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Mid Atlantic
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EXPERIENCED
CUSTOMER FOCUSED
INNOVATIVE

Preliminary Site Assessment Report
Richard S. Smith Revocable 1990 Trust Property
Parcel No. 5

Location:

Richard S. Smith Revocable 1990 Trust
1100 N. Berkeley Boulevard
Goldsboro, North Carolina 27534
Wayne County PIN 3519840829.00

Description:

US 13 (Berkeley Blvd) – Realignment of SR 1709 (Central Heights Road) at Berkeley Blvd.
TIP No.: U-5724
WBS Element: 54016.1.2

Report Date: October 30, 2018
MAA Job #: 000R3203.00

Prepared By:
Mid-Atlantic Associates, Inc.
409 Rogers View Court
Raleigh, North Carolina 27610
919-250-9918

MAAONLINE.COM

PRELIMINARY SITE ASSESSMENT REPORT
RICHARD S. SMITH REVOCABLE 1990 TRUST PROPERTY
PARCEL NO. 5
TIP NO: U-5724
WBS ELEMENT: 54016.1.2
WAYNE COUNTY
WAYNE COUNTY PIN 3519840829.00

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US 13 (Berkeley Blvd) – Realignment of SR 1709 (Central Heights Road)
at Berkeley Blvd.

SITE:
Richard S. Smith Revocable 1990 Trust
1100 N. Berkeley Boulevard
Goldsboro, North Carolina 27534

Prepared For:

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

Prepared By:

Mid-Atlantic Associates, Inc.
409 Rogers View Court
Raleigh, North Carolina 27610
Mid-Atlantic Job No. 000R3203.00

October 30, 2018

Mid Atlantic
Engineering & Environmental Solutions

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Prepared By:

MID-ATLANTIC ASSOCIATES, INC.

DocuSigned by:
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NORTH CAROLINA LICENSED SEAL 1338 GEOLOGIST RAYMOND S. MARCHANT, III

10/30/18

Raymond S. Marchant, III, P.G.
Principal Geologist

DocuSigned by:
DAC98CAB8CA24E8...

Daniel H. Nielsen, P.E.
Principal Engineer

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LIST OF ACRONYMS

2000 Guidelines	Groundwater Section Guidelines for Investigation and Remediation of Soil and Groundwater, DENR, Division of Water Quality Groundwater Section, July 2000.
2008 Guidelines	Underground Storage Tank Section Guidelines for Assessment and Corrective Action, DENR, Division of Waste Management UST Section, July 15, 2008.
AFVR	Aggressive Fluid-Vapor Recovery
AS	Air Sparge
AST	Aboveground Storage Tank
BQL	Below (Laboratory Practical) Quantitation Limit
BLS	Below Land Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAP	Corrective Action Plan
cm	Centimeter
COC	Constituents of Concern
CSA	Comprehensive Site Assessment
DIPE	Diisopropyl Ether (also IPE: Isopropyl Ether)
DNAPL	Dense Non-Aqueous Phase Liquids
DO	Dissolved Oxygen
DPT	Direct Push Technology
DRO	Diesel Range Organics
DSCA	North Carolina Dry-Cleaning Solvent Act
DTW	Depth to Water
DWM	Division of Waste Management
DWQ	Division of Water Quality
EDB	Ethylene di-bromide
EPA	Environmental Protection Agency
EPH	Extractable Petroleum Hydrocarbons
FID	Flame Ionization Detector
FT	Feet
GCL	Gross Contamination Level
GIS	Geographic Information System
GPM	Gallons Per Minute
GPS	Global Positioning System
GRO	Gasoline Range Organics
ID	Identification
IDW	Investigation Derived Waste
IGQS	Interim Groundwater Quality Standards
LSA	Limited Site Assessment
LUST	Leaking Underground Storage Tank
m	Meter
MADEP	Massachusetts Department of Environmental Protection
Mid-Atlantic	Mid-Atlantic Associates, Inc.
MDL	Method Detection Limit
mg/Kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MMP	Minimum Management Practices
MMPE	Mobile Multi-Phase Extraction
MNA	Monitored Natural Attenuation
MSCC	Maximum Soil Contaminant Concentration
MSL	Mean Sea Level
MTBE	Methyl tertiary butyl ether
µg/Kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
NA	Not Analyzed
N/A	Not Applicable
NC	North Carolina
NCAC	North Carolina Administrative Code
NCDENR	North Carolina Department of Environment and Natural Resources
NCDOT	North Carolina Department of Transportation
NCGQS	North Carolina Groundwater Quality Standards
NCSWQS	North Carolina Surface Water Quality Standards
ND	Not Detected
NM	Not Measured
NORR	Notice of Regulatory Requirements
NOV	Notice of Violation
NRP	Notice of Residual Petroleum
NS	Not Sampled
OVA	Organic Vapor Analyzer
PA	Prioritization Assessment
PAA	Prioritization Assessment Agreement
PAH	Polynuclear Aromatic Hydrocarbons
Pb	Lead
PCBs	Polychlorinated Biphenyls
PCE	Perchloroethylene (also tetrachloroethene)
PPB	Parts Per Billion
PPM	Parts Per Million
PID	Photo Ionization Detector
POTW	Publicly Owned Treatment Works
PQL	Practical Quantitation Limit
PRF	Prioritization Ranking Form
PVC	Polyvinyl chloride
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act
ROI	Radius of Influence
s	Seconds
SAR	Soil Assessment Report
SOW	Scope of Work
STG	Soil-to-Groundwater
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
TDHF	Toxicologically Defined Hydrocarbon Fractions
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
US	United States
USCS	Unified Soil Classification System
USGS	United States Geological Survey
UST	Underground Storage Tank
UT	Unnamed Tributary
VOC	Volatile Organic Compounds
VPH	Volatile Petroleum Hydrocarbons
yr	Year

1.0 INTRODUCTION

Mid-Atlantic Associates, Inc. (Mid-Atlantic) has prepared this Preliminary Site Assessment (PSA) Report in response to the North Carolina Department of Transportation's (NCDOT) Request for Technical and Cost Proposal (RFP) dated July 30, 2018 and in accordance with Mid-Atlantic's "Revision No. 1 Technical and Cost Proposal for Preliminary Site Assessment" dated August 15, 2018. Mid-Atlantic has performed the PSA for the Richard S. Smith Revocable 1990 Trust property (Subject Site), located at 1100 N. Berkeley Boulevard in Goldsboro, North Carolina (**Drawing 1.1**). The Subject Site is one of four parcels being assessed in association with this project. Acquisition of the right-of-way/easement is necessary for roadway improvements along this project. The Subject Site has historically operated as a petroleum retail facility and is currently occupied by an International House of Pancakes (IHOP) restaurant.

The NCDOT contracted with Mid-Atlantic to perform the PSA due to the historical use of petroleum hydrocarbons at the Subject Site. The PSA was performed to determine if relict UST systems may exist and/or if the soils and/or groundwater have been impacted as a result of the historical use of the Subject Site.

This report documents the results of the geophysical survey, the locations and volume of any USTs identified in the investigation area, and the subsurface investigation of identified areas of concern conducted at the site. The opinions included herein are based on our experience and information obtained during the study. This report is based on limited observations made on the dates noted using procedures described herein. If additional information becomes available, we request the opportunity to review the information, reassess the potential environmental concerns, and modify our conclusions, if appropriate.

1.1 Site Description

The Subject Site is located in a mostly commercial area of Goldsboro, although residential properties are located nearby to the south and east of the site. It is currently developed with an IHOP restaurant. The site is bounded to the north and east by an Autozone and a Lowes Home Improvement, to the northwest by Berkeley Boulevard (NC Highway 13), and by a railroad track and Central Heights Road to the south. It is our understanding that NCDOT plans to acquire a portion of the railroad right of way for the road improvements, although access has not yet been secured from the railroad operator. Therefore, the scope of this investigation does not include the railroad right of way, and a second investigation may be required after access to the railroad right of way is secured. Please refer to **Drawing 1.1** for the site location and site topography.

1.2 Scope of Work

Per the NCDOT RFP, the scope of work for this PSA is as follows:

- Notify property owner/tenant of proposed work scope.
- Locate all USTs and determine approximate size and contents (if any).
- Determine if contaminated soils are present.
- Test soil for contaminants relevant to the site's past use and/or possible release(s) using UVF methodology.
- Include the RedLab graphs in reports in the report and send the GeoEnvironmental Section a copy of the RedLab Excel file(s).
- If contamination is evident and groundwater is encountered, convert one boring into a temporary well and collect a groundwater sample.
- If contamination is evident, estimate the quantity of impacted soils and indicate the approximate area of soil contamination on a site map.
- Provide a MicroStation file with the location of soil borings, USTs, soil contamination and monitoring wells.
- Prepare a report including field activities, findings, and recommendations for the site.

2.0 SITE HISTORY

2.1 Parcel Usage

Based on historical aerial photography and UST database records, the Subject Site was operated as a convenience store and petroleum retail facility from 1974 until 2005, and demolition occurred sometime between 2006 and 2007. It appears that the site was a cleared lot for a few years demolition and the current IHOP was constructed in 2009. Historical aerial photographs from Google Earth are included as **Appendix A**.

2.2 Facility ID Numbers

The Subject Site was identified in the North Carolina Department of Environmental Quality (NCDEQ) UST Database as Facility ID number 00-0-0000005363 and is listed as the Happy Store #346 and being owned by Triton Marketing of Atlanta, Georgia. Please refer to the table below for information regarding the USTs that were formerly located at the site.

Tank No.	Const. Type	Install Date	Size (Gallons)	Tank Dimensions	Closure Date	Registered Contents
1	Single Wall Steel	5/3/74	8,000	8' Diameter 21'4" Length	1/27/90	Gasoline

2	Single Wall Steel	5/3/74	8,000	8' Diameter 21'4" Length	1/27/90	Gasoline
3	Single Wall Steel	5/3/74	8,000	8' Diameter 21'4" Length	1/27/90	Gasoline
4	Single Wall Steel	5/3/74	6,000	8' Diameter 16' Length	1/27/90	Gasoline
1A	Single Wall Steel	1/27/90	10,000	8' Diameter 26'7" Length	1/28/05	Gasoline
2A	Single Wall Steel	1/27/90	10,000	8' Diameter 26'7" Length	1/28/05	Gasoline
3A	Single Wall Steel	1/27/90	6,000	8' Diameter 16' Length	1/28/05	Gasoline
4A	Single Wall Steel	1/27/90	6,000	8' Diameter 16' Length	1/28/05	Diesel
5A	Single Wall Steel	1/27/90	4,000	64" Diameter 24' Length	1/28/05	Kerosene

Notes:
1) UST Information obtained from the NCDEQ Registered UST Database.

2.3 Groundwater Incident Numbers

According to the NCDEQ Division of Waste Management (DWM) website, there is one known historical groundwater incident associated with the Subject Site. The Happy Store #346 (Incident 31440) reported a petroleum release in February of 2005 and was reportedly determined to be a low risk release and a Notice of Residual Petroleum was filed for the site in December of 2008. No reports were available on-line through NCDEQ's Laserfische site.

3.0 SITE OBSERVATIONS

3.1 Groundwater Monitoring Wells

Mid-Atlantic observed two former groundwater monitoring wells on the Subject Site (note: these wells are located in the current railroad right of way). The locations are shown on **Drawing 3.1**. Mid-Atlantic's technician opened the well covers and discovered that both wells were PVC and one was 4 inches in diameter and one was 2 inches in diameter. The wells appeared to have been abandoned (casings were filled with grout), although the manholes and pads were still intact.

3.2 Active USTs

No "Active" USTs were identified on site and no evidence of orphaned USTs were discovered during the geophysical survey.

3.3 Features Apparent Beyond ROW/Easement

No suspect features (i.e. monitoring wells, remediation systems, hydraulic lifts) were observed by Mid-Atlantic during the completion of this PSA.

4.0 METHODS

The PSA field activities included a geophysical survey of the proposed right-of-way, permanent utility easement, permanent drainage easement, and construction easement areas to help identify potential underground storage tanks or other subsurface anomalies that may require further investigation. Based on the results of the survey and historical information, soil and groundwater samples were collected to help identify contaminated soils and/or groundwater that may affect future roadbuilding or utility construction activities. These activities are outlined below. Field work was conducted under a Health and Safety Plan prepared by Mid-Atlantic Associates.

4.1 Geophysics

A geophysical survey of the area of concern on the Subject Site was conducted by Pyramid Geophysical Services (Pyramid) on August 22 and 23, 2018. The geophysical survey was completed to locate subsurface utilities and buried objects such as USTs, private utilities, etc. Sub-surface utilities and buried objects were scanned using a combination of electromagnetic (EM) and ground penetrating radar (GPR) methods. A description of the geophysical survey methods used at the Subject Site are included in Pyramid's "Geophysical Survey, Metallic UST Investigation: Parcel 5, NCDOT Project U-5724" dated September 5, 2018 and included in **Appendix B.** In addition, the area of the geophysical survey is shown in the drawings provided in Pyramid's report.

4.2 Borings and Temporary Well Installation

Before fieldwork was initiated, North Carolina 811 was contacted to mark public utility service lines. Following utility location, Mid-Atlantic completed assessment activities on September 24 and 25, 2018 [Note: Mid-Atlantic's field work was delayed approximately one week due to Hurricane Florence]. The activities included collection of soil samples from the borings and installation of one temporary monitoring well in the event that evidence of contamination was encountered in the soil. The drilling and temporary well construction services were performed by Quantex, Inc. of Raleigh, North Carolina and Mid-Atlantic's technician provided oversight. Boring locations were identified and placed on the Subject Site in areas of the right of way that were adjacent to known historical UST systems or in locations indicated by aerial photos and/or the GPR survey to contain suspect features (as applicable).

4.2.1 Soil Sampling Activities

On September 24, 2018, Mid-Atlantic mobilized to the site to oversee the advancement of nine soil borings on the parcel. The work was completed during the same mobilization as sampling conducted for Parcels 17, 22, and 24. Sampling locations were placed to assess soil quality at the locations shown on **Drawing 3.1**. Initially a total of nine locations were selected for investigation during the PSA (identified as SB-5-1 through SB-5-9). One of the borings (the eastern-most boring) was moved from its initial location to the final location of SB-5-9 to account for a drainage utility to be constructed near this area.

Using a GeoProbe "macrocore" sampling device and direct push technology (DPT), continuous soil samples were collected at each soil boring and scanned for the presence of volatile organic compounds (VOCs) using a RKI GX6000 Photo-Ionization Detector (PID). The borings were advanced to a depth of approximately 10 feet BLS. The soils were classified for soil type and screened at approximate two-foot intervals using the PID. Boring Logs **(Appendix C)** note the PID readings and soil type descriptions recorded by Mid-Atlantic personnel as drilling progressed. In general, the soils at the site consisted of light brown to tan clayey to silty fine to medium sands.

Upon completion of the borings (and completion of the borings at the other three parcels), Mid-Atlantic collected GPS coordinates on September 26, 2018 for the sampling locations using a Trimble Geo 7X unit. The coordinates were used to place the final locations of the sample points on the provided drawings.

4.2.2 Groundwater Sampling Activities

As mentioned earlier, one temporary monitoring well (TMW-5-2) was installed after boring SB-5-2 exhibited petroleum odors and elevated PID readings upon penetration of the water table. The temporary well was constructed as follows:

- The boring was advanced using the Geoprobe's macrocore sampler through the saturated zone to a depth of 12 feet BLS (water table at 5.8 feet BLS);
- A one-inch diameter, Schedule 40 PVC well was installed with 10 feet of 0.010-inch slotted screen (screened 2 to 12) and was fitted with a threaded bottom cap and threaded riser to approximately six inches above land surface;
- A sand pack was installed from bottom of well to just above the top of the screened interval; and
- The well was developed by purging with a bailer to remove fine particles.

Upon completion of the well construction and sample collection, the well was abandoned by pulling the casing from the ground and filling the hole with soil cuttings.

4.2.3 Sample Protocol

A total of nine soil samples were collected for laboratory analysis in accordance with the Mid-Atlantic procedures located in **Appendix D.** Samples were collected into sampling containers provided by the laboratory, packed into an ice-filled cooler and shipped to Rapid Environmental Diagnostics Laboratories, LLC (RED Lab) in Wilmington, North Carolina. The soil samples were analyzed for total petroleum hydrocarbons (TPH GRO and DRO) and other constituents using the ultraviolet fluorescence (UVF) detector method.

Additionally, a groundwater sample was collected from well TMW-5-2 using the methods described in **Appendix D**. The sample was shipped to Pace Analytical Laboratories in Mt. Juliet, Tennessee, where they were analyzed for VOCs using Standard Method 6200B and SVOCs using EPA Method 625.

5.0 RESULTS

5.1 Objects

5.1.1 Underground Storage Tanks

The site was used as a gasoline station from approximately 1974 to 2005 and utilized two different sets of gasoline underground storage tanks during that time period. However, records indicate that these USTs were removed from the ground upon being taken out of use. As shown in **Appendix B**, the geophysical survey did find evidence of suspected buried metallic debris (most likely from demolition of the former gasoline station at the site) but did not find evidence of USTs existing within the area of the survey.

5.1.2 Hydraulic Lifts

No Hydraulic lifts were identified during Mid-Atlantic's completion of this PSA.

5.1.3 Monitoring Wells

Mid-Atlantic observed two former groundwater monitoring wells on the Subject Site (note: these wells are located in the railroad right of way). The locations are shown on **Drawing 3.1.** Mid-Atlantic's technician opened the well covers and discovered that both wells were PVC and one was 4 inches in diameter and one was 2 inches in diameter. The wells appeared to have been abandoned (casings were filled with grout), although the manholes and pads were still intact.

5.1.4 Oil-Water Separators

No Oil-Water Separators (OWS) were identified during Mid-Atlantic's completion of this PSA.

5.2 Impacted Media

Impacts to soil and groundwater, including the depths and volume calculations (if applicable), are discussed below.

5.2.1 Impacted Soil &/or Water & Groundwater

As documented in RED Lab's report located in **Appendix E** and summarized (along with PID readings) in **Table 5.1**, TPH GRO was not detected in the collected soil samples at a concentration exceeding the UVF analyzer's detection limit. TPH DRO were detected in eight of the nine samples at concentrations exceeding the UVF analyzer's detection limit. However, none of the samples exhibited concentrations exceeding the NCDEQ Action Level of 100 mg/kg. The laboratory analytical report and graphs for the soil samples collected at the site are provided in **Appendix E**. Detected chemical constituents in soil samples are shown on **Drawing 3.1.**

An assessment of water (surface water) was not included in this scope of work. Surface water was not observed on site. A stormwater control measures device was observed in the approximate former location of the fueling station canopy.

A laboratory report for the groundwater sample collected from temporary monitoring well TMW-5-2 is provided in **Appendix F**, summarized in **Table 5.2,** and the results are shown on **Drawing 5.1**. As summarized, petroleum fuel-related constituents were detected at concentrations exceeding the NCGQS. The impacted groundwater is likely related to the historical incident #31440 that occurred at the subject site and was later closed by NCDEQ.

5.2.2 Depth

As documented in the soil boring logs and laboratory analytical reports, impacted soil above regulatory action limits was not encountered in the unsaturated zone in borings placed on the site. The depth to water in the borings ranged from approximately 3.6 feet to approximately 7.1 feet, generally getting deeper moving towards the west. Due to limited coverage of the soil sampling, it is possible that shallow petroleum contamination originating from former dispensers and/or piping in this area could exist in vadose zone soils in the area near the former canopy (boring locations SB-5-2 through SB-5-6). Additionally, the canopy extended into the current railroad ROW, which was not assessed during this PSA.

It appears that the shallow groundwater has been impacted by the historical UST release at the site. Given the depth to groundwater (generally in the 5 to 6 feet BLS range, and with the potential for variance due to natural fluctuation), it is possible that impacted groundwater may be encountered during the construction of drainage or other utilities.

5.2.3 Quantities Calculation

During the advancement of the soil borings completed for this PSA, petroleum-impacted soil was not encountered at concentrations exceeding NCDEQ's Action Levels for TPH. However, given the historical use of the site, it is possible that petroleum contamination could exist in vadose zone soils in the area near the former canopy as well as within the current railroad ROW. Although it is not expected that large quantities of impacted soil are present, additional assessment would be needed to better quantify any residual contamination.

6.0 CONCLUSIONS

6.1 Interpretation of Results

Based on the results of this assessment, Mid-Atlantic concludes the following:

- Historical data indicates that the site was used as a gasoline filling station from approximately 1974 to 2005, and two different sets of USTs were utilized during that period. Aerial photographs indicate that the canopy (and thus the dispensers/piping) extended into the current easement, as well as into the railroad's ROW. Although petroleum-impacted vadose zone soil was not found in this area during this assessment, it is possible that it could be present; and

- A historical release of petroleum has impacted the groundwater beneath the site. Based on the depth to groundwater (approximately 5 to 6 feet BLS, with potential for natural fluctuations), it is possible that impacted groundwater will be encountered during drainage utility and/or other construction activities.

6.2 Geophysics

Based on the results of the Geophysical assessment, Mid-Atlantic concludes the following:

- Evidence of suspected buried metallic debris (most likely from demolition of the former gasoline station at the site) was encountered, but there was no evidence of USTs existing within the area of the survey. The railroad ROW was not surveyed.

6.3 Sampling

Based on the results of the sampling, Mid-Atlantic concludes the following:

- Based on the nine soil borings advanced at the site, vadose zone contamination was not encountered but could possibly exist in shallow soils in the vicinity of the former canopy (dispensers and product lines); and

- Petroleum-impacted groundwater exceeding the NCGQS was encountered in a temporary well installed at location SB-5-2. This contamination is likely the result of the historical UST system release on the site.

6.4 Groundwater

The depth to groundwater at the site ranges from 3.6 feet to 7.1 feet, getting deeper moving towards the west. In the area of the temporary monitoring well, the depth to water was approximately 5.8 feet BLS. Based on the depth to water (and natural fluctuations) and the planned roadway construction activities, it appears possible that impacted groundwater could be encountered during drainage utility installation and/or operation.

6.5 Quantities

During the advancement of the soil borings completed for this PSA, petroleum-impacted soil was not encountered at concentrations exceeding NCDEQ's Action Levels for TPH. However, given the historical use of the site, it is possible that petroleum contamination could exist in vadose zone soils in the area near the former canopy as well as within the current railroad ROW. Although it is not expected that large quantities of impacted soil are present, additional assessment would be needed to better quantify remaining contamination.

7.0 RECOMMENDATIONS

Based on these results, Mid-Atlantic recommends the following:

- Although large quantities of residual vadose zone soil contamination are not expected, it is possible that it could be encountered during construction activities. If this is of concern to NCDOT, Mid-Atlantic recommends collecting shallow samples (0-5 ft) on a tighter grid pattern in proposed cut areas where the former dispensers and piping were located. This should be completed after access to the railroad's ROW is secured so that area can be investigated also;

- If residual soil contamination is encountered during roadway construction activities, it should be properly managed and disposed; and

- Since impacted groundwater is present at a relatively shallow depth (5 to 6 ft BLS range, with variations due to natural fluctuation), it is possible that it could be encountered during drainage utility construction or operation. Mid-Atlantic recommends constructing a sealed drainage system to prevent potentially impacted water from entering the pipes. If groundwater is encountered during construction, it should be containerized and properly managed and disposed.

TABLES

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TABLE 5.1
SOIL SAMPLING RESULTS
RICHARD S. SMITH REVOCABLE 1990 TRUST PROPERTY
GOLDSBORO, NORTH CAROLINA
MID-ATLANTIC JOB NO. R3203.00

SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (FEET BLS)	PID FIELD SCREENING (PPM)	TPH GRO (C5 - C10) MG/KG	TPH DRO (C5 - C35) MG/KG
SB 5-1	9/24/2018	2 - 3	1.10	<0.49	4.9
SB 5-2	9/24/2018	3 -4	1.40	<0.49	1.6
SB 5-3	9/24/2018	3 - 4	0.80	<0.27	0.27
SB 5-4	9/24/2018	3 - 4	0.90	<0.25	0.25
SB 5-5	9/24/2018	4 - 5	0.10	<0.43	0.43
SB 5-6	9/24/2018	4 - 5	0.40	<0.46	0.46
SB 5-7	9/24/2018	4 - 5	0.30	<0.24	<0.24
SB 5-8	9/24/2018	4 - 5	0.01	<0.49	1.1
SB 5-9	9/24/2018	5 - 6	0.20	<0.45	2

Notes:

BLS - Below Land Surface
PPM - Parts per million
MG/KG - milligrams per kilogram (ppm)

TABLE 5.2
SUMMARY OF CHEMICAL CONSTITUENTS DETECTED IN GROUNDWATER THAT EXCEED NC GROUNDWATER QUALITY STANDARDS
RICHARD S. SMITH REVOCABLE 1990 TRUST PROPERTY (PARCEL 5)
NCDOT: U-5724 GOLDSBORO PSA
GOLDSBORO, NORTH CAROLINA
MID-ATLANTIC JOB NO. R3203.00

CHEMICAL CONSTITUENT	CONCENTRATION (µg/L)	
	TMW-5-2 9/25/2018	NC Groundwater Quality Standards
Volatile Organic Compounds - SM 6200B		
Ethylbenzene	**1,280**	600
Isopropylbenzene	**168**	70
Naphthalene	**481**	6
n-Propylbenzene	**650**	70
1,2,4-Trimethylbenzene	**4,440**	400
1,3,5-Trimethylbenzene	**1,300**	400
Xylenes, total	**6,860**	500
Semi Volatile Organic Compounds - EPA Method 625		
Naphthalene	**233**	6

Notes:
(µg/L) = Microgram per liter (parts per billion)
NL = No NCGQS listed for analyte

DRAWINGS

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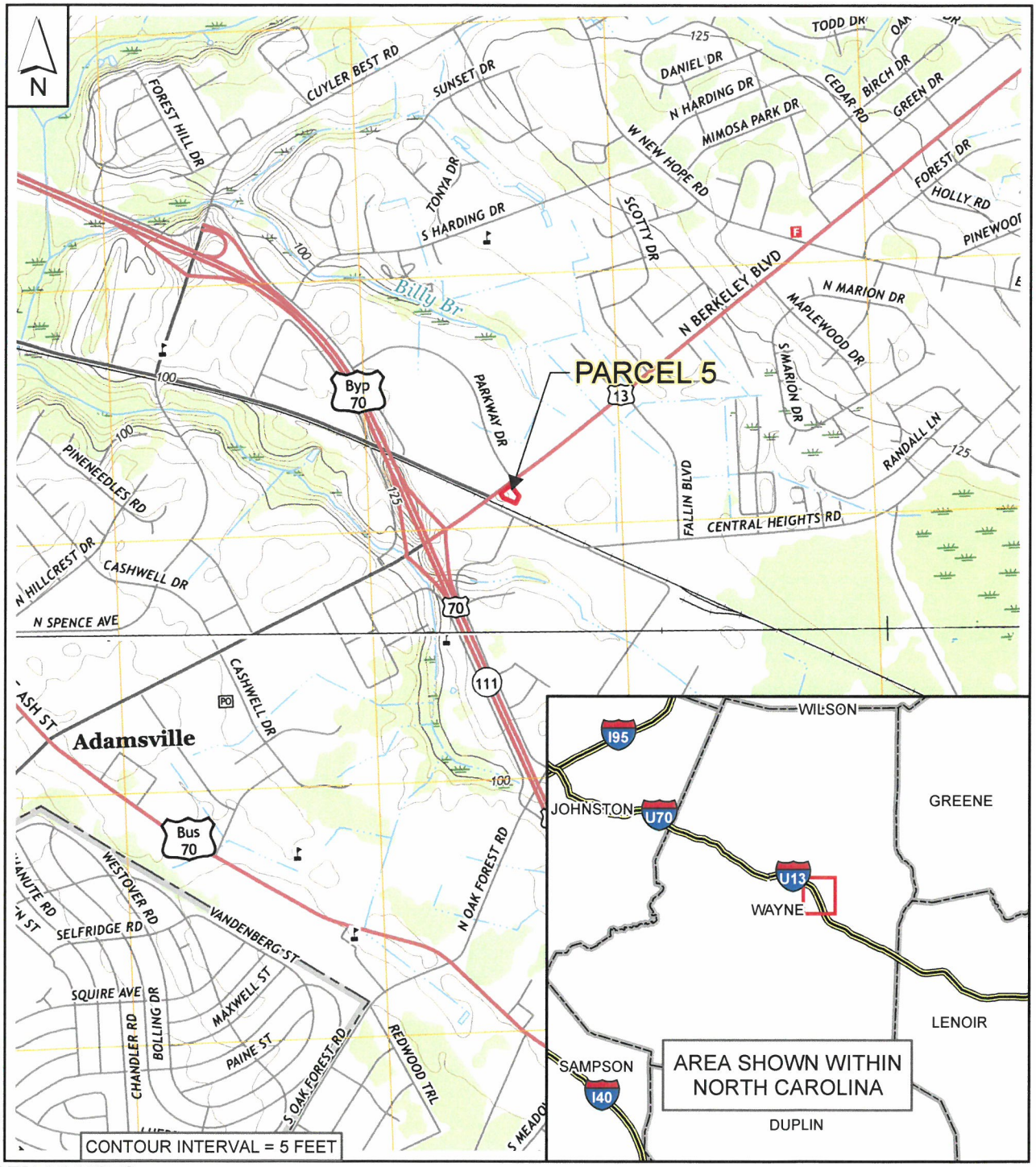


REFERENCES:

1. USGS TOPOGRAPHIC QUADRANGLES: NORTHEAST GOLDSBORO, NC - 2016; SOUTHEAST GOLDSBORO, NC - 2016
2. PROPERTY BOUNDARY FROM WAYNE COUNTY GIS
3. INSET MAP DIGITAL DATA FROM 2002 NATIONAL TRANSPORTATION ATLAS, BUREAU OF TRANSPORATION STATISTICS, WASHINGTON, D.C.

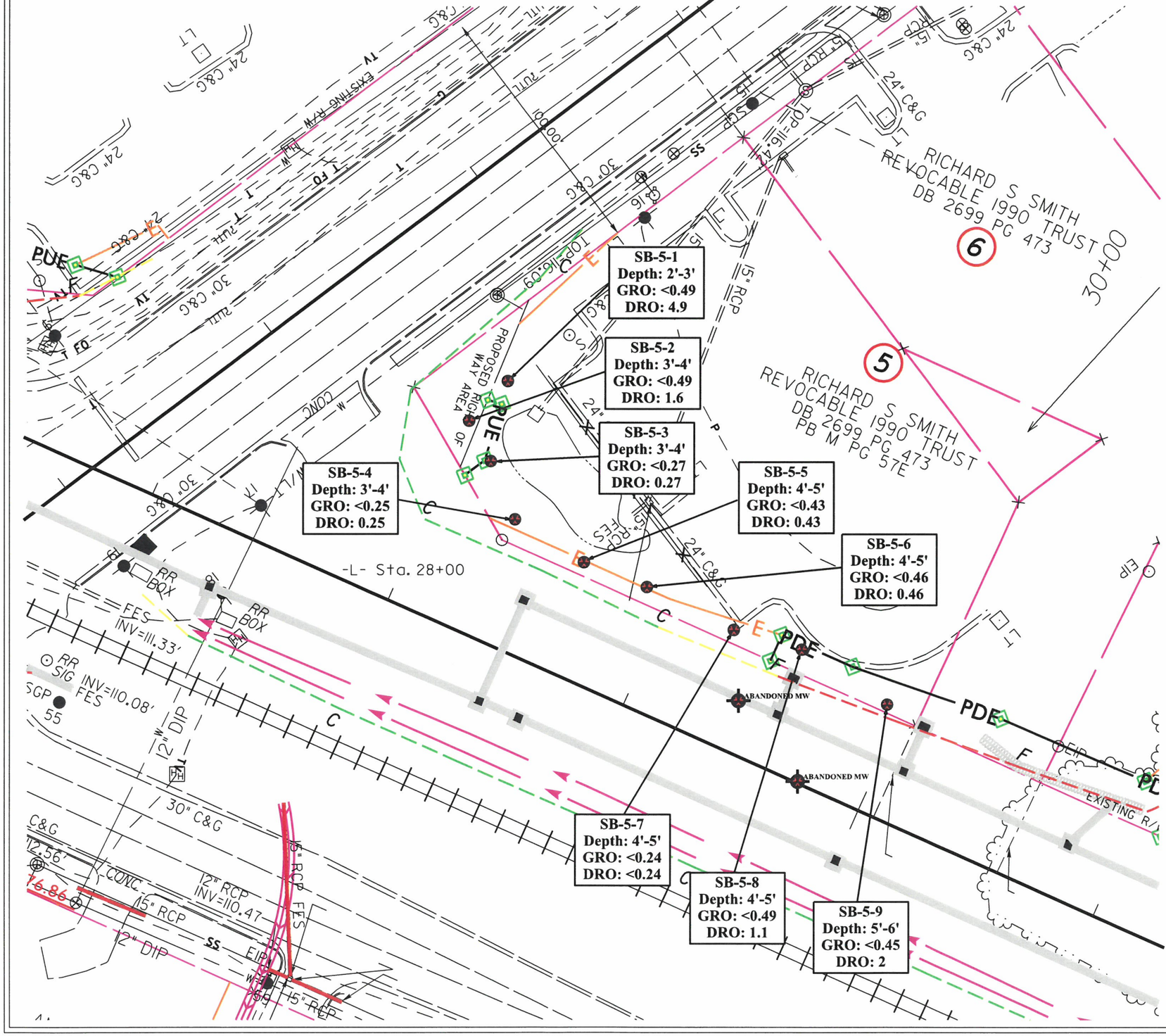
SCALE:1:24,000

0 1,000 2,000 4,000 Feet

Mid Atlantic Engineering & Environmental Solutions

TOPOGRAPHIC SITE MAP
PARCEL 5
RICHARD S. SMITH REVOCABLE 1990 TRUST PROPERTY
1100 N. BERKELEY BOULEVARD
GOLDSBORO, NORTH CAROLINA

DRAWN BY: JS	DATE: OCTOBER 2018
DRAFT CHECK: RSM	JOB NO: 000R3203.00
ENG. CHECK: RSM	GIS NO: 5G-R3203.00-01
APPROVAL: AW	DWG NO: 1.1



LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PDE — PROPOSED PERMANENT DRAINAGE
- PUE — PROPOSED PERMANENT UTILITY
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- SOIL BORING LOCATION
- ABANDONED MONITOR WELL

SB-X-X SAMPLE-PARCEL#-BORING
DRO DIESEL RANGE ORGANICS*
GRO GASOLINE RANGE ORGANICS*

*ALL CONCENTRATIONS PRESENTED IN mg/kg

DRAWN BY: EC
DRAFTING CHECK BY:
ENGINEER CHECK BY:
APPROVED BY:

DATE: OCTOBER 2018
JOB NO: R3203.00
CAD # FIGURE 2
DWG NO: 3.1

SOIL SAMPLE MAP
RICHARD S. SMITH PROPERTY
(PARCEL 5)
NCDOT PROJECT U-5724
1100 NORTH BERKELEY BOULEVARD
GOLDSBORO, NC

Mid Atlantic
Engineering & Environmental Solutions

REFERENCE: NCDOT MICROSTATION (FS, HYD_DRN, ROW, SS, DSN)

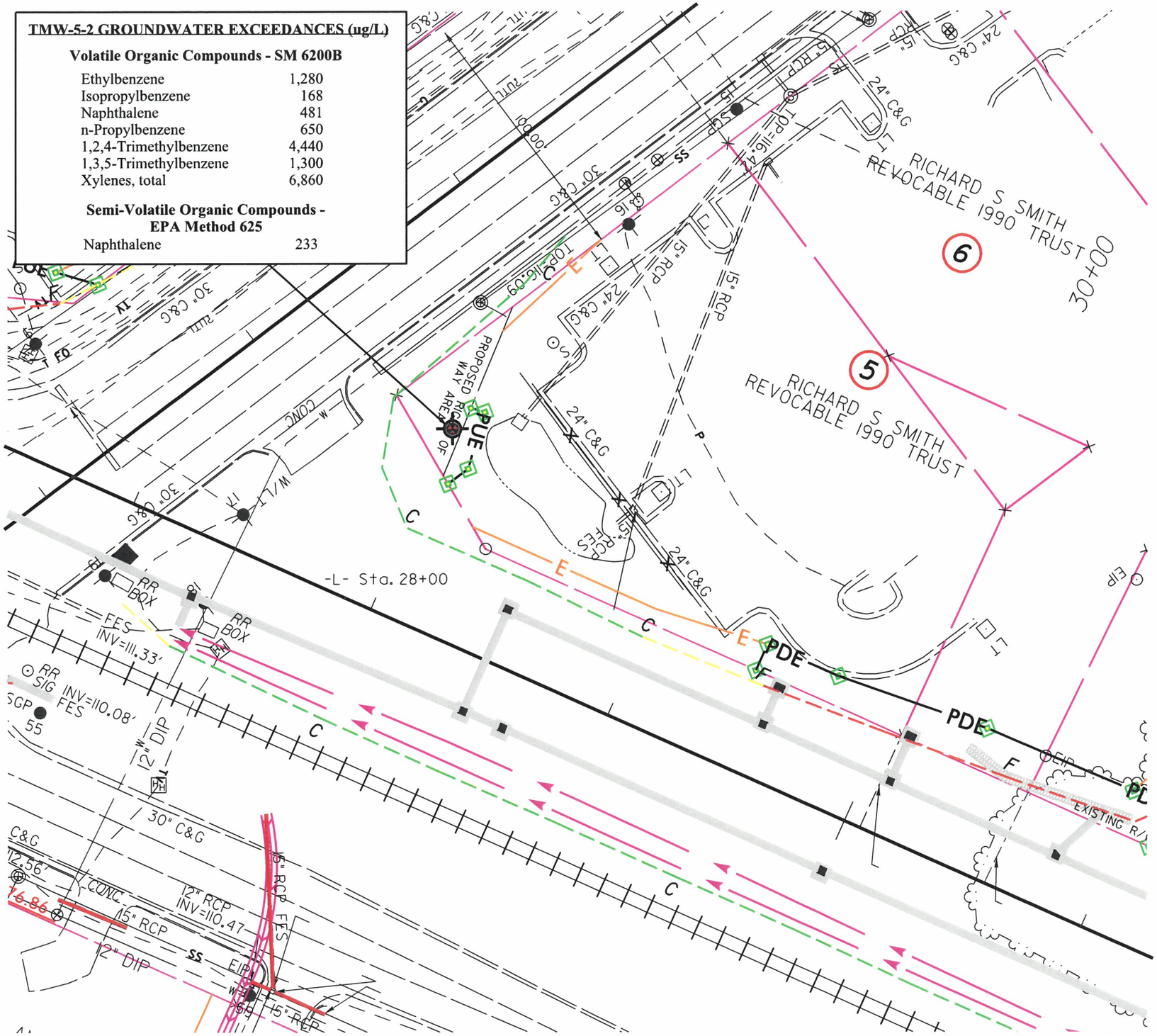
TMW-5-2 GROUNDWATER EXCEEDANCES (ug/L)

Volatile Organic Compounds - SM 6200B

Ethylbenzene	1,280
Isopropylbenzene	168
Naphthalene	481
n-Propylbenzene	650
1,2,4-Trimethylbenzene	4,440
1,3,5-Trimethylbenzene	1,300
Xylenes, total	6,860

Semi-Volatile Organic Compounds - EPA Method 625

Naphthalene	233



LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PDE – PROPOSED PERMANENT DRAINAGE
- PUE – PROPOSED PERMANENT UTILITY
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- TEMPORARY MONITOR WELL LOCATION

ug/L - MICROGRAMS PER LITER

0 40

SCALE: 1"= 40

DRAWN BY: EC	DATE: OCTOBER 2018
DRAFTING CHECK BY: DSN	JOB NO: R3203.00
ENGINEER CHECK BY: DSN	CAD # FIGURE 3
APPROVED BY: DSN	DWG NO: 5.1

GROUNDWATER SAMPLING MAP
RICHARD S. SMITH PROPERTY
(PARCEL 5)
NCDOT PROJECT U-5724
1100 NORTH BERKELEY BOULEVARD
GOLDSBORO, NC

Mid Atlantic
Engineering & Environmental Solutions

REFERENCE: NCDOT MICROSTATION (FS, HYD_DRN, ROW, SS, DSN)

APPENDIX A

HISTORICAL AERIALS AND SITE PHOTO LOG

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Former Canopy
Parcel No. 5, 1993 Aerial Photo Overlay
RICHARD S SMITH REVOCABLE 1990 TRUST DB 2699 PG 473
ROWAN ASSET COMPA DB 2707 PG 839
RICHARD S SMITH REVOCABLE 1990 TRUST DB 2699 PG 469
RICHARD S SMITH REVOCABLE 1990 TRUST DB 2699 PG 473 PB M PG 57E
12" DIP
EXISTING R/W
CR

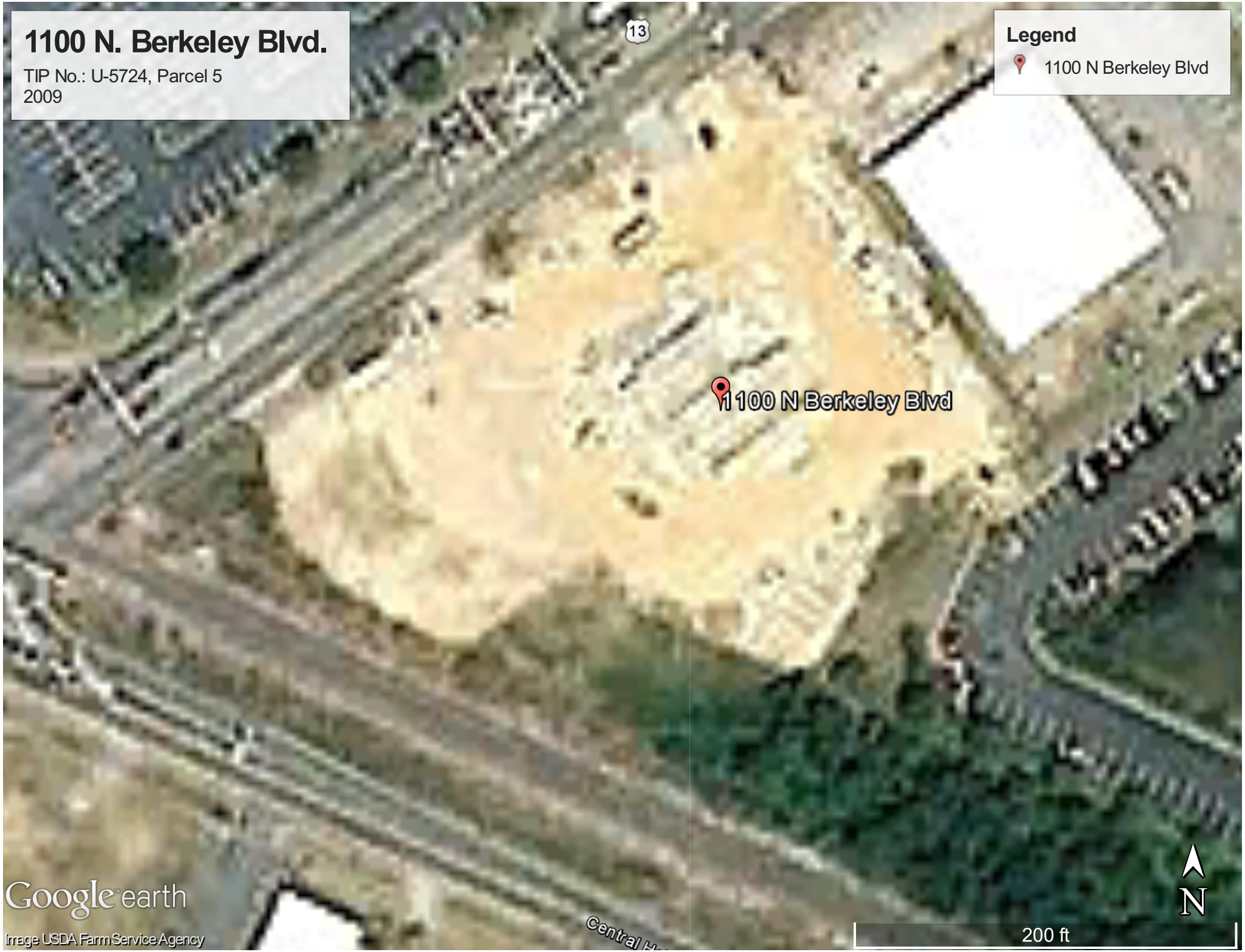

1100 N. Berkeley Blvd.
TIP NO.: U-5724, PARCEL 5
March 1993
Legend
1100 N Berkeley Blvd
N Berkeley Blvd
Royall Ave
1100 N Berkeley Blvd
13
1579
Central Heights Rd
Google earth
Image U.S. Geological Survey
N
300 ft

1100 N. Berkeley Blvd.

TIP No.: U-5724, Parcel 5
1998


1100 N. Berkeley Blvd.
TIP NO: U-5724, Parcel 5
2006
Legend
1001 N Berkeley Blvd
N Berkeley Blvd
Royall Ave
1100 N Berkeley Blvd
13
1579
Central Heights Rd
Google earth
Image USDA Farm Service Agency
N
300 ft


1100 N. Berkeley Blvd.
TIP No.: U-5724, Parcel 5
2007
Legend
1100 N Berkeley Blvd
13
1100 N Berkeley Blvd
Google earth
Image © 2018 DigitalGlobe
N
200 ft


1100 N. Berkeley Blvd.
TIP No.: U-5724, Parcel 5
2009
13
Legend
1100 N Berkeley Blvd
1100 N Berkeley Blvd
Google earth
Image USDA Farm Service Agency
N
200 ft


1100 N. Berkeley Blvd.
TIP No.: U-5724, Parcel 5
2013
Legend
1100 N Berkeley Blvd
13
1100 N Berkeley Blvd
Google earth
N
200 ft

Photo 1 – A general view of site.
(photo courtesy of Google Earth)

Photo 2 – A view of the four-inch diameter monitoring well (abandoned)
in the railroad right of way.

Photo 3 – A view of the two-inch diameter monitoring well (abandoned) in the railroad right of way.

Photo 4 – A view of the southeastern portion of the former canopy/dispenser island area. Stormwater control device now in this area.

APPENDIX B

GEOPHYSICAL REPORT

Mid Atlantic
Engineering & Environmental Solutions

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2018-230)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 5
NCDOT PROJECT U-5724 (54016.1.2)

1100 NORTH BERKELEY BOULEVARD, GOLDSBORO, NC

SEPTEMBER 5, 2018

Report prepared for: **Trey Marchant, P.G.**
Mid-Atlantic Associates, Inc.
409 Rogers View Court
Raleigh, NC 27610

Prepared by: _____
Eric C. Cross, P.G.
NC License #2181

Reviewed by: _____
Douglas A. Canavello, P.G.
NC License #1066

503 INDUSTRIAL AVENUE, GREENSBORO, NC 27406
P: 336.335.3174 F: 336.691.0648
C257: GEOLOGY C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 5 – 1100 North Berkeley Boulevard
Goldsboro, Wayne County, North Carolina

Table of Contents

Figures

LIST OF ACRONYMS

CADD .....Computer Assisted Drafting and Design
DF .....Dual Frequency
EM.....Electromagnetic
GPR.....Ground Penetrating Radar
GPS .....Global Positioning System
NCDOT.....North Carolina Department of Transportation
ROW .....Right-of-Way
UST .....Underground Storage Tank

EXECUTIVE SUMMARY

Project Description: Pyramid Environmental conducted a geophysical investigation for Mid-Atlantic Associates, Inc. at Parcel 5, located at 1100 North Berkeley Boulevard, in Goldsboro, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-5724). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted from August 22-23, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

Geophysical Results: The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of ten EM anomalies were identified. Several of the EM anomalies were directly attributed to visible cultural features. Multiple anomalies were associated with suspected buried metallic debris and/or utilities and were further investigated with GPR. GPR performed across EM anomalies within the footprint of the former gas station recorded evidence of buried debris and isolated structures that may be related to remnant debris/infrastructure. Extensive reconnaissance GPR scans were conducted across this area to further investigate for significant structures. No evidence of larger structures such as USTs was observed. The remaining GPR transects recoded additional evidence of suspected buried metallic debris. No evidence of larger structures was observed. Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 5.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Mid-Atlantic Associates, Inc. at Parcel 5, located at 1100 North Berkeley Boulevard, in Goldsboro, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-5724). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted from August 22-23, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a commercial building surrounded by grass, asphalt and gravel surfaces. Discussions with Mid-Atlantic indicated that a portion of the property formerly contained a gas station that had been demolished. Mid-Atlantic provided historical aerial photographs to Pyramid depicting the location of the former gas station on the west side of the parcel. An aerial photograph showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

FIELD METHODOLOGY

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. Pyramid collected the EM data using a Geonics EM61-MK2 (EM61) metal detector integrated with a Geode External GPS/GLONASS receiver. The integrated GPS system allows the location of the instrument to be recorded in real-time during data collection, resulting in an EM data set that is geo-referenced and can be overlain on aerial photographs and CADD drawings. A boundary grid was established around the perimeter of the site with marks every 10 feet to maintain orientation of the instrument throughout the survey and assure complete coverage of the area.

According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. Smaller objects (1-foot or less in size) can be detected to a maximum depth of 4 to 5 feet. The EM61 data were digitally collected at approximately 0.8-foot intervals along north-south trending or east-west trending, generally parallel survey lines, spaced five feet apart. The data were downloaded to a computer and reviewed in the field and office using the Geonics NAV61 and Surfer for Windows Version 15.0 software programs.

GPR data were acquired across select EM anomalies on August 23, 2018, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Data were collected both in reconnaissance fashion as well as along formal transect lines across EM features. The GPR data were viewed in real-time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 6 feet, based on dielectric constants calculated by the DF unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the DF unit for post-processing and figure generation.

Pyramid's classifications of USTs for the purposes of this report are based directly on the geophysical UST ratings provided by the NCDOT. These ratings are as follows:

Geophysical Surveys for Underground Storage Tanks
on NCDOT Projects

High Confidence	Intermediate Confidence	Low Confidence	No Confidence
Known UST Active tank - spatial location, orientation, and approximate depth determined by geophysics.	**Probable UST** Sufficient geophysical data from both magnetic and radar surveys that is characteristic of a tank. Interpretation may be supported by physical evidence such as fill/vent pipe, metal cover plate, asphalt/concrete patch, etc.	**Possible UST** Sufficient geophysical data from either magnetic or radar surveys that is characteristic of a tank. Additional data is not sufficient enough to confirm or deny the presence of a UST.	Anomaly noted but not characteristic of a UST. Should be noted in the text and may be called out in the figures at the geophysicist's discretion.

DISCUSSION OF RESULTS

Discussion of EM Results

A contour plot of the EM61 results obtained across the survey area at the property is presented in **Figure 2**. Each EM anomaly is numbered for reference in the figure. The following table presents the list of EM anomalies and the cause of the metallic response, if known:

LIST OF METALLIC ANOMALIES IDENTIFIED BY EM SURVEY

Metallic Anomaly #	Cause of Anomaly	Investigated with GPR
1	Drop Inlet/Sign/Manhole	
2	Manhole	
3	Suspected Buried Metallic Debris	☑
4	Utilities	
5	Hydrant	
6	Light	
7	Sign/Fence/Vehicles	
8	Suspected Buried Debris/ Former Gas Station Infrastructure	☑
9	Vehicle	
10	Suspected Buried Metallic Debris	☑

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including signs, vehicles, manholes, utilities, a hydrant, and a fence. Anomalies 3 and 10 were result of suspected buried metallic debris and Anomaly 8 was a result of suspected buried debris/former gas station infrastructure. These anomalies were further investigated with GPR.

Discussion of GPR Results

Figure 3 presents the locations of the representative GPR transects performed at the property, as well as transect images. A total of four GPR transects were recorded.

Transects 1 and 4 were collected across EM Anomaly 8. These transects showed both low- and high-amplitude anomalies indicative of potential buried debris and/or utilities. These

anomalies are located in the vicinity of the former gas station and may be related to remnant debris/infrastructure. Extensive reconnaissance GPR scans were conducted across this area to further investigate for significant structures. No evidence of larger structures such as USTs was observed.

Transects 2 and 3 were collected across EM Anomalies 3 and 10, respectively. These transects showed small, hyperbolic anomalies indicative of suspected buried metallic debris.

Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 5. **Figure 4** provides an overlay of the geophysical survey onto the NCDOT MicroStation engineering plans for reference.

SUMMARY & CONCLUSIONS

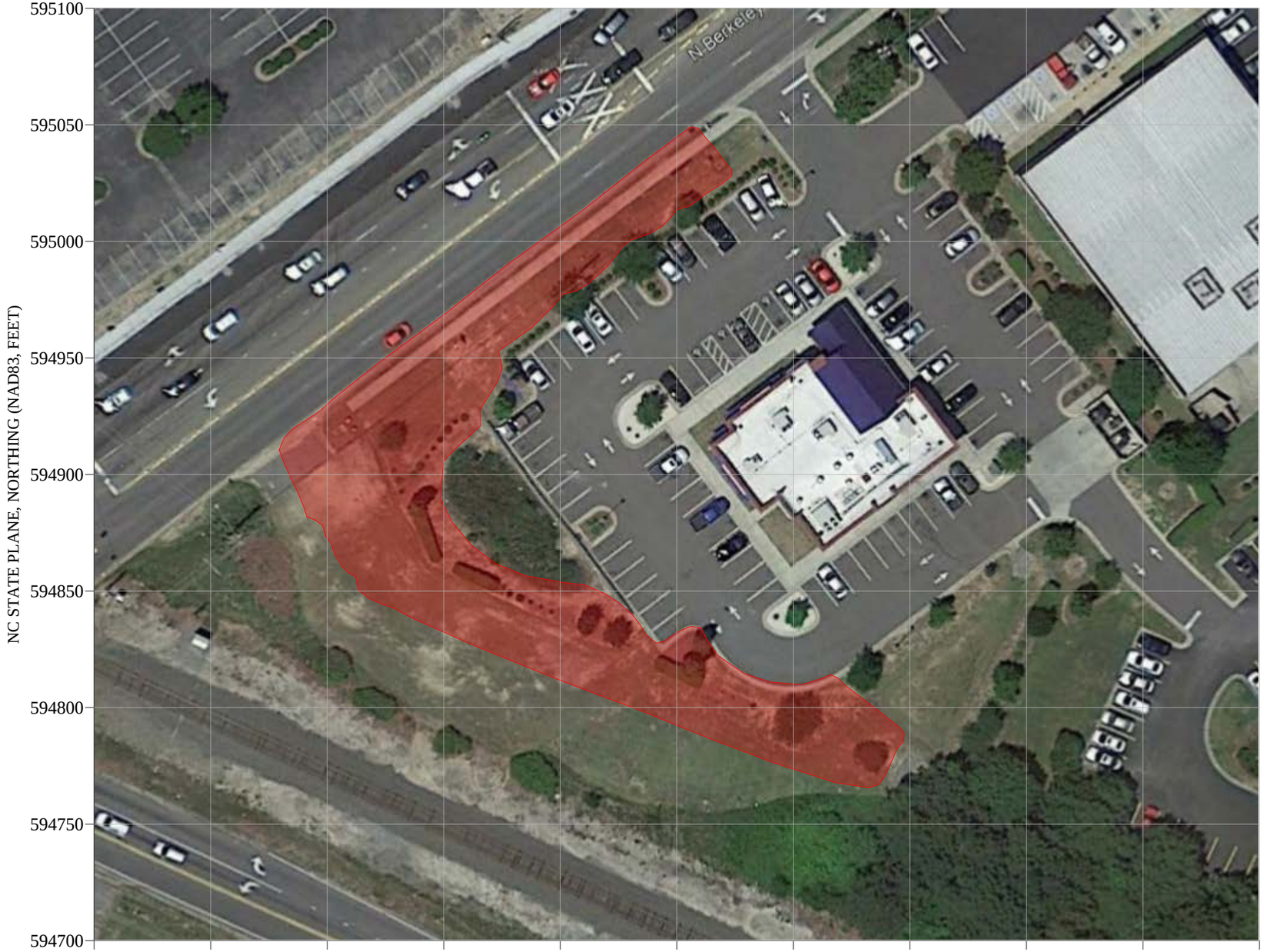
Pyramid's evaluation of the EM61 and GPR data collected at Parcel 5 in Goldsboro, North Carolina, provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- Several of the EM anomalies were directly attributed to visible cultural features.
- Multiple anomalies were associated with suspected buried metallic debris and/or utilities and were further investigated with GPR.
- GPR performed across EM anomalies within the footprint of the former gas station recorded evidence of buried debris and isolated structures that may be related to remnant debris/infrastructure. Extensive reconnaissance GPR scans were conducted across this area to further investigate for significant structures. No evidence of larger structures such as USTs was observed.
- The remaining GPR transects recoded additional evidence of suspected buried metallic debris. No evidence of larger structures was observed.
- Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 5.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for Mid-Atlantic Associates, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR surveys are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project have not conclusively determined the definitive presence or absence of metallic USTs, but the evidence collected is sufficient to result in the conclusions made in this report. Additionally, it should be understood that areas containing extensive vegetation, reinforced concrete, or other restrictions to the accessibility of the geophysical instruments could not be fully investigated.

APPROXIMATE BOUNDARIES OF GEOPHYSICAL SURVEY AREA



View of Survey Area
(Facing Approximately Northeast)

View of Survey Area
(Facing Approximately Southeast)

N

PYRAMID GEOPHYSICS
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GREENSBORO, NC 27460
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

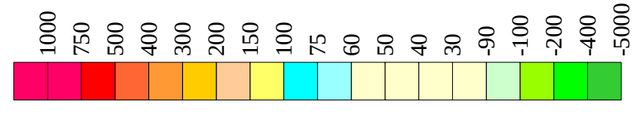
PROJECT	PARCEL 5 GOLDSBORO, NORTH CAROLINA NCDOT PROJECT U-5724	TITLE	PARCEL 5 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	DATE 8/22/2018 PYRAMID PROJECT #: 2018-230
CLIENT	MID-ATLANTIC ASSOCIATES, INC.			**FIGURE 1**

EM61 METAL DETECTION RESULTS

NO EVIDENCE OF UNKNOWN METALLIC USTs OBSERVED.

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM61 data were collected on August 22, 2018, using a Geonics EM61 instrument. Verification GPR data were collected using a GSSI UtilityScan DF instrument with a dual frequency 300/800 MHz antenna on August 23, 2018.

EM61 Metal Detection Response (millivolts)



N

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PROJECT: PARCEL 5
GOLDSBORO, NORTH CAROLINA
NCDOT PROJECT U-5724

TITLE: PARCEL 5 - EM61 METAL DETECTION CONTOUR MAP

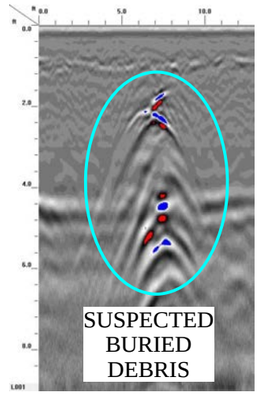
DATE: 8/22/2018

PYRAMID PROJECT #: 2018-230

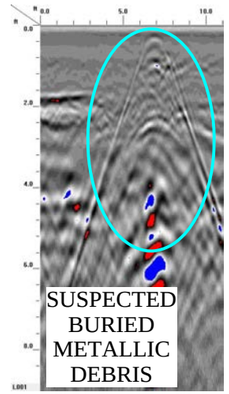
CLIENT: MID-ATLANTIC ASSOCIATES, INC.

FIGURE 2

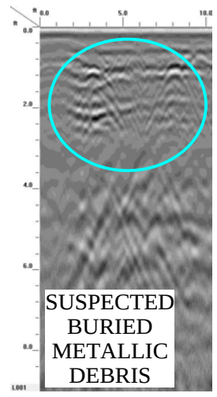
LOCATIONS OF GPR TRANSECTS



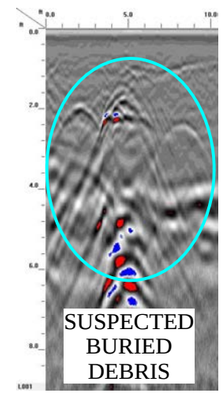
GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)



GPR TRANSECT 3 (T3)



GPR TRANSECT 4 (T4)

*EXTENSIVE GPR SCANS WERE CONDUCTED OVER THE ENTIRE SITE. TRANSECT LINES ON THE MAP ABOVE INDICATE LOCATIONS WHERE DATA WERE SAVED.
THESE LOCATIONS WERE CHOSEN TO HIGHLIGHT STRUCTURES IDENTIFIED IN THE SUBSURFACE OR TRANSECTS THAT ARE REPRESENTATIVE OF GENERAL SUBSURFACE CONDITIONS.

N

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PROJECT
PARCEL 5
GOLDSBORO, NORTH CAROLINA
NCDOT PROJECT U-5724

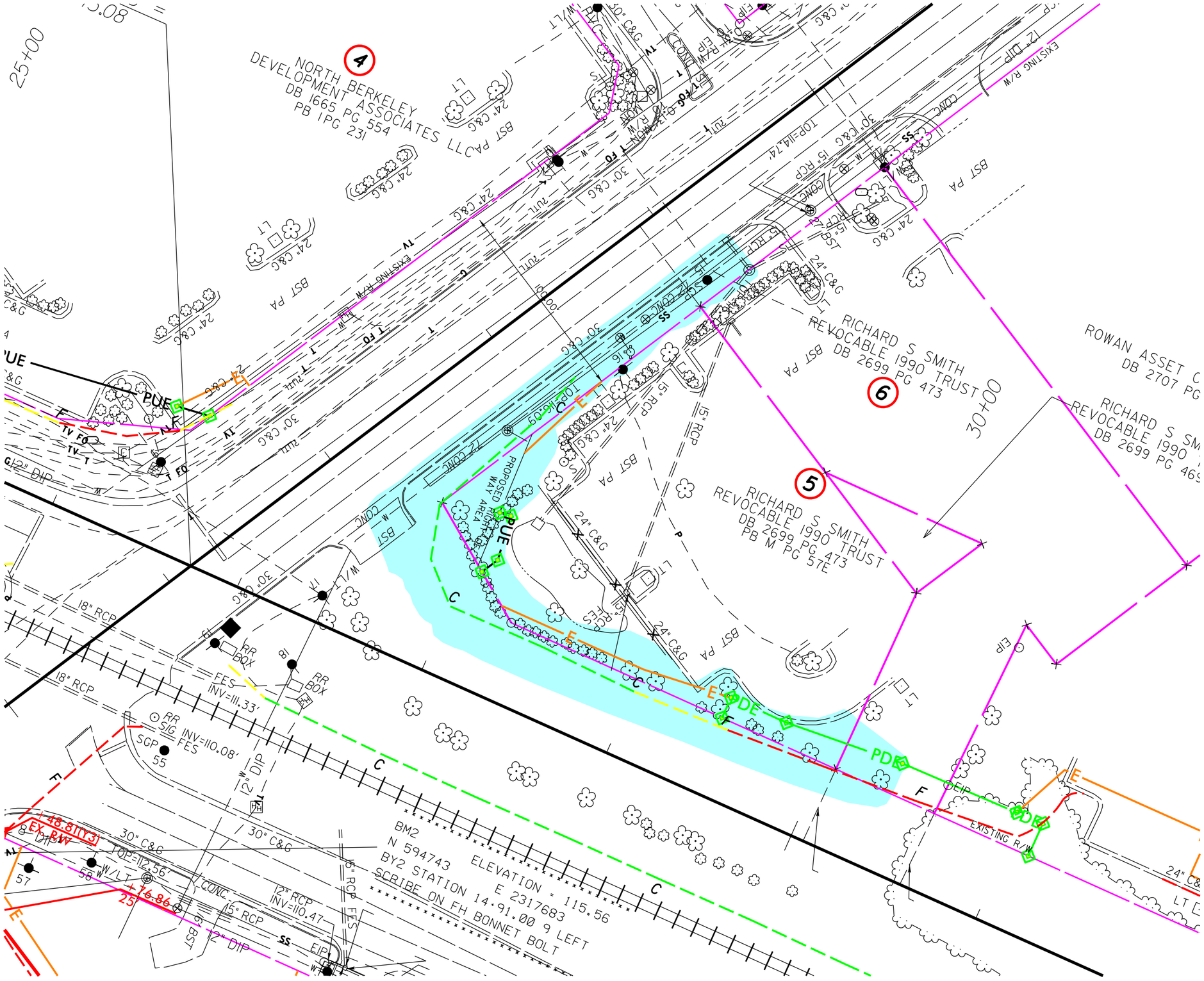
TITLE
PARCEL 5 - GPR TRANSECT LOCATIONS AND IMAGES

DATE 8/23/2018

PYRAMID PROJECT #: 2018-230

CLIENT MID-ATLANTIC ASSOCIATES, INC.

FIGURE 3



LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PDE — PROPOSED PERMANENT DRAINAGE
- PUE — PROPOSED PERMANENT UTILITY
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- GEOPHYSICAL SURVEY AREA

TITLE
OVERLAY OF GEOPHYSICAL SURVEY BOUNDARIES ON NCDOT ENGINEERING PLANS

PROJECT
PARCEL 5
GOLDSBORO, NORTH CAROLINA
NCDOT PROJECT U-5724

PYRAMID GEOPHYSICS
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27406
336.335.3174 (p) 336.691.0648 (f)
License # C1251 Eng. / #C257 Geology

DATE: 09-07-2018	REVISION NO. 0
PYRAMID PROJECT NO. 2018-230	FIGURE NO. 4

APPENDIX C

BORING LOGS

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Engineering & Environmental Solutions

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-1

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	10
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	N/A
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	N/A
Date Started:	9/24/2018	Driller :	James Barker	DTW (ft):	N/A
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
				Grass/topsoil		
	None	0.20				
2	None	1.10	Yes			2
	None	3.60				
4						4
				Light brown clayey silty fine to medium SAND		
6						6
	Moderate	15.90				
8						8
10				Boring Terminated at 10 ft-bgs Water level in borehole at 3.6ft-bgs		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-2/TMW-5-2

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	12
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	12
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	2-12'
Date Started:	9/24/2018	Driller :	James Barker	DTW (ft):	5.8
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
				Grass/topsoil		
	None	0.10			1in PVC Temp Well	
2	None	1.30				2
4	None	1.40	Yes			4
				Light brown slightly silty fine to coarse SAND 5'-10' macrocore only 2ft of recovery		
6	Moderate	4.90			Screen 2ft -12ft	6
8	Moderate	39.60				8
10				Boring Terminated at 10 ft-bgs After all borings were completed for Parcel 5 the drillers came back to SB-5-2 and Macrocored to 12 ft-bgs		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-3

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	10
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	N/A
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	N/A
Date Started:	9/24/2018	Driller :	James Barker	DTW (ft):	N/A
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
				Grass/topsoil		
	None	0.40		Light brown fine SAND		
2	None	0.80	Yes			2
4	None	0.90		Medium brown fine to medium SAND		4
	None	0.60		Tan slightly silty fine to medium SAND		
6						6
	Slight Odor	4.30				
8						8
10				Boring Terminated at 10 ft-bgs Water level in borehole at 5.3 ft-bgs		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-4

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	10
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	N/A
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	N/A
Date Started:	9/24/2018	Driller :	James Barker	DTW (ft):	N/A
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
				Grass/topsoil		
	None	0.40		Light brown to orange slightly clayey very fine to medium SAND		
2	None	0.90	Yes			2
4	None	0.70				4
	Slight	5.80		Tan slightly silty fine to medium SAND		
6						6
	Slight	9.60				
8						8
10				Boring Terminated at 10 ft-bgs Water level in borehole at 5.6 ft-bgs		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-5

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	10
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	N/A
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	N/A
Date Started:	9/25/2018	Driller :	James Barker	DTW (ft):	N/A
Date Completed:	9/25/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
				Grass/topsoil		
	None	0.00				
2	None	0.10				2
4	None	0.10	Yes			4
	None	0.20		Light brown to tan slightly clayey silty very fine to medium SAND		
6						6
	None	0.30				
8						8
10				Boring Terminated at 10 ft-bgs Water level in borehole at 6.4 ft-bgs		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-6

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	10
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	N/A
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	N/A
Date Started:	9/24/2018	Driller :	James Barker	DTW (ft):	N/A
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
				Grass/topsoil		
	None	0.60				
2	None	0.40				2
4	None	0.40	Yes			4
	None	0.40		Light brown slightly silty very fine SAND		
6						6
	None	0.30				
8						8
10				Boring Terminated at 10 ft-bgs Water level in borehole at 6.4 ft-bgs		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-7

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	10
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	N/A
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	N/A
Date Started:	9/24/2018	Driller :	James Barker	DTW (ft):	N/A
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
				Grass/topsoil		
	None	0.30		Light brown very fine SAND and CLAY		
2	None	0.20				2
4	None	0.30	Yes			4
	None	0.80		Tan slightly clayey to silty very fine to medium SAND		
6						6
8	None	1.60				8
10				Boring Terminated at 10 ft-bgs Water level in borehole at 6.1 ft-bgs		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-8

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	10
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	N/A
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	N/A
Date Started:	9/24/2018	Driller :	James Barker	DTW (ft):	N/A
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
				Grass/topsoil		
	None	0.02				
2	None	0.01				2
4	None	0.01	Yes			4
	None	0.20		Light brown to tan slightly clayey silty fine to medium SAND		
6						6
8	None	0.60				8
10				Boring Terminated at 10 ft-bgs Water level in borehole at 7.1 ft-bgs		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-5-9

Site Name:	NCDOT U-5724 PSA	Drilling/Boring Method:	Geoprobe	Total Boring Depth (ft):	10
Project Number:	000R3203.00	Sampling Method:	Macrocore	Well Depth (ft):	N/A
Location:	Goldsboro, NC	Subcontractor/Drillers:	Quantex, Inc.	Screen Depth (ft):	N/A
Date Started:	9/24/2018	Driller :	James Barker	DTW (ft):	N/A
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	Gary Fischer

ft -bgs	Sampling Interval, Odors	PID (ppm)	Sample to Laboratory	SOIL DESCRIPTION (color, texture, moisture, etc.)	Construction Details	ft-bgs
0				Grass/topsoil		0
2	None	0.10		Medium brown slightly silty very fine SAND 0'-5' Macrocore only 1' of recovery		2
4						4
6	None	0.20	Yes			6
8	None	0.30		Light brown fine SANDY CLAY		8
10	None	0.40		Tan slightly clayey fine to medium SAND		10
12				Boring Terminated at 10 ft-bgs Water level in borehole 6.8 ft-bgs		12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼

in - indicates inches
ft - indicates depth in feet
ft-bgs - indicates feet below ground surface

N/A - indicates not applicable to this boring
ppm - indicates parts per million
TD - Total Depth of Boring for Sampling

APPENDIX D

MID-ATLANTIC FIELD PROCEDURES

Mid Atlantic
Engineering & Environmental Solutions

Soil Sampling Procedures

I. Sample Collection

Direct Push Technology (DPT, or "Geoprobe")

DPT uses a truck-mounted hydraulic rig to push a steel sampling probe into the subsurface to collect soil and/or groundwater samples. The sampling device used to collect the soil samples during this investigation was the "macrocore" sampler. This sampler consists of a four-foot long, two-inch diameter stainless steel spoon containing a clear, acetate liner. When the macrocore sampler is driven into the subsurface, the soil is collected into the acetate liner and then retrieved to the land surface. The liner is then cut open and the soil lithology is characterized and soil samples are collected.

Split Spoon Sampling

This method of soil sampling is typically used during advancement of hollowstem augers for the construction of monitoring wells. Soil samples are obtained from the borings by driving a prewashed, 1-3/8-inch inner-diameter split-spoon sampler at five foot intervals to termination in general accordance with ASTM D-1586 (Standard Penetration Test) specifications. Blow counts for each six inches of split-spoon penetration are recorded during advancement of the spoon. Samples are then retrieved to the land surface, the split-spoon is opened, and the soil lithology is characterized and soil samples are collected.

Hand Augering

This method is typically used for shallow sampling in areas where access is limited or underground obstacles such as utilities may be present. A pre-washed, three-inch diameter steel auger bucket is attached to extension rods and manually turned to penetrate the subsurface to the desired sampling depth. Samples are then retrieved to the land surface and the soil lithology is characterized and soil samples are collected directly from the hand auger bucket.

Excavator Bucket Sampling

This method is typically used during UST excavation and soil excavation projects. The soil samples are collected from the excavator bucket when it is not safe to collect the samples by other means. Care is taken when collecting samples from the bucket to avoid soil that has come in contact with the bucket itself to avoid cross contamination.

II. Headspace Field Screening

A portion of each sample is removed from the sampling device and placed in a pre-labeled, plastic "ziploc" bag. After several minutes, the gas contained in the "headspace" or void area within the bag is tested with a photoionization detection (PID) and/or Flame Ionization Detector (FID). These are useful as scanning devices to detect the presence of volatile organic compounds (VOCs) but are not relied upon to determine specific levels of contamination. Typically, the samples exhibiting the highest headspace readings will be submitted to the laboratory for analysis.

III. Preparation for Laboratory Analysis

The sample collector dons new nitrile sampling gloves prior to handling each sample. The samples are placed into laboratory-prepared, pre-labeled, sampling containers, packed in ice, and shipped to a certified laboratory under chain-of-custody control. The sampler places an executed custody seal on the cooler prior to leaving the sampler's custody. Laboratory analyses to be performed on the samples, along with other sampling information, are specified on the chain-of-custody, which is placed in the cooler with the samples.

Groundwater Sampling Procedures

I. Sample Collection

A. Monitoring Wells

Prior to sample collection, each well is purged of three to five standing well volumes or to dryness to remove stagnant water from the well and well bore in an effort to collect samples that are representative of the water quality in the formation surrounding each well. Purging is performed either with a new, polyethylene bailer dedicated to each well, or with a decontaminated pump. Samples are retrieved from the monitoring well using the dedicated bailer. New nylon string is used on each dedicated bailer, and new nitrile sampling gloves are donned prior to purging and sampling of each well.

B. Geoprobe “Screen Point Sampler”

The screen point sampler is a “grab” sampling device that is driven into the saturated zone and a surrounding metal sheath is retracted, exposing a screen. Groundwater entering the screen is then drawn to land surface through disposable tubing that is placed through the hollow push rods. The sample is collected from the tubing into the appropriate sampling glassware.

C. Water-Supply Wells

Water samples are typically collected from the available spigot that is nearest to the well. The water is allowed to run at a high flow from the spigot for approximately 10 to 15 minutes to allow the water in the delivery lines to be purged. The sample flow is then reduced and the samples are collected directly into pre-labeled containers as described below. New nitrile sampling gloves are donned prior to sampling of each well.

D. Treatment System Influent/Effluent

Samples are typically collected from the influent or effluent of pump-and-treat groundwater remediation systems using designated sampling ports in the influent and effluent water transport lines. The water is typically allowed to run for several seconds to clear potential debris in the sampling port. The sample is then collected directly into sampling containers as described below. New nitrile sampling gloves are donned prior to sample collection.

II. Preparation for Laboratory Analysis

Groundwater samples are decanted directly into laboratory-prepared, pre-labeled, sampling containers, packed in ice, and shipped to a certified laboratory under chain-of-custody control. Laboratory analyses performed on the samples are specified on the chain-of-custody.

APPENDIX E

SOIL LABORATORY ANALYTICAL REPORTS AND GRAPHS

Mid Atlantic
Engineering & Environmental Solutions

QED

REDLAB™ RAPID ENVIRONMENTAL DIAGNOSTICS

QROS

Hydrocarbon Analysis Results

Client: MID ATLANTIC ASSOCIATES
Address: 409 ROGERS VIEW CT
RALEIGH NC 27610

Samples taken Monday, September 24, 2018
Samples extracted Monday, September 24, 2018
Samples analysed Thursday, September 27, 2018

Contact: TREY MARCHANT
COLLECTED BY GARY FISCHER
Project: NCDOT

Operator NICK HENDRIX

H09382

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	% Ratios			HC Fingerprint Match
										C5 - C10	C10 - C18	C18	
s	SB-5-1 (2'-3')	19.4	<0.49	<0.49	4.9	4.9	2.5	<0.16	<0.019	0	75.8	24.2	Deg.PHC 80.9%,(FCM)
s	SB-5-2 (3'-4')	19.5	<0.49	<0.49	1.6	1.6	1	<0.16	<0.02	0	83.5	16.5	Deg.Fuel 79.2%,(FCM)
s	SB-5-3 (3'-4')	10.8	<0.27	<0.27	0.27	0.27	0.24	<0.09	<0.011	0	69.6	30.4	V.Deg.PHC 75.9%,(FCM),(P)
s	SB-5-4 (3'-4')	10.1	<0.25	<0.25	0.25	0.25	0.14	<0.08	<0.01	0	74.1	25.9	V.Deg.PHC 91.5%,(FCM)
s	SB-5-5 (4'-5')	17.2	<0.43	<0.43	0.43	0.43	0.4	<0.14	<0.017	0	61.3	38.7	V.Deg.PHC 74.4%,(FCM),(BO),(P)
s	SB-5-6 (4'-5')	18.6	<0.46	<0.46	0.46	0.46	0.29	<0.15	<0.019	0	63.1	36.9	V.Deg.PHC 75.6%,(FCM),(BO),(P)
s	SB-5-7 (4'-5')	9.8	<0.24	<0.24	<0.24	0.16	0.16	<0.08	<0.01	0	64.4	35.6	Residual HC,(P)
s	SB-5-8 (4'-5')	19.5	<0.49	<0.49	1.1	1.1	0.54	<0.16	<0.02	0	67.5	32.5	V.Deg.PHC 91.3%,(FCM),(P)
s	SB-5-9 (5'-6')	17.9	<0.45	<0.45	2	2	0.98	<0.14	<0.018	0	68	32	V.Deg.PHC 94.1%,(FCM)
s													

Initial Calibrator QC check OK

Final FCM QC Check OK 98 %

Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

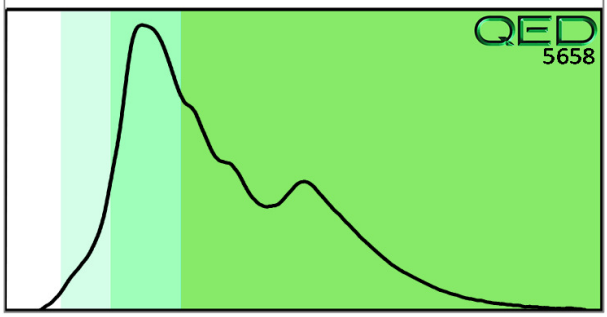
B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

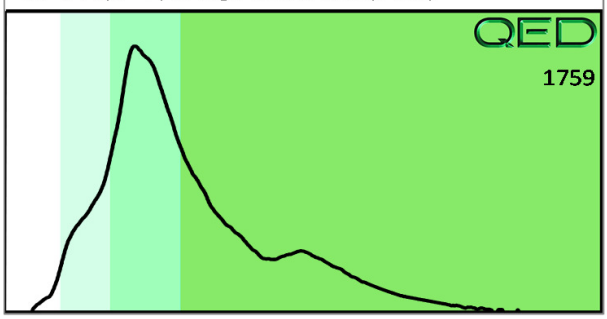
QED Hydrocarbon Fingerprints

Project: NCDOT ##################

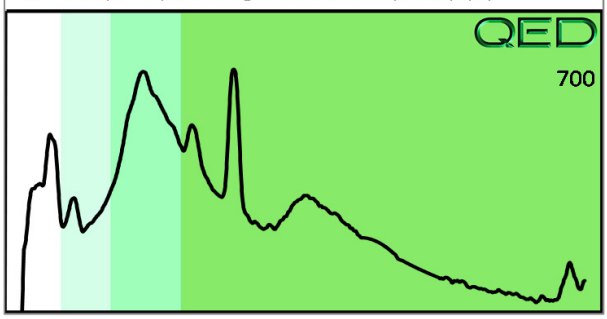
SB-5-1 (2'-3') : Deg.PHC 80.9%,(FCM)



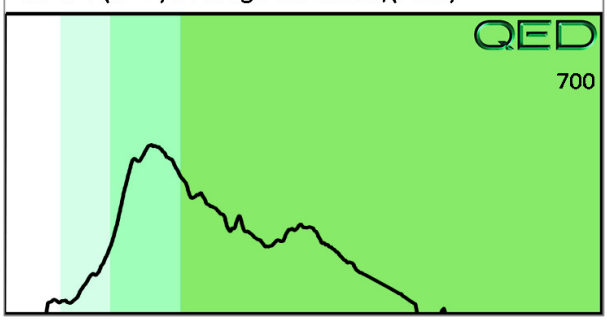
SB-5-2 (3'-4') : Deg.Fuel 79.2%,(FCM)



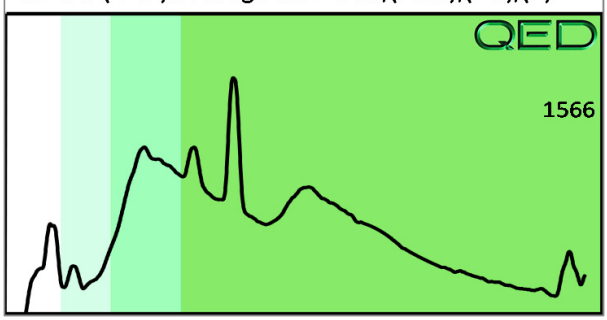
SB-5-3 (3'-4') : V.Deg.PHC 75.9%,(FCM),(P)



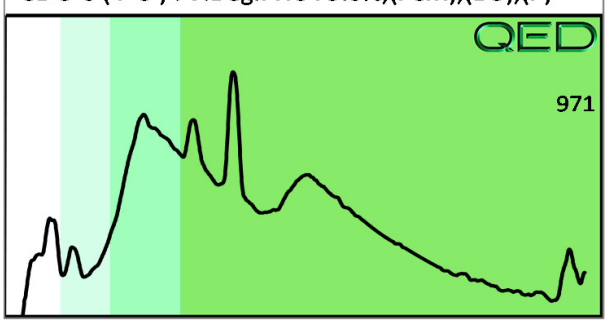
SB-5-4 (3'-4') : V.Deg.PHC 91.5%,(FCM)



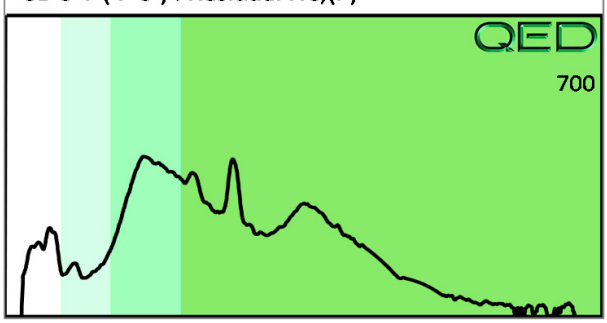
SB-5-5 (4'-5') : V.Deg.PHC 74.4%,(FCM),(BO),(P)



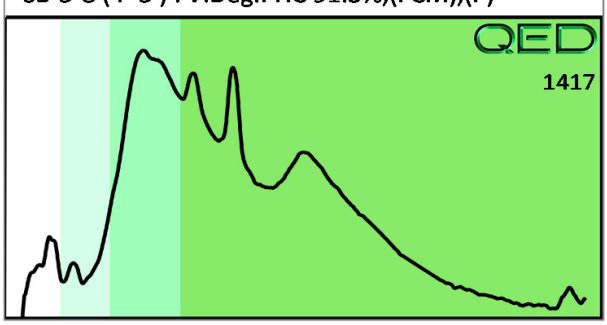
SB-5-6 (4'-5') : V.Deg.PHC 75.6%,(FCM),(BO),(P)



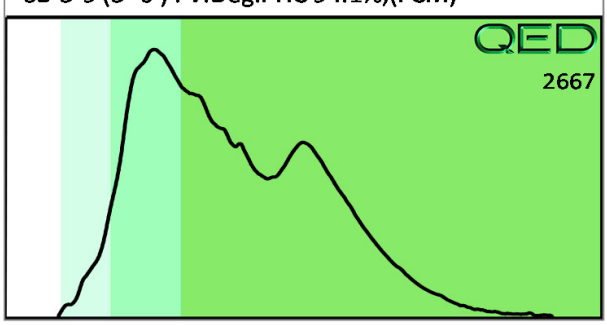
SB-5-7 (4'-5') : Residual HC,(P)



SB-5-8 (4'-5') : V.Deg.PHC 91.3%,(FCM),(P)



SB-5-9 (5'-6') : V.Deg.PHC 94.1%,(FCM)



APPENDIX F

GROUNDWATER LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY RECORD

Mid Atlantic
Engineering & Environmental Solutions

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

October 05, 2018

Mid-Atlantic Associates, Inc.

Sample Delivery Group:	L1029561
Samples Received:	09/27/2018
Project Number:	R3203.00
Description:	NCDOT U5724 PSA

Report To: Mr. Trey Marchant
409 Rogers View Court
Raleigh, NC 27610

Entire Report Reviewed By:

T. Alan Harvill
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

TABLE OF CONTENTS

TMW-5-2 L1029561-01 GW

Collected by	Collected date/time	Received date/time
Cory A. Fisher	09/25/18 10:05	09/27/18 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 6200B-1997	WG1173905	50	10/01/18 12:18	10/01/18 12:18	RAS
Semi Volatile Organic Compounds (GC/MS) by Method 625.1	WG1173780	1.02	10/01/18 16:58	10/02/18 06:32	AO

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

T. Alan Harvill
Project Manager

Volatile Organic Compounds (GC/MS) by Method 6200B-1997

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		500	2500	50	10/01/2018 12:18	WG1173905
Acrolein	U		444	2500	50	10/01/2018 12:18	WG1173905
Acrylonitrile	U		93.5	500	50	10/01/2018 12:18	WG1173905
Benzene	U		16.6	50.0	50	10/01/2018 12:18	WG1173905
Bromobenzene	U		17.6	50.0	50	10/01/2018 12:18	WG1173905
Bromodichloromethane	U		19.0	50.0	50	10/01/2018 12:18	WG1173905
Bromoform	U		23.4	50.0	50	10/01/2018 12:18	WG1173905
Bromomethane	U		43.3	250	50	10/01/2018 12:18	WG1173905
n-Butylbenzene	U		18.0	50.0	50	10/01/2018 12:18	WG1173905
sec-Butylbenzene	U		18.2	50.0	50	10/01/2018 12:18	WG1173905
tert-Butylbenzene	U		20.0	50.0	50	10/01/2018 12:18	WG1173905
Carbon tetrachloride	U		19.0	50.0	50	10/01/2018 12:18	WG1173905
Chlorobenzene	U		17.4	50.0	50	10/01/2018 12:18	WG1173905
Chlorodibromomethane	U		16.4	50.0	50	10/01/2018 12:18	WG1173905
Chloroethane	U		22.6	250	50	10/01/2018 12:18	WG1173905
Chloroform	U		16.2	250	50	10/01/2018 12:18	WG1173905
Chloromethane	U		13.8	125	50	10/01/2018 12:18	WG1173905
2-Chlorotoluene	U		18.8	50.0	50	10/01/2018 12:18	WG1173905
4-Chlorotoluene	U		17.6	50.0	50	10/01/2018 12:18	WG1173905
1,2-Dibromo-3-Chloropropane	U		66.5	250	50	10/01/2018 12:18	WG1173905
1,2-Dibromoethane	U		19.0	50.0	50	10/01/2018 12:18	WG1173905
Dibromomethane	U		17.3	50.0	50	10/01/2018 12:18	WG1173905
1,2-Dichlorobenzene	U		17.4	50.0	50	10/01/2018 12:18	WG1173905
1,3-Dichlorobenzene	U		11.0	50.0	50	10/01/2018 12:18	WG1173905
1,4-Dichlorobenzene	U		13.7	50.0	50	10/01/2018 12:18	WG1173905
Dichlorodifluoromethane	U		27.6	250	50	10/01/2018 12:18	WG1173905
1,1-Dichloroethane	U		13.0	50.0	50	10/01/2018 12:18	WG1173905
1,2-Dichloroethane	U		18.0	50.0	50	10/01/2018 12:18	WG1173905
1,1-Dichloroethene	U		19.9	50.0	50	10/01/2018 12:18	WG1173905
cis-1,2-Dichloroethene	U		13.0	50.0	50	10/01/2018 12:18	WG1173905
trans-1,2-Dichloroethene	U		19.8	50.0	50	10/01/2018 12:18	WG1173905
1,2-Dichloropropane	U		15.3	50.0	50	10/01/2018 12:18	WG1173905
1,1-Dichloropropene	U		17.6	50.0	50	10/01/2018 12:18	WG1173905
1,3-Dichloropropane	U		18.3	50.0	50	10/01/2018 12:18	WG1173905
2,2-Dichloropropane	U		16.0	50.0	50	10/01/2018 12:18	WG1173905
Di-isopropyl ether	U		16.0	50.0	50	10/01/2018 12:18	WG1173905
Ethylbenzene	1280		19.2	50.0	50	10/01/2018 12:18	WG1173905
Hexachloro-1,3-butadiene	U		12.8	50.0	50	10/01/2018 12:18	WG1173905
Isopropylbenzene	168		16.3	50.0	50	10/01/2018 12:18	WG1173905
p-Isopropyltoluene	U		17.5	50.0	50	10/01/2018 12:18	WG1173905
2-Butanone (MEK)	U		196	500	50	10/01/2018 12:18	WG1173905
Methylene Chloride	U		50.0	250	50	10/01/2018 12:18	WG1173905
4-Methyl-2-pentanone (MIBK)	U		107	500	50	10/01/2018 12:18	WG1173905
Methyl tert-butyl ether	U		18.4	50.0	50	10/01/2018 12:18	WG1173905
Naphthalene	481		50.0	250	50	10/01/2018 12:18	WG1173905
n-Propylbenzene	650		17.4	50.0	50	10/01/2018 12:18	WG1173905
Styrene	U		15.4	50.0	50	10/01/2018 12:18	WG1173905
1,1,1,2-Tetrachloroethane	U		19.2	50.0	50	10/01/2018 12:18	WG1173905
1,1,2,2-Tetrachloroethane	U		6.50	50.0	50	10/01/2018 12:18	WG1173905
Tetrachloroethene	U		18.6	50.0	50	10/01/2018 12:18	WG1173905
Toluene	45.0	J	20.6	50.0	50	10/01/2018 12:18	WG1173905
1,2,3-Trichlorobenzene	U		11.5	50.0	50	10/01/2018 12:18	WG1173905
1,2,4-Trichlorobenzene	U		17.8	50.0	50	10/01/2018 12:18	WG1173905
1,1,1-Trichloroethane	U		16.0	50.0	50	10/01/2018 12:18	WG1173905
1,1,2-Trichloroethane	U		19.2	50.0	50	10/01/2018 12:18	WG1173905
Trichloroethene	U		19.9	50.0	50	10/01/2018 12:18	WG1173905

Volatile Organic Compounds (GC/MS) by Method 6200B-1997

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Trichlorofluoromethane	U		60.0	250	50	10/01/2018 12:18	WG1173905
1,2,3-Trichloropropane	U		40.4	125	50	10/01/2018 12:18	WG1173905
1,2,4-Trimethylbenzene	4440		18.6	50.0	50	10/01/2018 12:18	WG1173905
1,3,5-Trimethylbenzene	1300		19.4	50.0	50	10/01/2018 12:18	WG1173905
Vinyl chloride	U		13.0	50.0	50	10/01/2018 12:18	WG1173905
o-Xylene	1940		17.0	50.0	50	10/01/2018 12:18	WG1173905
m&p-Xylenes	4920		36.0	100	50	10/01/2018 12:18	WG1173905
(S) Toluene-d8	*101*			*80.0-120*		*10/01/2018 12:18*	WG1173905
(S) Dibromofluoromethane	*106*			*75.0-120*		*10/01/2018 12:18*	WG1173905
(S) a,a,a-Trifluorotoluene	*99.1*			*80.0-120*		*10/01/2018 12:18*	WG1173905
(S) 4-Bromofluorobenzene	*108*			*77.0-126*		*10/01/2018 12:18*	WG1173905

Semi Volatile Organic Compounds (GC/MS) by Method 625.1

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	1.68		0.322	1.02	1.02	10/02/2018 06:32	WG1173780
Acenaphthylene	U		0.315	1.02	1.02	10/02/2018 06:32	WG1173780
Anthracene	0.311	J	0.297	1.02	1.02	10/02/2018 06:32	WG1173780
Benzidine	U		4.41	10.2	1.02	10/02/2018 06:32	WG1173780
Benzo(a)anthracene	U		0.0995	1.02	1.02	10/02/2018 06:32	WG1173780
Benzo(b)fluoranthene	U		0.0914	1.02	1.02	10/02/2018 06:32	WG1173780
Benzo(k)fluoranthene	U		0.362	1.02	1.02	10/02/2018 06:32	WG1173780
Benzo(g,h,i)perylene	U		0.164	1.02	1.02	10/02/2018 06:32	WG1173780
Benzo(a)pyrene	U		0.347	1.02	1.02	10/02/2018 06:32	WG1173780
Bis(2-chlorethoxy)methane	U		0.336	10.2	1.02	10/02/2018 06:32	WG1173780
Bis(2-chloroethyl)ether	U		1.65	10.2	1.02	10/02/2018 06:32	WG1173780
Bis(2-chloroisopropyl)ether	U		0.454	10.2	1.02	10/02/2018 06:32	WG1173780
4-Bromophenyl-phenylether	U		0.342	10.2	1.02	10/02/2018 06:32	WG1173780
2-Chloronaphthalene	U	J4	0.337	1.02	1.02	10/02/2018 06:32	WG1173780
4-Chlorophenyl-phenylether	U		0.309	10.2	1.02	10/02/2018 06:32	WG1173780
Chrysene	U		0.339	1.02	1.02	10/02/2018 06:32	WG1173780
Dibenz(a,h)anthracene	U		0.285	1.02	1.02	10/02/2018 06:32	WG1173780
3,3-Dichlorobenzidine	U		2.06	10.2	1.02	10/02/2018 06:32	WG1173780
2,4-Dinitrotoluene	U		1.68	10.2	1.02	10/02/2018 06:32	WG1173780
2,6-Dinitrotoluene	U		0.285	10.2	1.02	10/02/2018 06:32	WG1173780
Fluoranthene	U		0.316	1.02	1.02	10/02/2018 06:32	WG1173780
Fluorene	1.57		0.329	1.02	1.02	10/02/2018 06:32	WG1173780
Hexachlorobenzene	U		0.348	1.02	1.02	10/02/2018 06:32	WG1173780
Hexachloro-1,3-butadiene	U		0.336	10.2	1.02	10/02/2018 06:32	WG1173780
Hexachlorocyclopentadiene	U		2.38	10.2	1.02	10/02/2018 06:32	WG1173780
Hexachloroethane	U	J4	0.372	10.2	1.02	10/02/2018 06:32	WG1173780
Indeno(1,2,3-cd)pyrene	U		0.285	1.02	1.02	10/02/2018 06:32	WG1173780
Isophorone	U		0.277	10.2	1.02	10/02/2018 06:32	WG1173780
Naphthalene	233		0.379	1.02	1.02	10/02/2018 06:32	WG1173780
Nitrobenzene	U		0.374	10.2	1.02	10/02/2018 06:32	WG1173780
n-Nitrosodimethylamine	U		1.29	10.2	1.02	10/02/2018 06:32	WG1173780
n-Nitrosodiphenylamine	U		1.21	10.2	1.02	10/02/2018 06:32	WG1173780
n-Nitrosodi-n-propylamine	U		0.411	10.2	1.02	10/02/2018 06:32	WG1173780
Phenanthrene	1.93		0.373	1.02	1.02	10/02/2018 06:32	WG1173780
Benzylbutyl phthalate	U		0.281	3.06	1.02	10/02/2018 06:32	WG1173780
Bis(2-ethylhexyl)phthalate	U		0.723	3.06	1.02	10/02/2018 06:32	WG1173780
Di-n-butyl phthalate	U		0.271	3.06	1.02	10/02/2018 06:32	WG1173780
Diethyl phthalate	U		0.288	3.06	1.02	10/02/2018 06:32	WG1173780
Dimethyl phthalate	U		0.289	3.06	1.02	10/02/2018 06:32	WG1173780
Di-n-octyl phthalate	U		0.284	3.06	1.02	10/02/2018 06:32	WG1173780
Pyrene	0.476	J	0.337	1.02	1.02	10/02/2018 06:32	WG1173780

Semi Volatile Organic Compounds (GC/MS) by Method 625.1

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,2,4-Trichlorobenzene	U	J4	0.362	10.2	1.02	10/02/2018 06:32	WG1173780
4-Chloro-3-methylphenol	U		0.268	10.2	1.02	10/02/2018 06:32	WG1173780
2-Chlorophenol	U		0.289	10.2	1.02	10/02/2018 06:32	WG1173780
2,4-Dichlorophenol	U		0.290	10.2	1.02	10/02/2018 06:32	WG1173780
2,4-Dimethylphenol	U		0.636	10.2	1.02	10/02/2018 06:32	WG1173780
4,6-Dinitro-2-methylphenol	U		2.67	10.2	1.02	10/02/2018 06:32	WG1173780
2,4-Dinitrophenol	U		3.32	10.2	1.02	10/02/2018 06:32	WG1173780
2-Nitrophenol	U		0.326	10.2	1.02	10/02/2018 06:32	WG1173780
4-Nitrophenol	U		2.05	10.2	1.02	10/02/2018 06:32	WG1173780
Pentachlorophenol	U		0.319	10.2	1.02	10/02/2018 06:32	WG1173780
Phenol	U		0.341	10.2	1.02	10/02/2018 06:32	WG1173780
2,4,6-Trichlorophenol	U		0.303	10.2	1.02	10/02/2018 06:32	WG1173780
(S) Nitrobenzene-d5	*53.5*			*15.0-314*		*10/02/2018 06:32*	WG1173780
(S) 2-Fluorobiphenyl	*30.1*			*22.0-127*		*10/02/2018 06:32*	WG1173780
(S) p-Terphenyl-d14	*31.7*			*29.0-141*		*10/02/2018 06:32*	WG1173780
(S) Phenol-d5	*23.4*			*8.00-424*		*10/02/2018 06:32*	WG1173780
(S) 2-Fluorophenol	*20.8*			*10.0-120*		*10/02/2018 06:32*	WG1173780
(S) 2,4,6-Tribromophenol	*24.1*			*10.0-153*		*10/02/2018 06:32*	WG1173780

Sample Narrative:

L1029561-01 WG1173780: Dilution due to sample volume

Method Blank (MB)

(MB) R3347755-4 10/01/18 11:41

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		10.0	50.0
Acrolein	U		8.87	50.0
Acrylonitrile	U		1.87	10.0
Benzene	U		0.331	1.00
Bromobenzene	U		0.352	1.00
Bromodichloromethane	U		0.380	1.00
Bromoform	U		0.469	1.00
Bromomethane	U		0.866	5.00
n-Butylbenzene	U		0.361	1.00
sec-Butylbenzene	U		0.365	1.00
tert-Butylbenzene	U		0.399	1.00
Carbon tetrachloride	U		0.379	1.00
Chlorobenzene	U		0.348	1.00
Chlorodibromomethane	U		0.327	1.00
Chloroethane	U		0.453	5.00
Chloroform	U		0.324	5.00
Chloromethane	U		0.276	2.50
2-Chlorotoluene	U		0.375	1.00
4-Chlorotoluene	U		0.351	1.00
1,2-Dibromo-3-Chloropropane	U		1.33	5.00
1,2-Dibromoethane	U		0.381	1.00
Dibromomethane	U		0.346	1.00
1,2-Dichlorobenzene	U		0.349	1.00
1,3-Dichlorobenzene	U		0.220	1.00
1,4-Dichlorobenzene	U		0.274	1.00
Dichlorodifluoromethane	U		0.551	5.00
1,1-Dichloroethane	U		0.259	1.00
1,2-Dichloroethane	U		0.361	1.00
1,1-Dichloroethene	U		0.398	1.00
cis-1,2-Dichloroethene	U		0.260	1.00
trans-1,2-Dichloroethene	U		0.396	1.00
1,2-Dichloropropane	U		0.306	1.00
1,1-Dichloropropene	U		0.352	1.00
1,3-Dichloropropane	U		0.366	1.00
2,2-Dichloropropane	U		0.321	1.00
Di-isopropyl ether	U		0.320	1.00
Ethylbenzene	U		0.384	1.00
Hexachloro-1,3-butadiene	U		0.256	1.00
Isopropylbenzene	U		0.326	1.00
p-Isopropyltoluene	U		0.350	1.00

Method Blank (MB)

(MB) R3347755-4 10/01/18 11:41

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
2-Butanone (MEK)	U		3.93	10.0
Methylene Chloride	U		1.00	5.00
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0
Methyl tert-butyl ether	U		0.367	1.00
Naphthalene	U		1.00	5.00
n-Propylbenzene	U		0.349	1.00
Styrene	U		0.307	1.00
1,1,1,2-Tetrachloroethane	U		0.385	1.00
1,1,2,2-Tetrachloroethane	U		0.130	1.00
Tetrachloroethene	U		0.372	1.00
Toluene	U		0.412	1.00
1,2,3-Trichlorobenzene	U		0.230	1.00
1,2,4-Trichlorobenzene	U		0.355	1.00
1,1,1-Trichloroethane	U		0.319	1.00
1,1,2-Trichloroethane	U		0.383	1.00
Trichloroethene	U		0.398	1.00
Trichlorofluoromethane	U		1.20	5.00
1,2,3-Trichloropropane	U		0.807	2.50
1,2,4-Trimethylbenzene	U		0.373	1.00
1,3,5-Trimethylbenzene	U		0.387	1.00
Vinyl chloride	U		0.259	1.00
o-Xylene	U		0.341	1.00
m&p-Xylenes	U		0.719	2.00
(S) Toluene-d8	*97.0*			*80.0-120*
(S) Dibromofluoromethane	*116*			*75.0-120*
(S) a,a,a-Trifluorotoluene	*96.6*			*80.0-120*
(S) 4-Bromofluorobenzene	*97.8*			*77.0-126*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3347755-1 10/01/18 10:26 • (LCSD) R3347755-2 10/01/18 10:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	125	140	151	112	121	19.0-160			7.29	27
Acrolein	125	114	136	91.1	109	10.0-160			18.0	26
Acrylonitrile	125	131	139	105	111	55.0-149			5.94	20
Benzene	25.0	25.0	25.1	99.9	100	70.0-123			0.352	20
Bromobenzene	25.0	26.7	28.0	107	112	73.0-121			4.56	20
Bromodichloromethane	25.0	24.2	24.2	96.7	96.7	75.0-120			0.00823	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3347755-1 10/01/18 10:26 • (LCSD) R3347755-2 10/01/18 10:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromoform	25.0	26.8	28.0	107	112	68.0-132			4.27	20
Bromomethane	25.0	26.4	26.3	106	105	10.0-160			0.360	25
n-Butylbenzene	25.0	23.5	25.0	94.1	99.8	73.0-125			5.89	20
sec-Butylbenzene	25.0	25.4	26.6	102	106	75.0-125			4.71	20
tert-Butylbenzene	25.0	26.9	28.5	108	114	76.0-124			5.55	20
Carbon tetrachloride	25.0	25.5	25.3	102	101	68.0-126			0.598	20
Chlorobenzene	25.0	23.9	24.9	95.4	99.5	80.0-121			4.19	20
Chlorodibromomethane	25.0	23.3	23.4	93.4	93.5	77.0-125			0.126	20
Chloroethane	25.0	25.6	26.0	103	104	47.0-150			1.51	20
Chloroform	25.0	25.5	24.9	102	99.8	73.0-120			2.32	20
Chloromethane	25.0	31.7	31.9	127	128	41.0-142			0.701	20
2-Chlorotoluene	25.0	27.3	27.7	109	111	76.0-123			1.55	20
4-Chlorotoluene	25.0	27.1	28.0	108	112	75.0-122			3.28	20
1,2-Dibromo-3-Chloropropane	25.0	22.5	23.1	90.1	92.5	58.0-134			2.66	20
1,2-Dibromoethane	25.0	23.6	24.3	94.4	97.3	80.0-122			3.05	20
Dibromomethane	25.0	24.6	24.3	98.6	97.4	80.0-120			1.26	20
1,2-Dichlorobenzene	25.0	23.5	23.8	94.0	95.3	79.0-121			1.46	20
1,3-Dichlorobenzene	25.0	24.7	25.2	98.6	101	79.0-120			2.13	20
1,4-Dichlorobenzene	25.0	23.9	24.7	95.4	98.7	79.0-120			3.40	20
Dichlorodifluoromethane	25.0	29.3	29.5	117	118	51.0-149			0.703	20
1,1-Dichloroethane	25.0	26.2	30.4	105	121	70.0-126			14.6	20
1,2-Dichloroethane	25.0	26.1	25.6	104	103	70.0-128			1.71	20
1,1-Dichloroethene	25.0	24.1	24.6	96.5	98.5	71.0-124			2.06	20
cis-1,2-Dichloroethene	25.0	25.0	24.9	99.8	99.5	73.0-120			0.324	20
trans-1,2-Dichloroethene	25.0	25.8	30.0	103	120	73.0-120			15.1	20
1,2-Dichloropropane	25.0	24.1	24.4	96.5	97.4	77.0-125			0.903	20
1,1-Dichloropropene	25.0	26.5	26.4	106	105	74.0-126			0.400	20
1,3-Dichloropropane	25.0	24.0	24.7	96.1	99.0	80.0-120			3.02	20
2,2-Dichloropropane	25.0	25.1	25.1	101	100	58.0-130			0.303	20
Di-isopropyl ether	25.0	27.3	30.1	109	120	58.0-138			9.91	20
Ethylbenzene	25.0	23.8	25.4	95.2	102	79.0-123			6.59	20
Hexachloro-1,3-butadiene	25.0	21.6	22.4	86.5	89.5	54.0-138			3.39	20
Isopropylbenzene	25.0	27.5	29.1	110	116	76.0-127			5.55	20
p-Isopropyltoluene	25.0	25.5	27.0	102	108	76.0-125			5.72	20
2-Butanone (MEK)	125	141	137	113	110	44.0-160			2.50	20
Methylene Chloride	25.0	25.1	28.8	100	115	67.0-120			14.0	20
4-Methyl-2-pentanone (MIBK)	125	138	139	110	111	68.0-142			0.826	20
Methyl tert-butyl ether	25.0	24.0	27.1	96.1	108	68.0-125			11.8	20
Naphthalene	25.0	20.8	20.8	83.3	83.1	54.0-135			0.274	20
n-Propylbenzene	25.0	27.3	28.5	109	114	77.0-124			4.26	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3347755-1 10/01/18 10:26 • (LCSD) R3347755-2 10/01/18 10:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Styrene	25.0	29.5	30.7	118	123	73.0-130			4.00	20
1,1,1,2-Tetrachloroethane	25.0	23.2	24.0	92.7	96.0	75.0-125			3.44	20
1,1,2,2-Tetrachloroethane	25.0	27.8	28.2	111	113	65.0-130			1.54	20
Tetrachloroethene	25.0	23.4	24.3	93.7	97.1	72.0-132			3.54	20
Toluene	25.0	23.0	23.9	91.9	95.4	79.0-120			3.74	20
1,2,3-Trichlorobenzene	25.0	18.8	19.8	75.3	79.0	50.0-138			4.79	20
1,2,4-Trichlorobenzene	25.0	20.1	20.5	80.5	82.2	57.0-137			2.12	20
1,1,1-Trichloroethane	25.0	26.1	26.4	104	106	73.0-124			1.24	20
1,1,2-Trichloroethane	25.0	23.9	25.0	95.7	100	80.0-120			4.46	20
Trichloroethene	25.0	23.3	24.1	93.3	96.5	78.0-124			3.41	20
Trichlorofluoromethane	25.0	27.3	27.2	109	109	59.0-147			0.547	20
1,2,3-Trichloropropane	25.0	27.5	27.5	110	110	73.0-130			0.0117	20
1,2,4-Trimethylbenzene	25.0	25.5	26.4	102	106	76.0-121			3.71	20
1,3,5-Trimethylbenzene	25.0	26.7	28.0	107	112	76.0-122			4.61	20
Vinyl chloride	25.0	27.8	28.1	111	113	67.0-131			1.43	20
o-Xylene	25.0	24.2	25.0	96.8	99.9	80.0-122			3.14	20
m&p-Xylenes	50.0	49.4	51.1	98.7	102	80.0-122			3.47	20
(S) Toluene-d8				*99.5*	*101*	*80.0-120*				
(S) Dibromofluoromethane				*107*	*102*	*75.0-120*				
(S) a,a,a-Trifluorotoluene				*97.1*	*97.9*	*80.0-120*				
(S) 4-Bromofluorobenzene				*111*	*112*	*77.0-126*				

Method Blank (MB)

(MB) R3346721-3 10/02/18 00:38

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acenaphthene	U		0.316	1.00
Acenaphthylene	U		0.309	1.00
Anthracene	U		0.291	1.00
Benzidine	U		4.32	10.0
Benzo(a)anthracene	U		0.0975	1.00
Benzo(b)fluoranthene	U		0.0896	1.00
Benzo(k)fluoranthene	U		0.355	1.00
Benzo(g,h,i)perylene	U		0.161	1.00
Benzo(a)pyrene	U		0.340	1.00
Bis(2-chlorethoxy)methane	U		0.329	10.0
Bis(2-chloroethyl)ether	U		1.62	10.0
Bis(2-chloroisopropyl)ether	U		0.445	10.0
4-Bromophenyl-phenylether	U		0.335	10.0
2-Chloronaphthalene	U		0.330	1.00
4-Chlorophenyl-phenylether	U		0.303	10.0
Chrysene	U		0.332	1.00
Dibenz(a,h)anthracene	U		0.279	1.00
3,3-Dichlorobenzidine	U		2.02	10.0
2,4-Dinitrotoluene	U		1.65	10.0
2,6-Dinitrotoluene	U		0.279	10.0
Fluoranthene	U		0.310	1.00
Fluorene	U		0.323	1.00
Hexachlorobenzene	U		0.341	1.00
Hexachloro-1,3-butadiene	U		0.329	10.0
Hexachlorocyclopentadiene	U		2.33	10.0
Hexachloroethane	U		0.365	10.0
Indeno(1,2,3-cd)pyrene	U		0.279	1.00
Isophorone	U		0.272	10.0
Naphthalene	U		0.372	1.00
Nitrobenzene	U		0.367	10.0
n-Nitrosodimethylamine	U		1.26	10.0
n-Nitrosodiphenylamine	U		1.19	10.0
n-Nitrosodi-n-propylamine	U		0.403	10.0
Phenanthrene	U		0.366	1.00
Benzylbutyl phthalate	U		0.275	3.00
Bis(2-ethylhexyl)phthalate	U		0.709	3.00
Di-n-butyl phthalate	U		0.266	3.00
Diethyl phthalate	U		0.282	3.00
Dimethyl phthalate	U		0.283	3.00
Di-n-octyl phthalate	U		0.278	3.00

Method Blank (MB)

(MB) R3346721-3 10/02/18 00:38

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Pyrene	U		0.330	1.00
1,2,4-Trichlorobenzene	U		0.355	10.0
4-Chloro-3-methylphenol	U		0.263	10.0
2-Chlorophenol	U		0.283	10.0
2-Nitrophenol	U		0.320	10.0
4-Nitrophenol	U		2.01	10.0
Pentachlorophenol	U		0.313	10.0
Phenol	U		0.334	10.0
2,4,6-Trichlorophenol	U		0.297	10.0
2,4-Dichlorophenol	U		0.284	10.0
2,4-Dimethylphenol	U		0.624	10.0
4,6-Dinitro-2-methylphenol	U		2.62	10.0
2,4-Dinitrophenol	U		3.25	10.0
(S) Nitrobenzene-d5	*62.3*			*15.0-314*
(S) 2-Fluorobiphenyl	*59.3*			*22.0-127*
(S) p-Terphenyl-d14	*73.7*			*29.0-141*
(S) Phenol-d5	*27.1*			*8.00-424*
(S) 2-Fluorophenol	*46.9*			*10.0-120*
(S) 2,4,6-Tribromophenol	*45.3*			*10.0-153*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3346721-1 10/01/18 23:50 • (LCSD) R3346721-2 10/02/18 00:14

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ug/l	ug/l	ug/l	%	%	%			%	%
Acenaphthene	50.0	32.6	34.4	65.2	68.8	47.0-145			5.37	48
Acenaphthylene	50.0	32.0	33.8	64.0	67.6	33.0-145			5.47	74
Anthracene	50.0	32.1	33.9	64.2	67.8	27.0-133			5.45	66
Benzidine	50.0	12.7	14.5	25.4	29.0	1.00-120			13.2	36
Benzo(a)anthracene	50.0	36.2	39.5	72.4	79.0	33.0-143			8.72	53
Benzo(b)fluoranthene	50.0	37.3	37.2	74.6	74.4	24.0-159			0.268	71
Benzo(k)fluoranthene	50.0	36.0	41.6	72.0	83.2	11.0-162			14.4	63
Benzo(g,h,i)perylene	50.0	37.4	40.5	74.8	81.0	1.00-219			7.96	97
Benzo(a)pyrene	50.0	36.3	38.5	72.6	77.0	17.0-163			5.88	72
Bis(2-chlorethoxy)methane	50.0	28.8	30.1	57.6	60.2	1.00-219			4.41	54
Bis(2-chloroethyl)ether	50.0	31.9	34.1	63.8	68.2	33.0-185			6.67	108
Bis(2-chloroisopropyl)ether	50.0	30.6	31.9	61.2	63.8	36.0-166			4.16	76
4-Bromophenyl-phenylether	50.0	34.0	35.8	68.0	71.6	53.0-127			5.16	43
2-Chloronaphthalene	50.0	29.6	30.9	59.2	61.8	60.0-120	J4		4.30	24

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3346721-1 10/01/18 23:50 • (LCSD) R3346721-2 10/02/18 00:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
4-Chlorophenyl-phenylether	50.0	33.8	35.4	67.6	70.8	25.0-158			4.62	61
Chrysene	50.0	36.4	39.1	72.8	78.2	17.0-168			7.15	87
Dibenz(a,h)anthracene	50.0	35.8	38.4	71.6	76.8	1.00-227			7.01	126
3,3-Dichlorobenzidine	50.0	32.4	35.5	64.8	71.0	1.00-262			9.13	108
2,4-Dinitrotoluene	50.0	36.7	39.5	73.4	79.0	39.0-139			7.35	42
2,6-Dinitrotoluene	50.0	33.9	36.5	67.8	73.0	50.0-158			7.39	48
Fluoranthene	50.0	35.8	39.0	71.6	78.0	26.0-137			8.56	66
Fluorene	50.0	34.6	36.2	69.2	72.4	59.0-121			4.52	38
Hexachlorobenzene	50.0	36.0	37.8	72.0	75.6	1.00-152			4.88	55
Hexachloro-1,3-butadiene	50.0	12.5	13.1	25.0	26.2	24.0-120			4.69	62
Hexachlorocyclopentadiene	50.0	16.4	17.7	32.8	35.4	10.0-120			7.62	31
Hexachloroethane	50.0	13.9	14.7	27.8	29.4	40.0-120	J4	J4	5.59	52
Indeno(1,2,3-cd)pyrene	50.0	37.6	40.4	75.2	80.8	1.00-171			7.18	99
Isophorone	50.0	29.3	30.5	58.6	61.0	21.0-196			4.01	93
Naphthalene	50.0	25.9	26.5	51.8	53.0	21.0-133			2.29	65
Nitrobenzene	50.0	29.6	30.8	59.2	61.6	35.0-180			3.97	62
n-Nitrosodimethylamine	50.0	22.7	22.2	45.4	44.4	10.0-120			2.23	34
n-Nitrosodiphenylamine	50.0	35.6	37.8	71.2	75.6	44.0-120			5.99	21
n-Nitrosodi-n-propylamine	50.0	31.3	34.2	62.6	68.4	1.00-230			8.85	87
Phenanthrene	50.0	32.8	34.9	65.6	69.8	54.0-120			6.20	39
Benzylbutyl phthalate	50.0	26.4	29.8	52.8	59.6	1.00-152			12.1	60
Bis(2-ethylhexyl)phthalate	50.0	34.6	37.7	69.2	75.4	8.00-158			8.58	82
Di-n-butyl phthalate	50.0	32.4	35.3	64.8	70.6	1.00-120			8.57	47
Diethyl phthalate	50.0	25.5	27.3	51.0	54.6	1.00-120			6.82	100
Dimethyl phthalate	50.0	12.7	13.3	25.4	26.6	1.00-120			4.62	183
Di-n-octyl phthalate	50.0	34.9	38.0	69.8	76.0	4.00-146			8.50	69
Pyrene	50.0	35.8	38.1	71.6	76.2	52.0-120			6.22	49
1,2,4-Trichlorobenzene	50.0	20.7	21.7	41.4	43.4	44.0-142	J4	J4	4.72	50
4-Chloro-3-methylphenol	50.0	30.9	32.7	61.8	65.4	22.0-147			5.66	73
2-Chlorophenol	50.0	32.2	33.6	64.4	67.2	23.0-134			4.26	61
2,4-Dichlorophenol	50.0	31.1	33.4	62.2	66.8	39.0-135			7.13	50
2,4-Dimethylphenol	50.0	30.8	32.0	61.6	64.0	32.0-120			3.82	58
4,6-Dinitro-2-methylphenol	50.0	25.2	25.3	50.4	50.6	1.00-181			0.396	203
2,4-Dinitrophenol	50.0	21.3	22.9	42.6	45.8	1.00-191			7.24	132
2-Nitrophenol	50.0	32.2	34.8	64.4	69.6	29.0-182			7.76	55
4-Nitrophenol	50.0	13.1	14.1	26.2	28.2	1.00-132			7.35	131
Pentachlorophenol	50.0	17.9	19.5	35.8	39.0	14.0-176			8.56	86
Phenol	50.0	15.3	16.6	30.6	33.2	5.00-120			8.15	64
2,4,6-Trichlorophenol	50.0	32.7	32.7	65.4	65.4	37.0-144			0.000	58
(S) Nitrobenzene-d5				*55.2*	*58.8*	*15.0-314*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3346721-1 10/01/18 23:50 • (LCSD) R3346721-2 10/02/18 00:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
(S) 2-Fluorobiphenyl				*56.2*	*60.8*	*22.0-127*				
(S) p-Terphenyl-d14				*70.3*	*76.2*	*29.0-141*				
(S) Phenol-d5				*27.6*	*30.0*	*8.00-424*				
(S) 2-Fluorophenol				*45.2*	*49.4*	*10.0-120*				
(S) 2,4,6-Tribromophenol				*60.0*	*62.5*	*10.0-153*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J4	The associated batch QC was outside the established quality control range for accuracy.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

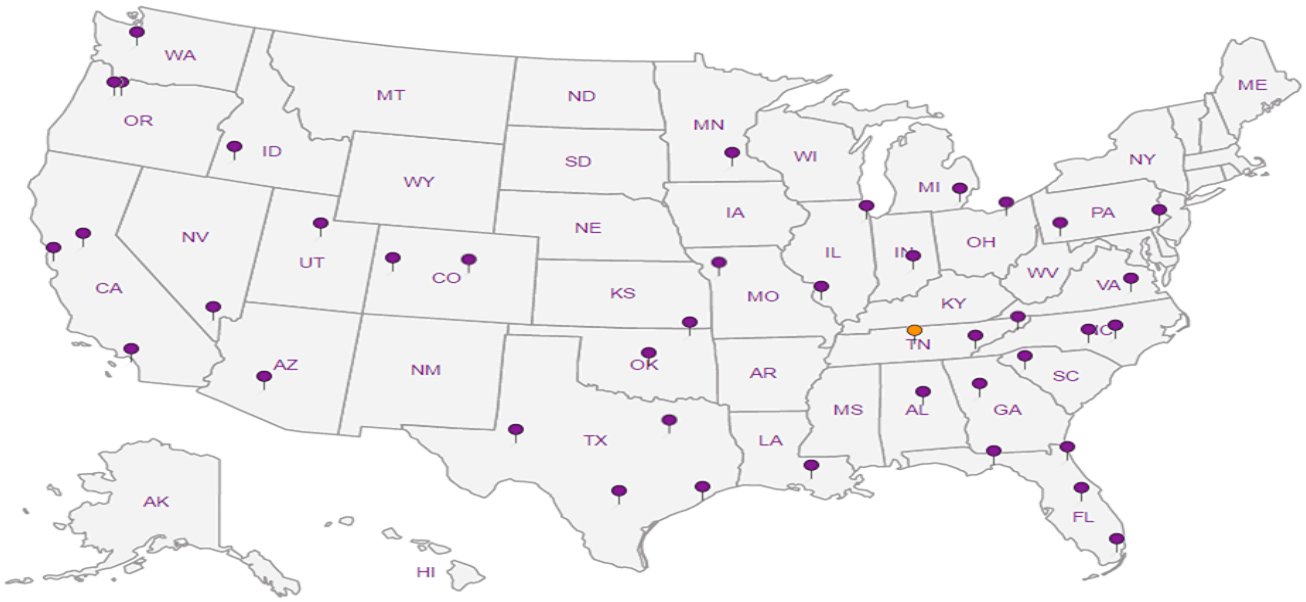
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Company Name/Address:
Mid-Atlantic Associates, Inc.
409 Rogers View Ct
Raleigh, NC 27610

Billing Information:

Report to: **Trey Marchant**

Email To: **tmarchant@maaonline.com**

Project Description: **NCDOT U5724 PSA**

City/State Collected: Goldsboro, NC

Phone: **919-250-9918**
Fax: 919-250-9950

Client Project # **R3203.00**

Lab Project #

Collected by (print): Gary A. Fisher

Site/Facility ID #

P.O. #

Collected by (signature): Gary A. Fisher

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day 200%
___ Next Day 100%
___ Two Day 50%
___ Three Day 25%

Date Results Needed: Standard

Email? ___No ___Yes
FAX? ___No ___Yes

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	6200B w/xylenes, MTBE, IPE - 40ml amber HCL	625 BNA - 100ml amber	Rem./Contaminant	Sample # (lab only)
TMW-5-2	Grab	GW		9/25/18	1005	5	X	X		-01

Fed Ex # 4430 3428 7683

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other _____

RAD SCREEN: <0.5 mR/hr pH _____ Temp _____

Remarks: 625 + BNA's 4430 3428 7683 Flow _____ Other _____

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LABORATORY SCIENCES
YOUR LAB OF CHOICE
12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1029561

F029

Acctnum: MIDATLRNC
Template:
Prelogin:
TSR: Harvill
Cooler:
Shipped Via:

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Gary A. Fisher	9/26/18	1430	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)
			ARM

Samples returned via: ☐ UPS ☑ FedEx ☐ Courier ☐ _____

Temp: 2.5, 2.0 °C Bottles Received: 5

Date: 9/27/18 Time: 845

Hold #

Condition: (lab use only) OK

COC Seal Intact: ___Y ___N ___NA

pH Checked: NCF:

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client:	MIDATLRNC	SDG#	L1029561
Cooler Received/Opened On: 09/ 27 /18		Temperature:	2.0
Received By: Alexandra Murtaugh			
Signature:			

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?		✓	
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?		✓	
Preservation Correct / Checked?			