Preliminary Site Assessment Report
Tsoumbos Aristotelis Property

Parcel 202
Durham
Durham County, North Carolina

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

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Tsoumbos Aristotelis Property Parcel #202
Durham, Durham County, North Carolina
H&H Project ROW-416

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Preliminary Site Assessment Report
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Durham, Durham County, North Carolina
H&H Project ROW-416

1.0 Introduction

Hart & Hickman, PC (H&H) has prepared this Preliminary Site Assessment (PSA) report documenting assessment activities performed at the Tsoumbos Aristotelis property (Parcel 202) located at 951 S. Miami Blvd in Durham, Durham County, North Carolina (NC). This assessment was conducted on behalf of the NC Department of Transportation (NC DOT) in accordance with H&H's May 8, 2013 proposal.

The purpose of this assessment was to collect data to evaluate the potential for underground storage tank (UST) systems and the presence or absence of impacted soil in proposed right-of-way and construction easement areas on the subject property related to the proposed widening of US Highway 70 (State Project U-0071). The Parcel 202 property currently operates as Tellis Foreign Auto Repair. Because the Parcel 202 property is a potential total take, PSA activities were conducted on the entire property. A site location map is included as Figure 1, and a site map is presented as Figure 2. The NC DOT preliminary plan of the US Highway 70 widening area near the Parcel 202 property is attached as Appendix A.

H&H reviewed UST incident files for the Parcel 202 property at the NC Department of Environment and Natural Resources (DENR) Raleigh and Central Offices to better target UST system areas and to find locations of previously reported impacts. Based on the EMS Environmental, Inc (EMS) *Underground Storage Tank Closure Report* dated April 20, 1994, four 3,000-gallon gasoline USTs were removed from the site in March 1994. Prior to UST removals, five soil borings were advanced near the UST basin and the associated dispenser island. No target petroleum constituents were detected in the soil samples collected. In addition, no target petroleum constituents were detected in the soil samples collected beneath the four USTs, and associated piping and dispenser island during the UST closure activities. The former UST system was located within the NC DOT proposed right-of-way and construction easement areas on the Parcel 202

property. Based on results of the UST closure activities, DENR issued a letter indicating no further action status for the site on July 29, 1996.

Excel Civil & Environmental Associates, PLLC (Excel) is providing environmental consulting services for groundwater remediation on the property to the south. Excel's *Active Remediation Monitoring Report (ARMR)* dated January 18, 2013 was prepared for ongoing remediation activities at the adjacent property (Parcel 205). One monitoring well (MW-21) associated with the release at Parcel 205 is located on the subject Parcel 202 property. The monitoring well was observed during PSA activities; however, it was under a car. The well is located within the NC DOT proposed right of way and construction easement area. The estimated well location is shown on Figure 2.

Copies of the EMS *Underground Storage Tank Closure Report*, the DENR no further action letter, and Excel's ARMR Figure 2 are included in Appendix B.

The PSA activities conducted by H&H on the Parcel 202 property are discussed below.

2.0 Site Assessment

Soil Assessment Field Activities

H&H mobilized to the Parcel 202 property on July 9 and 10, 2013 and advanced 15 soil borings (202-1 through 202-15) by direct push technology (DPT). Prior to advancing the soil borings, H&H reviewed the results of a geophysical survey performed at the subject site by Schnabel Engineering (Schnabel) in June 2013. Schnabel utilized electromagnetic (EM) induction technology and ground penetrating radar (GPR) to identify potential geophysical anomalies and potential USTs at the site. The EM results indicated the presence of anomalies attributed to buried utilities, small pieces of metal, metal structures at the ground surface (signs, guy wires, reinforced concrete, etc.), and anomalies due to unknown causes. Follow up with GPR indicated the presence of a possible UST located to the south of the site building outside of the proposed NC DOT proposed right of way and construction easement areas. The probable UST appears to be buried approximately 1 to 2 ft below ground surface (bgs) and is approximately 7.5 ft long and 3.5 ft in diameter with an estimated

capacity of 560 gallons. Schnabel's report, including a site map depicting the results of the EM and GPR survey, is provided in Appendix C.

Prior to conducting soil borings, utilities were marked by NC One Call and a private utility locator. Borings were also cleared to a five foot depth by hand auger. H&H utilized Probe Technology, Inc. (PTI) of Concord, North Carolina to advance the soil borings (Figure 2). During soil sampling activities, H&H attempted to advance all borings to a total depth of 12 ft bgs. Hand auger and/or DPT refusal was encountered at 5 ft bgs to 11 ft bgs in soil borings 202-2, 202-4, 202-5, 202-11, and 202-12. To facilitate the selection of soil samples for laboratory analysis, soil from each boring was screened continuously for the presence of volatile organic compounds (VOCs) with an organic vapor analyzer (OVA). Additionally, H&H observed the soil for visual and olfactory indications of petroleum impacts. During soil screening, there were low level indications of potential impacts in boring 202-1. There were no significant indications of potential impacts in soil borings 202-2 through 202-15. Soil samples were collected at depths ranging from 0 to 1 ft bgs to 5 to 6 ft bgs from the soil boring locations. Soil boring logs are included in Appendix D.

Soil borings 202-1 and 202-3 were advanced near the former dispenser island located in the northwest portion of the property. Soil boring 202-4 was advanced near a floor drain and a hydraulic lift located within the garage in the western portion of the site building. Soil borings 202-2 and 202-5 were advanced near the former UST basin located on the southern side of the site building. Soil boring 202-6 was advanced near a septic tank. Soil borings 202-7 and 202-8 were advanced near the possible UST located to the south of the site building. Soil borings 202-9 and 202-10 were advanced adjacent to the eastern portion of the building near heavily stained concrete and asphalt. Soil borings 202-11 through 202-13 were advanced in the asphalt parking area in the southern portion of the property. Soil boring 202-14 was advanced near two above ground storage tanks located on the northern side of the site building, and soil boring 202-15 was advanced near discarded drums located adjacent to the northeastern corner of the site building. GPS coordinate data for soil borings are included in Table 1.

H&H submitted a total of 15 soil samples (202-1 through 202-15) for laboratory analysis. Samples were sent to Pace Analytical Services, Inc. using standard chain-of-custody protocol for analysis of total petroleum hydrocarbons (TPH) as gasoline-range organics (GRO) and diesel-range organics (DRO) by EPA Method 8015. Sample depths and analytical results are summarized in Table 2. Laboratory analytical data sheets for the Parcel 202 soil samples and chain-of-custody documentation are provided in Appendix E. The analytical results are discussed below.

3.0 Analytical Results

Widespread TPH DRO impacts were detected on Parcel 202. TPH DRO was detected in 9 of the 15 soil samples collected from Parcel 202. Concentrations of TPH DRO (up to 333 mg/kg) were detected in soil samples 202-4, 202-5 and 202-9 through 202-13 above the DENR Action Level of 10 milligrams per kilogram (mg/kg). Concentrations of TPH DRO (7.8 mg/kg and 5.9 mg/kg) were detected in soil samples 202-2 and 202-15 below the DENR Action Level. No TPH GRO concentrations were detected above the laboratory detections limits in soil samples 202-1 through 202-15.

- H&H estimates that there are roughly 80 cubic yards (120 tons) of petroleum impacted soil between 2 ft and 8 ft near the hydraulic lift and the floor drain in the garage area near soil boring 202-4.
- There are roughly 200 cubic yards (300 tons) of petroleum impacted soil between the surface and 4 ft near the eastern corner of the site building near soil borings 202-9 and 202-10.
- There are roughly 100 cubic yards (150 tons) of petroleum impacted soil below the DENR Action Level between the surface and 4 ft near the former UST basin near soil boring 202-2.
- There are roughly 800 cubic yards (1,200 tons) of petroleum impacted soil between the surface and 4 ft near the former UST basin and in the asphalt parking area in the southern portion of the property near soil borings 202-5 and 202-11through 202-13.
- There are roughly 30 cubic yards (45 tons) of petroleum impacted soil below the DENR Action Level between the surface and 2 ft near the discarded drums in the northeast corner of the property near soil boring 202-15.

The estimated depth of impacted soils is based on field screening results. However, field screening and lab results did not provide information that defines the impacted soil interval or extent in most locations. Therefore, impacts may extend beyond the depths and amounts indicated above. Although the TPH DRO impacts are below the Action Level near borings 202-2 and 202-15, these soils should also be managed as impacted if they are disturbed or excavated by site work. The approximate areas of petroleum impacted soils are shown on Figure 2.

4.0 Summary and Regulatory Considerations

H&H has reviewed DENR incident files, geophysical survey results, and analytical results of soil samples collected at the Parcel 202 property. Review of DENR files indicate that four 3,000-gallon gasoline USTs were removed from the site in March 1994. Based on UST closure soil sample analytical results, DENR issued a no further action status for the site in July 1996. The former UST system was located within the proposed NC DOT right of way and construction easement areas. Based on GPR survey, one possible UST was identified to the south of the site building, to the northeast and outside of the proposed utility easement. One existing below-ground hydraulic lift was identified in the garage area in the western portion of the site building. The lift likely has a below grade reservoir of hydraulic fluid. One monitoring well is located within the proposed right of way and construction easement in the southern portion of the property.

Widespread TPH DRO impacts were detected on Parcel 202. Analytical results of soil samples collected by H&H indicate TPH DRO in 9 of 15 soil samples collected on Parcel 202.

- H&H estimates that there are roughly 80 cubic yards (120 tons) of petroleum impacted soil between 2 ft and 8 ft near the hydraulic lift and the floor drain in the garage area near soil boring 202-4.
- There are roughly 200 cubic yards (300 tons) of petroleum impacted soil between the surface and 4 ft near the eastern corner of the site building near soil borings 202-9 and 202-10.

- There are roughly 100 cubic yards (150 tons) of petroleum impacted soil below the DENR Action Level between the surface and 4 ft near the former UST basin near soil boring 202-2.
- There are roughly 800 cubic yards (1,200 tons) of petroleum impacted soil between the surface and 4 ft near the former UST basin and in the asphalt parking area in the southern portion of the property near soil borings 202-5 and 202-11 through 202-13.
- There are roughly 30 cubic yards (45 tons) of petroleum impacted soil below the DENR Action Level between the surface and 2 ft near the discarded drums in the northeast corner of the property near soil boring 202-15.

H&H estimates there are a total of 1,210 cubic yards of impacted soil on the Parcel 202 property. However, field screening and lab results did not provide information that defines the extent of impacts. NC DOT plans indicate proposed cuts in proposed NC DOT work areas. Impacted soil that is removed during road construction activities should be properly managed and disposed at a permitted facility. The possible UST identified the central portion of the property and its contents should be removed in accordance with DENR regulations and properly disposed if site work extends into this area. H&H also recommends that the hydraulic lift and associated liquids be removed. If impacted soil is encountered and removed from the UST area or hydraulic lift/floor drain area it should also be properly managed and disposed at a permitted facility. The on-site monitoring well should also be properly abandoned prior to road construction activities.

5.0 Signature Page

This report was prepared by:

David Graham
Senior Project Geologist for
Hart and Hickman, PC

This report was reviewed by:

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

NORTH CAROLINA PROFESSIONAL SEAL 25069 ENGINEER MATTHEW V. BRAMBLETT 8/14/13

Table 1
Soil Boring GPS Coordinate Data
Tsoumbos Aristotelis Property (Parcel 202)
Durham, Durham County, North Carolina
H&H Job No. ROW-416

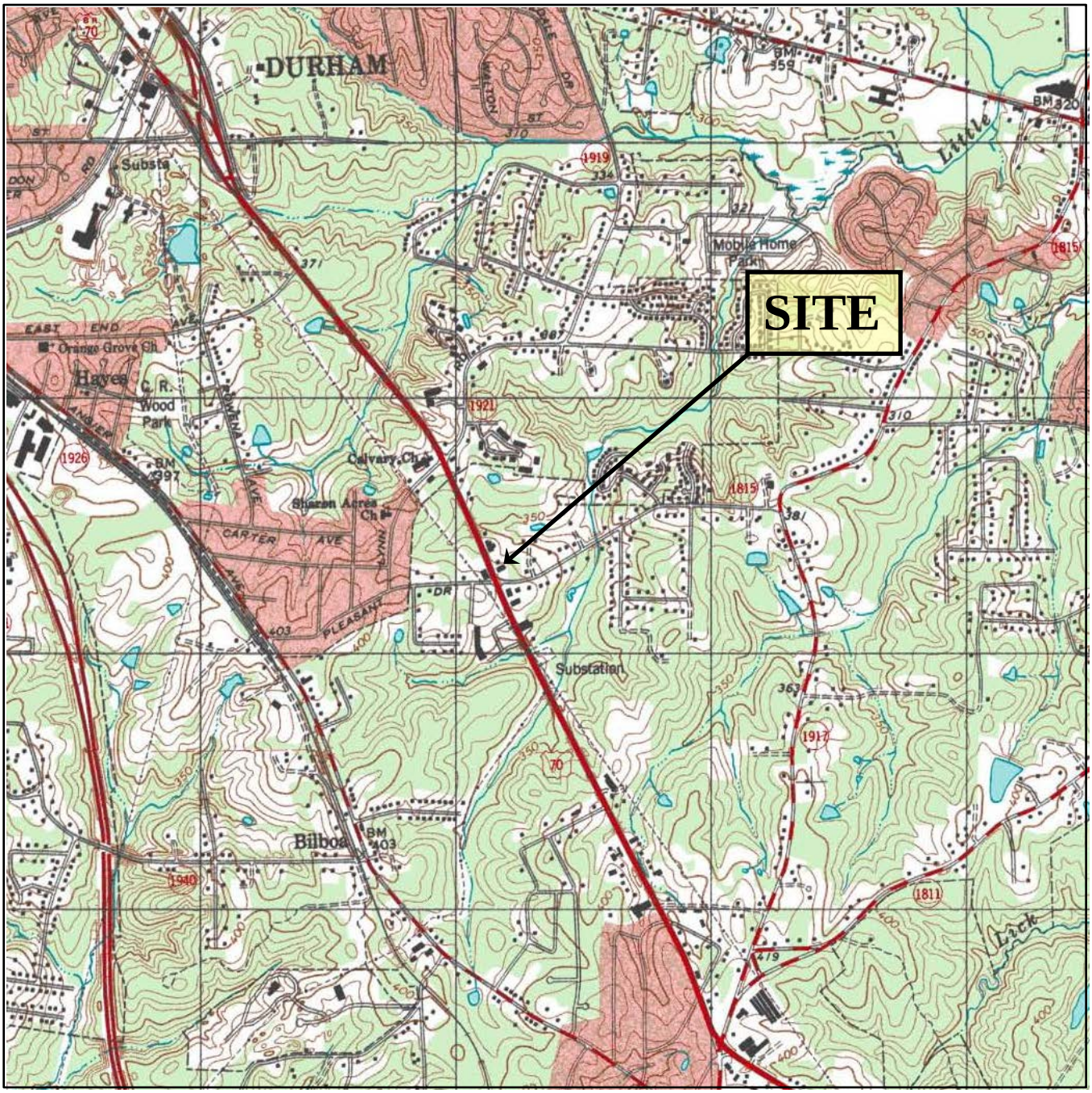
Sample ID	Latitude	Longitude
202-1	35.966063491	-78.846815568
202-2	35.965994502	-78.846717562
202-3	35.966021451	-78.846789872
202-4	35.966135365	-78.846720901
202-5	35.965917766	-78.846615450
202-6	35.966012242	-78.846636360
202-7	35.966020538	-78.846563638
202-8	35.966017552	-78.846513541
202-9	35.966070210	-78.846471198
202-10	35.966114378	-78.846468755
202-11	35.965844990	-78.846596492
202-12	35.965782402	-78.846445617
202-13	35.965844669	-78.846426640
202-14	35.966198164	-78.846693380
202-15	35.966278520	-78.846492572

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

Table 2
Soil Analytical Results
Tsoumbos Aristotelis Property (Parcel 202)
Durham, Durham County, North Carolina
H&H Job No. ROW-416

Sample ID	202-1	202-2	202-3	202-4	202-5	202-6	202-7	202-8	202-9	202-10	202-11	202-12	202-13	202-14	202-15	Regulatory Standard
Sample Depth (ft)	4-5	2-3	3-4	3-4	2-3	4-5	5-6	5-6	0-1	0-1	0-1	0-1	0-1	0-1	0-1	
Sample Date	7/9/2013	7/9/2013	7/9/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	7/10/2013	
TPH-DRO/GRO (8015) (mg/kg)																**NCDENR Action Level (mg/kg)**
Diesel-Range Organics (DRO)	<5.8	7.8	<5.6	**17**	**24.4**	<6.1	<6.0	<6.0	**14.2**	**333**	**66.8**	**57.7**	**58.5**	<5.6	5.9	10
Gasoline-Range Organics (GRO)	<4.9	<6.0	<4.2	<5.4	<5.8	<5.3	<5.2	<5.2	<5.1	<5.1	<4.9	<5.3	<5.2	<5.7	<4.8	10

Notes:
EPA Method follows parameter in parenthesis
TPH = total petroleum hydrocarbons
Bold indicates above DENR Action Level.



N

APPROXIMATE

0 2000 4000

SCALE IN FEET

U.S.G.S. QUADRANGLE MAP

SOUTHEAST DURHAM, NORTH CAROLINA 2002

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

TITLE	**SITE LOCATION MAP**
PROJECT	TSOUMBOS ARISTOTELIS PROPERTY PARCEL 202 951 S. MIAMI BLVD, DURHAM, NC

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
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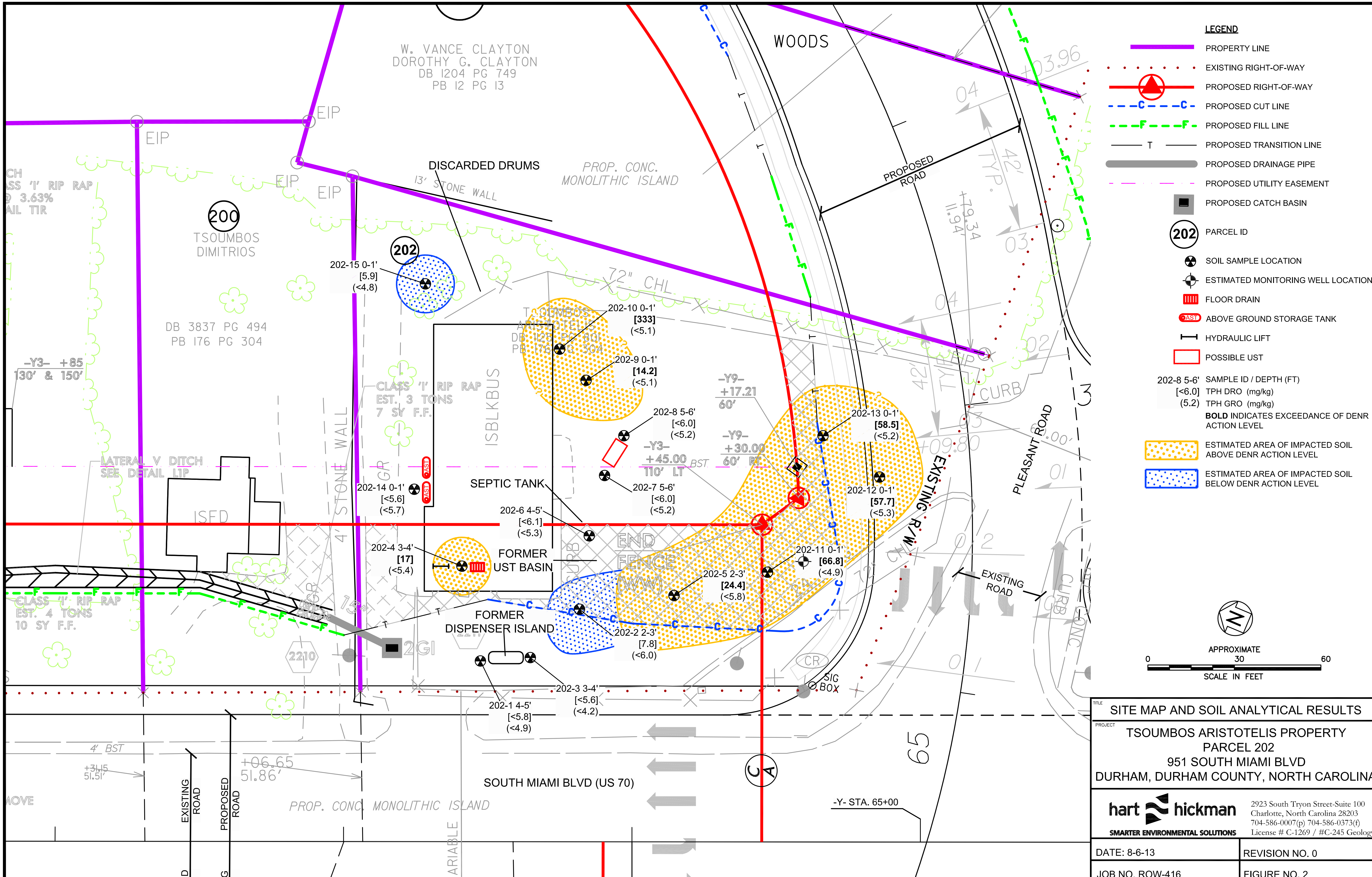
704-586-0007 (p) 704-586-0373 (f)

DATE:	7-8-2013	REVISION NO:	0
JOB NO:	ROW-416	FIGURE:	1


LEGEND
PROPERTY LINE
EXISTING RIGHT-OF-WAY
PROPOSED RIGHT-OF-WAY
PROPOSED CUT LINE
PROPOSED FILL LINE
PROPOSED TRANSITION LINE
PROPOSED DRAINAGE PIPE
PROPOSED UTILITY EASEMENT
PROPOSED CATCH BASIN
PARCEL ID
SOIL SAMPLE LOCATION
ESTIMATED MONITORING WELL LOCATION
FLOOR DRAIN
ABOVE GROUND STORAGE TANK
HYDRAULIC LIFT
POSSIBLE UST
202-8 5-6' SAMPLE ID / DEPTH (FT)
[<6.0] TPH DRO (mg/kg)
(5.2) TPH GRO (mg/kg)
BOLD INDICATES EXCEEDANCE OF DENR ACTION LEVEL
ESTIMATED AREA OF IMPACTED SOIL ABOVE DENR ACTION LEVEL
ESTIMATED AREA OF IMPACTED SOIL BELOW DENR ACTION LEVEL
WOODS
W. VANCE CLAYTON
DOROTHY G. CLAYTON
DB 1204 PG 749
PB 12 PG 13
200
TSOUMBOS DIMITRIOS
DB 3837 PG 494
PB 176 PG 304
202
DISCARDED DRUMS
PROP. CONC. MONOLITHIC ISLAND
PROPOSED ROAD
SEPTIC TANK
FORMER UST BASIN
FORMER DISPENSER ISLAND
EXISTING R/W
EXISTING ROAD
PLEASANT ROAD
SOUTH MIAMI BLVD (US 70)
-Y- STA. 65+00
202-15 0-1' [5.9] (<4.8)
202-10 0-1' [333] (<5.1)
202-9 0-1' [14.2] (<5.1)
202-8 5-6' [<6.0] (<5.2)
202-7 5-6' [<6.0] (<5.2)
202-13 0-1' [58.5] (<5.2)
202-12 0-1' [57.7] (<5.3)
202-14 0-1' [<5.6] (<5.7)
202-6 4-5' [<6.1] (<5.3)
202-4 3-4' [17] (<5.4)
202-11 0-1' [66.8] (<4.9)
202-5 2-3' [24.4] (<5.8)
202-2 2-3' [7.8] (<6.0)
202-3 3-4' [<5.6] (<4.2)
202-1 4-5' [<5.8] (<4.9)
APPROXIMATE
0 30 60
SCALE IN FEET

TITLE
SITE MAP AND SOIL ANALYTICAL RESULTS

PROJECT
TSOUMBOS ARISTOTELIS PROPERTY
PARCEL 202
951 SOUTH MIAMI BLVD
DURHAM, DURHAM COUNTY, NORTH CAROLINA

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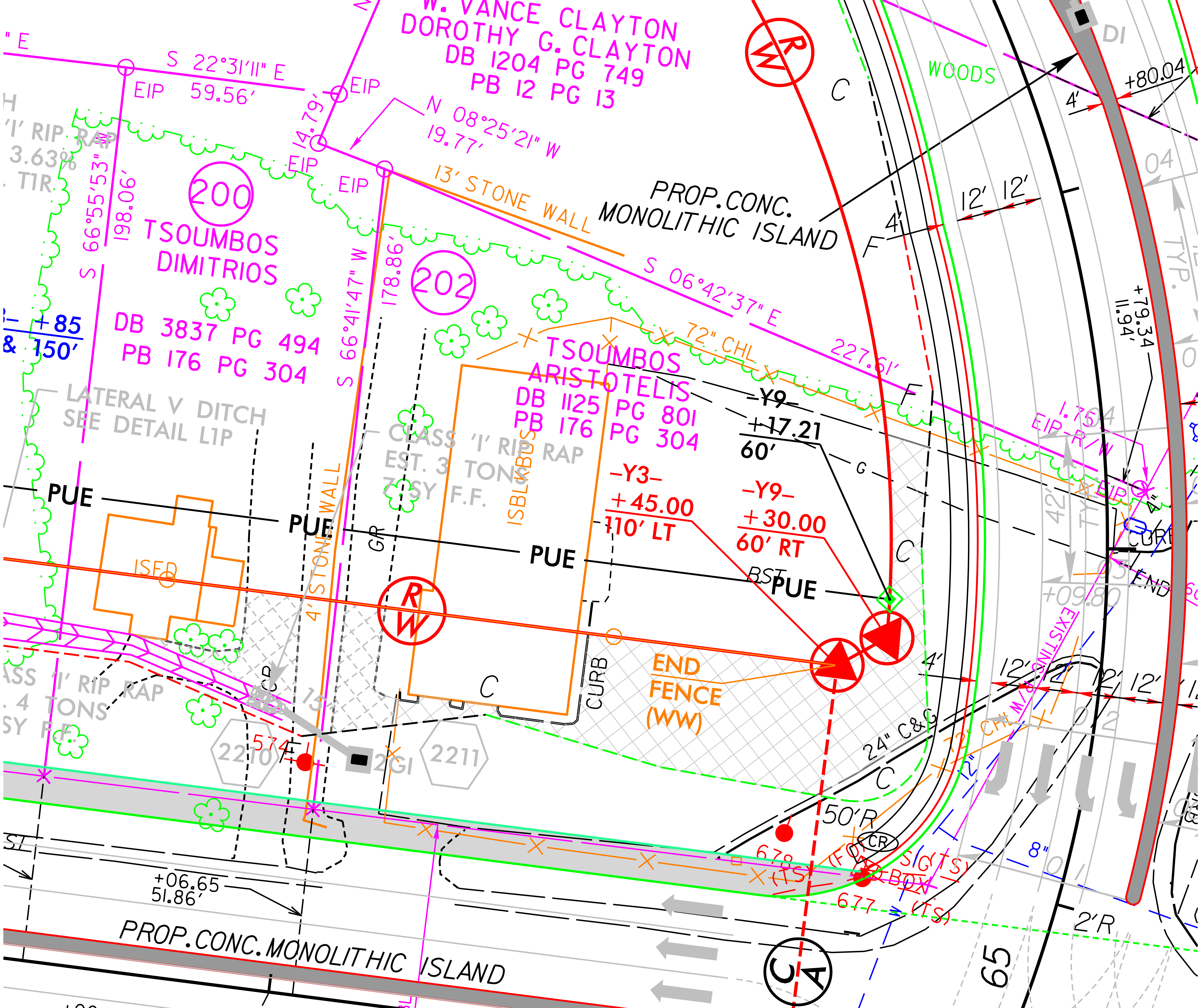
License # C-1269 / #C-245 Geology

DATE: 8-6-13	REVISION NO. 0
JOB NO. ROW-416	FIGURE NO. 2

Appendix A

NC DOT Preliminary Plan


W. VANCE CLAYTON
DOROTHY G. CLAYTON
DB 1204 PG 749
PB 12 PG 13
S 22°31'11" E
EIP 59.56'
EIP
14.79'
N 08°25'21" W
19.77'
13' STONE WALL
PROP.CONC. MONOLITHIC ISLAND
200
TSOUMBOS DIMITRIOS
DB 3837 PG 494
PB 176 PG 304
S 66°55'53" W
198.06'
S 66°41'47" W
178.86'
202
TSOUMBOS ARISTOTELIS
DB 1125 PG 801
PB 176 PG 304
S 06°42'37" E
227.61'
72" CHL
WOODS
+80.04
12' 12'
-Y9-
+17.21
60'
-Y3-
+45.00
110' LT
-Y9-
+30.00
60' RT
+79.34
11.94'
+85
150'
LATERAL V DITCH
SEE DETAIL L1P
CLASS 'I' RIP RAP
EST. 3 TONS
7 SY F.F.
PUE
4' STONE WALL
ISLB
ISFD
END FENCE (WW)
CURB
24" C&G
50'R
2210
2211
2GI
+06.65
51.86'
PROP.CONC.MONOLITHIC ISLAND
EXISTING R/W
EIP-R/W
+09.80
8"
2'R
65

Appendix B

DENR Incident Files

Underground Storage Tank Closure Report

Prepared for:

Tellis Foreign Auto Repair & Sales, Inc.
951 South Miami Blvd.
Durham, North Carolina 27703

Prepared by:

EMS Environmental, Inc.
117 South Hoover Road
Durham, North Carolina 27703

April 20, 1994

ENVIRONMENTAL INC.

Underground Storage Tank Closure Report

Prepared for:

Tellis Foreign Auto Repair & Sales, Inc.
951 South Miami Blvd.
Durham, North Carolina 27703

Prepared by:

EMS Environmental, Inc.
117 South Hoover Road
Durham, North Carolina 27703

April 20, 1994

Prepared By:

James M. Stahling
Project Manager

NORTH CAROLINA LICENSED SEAL 1063 GEOLOGIST MATTHEW STAHLING

Reviewed By:

James Dodson
Office Manager

Table of Contents

1.0 Introduction

At the request of Tellis Foreign Auto Repair and Sales, Inc., EMS Environmental, Inc. (EMS) has performed monitoring and soil sampling activities for the removal of an underground storage tank system. Four underground storage tanks and associated product lines were removed from the Tellis Foreign Auto Repair and Sales (Tellis) facility located on 951 South Miami Boulevard in Durham County, North Carolina. The site location is shown in a portion of the Southeast Durham, N.C., USGS topographical map attached as Figure 1.

The following report describes the results of a limited soil boring investigation and UST closure activities at the facility.

1.1 Site Description

Automobile maintenance services and the retail of used automobiles is performed at the Tellis facility. The company is situated in a former gasoline station at the intersection of South Miami Blvd (US 70) and Pleasant Drive. Gasoline was formerly stored in four underground storage tanks located at the facility. The tanks have not been used for the storage of gasoline or other petroleum products since Mr. Tsoumbos acquired the property in 1981.

The four USTs were of steel construction and had a 3,000 gallon capacity. Each tank had an outside dimension of 5.3' X 18'. The USTs serviced two dispensers that were formerly located on a dispenser island. The UST and former location of the dispenser island are shown in Figure 2.

The site is situated at an elevation of approximately 375 feet above mean sea level as shown in the attached USGS Southeast Durham 15' quadrangle map (Figure 1). Surface water drainage along South Miami Blvd. near the north property boundary flows north to an unnamed tributary of Little Lick Creek. Little Lick Creek is located east of the site and in the site vicinity flows to the northeast.

1.2 Local Area Description

Land use in the site vicinity is mixed residential and commercial. A gasoline station (Crown Central) is located across Pleasant Drive, a retail furniture store (Colfax furniture) is located across South Miami Drive and a residence is located north of the site.

A municipal water supply services residences located on Pleasant Drive. The line terminates at the east property boundary and the Tellis facility is serviced by a potable water well.

A release of petroleum hydrocarbons has been documented at the Crown Central Station. Four monitoring wells installed to delineate the petroleum hydrocarbons in the groundwater have been installed north of Pleasant Drive near the Tellis facility. A groundwater remediation system has been installed on the Crown Central property. A groundwater recovery well associated with the remediation system is located within 100 feet of the Tellis potable well.

Prior to UST closure activities, EMS Environmental, Inc. (EMS) performed a limited soil boring investigation. The soil boring investigation was performed to evaluate the subsurface surrounding the UST system for the potential presence of petroleum hydrocarbons.

1.3 Soil Boring Investigation

EMS performed a field investigation on September 14-15, 1994 that included the advancement of five hand augered soil borings. Four borings were advanced at locations surrounding the UST basin and one boring was advanced in the center of the former dispenser island. The borings were completed at depths ranging from 6.6 feet below ground surface (BGS) at the dispenser island location to 11.3 feet BGS at locations surrounding the USTs. The boring locations are shown in Figure 3.

Soil samples were collected at various depths and scanned with a HNu photo-ionization detector (PID) for volatile organic compounds (VOC). Field scanning was performed by placing the soil inside a new resealable plastic bag and allowing the vapor to reach equilibrium within the bags headspace for a minimum of 15 minutes. The PID probe was then inserted into the bag and the highest reading was recorded.

One soil sample was collected from the termination depth of each boring and laboratory analyzed for gasoline range petroleum hydrocarbons. The soil samples were analyzed for Total Petroleum Hydrocarbons by Gas Chromatograph (TPH) using EPA method 5030.

1.4 Results of Soil Boring Investigation

The results of PID scanning revealed detectable VOC concentrations ranging from non-detect to 40 parts per million (ppm). The highest measurable concentrations were detected in samples collected from HA-4 (4.1 feet BGS) and HA-5 (4 feet BGS). Volatile organic compound concentrations are included within Table 1.

Gasoline range hydrocarbons were not detected in the soil samples by TPH analysis. The analytical detection limit was 2 milligrams per kilogram (mg/Kg). TPH laboratory results are included in Appendix A.

2.0 Underground Storage Tank and Product Line Removal

2.1 UST Removal and UST Conditions

Four Seasons Industrial Services removed 12,040 gallons of a gasoline-water mixture and 200 gallons of a sludge-mud mixture from the UST's on February 16, 1994. Manifest forms prepared by Four Seasons for the removal of waste water are attached in Appendix B. The USTs were removed by B & W Construction Company on March 18, 1994. Fire marshals from the City of Durham and Durham County were present on the site before and during UST removal.

Prior to UST removal, vapor within the tanks was purged by dry ice until the lower explosive level was lower than 15%. Tank vapor monitoring was performed by an EMS geologist using an MSA explosimeter. Once the tanks were purged of explosive vapors the tanks were removed and visually inspected for corrosion holes and pitting. Holes or pitting were not observed on the tanks. The tanks were removed off-site by B & W Construction for disposal by S & R Fuel Tank Disposal located in La Grange, North Carolina.

The final excavation dimensions were 32 feet north-south by 18 feet east-west with a depth of 11 feet BGS. Soil excavated from the UST basin was backfilled into the excavation following closure activities.

A copy of the UST disposal manifest is attached in Appendix C. Photographs showing excavation activity and UST conditions are presented in Appendix D. UST closure notification forms for the County of Durham and NCDEM (GW/UST-3) along with a UST closure report form (GW/UST-2) is attached in Appendix E.

The product lines were removed on April 4, 1994. The lines were uncovered at the juncture of the excavation and pulled out with a backhoe.

2.2 Soil Sampling

Soil laboratory samples were collected from underneath the former USTs, former pump locations and a borehole advanced near the product line location. Three samples were collected with a backhoe from approximately three feet beneath each UST. Each sample was identified with the tank identification and placement. Two soil samples identified as P-1 and P-3 were collected with a hand auger from approximately two feet beneath the former dispenser locations. Soil sample P-2 was collected from a location adjacent to the product lines. A composite soil sample identified as C-1 was collected from the excavated soil. Sample locations are shown in Figure 3.

Soil at each sample location was scanned on-site for volatile organic compounds (VOC) using an photoionization detector (PID) calibrated to 98.5 ppm isobutylene in air per manufacturers specifications. Field scanning of each sample was performed by placing the soil in a new resealable plastic bag and placing the bag inside a cooler chilled with ice. The vapors within the bag were allowed to reach equilibrium within the bags headspace for a minimum of 15 minutes. The probe was then inserted into the bag and the highest reading was recorded.

Samples were collected and placed inside laboratory supplied sample bottles and stored in coolers chilled with ice. The samples were relinquished to Industrial and Environmental Analysts (IEA) located in Cary, North Carolina. The soil samples were analyzed for gasoline range total petroleum hydrocarbons (TPH) by EPA method 5030.

3.0 Results of Investigation

3.1 Soil Quality

Soil sample headspace measurements obtained with the PID varied from 18.3 parts per million (ppm) to 51.3 ppm in samples collected underneath the underground storage tanks. Headspace measurements of samples collected from underneath the former dispensers and product line location varied from 32 ppm to 37.8 ppm.

Petroleum hydrocarbons with an analytical range similar to gasoline were not detected in any of the samples collected from underneath the USTs, former dispenser island, product line location or excavated soil. The results of soil laboratory analyses and headspace scanning are shown Table 1. Complete laboratory analytical results are attached in Appendix F.

4.0 Investigation Summary and Conclusions

The following is summary of the UST closure investigation performed at the Tellis Auto Repair facility.

- Gasoline range petroleum hydrocarbons were not detected at the approximate depth of 11 feet BGS in four soil borings advanced at locations surrounding the underground storage tanks.
- Gasoline range petroleum hydrocarbons were not detected at a depth of 6.6 feet BGS underneath the middle of the former dispenser island.
- Four USTs were removed from the site. The USTs were of steel construction and had a 3,000 gallon capacity. The tanks formerly held gasoline.
- No corrosion holes or pitting were observed on the USTs.
- Gasoline range petroleum hydrocarbons were not detected in twelve soil samples collected from below the USTs.
- Gasoline range petroleum hydrocarbons were not detected in three samples collected at the dispenser and product line locations.
- Gasoline range petroleum hydrocarbons were not detected in a composite sample collected from the excavated soil. The soil was used for excavation backfill.

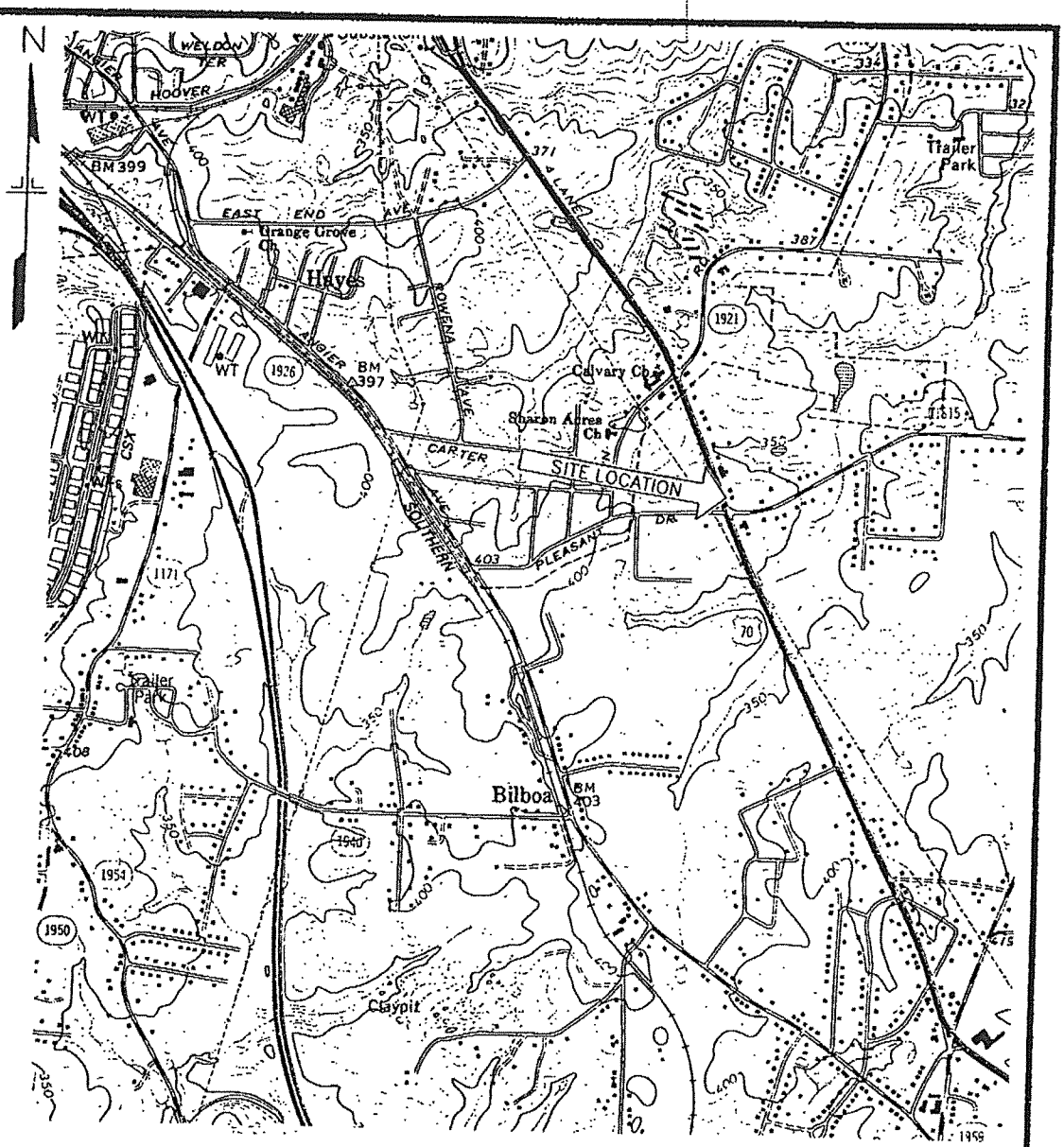
Based on the non-detection of petroleum hydrocarbons in the soil laboratory samples, it appears no further investigative work is necessary.

Table 1
VOC Concentrations and TPH Laboratory Results
Tellis Auto
Durham, North Carolina
EMS Project No. 7075

Boring ID	Sample Depth (ft)	VOC (ppm)	TPH (mg/Kg)
HA-1	1.8	0	NS
	3	0	NS
	4.8	0	NS
	6	0	NS
	8.2	0	NS
	11.2	0	ND
HA-2	2.1	1	NS
	3.8	1	NS
	4.9	3	NS
	5.7	6	NS
	8	4	NS
	10.4	2	NS
	11.3	2	ND
HA-3	4	1	NS
	6.1	2	NS
	8.8	1	NS
	11.3	1	NS
HA-4	4.1	35	NS
	6.3	1	NS
	8.3	0	NS
	11.3	1	ND
HA-5	3.2	10	NS
	4	40	NS
	6.6	3	ND

Sample ID	Sample Depth (ft)	VOC (ppm)	TPH (mg/Kg)
T-1E	11	20.2	ND
T-1M	11	19.3	ND
T-1W	11	18.5	ND
T-2E	11	15.4	ND
T-2M	11	23	ND
T-2W	11	18.3	ND
T-3E	11	21	ND
T-3M	11	26.3	ND
T-3W	11	41.3	ND
T-4E	11	29.3	ND
T-4M	11	25.3	ND
T-4W	11	51.3	ND
P-1	2.8	37.5	ND
P-2	2.7	32	ND
P-3	3	37.8	ND
C-1	N/A	77.7	ND

NS denotes not sampled for TPH
ND denotes not detected with an analytical detection limit of 2 milligrams per kilogram (mg/Kg)



SOUTHEAST DURHAM, N. C.

NE/4 DURHAM SOUTH 15' QUADRANGLE

35078-H7-TF-024

1973

SCALE 1:24 000

1 0 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

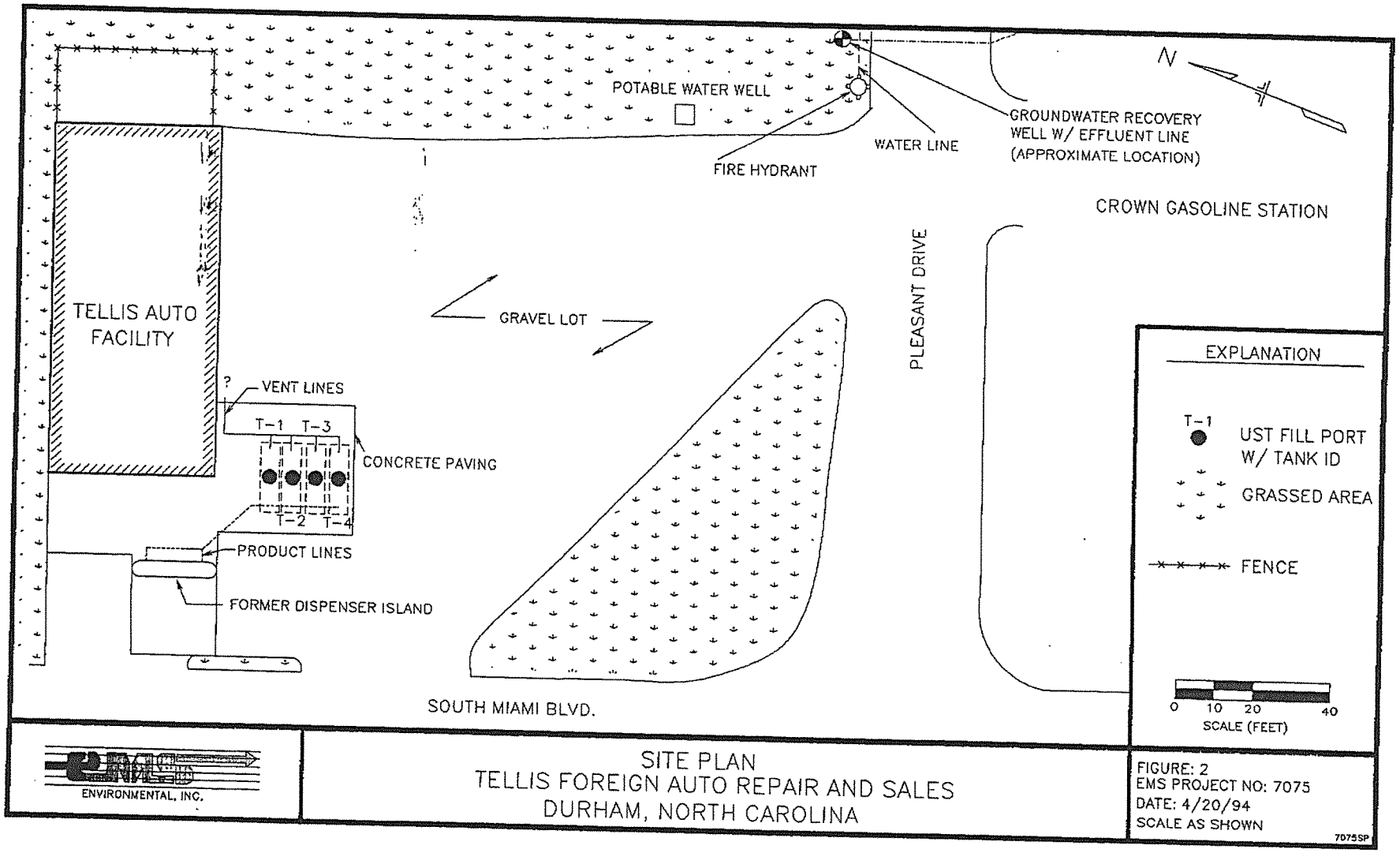
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ENVIRONMENTAL, INC.

SITE VICINITY MAP
TELLIS AUTO REPAIR
DURHAM, NORTH CAROLINA

FIGURE: 1
SCALE: AS SHOWN
PROJECT NO.: 7075
DATE: 10/18/93

7075F1

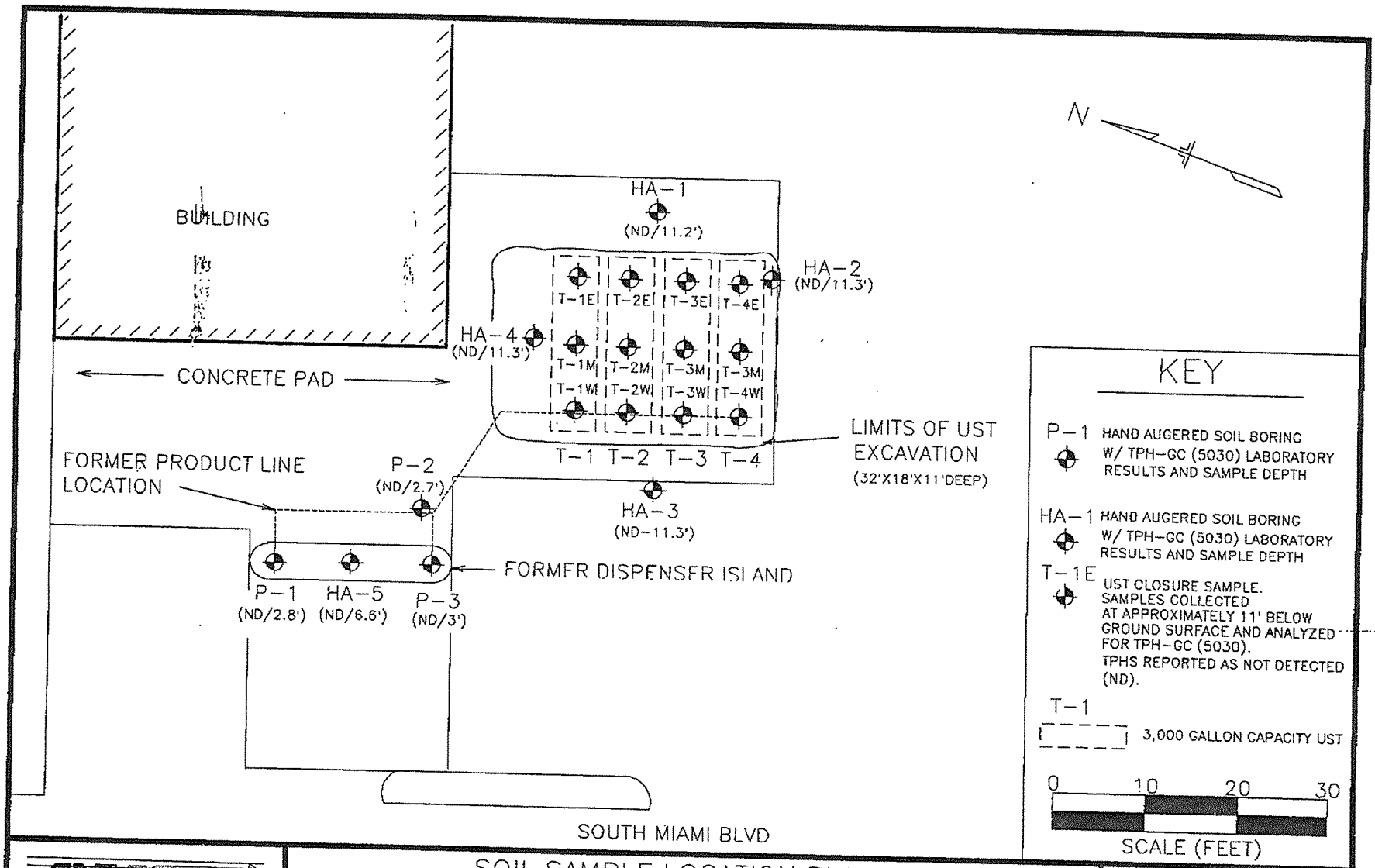


ENVIRONMENTAL, INC.

SITE PLAN
TELLIS FOREIGN AUTO REPAIR AND SALES
DURHAM, NORTH CAROLINA

FIGURE: 2
EMS PROJECT NO: 7075
DATE: 4/20/94
SCALE AS SHOWN

7075SP



ENVIRONMENTAL, INC.

SOIL SAMPLE LOCATION PLAN
TELLIS FOREIGN AUTO REPAIR AND SALES
DURHAM, NORTH CAROLINA

FIGURE: 3
PROJECT NO.: 7075
DATE: 4/20/94
SCALE: AS SHOWN 7075SBP

State of North Carolina
Department of Environment,
Health and Natural Resources
Raleigh Regional Office

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary

DEHNR

DIVISION OF WATER QUALITY
GROUNDWATER SECTION
JULY 29, 1996

Mr. Tellis Tsoumbos
951 South Miami Boulevard
Durham, North Carolina 27703

Subject: Review of Underground Storage Tank Closure Report
Tellis Foreign Auto Repair, 951 South Miami Blvd
Durham, Durham County, Incident #: 12596

Dear Mr. Tsoumbos:

The following letter is submitted to advise you that the Raleigh Regional Office (RRO) of the Groundwater Section of the Division of Water Quality is closing the subject incident file. The facility is located at the Tellis Foreign Auto Repair, 951 South Miami Blvd, Durham, Durham County, North Carolina.

An Underground Storage Tank(s) closure report for the four 3,000 gallon Gasoline UST systems, was submitted by EMS Environmental, Inc., and received on April 29, 1994. A review of this report indicates that the UST systems at this location are in compliance with State regulation 15A NCAC 2N .0800 and these tanks are considered permanently closed.

Please note that this office may not have conducted a site visit prior to closure and is relying on the accuracy of the information submitted by you and your agent to make this determination.

In closing this file, the Section reserves the right to reopen its investigation should information become available which indicates the cleanup at this site does not meet regulatory requirements for site closure.

Should you have any questions, please contact Mr. Michael Linscott or Mr. Keith Edwards at (919) 571-4700.

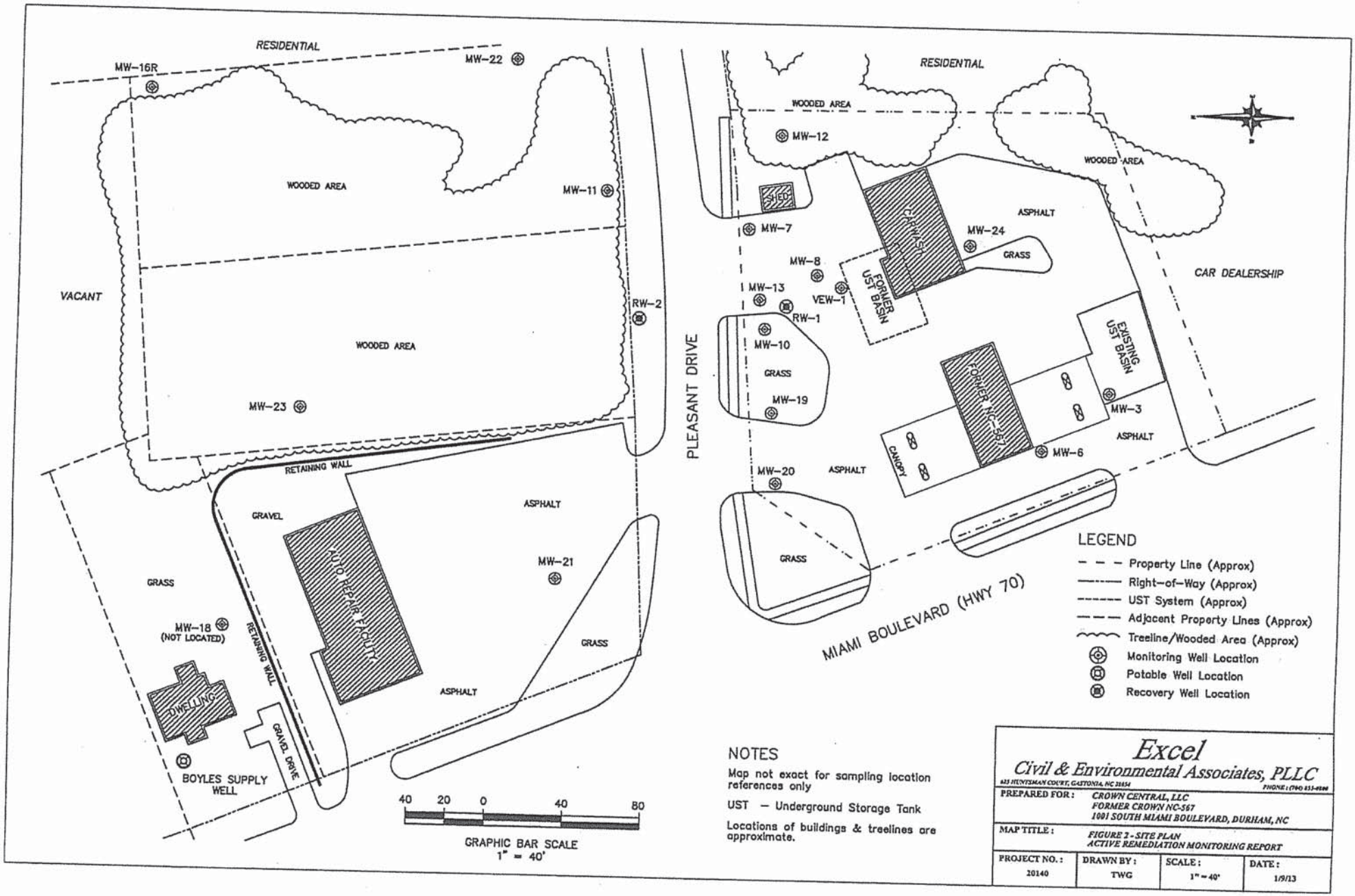
Sincerely,

S. Jay Zimmerman, L. G.
Environmental Regional Supervisor
Raleigh Regional Office

cc: Michael Linscott
Jim Stallings / EMS Environmental / 117 Hoover Road / Durham, NC 27703

3800 Barrett Drive, Suite 101,
Raleigh, North Carolina 27609
Voice 919-571-4700

FAX 919-571-4718


RESIDENTIAL
MW-16R
MW-22
WOODED AREA
MW-11
VACANT
RW-2
WOODED AREA
MW-23
RETAINING WALL
GRAVEL
ASPHALT
AUTO REPAIR FACILITY
MW-21
GRASS
MW-18
(NOT LOCATED)
RETAINING WALL
GRASS
DWELLING
GRAVEL DRIVE
BOYLES SUPPLY WELL
ASPHALT
PLEASANT DRIVE
RESIDENTIAL
WOODED AREA
MW-12
SHED
MW-7
CARWASH
ASPHALT
MW-24
GRASS
MW-8
FORMER UST BASIN
CAR DEALERSHIP
MW-13
VEW-1
RW-1
MW-10
GRASS
MW-19
EXISTING UST BASIN
MW-3
FORMER NC-567
ASPHALT
CANOPY
MW-6
MW-20
ASPHALT
GRASS
MIAMI BOULEVARD (HWY 70)
40 20 0 40 80
GRAPHIC BAR SCALE
1" = 40'
LEGEND
Property Line (Approx)
Right-of-Way (Approx)
UST System (Approx)
Adjacent Property Lines (Approx)
Treeline/Wooded Area (Approx)
Monitoring Well Location
Potable Well Location
Recovery Well Location
NOTES
Map not exact for sampling location references only
UST – Underground Storage Tank
Locations of buildings & treelines are approximate.
Excel
Civil & Environmental Associates, PLLC
623 HUNTSMAN COURT, GASTONIA, NC 28054
PHONE: (704) 853-4848
PREPARED FOR: CROWN CENTRAL, LLC
FORMER CROWN NC-567
1001 SOUTH MIAMI BOULEVARD, DURHAM, NC
MAP TITLE: FIGURE 2 - SITE PLAN
ACTIVE REMEDIATION MONITORING REPORT
PROJECT NO.: 20140
DRAWN BY: TWG
SCALE: 1" = 40'
DATE: 1/9/13

Appendix C

Schnabel Engineering Geophysical Survey Report

Schnabel ENGINEERING

July 25, 2013

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

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

Subject: **Project 11821014.28, Report on Geophysical Surveys**
Parcel 202, Tsoumbos Aristotelis Property, Durham, North Carolina

Dear Mr. Bramblett:

SCHNABEL ENGINEERING SOUTH, PC (Schnabel) is pleased to present this report on the geophysical surveys we performed on the subject property. The report includes two 11x17 color figures and three 8.5x11 color figures. This study was performed in accordance with our proposal for Geophysical Surveys to Locate Possible USTs dated May 21, 2013, as approved by Cathy Houser on May 30, 2013, and our agreement dated June 2, 2011. Terry Fox provided a verbal notice to proceed on May 24, 2013.

INTRODUCTION

The field work described in this report was performed on June 18, June 19, and June 27, 2013, by Schnabel under our 2011 contract with the NCDOT. The purpose of the geophysical surveys was to evaluate the potential presence of metal underground storage tanks (USTs) in the accessible areas of Parcel 202. Photographs of the property are included on Figure 1. The property is located in the northeast quadrant of US 70 (S. Miami Boulevard) and Pleasant Road, in Durham, NC (947 S. Miami Boulevard).

The geophysical surveys consisted of an electromagnetic (EM) induction survey and a ground penetrating radar (GPR) survey. The EM survey was performed using a Geonics EM61-MK2 instrument. The EM61 is a time domain metal detector that stores data digitally for later processing and review. Sensitivity to metallic objects is dependent on the size, depth, and orientation of the buried object and the amount of noise (i.e. response from spurious metallic objects) in the area. The EM61 can generally observe a single buried 55 gallon drum at a depth of 10 feet or less. The EM61 makes measurements by creating an

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

The GPR survey was performed over selected EM61 anomalies using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna to further evaluate EM responses that could indicate a potential UST.

Photographs of the equipment used are shown on Figure 2.

FIELD METHODOLOGY

Locations of geophysical data points were obtained using a sub-meter Trimble Pro-XRS differential global positioning system (DGPS). References to direction and location in this report are based on the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 83 datum, with units in US survey feet. We recorded the locations of existing site features (metal objects, signs, etc.) with the DGPS for later correlation with the geophysical data and a site plan provided by the NCDOT.

The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart. The EM61 and DGPS data were recorded digitally using a field computer and later transferred to a desktop computer for data processing. The GPR data were collected along survey lines spaced approximately one to two feet apart in orthogonal directions over anomalous EM readings not attributed to cultural features. The GPR data were reviewed in the field to evaluate the possible presence of USTs. The GPR data also were recorded digitally and later transferred to a desktop computer for further review.

DISCUSSION OF RESULTS

The contoured EM61 data collected over Parcel 202 and the GPR survey area locations are shown on Figure 3, EM61 Early Time Gate Response, and Figure 4, EM61 Differential Response. Areas outside the colored, contoured EM61 data were not surveyed. Early time data refer to the response measured at a short time after the initial EM pulse is generated. Early time data are sensitive to all metal objects, small or large and shallow or deep, within the sensitivity range of the instrument. Differential data represent the difference in response between the top and bottom coils of the EM61 instrument at a later time after the initial pulse than early time data. Differential data naturally tend to filter out the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as USTs.

The EM data contain multiple anomalies on the site, most of which appear to be the result of buried utilities, small pieces of metal at the ground surface or at shallow depths, or metal structures at the ground surface, including signs, guy wires, reinforced concrete slabs, etc. However, we collected GPR data over several EM anomalies as shown on Figures 3 and 4 to further investigate the EM anomalies. GPR data collected near the south wall of the building on Parcel 202 over an EM anomaly of unknown cause indicated the presence of a possible UST, as shown on Figures 3 and 4. The identification of Possible UST No. 1 was selected in accordance with the anomaly categories provided by the NCDOT in their letter, dated May 19, 2009, entitled “Geophysical Surveys to Identify USTs”. The EM and GPR data both suggest the potential presence of a UST, but both geophysical methods do not provide sufficient

evidence characteristic of the interpreted UST. The location of Possible UST No. 1 is shown on Figures 3 and 4. Example GPR images from lines oriented over the marked location of Possible UST No. 1 are also shown on Figures 3 and 4. The GPR data suggests the top of Possible UST No. 1 is approximately 1.0 to 2.0 feet below ground surface and that the possible UST is about 3.5 feet in diameter and about 7.5 feet long, equivalent to a capacity of a 560 gallon UST. Photographs of the approximate location of the possible UST that was marked in the field are included on Figure 5.

CONCLUSIONS

As shown in Figures 3 and 4, the EM data we collected at Parcel 202 cover most of the planned survey area with the exception of vegetated areas at the northern end of the site, in addition to other inaccessible areas including the building and other obstacles. The EM data include responses from several visible metallic objects at grade (e.g. signs and guy wires from utility poles) and reinforced concrete.

The geophysical data indicate the presence of a possible UST outside the right-of-way/easement on Parcel 202. The EM and GPR data suggest Possible UST No. 1 is about the size of a 560-gallon capacity UST and the top is about 1.0 to 2.0 feet below ground surface.

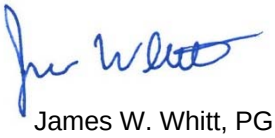
LIMITATIONS

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

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

Sincerely,

SCHNABEL ENGINEERING SOUTH, PC



James W. Whitt, PG
Senior Staff Geophysicist

Gary D. Rogers, PG
Senior Associate

JWW:MAP:GDR
Attachments: Figures (5)
CC: NCDOT, Terry Fox
FILE: G:\2011-SDE-JOBS\11821014_00_NCDOT_2011_GEOTECHNICAL_UNIT_SERVICES\11821014_28_U-0071_DURHAM_COUNTY\REPORT\PARCEL 202\SCHNABEL GEOPHYSICAL REPORT ON PARCEL 202 (U-0071).DOCX

Attachments:

- Figure 1 - Parcel 202 Site Photos
- Figure 2 - Photos of Geophysical Equipment Used
- Figure 3 - Parcel 202 Early Time Gate Response
- Figure 4 - Parcel 202 Differential Response
- Figure 5 - Parcel 202 Photos of Possible UST Location

Parcel 202 (Tsoumbos Aristotelis Property), looking southeast

Parcel 202 (Tsoumbos Aristotelis Property), looking northeast

Schnabel ENGINEERING	STATE PROJECT U-0071 NC DEPT. OF TRANSPORTATION DURHAM COUNTY, NC PROJECT NO. 11821014.28	PARCEL 202 SITE PHOTOS FIGURE 1

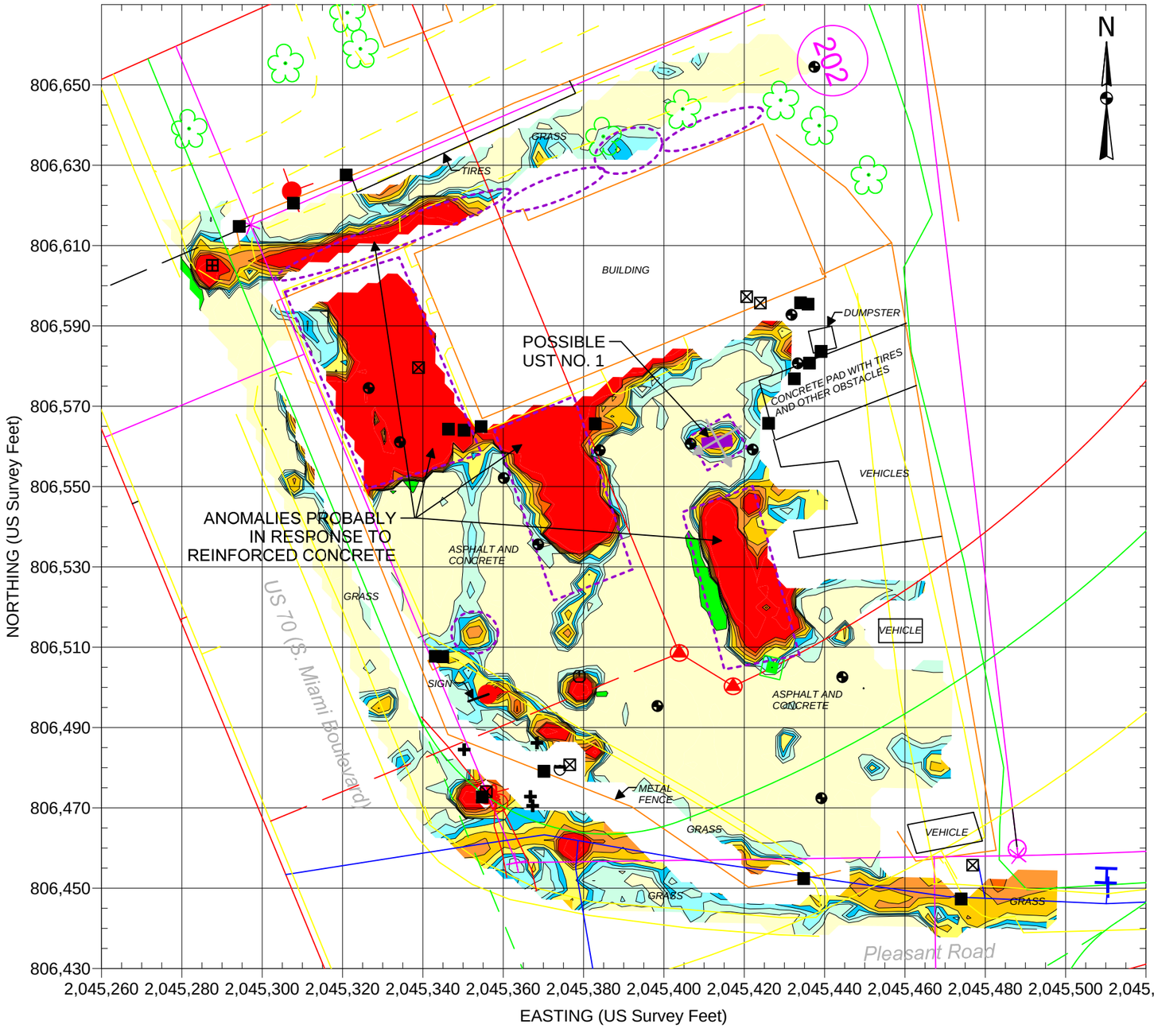
Geonics EM61-MK2 Metal Detector with Trimble DGPS Unit

GSSI SIR-3000 Ground-Penetrating Radar with 400 MHz Antenna

Note: Stock photographs – not taken on site.

Schnabel ENGINEERING	STATE PROJECT U-0071 NC DEPT. OF TRANSPORTATION DURHAM COUNTY, NC PROJECT NO. 11821014.28	PHOTOS OF GEOPHYSICAL EQUIPMENT USED FIGURE 2

PARCEL 202



EM61 Early Time Gate Response (mV)

-15000 -100 0 50 100 150 200 300 500 750 1000 2000

Scale in US Survey Feet: 1 in = 30 ft

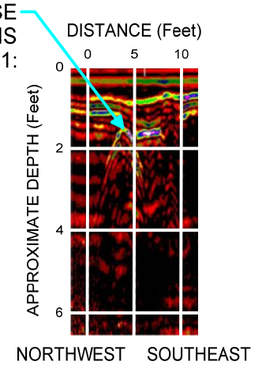
0 30 60 90

EXPLANATION

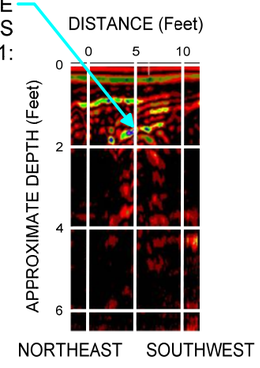
- STORMSEWER INLET
- PROPOSED BORING LOCATION (HART & HICKMAN)
- SIGN
- MISCELLANEOUS METALLIC OBJECT
- UTILITY MANHOLE, METER, BOX, ETC.
- GUY WIRE
- MONITORING WELL
- EDGE OF NCDOT PROPOSED R/W
- GPR SURVEY AREA
- LOCATION OF SUSPECT UST MARKED ON SITE
- EXAMPLE GPR LINE LOCATION

BASE PLAN FROM NCDOT FILE:
u0071_rdy_psh22.dgn
(FOR SOME SITE FEATURES)

EXAMPLE GPR RESPONSE FROM THE SHORT AXIS OF POSSIBLE UST NO. 1:



EXAMPLE GPR RESPONSE FROM THE LONG AXIS OF POSSIBLE UST NO. 1:



Note: The contour plot shows the earliest and more sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on June 18 and June 19, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina Zone 3200, using the NAD 1983 datum. GPR data were acquired on June 27, 2013, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

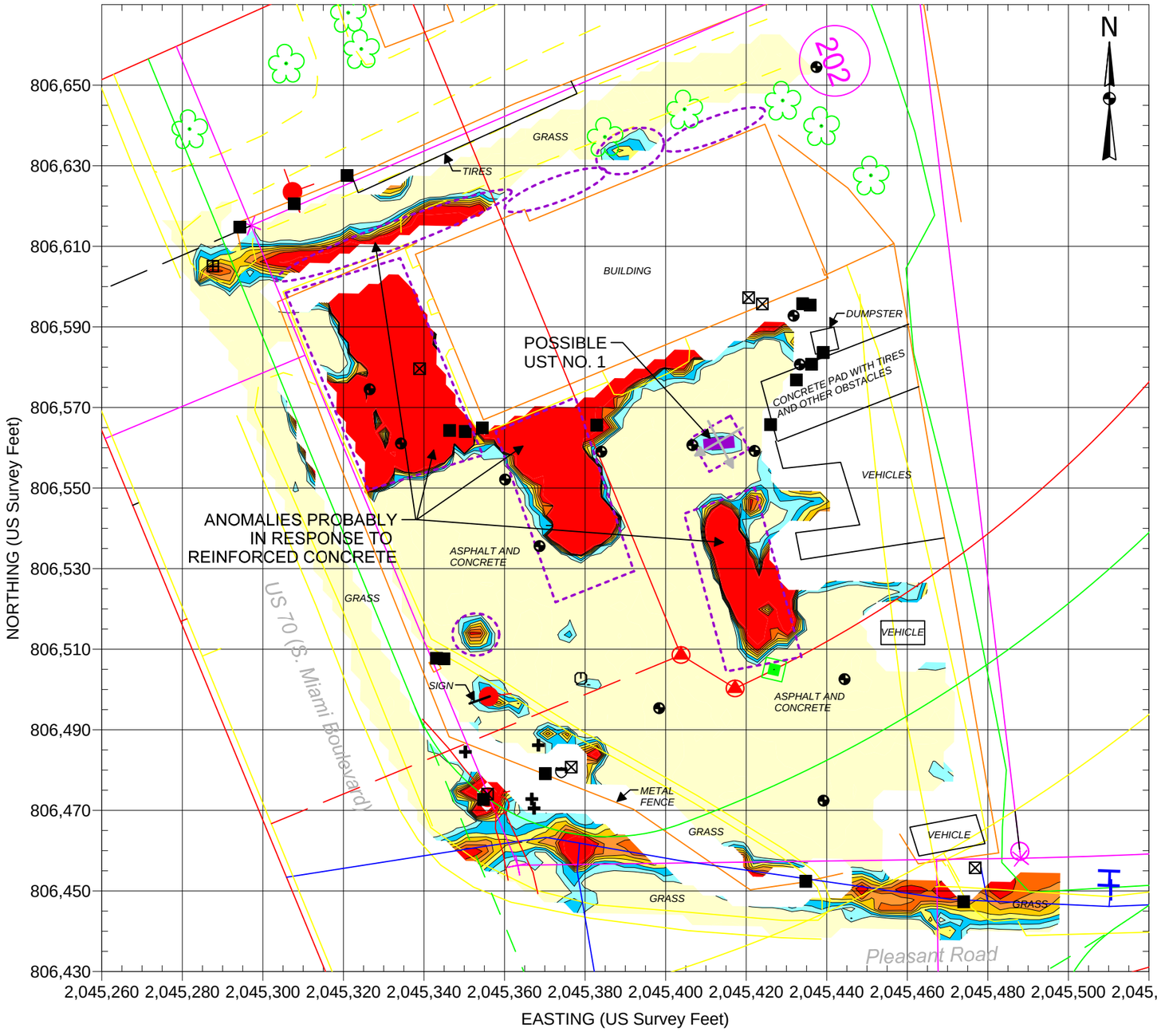
Schnabel ENGINEERING

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

EM61
EARLY TIME GATE
RESPONSE

FIGURE 3

PARCEL 202



EM61 Differential Response (mV)

-20000 -100 0 40 60 80 100 120 140 160 200

Scale in US Survey Feet: 1 in = 30 ft

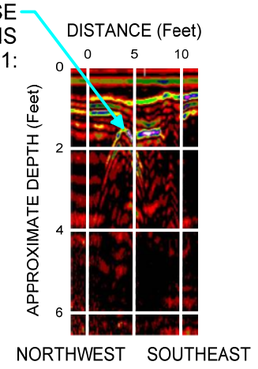
0 30 60 90

EXPLANATION

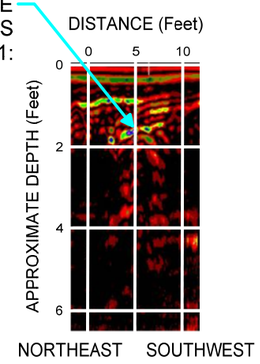
- STORMSEWER INLET
- PROPOSED BORING LOCATION (HART & HICKMAN)
- SIGN
- MISCELLANEOUS METALLIC OBJECT
- UTILITY MANHOLE, METER, BOX, ETC.
- GUY WIRE
- MONITORING WELL
- EDGE OF NCDOT PROPOSED R/W
- GPR SURVEY AREA
- LOCATION OF SUSPECT UST MARKED ON SITE
- EXAMPLE GPR LINE LOCATION

BASE PLAN FROM NCDOT FILE:
u0071_rdy_psh22.dgn
(FOR SOME SITE FEATURES)

EXAMPLE GPR RESPONSE FROM THE SHORT AXIS OF POSSIBLE UST NO. 1:



EXAMPLE GPR RESPONSE FROM THE LONG AXIS OF POSSIBLE UST NO. 1:



Note: The contour plot shows the difference, in millivolts (mV), between the readings from the top and bottom coils of the EM61. The difference is taken to reduce the effect of shallow metal objects and emphasize anomalies caused by deeper metallic objects, such as drums and tanks. The EM data were collected on June 18 and June 19, 2013, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum. GPR data were acquired on June 27, 2013, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

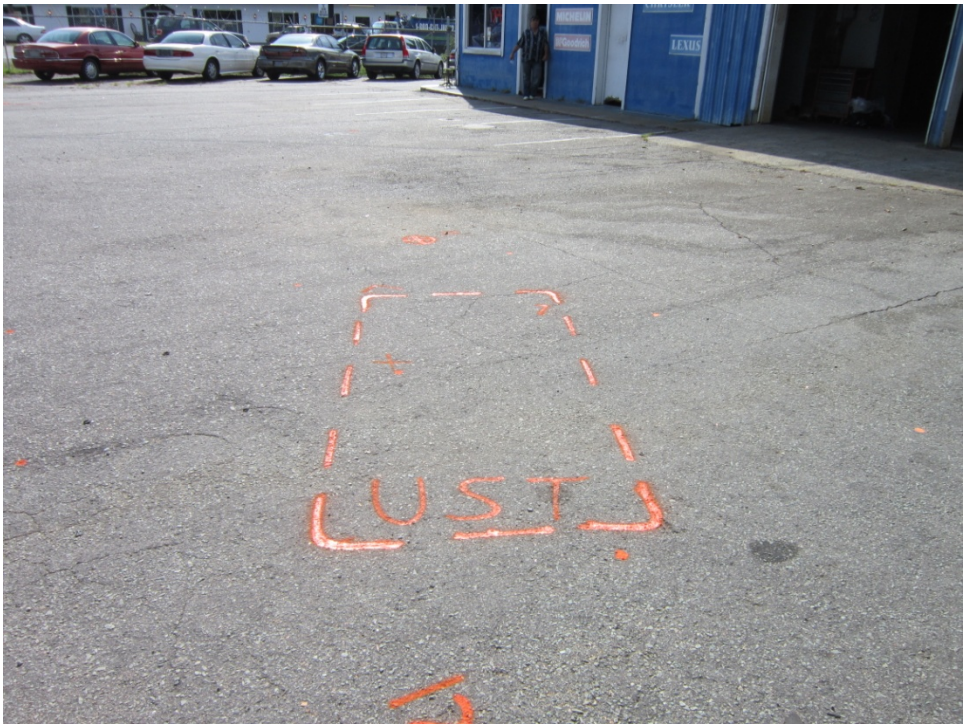
Schnabel ENGINEERING

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

EM61
DIFFERENTIAL
RESPONSE

FIGURE 4

Parcel 202 (Tsoumbos Aristotelis Property), looking north. Photo shows approximate marked location of Possible UST No. 1 near the south side of the building.



Parcel 202 (Tsoumbos Aristotelis Property), looking west. Photo shows approximate marked location of Possible UST No. 1 near the south side of the building.

Schnabel ENGINEERING	STATE PROJECT U-0071 NC DEPT. OF TRANSPORTATION DURHAM CO., NORTH CAROLINA PROJECT NO. 11821014.28	PARCEL 202 PHOTOS OF POSSIBLE UST LOCATION FIGURE 5

Appendix D

Soil Boring Logs

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

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

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

BORING NUMBER 202-1

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm) BKG.	OVA (ppm) SAMP.	LITHOLOGY	MATERIAL DESCRIPTION
0.0						Asphalt
			0	2.2		Light brown, sandy SILT
			0	12.2		
2.5			0	4.4		Brown tan, sandy CLAY
			0	4.3		
		GB	0	7.4		
5.0			0	0		
			0	0		
7.5			0	0		Gray, silty CLAY
			0	0		
10.0			0	0		Orange tan, clayey SILT
			0	0		
			0	0		
12.5						Bottom of borehole at 12.0 feet.

BORING DIAGRAM

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

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

Remarks:
Soil sample collected from 4 to 5 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

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

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

BORING NUMBER 202-2

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm) BKG.	OVA (ppm) SAMP.	LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM
0.0						Asphalt	
			0	0		Light brown, sandy SILT	
			0	2.8			
2.5		GB	0	7.1		Orange tan, sandy CLAY, trace of mica	
			0	0.5			
			0	0.4			
5.0			0	0			
			0	0			
7.5			0	0			
			0	0			
10.0						Refusal at 9.0 feet. Bottom of borehole at 9.0 feet.	

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

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

Remarks:
Soil sample collected from 2 to 3 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

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

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

BORING NUMBER 202-3

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

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

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

Remarks:
Soil sample collected from 3 to 4 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

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

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

BORING NUMBER 202-4

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm) BKG.	OVA (ppm) SAMP.	LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM
0						Concrete	
			0	0		Tan brown, sandy SILT	
1			0	0			
2			0	0		Orange brown, sandy SILT, trace of mica	
3		GB	0	0			
4			0	0			
5						Refusal at 5.0 feet. Bottom of borehole at 5.0 feet.	
6							

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 5 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 3 to 4 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

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Raleigh, North Carolina 27607
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BORING NUMBER 202-5

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

BORING DIAGRAM

DEPTH (ft) 0.0, 2.5, 5.0, 7.5, 10.0

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 9 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 2 to 3 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

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3334 Hillsborough Street
Raleigh, North Carolina 27607
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BORING NUMBER 202-6

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 4 to 5 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

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Charlotte, North Carolina 28203
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3334 Hillsborough Street
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)

BORING NUMBER 202-7

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 5 to 6 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

hart hickman
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Charlotte, North Carolina 28203
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3334 Hillsborough Street
Raleigh, North Carolina 27607
919-847-4241(p) 919-847-4261(f)

BORING NUMBER 202-8

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 5 to 6 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

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BORING NUMBER 202-9

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

BORING DIAGRAM

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 0 to 1 ft bgs

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

BORING NUMBER 202-10

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 0 to 1 ft bgs

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Raleigh, North Carolina 27607
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BORING NUMBER 202-11

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

BORING DIAGRAM

DEPTH (ft) 0.0, 2.5, 5.0, 7.5, 10.0

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 10 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 0 to 1 ft bgs

BORING NUMBER 202-12

hart hickman
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Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)

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

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm) BKG.	OVA (ppm) SAMP.	LITHOLOGY	MATERIAL DESCRIPTION	BORING DIAGRAM	DEPTH (ft)
0.0						Asphalt		0.0
		GB	0	0		Light brown, sandy SILT		
			0	0		Tan brown, sandy CLAY		
2.5			0	0				2.5
			0	0				
			0	0				
5.0			0	0				5.0
			0	0		Moist, orange gray, silty CLAY		
			0	0				
7.5			0	0				7.5
			0	0				
			0	0				
10.0			0	0				10.0
						Refusal at 11.0 feet. Bottom of borehole at 11.0 feet.		

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 11 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 0 to 1 ft bgs

BORING LOG - HART HICKMAN.GDT - 8/8/13 10:48 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

hart hickman
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BORING NUMBER 202-13

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 0 to 1 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

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Raleigh, North Carolina 27607
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BORING NUMBER 202-14

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

DEPTH (ft)	RECOVERY (%)	SAMPLE TYPE NUMBER	OVA (ppm) BKG.	OVA (ppm) SAMP.	LITHOLOGY	MATERIAL DESCRIPTION
0.0		GB	0	0	Topsoil	Topsoil
			0	0	Reddish brown, sandy SILT	Reddish brown, sandy SILT
2.5			0	0	Tan brown, sandy CLAY, trace of mica	Tan brown, sandy CLAY, trace of mica
			0	0		
			0	0		
5.0			0	0		
			0	0	Orange gray, silty CLAY	Orange gray, silty CLAY
7.5			0	0		
			0	0		
10.0			0	0		
			0	0		
			0	0		
12.5						Bottom of borehole at 12.0 feet.

BORING DIAGRAM

DEPTH (ft) 0.0, 2.5, 5.0, 7.5, 10.0, 12.5

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 0 to 1 ft bgs

BORING LOG - HART HICKMAN.GDT - 7/30/13 16:00 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

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BORING NUMBER 202-15

PROJECT: NC DOT State Project U-0071 - Parcel 202
JOB NUMBER: ROW-416
LOCATION: Durham, NC

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

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

BORING STARTED: 7/10/13
BORING COMPLETED: 7/10/13
TOTAL DEPTH: 12 ft.
TOP OF CASING ELEV:
DEPTH TO WATER:

Remarks:
Soil sample collected from 0 to 1 ft bgs

BORING LOG - HART HICKMAN.GDT - 8/8/13 10:48 - S:\AAA-MASTER GINT PROJECTS\ROW-416\PARCEL 202.GPJ

Appendix E

Laboratory Analytical Report

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

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

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

July 19, 2013

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

RE: Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Dear Chemical Engineer:
Enclosed are the analytical results for sample(s) received by the laboratory on July 11, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

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

Sincerely,

Kevin Godwin

kevin.godwin@pacelabs.com
Project Manager

Enclosures

cc: David Graham, NCDOT East Central

Pace Analytical Services, Inc.
205 East Meadow Road - Suite A
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2225 Riverside Dr.
Asheville, NC 28804
(828)254-7176

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

CERTIFICATIONS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Charlotte Certification IDs
9800 Kincey Ave. Ste 100, Huntersville, NC 28078
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12
South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
West Virginia Certification #: 357
Virginia/VELAP Certification #: 460221

REPORT OF LABORATORY ANALYSIS

Pace Analytical
www.pacelabs.com

Pace Analytical Services, Inc.
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Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92164767001	**202-1 @ 4-5'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767002	**202-2 @ 2-3'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767003	**202-3 @ 3-4'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767004	**202-4 @ 3-4'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767005	**202-5 @ 2-3'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767006	**202-6 @ 4-5'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767007	**202-7 @ 5-6'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767008	**202-8 @ 5-6'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767009	**202-9 @ 0-1'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767010	**202-10 @ 0-1'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767011	**202-11 @ 0-1'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767012	**202-12 @ 0-1'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767013	**202-13 @ 0-1'**	EPA 8015 Modified	EJK	2	PASI-C

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767014	**202-14 @ 0-1'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C
92164767015	**202-15 @ 0-1'**	EPA 8015 Modified	EJK	2	PASI-C
		EPA 8015 Modified	GAW	2	PASI-C
		ASTM D2974-87	TNM	1	PASI-C

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PROJECT NARRATIVE

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Method: **EPA 8015 Modified**
Description: 8015 GCS THC-Diesel
Client: NCDOT East Central
Date: July 19, 2013

General Information:
15 samples were analyzed for EPA 8015 Modified. All samples were received in acceptable condition with any exceptions noted below.

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

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

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

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

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

QC Batch: OEXT/22947

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

- 202-10 @ 0-1' (Lab ID: 92164767010)
  - n-Pentacosane (S)

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

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

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

Additional Comments:

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PROJECT NARRATIVE

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Method: **EPA 8015 Modified**
Description: Gasoline Range Organics
Client: NCDOT East Central
Date: July 19, 2013

General Information:
15 samples were analyzed for EPA 8015 Modified. All samples were received in acceptable condition with any exceptions noted below.

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

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

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

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

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

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

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

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

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

Additional Comments:

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

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-1 @ 4-5' **Lab ID: 92164767001** Collected: 07/09/13 14:45 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	ND	mg/kg	5.8	1	07/11/13 16:30	07/12/13 23:43	68334-30-5	
Surrogates								
n-Pentacosane (S)	82	%	41-119	1	07/11/13 16:30	07/12/13 23:43	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	4.9	1	07/15/13 14:02	07/15/13 16:43	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	77	%	70-167	1	07/15/13 14:02	07/15/13 16:43	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**14.3**	%	0.10	1		07/12/13 09:26		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-2 @ 2-3' **Lab ID: 92164767002** Collected: 07/09/13 15:10 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**7.8**	mg/kg	6.2	1	07/11/13 16:30	07/12/13 23:43	68334-30-5	
Surrogates								
n-Pentacosane (S)	81	%	41-119	1	07/11/13 16:30	07/12/13 23:43	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	6.0	1	07/15/13 14:02	07/15/13 17:06	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	91	%	70-167	1	07/15/13 14:02	07/15/13 17:06	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**19.8**	%	0.10	1		07/12/13 09:26		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-3 @ 3-4' **Lab ID: 92164767003** Collected: 07/09/13 15:30 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	ND	mg/kg	5.6	1	07/11/13 16:30	07/13/13 00:06	68334-30-5	
Surrogates								
n-Pentacosane (S)	85	%	41-119	1	07/11/13 16:30	07/13/13 00:06	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	4.2	1	07/15/13 14:02	07/15/13 17:29	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	79	%	70-167	1	07/15/13 14:02	07/15/13 17:29	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**11.1**	%	0.10	1		07/12/13 09:26		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-4 @ 3-4' **Lab ID: 92164767004** Collected: 07/10/13 10:10 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**17.0**	mg/kg	5.7	1	07/11/13 16:30	07/13/13 00:06	68334-30-5	
Surrogates								
n-Pentacosane (S)	84	%	41-119	1	07/11/13 16:30	07/13/13 00:06	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.4	1	07/15/13 14:02	07/15/13 17:52	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	86	%	70-167	1	07/15/13 14:02	07/15/13 17:52	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**12.3**	%	0.10	1		07/12/13 09:26		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-5 @ 2-3' **Lab ID: 92164767005** Collected: 07/10/13 10:20 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**24.4**	mg/kg	5.8	1	07/11/13 16:30	07/13/13 00:30	68334-30-5	
Surrogates								
n-Pentacosane (S)	87	%	41-119	1	07/11/13 16:30	07/13/13 00:30	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.8	1	07/15/13 14:02	07/15/13 18:15	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	85	%	70-167	1	07/15/13 14:02	07/15/13 18:15	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**13.7**	%	0.10	1		07/12/13 09:26		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-6 @ 4-5' **Lab ID: 92164767006** Collected: 07/10/13 10:40 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	ND	mg/kg	6.1	1	07/11/13 16:30	07/13/13 00:30	68334-30-5	
Surrogates								
n-Pentacosane (S)	69	%	41-119	1	07/11/13 16:30	07/13/13 00:30	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.3	1	07/15/13 14:02	07/15/13 18:38	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	83	%	70-167	1	07/15/13 14:02	07/15/13 18:38	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**17.9**	%	0.10	1		07/12/13 09:26		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-7 @ 5-6' **Lab ID: 92164767007** Collected: 07/10/13 10:55 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	ND	mg/kg	6.0	1	07/11/13 16:30	07/13/13 00:53	68334-30-5	
Surrogates								
n-Pentacosane (S)	79	%	41-119	1	07/11/13 16:30	07/13/13 00:53	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.2	1	07/15/13 14:02	07/15/13 19:01	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	91	%	70-167	1	07/15/13 14:02	07/15/13 19:01	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**17.1**	%	0.10	1		07/12/13 09:27		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-8 @ 5-6' **Lab ID: 92164767008** Collected: 07/10/13 11:05 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	ND	mg/kg	6.0	1	07/11/13 16:30	07/13/13 00:53	68334-30-5	
Surrogates								
n-Pentacosane (S)	80	%	41-119	1	07/11/13 16:30	07/13/13 00:53	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.2	1	07/15/13 14:02	07/15/13 19:24	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	78	%	70-167	1	07/15/13 14:02	07/15/13 19:24	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**16.7**	%	0.10	1		07/12/13 09:27		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-9 @ 0-1' **Lab ID: 92164767009** Collected: 07/10/13 11:25 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**14.2**	mg/kg	5.6	1	07/11/13 16:30	07/13/13 01:17	68334-30-5	
Surrogates								
n-Pentacosane (S)	65	%	41-119	1	07/11/13 16:30	07/13/13 01:17	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.1	1	07/15/13 14:02	07/15/13 19:47	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	85	%	70-167	1	07/15/13 14:02	07/15/13 19:47	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**10.4**	%	0.10	1		07/12/13 09:27		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-10 @ 0-1' **Lab ID: 92164767010** Collected: 07/10/13 11:35 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**333**	mg/kg	5.9	1	07/11/13 16:30	07/13/13 01:17	68334-30-5	
Surrogates								
n-Pentacosane (S)	123	%	41-119	1	07/11/13 16:30	07/13/13 01:17	629-99-2	S5
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.1	1	07/15/13 14:02	07/15/13 20:10	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	85	%	70-167	1	07/15/13 14:02	07/15/13 20:10	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**15.0**	%	0.10	1		07/12/13 09:27		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-11 @ 0-1' **Lab ID: 92164767011** Collected: 07/10/13 11:50 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**66.8**	mg/kg	5.8	1	07/11/13 16:30	07/13/13 01:41	68334-30-5	
Surrogates								
n-Pentacosane (S)	86	%	41-119	1	07/11/13 16:30	07/13/13 01:41	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	4.9	1	07/15/13 14:02	07/15/13 20:33	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	80	%	70-167	1	07/15/13 14:02	07/15/13 20:33	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**14.2**	%	0.10	1		07/12/13 09:27		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-12 @ 0-1' **Lab ID: 92164767012** Collected: 07/10/13 12:05 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**57.7**	mg/kg	5.8	1	07/11/13 16:30	07/13/13 01:41	68334-30-5	
Surrogates								
n-Pentacosane (S)	68	%	41-119	1	07/11/13 16:30	07/13/13 01:41	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.3	1	07/15/13 14:02	07/15/13 20:56	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	82	%	70-167	1	07/15/13 14:02	07/15/13 20:56	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**14.2**	%	0.10	1		07/12/13 09:27		

REPORT OF LABORATORY ANALYSIS

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

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

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

ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-13 @ 0-1' **Lab ID: 92164767013** Collected: 07/10/13 12:20 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**58.5**	mg/kg	5.3	1	07/11/13 16:30	07/13/13 02:04	68334-30-5	
Surrogates								
n-Pentacosane (S)	77	%	41-119	1	07/11/13 16:30	07/13/13 02:04	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.2	1	07/15/13 14:02	07/15/13 21:19	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	83	%	70-167	1	07/15/13 14:02	07/15/13 21:19	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**6.2**	%	0.10	1		07/12/13 09:27		

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-14 @ 0-1' **Lab ID: 92164767014** Collected: 07/10/13 12:35 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	ND	mg/kg	5.6	1	07/11/13 16:30	07/13/13 02:04	68334-30-5	
Surrogates								
n-Pentacosane (S)	79	%	41-119	1	07/11/13 16:30	07/13/13 02:04	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	5.7	1	07/15/13 14:02	07/15/13 21:42	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	82	%	70-167	1	07/15/13 14:02	07/15/13 21:42	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**10.8**	%	0.10	1		07/12/13 09:27		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Sample: 202-15 @ 0-1' **Lab ID: 92164767015** Collected: 07/10/13 13:00 Received: 07/11/13 15:04 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical Method: EPA 8015 Modified Preparation Method: EPA 3546							
Diesel Components	**5.9**	mg/kg	5.7	1	07/11/13 16:30	07/13/13 02:28	68334-30-5	
Surrogates								
n-Pentacosane (S)	75	%	41-119	1	07/11/13 16:30	07/13/13 02:28	629-99-2	
Gasoline Range Organics	Analytical Method: EPA 8015 Modified Preparation Method: EPA 5035A/5030B							
Gasoline Range Organics	ND	mg/kg	4.8	1	07/15/13 14:02	07/15/13 22:05	8006-61-9	
Surrogates								
4-Bromofluorobenzene (S)	85	%	70-167	1	07/15/13 14:02	07/15/13 22:05	460-00-4	
Percent Moisture	Analytical Method: ASTM D2974-87							
Percent Moisture	**12.6**	%	0.10	1		07/12/13 09:27		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

QC Batch: GCV/7080 Analysis Method: EPA 8015 Modified
QC Batch Method: EPA 5035A/5030B Analysis Description: Gasoline Range Organics
Associated Lab Samples: 92164767001, 92164767002, 92164767003, 92164767004, 92164767005, 92164767006, 92164767007, 92164767008, 92164767009, 92164767010, 92164767011, 92164767012, 92164767013, 92164767014, 92164767015

METHOD BLANK: 1010101 Matrix: Solid
Associated Lab Samples: 92164767001, 92164767002, 92164767003, 92164767004, 92164767005, 92164767006, 92164767007, 92164767008, 92164767009, 92164767010, 92164767011, 92164767012, 92164767013, 92164767014, 92164767015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	6.0	07/15/13 13:16	
4-Bromofluorobenzene (S)	%	93	70-167	07/15/13 13:16	

LABORATORY CONTROL SAMPLE: 1010102

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	mg/kg	49.6	48.2	97	70-165	
4-Bromofluorobenzene (S)	%			78	70-167	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1010103 1010104

Parameter	Units	92164741005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Gasoline Range Organics	mg/kg	ND	47.3	47.3	55.6	54.9	117	115	47-187	1	
4-Bromofluorobenzene (S)	%						85	86	70-167		

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QUALITY CONTROL DATA

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

QC Batch: OEXT/22947 Analysis Method: EPA 8015 Modified
QC Batch Method: EPA 3546 Analysis Description: 8015 Solid GCSV
Associated Lab Samples: 92164767001, 92164767002, 92164767003, 92164767004, 92164767005, 92164767006, 92164767007, 92164767008, 92164767009, 92164767010, 92164767011, 92164767012, 92164767013, 92164767014, 92164767015

METHOD BLANK: 1008387 Matrix: Solid
Associated Lab Samples: 92164767001, 92164767002, 92164767003, 92164767004, 92164767005, 92164767006, 92164767007, 92164767008, 92164767009, 92164767010, 92164767011, 92164767012, 92164767013, 92164767014, 92164767015

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Components	mg/kg	ND	5.0	07/12/13 23:19	
n-Pentacosane (S)	%	87	41-119	07/12/13 23:19	

LABORATORY CONTROL SAMPLE: 1008388

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Diesel Components	mg/kg	66.7	52.5	79	49-113	
n-Pentacosane (S)	%			86	41-119	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1008389 1008390

Parameter	Units	92164767015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Diesel Components	mg/kg	5.9	76.4	76.4	58.5	56.7	69	67	10-146	3	
n-Pentacosane (S)	%						79	77	41-119		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

QC Batch: PMST/5664
QC Batch Method: ASTM D2974-87
Analysis Method: ASTM D2974-87
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 92164767001, 92164767002, 92164767003, 92164767004, 92164767005, 92164767006, 92164767007, 92164767008, 92164767009, 92164767010, 92164767011, 92164767012, 92164767013, 92164767014, 92164767015

SAMPLE DUPLICATE: 1008378

Parameter	Units	92164586002 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	7.9	9.0	12	

SAMPLE DUPLICATE: 1008379

Parameter	Units	92164165001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	9.5	9.3	2	

QUALIFIERS

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

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

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-C	Pace Analytical Services - Charlotte

ANALYTE QUALIFIERS

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

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: NCDOT-ROW-416 WBS#34745.1.1
Pace Project No.: 92164767

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92164767001	**202-1 @ 4-5'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767002	**202-2 @ 2-3'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767003	**202-3 @ 3-4'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767004	**202-4 @ 3-4'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767005	**202-5 @ 2-3'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767006	**202-6 @ 4-5'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767007	**202-7 @ 5-6'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767008	**202-8 @ 5-6'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767009	**202-9 @ 0-1'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767010	**202-10 @ 0-1'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767011	**202-11 @ 0-1'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767012	**202-12 @ 0-1'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767013	**202-13 @ 0-1'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767014	**202-14 @ 0-1'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767015	**202-15 @ 0-1'**	EPA 3546	OEXT/22947	EPA 8015 Modified	GCSV/15066
92164767001	**202-1 @ 4-5'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767002	**202-2 @ 2-3'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767003	**202-3 @ 3-4'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767004	**202-4 @ 3-4'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767005	**202-5 @ 2-3'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767006	**202-6 @ 4-5'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767007	**202-7 @ 5-6'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767008	**202-8 @ 5-6'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767009	**202-9 @ 0-1'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767010	**202-10 @ 0-1'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767011	**202-11 @ 0-1'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767012	**202-12 @ 0-1'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767013	**202-13 @ 0-1'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767014	**202-14 @ 0-1'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767015	**202-15 @ 0-1'**	EPA 5035A/5030B	GCV/7080	EPA 8015 Modified	GCV/7081
92164767001	**202-1 @ 4-5'**	ASTM D2974-87	PMST/5664		
92164767002	**202-2 @ 2-3'**	ASTM D2974-87	PMST/5664		
92164767003	**202-3 @ 3-4'**	ASTM D2974-87	PMST/5664		
92164767004	**202-4 @ 3-4'**	ASTM D2974-87	PMST/5664		
92164767005	**202-5 @ 2-3'**	ASTM D2974-87	PMST/5664		
92164767006	**202-6 @ 4-5'**	ASTM D2974-87	PMST/5664		
92164767007	**202-7 @ 5-6'**	ASTM D2974-87	PMST/5664		
92164767008	**202-8 @ 5-6'**	ASTM D2974-87	PMST/5664		
92164767009	**202-9 @ 0-1'**	ASTM D2974-87	PMST/5664		
92164767010	**202-10 @ 0-1'**	ASTM D2974-87	PMST/5664		
92164767011	**202-11 @ 0-1'**	ASTM D2974-87	PMST/5664		
92164767012	**202-12 @ 0-1'**	ASTM D2974-87	PMST/5664		
92164767013	**202-13 @ 0-1'**	ASTM D2974-87	PMST/5664		
92164767014	**202-14 @ 0-1'**	ASTM D2974-87	PMST/5664		
92164767015	**202-15 @ 0-1'**	ASTM D2974-87	PMST/5664		

REPORT OF LABORATORY ANALYSIS

Pace Analytical	Sample Condition Upon Receipt (SCUR)	Page 1 of 2
	Document Number: F-CHR-CS-03-rev.11	Issuing Authority: Pace Huntersville Quality Office

Client Name: Hart and Hickman

Where Received: ☑ Huntersville ☐ Asheville ☐ Eden ☐ Raleigh

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other_____

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

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other_____

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

Temp Correction Factor **T1102**: No Correction **T1301**: No Correction

Corrected Cooler Temp.: 2.3 C **Biological Tissue is Frozen:** Yes No (N/A)

Temp should be above freezing to 6°C **Comments:**

Optional
Proj. Due Date:
Proj. Name:

Date and Initials of person examining contents: CP 7/11/13

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix:_____	☐Yes ☑No ☐N/A	12. No Time on labels - All VPH kits Pg2 #1 time is 1220, #2 is 1235, #3 is 1300
All containers needing preservation have been checked.	☐Yes ☐No ☑N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	
exceptions: VOA, coliform, TOC, O&G, WI-DRO (water)	☐Yes ☑No	
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	14.
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	15.
Trip Blank Present:	☐Yes ☐No ☑N/A	16.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):_____		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

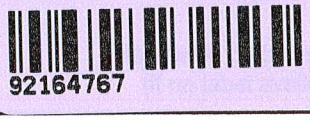
Comments/ Resolution: _____

SCURF Review: JDM **Date:** 7/11/13

SRF Review: [signature] **Date:** 7/12/13

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

WO#: 92164767



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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 2

1686031

Section A — **Required** Client Information:

Company: Hart & Hickman
Address: 2923 S. Tryon Street
Suite 100 Charlotte, NC
Email To: DGraham@harthickman.com
Phone: 704-887-4630 Fax:
Requested Due Date/TAT:

Section B — **Required** Project Information:

Report To: David Graham
Copy To:
Purchase Order No.: WBS# 34745.1.1
Project Name: NCDOT - ROW-416
Project Number: ROW-416

Section C — Invoice Information:

Attention: Cynthia Wells
Company Name: Hart & Hickman
Address: cwells@harthickman.com
Pace Quote Reference:
Pace Project Manager:
Pace Profile #: 5279-2

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NC

Section D — **Required** Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE)

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	TPH - GRO	TPH - DRO	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	202-1 @ 4-5'	SL	G	7/9/13		7/9/13	1445		4									N	X	X		001
2	202-2 @ 2-3'			7/9/13		7/9/13	1510												X	X		002
3	202-3 @ 3-4'			7/9/13		7/9/13	1530												X	X		003
4	202-4 @ 3-4			7/10/13		7/10/13	1010												X	X		004
5	202-5 @ 2-3			7/10/13		7/10/13	1020												X	X		005
6	202-6 @ 4-5			7/10/13		7/10/13	1040												X	X		006
7	202-7 @ 5-6			7/10/13		7/10/13	1055												X	X		007
8	202-8 @ 5-6			7/10/13		7/10/13	1105												X	X		008
9	202-9 @ 0-1			7/10/13		7/10/13	1125												X	X		009
10	202-10 @ 0-1			7/10/13		7/10/13	1135												X	X		010
11	202-11 @ 0-1			7/10/13		7/10/13	1150												X	X		011
12	202-12 @ 0-1			7/10/13		7/10/13	1205												X	X		012

92164767

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
* Separate chain required for each site/separate lab report	Matt Gillis	7/11/13	0950	[signature] pace	7/11/13	0950	
	[signature] pace	7/11/13	1584	[signature] A. Kelly/Pace	7/11/13	15:04	2.3 Y W Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Matt Gillis
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 7/11/13

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 2

1686032

Section A Required Client Information:

Company: Hart & Hickman
Address: 2923 S. Tryon Street
Suite 100 Charlotte, NC
Email To: DGraham@harthickman.com
Phone: 704-887-4630 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: David Graham
Copy To:
Purchase Order No.: WBS # 34745.1.1
Project Name: NCDOT - ROW-416
Project Number: ROW-416

Section C Invoice Information:

Attention: Cynthia Wells
Company Name: Hart & Hickman
Address: cwells@harthickman.com
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NC

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	TPH - GRO	TPH - DRO	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	202-13 @ 0-1	SL	G			7/10/13			4										X	X		013
2	202-14 @ 0-1	"	"			7/10/13			4										X	X		014
3	202-15 @ 0-1	"	"			7/10/13			4										X	X		015
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

Requested Analysis Filtered (Y/N)

92164767 Pace Project No./ Lab I.D.

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Matt Gillis	7/11/13	0950	[illegible] pace	7/11/13	0950				
	[illegible] pace	7/11/13	15:04	A. [illegible] Pace	7/11/13	1504	2.3	Y	W	X

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Matt Gillis
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 7/11/13

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.