general, the borings were advanced in order to evaluate the absence/presence of potential subsurface soil (vadose zone) impact and/or subsurface groundwater (petroleum smearing) impact associated with potential petroleum releases associated with either former and/or present UST system spills and/or releases into the subsurface. The soil borings were advanced to investigative depths ranging from 3.05 – 4.57 meters (10-15 feet) bls.

### 4.4 Soil Test Boring Methodology

A complete descriptive explanation of EI's *Standard Field Operating Procedures* that discusses specific sampling methodology is presented in **Appendix B**.

### 4.5 Soil Sample Collection Procedures

A total of ten (10) soil samples were collected for laboratory analysis. Soil samples retained for

laboratory analysis were transferred to a representative of Paradigm Analytical Laboratory, for laboratory analytical testing. Dates and times of sample shipment may be referenced in the analytical Chain-of-Custodies (COC) presented in **Appendix D**.

#### **4.6 Backfill Activities**

At the completion of the exploratory subsurface advancement activities, the test borings were backfilled to surface grade. A complete descriptive explanation of EI's *Standard Field Operating Procedures* that discusses backfill procedures is presented in **Appendix B**.

#### **4.7 Subsurface Soil Lithology**

As part of the boring advancement activities, soil samples were classified in the field by an EI geologist utilizing the Unified Soil Classification System (USCS). Subsurface soils encountered in the area of study were fairly consistent. The on-site geology consists of grass or asphalt with surficial topsoil from the surface to approximately 0.15 meters (0.5-foot) below grade. Layers of soil consisting of Light brown sandy clay were encountered to the investigated depth of approximately 1.83 meters (6.0 feet) below the land surface (bls). From there layers of soil consisting of Tan silty sand were encountered to the investigated depth of approximately 3.66 meters (12.0 feet) below the land surface (bls). Beyond that a section of Gray silt exists at 4.57 meters (15.0 feet).

Detailed descriptions are presented in Soil Boring Logs included in **Appendix C**. The boring logs include an interpretation of subsurface conditions based on field samples.

#### **4.8 Groundwater Investigation**

##### **4.8.1 Temporary Monitoring Well Installation**

During the field study (April 4, 2006), soil test boring "GP-10" (located north of the subject ASTs and 20 meters (65.6 feet) south of the centerline of US 19E ) was converted into a Type I (temporary) 2.54 cm (1.0 inch) diameter groundwater monitoring well (piezometer). The approximate location of the groundwater monitoring well is depicted in **Figure 2**. The well location was selected in the field by the EI Field Geologist (Kevin Horton) based on the topographic location of the boring and suspected impact in this area of the secondary containment. The well was installed to a depth of 5.57 meters (15.0 feet) bls.



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#### 4.8.2 Monitoring Well Sampling

EI personnel developed the well and collected a groundwater sample from the referenced temporary monitoring well ("GP-1") for purposes of analytical testing. On April 4, 2006, the samples were transferred to representatives of Prism Laboratories for analytical laboratory testing. Groundwater sampling procedures are discussed in more detail in the *Standard Operating Procedures* presented in **Appendix C**.

The groundwater table was measured in the temporary monitoring well ("GP-10") on April 5, 2006. Groundwater was measured at approximately 2.19 meters (7.2 feet) below the top of casing (TOC). The TOC was level with the ground surface.

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## 5.0 LABORATORY TESTING AND RESULTS

### 5.1 Subsurface Soil Analytical Methods

A total of ten (10) soil samples (GP1 – GP10) were submitted for TPH analyses by Method 8015B with preparation methods for the analysis of Diesel Range Organics (DRO) by GC-FID and Gasoline Range Organics (GRO) by GC-FID. The GRO method is utilized to extract volatile fuels such as gasoline, while the DRO method is utilized to extract less volatile petroleum products such as diesel fuel, No. 2 fuel oil, kerosene, and varsol. One soil sample (GP-9) was submitted for risk-based analysis consisting of EPA methods 8260, 8270, MADEP EPH and VPH.

### 5.2 Soil Laboratory Analyses Results

Analysis of the soil samples collected showed that one (1) of the ten (10) samples (GP-9) showed concentrations of GRO at concentrations above laboratory detection limits. The sample reported concentrations of GRO well above the North Carolina Department of Environment and Natural Resources (NCDENR) action limits of 10.0 mg/kg.

Analysis of the soil samples collected showed that three (3) of the ten (10) samples showed concentrations of DRO at concentrations above laboratory detection limits. Only one of the samples (GP-9) reported concentrations of DRO above NCDENR action limits of 40.0 mg/kg (for surficial spills other than from USTs).

Risk-Based analysis of one of the samples (GP-9) showed concentrations of VOCs, SVOCs, aliphatics and aromatics at or above the method laboratory detection limits.

The specific results of the analytical testing of the soil samples are tabulated and presented in **Table 1**. The complete laboratory results and Chain-of-Custody Records are presented in **Appendix D**.

### 5.3 Groundwater Laboratory Analysis

Groundwater sample "TW-1" collected from the referenced temporary well was submitted for VOCs analysis for aromatic and halogenated volatiles by GC/PID-ELCD for EPA Method 601/602, for semivolatile organic compounds by GC/MS for EPA Method 625 and the top ten peaks identified, for EPH by GC/FID by Method MADEP EPH, and for VPH by GC-PID/FID by MADEP VPH.

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#### 5.4 Groundwater Laboratory Analyses Results

Analysis of a groundwater sample collected from a temporary monitoring well ("TW-1") installed immediately adjacent to the subject ASTs did not detect concentrations of VOC, SVOC, aliphatic and aromatic analytes above the method laboratory detection limits. A summary of the analytical results is tabulated in **Table 2**.

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## 6.0 SUMMARY OF FINDINGS

EI has reviewed information gathered during the Limited PSA study including the site reconnaissance activities, review of NCDOT plan sheets, review of the site investigation including soil collection activities, and review of a laboratory analyses report. Compiled below is a summarized list of the significant findings.

- One (1) 30,280-liter (8,000-gallon) gasoline UST and one (1) 22,710-liter (6,000-gallon) diesel UST are currently located on the northwest portion of the parcel approximately 33 meters (108 feet) south of the centerline of US 19E.
- Two (2) 37,854-liter (10,000-gallon) and one (1) 1,893-litre (500-gallon) diesel ASTs are currently located on the northeast portion of the parcel approximately 31.4 meters (103 feet) south of the centerline of US 19E.
- Groundwater was encountered beneath the site at a location immediately adjacent to the subject ASTs at a depth of 2.19 meters (7.24 feet) below the top of casing (TOC).
- Analyses of one soil sample (GP-9) collected at a depth of approximately 0.61 - 1.22 meters (2 - 4 feet) bls, situated adjacent to the AST secondary containment, reported concentrations of GRO and DRO above the NCDENR action limits of 40.0 mg/kg.
- Risk-Based analysis of one of the samples (GP-9) showed concentrations of VOCs, SVOCs, aliphatics and aromatics at or above the method laboratory detection limits.
- Analysis of a groundwater sample collected from a temporary monitoring well ("W-1") installed immediately adjacent to the subject ASTs did not detect concentrations of VOC, SVOC, aliphatic and aromatic analytes above the method laboratory detection limits.

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## 7.0 CONCLUSIONS AND RECOMMENDATIONS

EI personnel have reviewed information obtained during the *Limited PSA* at the site (Parcel 42) and present the following conclusions and recommendations.

Based upon the petroleum hydrocarbon field indicators at shallow depths, it appears that the presence of hydrocarbons may be attributed to a spill incident, although a leak cannot be ruled out. Most likely a combination of both (leak and spill) has occurred.

Based on the current data, the vadose zone in a localized area located directly adjacent the subject ASTs (located within the NCDOT ROW) has been impacted by petroleum hydrocarbon residuals.

Considering that the tanks appear to be located outside the proposed right-of-way, the extent of impact could not accurately be determined, thus EI is assuming that some impact, although minor has likely occurred in the same. Thus, based on the projections stated above, EI estimates that a total estimated volume of approximately **137 cubic meters (180 cubic yards) of impacted subsurface soils** are likely present in the vicinity of the ASTs within the subsurface.

Based on the groundwater analysis, the groundwater has not been impacted to levels that exceed the regulatory standards.

Based on the conclusions, particularly based on the detection of DRO and GRO soil concentrations above reportable levels, the property owner should be notified of this finding. It also should be noted that the detection of DRO/GRO discovered during this investigation normally should be reported to the regulatory agency (NCDENR) by the property owner. At this time, no other recommendations are warranted.

*Note: This report does not constitute a guarantee that all potential sources of environmental contamination have been assessed and subsequently analyzed.*

**TABLES**

**TABLE 1**  
**SUMMARY OF SOIL ANALYTICAL RESULTS**  
 Parcel 42  
 Danny Hensley Property  
 25W US Highway 19E, Burnsville, NC 28714  
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Sample Identification	Sample Date										
	GP-1	GP-2	GP-3	GP-4	GP-5	GP-6	GP-7	GP-8	GP-9	GP-10	
	1.22-1.83 (4-6)	1.22-1.83 (4-6)	1.83-2.44 (6-8)	1.83-2.44 (6-8)	1.83-2.44 (6-8)	3.66-4.27 (12-14)	3.05-3.66 (10-12)	2.44-3.05 (8-10)	0.61-1.22 (2-4)	2.44-3.05 (8-10)	
Field Screening Results-PID (ppm)											
Laboratory Analysis	Residential MSCC (mg/kg)		Industrial Commercial MSCC (mg/kg)		Soil-to-GW MSCC (mg/kg)						Laboratory Results (mg/kg)
	MADEP VPH										
	C5-C8 Aliphatics		24528		72						15
	C9-C12 Aliphatics		9386		245280						190
	C9-C10 Aromatics		469		12264						340
	MADEP EPH										Laboratory Results (mg/kg)
	C8-C16 Aliphatics		9386		245280						1,000
	C19-C36 Aliphatics		469		12264						<250
	C11-C22 Aromatics		93860		a						220.0
	Volatile Organic Compounds Method 8260B/5035										Laboratory Results (mg/kg)
Benzene		22		200		0.0056				BQL	
Toluene		3200		62000		7				0.060	
Ethylbenzene		1560		40000		0.24				0.027	
Total Xylenes		32000		200000		5				BQL	
2-Butanone (MEK)		9385		245280		0.7				BQL	
Acetone		1564		40880		3				BQL	
Isopropylbenzene (Cumene)		1564		40880		2				0.027	
n-Propylbenzene		156		4088		2				0.065	
1,2,4-Trimethylbenzene		782		20440		8				3.820	
1,3,5-Trimethylbenzene		782		20440		7				1.600	
sec-Butylbenzene		156		4088		3				BQL	
n-Butylbenzene		156		4088		4				BQL	
Naphthalene		63		1635		0.58				1,100	
Diisopropylether (DIPE)		156		4088		0.37				BQL	
Methyl Tert-butyl Ether (MTBE)		156		4088		0.92				0.005	
Methylene chloride		85		763		0.02				BQL	
p-Isopropyltoluene		NS		NS		NS				BQL	
All Remaining Analytes		NA		NA		NA				BQL	
Semivolatile Organic Compounds SW846-8270C										Laboratory Results (mg/kg)	
Fluorene		620		16400		44				0.74	
2-methyl naphthalene		63		1635		3				3.01	
Phenanthrene		469		12264		60				BQL	
All Remaining Analytes		NA		NA		NA				BQL	
Laboratory Analysis (Total Petroleum Hydrocarbons by GC/FID 8015)										Laboratory Results (mg/kg)	
Gasoline Range Organics										273	
Diesel Range Organics										2720	

NOTE:  
 mg/kg denotes parts per million  
 MSCC = Maximum Soil Contaminant Concentrations  
**Bold & Italics Font** = In Excess of MSCC Cleanup Standards  
 \* NCDENR = North Carolina Department of Environment & Natural Resources

TABLE 2  
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS  
Parcel 42 - Danny Hensley Property  
25W US Highway 19E  
Burnsville, NC 28714  
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WBS Element: 35609.1.1

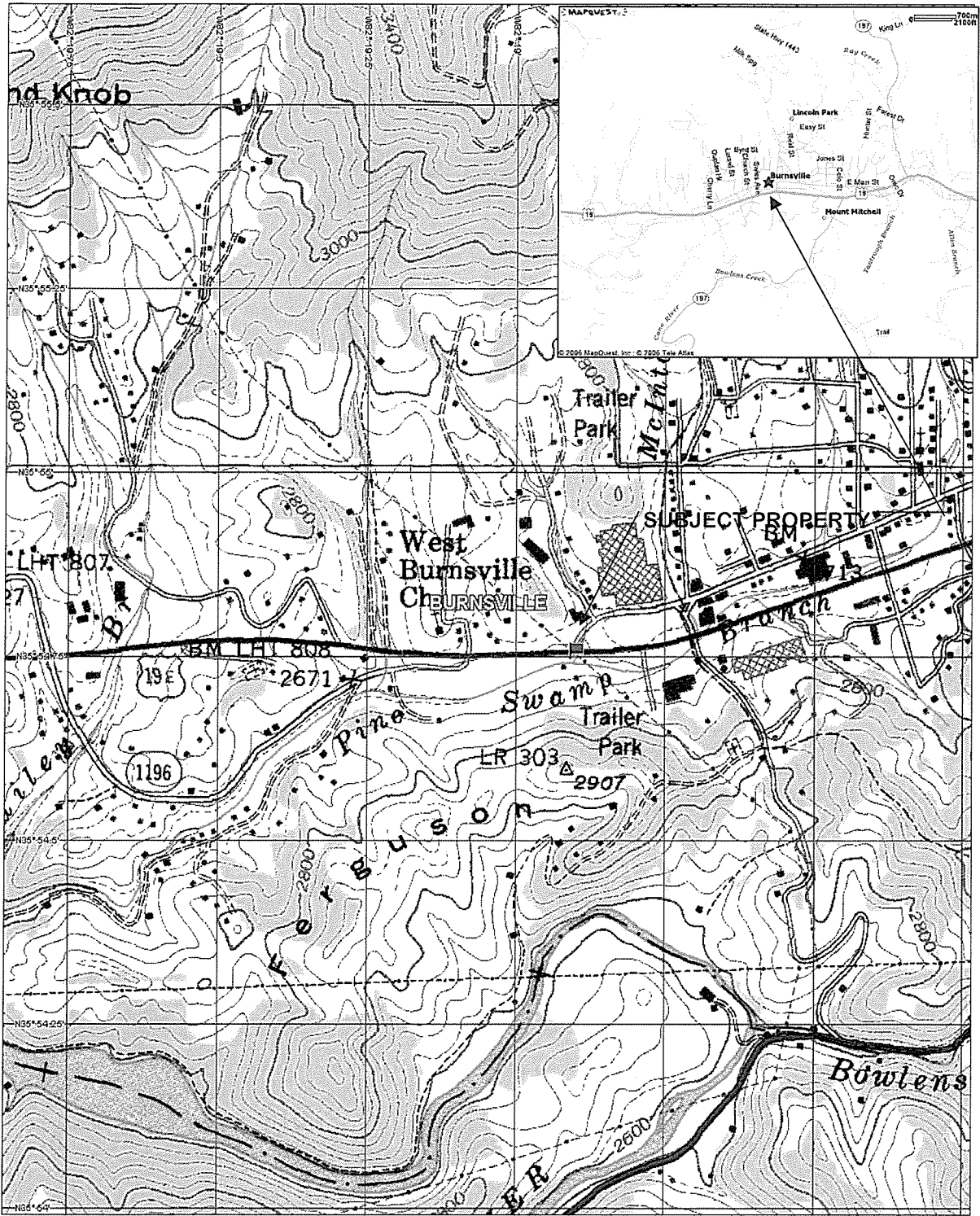
Sample Identification		W-1
Groundwater Depth (From top of casing) meters (Feet)		2.20 (7.20)
Sample Date		4/4/2006
Volatiles	2L Groundwater Standards (ug/L)	Laboratory Results (ug/L)
GC 601/602		
Isopropyl ether (IPE)	70	BQL
Ethylbenzene	29	BQL
Benzene	1	BQL
m,p Xylenes	530	BQL
Methyl-tert butyl ether (MTBE)	200	BQL
Naphthalene	21	BQL
o-Xylene	530	BQL
Toluene	1000	BQL
Remaining Analytes	NA	BQL
MADEP VPH	2L GW Standards (ug/L)	Laboratory Results (ug/L)
C5-C8 Aliphatics	420	<100
C9-C10 Aromatics	4200	<100
C9-C12 Aliphatics	210	<100
MADEP EPH	2L GW Standards (ug/L)	Laboratory Results (ug/L)
C9-C18 Aliphatics	4200	<100
C19-C36 Aliphatics	42000	<100
C11-C22 Aromatics	210	<100
Semivolatiles - GCMS Method 625		Laboratory Results (ug/L)
All Analytes	N/A	BQL

**Legend:**

*Italics/Bold Font* = In Excess of NCAC 2L Class GA Standards  
BQL = Below Quantitation Limit  
NA = Not Applicable  
NS = No Standard



**FIGURES**



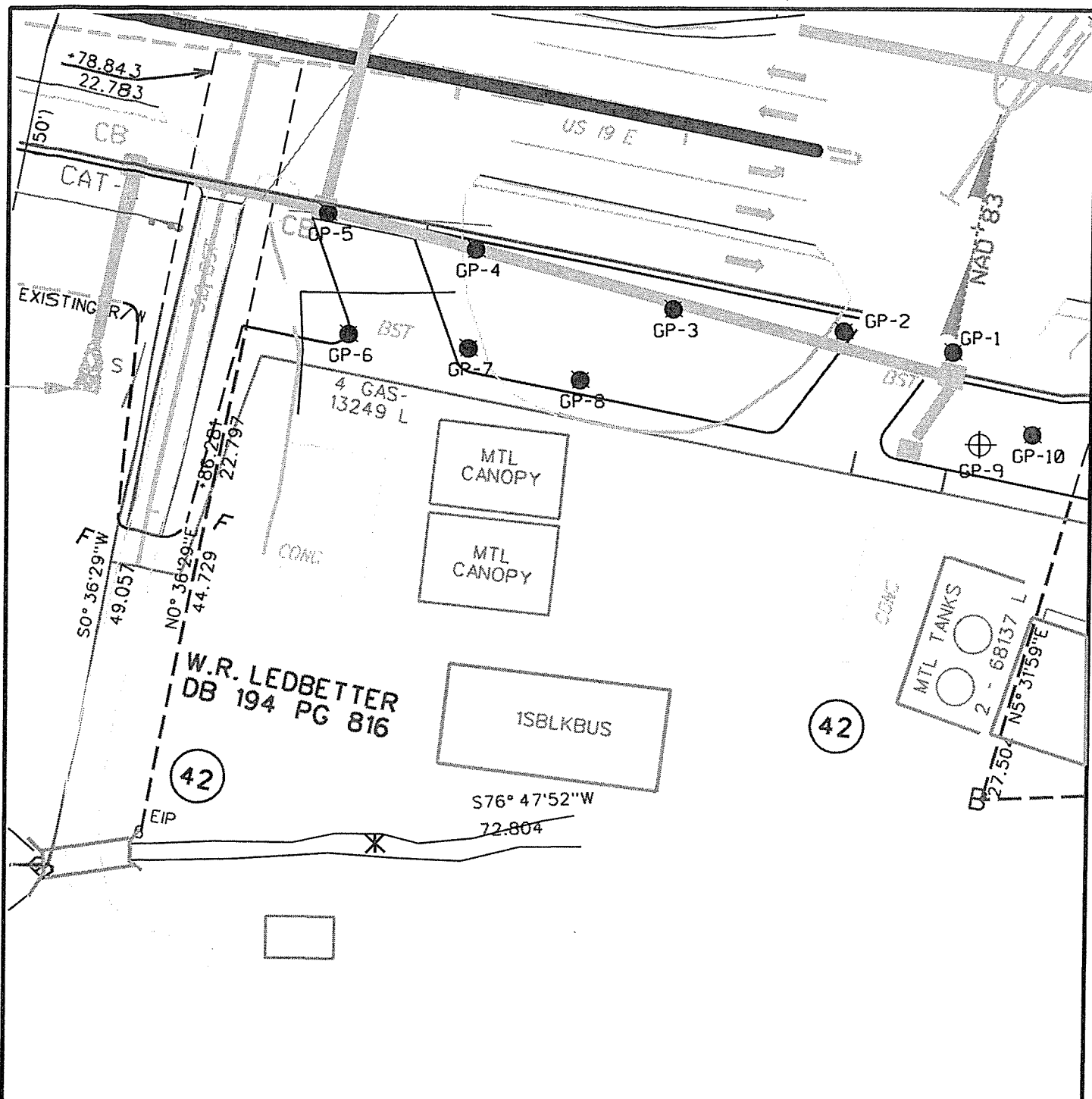
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 350 ft Scale: 1: 12,300 Detail: 14-0 Datum: WGS84



FIGURE NUMBER:	1
QUAD:	Burnsville
PROJECT NUMBER:	ENMO060029
SCALE:	As Shown

**SITE LOCATION MAP**  
 Danny Hensley Property  
 US Highway 19 E  
 Parcel 042  
 Burnsville, North Carolina

**ENVIRONMENTAL INVESTIGATIONS, INC**



**LEGEND**

- GP-1 ● SOIL TEST BORING
- GP-1 ⊕ TEMPORARY MONITORING WELL
- PROPERTY BOUNDARY
- - - EXISTING R/W

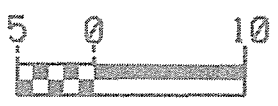
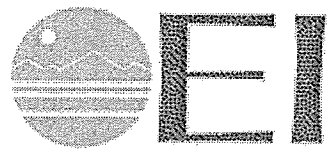
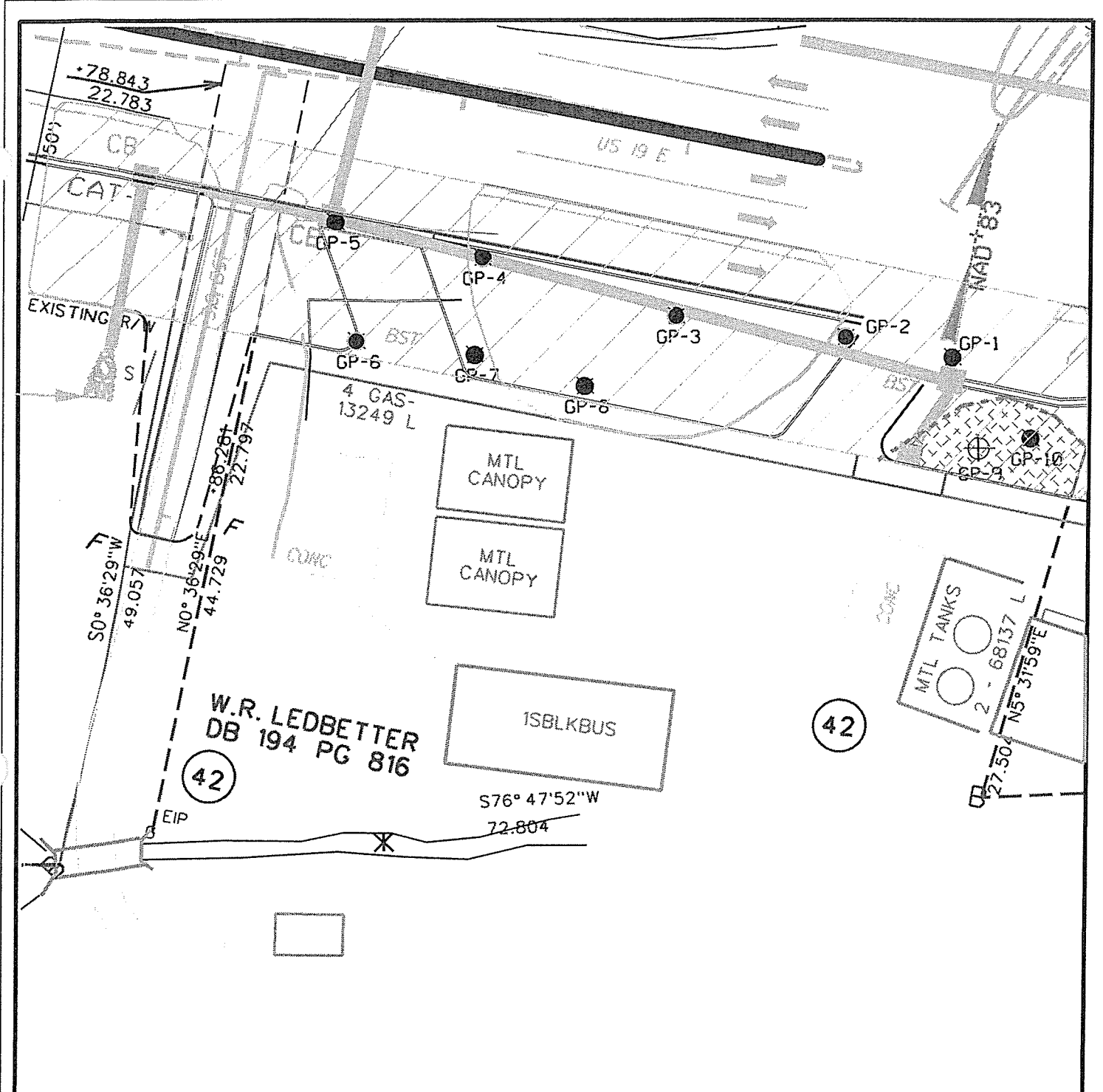


FIGURE:	2
DRAWN BY:	NCDOT/RMS
DATE:	APR 2006
PROJ NO:	ENM0060029.00
SCALE:	1 cm = 5m

**SITE MAP**  
**PARCEL 42**  
 Danny Hensley Property  
 25 West US HWY 19E  
 Burnsville, NC 28714  
 WBS Element: 35609.1.1





**LEGEND**

- GP-1 ● SOIL TEST BORING
- GP-1 ⊕ TEMPORARY MONITORING WELL
- PROPERTY BOUNDARY
- - - - - EXISTING R/W
- AREA OF INVESTIGATION
- SOIL IMPACTED AREA

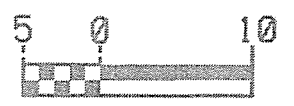
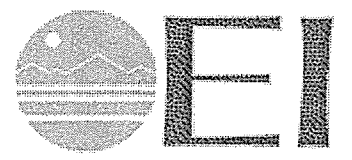


FIGURE:	3
DRAWN BY:	NCDOT/RMS
DATE:	APR 2006
PROJ NO:	ENMD060029.00
SCALE:	1 cm = 5m

**IMPACTED SOILS MAP**  
**PARCEL 42**  
 Danny Hensley Property  
 25 West US HWY 19E  
 Burnsville, NC 28714  
 WBS Element: 35609.1.1



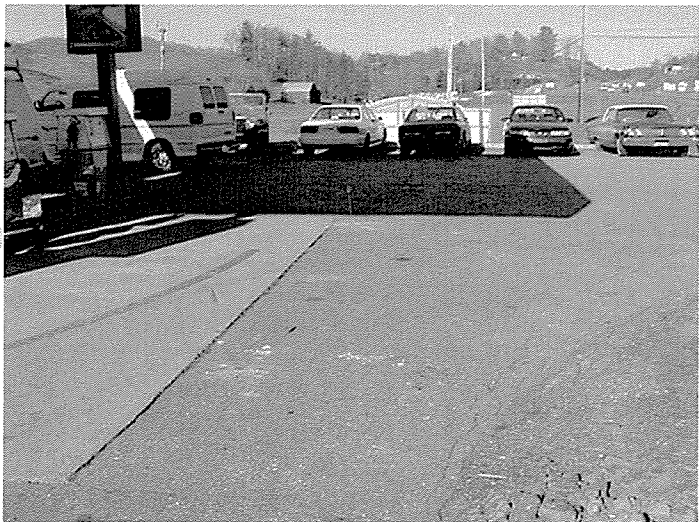
**APPENDIX A**  
**SITE PHOTOGRAPHS**



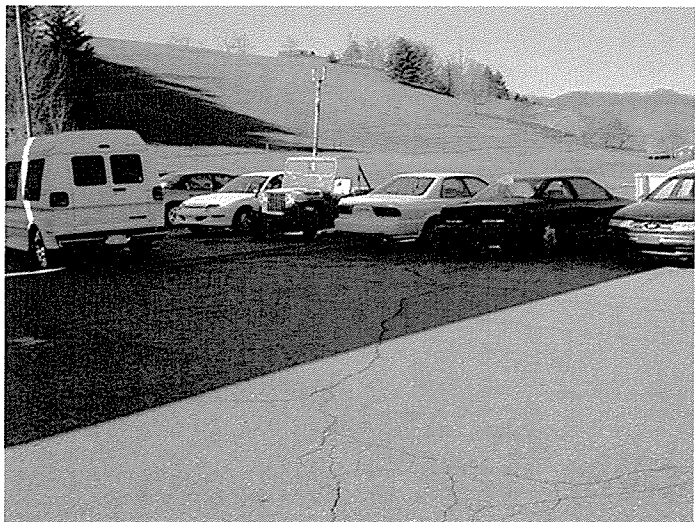
Subject Property



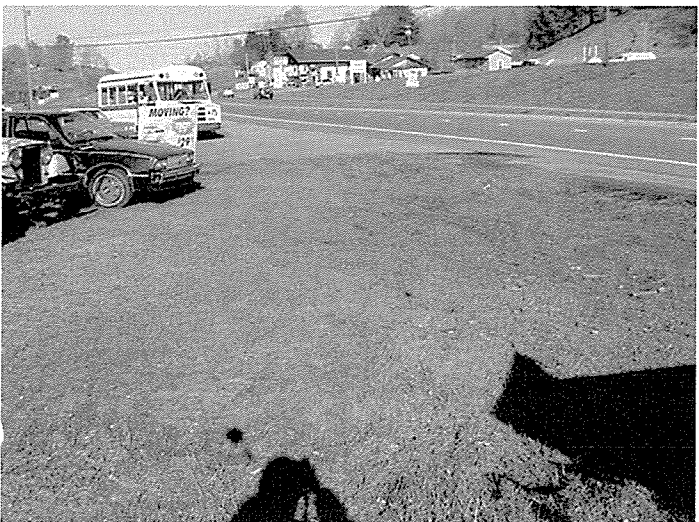
Borings GP9 and GP10 facing west



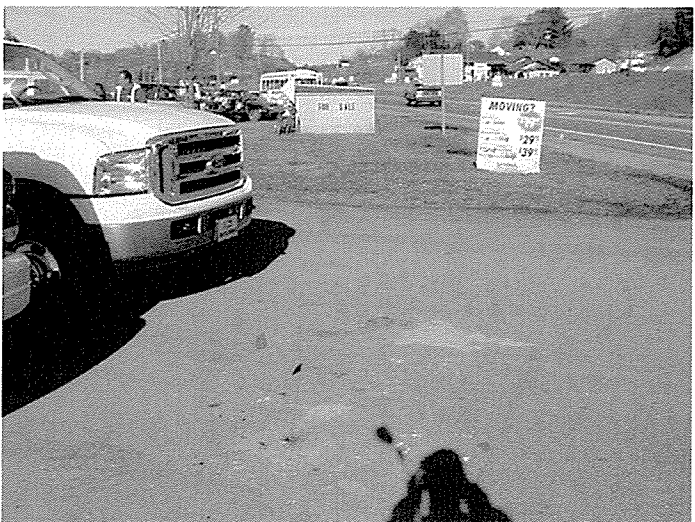
Borings GP7 and GP8 facing west



Boring GP6 and tank pit facing southwest



Borings GP4 and GP5 facing west



Borings GP1-GP3 facing west

**APPENDIX B**  
**STANDARD OPERATING PROCEDURES**

**STANDARD OPERATING PROCEDURES  
Subsurface Assessment Methodology And Sampling Protocol**

**Parcel 42  
Danny Hensley Property  
25W US Highway 19E  
Burnsville, NC 28714**

WBS Element # 325W9.1.1  
State Project # R-2519A  
**EI Project No. ENMO060029.00**

Prepared For:

Gregory A. Smith  
State of North Carolina  
Department of Transportation  
Geotechnical Unit  
GeoEnvironmental Section  
1589 Mail Service Center  
Raleigh, NC 27699-1589

Prepared by:

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2101 Gateway Centre Boulevard, Suite 200  
Morrisville, NC 2725W  
PH (919) 544-7500 FAX (919) 544-2199

May 2006



**STANDARD OPERATING PROCEDURES**  
**(Subsurface Assessment Methodology And Sampling Protocol)**

**INTRODUCTION**

Environmental Investigations, Inc. (EI) has prepared this STANDARD OPERATING PROCEDURES - Subsurface Assessment Methodology and Sampling Protocol Plan (SPP) for a residential property owned by Danny Hensley Property located at 25W US Highway 19E, Burnsville, Yancey County, North Carolina.

The document presented herein describes the methodology and protocol that was utilized during the *Limited Preliminary Site Assessment* conducted at the above referenced project "site".

**SAMPLING DESIGN**

Prior to conducting a subsurface assessment, a sampling strategy was developed by EI based on the objectives of the investigation. After designing our soil sampling strategy, the appropriate equipment and techniques were selected to conduct the investigation. Our sampling strategy was based upon the premise of accomplishing the following performance objectives:

- collect soil samples that are representative of conditions as they exist at the study site;
- selecting the appropriate sampling device(s);
- taking measures to avoid introducing contamination as a result of poor sampling and/or poor handling techniques;
- reducing the potential of cross contamination between samples;
- defining sampling site selections and collection procedures for the appropriate individual media;
- defining the quality control assurance procedures;
- analytical requirements and limitations; and
- Data interpretation and assessment.

The sampling plan for this study was developed using the non-probabilistic (directed sampling designs) in nature. The location and frequency was based on this approach, to allow for the flexibility of the field coordinator (Geologist) to determine the number of samples collected for analysis. This approach allowed for the study objectives, properties of the matrix, resource constraints and access to sampling points to be adequately performed. Provision for access, use of sampling equipment, was also pre-determined.

The following section of the SPP discusses the sampling equipment available and collection methods which have been utilized to be technically appropriate.

### **SITE ORIENTATION**

Prior to conducting any soil sampling procedures, the EI Project Geologist/Manager reviewed and presented the Site and Safety Health Plan to all participants involved with the project which was developed based on the EI Safety and Health program. All monitoring, protective equipment (latex gloves, Tyvek® suits, etc.), potential hazards associated with the site and general health and safety standards were discussed.

#### **Site Survey**

Prior to conducting specific sampling activities, EI personnel will conduct a limited site survey of the target and surrounding areas. Information discovered during the survey will be utilized to better perform the sampling activities and will provide more insight into establishment of the conclusions of this study. The site survey will consist of the following:

- General site layout (UST system layouts, overhead canopies, dispensers, etc.);
- Site access;
- Soil types and depths;
- Surface water drainage pathways;
- Existing site conditions;
- Visible staining of surface soil;
- Vegetation stress, and
- Possible offsite or non-site related sources.

### **FIELD INVESTIGATIVE PROCEDURES**

#### **Sampling Objectives**

The general objective of sampling for this project was to collect a sample representative of subsurface and/or groundwater to reduce the potential bias caused by the sampling equipment used to obtain the sample.

The chosen sample locations were evaluated as discrete samples. A discrete sample is defined as "a discrete aliquot representative of a specific location at a given point in time."

### **Areas of Environmental Concern**

The objectives of choosing the proper sampling methods to collect appropriate samples that are representative of the conditions as they exist at the site were as follows:

- Selecting the appropriate sampling device.
- Taking measures to avoid introducing contamination as a result of poor sampling and/or handling techniques.
- Reducing the potential of cross contamination between samples.

The areas of environmental concern consisted of an existing heating oil UST.

### **SOIL SAMPLING ACTIVITIES**

Manual techniques and equipment, such as hand augers, are usually used for surface or shallow, subsurface soil sampling. Power operated equipment is usually associated with collecting deep samples, but this equipment can also be used for collecting shallow samples when the auger hole begins to collapse, or when the soil is so tight that manual auguring is not practical. Based on the request of the property owner, EI mainly used hand augers and to a lesser extent we utilized Direct Push Technology (DPT). The following section discusses the DPT methods employed during the site study.

#### **Soil Sampling Collection Methods**

Soil samples were collected utilizing Direct Push Technology (DPT) methods.

#### **Direct Push Technology Methodology**

DPT refers to tools and sensors that are inserted into the subsurface without the use of drilling to remove soil and make a path for the tool. To perform the DPT activities, the contractor utilized a GeoProbe® 6600 machine. The GeoProbe® 6600 is a hydraulically-powered probing machine designed, which uses static force and a percussion hammer to advance small diameter sampling tools into the subsurface to collect soil cores, groundwater samples, and or soil gas samples. A GeoProbe relies on a relatively small amount of static (vehicle) weight combined with percussion as the energy for advancement of a tool string.

The advantages of utilizing DPT drilling methods are described as follows:

- avoids the use of drilling fluids and lubricants during drilling;
- the equipment is highly mobile;
- disturbance of geochemical conditions during installation is minimized; and
- The drilling process does not produce drill cuttings.

### **DPT Soil Sample Collection Methods**

Soil samples utilizing DPT methods were collected from the advanced DPT soil borings continuously in 5.0-foot increments using acetate liners contained in a nickel plated macro sampling tubes. Each soil-filled liner was split for field screening and soil sample collection purposes. Soil samples were collected from the liners with disposable vinyl gloves and utilized for soil vapor screening testing and/or laboratory retention. This sampling method allows for continuous soil sampling from the ground surface to the desired depth. Soil samples selected for analyses are referenced in the text section.

### **Soil Sample Collection Protocol**

The following soil sampling collection procedures were utilized during this study:

- Ensured that all equipment, samplers and tools that will come in contact with the sample media was thoroughly decontaminated.
- Informed driller of sample interval (s) for borehole and oversaw the sampling process.
- Prepared and labeled all sample containers. Samples collected for the analytes of volatiles (if applicable) were sampled first.
- Labeled the containers including the location, depth, analyte, date and time of sampling.
- Delegated the driller to prepare the sample liner by cutting the liner in half.
- Placed liners on a clean sheet of plastic.
- Cut the soil core with a clean decontaminated knife to allow of visual soil classification.
- Sniffed the soil core with a PID/FID and recorded instrument readings volatile organics (VOCs) in a logbook (discussed further below).
- Logged the soil core in a logbook, including borehole identification (ID), sample number, date, time and any pertinent data.

- Logged soil classification including: recording percent recovery, color, description of major constituent, soil texture/structure, grading/sorting/plasticity, relative density or hardness consistency, clay, sand, silt, gravel content, grain size, moisture content, odor, staining and the Unified Soil Classification System (USCS) identifier and symbol;
- Physically collected the selected soil samples and placed these samples into laboratory prepared containers.
- Ensured the soil sample did not contain twigs, stones, and other debris from the soil.
- Packed soil samples for shipment, prepared chain-of-custody records and shipping documentation

### **Soil Vapor Screening**

An important tool in performing this study is performing the soil vapor screening or sniffing activities. Field screening is generally performed for a variety of reasons. The technique conducted during this study was used to screen soil samples for measurable levels of volatile organics. The results obtained from this procedure are not quantitative; however the results from several soil samples are relative and allowed the Field Geologist/Project Manager to select samples that are the most contaminated with the contaminated media. Generally, the presence of little or no organic vapor is possibly indicative of non-contaminated soils. Soil samples collected for purposes of soil headspace screening were tested by the following procedures:

- the field instrument was calibrated, prior to use;
- soil samples were collected directly from the DPT soil liners and placed into sealable plastic bags;
- soil samples within the bags were allowed to equilibrate for approximately five minutes;
- the headspace of each bagged sample was screened with the instrument probe for the presence of volatile organic compound (VOCs) with a Mini-RAE Photo-ionization Detector (PID);
- recording the instrument readings (VOCs) in a field logbook; and
- Verified that the FID/PID was reading background levels prior to exposing the probe into another sample.

### **Collection of Grab Soil Samples**

Soil samples may provide two (2) types of soil contamination representation including grab and composite. Samples may be generally collected in random locations from a grid pattern or selected areas believed to be contaminated as evidenced by field indicators (staining, odors and/or measurable volatile organic readings).

For this study, grab samples selected from areas showing field indicators or confirmation soil samples chosen to confirm the absence of volatile organic readings were chosen. The technical definition for a grab sample is as follows: A grab sample is a discrete aliquot representative of a specific location at a given point in time. The sample is collected at one time and at one particular sampling point and depth. Refer to the text or Chain-of-Custody in this study for soil sample selection, date, time and depths of each sample chosen for laboratory analyses.

### **Sample Handling Procedures**

The sample handling procedures were conducted as follows:

- 1) Disposable surgical latex gloves were used to avoid cross contamination of samples. Gloves were discarded in a designated "waste bag after each sample was collected.
- 2) Each confirmation sample upon collection was immediately stored in a cooler containing ice. During the sample collection process, care was taken to insure the samples were not collected in direct sunlight. In addition, during the collection process, no parts of the body without gloves touched any part of the sample.
- 3) Once placed into the cooler, each sample was protected with bubble wrap® and foam was inserted in the base, sides and top of the cooler.

### **Soil Boring Abandonment Procedures**

Due to the fact that holes in the subsurface may act as a conduit for contamination migration, proper sealing of holes is essential for ensuring that a site assessment does not contribute to the spread of contaminants. The objective of hole-sealing is to prevent preferential migration of contaminants through the bore hole. To seal the boreholes advanced during this study, the contractor utilized a method known as surface pouring. Surface pouring entails sealing the boreholes with dry products (e.g., bentonite granules, chips and/or pellets). Once the DPT drive rods have been withdrawn, dry products are physically poured into the bottom of the

borehole and filled vertically up the column to at least two (2) feet from the base of the borehole. Once the dry products have seated into the borehole, the product is hydrated to expand the clay material. After the hydration process has been performed, the remaining portions of the boreholes are backfilled with the soil cores. Due to the nature of DPT, no soil cuttings were generated during soil boring exploration assessment work.

### **GROUNDWATER INVESTIGATION**

The purpose of a monitoring well is to provide an access point for measuring groundwater levels and to collect groundwater samples representing actual in-situ groundwater conditions at that point of access. For the purpose of this investigation, based on the scope of work, EI chose to install temporary groundwater monitoring wells (Type I).

### **WELL DEVELOPMENT AND GROUNDWATER SAMPLE COLLECTION**

#### **Water Development**

The groundwater monitor well was purged with a Peristaltic™ pump. Well development allows fresh water from the formation to enter the well and the groundwater samples will more accurately represent actual groundwater conditions. The well was purged of approximately three (3) to five (5) well volumes of water or until dry prior to sampling.

#### **Groundwater Sampling Procedures**

After well development activities were performed, groundwater samples were collected from the well(s) with the referenced pump. During the collection process, samples were poured directly from the bailer into the laboratory supplied containers which were placed into an ice chest filled with ice. Under no circumstances were any intermediate sample containers used, i.e. jar, beaker, etc., and then transferred to the sample container. In addition, water samples were not field filtered.

Prior to collecting the water sample, the containers were labeled accordingly. This procedure was performed prior to sampling because sample containers have a tendency to "sweat" when filled with groundwater; this makes it difficult to affix a label to the container after sampling. The sample label also was covered with a clear piece of tape, which was wrapped around the sample container. This procedure prevented the label from detaching from the container during sample storage and shipment.

Each sample container was labeled indicating the sample location (i.e. GP-1, or MW-1, etc.), date and time of collection, sample location, collector, project site, and analysis identification. Other pertinent information was recorded in the field book.

After the groundwater sample(s) was collected, the containers were immediately placed in a sample cooler containing ice. Upon completion, the samples were transported to Paradigm Analytical Laboratories, located in Wilmington, NC using chain-of-custody documentation.

### **Soil Boring Abandonment Procedures**

Due to the fact that holes in the subsurface may act as a conduit for contamination migration, proper sealing of holes is essential for ensuring that a site assessment does not contribute to the spread of contaminants. The objective of hole-sealing is to prevent preferential migration of contaminants through the bore hole. To seal the boreholes advanced during this study, the contractor utilized a method known as surface pouring. Surface pouring entails sealing the boreholes with dry products (e.g., bentonite granules, chips and/or pellets). Once the DPT drive rods have been withdrawn, dry products are physically poured into the bottom of the borehole and filled vertically up the column to at least two (2) feet from the base of the borehole. Once the dry products have seated into the borehole, the product is hydrated to expand the clay material. After the hydration process has been performed, the remaining portions of the boreholes are backfilled with the soil cores. Due to the nature of DPT, no soil cuttings were generated during soil boring exploration assessment work.

## **LABORATORY ANALYTICAL METHODS**

### **Soil Analytical Methods**

Based upon verbal information provided by NCDOT personnel (Eugene Tarascio), EI selected to analyze the chosen soil samples for total petroleum hydrocarbons (TPH) analyses by Method 8015B with preparation methods for the analysis of Diesel Range Organics (DRO) by GC-FID and Gasoline Range Organics (GRO) by GC-FID. The GRO method is utilized to extract volatile fuels such as gasoline, while the DRO method is utilized to extract less volatile petroleum products such as diesel fuel, fuel oil #2, kerosene, and varsol.

One (1) soil sample from the site was analyzed for volatile organics by SW-846 Method 8260 (5035 Prep), for semi-volatiles (SVOCs) by SW-846 Method 8270, and for aliphatics and aromatics by Massachusetts Department of Environmental Protection's (MADEP) method for volatile petroleum hydrocarbons (VPH) and MADEP's method for extractable



petroleum hydrocarbons (EPH), respectively.

These laboratory analytical methods were utilized as required in the *Guidelines* in order to compare results to the DWM's maximum soil contaminant concentration (MSCC) cleanup standards. The MSCC concentrations are also published in the *Guidelines*.

### **SAMPLE PACKAGING AND SHIPPING**

This section discusses the sample packaging and shipping protocol that shall be used to transport collected samples to the laboratories for analytical testing. Samples collected, prepared, preserved and stored must then be readied for packaging and shipping. It is important that the presented protocol be followed to ensure that the samples reach their destination in sound condition. In addition, the samples must be under strict COC from the time they are sampled until the analysis is complete.

Samples collected for this project were classified as environmental materials samples and were not considered hazardous. In addition, the samples collected for this study were not classified as "dangerous goods".

Environmental samples collected for this field study were packed prior to shipment using the following procedures:

1. Secure drain plug on cooler with tape.
2. Place cushioned layer on bottom of cooler (vermiculite or "bubble-wrap" plastic).
3. Line cooler with large heavy duty plastic bag.
4. Place all sample containers in large plastic bag within the cooler. Be sure the lids on all bottles are tight (will not leak).
5. Cushion containers to prevent breakage.
6. Put ice that has been "double bagged" in heavy duty polyethylene bags and placed on top of and/or between the samples within the large plastic bag. Fill all remaining space between the containers with cushion materials.
7. Securely fasten the top of the large plastic bag with tape or tie.
8. Place the Chain-of-Custody Record into a plastic bag, and tape the bag to the inner side of the cooler lid.
9. Close the cooler and securely tape (preferably with fiber tape) the top of the cooler shut. Custody seals should be affixed to the top and sides of the cooler within the securing tape so that the cooler cannot be opened without breaking the seal.
10. Shipping containers (ice cooler) must be marked "THIS END UP", and arrow labels which indicate the proper upward position of the container should be affixed to the container. A label containing the name and address of the shipper should be placed on the containers exterior. Labels

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used in the shipment of hazardous materials (e.g., Cargo Only Air Craft, Flammable Solids, etc.) are not permitted to be on the outside of containers used to transport environmental samples.

***Shipping Note:***

"When samples are to be shipped by common carrier or sent through the United States mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements of 40 CFR, Part 136, Table II, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric Acid (HCL) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric acid (HN03) in water solutions at concentrations of 0.-15% by weight or less (pH about 1.62 or greater); Sulfuric acid (H2SO4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); and Sodium Hydroxide (Na OH) in water solutions at concentrations of 0.08% by weight or less (pH about 12.30 or less). This footnote is wholly reproduced from 40 CFR 136.3, which is definitive".

**Sample Transportation**

The cooler(s) containing the collected soil samples was shipped overnight via Federal Express, with COC documentation, to Prism Laboratories, Inc. in Charlotte, NC. The following protocol was used for sample handling and transportation:

- 1) The lids on all bottles were tightened to reduce the potential for leakage.
- 2) The sample identification label on each individual laboratory container was covered with a clear piece of plastic tape. Each container was then placed within an appropriately sized polyethylene bag and sealed.
- 3) The containers were placed into a bubble-wrap® lined rectangular ice chest (cooler).
- 4) Ice was placed on top and surrounding bubble-wrap® sample containers. Some of the remaining spaces between the containers were filled with bubble-wrap® and/or ice.
- 5) The cooler drain plug was secured with clear tape.
- 6) The COC's were double plastic bagged and were taped to the inner side of the cooler lid.
- 7) The cooler was closed and securely taped.
- 8) A label with adhesive tape containing the name and address of the shipper and the address of the laboratory was placed on top of the cooler.

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**DECONTAMINATION PROCEDURES**

Decontamination is the process of washing, rinsing and removing contaminants from exposed surfaces of equipment. Decontamination helps prevent the spread of contamination off-site, and avoids cross-contamination to other samples. The decontamination procedures were performed as follows:

- 1) Disposable surgical latex gloves were used in lieu of decontamination procedures to collect soil samples.

The soil samples retained for laboratory analyses were placed in the appropriate clean laboratory prepared containers, labeled and subsequently delivered with chain-of-custody documentation (COC) for analysis. Dates and times of sampling may be referenced on the COC's. Specific laboratory analysis methods are referenced in the text of this Study.

**QUALITY ASSURANCE PROTOCOL**

**Field and Laboratory Control Samples**

The purpose of this section is to describe the standard control sampling program that supported the data quality objectives for this site. These control samples will included field control Quality Assurance (QA) samples used to assess sources of error. To minimize or consider the impact these errors have on the resulting data, a combination of unique field QA/QC protocols and control samples were developed to meet the QA overall objectives.

**Field Control Samples**

The elements of the sampling and field QA/QC strategy included the following:

- (1) El developed a well thought out sampling strategy for the site. The plan adequately and sufficiently outlined the different types of environmental media and protocol to sample the media.
- (2) Sampling methodologies to obtain true representative samples.
- (3) Used decontamination procedures in order to reduce cross-contamination potential between sampling points.
- (4) Used the proper sample containers, and preservation requirements.
- (5) Used the proper storage, and shipping of samples protocol.

Techniques to verify the inclusion of the QA/QC program included scheduled field control samples consisting of field blanks (trip and temperature). The field control samples were

STANDARD OPERATING PROCEDURES  
Subsurface Assessment Methodology And Sampling Protocol

**Parcel 42 – Danny Hensley Property**  
**25W US Highway 19E, Burnsville, NC 28714**  
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handled similarly as the environmental samples.

### **Quality Control Samples**

A trip and temperature blank were collected during this study.

### **Laboratory QA/QC Procedures**

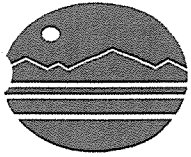
Laboratory QA/QC procedures are implemented in order to prevent, detect, and correct potential errors during the analytical process. The reliability and credibility of analytical laboratories are corroborated by the development and performance of their respective QA/QC programs. For this project, the NCDOT contracted laboratory provided and performed their program as they see fit. Standard practices used by the selected laboratory included the following quality control sample information in their generated reports:

- (a) laboratory method blanks;
- (b) temperature blanks.

### **INVESTIGATION DERIVED WASTE MANAGEMENT PROTOCOL**

The investigation derived waste (IDW) generated during the sampling activities were placed on site. These wastes include any derivative investigative soils leftover from the sampling and backfilling protocol, decontamination water (cleaning of field equipment), bailers, bailer haul-line and PPE equipment, if applicable. The management of IDW for this project complies with applicable or relevant and appropriate requirements (ARAs). The site specific ARAs were followed in consensus with the EPA Standard Operating Procedures (SOP) and Quality Assurance Manual, Region 4 and the *Guidelines For Assessment And Corrective Action*, drafted by the North Carolina Underground Storage Tank Section, effective July 1, 2001.

**APPENDIX C**  
**SOIL BORING LOGS**



# EI

ENVIRONMENTAL INVESTIGATIONS, INC.

2101 Gateway Centre Boulevard, Suite 200  
Morrisville, North Carolina  
919-544-7500

## SOIL BORING LOG

Boring No. GP-1  
Date Drilled: 04/04/06

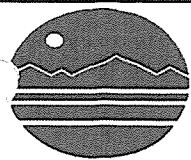
Client: NCDOT  
Project Name: Parcel #42  
Project/Site Location: 25W US Highway 19E, Burnsville, NC 28714  
Project Number: ENMO060029.00

Logged By: KDH  
Drilling Company: SEI  
Drill Device: GeoProbe 6600  
Drill Method: DPT

Total Boring Depth: 3.05m Weather Conditions: Cool Surface Elevation: \_\_\_\_\_  
Boring Diameter: 4.0" Boring Location: Drainage boring

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22						NA
6.00	1.83	11:05	x		SM	Tan silty SAND (SM), moist to wet.	0.9
8.00	2.44			100%			0.0
10.00	3.05						1.4
						Boring terminated at 3.05m (10.0') bls. x denotes soil sample at 1.22m - 1.83m (4-6') bls interval collected for laboratory retention.	





# E.I.

ENVIRONMENTAL INVESTIGATIONS, INC.

2101 Gateway Centre Boulevard, Suite 200  
Morrisville, North Carolina  
919-544-7500

## SOIL BORING LOG

Boring No. GP-2  
Date Drilled: 04/04/06

Client:	<u>NCDOT</u>	Logged By:	<u>KDH</u>
Project Name:	<u>Parcel #42</u>	Drilling Company:	<u>SEI</u>
Project/Site Location:	<u>25W US Highway 19E, Burnsville, NC 28714</u>	Drill Device:	<u>GeoProbe 6600</u>
Project Number:	<u>ENMO060029.00</u>	Drill Method:	<u>DPT</u>

Total Boring Depth: 3.05m      Weather Conditions: Cool      Surface Elevation: \_\_\_\_\_  
 Boring Diameter: 4.0"      Boring Location: Drainage boring

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22					NA	
6.00	1.83	11:15	x		SM	Tan silty SAND (SM), moist to wet.	0.8
8.00	2.44			100%		0.0	
10.00	3.05					1.1	
						Boring terminated at 3.05m (10.0') bls. x denotes soil sample at 1.22m - 1.83m (4-6') bls interval collected for laboratory retention.	



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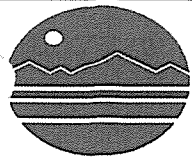
## SOIL BORING LOG

Boring No. GP-3  
Date Drilled: 04/04/06

Client:	<u>NCDOT</u>	Logged By:	<u>KDH</u>
Project Name:	<u>Parcel #42</u>	Drilling Company:	<u>SEI</u>
Project/Site Location:	<u>25W US Highway 19E, Burnsville, NC 28714</u>	Drill Device:	<u>GeoProbe 6600</u>
Project Number:	<u>ENMO060029.00</u>	Drill Method:	<u>DPT</u>

Total Boring Depth:	<u>3.05m</u>	Weather Conditions:	<u>Cool</u>	Surface Elevation:	<u>          </u>
Boring Diameter:	<u>4.0"</u>	Boring Location:	<u>Drainage boring</u>		

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22					NA	
6.00	1.83				SM	Tan silty SAND (SM), moist to wet.	0.4
8.00	2.44	11:20	x	100%			0.0
10.00	3.05						0.9
						Boring terminated at 3.05m (10.0') bls. x denotes soil sample at 1.83m - 2.44m (6-8') bls interval collected for laboratory retention.	



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## SOIL BORING LOG

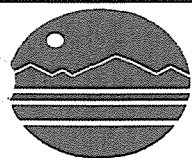
Boring No. GP-4  
Date Drilled: 04/04/06

Client:	<u>NCDOT</u>	Logged By:	<u>KDH</u>
Project Name:	<u>Parcel #42</u>	Drilling Company:	<u>SEI</u>
Project/ Site Location:	<u>25W US Highway 19E, Burnsville, NC 28714</u>	Drill Device:	<u>GeoProbe 6600</u>
Project Number:	<u>ENMO060029.00</u>	Drill Method:	<u>DPT</u>

Total Boring Depth: 3.05m      Weather Conditions: Cool      Surface Elevation: \_\_\_\_\_  
 Boring Diameter: 4.0"      Boring Location: Drainage boring

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22					NA	
6.00	1.83				SM	Tan silty SAND (SM), moist to wet.	1.0
8.00	2.44	11:30	x	100%		0.0	
10.00	3.05						1.1

Boring terminated at 3.05m (10.0') bls.  
 x denotes soil sample at 1.83m - 2.44m (6-8') bls interval collected for laboratory retention.



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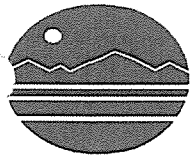
## SOIL BORING LOG

Boring No. GP-5  
Date Drilled: 04/04/06

Client:	<u>NCDOT</u>	Logged By:	<u>KDH</u>
Project Name:	<u>Parcel #42</u>	Drilling Company:	<u>SEI</u>
Project/Site Location:	<u>25W US Highway 19E, Burnsville, NC 28714</u>	Drill Device:	<u>GeoProbe 6600</u>
Project Number:	<u>ENMO060029.00</u>	Drill Method:	<u>DPT</u>

Total Boring Depth: 3.05m      Weather Conditions: Cool      Surface Elevation: \_\_\_\_\_  
 Boring Diameter: 4.0"      Boring Location: Drainage boring

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22					NA	
6.00	1.83				SM	Tan silty SAND (SM), moist to wet.	1.0
8.00	2.44	11:40	x	100%		0.0	
10.00	3.05					0.9	
<p>Boring terminated at 3.05m (10.0') bls.            x denotes soil sample at 1.83m - 2.44m (6-8') bls interval collected for laboratory retention.</p>							



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## SOIL BORING LOG

Boring No. GP-6  
Date Drilled: 04/04/06

Client: NCDOT  
Project Name: Parcel #42  
Project/Site Location: 25W US Highway 19E, Burnsville, NC 28714  
Project Number: ENMO060029.00

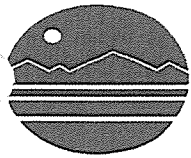
Logged By: KDH  
Drilling Company: SEI  
Drill Device: GeoProbe 6600  
Drill Method: DPT

Total Boring Depth: 4.57m  
Boring Diameter: 4.0"

Weather Conditions: Cool  
Boring Location: Delineation boring

Surface Elevation: \_\_\_\_\_

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22						NA
6.00	1.83					Tan silty SAND (SM), moist to wet.	1.0
8.00	2.44			100%	SM		0.0
10.00	3.05						1.0
12.00	3.66						0.0
14.00	4.27	11:45	x	100%	ML	Gray silt (ML), wet.	1.2
15.00	4.57						NA
						Boring terminated at 4.57m (15.0') bls. x denotes soil sample at 3.66m - 4.27m (12-14') bls interval collected for laboratory retention.	



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## SOIL BORING LOG

Boring No. GP-7  
Date Drilled: 04/04/06

Client: NCDOT  
Project Name: Parcel #42  
Project/Site Location: 25W US Highway 19E, Burnsville, NC 28714  
Project Number: ENMO060029.00

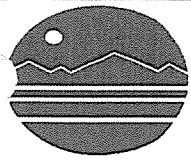
Logged By: KDH  
Drilling Company: SEI  
Drill Device: GeoProbe 6600  
Drill Method: DPT

Total Boring Depth: 4.57m  
Boring Diameter: 4.0"

Weather Conditions: Cool  
Boring Location: Delineation boring

Surface Elevation: \_\_\_\_\_

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22						NA
6.00	1.83					Tan silty SAND (SM), moist to wet.	0.8
8.00	2.44			100%	SM		NA
10.00	3.05	12:35	x				1.3
12.00	3.66			100%			NA
14.00	4.27				ML	Gray silt (ML), wet.	NA
15.00	4.57						0.9
						Boring terminated at 4.57m (15.0') bls. x denotes soil sample at 3.05m - 3.66m (10-12') bls interval collected for laboratory retention.	



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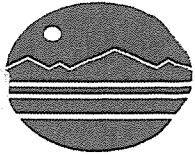
## SOIL BORING LOG

Boring No. GP-8  
 Date Drilled: 04/04/06

Client:	<u>NCDOT</u>	Logged By:	<u>KDH</u>
Project Name:	<u>Parcel #42</u>	Drilling Company:	<u>SEI</u>
Project/Site Location:	<u>25W US Highway 19E, Burnsville, NC 28714</u>	Drill Device:	<u>GeoProbe 6600</u>
Project Number:	<u>ENMO060029.00</u>	Drill Method:	<u>DPT</u>

Total Boring Depth: 4.57m      Weather Conditions: Cool      Surface Elevation: \_\_\_\_\_  
 Boring Diameter: 4.0"      Boring Location: Delineation boring

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22						NA
6.00	1.83				SM	Tan silty SAND (SM), moist to wet.	0.9
8.00	2.44	12:45	x	100%			NA
10.00	3.05						1.3
12.00	3.66			100%	ML	Gray silt (ML), wet.	NA
14.00	4.27						1.1
15.00	4.57						NA
Boring terminated at 4.57m (15.0') bls. x denotes soil sample at 2.44m - 3.05m (8-10') bls interval collected for laboratory retention.							



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## SOIL BORING LOG

Boring No. GP-9  
Date Drilled: 04/04/06

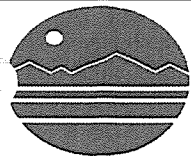
Client: NCDOT  
Project Name: Parcel #42  
Project/Site Location: 25W US Highway 19E, Burnsville, NC 28714  
Project Number: ENMO060029.00

Logged By: KDH  
Drilling Company: SEI  
Drill Device: GeoProbe 6600  
Drill Method: DPT

Total Boring Depth: 3.05m Weather Conditions: Cool Surface Elevation: \_\_\_\_\_  
Boring Diameter: 4.0" Boring Location: Drainage boring

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61				CL	Light brown to tan sandy CLAY (CL), moist.	NA
		13:00	x	100%			182.0
4.00	1.22				SM	Tan silty SAND (SM), moist to wet.	NA
6.00	1.83						0.0
8.00	2.44			100%			1.1
10.00	3.05						
Boring terminated at 3.05m (10.0') bls. x denotes soil sample at 0.61m - 1.22m (2-4') bls interval collected for laboratory retention.							





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## SOIL BORING LOG

Boring No. GP-10  
Date Drilled: 04/04/06

Client:	<u>NCDOT</u>	Logged By:	<u>KDH</u>
Project Name:	<u>Parcel #42</u>	Drilling Company:	<u>SEI</u>
Project/Site Location:	<u>25W US Highway 19E, Burnsville, NC 28714</u>	Drill Device:	<u>GeoProbe 6600</u>
Project Number:	<u>ENMO060029.00</u>	Drill Method:	<u>DPT</u>

Total Boring Depth:	<u>4.57m</u>	Weather Conditions:	<u>Cool</u>	Surface Elevation:	<u>          </u>
Boring Diameter:	<u>4.0"</u>	Boring Location:	<u>Delineation boring</u>		

Depth (Feet)	Depth (meters)	Time	Sample Analyzed	Recovery	Soil Profile	Lithological Description	Sample PID (ppm)
2.00	0.61			100%	CL	Light brown to tan sandy CLAY (CL), moist.	NA
4.00	1.22						NA
6.00	1.83						0.4
8.00	2.44	12:45	x	100%	SM	Tan silty SAND (SM), moist to wet.	NA
10.00	3.05						0.7
12.00	3.66			100%			NA
14.00	4.27				ML	Gray silt (ML), wet.	NA
15.00	4.57						NA
						Boring terminated at 4.57m (15.0') bls. x denotes soil sample at 2.44m - 3.05m (8-10') bls interval collected for laboratory retention.	

**APPENDIX D**  
**LABORATORY RESULTS**



Mr. Bob Shaut  
Environmental Investigations  
2101 Gateway Centre Boulevard  
Suite 200  
Morrisville NC 27560  
Report Number: G106-589  
Client Project: NCDOT

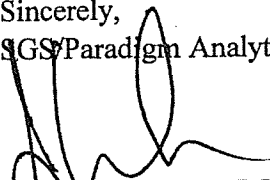
Dear Mr. Shaut:

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/Paradigm at (910) 350-1903. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS/Paradigm Analytical Labs for your analytical services. We look forward to working with you again on any additional analytical needs which you may have.

Sincerely,  
SGS/Paradigm Analytical Laboratories, Inc.

  
\_\_\_\_\_  
Laboratory Director  
J. Patrick Weaver

4/24/2006  
\_\_\_\_\_  
Date



Results for Total Petroleum Hydrocarbons  
by GC/FID 8015

Client Sample ID: GP1  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-1  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 11:05  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 73.36

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	8.28	5035	1	04/07/06
Diesel Range Organics	BQL	8.15	3541	1	04/18/06

Comments:

Flags:



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

Client Sample ID: GP2  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-2  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 11:15  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 70.88

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.49	5035	1	04/07/06
Diesel Range Organics	BQL	8.71	3541	1	04/18/06

Comments:

Flags:

Reviewed By: RP  
TPH\_LIMS\_v1.9



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

Client Sample ID: GP3  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-3  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 11:20  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 68.66

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.34	5035	1	04/07/06
Diesel Range Organics	BQL	7.88	3541	1	04/18/06

Comments:

Flags:

Reviewed By:   
TPH\_LIMS\_v1.9



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

Client Sample ID: GP4  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-4  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 11:30  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 79.04

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.65	5035	1	04/07/06
Diesel Range Organics	7.67	7.08	3541	1	04/18/06

Comments:

Flags:



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

Client Sample ID: GP5  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-5  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 11:40  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 69.72

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.90	5035	1	04/07/06
Diesel Range Organics	BQL	8.16	3541	1	04/18/06

Comments:

Flags:

Reviewed By: RM

TPH\_LIMS\_v1.9





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

Client Sample ID: GP6  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-6  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 11:45  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 71.35

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.79	5035	1	04/07/06
Diesel Range Organics	BQL	8.53	3541	1	04/18/06

Comments:

Flags:





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

Client Sample ID: GP8  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-8  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 12:45  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 68.84

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.88	5035	1	04/07/06
Diesel Range Organics	BQL	8.58	3541	1	04/18/06

Comments:

Flags:

Reviewed By: *ml*  
TPH\_LIMS\_v1.9



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

Client Sample ID: GP9  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-9  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 13:00  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 77.56

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	213	27.9	5035	4	04/11/06
Diesel Range Organics	2720	140	3541	20	04/18/06

Comments:

Flags:

Reviewed By:       
TPH\_LIMS\_v1.9



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

Client Sample ID: GP10  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-10  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: MJC  
Date Collected: 4/4/2006 13:10  
Date Received: 4/6/2006  
Matrix: Soil  
Solids 80.42

Analyte	Result MG/KG	RL MG/KG	Prep Method	Dilution Factor	Date Analyzed
Gasoline Range Organics	BQL	7.13	5035	1	04/11/06
Diesel Range Organics	7.82	7.45	3541	1	04/18/06

Comments:

Flags:

Reviewed By: PN  
TPH\_LIMS\_v1.9



Results for Volatiles  
by GCMS 8260B/5035

Client Sample ID: GP9  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-9B  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: JTF  
Date Collected: 4/4/2006 13:00  
Date Received: 4/6/2006  
Matrix: Soil  
%Solids: 77.6

Compound	Result UG/KG	Quantitation Limit UG/KG	Dilution Factor	Date Analyzed
Acetone	BQL	26700	800	4/15/2006
Benzene	BQL	1070	800	4/15/2006
Bromobenzene	BQL	1070	800	4/15/2006
Bromochloromethane	BQL	1070	800	4/15/2006
Bromodichloromethane	BQL	1070	800	4/15/2006
Bromoform	BQL	1070	800	4/15/2006
Bromomethane	BQL	1070	800	4/15/2006
2-Butanone	BQL	26700	800	4/15/2006
n-Butylbenzene	BQL	1070	800	4/15/2006
sec-Butylbenzene	BQL	1070	800	4/15/2006
tert-Butylbenzene	BQL	1070	800	4/15/2006
Carbon disulfide	BQL	1070	800	4/15/2006
Carbon tetrachloride	BQL	1070	800	4/15/2006
Chlorobenzene	BQL	1070	800	4/15/2006
Chloroethane	BQL	1070	800	4/15/2006
Chloroform	BQL	1070	800	4/15/2006
Chloromethane	BQL	1070	800	4/15/2006
2-Chlorotoluene	BQL	1070	800	4/15/2006
4-Chlorotoluene	BQL	1070	800	4/15/2006
Dibromochloromethane	BQL	1070	800	4/15/2006
1,2-Dibromo-3-chloropropane	BQL	5350	800	4/15/2006
Dibromomethane	BQL	1070	800	4/15/2006
1,2-Dibromoethane (EDB)	BQL	1070	800	4/15/2006
1,2-Dichlorobenzene	BQL	1070	800	4/15/2006
1,3-Dichlorobenzene	BQL	1070	800	4/15/2006
1,4-Dichlorobenzene	BQL	1070	800	4/15/2006
trans-1,4-Dichloro-2-butene	BQL	5350	800	4/15/2006
1,1-Dichloroethane	BQL	1070	800	4/15/2006
1,1-Dichloroethene	BQL	1070	800	4/15/2006
1,2-Dichloroethane	BQL	1070	800	4/15/2006
cis-1,2-Dichloroethene	BQL	1070	800	4/15/2006
trans-1,2-dichloroethene	BQL	1070	800	4/15/2006
1,2-Dichloropropane	BQL	1070	800	4/15/2006
1,3-Dichloropropane	BQL	1070	800	4/15/2006
2,2-Dichloropropane	BQL	1070	800	4/15/2006
1,1-Dichloropropene	BQL	1070	800	4/15/2006
cis-1,3-Dichloropropene	BQL	1070	800	4/15/2006
trans-1,3-Dichloropropene	BQL	1070	800	4/15/2006
Dichlorodifluoromethane	BQL	5350	800	4/15/2006
Diisopropyl ether (DIPE)	BQL	1070	800	4/15/2006
Ethylbenzene	BQL	1070	800	4/15/2006
Hexachlorobutadiene	BQL	1070	800	4/15/2006



**Results for Volatiles  
by GCMS 8260B/5035**

Client Sample ID: GP9  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-9B  
Lab Project ID: G106-589  
Report Basis: Dry Weight

Analyzed By: JTF  
Date Collected: 4/4/2006 13:00  
Date Received: 4/6/2006  
Matrix: Soil  
%Solids: 77.6

Compound	Result UG/KG	Quantitation Limit UG/KG	Dilution Factor	Date Analyzed
2-Hexanone	BQL	5350	800	4/15/2006
Iodomethane	BQL	1070	800	4/15/2006
Isopropylbenzene	BQL	1070	800	4/15/2006
4-Isopropyltoluene	BQL	1070	800	4/15/2006
Methylene chloride	BQL	5350	800	4/15/2006
4-Methyl-2-pentanone	BQL	5350	800	4/15/2006
Methyl-tert-butyl ether (MTBE)	BQL	1070	800	4/15/2006
Naphthalene	<b>1100</b>	1070	800	4/15/2006
n-Propyl benzene	BQL	1070	800	4/15/2006
Styrene	BQL	1070	800	4/15/2006
1,1,1,2-Tetrachloroethane	BQL	1070	800	4/15/2006
1,1,2,2-Tetrachloroethane	BQL	1070	800	4/15/2006
Tetrachloroethene	BQL	1070	800	4/15/2006
Toluene	BQL	1070	800	4/15/2006
1,2,3-Trichlorobenzene	BQL	1070	800	4/15/2006
1,2,4-Trichlorobenzene	BQL	1070	800	4/15/2006
Trichloroethene	BQL	1070	800	4/15/2006
1,1,1-Trichloroethane	BQL	1070	800	4/15/2006
1,1,2-Trichloroethane	BQL	1070	800	4/15/2006
Trichlorofluoromethane	BQL	1070	800	4/15/2006
1,2,3-Trichloropropane	BQL	1070	800	4/15/2006
1,2,4-Trimethylbenzene	<b>3620</b>	1070	800	4/15/2006
1,3,5-Trimethylbenzene	<b>1600</b>	1070	800	4/15/2006
Vinyl chloride	BQL	1070	800	4/15/2006
m-,p-Xylene	BQL	2140	800	4/15/2006
o-Xylene	BQL	1070	800	4/15/2006

	Spike Added	Spike Result	Percent Recovered
4-Bromofluorobenzene	10	10	100
1,2-Dichloroethane-d4	10	9.38	94
Toluene-d8	10	9.57	96

**Comments:**

**Flags:**

BQL = Below Quantitation Limits.

Reviewed By:



Results for Semivolatiles  
by GCMS 8270

Client Sample ID: GP9  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-9M  
Lab Project ID: G106-589  
Report Basis: Dry weight

Analyzed By: MRC  
Date Collected: 4/4/2006 13:00  
Date Received: 4/6/2006  
Date Extracted: 4/10/2006  
Matrix: Soil  
% Solids: 77.56

Compound	Result ug/Kg	RL ug/Kg	Dilution Factor	Date Analyzed
Acenaphthene	BQL	395	1	4/14/2006
Acenaphthylene	BQL	395	1	4/14/2006
Anthracene	BQL	395	1	4/14/2006
Benzo[a]anthracene	BQL	395	1	4/14/2006
Benzo[a]pyrene	BQL	395	1	4/14/2006
Benzo[b]fluoranthene	BQL	395	1	4/14/2006
Benzo[g,h,i]perylene	BQL	395	1	4/14/2006
Benzo[k]fluoranthene	BQL	395	1	4/14/2006
Benzoic Acid	BQL	791	1	4/14/2006
Bis(2-chloroethoxy)methane	BQL	395	1	4/14/2006
Bis(2-chloroethyl)ether	BQL	395	1	4/14/2006
Bis(2-chloroisopropyl)ether	BQL	395	1	4/14/2006
Bis(2-ethylhexyl)phthalate	BQL	395	1	4/14/2006
4-bromophenyl phenyl ether	BQL	395	1	4/14/2006
Butylbenzylphthalate	BQL	395	1	4/14/2006
2-Chloronaphthalene	BQL	395	1	4/14/2006
2-Chlorophenol	BQL	395	1	4/14/2006
4-Chloro-3-methylphenol	BQL	395	1	4/14/2006
4-Chloroaniline	BQL	1980	1	4/14/2006
4-Chlorophenyl phenyl ether	BQL	395	1	4/14/2006
Chrysene	BQL	395	1	4/14/2006
Dibenzo[a,h]anthracene	BQL	395	1	4/14/2006
Dibenzofuran	BQL	395	1	4/14/2006
Di-n-Butylphthalate	BQL	395	1	4/14/2006
1,2-Dichlorobenzene	BQL	395	1	4/14/2006
1,3-Dichlorobenzene	BQL	395	1	4/14/2006
1,4-Dichlorobenzene	BQL	395	1	4/14/2006
3,3'-Dichlorobenzidine	BQL	791	1	4/14/2006
2,4-Dichlorophenol	BQL	395	1	4/14/2006
Diethylphthalate	BQL	395	1	4/14/2006
Dimethylphthalate	BQL	395	1	4/14/2006
2,4-Dimethylphenol	BQL	395	1	4/14/2006
Di-n-octylphthalate	BQL	395	1	4/14/2006
4,6-Dinitro-2-methylphenol	BQL	1980	1	4/14/2006
2,4-Dinitrophenol	BQL	1980	1	4/14/2006
2,4-Dinitrotoluene	BQL	395	1	4/14/2006
2,6-Dinitrotoluene	BQL	395	1	4/14/2006
Diphenylamine *	BQL	395	1	4/14/2006
Fluoranthene	BQL	395	1	4/14/2006
Fluorene	735	395	1	4/14/2006
Hexachlorobenzene	BQL	395	1	4/14/2006
Hexachlorobutadiene	BQL	395	1	4/14/2006
Hexachlorocyclopentadiene	BQL	791	1	4/14/2006
Hexachloroethane	BQL	395	1	4/14/2006





Results for Semivolatiles  
by GCMS 8270

Client Sample ID: GP9  
Client Project ID: NCDOT  
Lab Sample ID: G106-589-9M  
Lab Project ID: G106-589  
Report Basis: Dry weight

Analyzed By: MRC  
Date Collected: 4/4/2006 13:00  
Date Received: 4/6/2006  
Date Extracted: 4/10/2006  
Matrix: Soil  
% Solids: 77.56

Compound	Result ug/Kg	RL ug/Kg	Dilution Factor	Date Analyzed
Indeno(1,2,3-c,d)pyrene	BQL	395	1	4/14/2006
Isophorone	BQL	395	1	4/14/2006
2-Methylnaphthalene	3010	395	1	4/14/2006
2-Methylphenol	BQL	395	1	4/14/2006
3- & 4-Methylphenol	BQL	395	1	4/14/2006
Naphthalene	BQL	395	1	4/14/2006
2-Nitroaniline	BQL	395	1	4/14/2006
3-Nitroaniline	BQL	1980	1	4/14/2006
4-Nitroaniline	BQL	1980	1	4/14/2006
Nitrobenzene	BQL	395	1	4/14/2006
2-Nitrophenol	BQL	395	1	4/14/2006
4-Nitrophenol	BQL	1980	1	4/14/2006
N-Nitrosodi-n-propylamine	BQL	395	1	4/14/2006
Pentachlorophenol	BQL	1980	1	4/14/2006
Phenanthrene	BQL	395	1	4/14/2006
Phenol	BQL	395	1	4/14/2006
Pyrene	BQL	395	1	4/14/2006
1,2,4-Trichlorobenzene	BQL	395	1	4/14/2006
2,4,5-Trichlorophenol	BQL	395	1	4/14/2006
2,4,6-Trichlorophenol	BQL	395	1	4/14/2006

	Spike Added	Spike Result	Percent Recovered
2-Fluorobiphenyl	10	10.2	102
2-Fluorophenol	10	12.7	127 #
Nitrobenzene-d5	10	13.9	139 #
Phenol-d6	10	11.5	115
2,4,6-Tribromophenol	10	19.2	192 #
4-Terphenyl-d14	10	13.3	133

**Comments:**

\* N-Nitrosodiphenylamine is reported as the breakdown product Diphenylamine.

**Flags:**

BQL = Below Quantitation Limits.

# = Elevated surrogate recovery due to co-eluting non-target matrix interferences.

Reviewed By:



### VPH (Aliphatics/Aromatics) Laboratory Reporting Form

Client Name: Environmental Investigations  
Project Name: NCDOT

Sample Information and Analytical Results	
Sample Identification	GP9
Sample Matrix	Soil
Collection Option (for Soil)*	2
Date Collected	04/04/06
Date Received	04/06/06
Date Extracted	04/04/06
Date Analyzed	04/07/06
Dry Weight	78
Dilution Factor	1
C <sub>5</sub> -C <sub>8</sub> Aliphatics**	15 (mg/Kg)
C <sub>9</sub> -C <sub>12</sub> Aliphatics**	190 (mg/Kg)
C <sub>9</sub> -C <sub>10</sub> Aromatics**	340 (mg/Kg)
Surrogate % Recovery - PID	350***
Surrogate % Recovery - FID	740***

\* = Option 1 = Established fill line on vial, Option 2 = Sampling Device/Brand, or Option 3 = Field weight of soil.

\*\* = Excludes any surrogates or internal standards.

\*\*\*= High surrogate recovery due to matrix interference

Lab Info: g106-589-9a

Reviewed By: Paul



Attachment 2

VPH Laboratory Reporting Form

**Calibration and QA/QC Information**

FID Initial Calibration Date: 02/11/06 PID Initial Calibration Date: 02/11/06

**Calibration Ranges and Limits**

Range	MDL (07/15/2004) (µg/L)	ML (µg/L)	RL (µg/L)	RL (mg/Kg)
C <sub>5</sub> -C <sub>8</sub> Aliphatics	4.4	14	100	10
C <sub>9</sub> -C <sub>12</sub> Aliphatics	3.4	11	100	10
C <sub>9</sub> -C <sub>10</sub> Aromatics	0.13	0.41	100	10

**Calibration Concentration Levels**

Range	Levels (µg/L)	%RSD or CCC	Method of Quantitation
C <sub>5</sub> -C <sub>8</sub> Aliphatics	40	10.8	Calibration Factor
	1000		
	2000		
	3000		
	4000		
C <sub>9</sub> -C <sub>12</sub> Aliphatics	10	0.99	Linear Regression
	250		
	500		
	750		
	1000		
C <sub>9</sub> -C <sub>10</sub> Aromatics	10	19.30	Calibration Factor
	250		
	500		
	750		
	1000		

Calibration Check Date: 04/07/06

**Calibration Check**

Range	Levels (mg/Kg)	(µg/L)	RPD
C <sub>5</sub> -C <sub>8</sub> Aliphatics	2000	200	4.7
C <sub>9</sub> -C <sub>12</sub> Aliphatics	500	50	-13.2
C <sub>9</sub> -C <sub>10</sub> Aromatics	500	50	4.2

MDL = Method Detection Limit  
ML = Minimum Limit  
RL = Reportable Limit

RPD = Relative Percent Difference  
%RSD = Percent Relative Standard Deviation  
CCC = Correlation Coefficient of Curve



## EPH (Aliphatics/Aromatics) Results

by MDEP-EPH

Client Name: Environmental Investigations

Project Name: NCDOT

Sample Information and Analytical Results	
Sample Identification	GP9
Sample Matrix	Soil
Date Collected	04/04/06
Date Received	04/06/06
Date Extracted	04/18/06
Date Analyzed	04/26/06
Dry Weight	77.6
Dilution Factor	25:5
C <sub>9</sub> -C <sub>18</sub> Aliphatics*	1000 (mg/Kg)
C <sub>19</sub> -C <sub>38</sub> Aliphatics*	< 250 (mg/Kg)
C <sub>11</sub> -C <sub>22</sub> Aromatics*	220 (mg/Kg)
Aliphatic Surrogate % Recovery	NA
Aromatic Surrogate % Recovery	85
Fractionation Surrogate 1 % Recovery	100

### Comments:

\* = Excludes any surrogates or internal standards.

Lab info: G106-589-9N

Reviewed By: RL



## EPH Laboratory Reporting Form

## Calibration and QA/QC Information

Initial Calibration Date: 04/19/06

## Calibration Ranges and Limits

Range	MDL (2/2004) (µg/L)	ML (µg/L)	RL	
			(µg/L)	(mg/Kg)
C <sub>9</sub> -C <sub>18</sub> Aliphatics	3.84	12.2	100	10
C <sub>19</sub> -C <sub>36</sub> Aliphatics	0.57	1.8	100	10
C <sub>11</sub> -C <sub>22</sub> Aromatics	4.54	14.4	100	10

## Calibration Concentration Levels

Range	Levels (µg/mL)	%RSD or CCC	Method of Quantitation
C <sub>9</sub> -C <sub>18</sub> Aliphatics	6	13.30	Calibration Factor
	30		
	60		
	120		
	240		
C <sub>19</sub> -C <sub>36</sub> Aliphatics	8	10.1	Calibration Factor
	40		
	80		
	160		
	320		
C <sub>11</sub> -C <sub>22</sub> Aromatics	17	4.5	Calibration Factor
	85		
	170		
	340		
	680		

Calibration Check Date: 04/26/06

## Calibration Check

Range	Levels (µg/mL)	RPD
C <sub>9</sub> -C <sub>18</sub> Aliphatics	120	9.4
C <sub>19</sub> -C <sub>36</sub> Aliphatics	160	7.6
C <sub>11</sub> -C <sub>22</sub> Aromatics	340	-4.3

MDL = Method Detection Limit

ML = Minimum Limit

RL = Reportable Limit

RPD = Relative Percent Difference

%RSD = Percent Relative Standard Deviation

CCC = Correlation Coefficient of Curve



## List of Reporting Abbreviations and Data Qualifiers

B = Compound also detected in batch blank

BQL = Below Quantitation 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 = Reporting Limit

RPD = Relative Percent Difference

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

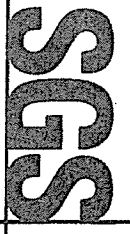
ug/L = micrograms per liter, ppb, parts per billion

% 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.



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

- Locations Nationwide**
- Alaska
  - Louisiana
  - New Jersey
  - West Virginia
  - Hawaii
  - Maryland
  - North Carolina

www.us.sgs.com 056746

SGS Reference: **G106-589**

PAGE **1** OF **1**

1 CLIENT: **ETC** PHONE NO: **(919) 857-7508**

CONTACT: **Bob Shaud** SITE/PSID#: **Parcel 42**

PROJECT: **NC DOT** REPORTS TO: **ET**

INVOICE TO: **NC DOT** QUOTE # **WBS Element 35609.1.1**

FAX NO: ( ) P.O. NUMBER: **TR-2519A**

2

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX
6P1		4/4	1105	S
6P2			1115	
6P3			1120	
6P4			1130	
6P5			1140	
6P6			1145	
6P7			1235	
6P8			1245	
6P9			1300	
6P10			1810	

3 Collected/Relinquished By: (1) **Kevin Horton** Date: **4/4** Time: **2130** Received By: \_\_\_\_\_

Relinquished By: (2) \_\_\_\_\_ Date: **4/6/08** Time: **1015** Received By: **Aula Hume**

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

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

4

No CONTAINERS	SAMPLE TYPE C= COMP G= GRAB	Preservatives Lead Analysis Required	REMARKS	
			Analysis Required	REMARKS
			<b>3</b>	<b>6P0/PRO</b>
				<b>8250</b>
				<b>8270</b>
				<b>EPH</b>
				<b>UPH</b>

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

Shipping Ticket No: **856797326** Temperature (C): **5.6°C**

Special Deliverable Requirements: Chain of Custody Seal: (Circle) **ABSENT**

Requested Turnaround Time and Special Instructions: **Standard**

1200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301

5500 Business Dr., Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

1258 Greenbrier Street Charleston, WV 25311 Tel: (304) 346-0725 Fax: (304) 346-0761

White - Retained by Lab  
 Yellow - Returned with Report  
 Pink - Retain

# Case Narrative



Date: 04/22/06

Company: NC Dept. of Transportation  
Contact: c/o EI / Bob Shaut  
Address: Suite 200  
2101 Gateway Centre Blvd.  
Morrisville, NC 27560

Client Project ID: Parcel 42/NC DOT-Burnsville NC  
Client Project Name or No: WBS# 35609.1.1  
Prism COC Group No: G0406108  
Collection Date(s): 04/04/05  
Lab Submittal Date: 04/05/06

This data package contains the analytical results for the project identified above and includes a Case Narrative, Laboratory Report and Quality Control Data totaling 15 pages. A chain-of-custody is also attached for the samples submitted to Prism for this project.

Data qualifiers are flagged individually on each sample. A Key Reference for the data qualifiers appears at the bottom of this page. Quality control statements and/or sample specific remarks are included in the sample comments section of the laboratory report for each sample affected.

Please call if you have any questions relating to this analytical report.

Data Reviewed by: Robbi A. Jones  
Signature: *Robbi A. Jones*  
Review Date: 04/22/06

Project Manager: Angela D. Overcash  
Signature: *Robbi A. Jones* for Angela Overcash  
Approval Date: 04/22/06

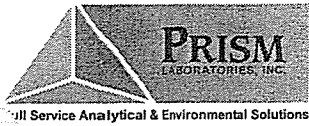
### Data Qualifier Key Reference:

- #: Result outside of QC Limits
- B: Compound also detected in the method blank
- DO: Compound diluted out.
- E: Estimated concentration, calibration range exceeded
- J: The analyte was positively identified but the value is estimated below the reporting limit
- JH: Estimated concentration with a high bias
- JL: Estimated concentration with a low bias
- M: A matrix effect is present
- T: Tentatively identified compound. The concentration is estimated.

Notes: This report should not be reproduced, except in its entirety, without the written consent of Prism Laboratories, Inc. The results in this report relate only to the samples submitted for analysis.

449 Springbrook Road, P. O. Box 240543, Charlotte, NC 28224-0403  
Phone: 704/529-6364 Toll Free: 800/529-6364 Fax: 704/525-0409





NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735  
 FL Certification No. E87519

# Laboratory Report

04/22/06

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2519A  
 Project ID: DOT-Parcel 42  
 Project No.: WBS# 35609.1.1  
 Sample Matrix: Water

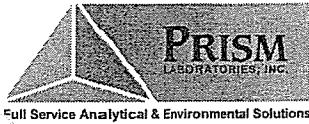
Client Sample ID: W-1  
 Prism Sample ID: 146857  
 COC Group: G0406108  
 Time Collected: 04/04/06 18:30  
 Time Submitted: 04/05/06 12:45

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
<b><u>Purgeable Aromatics by GC-PID</u></b>									
Benzene	BRL	µg/L	0.50	0.090	1	601/602	04/13/06 4:57	erussell	Q13957
Ethylbenzene	BRL	µg/L	1.0	0.13	1	601/602	04/13/06 4:57	erussell	Q13957
Isopropyl ether (IPE)	BRL	µg/L	5.0	0.041	1	601/602	04/13/06 4:57	erussell	Q13957
m,p-Xylenes	BRL	µg/L	2.0	0.43	1	601/602	04/13/06 4:57	erussell	Q13957
Methyl t-butyl ether (MTBE)	BRL	µg/L	5.0	0.28	1	601/602	04/13/06 4:57	erussell	Q13957
Naphthalene	BRL	µg/L	1.0	0.28	1	601/602	04/13/06 4:57	erussell	Q13957
o-Xylene	BRL	µg/L	1.0	0.29	1	601/602	04/13/06 4:57	erussell	Q13957
Toluene	BRL	µg/L	1.0	0.13	1	601/602	04/13/06 4:57	erussell	Q13957

Surrogate	% Recovery	Control Limits
1,4-Difluorobenzene-PID	105	69 - 140

**Semivolatile Organic Compounds by GC/MS**

1,2,4-Trichlorobenzene	BRL	µg/L	9.7	2.4	1	625	04/12/06 19:08	kelliot	Q13955
1,2-Dichlorobenzene	BRL	µg/L	9.7	2.6	1	625	04/12/06 19:08	kelliot	Q13955
1,3-Dichlorobenzene	BRL	µg/L	9.7	1.8	1	625	04/12/06 19:08	kelliot	Q13955
1,4-Dichlorobenzene	BRL	µg/L	9.7	2.3	1	625	04/12/06 19:08	kelliot	Q13955
2,4-Dinitrotoluene	BRL	µg/L	9.7	0.82	1	625	04/12/06 19:08	kelliot	Q13955
2,6-Dinitrotoluene	BRL	µg/L	9.7	1.6	1	625	04/12/06 19:08	kelliot	Q13955
2-Chloronaphthalene	BRL	µg/L	9.7	2.1	1	625	04/12/06 19:08	kelliot	Q13955
3,3'-Dichlorobenzidine	BRL	µg/L	49	9.1	1	625	04/12/06 19:08	kelliot	Q13955
4-Bromophenylphenylether	BRL	µg/L	9.7	1.9	1	625	04/12/06 19:08	kelliot	Q13955
4-Chlorophenylphenylether	BRL	µg/L	9.7	1.6	1	625	04/12/06 19:08	kelliot	Q13955
Acenaphthene	BRL	µg/L	9.7	1.8	1	625	04/12/06 19:08	kelliot	Q13955
Acenaphthylene	BRL	µg/L	9.7	2.0	1	625	04/12/06 19:08	kelliot	Q13955
Anthracene	BRL	µg/L	9.7	0.95	1	625	04/12/06 19:08	kelliot	Q13955
Benzo(a)anthracene	BRL	µg/L	9.7	0.91	1	625	04/12/06 19:08	kelliot	Q13955



NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735  
 FL Certification No. E87519

# Laboratory Report

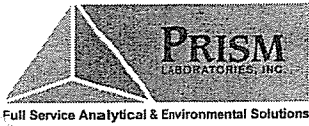
04/22/06

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2519A  
 Project ID: DOT-Parcel 42  
 Project No.: WBS# 35609.1.1  
 Sample Matrix: Water

Client Sample ID: W-1  
 Prism Sample ID: 146857  
 COC Group: G0406108  
 Time Collected: 04/04/06 18:30  
 Time Submitted: 04/05/06 12:45

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Benzo(a)pyrene	BRL	µg/L	9.7	0.97	1	625	04/12/06 19:08	kelliot	Q13955
Benzo(b)fluoranthene	BRL	µg/L	9.7	1.7	1	625	04/12/06 19:08	kelliot	Q13955
Benzo(g,h,i)perylene	BRL	µg/L	9.7	2.0	1	625	04/12/06 19:08	kelliot	Q13955
Benzo(k)fluoranthene	BRL	µg/L	9.7	1.8	1	625	04/12/06 19:08	kelliot	Q13955
Bis(2-chloroethoxy)methane	BRL	µg/L	9.7	2.1	1	625	04/12/06 19:08	kelliot	Q13955
Bis(2-chloroethyl)ether	BRL	µg/L	9.7	2.0	1	625	04/12/06 19:08	kelliot	Q13955
Bis(2-chloroisopropyl)ether	BRL	µg/L	9.7	2.3	1	625	04/12/06 19:08	kelliot	Q13955
Bis(2-ethylhexyl)phthalate	BRL	µg/L	9.7	0.69	1	625	04/12/06 19:08	kelliot	Q13955
Butylbenzylphthalate	BRL	µg/L	9.7	0.68	1	625	04/12/06 19:08	kelliot	Q13955
Chrysene	BRL	µg/L	9.7	0.55	1	625	04/12/06 19:08	kelliot	Q13955
Di-n-butylphthalate	BRL	µg/L	9.7	1.4	1	625	04/12/06 19:08	kelliot	Q13955
Di-n-octylphthalate	BRL	µg/L	9.7	2.1	1	625	04/12/06 19:08	kelliot	Q13955
Dibenzo(a,h)anthracene	BRL	µg/L	9.7	1.1	1	625	04/12/06 19:08	kelliot	Q13955
Dibenzofuran	BRL	µg/L	9.7	2.1	1	625	04/12/06 19:08	kelliot	Q13955
Diethylphthalate	BRL	µg/L	9.7	1.1	1	625	04/12/06 19:08	kelliot	Q13955
Dimethylphthalate	BRL	µg/L	9.7	1.4	1	625	04/12/06 19:08	kelliot	Q13955
Fluoranthene	BRL	µg/L	9.7	0.91	1	625	04/12/06 19:08	kelliot	Q13955
Fluorene	BRL	µg/L	9.7	1.4	1	625	04/12/06 19:08	kelliot	Q13955
Hexachlorobenzene	BRL	µg/L	9.7	1.3	1	625	04/12/06 19:08	kelliot	Q13955
Hexachlorobutadiene	BRL	µg/L	9.7	2.1	1	625	04/12/06 19:08	kelliot	Q13955
Hexachlorocyclopentadiene	BRL	µg/L	9.7	2.3	1	625	04/12/06 19:08	kelliot	Q13955
Hexachloroethane	BRL	µg/L	9.7	1.7	1	625	04/12/06 19:08	kelliot	Q13955
Indeno(1,2,3-cd)pyrene	BRL	µg/L	9.7	1.7	1	625	04/12/06 19:08	kelliot	Q13955
Isophorone	BRL	µg/L	9.7	1.6	1	625	04/12/06 19:08	kelliot	Q13955
N-Nitrosodi-n-propylamine	BRL	µg/L	9.7	2.1	1	625	04/12/06 19:08	kelliot	Q13955
Naphthalene	BRL	µg/L	9.7	2.1	1	625	04/12/06 19:08	kelliot	Q13955
Nitrobenzene	BRL	µg/L	9.7	1.8	1	625	04/12/06 19:08	kelliot	Q13955
Phenanthrene	BRL	µg/L	9.7	0.87	1	625	04/12/06 19:08	kelliot	Q13955



NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735  
 FL Certification No. E87519

# Laboratory Report

04/22/06

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2519A  
 Project ID: DOT-Parcel 42  
 Project No.: WBS# 35609.1.1  
 Sample Matrix: Water

Client Sample ID: W-1  
 Prism Sample ID: 146857  
 COC Group: G0406108  
 Time Collected: 04/04/06 18:30  
 Time Submitted: 04/05/06 12:45

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Pyrene	BRL	µg/L	9.7	0.88	1	625	04/12/06 19:08	kelliot	Q13955
Sample Preparation:			1030	mL /	1 mL	625BN	04/06/06 14:00	smanivanh	P15068

Surrogate	% Recovery	Control Limits
Terphenyl-d14	95	10 - 154
Phenol-d5	11	10 - 48
Nitrobenzene-d5	69	22 - 103
2-Fluorophenol	17	10 - 59
2-Fluorobiphenyl	69	29 - 112
2,4,6-Tribromophenol	72	27 - 125

**Extractable Petroleum Hydrocarbons by GC-FID**

C11-C22 Aromatics	BRL	µg/L	100	71	1	MADEP EPH	04/19/06 21:26	grappaccioli	Q13970
C19-C36 Aliphatics	BRL	µg/L	100	31	1	MADEP EPH	04/19/06 21:26	grappaccioli	Q13970
C9-C18 Aliphatics	BRL	µg/L	100	75	1	MADEP EPH	04/19/06 21:26	grappaccioli	Q13970

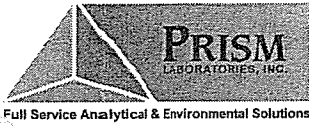
\* Analysis Note for C11-C22 Aromatics: Adjusted value.

Sample Preparation: 1000 mL / 2 mL EPH 04/10/06 8:00 smanivanh P15099

Surrogate	% Recovery	Control Limits
o-Terphenyl	116	40 - 140
2-Fluorobiphenyl	121	40 - 140
2-Bromonaphthalene	98	40 - 140
1-Chloro-octadecane	115	40 - 140

**Volatile Petroleum Hydrocarbons by GC-PID/FID**

C5-C8 Aliphatics	BRL	µg/L	100	50	1	MADEP VPH	04/06/06 20:46	javogel	Q13860
C9-C10 Aromatics	BRL	µg/L	100	35	1	MADEP VPH	04/06/06 20:46	javogel	Q13860
C9-C12 Aliphatics	BRL	µg/L	100	50	1	MADEP VPH	04/06/06 20:46	javogel	Q13860



NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735  
 FL Certification No. E87519

# Laboratory Report

04/22/06

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2519A  
 Project ID: DOT-Parcel 42  
 Project No.: WBS# 35609.1.1  
 Sample Matrix: Water

Client Sample ID: W-1  
 Prism Sample ID: 146857  
 COC Group: G0406108  
 Time Collected: 04/04/06 18:30  
 Time Submitted: 04/05/06 12:45

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
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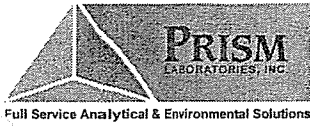
- \* Analysis Note for C5-C8 Aliphatics: Adjusted value.
- \* Analysis Note for C9-C12 Aliphatics: Adjusted value.

Surrogate	% Recovery	Control Limits
2,5-Dibromotoluene-PID	72	70 - 130
2,5-Dibromotoluene-FID	93	70 - 130

Sample Comment(s):

All results are reported on a wet-weight basis  
 BRL = Below Reporting Limit  
 J = Estimated value between the Reporting Limit and the MDL

Angela D. Overcash, V.P. Laboratory Services



NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735  
 FL Certification No. E87519

# Laboratory Report

04/22/06

N. C. Department of Transportation  
 Attn: Bob Shau/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2519A  
 Project ID: DOT-Parcel 42  
 Project No.: WBS# 35609.1.1  
 Sample Matrix: Water

Client Sample ID: TRIP BLANK  
 Prism Sample ID: 146858  
 COC Group: G0406108  
 Time Collected: 04/04/06  
 Time Submitted: 04/05/06 12:45

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
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**Volatile Petroleum Hydrocarbons by GC-PID/FID**

C5-C8 Aliphatics	BRL	µg/L	100	50	1	MADEP VPH	04/06/06 22:31	javogel	Q13860
C9-C10 Aromatics	BRL	µg/L	100	35	1	MADEP VPH	04/06/06 22:31	javogel	Q13860
C9-C12 Aliphatics	BRL	µg/L	100	50	1	MADEP VPH	04/06/06 22:31	javogel	Q13860

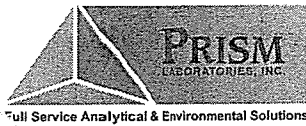
- \* Analysis Note for C5-C8 Aliphatics: Adjusted value.
- \* Analysis Note for C9-C12 Aliphatics: Adjusted value.

Surrogate	% Recovery	Control Limits
2,5-Dibromotoluene-PID	73	70 - 130
2,5-Dibromotoluene-FID	98	70 - 130

Sample Comment(s):

All results are reported on a wet-weight basis  
 BRL = Below Reporting Limit  
 J = Estimated value between the Reporting Limit and the MDL

Angela D. Overcash, V.P. Laboratory Services



NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735

# Level II QC Report

4/21/2006

N. C. Department of Transportation  
 Attn: Bob Shau/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
 Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
 Project No.: WBS# 35609.1.1

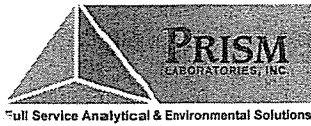
## Volatile Petroleum Hydrocarbons by GC-PID/FID, method MADEP VPH

Method Blank						QC Batch ID
	Result	RL	Control Limit	Units		
C5-C8 Aliphatics	ND	100	<50	µg/L		Q13860
C9-C10 Aromatics	ND	100	<50	µg/L		Q13860
C9-C12 Aliphatics	ND	100	<50	µg/L		Q13860

Laboratory Control Sample						QC Batch ID
	Result	Spike Amount	Units	Recovery %	Recovery Range %	
C5-C8 Aliphatics	139	150	µg/L	93	70 - 130	Q13860
C9-C10 Aromatics	38.4	50	µg/L	77	70 - 130	Q13860
C9-C12 Aliphatics	83.5	100	µg/L	84	70 - 130	Q13860

Matrix Spike						QC Batch ID
Sample ID:	Result	Spike Amount	Units	Recovery %	Recovery Range %	
146456 C5-C8 Aliphatics	147.000	150	µg/L	98	70 - 130	Q13860
C9-C10 Aromatics	38.100	50	µg/L	76	70 - 130	Q13860
C9-C12 Aliphatics	98.600	100	µg/L	99	70 - 130	Q13860

Matrix Spike Duplicate						RPD %	RPD Range %	QC Batch ID
Sample ID:	Result	Spike Amount	Units	Recovery %	Recovery Range %			
146456 C5-C8 Aliphatics	179	150	µg/L	119	70 - 130	20	0 - 25	Q13860
C9-C10 Aromatics	36.6	50	µg/L	73	70 - 130	4	0 - 25	Q13860
C9-C12 Aliphatics	126	100	µg/L	126	70 - 130	24	0 - 25	Q13860



NC Certification No. 402  
SC Certification No. 99012  
NC Drinking Water Cert. No. 37735

# Level II QC Report

4/21/2006

N. C. Department of Transportation  
Attn: Bob Shaut/EI  
c/o Environmental Investigations, Inc  
2101 Gateway Centre Blvd. Ste 200  
Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
Project No.: WBS# 35609.1.1

## Semivolatile Organic Compounds by GC/MS, method 625

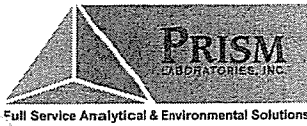
### Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
1,2,4-Trichlorobenzene	ND	10	<5	µg/L	Q13955
1,2-Dichlorobenzene	ND	10	<5	µg/L	Q13955
1,3-Dichlorobenzene	ND	10	<5	µg/L	Q13955
1,4-Dichlorobenzene	ND	10	<5	µg/L	Q13955
2,4,6-Trichlorophenol	ND	10	<5	µg/L	Q13955
2,4-Dichlorophenol	ND	10	<5	µg/L	Q13955
2,4-Dimethylphenol	ND	10	<5	µg/L	Q13955
2,4-Dinitrophenol	ND	50	<25	µg/L	Q13955
2,4-Dinitrotoluene	ND	10	<5	µg/L	Q13955
2,6-Dinitrotoluene	ND	10	<5	µg/L	Q13955
2-Chloronaphthalene	ND	10	<5	µg/L	Q13955
2-Chlorophenol	ND	10	<5	µg/L	Q13955
2-Nitrophenol	ND	10	<5	µg/L	Q13955
3,3'-Dichlorobenzidine	ND	50	<25	µg/L	Q13955
4,6-Dinitro-2-methylphenol	ND	50	<25	µg/L	Q13955
4-Bromophenylphenylether	ND	10	<5	µg/L	Q13955
4-Chloro-3-methylphenol	ND	10	<5	µg/L	Q13955
4-Chlorophenylphenylether	ND	10	<5	µg/L	Q13955
4-Nitrophenol	ND	50	<25	µg/L	Q13955
Acenaphthene	ND	10	<5	µg/L	Q13955
Acenaphthylene	ND	10	<5	µg/L	Q13955
Anthracene	ND	10	<5	µg/L	Q13955
Benzo(a)anthracene	ND	10	<5	µg/L	Q13955
Benzo(a)pyrene	ND	10	<5	µg/L	Q13955
Benzo(b)fluoranthene	ND	10	<5	µg/L	Q13955
Benzo(g,h,i)perylene	ND	10	<5	µg/L	Q13955
Benzo(k)fluoranthene	ND	10	<5	µg/L	Q13955
Bis(2-chloroethoxy)methane	ND	10	<5	µg/L	Q13955
Bis(2-chloroethyl)ether	ND	10	<5	µg/L	Q13955
Bis(2-chloroisopropyl)ether	ND	10	<5	µg/L	Q13955
Bis(2-ethylhexyl)phthalate	ND	10	<5	µg/L	Q13955
Butylbenzylphthalate	ND	10	<5	µg/L	Q13955
Chrysene	ND	10	<5	µg/L	Q13955
Di-n-butylphthalate	ND	10	<5	µg/L	Q13955
Di-n-octylphthalate	ND	10	<5	µg/L	Q13955
Dibenzo(a,h)anthracene	ND	10	<5	µg/L	Q13955
Diethylphthalate	ND	10	<5	µg/L	Q13955
Dimethylphthalate	ND	10	<5	µg/L	Q13955
Fluoranthene	ND	10	<5	µg/L	Q13955
Fluorene	ND	10	<5	µg/L	Q13955
Hexachlorobenzene	ND	10	<5	µg/L	Q13955
Hexachlorobutadiene	ND	10	<5	µg/L	Q13955

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NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735

# Level II QC Report

4/21/2006

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
 Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
 Project No.: WBS# 35609.1.1

## Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Hexachlorocyclopentadiene	ND	10	<5	µg/L	Q13955
Hexachloroethane	ND	10	<5	µg/L	Q13955
Indeno(1,2,3-cd)pyrene	ND	10	<5	µg/L	Q13955
Isophorone	ND	10	<5	µg/L	Q13955
N-Nitrosodi-n-propylamine	ND	10	<5	µg/L	Q13955
Naphthalene	ND	10	<5	µg/L	Q13955
Nitrobenzene	ND	10	<5	µg/L	Q13955
Pentachlorophenol	ND	10	<5	µg/L	Q13955
Phenanthrene	ND	10	<5	µg/L	Q13955
Phenol	ND	10	<5	µg/L	Q13955
Pyrene	ND	10	<5	µg/L	Q13955

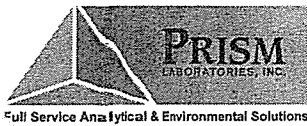
## Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
1,2,4-Trichlorobenzene	77.3	100	µg/L	77	44 - 142	Q13955
1,2-Dichlorobenzene	70.6	100	µg/L	71	32 - 129	Q13955
1,3-Dichlorobenzene	70.8	100	µg/L	71	20 - 124	Q13955
1,4-Dichlorobenzene	74.5	100	µg/L	74	20 - 124	Q13955
2,4,6-Trichlorophenol	79.6	100	µg/L	80	37 - 144	Q13955
2,4-Dichlorophenol	72.1	100	µg/L	72	39 - 135	Q13955
2,4-Dimethylphenol	71.9	100	µg/L	72	32 - 119	Q13955
2,4-Dinitrophenol	82.5	100	µg/L	83	10 - 191	Q13955
2,4-Dinitrotoluene	96.6	100	µg/L	97	39 - 139	Q13955
2,6-Dinitrotoluene	99.8	100	µg/L	100	50 - 158	Q13955
2-Chloronaphthalene	81.7	100	µg/L	82	60 - 118	Q13955
2-Chlorophenol	66.2	100	µg/L	66	23 - 134	Q13955
2-Nitrophenol	77.8	100	µg/L	78	29 - 182	Q13955
3,3'-Dichlorobenzidine	104	100	µg/L	104	10 - 262	Q13955
4,6-Dinitro-2-methylphenol	91.8	100	µg/L	92	10 - 181	Q13955
4-Bromophenylphenylether	84.0	100	µg/L	84	53 - 127	Q13955
4-Chloro-3-methylphenol	76.8	100	µg/L	77	22 - 147	Q13955
4-Chlorophenylphenylether	88.8	100	µg/L	89	25 - 158	Q13955
4-Nitrophenol	30.3	100	µg/L	30	10 - 132	Q13955
Acenaphthene	83.7	100	µg/L	84	47 - 145	Q13955
Acenaphthylene	84.7	100	µg/L	85	33 - 145	Q13955
Anthracene	86.2	100	µg/L	86	27 - 133	Q13955
Benzo(a)anthracene	93.1	100	µg/L	93	33 - 143	Q13955
Benzo(a)pyrene	92.5	100	µg/L	93	17 - 163	Q13955
Benzo(b)fluoranthene	104	100	µg/L	104	24 - 159	Q13955
Benzo(g,h,i)perylene	98.2	100	µg/L	98	10 - 219	Q13955
Benzo(k)fluoranthene	66.1	100	µg/L	66	11 - 162	Q13955
Bis(2-chloroethoxy)methane	77.9	100	µg/L	78	33 - 184	Q13955
Bis(2-chloroethyl)ether	72.1	100	µg/L	72	12 - 158	Q13955
Bis(2-chloroisopropyl)ether	77.9	100	µg/L	78	36 - 166	Q13955

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NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735

# Level II QC Report

4/21/2006

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
 Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
 Project No.: WBS# 35609.1.1

## Laboratory Control Sample

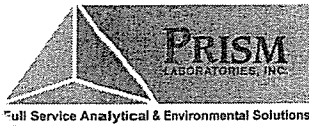
	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Bis(2-ethylhexyl)phthalate	96.2	100	µg/L	96	10 - 158	Q13955
Butylbenzylphthalate	95.0	100	µg/L	95	10 - 152	Q13955
Chrysene	85.1	100	µg/L	85	17 - 168	Q13955
Di-n-butylphthalate	92.2	100	µg/L	92	10 - 118	Q13955
Di-n-octylphthalate	98.4	100	µg/L	98	10 - 146	Q13955
Dibenzo(a,h)anthracene	94.3	100	µg/L	94	10 - 227	Q13955
Diethylphthalate	96.3	100	µg/L	96	10 - 114	Q13955
Dimethylphthalate	91.0	100	µg/L	91	10 - 112	Q13955
Fluoranthene	86.4	100	µg/L	86	26 - 137	Q13955
Fluorene	85.5	100	µg/L	85	59 - 121	Q13955
Hexachlorobenzene	86.1	100	µg/L	86	10 - 152	Q13955
Hexachlorobutadiene	77.2	100	µg/L	77	24 - 116	Q13955
Hexachlorocyclopentadiene	91.5	100	µg/L	91	32 - 103	Q13955
Hexachloroethane	68.6	100	µg/L	69	40 - 113	Q13955
Indeno(1,2,3-cd)pyrene	106	100	µg/L	106	10 - 171	Q13955
Isophorone	88.1	100	µg/L	88	21 - 196	Q13955
N-Nitrosodi-n-propylamine	83.1	100	µg/L	83	10 - 230	Q13955
Naphthalene	81.6	100	µg/L	82	21 - 133	Q13955
Nitrobenzene	83.9	100	µg/L	84	35 - 180	Q13955
Pentachlorophenol	99.3	100	µg/L	99	14 - 176	Q13955
Phenanthrene	87.9	100	µg/L	88	54 - 120	Q13955
Phenol	27.4	100	µg/L	27	10 - 112	Q13955
Pyrene	91.5	100	µg/L	91	52 - 115	Q13955

## Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
146738	1,2,4-Trichlorobenzene	144.176	196.08	µg/L	74	44 - 142	Q13955
	1,2-Dichlorobenzene	150.353	196.08	µg/L	77	32 - 129	Q13955
	1,3-Dichlorobenzene	150.353	196.08	µg/L	77	20 - 124	Q13955
	1,4-Dichlorobenzene	143.686	196.08	µg/L	73	20 - 124	Q13955
	2,4,6-Trichlorophenol	145.569	196.08	µg/L	74	37 - 144	Q13955
	2,4-Dichlorophenol	141.255	196.08	µg/L	72	39 - 135	Q13955
	2,4-Dimethylphenol	130.235	196.08	µg/L	66	32 - 119	Q13955
	2,4-Dinitrophenol	113.627	196.08	µg/L	58	10 - 191	Q13955
	2,4-Dinitrotoluene	179.588	196.08	µg/L	92	39 - 139	Q13955
	2,6-Dinitrotoluene	179.490	196.08	µg/L	92	50 - 158	Q13955
	2-Chloronaphthalene	151.549	196.08	µg/L	77	60 - 118	Q13955
	2-Chlorophenol	141.255	196.08	µg/L	72	23 - 134	Q13955
	2-Nitrophenol	143.216	196.08	µg/L	73	29 - 182	Q13955
	3,3'-Dichlorobenzidine	201.941	196.08	µg/L	103	10 - 262	Q13955
	4,6-Dinitro-2-methylphenol	167.059	196.08	µg/L	85	10 - 181	Q13955
	4-Bromophenylphenylether	156.627	196.08	µg/L	80	53 - 127	Q13955
	4-Chloro-3-methylphenol	148.667	196.08	µg/L	76	22 - 147	Q13955
	4-Chlorophenylphenylether	168.882	196.08	µg/L	86	25 - 158	Q13955

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NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735

# Level II QC Report

4/21/2006

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
 Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
 Project No.: WBS# 35609.1.1

## Matrix Spike

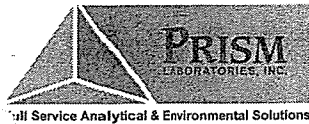
Sample ID:	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
4-Nitrophenol	73.569	196.08	µg/L	38	10 - 132	Q13955
Acenaphthene	167.039	196.08	µg/L	85	47 - 145	Q13955
Acenaphthylene	157.922	196.08	µg/L	81	33 - 145	Q13955
Anthracene	163.765	196.08	µg/L	84	27 - 133	Q13955
Benzo(a)anthracene	173.314	196.08	µg/L	88	33 - 143	Q13955
Benzo(a)pyrene	169.902	196.08	µg/L	87	17 - 163	Q13955
Benzo(b)fluoranthene	204.196	196.08	µg/L	104	24 - 159	Q13955
Benzo(g,h,i)perylene	172.353	196.08	µg/L	88	10 - 219	Q13955
Benzo(k)fluoranthene	137.569	196.08	µg/L	70	11 - 162	Q13955
Bis(2-chloroethoxy)methane	153.000	196.08	µg/L	78	33 - 184	Q13955
Bis(2-chloroethyl)ether	131.157	196.08	µg/L	67	12 - 158	Q13955
Bis(2-chloroisopropyl)ether	156.353	196.08	µg/L	80	36 - 166	Q13955
Bis(2-ethylhexyl)phthalate	182.235	196.08	µg/L	93	10 - 158	Q13955
Butylbenzylphthalate	184.353	196.08	µg/L	94	10 - 152	Q13955
Chrysene	164.667	196.08	µg/L	84	17 - 168	Q13955
Di-n-butylphthalate	167.863	196.08	µg/L	86	10 - 118	Q13955
Di-n-octylphthalate	183.784	196.08	µg/L	94	10 - 146	Q13955
Dibenzo(a,h)anthracene	175.824	196.08	µg/L	90	10 - 227	Q13955
Diethylphthalate	171.020	196.08	µg/L	87	10 - 114	Q13955
Dimethylphthalate	169.784	196.08	µg/L	87	10 - 112	Q13955
Fluoranthene	160.451	196.08	µg/L	82	26 - 137	Q13955
Fluorene	161.353	196.08	µg/L	82	59 - 121	Q13955
Hexachlorobenzene	163.137	196.08	µg/L	83	10 - 152	Q13955
Hexachlorobutadiene	139.529	196.08	µg/L	71	24 - 116	Q13955
Hexachlorocyclopentadiene	180.137	196.08	µg/L	92	48 - 94	Q13955
Hexachloroethane	140.686	196.08	µg/L	72	40 - 113	Q13955
Indeno(1,2,3-cd)pyrene	189.745	196.08	µg/L	97	10 - 171	Q13955
Isophorone	163.510	196.08	µg/L	83	21 - 196	Q13955
N-Nitrosodi-n-propylamine	165.314	196.08	µg/L	84	10 - 230	Q13955
Naphthalene	144.000	196.08	µg/L	73	21 - 133	Q13955
Nitrobenzene	197.725	196.08	µg/L	101	35 - 180	Q13955
Pentachlorophenol	179.275	196.08	µg/L	91	14 - 176	Q13955
Phenanthrene	171.039	196.08	µg/L	87	54 - 120	Q13955
Phenol	74.980	196.08	µg/L	38	10 - 112	Q13955
Pyrene	176.784	196.08	µg/L	90	52 - 115	Q13955

## Matrix Spike Duplicate

Sample ID:	Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID	
146738	1,2,4-Trichlorobenzene	150	196.08	µg/L	77	44 - 142	4	0 - 36	Q13955
	1,2-Dichlorobenzene	144	196.08	µg/L	73	32 - 129	4	0 - 38	Q13955
	1,3-Dichlorobenzene	148	196.08	µg/L	75	20 - 124	2	0 - 41	Q13955
	1,4-Dichlorobenzene	148	196.08	µg/L	75	20 - 124	3	0 - 36	Q13955
	2,4,6-Trichlorophenol	156	196.08	µg/L	80	37 - 144	7	0 - 30	Q13955
	2,4-Dichlorophenol	149	196.08	µg/L	76	39 - 135	5	0 - 31	Q13955

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NC Certification No. 402  
 SC Certification No. 99012  
 NC Drinking Water Cert. No. 37735

# Level II QC Report

4/21/2006

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
 c/o Environmental Investigations, Inc  
 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
 Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
 Project No.: WBS# 35609.1.1

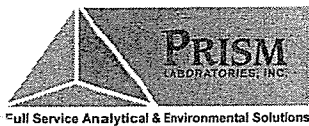
## Matrix Spike Duplicate

Sample ID:	Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
2,4-Dimethylphenol	140	196.08	µg/L	72	32 - 119	8	0 - 26	Q13955
2,4-Dinitrophenol	146	196.08	µg/L	74	10 - 191	25	0 - 30	Q13955
2,4-Dinitrotoluene	201	196.08	µg/L	102	39 - 139	11	0 - 29	Q13955
2,6-Dinitrotoluene	199	196.08	µg/L	101	50 - 158	10	0 - 15	Q13955
2-Chloronaphthalene	157	196.08	µg/L	80	60 - 118	3	0 - 21	Q13955
2-Chlorophenol	144	196.08	µg/L	74	23 - 134	2	0 - 35	Q13955
2-Nitrophenol	155	196.08	µg/L	79	29 - 182	8	0 - 34	Q13955
3,3'-Dichlorobenzidine	208	196.08	µg/L	106	10 - 262	3	0 - 50	Q13955
4,6-Dinitro-2-methylphenol	185	196.08	µg/L	94	10 - 181	10	0 - 19	Q13955
4-Bromophenylphenylether	160	196.08	µg/L	82	53 - 127	2	0 - 18	Q13955
4-Chloro-3-methylphenol	153	196.08	µg/L	78	22 - 147	3	0 - 33	Q13955
4-Chlorophenylphenylether	170	196.08	µg/L	87	25 - 158	0	0 - 19	Q13955
4-Nitrophenol	88.6	196.08	µg/L	45	10 - 132	19	0 - 50	Q13955
Acenaphthene	167	196.08	µg/L	85	47 - 145	0	0 - 20	Q13955
Acenaphthylene	164	196.08	µg/L	84	33 - 145	4	0 - 24	Q13955
Anthracene	173	196.08	µg/L	88	27 - 133	5	0 - 30	Q13955
Benzo(a)anthracene	188	196.08	µg/L	96	33 - 143	8	0 - 26	Q13955
Benzo(a)pyrene	187	196.08	µg/L	95	17 - 163	9	0 - 25	Q13955
Benzo(b)fluoranthene	203	196.08	µg/L	103	24 - 159	1	0 - 29	Q13955
Benzo(g,h,i)perylene	191	196.08	µg/L	97	10 - 219	10	0 - 27	Q13955
Benzo(k)fluoranthene	137	196.08	µg/L	70	11 - 162	0	0 - 11	Q13955
Bis(2-chloroethoxy)methane	153	196.08	µg/L	78	33 - 184	0	0 - 31	Q13955
Bis(2-chloroethyl)ether	148	196.08	µg/L	76	12 - 158	12	0 - 36	Q13955
Bis(2-chloroisopropyl)ether	159	196.08	µg/L	81	36 - 166	2	0 - 40	Q13955
Bis(2-ethylhexyl)phthalate	196	196.08	µg/L	100	10 - 158	7	0 - 17	Q13955
Butylbenzylphthalate	193	196.08	µg/L	98	10 - 152	4	0 - 15	Q13955
Chrysene	178	196.08	µg/L	91	17 - 168	8	0 - 25	Q13955
Di-n-butylphthalate	187	196.08	µg/L	95	10 - 118	11	0 - 27	Q13955
Di-n-octylphthalate	200	196.08	µg/L	102	10 - 146	8	0 - 17	Q13955
Dibenzo(a,h)anthracene	187	196.08	µg/L	95	10 - 227	6	0 - 28	Q13955
Diethylphthalate	193	196.08	µg/L	99	10 - 114	12	0 - 16	Q13955
Dimethylphthalate	174	196.08	µg/L	89	10 - 112	3	0 - 15	Q13955
Fluoranthene	174	196.08	µg/L	89	26 - 137	8	0 - 24	Q13955
Fluorene	174	196.08	µg/L	89	59 - 121	7	0 - 15	Q13955
Hexachlorobenzene	167	196.08	µg/L	85	10 - 152	3	0 - 18	Q13955
Hexachlorobutadiene	146	196.08	µg/L	75	24 - 116	5	0 - 34	Q13955
Hexachlorocyclopentadiene	184	196.08	µg/L	94	48 - 94	2	0 - 30	Q13955
Hexachloroethane	143	196.08	µg/L	73	40 - 113	1	0 - 38	Q13955
Indeno(1,2,3-cd)pyrene	211	196.08	µg/L	107	10 - 171	10	0 - 29	Q13955
Isophorone	173	196.08	µg/L	88	21 - 196	5	0 - 32	Q13955
N-Nitrosodi-n-propylamine	170	196.08	µg/L	87	10 - 230	3	0 - 36	Q13955
Naphthalene	155	196.08	µg/L	79	21 - 133	7	0 - 42	Q13955
Nitrobenzene	176	196.08	µg/L	90	35 - 180	11	0 - 25	Q13955
Pentachlorophenol	192	196.08	µg/L	98	14 - 176	7	0 - 21	Q13955

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NC Certification No. 402  
SC Certification No. 99012  
NC Drinking Water Cert. No. 37735

# Level II QC Report

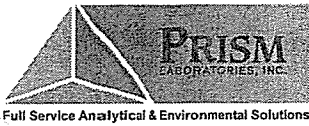
4/21/2006

N. C. Department of Transportation  
Attn: Bob Shaut/EI  
c/o Environmental Investigations, Inc  
2101 Gateway Centre Blvd. Ste 200  
Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
Project No.: WBS# 35609.1.1

## Matrix Spike Duplicate

Sample ID:	Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
Phenanthrene	171	196.08	µg/L	87	54 - 120	0	0 - 29	Q13955
Phenol	78.2	196.08	µg/L	40	10 - 112	4	0 - 39	Q13955
Pyrene	184	196.08	µg/L	94	52 - 115	4	0 - 15	Q13955



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4/21/2006

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Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
 Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
 Project No.: WBS# 35609.1.1

## Purgeable Aromatics by GC-PID, method 601/602

### Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
Benzene	ND	0.5	<0.25	µg/L	Q13957
Ethylbenzene	ND	1	<0.5	µg/L	Q13957
Isopropyl ether (IPE)	ND	5	<2.5	µg/L	Q13957
m,p-Xylenes	ND	2	<1	µg/L	Q13957
Methyl t-butyl ether (MTBE)	ND	5	<2.5	µg/L	Q13957
Naphthalene	ND	1	<0.5	µg/L	Q13957
o-Xylene	ND	1	<0.5	µg/L	Q13957
Toluene	ND	1	<0.5	µg/L	Q13957

### Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
Benzene	20.3	20	µg/L	102	39 - 150	Q13957
Ethylbenzene	22.0	20	µg/L	110	32 - 160	Q13957
Isopropyl ether (IPE)	21.5	20	µg/L	107	61 - 134	Q13957
m,p-Xylenes	44.7	40	µg/L	112	65 - 130	Q13957
Methyl t-butyl ether (MTBE)	20.7	20	µg/L	104	74 - 130	Q13957
Naphthalene	21.9	20	µg/L	110	60 - 136	Q13957
o-Xylene	19.1	20	µg/L	96	66 - 129	Q13957
Toluene	20.1	20	µg/L	101	46 - 148	Q13957

### Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
147050	Benzene	84.120	80	µg/L	105	39 - 150	Q13957
	Ethylbenzene	90.936	80	µg/L	114	32 - 160	Q13957
	Isopropyl ether (IPE)	86.336	80	µg/L	108	60 - 132	Q13957
	m,p-Xylenes	181.964	160	µg/L	114	65 - 130	Q13957
	Methyl t-butyl ether (MTBE)	81.364	80	µg/L	102	73 - 130	Q13957
	Naphthalene	86.764	80	µg/L	108	58 - 132	Q13957
	o-Xylene	77.924	80	µg/L	97	66 - 129	Q13957
	Toluene	82.036	80	µg/L	103	46 - 148	Q13957

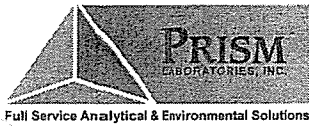
### Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
147050	Benzene	82.0	80	µg/L	102	39 - 150	3	0 - 12	Q13957
	Ethylbenzene	87.1	80	µg/L	109	32 - 160	4	0 - 15	Q13957
	Isopropyl ether (IPE)	85.9	80	µg/L	107	60 - 132	1	0 - 16	Q13957
	m,p-Xylenes	176	160	µg/L	110	65 - 130	3	0 - 21	Q13957
	Methyl t-butyl ether (MTBE)	82.2	80	µg/L	103	73 - 130	1	0 - 26	Q13957
	Naphthalene	86.9	80	µg/L	109	58 - 132	0	0 - 28	Q13957
	o-Xylene	74.8	80	µg/L	93	66 - 129	4	0 - 15	Q13957
	Toluene	79.8	80	µg/L	100	46 - 148	3	0 - 14	Q13957

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# Level II QC Report

4/21/2006

N. C. Department of Transportation  
 Attn: Bob Shaut/EI  
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 2101 Gateway Centre Blvd. Ste 200  
 Morrisville, NC 27560

Project Name: Burnsville, NC/Tip #R-2 COC Group Number: G0406108  
 Project ID: DOT-Parcel 42 Date/Time Submitted: 4/5/2006 12:45  
 Project No.: WBS# 35609.1.1

## Extractable Petroleum Hydrocarbons by GC-FID, method MADEP EPH

### Method Blank

	Result	RL	Control Limit	Units	QC Batch ID
C11-C22 Aromatics	ND	100	<50	µg/L	Q13970
C19-C36 Aliphatics	ND	100	<50	µg/L	Q13970
C9-C18 Aliphatics	ND	100	<50	µg/L	Q13970

### Laboratory Control Sample

	Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
C11-C22 Aromatics	1830	1700	µg/L	108	40 - 140	Q13970
C19-C36 Aliphatics	529	800	µg/L	66	40 - 140	Q13970
C9-C18 Aliphatics	386	600	µg/L	64	40 - 140	Q13970

### Matrix Spike

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	QC Batch ID
146849	C11-C22 Aromatics	1505.200	1700	µg/L	89	40 - 140	Q13970
	C19-C36 Aliphatics	683.800	800	µg/L	85	40 - 140	Q13970
	C9-C18 Aliphatics	470.600	600	µg/L	78	40 - 140	Q13970

### Matrix Spike Duplicate

Sample ID:		Result	Spike Amount	Units	Recovery %	Recovery Range %	RPD %	RPD Range %	QC Batch ID
146849	C11-C22 Aromatics	1330	1700	µg/L	78	40 - 140	12	0 - 50	Q13970
	C19-C36 Aliphatics	537	800	µg/L	67	40 - 140	24	0 - 50	Q13970
	C9-C18 Aliphatics	390	600	µg/L	65	40 - 140	19	0 - 50	Q13970

**VPH (Aliphatics/Aromatics) Laboratory Reporting Form**

Client Name: Environmental Investigations, Inc. Laboratory Name: Prism Laboratories, Inc.  
 Project Name: NCDOT Parcel 42 NC Certification # (Lab): 402  
 Site Location: Burnsville, NC Sample Matrix: Water

Sample Information and Analytical Results						
Method for Ranges: MADEP VPH						
VPH Surrogate Standards: Aliphatic - 2,5-Dibromotoluene / Aromatic - 2,5-Dibromotoluene						
Sample Identification:		146857	146858	NA	NA	NA
Collection Option (for soil*):		NA	Trip Blank			
Date Collected:		4/4/06	4/4/06			
Date Received:		4/5/06	4/5/06			
Date Extracted:		NA	NA			
Date Analyzed:		4/6/06	4/6/06			
% Dry Solids:		NA	NA			
Dilution Factor:		1	1			
Hydrocarbon Ranges in ug/L:		Sample Results	Sample Results	Sample Results	Sample Results	Sample Results
C5-C8 Aliphatics ***		<100	<100			
C9-C12 Aliphatics ***		<100	<100			
C9-C10 Aromatics **		<100	<100			
Blank:	C5-C8 Aliphatics	<100	<100	<100	<100	<100
	C9-C12 Aliphatics	<100	<100	<100	<100	<100
	C9-C10 Aromatics	<100	<100	<100	<100	<100
RL:	C5-C8 Aliphatics	100	100			
	C9-C12 Aliphatics	100	100			
	C9-C10 Aromatics	100	100			
MDL:	C5-C8 Aliphatics	50	50			
	C9-C12 Aliphatics	50	50			
	C9-C10 Aromatics	35	35			
Surrogate Acceptance Range:	Blank	70-130 %	70-130 %	70-130 %	70-130 %	70-130 %
Aliphatic Surrogate % Rec. - FID:	97	93	98			
Aromatic Surrogate % Rec. - PID:	75	72	73			

- \* Option 1 = Established fill line on vial
- \* Option 2 = Sampling device (indicate brand, e.g., EnCore TM)
- \* Option 3 = Field weight of soil

\*\* Unadjusted value - should exclude the concentration of any surrogate(s), internal standards and/or concentrations of other ranges that elute within the specified range.

\*\*\* Adjusted value

MDL = Method Detection Limit      RL = Reporting Limit      Blank = Laboratory Method Blank or Trip Blank  
 (whichever is higher - indicate type)

Were all performance/acceptance standards for required QA/QC procedures achieved?

<b>YES</b>	No - Details Attached
<b>NO</b>	Yes - Details Attached

Were any significant modifications to the VPH method made?

Comments:      VPH trip blank was not submitted to the laboratory.

**EPH (Aliphatics/Aromatics) Laboratory Reporting Form**

Client Name: Environmental Investigations, Inc. Laboratory Name: Prism Laboratories, Inc.  
 Project Name: NCDOT Parcel 42 NC Certification # (Lab): 402  
 Site Location: Burnsville, NC Sample Matrix: Water

Sample Information and Analytical Results						
Method for Ranges: MADEP EPH						
EPH Surrogate Standards: Aliphatic - 1-Chloro-octadecane / Aromatic - o-Terphenyl						
EPH Fractionation Surrogates: #1 - 2-Bromonaphthalene / #2 - Fluorobiphenyl						
Sample Identification:		146857	NA	NA	NA	NA
Date Collected:		4/4/06				
Date Received:		4/5/06				
Date Extracted:		4/10/06				
Date Analyzed:		4/19/06				
% Dry Solids:		NA				
Dilution Factor:		1				
Hydrocarbon Ranges in ug/L:		Sample Results	Sample Results	Sample Results	Sample Results	Sample Results
C9-C18 Aliphatics *		<100				
C19-C36 Aliphatics *		<100				
C11-C22 Aromatics **		<100				
Blank:	C9-C18 Aliphatics	<100	<100	<100	<100	<100
	C19-C36 Aliphatics	<100	<100	<100	<100	<100
	C11-C22 Aromatics	<100	<100	<100	<100	<100
RL:	C9-C18 Aliphatics	100				
	C19-C36 Aliphatics	100				
	C11-C22 Aromatics	100				
MDL:	C9-C18 Aliphatics	75				
	C19-C36 Aliphatics	31				
	C11-C22 Aromatics	71				
Surrogate Acceptance Range:	Blank	40-140 %	40-140 %	40-140 %	40-140 %	40-140 %
Aliphatic Surrogate % Rec.:	98	115				
Aromatic Surrogate % Rec.:	87	116				
Fractionation Surrogate Accep. Range:	Blank	40-140 %	40-140 %	40-140 %	40-140 %	40-140 %
Frac. Surrogate #1 % Rec.:	54	98				
Frac. Surrogate #2 % Rec.:	71	121				

\* Unadjusted value - should exclude the concentration of any surrogate(s), internal standards and/or concentrations of other ranges that elute within the specified range.

\*\* Adjusted value

MDL = Method Detection Limit      RL = Reporting Limit      Blank = Laboratory Method Blank

Were all performance/acceptance standards for required QA/QC procedures achieved?

**YES**      No - Details Attached

Was blank correction applied as a significant modification of the method?

Yes      **NO**

Were any significant modifications to the EPH method made?

**NO**      Yes - Details Attached

Comments:





Full Service Analytical & Environmental Solutions

449 Springbrook Road • P.O. Box 240543 • Charlotte, NC 28224-0543  
Phone: 704/529-6364 • Fax: 704/525-0409

Client Company Name: ET  
Report To/Contact Name: Bob Shoyt  
Reporting Address: Morrisville, NC

Phone: 704/527-1500 Fax (Res) (No):  
Email (Res) (No) Email Address:  
EDD Type: Parcel Other 42  
Site Location Name: Parcel 42  
Site Location Physical Address: Berns Valley, NC

# CHAIN OF CUSTODY RECORD

PAGE 1 OF 1 QUOTE # TO ENSURE PROPER BILLING:

Project Name: NC DOT  
Short Hold Analysis: (Yes) (No) UST Project: (Yes) (No)  
\*Please ATTACH any project specific reporting (QC LEVEL I II III IV) provisions and/or QC Requirements.  
Invoice To: NC DOT

Address: WBS Element 35609.1.1  
Purchase Order No./Billing Reference Tip # R-2519A  
Requested Due Date  1 Day  2 Days  3 Days  4 Days  5 Days  
"Working Days"  6-9 Days  Standard 10 days  
Samples received after 15:00 will be processed next business day.  
Turnaround time is based on business days, excluding weekends and holidays.  
(SEE REVERSE FOR TERMS & CONDITIONS REGARDING SERVICES RENDERED BY PRISM LABORATORIES, INC. TO CLIENT)

## LAB USE ONLY

Samples: INTACT upon arrival? YES NO N/A  
Received ON WET ICE? Temp 1.90  
PROPER PRESERVATIVES indicated?  
Received WITHIN HOLDING TIMES?  
CUSTODY SEALS INTACT?  
VOLATILES rec'd W/OUT HEADSPACE?  
PROPER CONTAINERS used?

TO BE FILLED IN BY CLIENT/SAMPLING PERSONNEL

Certification: NELAC USACE FL NC

SC OTHER N/A

Water Chlorinated: YES NO   
Sample Iced Upon Collection: YES  NO

CLIENT SAMPLE DESCRIPTION	DATE COLLECTED	TIME COLLECTED MILITARY HOURS	MATRIX (SOIL, WATER OR SLUDGE)	SAMPLE CONTAINER		PRESERVATIVES	ANALYSES REQUESTED	REMARKS	PRISM LAB ID NO.
				*TYPE SEE BELOW	NO. SIZE				
W-1	4/4	1230	W				ANALYSES REQUESTED: <u>COPPER</u>	BN on by per B. Shoyt 10/4/06	146857
								TB VPH	146858

PRESS DOWN FIRMLY - 3 COPIES

PRISM USE ONLY  
Site Arrival Time:  
Site Departure Time:  
Field Tech Fee:  
Mileage:

Additional Comments:

Only rec'd  
1 x 625 7-1 x EPA

(42)

Upon relinquishing, this Chain of Custody is your authorization for Prism to proceed with the analyses as requested above. Any changes must be submitted in writing to the Prism Project Manager. There will be charges for any changes after analyses have been initialized.

Relinquished By: (Signature) [Signature] Date 4/5/06 Military/Hours 12:45  
Received By: (Signature) [Signature] Date 4/5/06 Log-in Group No. G040610B

Relinquished By: (Signature) [Signature] Date 4/5/06 Military/Hours 12:45  
Received By: (Signature) [Signature] Date 4/5/06 Log-in Group No. G040610B

Method of Shipment: NOTE: ALL SAMPLE COOLERS SHOULD BE TAPED SHUT WITH CUSTODY SEALS FOR TRANSPORTATION TO THE LABORATORY. SAMPLES ARE NOT ACCEPTED AND VERIFIED AGAINST COC UNTIL RECEIVED AT THE LABORATORY.  
 Fed Ex  UPS  Hand-delivered  Prism Field Service  Other

NPDES:  NC  SC  NC  SC  NC  SC  NC  SC  NC  SC  NC  SC

USE:  GROUNDWATER:  NC  SC  NC  SC  NC  SC  NC  SC  NC  SC

DRINKING WATER:  NC  SC  NC  SC  NC  SC  NC  SC

SOLID WASTE:  NC  SC  NC  SC  NC  SC

CERCLA:  NC  SC  NC  SC  NC  SC

RCRA:  NC  SC  NC  SC  NC  SC

LANDFILL:  NC  SC  NC  SC  NC  SC

OTHER:  NC  SC  NC  SC

SEE REVERSE FOR TERMS & CONDITIONS

**APPENDIX E**  
**GEOPHYSICAL REPORT**

May 8, 2006

Mr. Robert M. Shaut  
EI, Inc.  
2101 Gateway Centre Boulevard, Suite 200  
Morrisville, NC 27560

Via email (pdf)

RE: State Project: R-2519A, WBS Element 35609.1.1, Yancey County  
US 19E from east of SR 1336 (Jacks Creek Road) to SR 1186 (Old US 19)

SUBJECT: Report on Geophysical Surveys for Locating Possible UST's on 14 Parcels  
Schnabel Engineering Project No. 05211014.01-07

Dear Mr. Shaut:

This letter contains our report on the geophysical surveys we conducted on the subject properties.  
This letter report includes one 8.5x11 color figure and thirty-two 11x17 color figures.

## 1.0 INTRODUCTION

The work described in this report was conducted by Schnabel Engineering under our contract with the NCDOT. The work was conducted at the locations indicated by EI to support their environmental assessment of the subject parcels. The purpose of the geophysical surveys was to locate possible metal underground storage tanks (UST's) and associated metal product lines in the accessible areas of the sites.

Schnabel Engineering conducted geophysical surveys on March 13 through 17, 2006, in the accessible areas of the proposed right-of-way (ROW) sections of the parcels: 040, 042, 088, 099, 114, 115, 117, 134, 144, 167, 177, 194, 196 and 214. Photographs of these properties are included on Figures 1 through 4. Photographs of UST locations as marked in the field are included on Figure

5.

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 were conducted using a Geophysical Survey Systems SIR-2000 system equipped with a 400 MHz antenna. A Fisher Gemini-3 was used in the conduction mode to trace exposed vent pipes and product lines. Photographs of these instruments are shown in Figure 6.

## **2.0 FIELD METHODOLOGY**

### **2.1 Location Control**

Locations of geophysical data points and site features were obtained using a sub-meter Trimble Pro-XRS DGPS system on Parcels 40, 42, 88, 99, 114, 115, 117, 134, 144, 167, 177, 194, and 214. An X-Y survey grid was set up on Parcel 196. References to direction and location in this report for Parcel 196 are based on this local site grid. References to direction and location in this report for Parcels 40, 42, 88, 99, 114, 115, 117, 134, 144, 167, 177, 194, and 214 are based on the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 83 datum, with units in meters. The locations of existing site features (building, curbs, signs, etc.) were recorded for later correlation with the geophysical data and for location references to the NCDOT drawings.

### **2.2 Data Collection**

The EM61 data were collected in the accessible portions of the parcels along parallel survey lines spaced approximately one meter 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-half to one meter apart in orthogonal directions over areas of reinforced concrete and over anomalous EM readings not attributed to cultural features. The GPR

data were reviewed in the field to evaluate the possible presence of USTs. The GPR data also were recorded digitally and later transferred to a desktop computer for further review.

Preliminary results were sent to Bob Shaut of EI on March 20, 2006.

### **3.0 DISCUSSION OF RESULTS**

The contoured EM61 data are shown on Figures 7 through 34. The EM61 early time gate results are plotted on Figures 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, and 33. The early time gate data provide the most sensitive detection of metal object targets, regardless of size. Figures 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, and 32 show 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 USTs.

#### **3.1 Parcel 040 - Andrew E. Brown Property (Andy's, Inc.)**

The parcel owned by Andrew E. Brown is located approximately 61 meters east of NCSR 1375 on the north side of US Highway 19E. The EM61 results are shown on Figure 7 (early time gate) and Figure 8 (differential). Two vehicles could not be moved at the time of our surveys. The early time gate results show anomalies probably due to reinforced concrete, several small anomalies probably caused by insignificant buried metal objects, several anomalies caused by known site features, and a large linear anomaly probably caused by a buried utility. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were conducted over three areas of reinforced concrete. The GPR data did not indicate the presence of USTs in the areas surveyed.

#### **3.2 Parcel 042 - Danny Hensley Property (Burnsville Independent)**

The parcel owned by Danny Hensley is located approximately 244 meters to the east of NCSR 1196

on the south side of US Highway 19E. The EM61 results are shown on Figure 9 (early time gate) and Figure 10 (differential). Several vehicles and trailers could not be moved at the time of our surveys. The early time gate results show several small anomalies probably caused by insignificant buried metal objects, and several anomalies caused by known site features. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were not conducted on the site.

### **3.3 Parcel 088 - Bill Riddle Property (Riddle Fuel Oil Company)**

The parcel owned by Bill Riddle is located approximately 488 meters to the west of NC Highway 197 on the north side of US Highway 19E. The EM61 results are shown on Figure 11 (early time gate) and Figure 12 (differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, linear anomalies probably caused by buried utilities, two linear anomalies probably caused by buried metal culverts, and several anomalies caused by known site features. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were not conducted on the site.

### **3.4 Parcel 099 - Charles Dellinger Property (Texaco)**

The parcel owned by Charles Dellinger is located at the southwestern quadrant of the intersection of US Highway 19E and NC 197. The EM61 results are shown on Figure 13 (early time gate) and Figure 14 (differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, linear anomalies probably caused by buried utilities, and several anomalies caused by known site features. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were not conducted on the site.

### **3.5 Parcel 114 - Arlene Ray, Inc. Property (Burnsville Gas, Inc.)**

The parcel owned by Arlene Ray, Inc. is located at the southwest quadrant of US Highway 19E and NCSR 1140. The EM61 results are shown on Figure 15 (early time gate) and Figure 16

(differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, three linear anomalies probably caused by buried metal culverts, an anomaly probably caused by reinforced concrete, and several anomalies caused by known site features. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were conducted to investigate the reinforced concrete. The GPR data did not indicate the presence of USTs in the areas surveyed.

### **3.6 Parcel 115 - Tom Morgan Property (Convenience King 22)**

The parcel owned by Tom Morgan is located at the intersection of Main Street and US Highway 19E. The EM61 results are shown on Figure 17 (early time gate) and Figure 18 (differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, several anomalies probably caused by buried metal culverts, and several anomalies caused by known site features. Some of the observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were conducted to investigate several EM61 differential anomalies on the site. The GPR data did not indicate the presence of USTs in the areas surveyed.

### **3.7 Parcel 117 - Samuel S. Styles Property (Former Sam's Oil Company)**

The parcel owned by Samuel S. Styles is located on the north side of US 19 East Business (East Main Street) just west of SR 1436. The EM61 results are shown on Figure 19 (early time gate) and Figure 20 (differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, an anomaly probably caused by a buried metal culvert, and several anomalies caused by known site features. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were conducted to investigate several EM61 differential anomalies on the site. GPR surveys were not conducted behind the building in the area of the observed fill port because of the presence of large metallic obstructions and debris, and because this area was not within the intended survey area indicated by EI. The GPR data did not indicate the presence of USTs in the areas surveyed. The Gemini-3 was used in the

conduction mode in an attempt to trace out the extent of the vent pipe on the east side of the building. A signal was not detected, which suggests the vent pipe either does not extend very far under the surface beyond the exposed section, or the vent pipe extends beneath the building. A signal would have been detected if the vent pipe connected directly to a UST next to the building.

### **3.8 Parcel 134 - Keith Presnell Property (Austin Automotive)**

The parcel owned by Keith Presnell is located at the northeast quadrant of the intersection of US Highway 19E and NCSR 1329. The EM61 results are shown on Figure 21 (early time gate) and Figure 22 (differential). Several vehicles and trailers could not be moved at the time of our surveys. The early time gate results show several small anomalies probably caused by insignificant buried metal objects, linear anomalies probably caused by utilities, and several anomalies caused by known site features. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were not conducted on the site.

### **3.9 Parcel 144 - Peggy Jones Property (Prives & Perches)**

The parcel owned by Peggy Jones is located approximately 305 meters west of NCSR 1141 on the south side of US Highway 19E. The EM61 results are shown on Figure 23 (early time gate) and Figure 25 (differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, two linear anomalies probably caused by buried metal culverts, an anomaly probably caused by a partially buried metal conduit pipe, and several anomalies caused by known site features. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were not conducted on the site. The Gemini-3 was used in the conduction mode to trace out the extent of the metal conduit pipe that was visible in the area of the former pump island, which was then marked out on the ground surface. The conduit pipe was traced to the front of the building, and the owner of the property informed our representative that on the wall inside the building a switch existed that was used to turn the pump off and on. The owner also informed our representative that the USTs and product lines were removed at the same time as the pump island, but the conduit pipe for the electrical was left in place.



### **3.10 Parcel 167 - Edd Cassida Property (Edd's Independent Station)**

The parcel owned by Edd Cassida is located at the southwest quadrant of the intersection of US Highway 19E and NCSR 1142. The EM61 results are shown on Figure 25 (early time gate) and Figure 26 (differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, two linear anomalies probably caused by buried metal culverts, and several anomalies caused by known site features. The observed anomalies not attributed to known site features are removed in the differential data set. GPR surveys were not conducted on the site.

### **3.11 Parcel 177 - Johnnie Bennett Property (Former BP Gas Station)**

The parcel owned by Johnnie Bennett is located at the southwest quadrant of the intersection of US Highway 19E and NCSR 1143. The EM61 results are shown on Figure 27 (early time gate) and Figure 28 (differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, an anomaly probably caused by reinforced concrete, and several anomalies caused by known site features. The observed anomalies not attributed to known cultural features are removed in the differential data set. GPR surveys were conducted to investigate the reinforced concrete. The GPR data did not indicate the presence of USTs in the areas surveyed.

### **3.12 Parcel 194 - William Ira Young Property (Former Gas Station)**

The parcel owned by William Ira Young is located at the northwest quadrant of the intersection of SR 1323 and US Highway 19E. The EM61 results are shown on Figure 29 (early time gate) and Figure 30 (differential). Three site visits were required in order to survey the areas of concern because the site owner could only move obstructing trailers around at specific times. The early time gate results show several small anomalies probably caused by insignificant buried metal objects, an anomaly probably caused by a buried metal culvert, a linear anomaly probably caused by a buried utility, vent pipe line, or product line, and several anomalies caused by known site features. Some of

the observed anomalies not attributed to known site features are removed in the differential data set. Information provided by EI indicated a vent pipe at the southwest corner of the building, and three fill ports located southwest of the building. These features could not be located at the time of our surveys. GPR surveys were conducted to investigate the linear anomaly extending from the southwest corner of the building, as well as the areas occupied by trailers to the southwest of the building. The GPR data indicated the presence of one probable UST as shown on Figures 29 and 30, which was marked out on the ground surface as shown on Figure 5. The GPR data indicate that the UST is approximately 1.0 meter in diameter and about 1.5 meters in length, with an approximate capacity of 1100-1200 liters. It appears to be buried 1.0 to 1.5 meters below the ground surface.

### **3.13 Parcel 196 - Ed Gouge Property (Heritage Tire)**

The parcel owned by Ed Gouge is located on the south side of US Highway 19E approximately 60 meters east of SR 1144. A local X-Y site grid was laid out for positioning of the geophysical surveys at this parcel because the steep valley walls at this location did not allow enough satellite visuals to provide a reliable GPS signal to be used for positioning. The EM61 results are shown on Figure 31 (early time gate) and Figure 32 (differential). The early time gate results show several small anomalies probably caused by insignificant buried metal objects, an anomaly probably caused by a buried metal culvert, and several anomalies caused by known site features. Some of the observed anomalies not attributed to known cultural features are removed in the differential data set. GPR surveys were conducted to investigate three EM61 differential anomalies on the site. The GPR data did not indicate the presence of USTs in the areas surveyed.

### **3.14 Parcel 214 - Charles R. Dellinger**

The parcel owned by Charles Dellinger is located at the southwest corner of the intersection of US Highway 19E and SR 1146 (Cane Bridge Road). The EM61 results are shown on Figure 33 (early time gate). A malfunction with the top coil of the EM61 caused it to record random erroneous data, which influenced the differential data set. The differential data set was not used and has not been included in this report. The early time gate results show several small anomalies probably caused by

insignificant buried metal objects, an anomaly probably caused by a reinforced concrete bridge, and several anomalies caused by known site features. GPR surveys were conducted to investigate two EM61 early time gate anomalies on the site. The GPR data did not indicate the presence of USTs in the areas surveyed.

#### **4.0 CONCLUSIONS**

Our evaluation of the geophysical data collected on 14 Parcels on State Project R-2519A in Yancey County, NC indicate the following:


- The geophysical data indicate the presence of one possible UST on parcel 194. The possible UST is about 1.0 meter in diameter and about 1.5 meters in length, with an approximate capacity of 1100 to 1200 liters.
- The geophysical data do not indicate the presence USTs in the areas surveyed on parcels 040, 042, 088, 099, 114, 115, 117, 134, 144, 167, 177, 196, and 214.

#### **5.0 LIMITATIONS**

These services have been performed and this report prepared for 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.

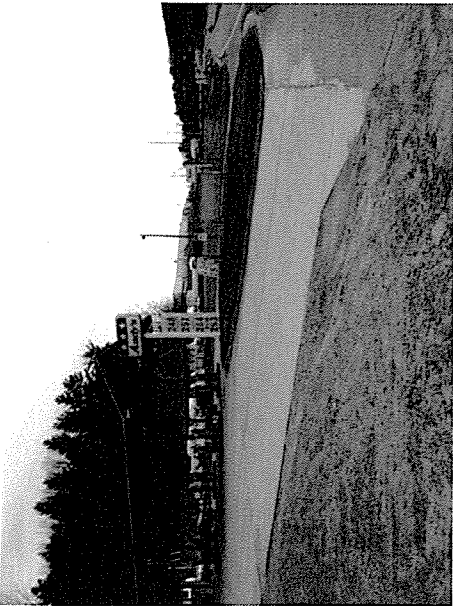
Thank you for the opportunity to serve you on this project. Please call if you need additional information or have any questions.

Sincerely,

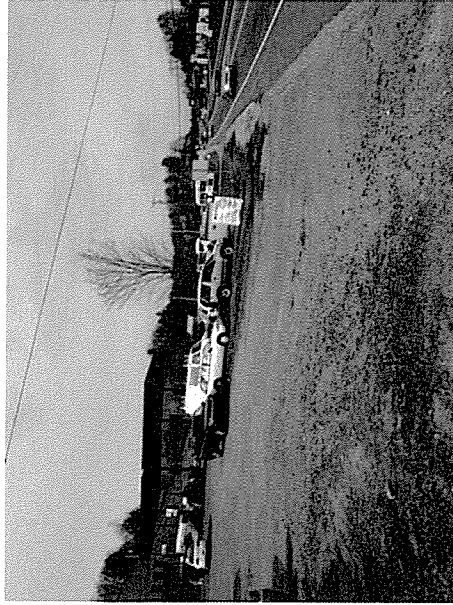


Jeremy S. Strohmeyer, L.G.  
Project Manager

JS/RC  
Attachment: Figures (1-33)



Parcel 040 - Andrew E. Brown Property, looking northeast



Parcel 042 - Danny Hensley Property, looking southwest



Parcel 088 - Bill Riddle Property, looking northeast



Parcel 099 - Charles Delinger Property, looking southwest

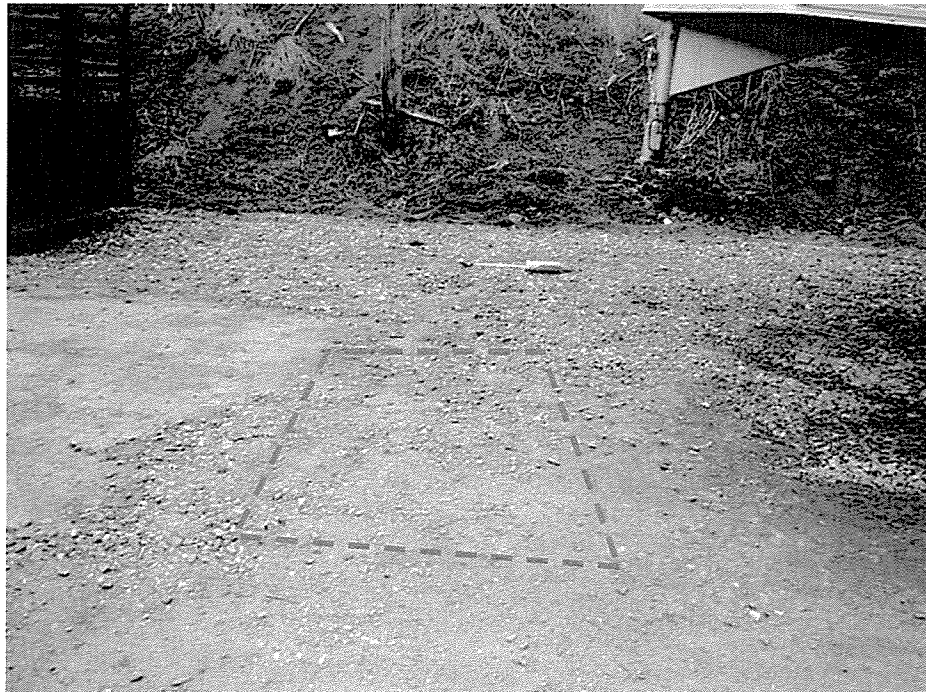


NC Department of Transportation  
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 State Project No. R-2519A  
 Yancey County, North Carolina

**SITE PHOTOS**



Location of possible UST as marked on site, looking northeast



Location of possible UST as marked on site, looking west

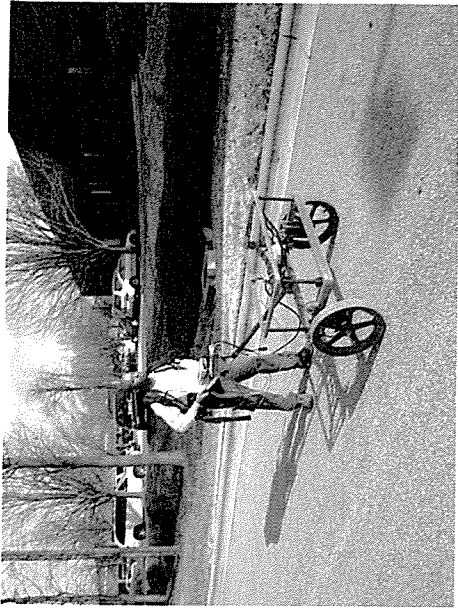


NC Department of Transportation  
Geotechnical Engineering Unit

State Project No. R-2519A  
Yancey County, North Carolina

**PHOTOS OF  
POSSIBLE UST  
LOCATION**

FIGURE 5



Geonics EM61-MK2



Geophysical Survey Systems SIR-2000 with 400 MHz antenna



Fisher Gemini-3 used in conduction mode

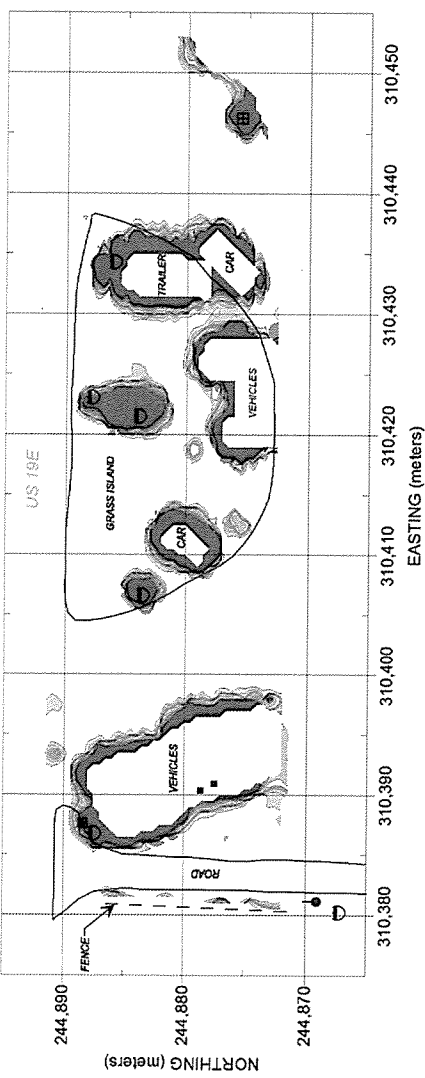


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State Project No. R-2519A  
Yancey County, North Carolina

PHOTOS OF  
GEOPHYSICAL  
EQUIPMENT

FIGURE 6



**EXPLANATION**

EM61 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART

STORM/WATER INLET/OUTLET

SIGN

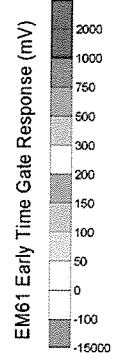
UTILITY

METALLIC OBJECT

RIGHT-OF-WAY MARKER

UTILITY POLE

GPR SURVEY AREA



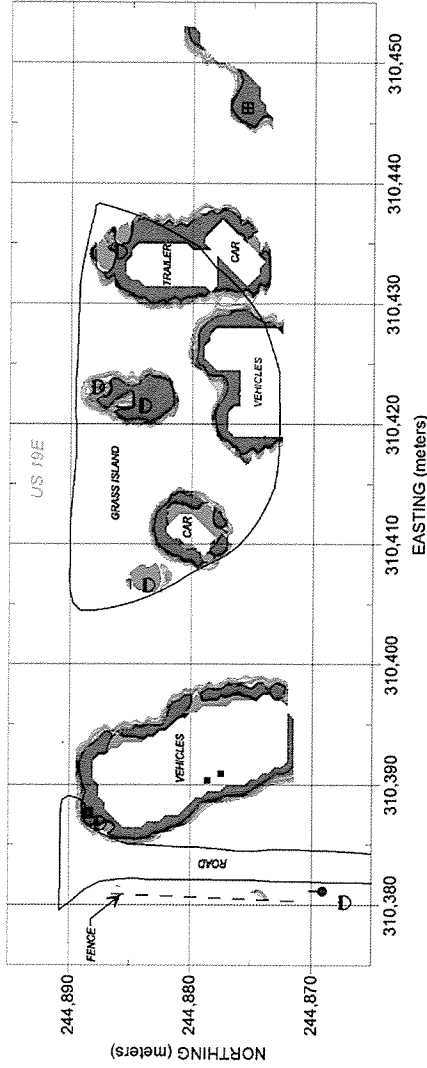
Note: The contour plot shows the earliest and most sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on March 14, 2006, using a Geonics EM61-MK2 instrument. Positioning for EM61 survey provided using a submeter Trimble ProXR5 DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum.



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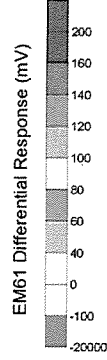
**PARCEL 42**  
**EM61 EARLY TIME**  
**GATE RESPONSE**





**EXPLANATION**

[Symbol]	EM61 SURVEY AREA - DATA ACQUIRED ALONG PARALLEL SURVEY LINES SPACED APPROXIMATELY 2.5 FEET APART
[Symbol]	STORM/WATER INLET/OUTLET
[Symbol]	SIGN
[Symbol]	UTILITY
[Symbol]	METALLIC OBJECT
[Symbol]	RIGHT-OF-WAY MARKER
[Symbol]	UTILITY POLE
[Symbol]	GPR SURVEY AREA



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 pipes and tanks. The EM data were collected on March 14, 2006, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey provided using a submeter Trimble ProXR5 DGPS system. Coordinates are in the US State Plane System, North Carolina 3200 Zone, using the NAD 1983 datum.



NC Department of Transportation  
Geotechnical Engineering Unit  
State Project No. R-2519A  
Yancey County, North Carolina

**PARCEL 42  
EM61 DIFFERENTIAL  
RESPONSE**

FIGURE 10