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Mid Atlantic
Engineering & Environmental Solutions

EXPERIENCED
CUSTOMER FOCUSED
INNOVATIVE

PRELIMINARY SITE ASSESSMENT REPORT
MALISSA B. SAULS PROPERTY
PARCEL NO. 22

Location:

Malissa B. Sauls Property
1001 N. Berkeley Boulevard
Goldsboro, North Carolina 27534
Wayne County PIN 3519741687.00

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
MALISSA B. SAULS PROPERTY
PARCEL NO. 22
TIP NO: U-5724
WBS ELEMENT: 54016.1.2
WAYNE COUNTY
WAYNE COUNTY PIN 3519741687.00

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

SITE:
Malissa B. Sauls Property
1001 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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409 Rogers View Court
Raleigh, NC 27610
office 919.250.9918
facsimile 919.250.9950
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1589 Mail Service Center
Raleigh, North Carolina 27699-1589

Prepared By:

MID-ATLANTIC ASSOCIATES, INC.

DocuSigned by:
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NORTH CAROLINA LICENSED SEAL 1336 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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DRAWINGS

APPENDICES

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 Malissa B. Sauls property (Subject Site), located at 1001 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 is currently occupied by Scott's Automotive repair service. Two masonry buildings are located on the site.

The NCDOT contracted with Mid-Atlantic to perform the PSA due to the possible historical use of petroleum or other regulated substances on the 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 commercial area of Goldsboro. It is currently developed with two buildings that are used by Scott's Automotive, a vehicle repair business. The site is bounded to the northeast by a commercial strip mall, to the southeast (across N. Berkeley Blvd.) by commercial enterprises, and to the west by Highway 70 and its east-bound on-ramp. 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, the Subject Site appears to be used for agricultural purposes in 1959. Two structures that appear to be part of the present-day structures are present on the property in 1967, and the 1978 photo shows that these structures have been added onto and are in their current configuration. No obvious evidence of petroleum sales (pump islands or canopies) are visible. Historical aerial photographs from NCDOT and Google Earth are included as **Appendix A**.

2.2 Facility ID Numbers

No registered USTs are associated with the property address.

2.3 Groundwater Incident Numbers

No groundwater incidents are associated with the property address.

3.0 SITE OBSERVATIONS

3.1 Groundwater Monitoring Wells

Mid-Atlantic observed one former groundwater monitoring well (RMW-1) on the Subject Site. The location of the well is shown on **Drawing 3.1**. Mid-Atlantic's technician opened the well cover and discovered that the well is four inches in diameter, PVC and had an approximate 1.5-inch diameter horizontal PVC pipe connected to the casing, suggesting it may have been used for remedial purposes in the past (photo in **Appendix A**). The well identification tag labeled the well as 15 feet deep. The well has not been abandoned and the manhole and pad is still intact. A report for the former groundwater incident at Parcel No. 24 (Delmus Bridgers/Cash Farm Supplies, Incident No.6695) did not make reference to this well, but it is assumed that the well is

associated with this release, since no groundwater incidents were reported with respect to Parcel 22. The report did reference a monitoring well MW-6 on Parcel 22, but this well could not be located during site reconnaissance activities conducted on August 22, 2018. A copy of the report, which includes a site map showing the locations of the monitoring wells constructed in association with Incident No. 6695, is provided in **Appendix B**.

3.2 Active USTs

No "Active" USTs were identified on site during our reconnaissance.

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. Two buildings on site have in-ground reservoir hydraulic lifts. According to the business owner, these lifts are present in the masonry building closest to the road as well as one of the buildings further to the north.

4.0 METHODS

The PSA field activities included a geophysical survey of the proposed right-of-way and temporary 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) from 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 22, NCDOT Project U-5724" dated September 6, 2018 and included in **Appendix C.** 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 placed on the Subject Site in areas of the right of way and construction easement. Sampling locations were evenly spaced within these areas since the geophysical survey did not reveal a UST or other data requiring specific focus.

4.2.1 Soil Sampling Activities

On September 24, 2018, Mid-Atlantic mobilized to the site to oversee the advancement of four soil borings on the parcel. The work was completed during the same mobilization as sampling conducted for Parcels 5, 22, and 24. Sampling locations are shown on **Drawing 3.1**.

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 (note: the water table was typically found in the 3 to 4 ft BLS range). The soils were classified for soil type and screened at approximate two-foot intervals using the PID. Boring Logs **(Appendix D)** 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 to dark 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

One temporary monitoring well (TMW-22-2) was installed in boring the SB-22-2 location, which exhibited elevated PID readings and a strong petroleum odor. 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 3.6 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 four soil samples were collected for laboratory analysis in accordance with the Mid-Atlantic procedures located in **Appendix E.** 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-22-2 using the methods described in **Appendix E**. 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

As shown in **Appendix C**, the geophysical survey did find evidence characteristic of buried metallic debris but did not find evidence of USTs existing within the area of the survey.

5.1.2 Hydraulic Lifts

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

5.1.3 Monitoring Wells

Mid-Atlantic observed one former groundwater monitoring well (RMW-1) on the Subject Site. The location of the well is shown on **Drawing 3.1**. The well is four inches in diameter and 15 feet deep. The well has not been abandoned and the manhole and pad is still intact. A report for the former groundwater incident at Parcel No. 24 (Delmus Bridgers/Cash Farm Supplies, Incident No.6695) referenced a monitoring well MW-6 on Parcel 22, but this well could not be located during site reconnaissance activities. See Section 3.1 for further information.

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 F** and summarized (along with PID readings) in **Table 5.1**, TPH GRO were detected in two of the four samples at concentrations exceeding the UVF analyzer's detection limit. However, none of the samples exhibited concentrations exceeding the NCDEQ Action Level of 50 mg/kg. TPH DRO were detected in all four 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 F**. 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 laboratory report for the groundwater sample collected from temporary monitoring well TMW-22-2 is provided in **Appendix G** 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 more volatile constituents (e.g., benzene) are not present in the sample and the constituents detected in the sample are more representative of an older plume that has degraded over time. The impacted groundwater is likely related to the historical incident No. 6695 that occurred on adjacent Parcel No. 24 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 3.4 feet to approximately 3.9 feet BLS. The water table may be higher than normal due to Hurricane Florence recently passing through.

It appears that the shallow groundwater has been impacted by the historical UST release at adjacent Parcel No. 24. Given the depth to groundwater (generally in the 3 to 4 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 shallow water table and the excavation required for drainage or other utility installations, it is possible that relatively small quantities of petroleum-contaminated waste (soils and/or groundwater) could be generated during road improvement activities.

6.0 CONCLUSIONS

6.1 Interpretation of Results

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

- A historical release of petroleum that occurred on adjacent Parcel No. 24 has impacted the groundwater beneath the site. Based on the depth to groundwater (approximately 3 to 4 feet BLS, with potential for natural fluctuations), it is possible that impacted soil and/or groundwater could 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:

- The geophysical survey did find evidence characteristic of buried metallic debris but did not find evidence of USTs existing within the area of the survey.

6.3 Sampling

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

- Based on the four soil borings advanced at the site, vadose zone contamination was not encountered but small quantities of soil waste could be generated if soils in the saturated zone are excavated for utility installation;

- Petroleum-impacted groundwater exceeding the NCGQS was encountered in a temporary well installed at location TMW-22-2. This contamination is likely the result of the historical UST system release on the adjacent Parcel No. 24 site.

6.4 Groundwater

- The depth to groundwater at the site ranges from 3.4 to 3.9 feet BLS. Based on the depth to groundwater, the proposed construction plans for grading and drainage, and the sampling results, it is possible that impacted groundwater could be encountered during road improvement activities.

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 shallow water table and the excavation required for drainage or other utility installations, it is possible that relatively small quantities of petroleum-contaminated waste (soils and/or groundwater) could be generated during road improvement activities.

7.0 RECOMMENDATIONS

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

- If encountered during drainage or other utility installation, residual soil contamination should be properly managed and disposed; and

- Since impacted groundwater is present at a relatively shallow depth (3 to 4 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
MALISSA B. SAULS 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-22-1	9/24/2018	2 - 3	2.90	<0.47	2.4
SB-22-2	9/24/2018	2 - 3	0.90	1.2	1.7
SB-22-3	9/24/2018	2 - 3	0.30	<0.44	0.87
SB-22-4	9/24/2018	2 - 3	3.20	1.3	7.3

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
MALISSA B. SAULS PROPERTY (PARCEL 22)
NCDOT: U-5724 GOLDSBORO PSA
GOLDSBORO, NORTH CAROLINA
MID-ATLANTIC JOB NO. R3203.00

CHEMICAL CONSTITUENT	CONCENTRATION (µg/L)	
	TMW-22-2 9/24/2018	NC Groundwater Quality Standards
Volatile Organic Compounds - SM 6200B		
p-Isopropyltoluene	**18.6**	NE
Naphthalene	**87.4**	6
n-Propylbenzene	**150**	70
1,2,4-Trimethylbenzene	**955**	400
Semi Volatile Organic Compounds - EPA Method 625		
Naphthalene	**105**	6

Notes:
(µg/L) = Microgram per liter (parts per billion)
NE- No established NC groundwater quality standard

DRAWINGS

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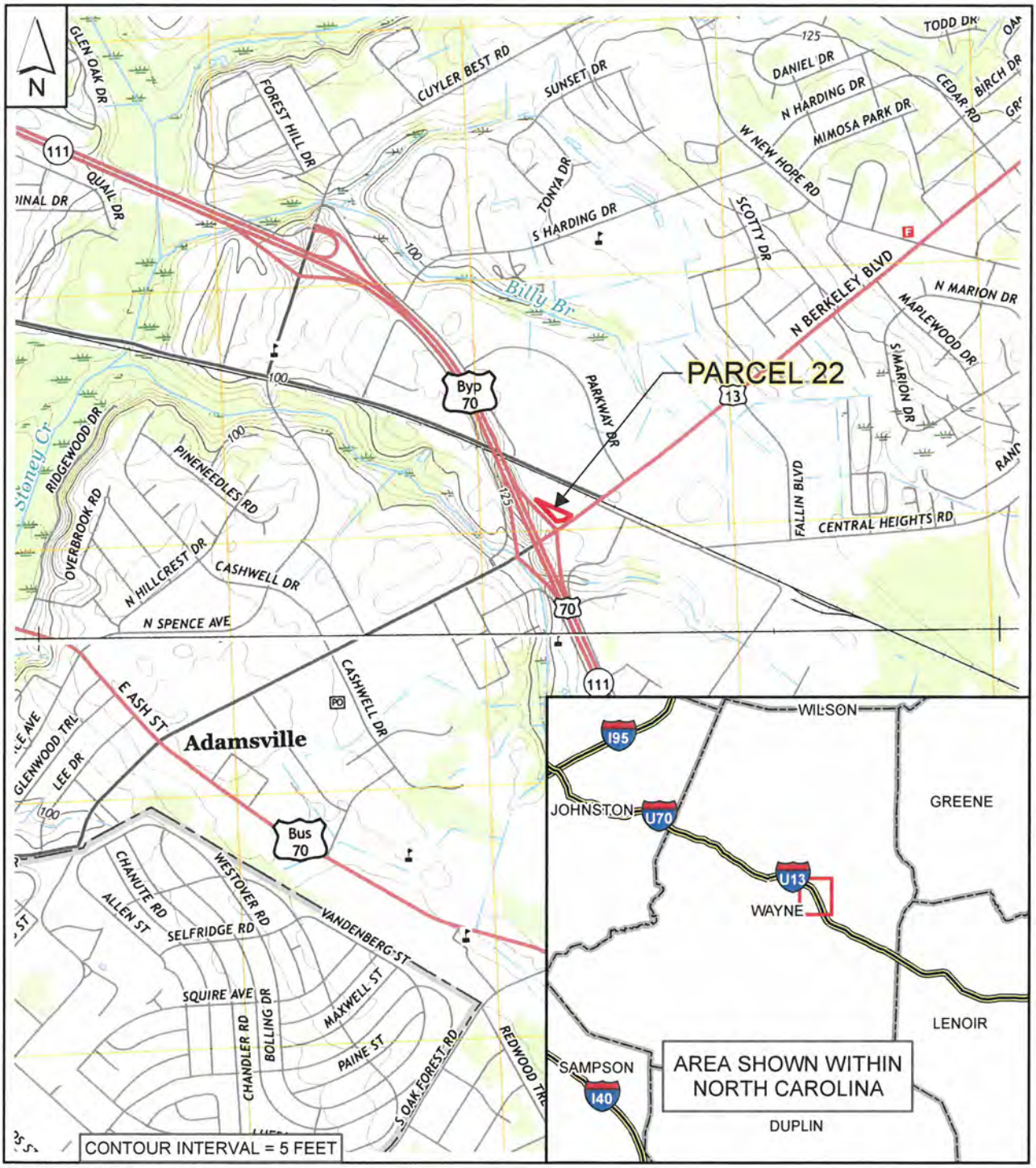

REFERENCES:

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

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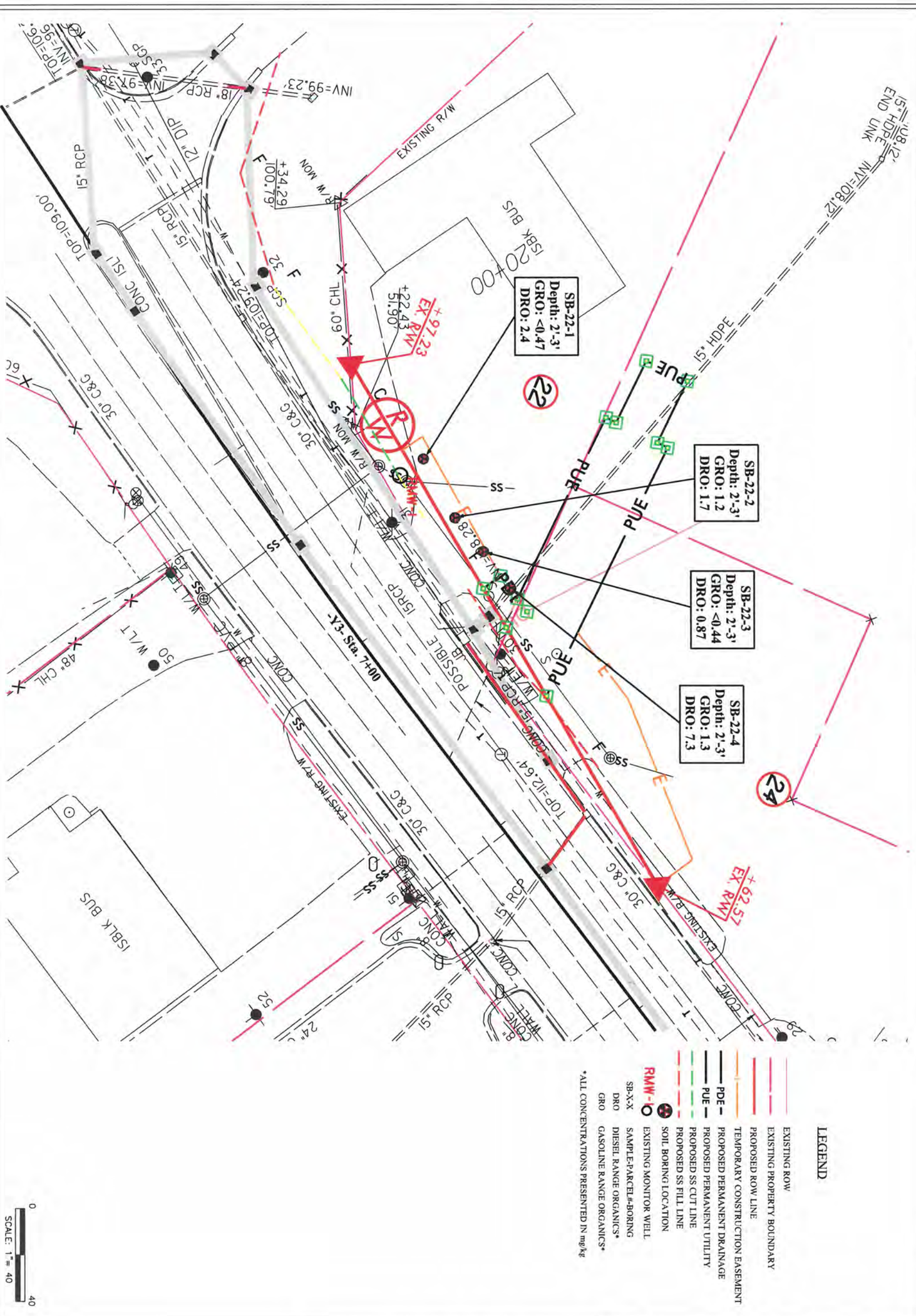
TOPOGRAPHIC SITE MAP
PARCEL 22
MALISSA B. SAULS PROPERTY
1001 N. BERKELEY BOULEVARD
GOLDSBORO, NORTH CAROLINA

DRAWN BY: JS	DATE: OCTOBER 2018
DRAFT CHECK: RSM	JOB NO: 000R3203.00
ENG. CHECK: RSM	GIS NO: 5G-R3203.00-03
APPROVAL: DLW	DWG NO: 1.1



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SOIL SAMPLE MAP
MALISSA B. SAULS PROPERTY
(PARCEL 22)
NCDOT PROJECT U-5724
1001 NORTH BERKELEY BOULEVARD
GOLDSBORO, NC

DRAWN BY: EC	DATE: OCTOBER 2018
DRAFTING CHECK BY: RSM	JOB NO: R3203.00
ENGINEER CHECK BY: RSM	CAD # FIGURE 2
APPROVED BY: DJV	DWG NO: 3.1

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

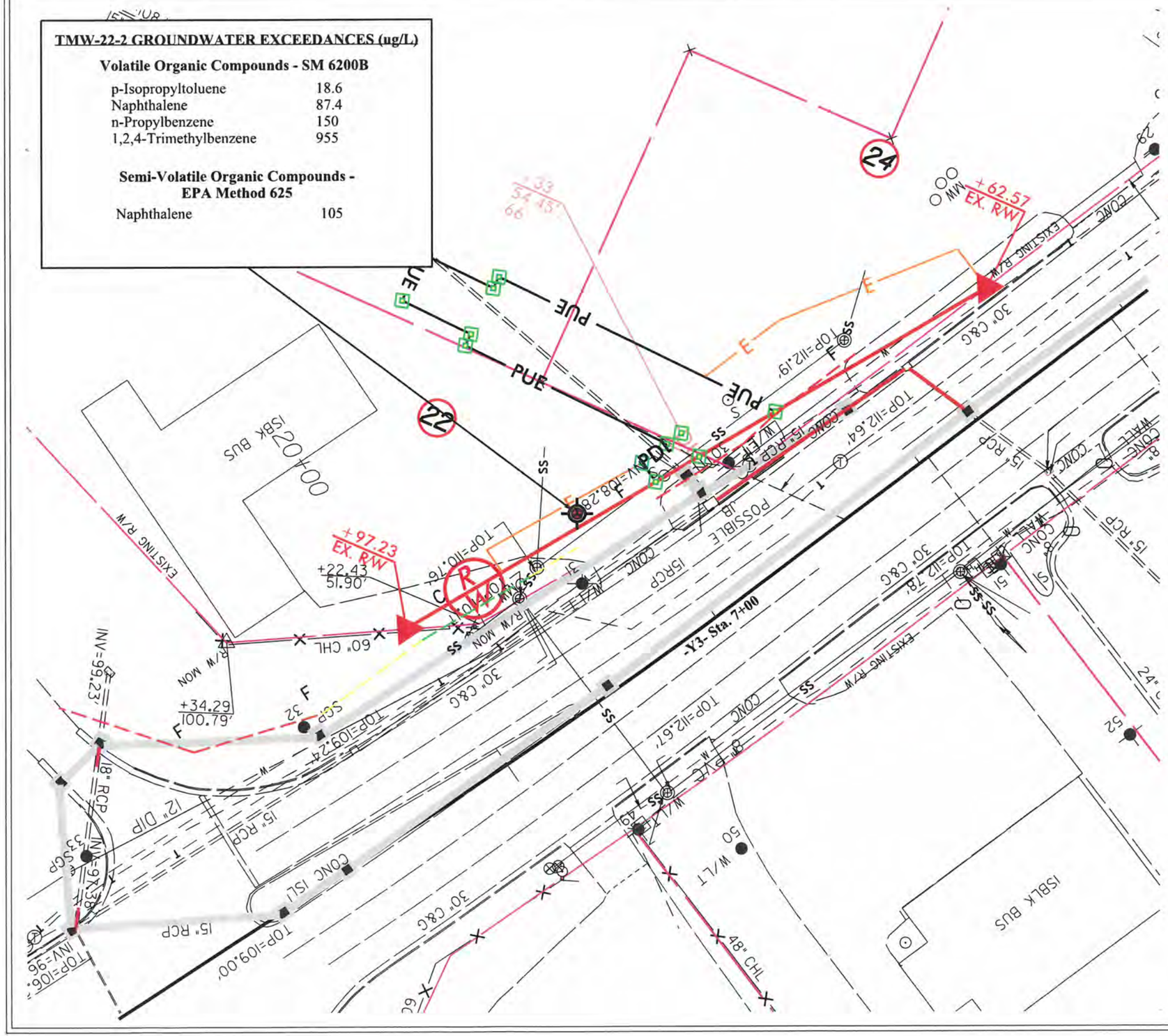
TMW-22-2 GROUNDWATER EXCEEDANCES (ug/L)

Volatile Organic Compounds - SM 6200B

p-Isopropyltoluene	18.6
Naphthalene	87.4
n-Propylbenzene	150
1,2,4-Trimethylbenzene	955

Semi-Volatile Organic Compounds - EPA Method 625

Naphthalene	105



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

GROUNDWATER SAMPLING MAP
MALISSA B. SAULS PROPERTY
(PARCEL 22)
NCDOT PROJECT U-5724
1001 NORTH BERKELEY BOULEVARD
GOLDSBORO, NC

Mid Atlantic
Engineering & Environmental Solutions

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

APPENDIX A

HISTORICAL AERIALS & SITE PHOTO LOG

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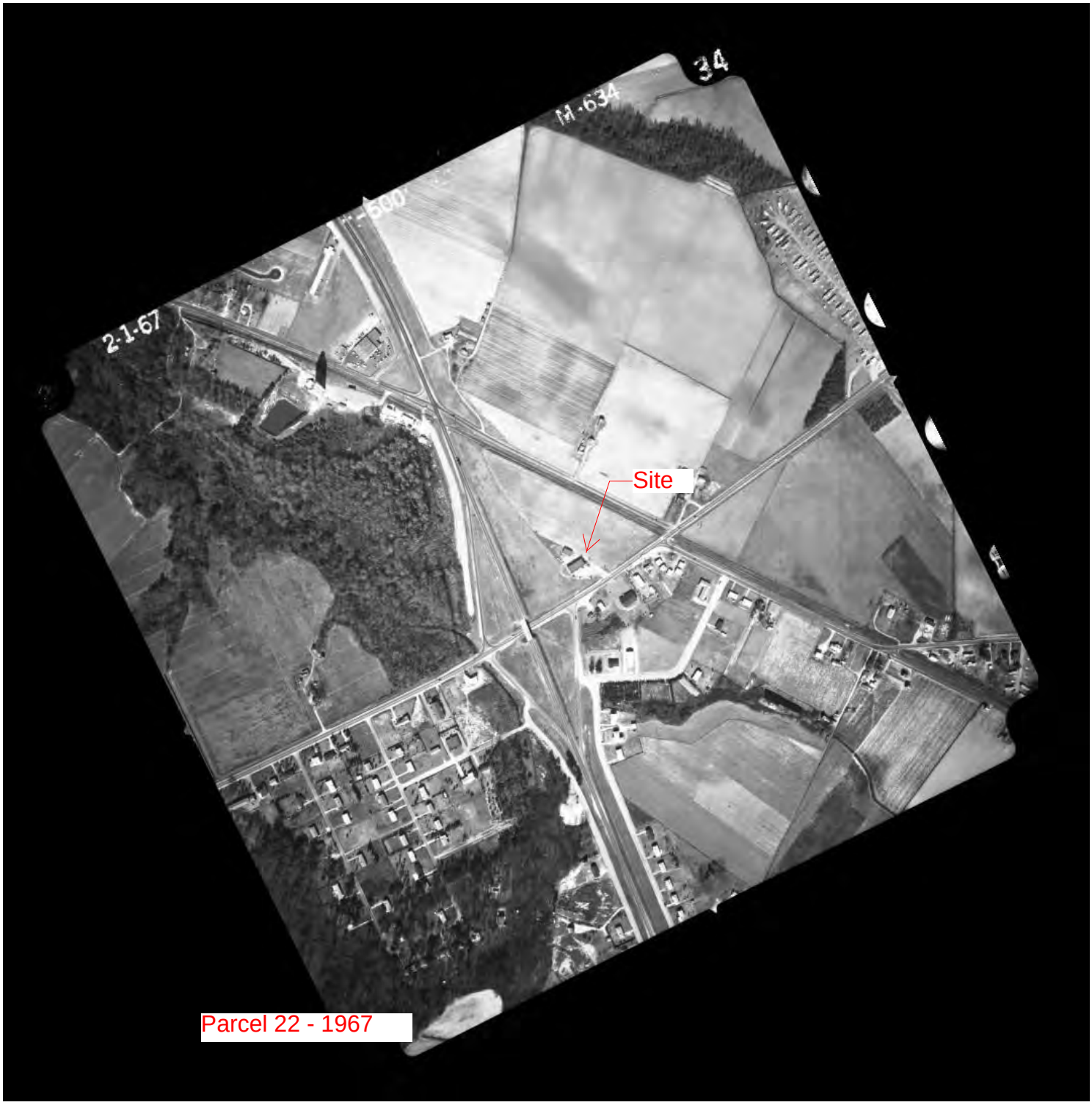
Site
Parcel 22 - 1959
112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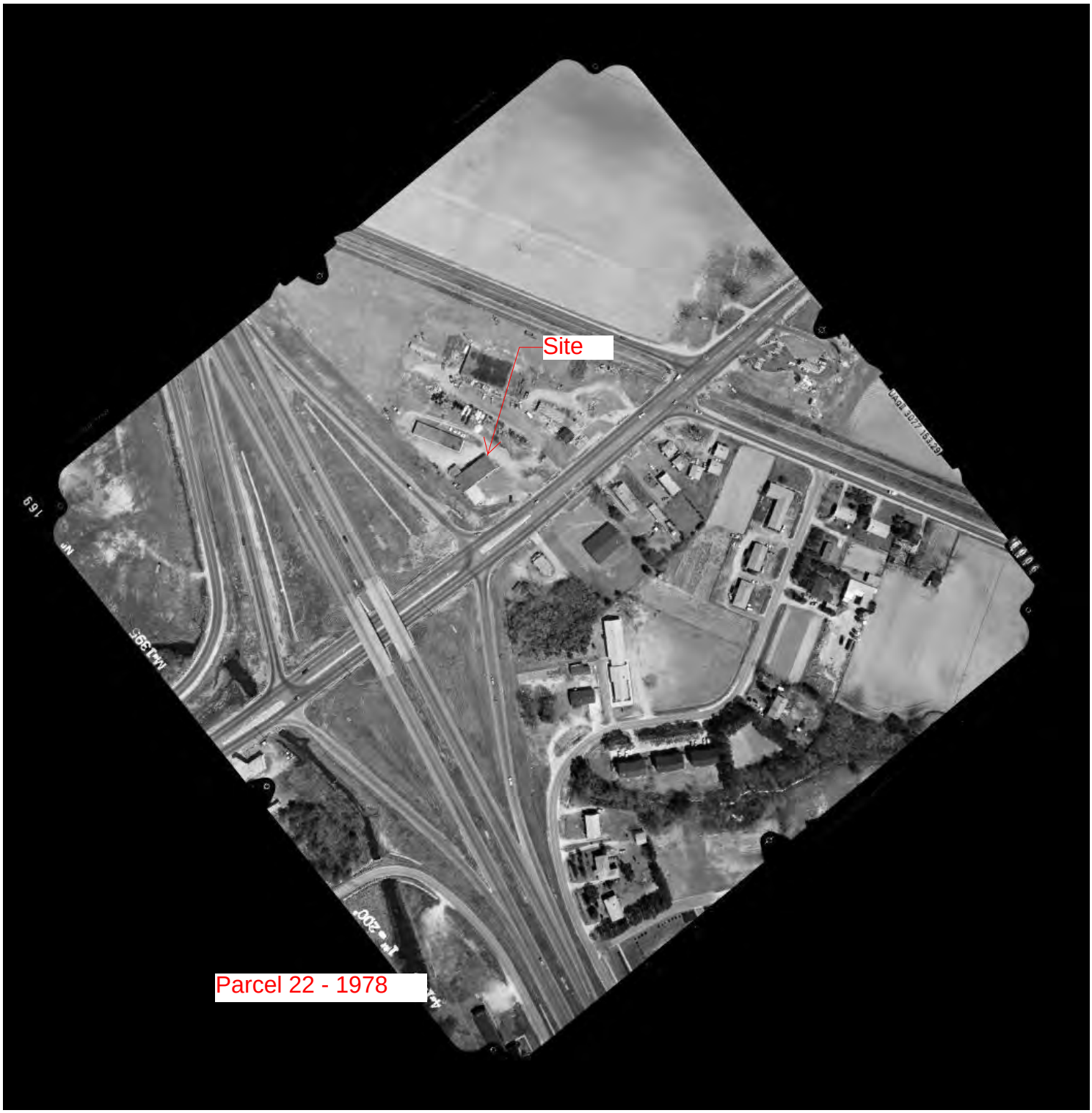
M-634
2-1-67
Site
Parcel 22 - 1967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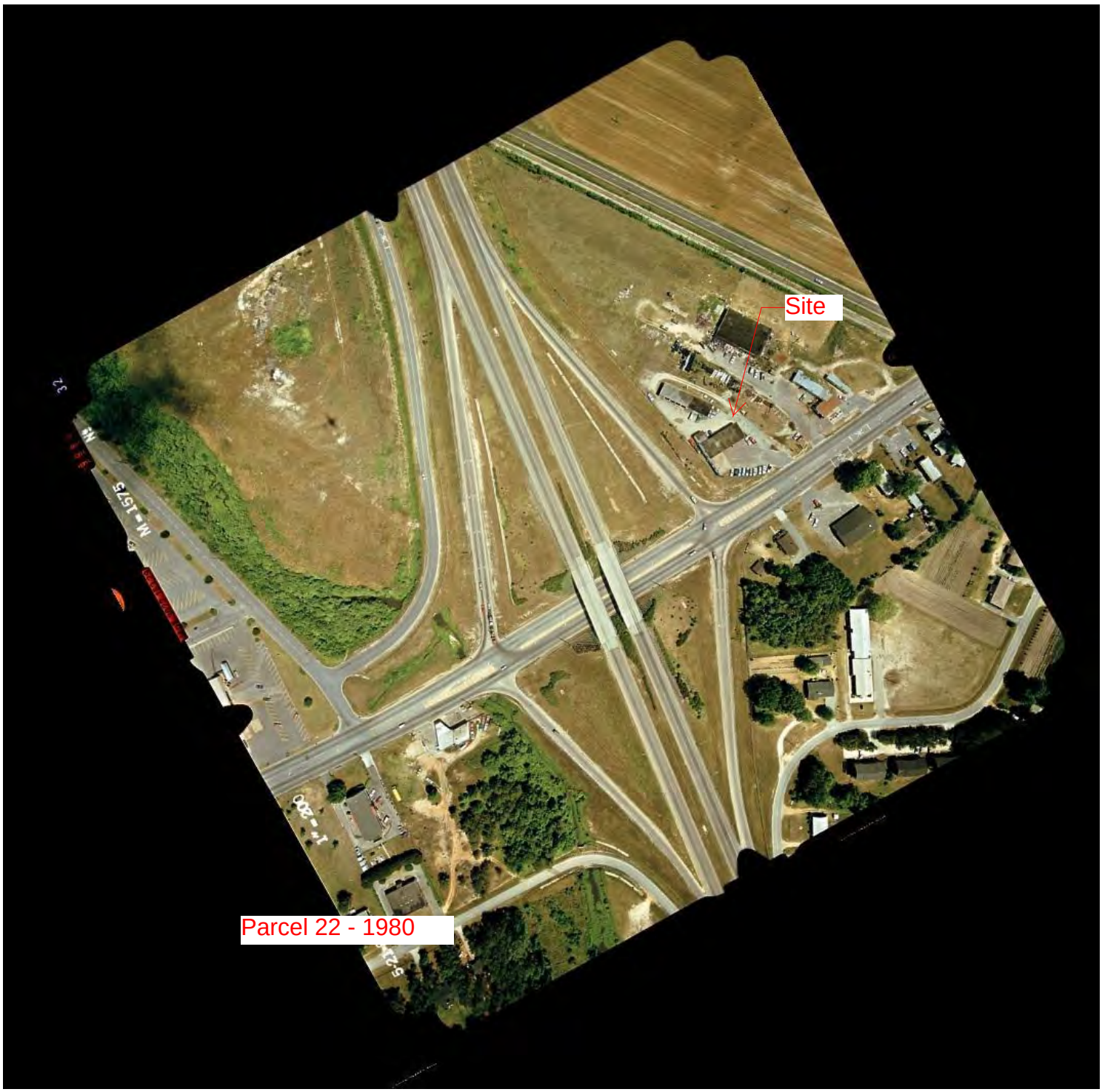
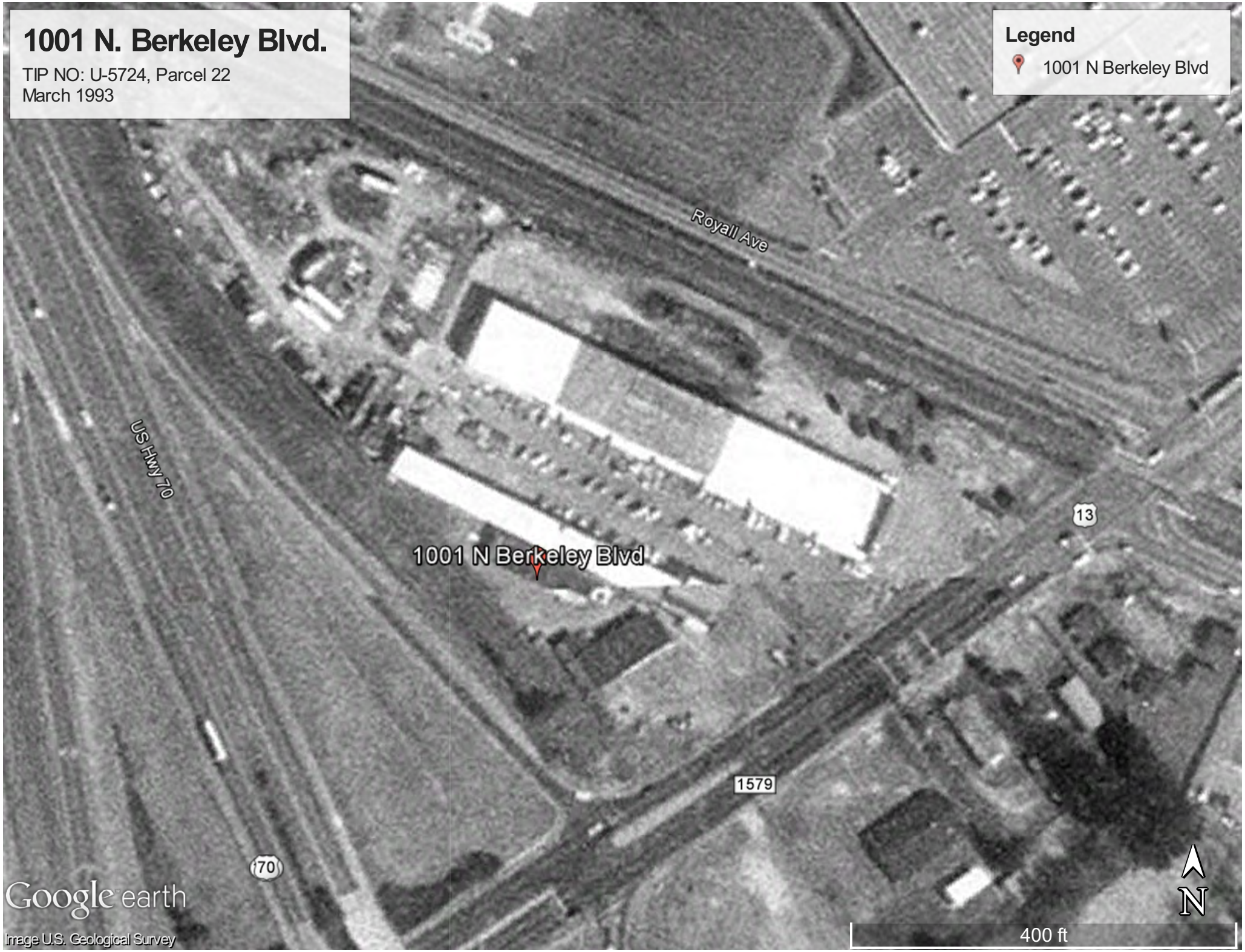
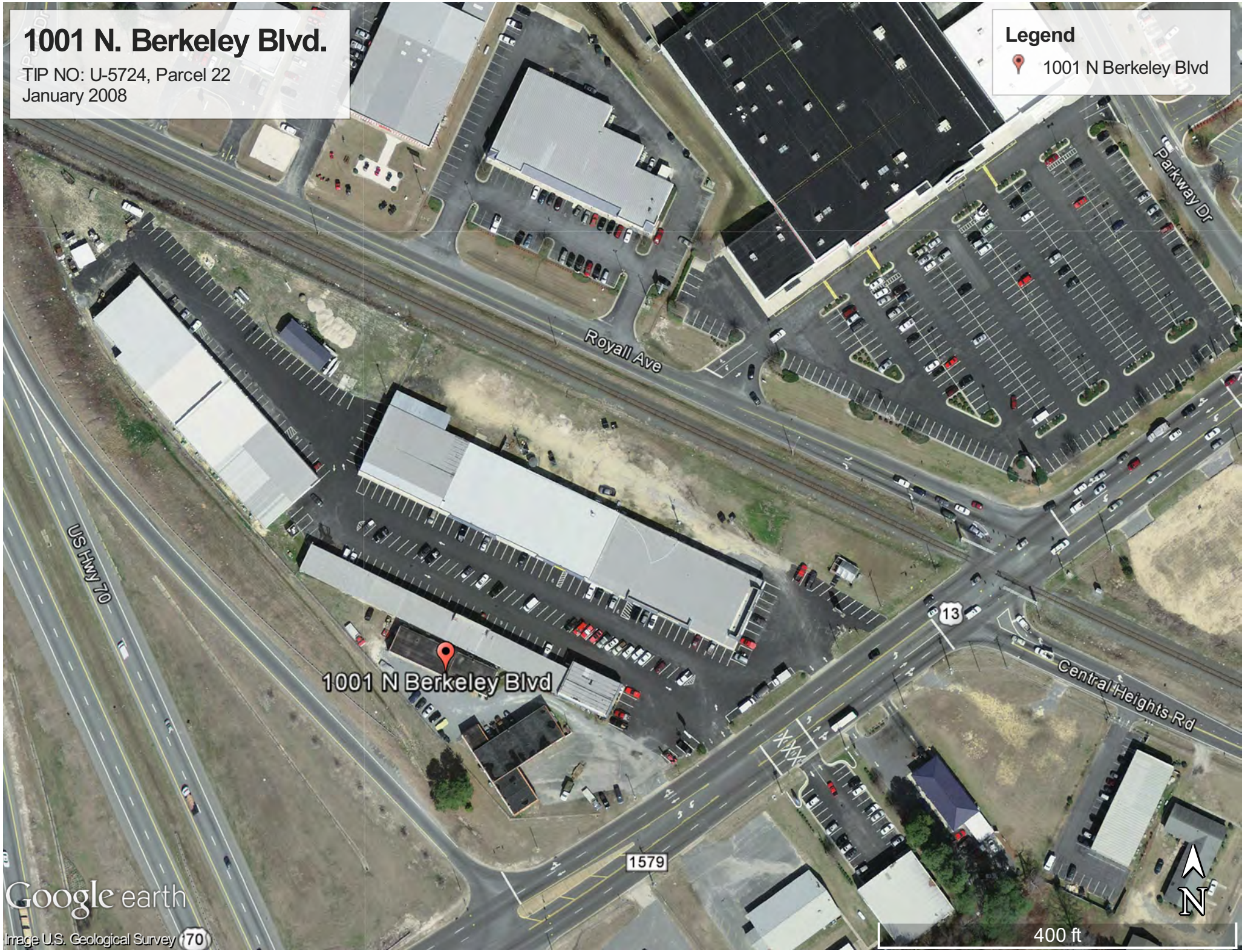

Site
Parcel 22 - 1980


1001 N. Berkeley Blvd.
TIP NO: U-5724, Parcel 22
March 1993
Legend
1001 N Berkeley Blvd
Royall Ave
US Hwy 70
1001 N Berkeley Blvd
13
1579
70
Google earth
Image U.S. Geological Survey
N
400 ft


1001 N. Berkeley Blvd.
TIP NO: U-5724, Parcel 22
January 1998
Legend
1001 N Berkeley Blvd
Parkway Dr
70
US Hwy 70
13
1001 N Berkeley Blvd
Central Heights Rd
1579
McLain St
N
500 ft
Google earth
Image U.S. Geological Survey


1001 N. Berkeley Blvd.
TIP NO: U-5724, Parcel 22
January 2008
Legend
1001 N Berkeley Blvd
Royall Ave
Parkway Dr
US Hwy 70
1001 N Berkeley Blvd
13
Central Heights Rd
1579
70
Google earth
Image U.S. Geological Survey
N
400 ft


1001 N. Berkeley Blvd.
TIP NO: U-5724, Parcel 22
May 2016
Legend
1001 N Berkeley Blvd
Royall Ave
Parkway Dr
US Hwy 70
1001 N Berkeley Blvd
13
Central Heights Rd
1579
70
Google earth
N
400 ft

Photo 1 – A general view of site, looking west from Berkeley Boulevard.
(photo courtesy of Google Earth)

Photo 2 – A view of well RMW-1 (not abandoned), looking west.

Photo 3 – A close-up view of well RMW-1 (not abandoned) – note horizontal pipe connected to well.

APPENDIX B

2013 MONITORING REPORT FOR INCIDENT NO. 6695 (PARCEL NO. 24)

Mid Atlantic
Engineering & Environmental Solutions

1456

BRYAN K.
JONES CONSULTING ENGINEERS, P.A.
Carolina Commerce Center
2815 North William Street, Suite E
Goldsboro, NC 27530
Phone: 919.221.5222
Fax: 919.242.8666
Email: bkjones@nc.rr.com

MONITORING REPORT

CASH FARM SUPPLIES/DELMUS BRIDGER'S SITE
1003 NORTH BERKELEY BLVD., WAYNE COUNTY, NC
INCIDENT NUMBER: 6695
RISK CLASSIFICATION: INTERMEDIATE
RANKING: I 140-D

DATE OF REPORT
19 JULY 2013

UST OWNER/OPERATOR & PROPERTY OWNER
MR. DELMUS BRIDGERS
CASH FARM SUPPLIES
P.O. BOX 10848
GOLDSBORO, NORTH CAROLINA 27532
(919) 778-1882

CONSULTANT
BRYAN K. JONES CONSULTING ENGINEERS, P.A.
CAROLINA COMMERCE CENTER
2815 NORTH WILLIAM STREET, SUITE E
GOLDSBORO, NORTH CAROLINA
(919) 221-5222

RELEASE INFORMATION
DATE DISCOVERED: 26 APRIL 1991
LATITUDE/LONGITUDE: N35-22-46.2/W77-56-05.63

Received
Waro DWM
JUL 23 2013

6695
Wayne

Bullock, Scott

From: Robert Jones [rjones186@nc.rr.com]
Sent: Monday, May 21, 2012 10:59 AM
To: Bullock, Scott
Cc: Jones Engineering
Subject: Cash Farm Supply/Delmus Hardware

Scott,

Just thought I would update you on the status of the Monitoring Report. I'm waiting on Paul, Delmus's son to find evidence of the last time they used the tanks so I can finish the eligibility form. As I mentioned before, the hardware store caught fire several years ago and burnt up all their files.

Robert A. Jones, B.S.C.E., C.P.E.S.C.
Bryan K. Jones Consulting Engineers, P.A.
Carolina Commerce Center
2815 North William Street, Suite E
Goldsboro, NC 27530
(919)222-1604

BRYAN K.
JONES CONSULTING ENGINEERS, P.A.
Carolina Commerce Center
2815 North William Street, Suite E
Goldsboro, NC 27530
Phone: 919.221.5222
Fax: 919.242.8666
Email: bkjones@nc.rr.com

REPORT PREPARED BY: _____

Robert A. Jones, B.S.C.E., C.P.E.S.C.

_____

Bryan K. Jones, P.E.

CERTIFICATION

NORTH CAROLINA PROFESSIONAL SEAL 030261 ENGINEER BRYAN K. JONES

I, Bryan K. Jones *, a Professional Engineer for Bryan K. Jones Consulting Engineers, P.A., do certify that the information contained in this report is correct and accurate to the best of my knowledge.*

Bryan K. Jones Consulting Engineers, P.A. is licensed to practice engineering in North Carolina. The certification number of the company is C-3065 *.*

BRYAN K.
JONES CONSULTING ENGINEERS, P.A.
Carolina Commerce Center
2815 North William Street, Suite E
Goldsboro, NC 27530
Phone: 919.221.5222
Fax: 919.242.8666
Email: bkjones@nc.rr.com

MONITORING REPORT

CASH FARM SUPPLIES/DELMUS BRIDGER'S SITE
1003 NORTH BERKELEY BLVD., WAYNE COUNTY, NC
INCIDENT NUMBER: 6695
RISK CLASSIFICATION: INTERMEDIATE
RANKING: I 140-D

DATE OF REPORT
19 JULY 2013

I. INTRODUCTION

A. ***Site Location****. Cash Farm Supplies (Delmus Hardware) is located at the southwest corner of Highway 70 West and Highway 581, Goldsboro, NC. A location map showing the site location can be seen in Appendix A, Enclosure 1.*

B. Underground Storage Tanks. *Two (2) 10,000-gallon underground storage tanks (UST) used to store gasoline were installed in June 1969. On 26 April 1991 during a tank closure, groundwater samples were collected for laboratory analysis. Lab results on the collected water samples were sent to the Division of Environmental Management (DEM) in Washington. On 31 May 1991 Delmus Bridgers was issued a Notice Of Violation(NOV) from the DEM and was requested to conduct a Comprehensive Site Assessment (CSA). The CSA was completed and a report, dated 14 January 1992 was submitted to the DEM. The site was recently issued a NORR dated 1 May 2012 requesting a Groundwater Monitoring Report be conducted.*

II. GROUNDWATER SAMPLING RESULTS

A. ***Summary of Current Groundwater Sampling Results.*** *A total of ten (10) monitoring wells were sampled from wells sampled for previous groundwater investigations. These wells are identified as MW-11A, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, & MW-10. Three of the wells, MW-7, MW-8, & MW-9 had been destroyed from construction activity which had taken place over the years so only seven (7) of the ten (10) wells were sampled. A map showing the well locations can be seen in Appendix A, Enclosure 2. Laboratory results can be seen in Appendix B. A table summarizing these results is shown below:*

Date Sampled	*Sample Location*	*Parameter Exceeding 2L Standard*	*Concentration ug/l*	*2L Standard ug/l*	*Laboratory Method*
6/26/2013	*MW-11A*		*ND*		*8260B*
6/26/2013	*MW-2*		*ND*		*8260B*
6/26/2013	*MW-3*		*ND*		*8260B*
6/26/2013	*MW-4*		*ND*		*8260B*
6/26/2013	*MW-5*		*ND*		*8260B*
6/26/2013	*MW-6*	*Benzene*	*8.1*	*1.0*	*8260B*
		Ethylbenzene	*450*	*600*	
		Toluene	*23*	*600*	
		Xylenes	*690*	*500*	
6/26/2013	*MW-7*		*NS*		
6/26/2013	*MW-8*		*NS*		
6/26/2013	*MW-9*		*NS*		
6/26/2013	*MW-10*		*ND*		*8260B*

Note:

ug/l = part per billion

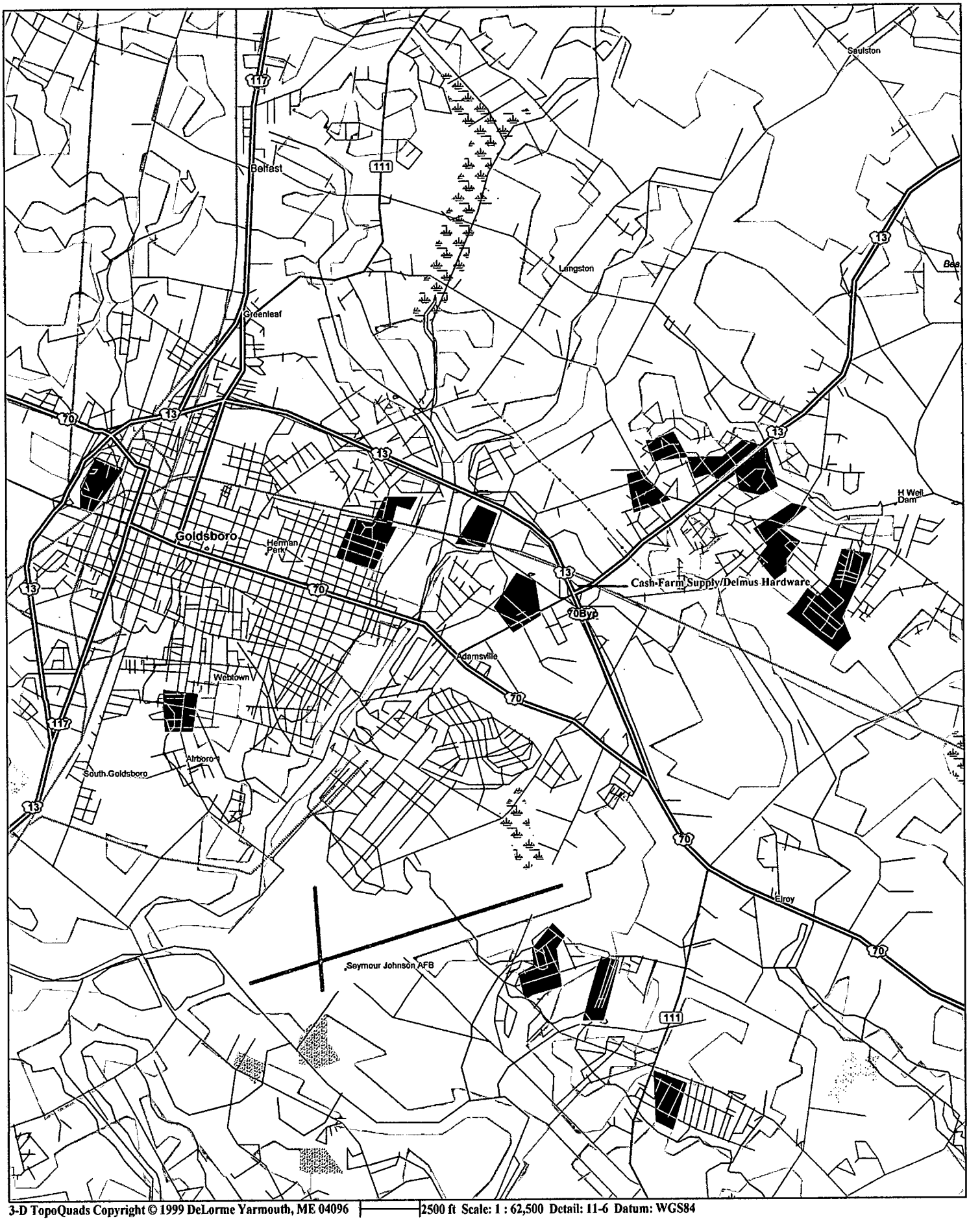
ND = No parameters detected

NS = Not sampled due to well being destroyed

8.1 = Highlighted numbers exceed 15A NCAC 02L .0202 groundwater standards

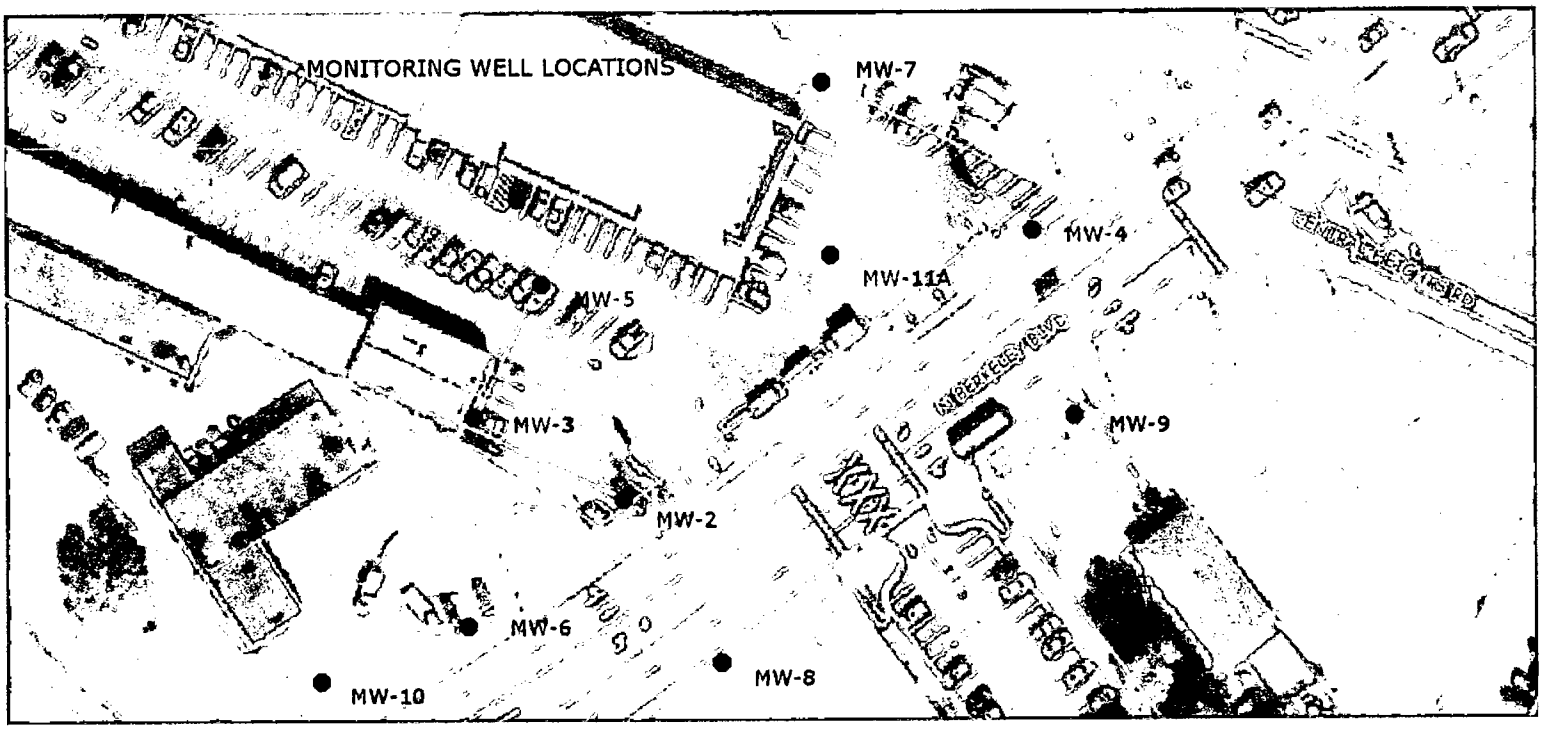
III. CONCLUSIONS/SUMMARY

A. Ten monitoring wells were selected for groundwater collection. Three of the wells had been destroyed so only seven of the existing wells were sampled. Out of the seven wells sampled, only one well, MW-6, had parameters detected by the laboratory using Method 8260B. This well had two parameters detected which exceeded the 15A NCAC 02L .0202 groundwater standard. These were Benzene and total Xylenes.



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 2500 ft Scale: 1 : 62,500 Detail: 11-6 Datum: WGS84

Appendix A, Enclosure 1



AIREAL VIEW OF MONITORING WELL LOCATIONS

APPENDIX C

GEOPHYSICAL REPORT

Mid Atlantic
Engineering & Environmental Solutions

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2018-230)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 22
NCDOT PROJECT U-5724 (54016.1.2)

1001 NORTH BERKELEY BOULEVARD, GOLDSBORO, NC

SEPTEMBER 6, 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 22 – 1001 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 22, located at 1001 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 eight EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features. Two EM anomalies were associated with suspected buried metallic debris and were further investigated with GPR. GPR recorded evidence of isolated high-amplitude reflectors at the location of one of the EM anomalies that is characteristic of buried metallic debris. GPR did not record any evidence of significant buried structures at the second unknown EM anomaly location. Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 22.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Mid-Atlantic Associates, Inc. at Parcel 22, located at 1001 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 one former and one active service garage in a shopping plaza surrounded by grass, asphalt, and gravel surfaces. 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	Suspected Debris	☑
2	Metal on Surface	
3	Fence Posts	
4	Metallic Debris/Fence Posts	☑
5	Hydrant/Fence Posts	
6	Manholes/Sign	
7	Suspected Utility	
8	Utilities/Sign	

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including surface metal, fence posts, a hydrant, manholes, and utilities. Anomaly 1 was associated with suspected debris and was further investigated with GPR. Anomaly 4 was associated with metallic debris and a fence post and was further investigated with GPR.

Discussion of GPR Results

Figure 3 presents the locations of the GPR transects performed at the property, as well as the transect images. A total of three GPR transects were recorded. Transect 1 was collected across EM Anomaly 4 and recorded small hyperbolic anomalies that are characteristic of buried metallic debris.

Transects 2 and 3 were collected across EM Anomaly 1. These transects did not record any evidence of significant structures.

Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 22. **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 22 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.
- The majority of the EM anomalies were directly attributed to visible cultural features.
- Two EM anomalies were associated with suspected buried metallic debris and were further investigated with GPR.
- GPR recorded evidence of isolated high-amplitude reflectors at the location of one of the EM anomalies that is characteristic of buried metallic debris. GPR did not record any evidence of significant buried structures at the second unknown EM anomaly location.
- Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 22.

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 Southwest)

N

PYRAMID GEOPHYSICS 503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	PROJECT PARCEL 22 GOLDSBORO, NORTH CAROLINA NCDOT PROJECT U-5724	TITLE PARCEL 22 - 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.

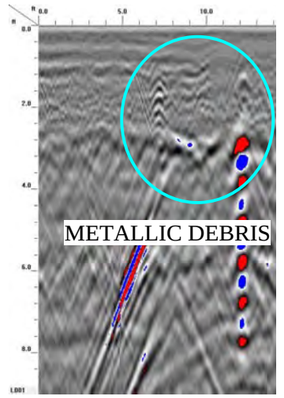
EM61 Metal Detection Response (millivolts)

N

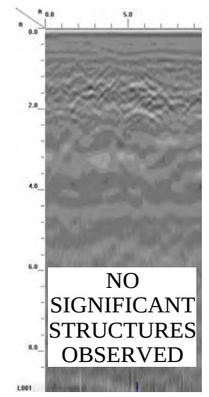
PYRAMID GEOPHYSICS
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27460
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

PROJECT	PARCEL 22 GOLDSBORO, NORTH CAROLINA NCDOT PROJECT U-5724	TITLE	PARCEL 22 - EM61 METAL DETECTION CONTOUR MAP	DATE 8/22/2018 PYRAMID PROJECT #: 2018-230
				CLIENT MID-ATLANTIC ASSOCIATES, INC. **FIGURE 2**

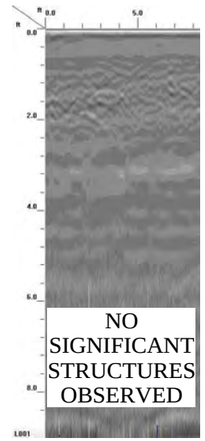
LOCATIONS OF GPR TRANSECTS



GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)



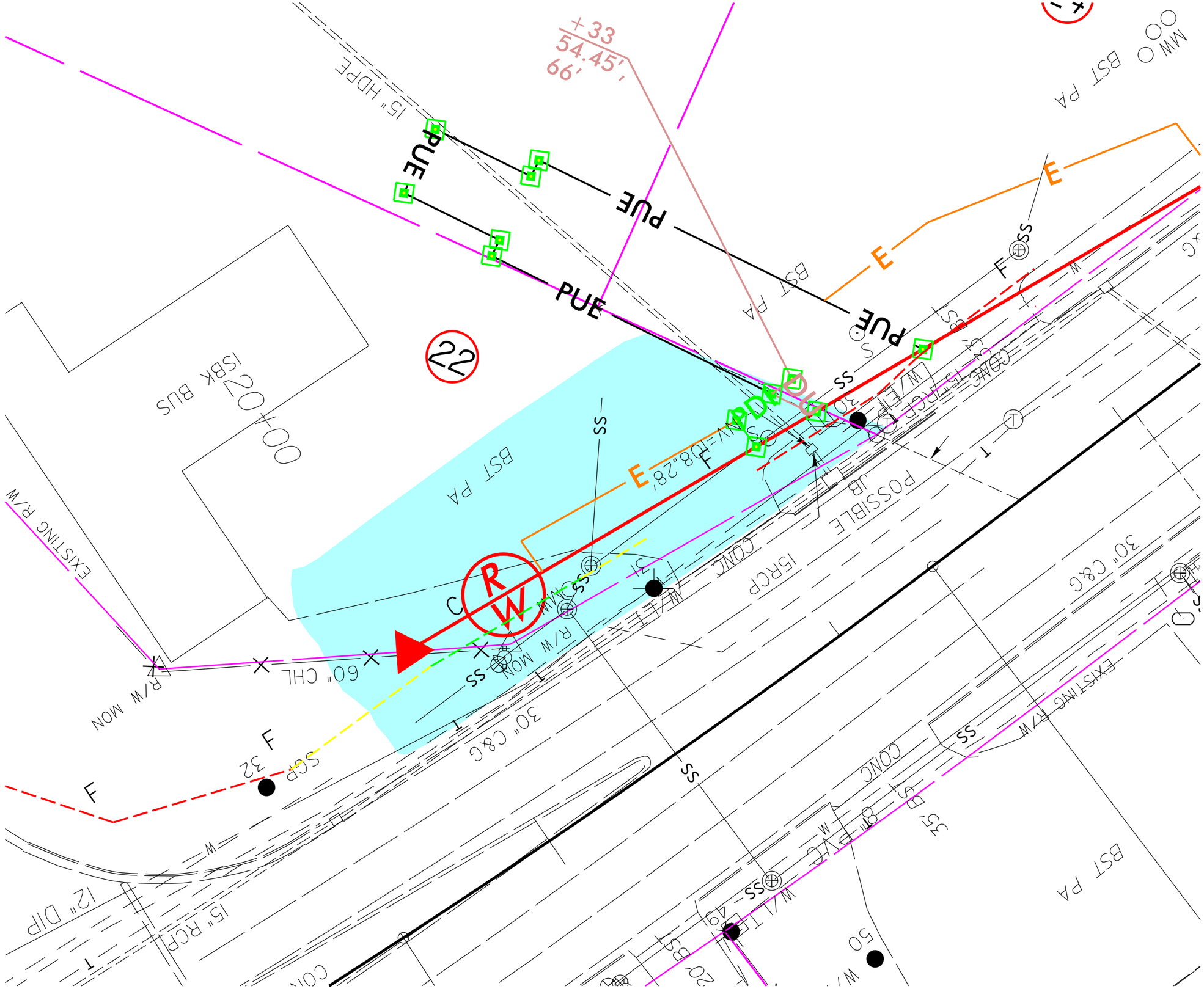
GPR TRANSECT 3 (T3)

*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

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

PROJECT	PARCEL 22 GOLDSBORO, NORTH CAROLINA NCDOT PROJECT U-5724	TITLE	PARCEL 22 - 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 22
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 D

BORING LOGS

Mid Atlantic
Engineering & Environmental Solutions

Mid Atlantic
Engineering & Environmental Solutions
409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-22-1

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
				ASPHALT/ GRAVEL		
	NONE	2.70		LIGHT BROWN SLIGHTLY CLAYEY VERY FINE SAND		
2	NONE	2.90	YES			2
	NONE	3.90				
4						4
				TAN VERY FINE SAND AND CLAY		
	STRONG	5,000+		TAN FINE TO MEDIUM SAND 5'-10' MACROCORE ONLY 2.5 FT OF RECOVERY		
6						6
8						8
10				BORING TERMINATED AT 10 FT-BGS WATER IN BOREHOLE AT 3.9 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-22-2/TMW-22-2

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):	3.6
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
				ASPHALT/ GRAVEL		
	NONE	0.30			1-IN PVC TEMP WELL	
2				LIGHT BROWN VERY FINE SAND AND CLAY		2
	NONE	0.90	YES			
4	NONE	10.60				4
				TAN CLAY VERY FINE SAND		
6						6
					SCREEN 2FT-12FT	
					WATER LEVEL 3.6FT	
	STRONG	5,000+		LIGHT BROWN FINE TO COARSE SLIGHTLY SILTY SAND		
8				5'-10' MACROCORE ONLY 2.5FT OF RECOVERY		8
10						10
				BORING TERMINATED AT 10 FT-BGS		
				WATER LEVEL IN BOREHOLE 3.7 FT-BGS		
				AFTER ALL BORINGS WERE COMPLETED FOR PARCEL 22 THE DRILLERS CA		
12				AND MACROCORED TO 12 FT-BGS AND INSTALLED TMW		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-22-3

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
				ASPHALT/ GRAVEL		
	NONE	0.00				
2	NONE	0.30	YES	LIGHT BROWN VERY FINE SAND		2
	NONE	0.90				
4				TAN CLAYEY VERY FINE TO MEDIUM SAND		4
6						6
	STRONG	1190		TAN SLIGHTLY SILTY FINE TO COARSE SAND 5'-10' MACROCORE ONLY 2FT OF RECOVERY		
8						8
10				BORING TERMINATED AT 10 FT-BGS WATER LEVEL IN BOREHOLE 3.7 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-22-4

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
				GRAVEL		
	NONE	1.70		LIGHT BROWN VERY FINE SAND		
2	NONE	3.20	YES	LIGHT BROWN CLAYEY VERY FINE SAND		2
4	NONE	4.90		TAN CLAYEY VERY FINE TO MEDIUM SAND		4
6	--	--		TAN SILTY FINE TO COARSE SAND 5-10' MACRACORE ONLY 2.5 FT RECOVERY		6
8						8
10				BORING TERMINATED AT 10 FT-BGS WATER IN BOREHOLE AT 3.4 FT-BGS		10
12						12
14						14
16						16
18						18
20						20

COMMENTS:
DTW - Depth to Water ▼
-- not recorded by technician

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 E

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 F

SOIL LABORATORY ANALYTICAL REPORTS AND LAB 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-22-1 (2'-3')	18.7	<0.47	<0.47	2.4	2.4	1.4	<0.15	<0.019	0	68.7	31.3	V.Deg.PHC 77.3%,(FCM),(BO)
S	SB-22-2 (2'-3')	19.8	<0.5	1.2	1.7	2.9	1.1	<0.16	<0.02	62.6	28.6	8.8	Deg Fuel 73%,(FCM)
S	SB-22-3 (2'-3')	17.4	<0.44	<0.44	0.87	0.87	0.61	<0.14	<0.017	0	63.8	36.2	V.Deg.PHC 77%,(FCM),(P)
S	SB-22-4 (2'-3')	18.6	<0.46	1.3	7.3	8.6	5.5	0.32	<0.019	26.5	63.3	10.2	Deg Fuel 76.7%,(FCM)
S													
S													
S													
S													
S													
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

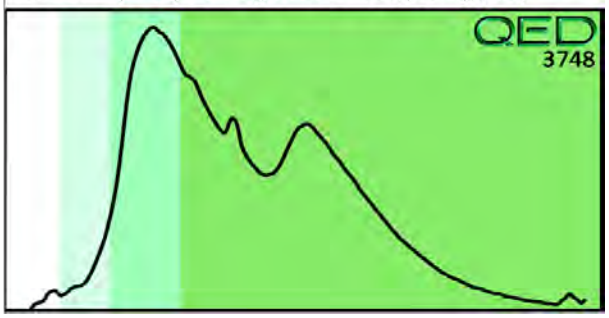
B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

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

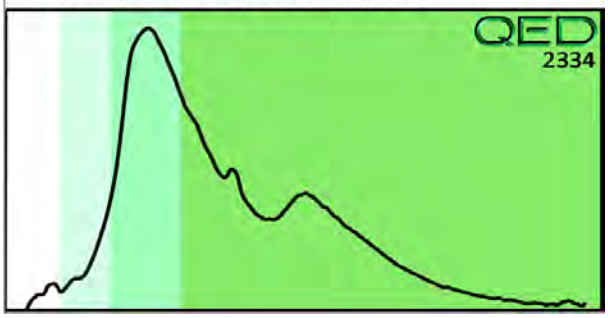
QED Hydrocarbon Fingerprints

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

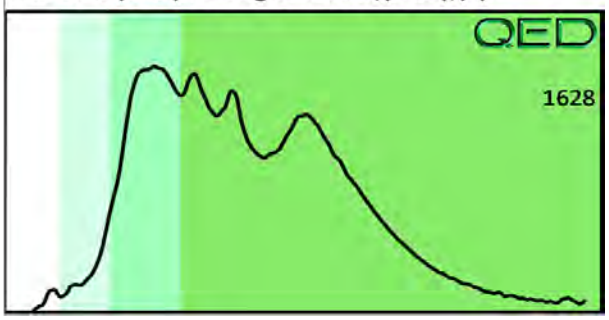
SB-22-1 (2'-3') : V.Deg.PHC 77.3%,(FCM),(BO)



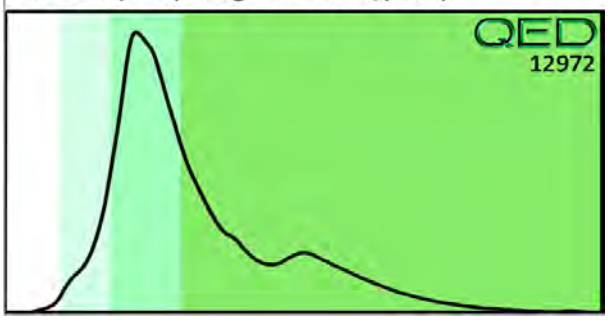
SB-22-2 (2'-3') : Deg Fuel 73%,(FCM)



SB-22-3 (2'-3') : V.Deg.PHC 77%,(FCM),(P)



SB-22-4 (2'-3') : Deg Fuel 76.7%,(FCM)



APPENDIX G

GROUNDWATER LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY RECORD

Mid Atlantic
Engineering & Environmental Solutions

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

October 01, 2018

Mid-Atlantic Associates, Inc.

Sample Delivery Group:	L1029585
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-22-2 L1029585-01 GW

Collected by	Collected date/time	Received date/time
Cory A. Fisher	09/24/18 14:35	09/27/18 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 6200B-1997	WG1173054	5	09/28/18 20:52	09/28/18 20:52	ACG
Semi Volatile Organic Compounds (GC/MS) by Method 625.1	WG1173376	1	09/29/18 17:49	09/30/18 15:36	LEA

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	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		50.0	250	5	09/28/2018 20:52	WG1173054
Acrolein	U		44.4	250	5	09/28/2018 20:52	WG1173054
Acrylonitrile	U		9.35	50.0	5	09/28/2018 20:52	WG1173054
Benzene	U		1.66	5.00	5	09/28/2018 20:52	WG1173054
Bromobenzene	U		1.76	5.00	5	09/28/2018 20:52	WG1173054
Bromodichloromethane	U		1.90	5.00	5	09/28/2018 20:52	WG1173054
Bromoform	U		2.34	5.00	5	09/28/2018 20:52	WG1173054
Bromomethane	U		4.33	25.0	5	09/28/2018 20:52	WG1173054
n-Butylbenzene	14.8		1.80	5.00	5	09/28/2018 20:52	WG1173054
sec-Butylbenzene	10.9		1.82	5.00	5	09/28/2018 20:52	WG1173054
tert-Butylbenzene	U		2.00	5.00	5	09/28/2018 20:52	WG1173054
Carbon tetrachloride	U		1.90	5.00	5	09/28/2018 20:52	WG1173054
Chlorobenzene	U		1.74	5.00	5	09/28/2018 20:52	WG1173054
Chlorodibromomethane	U		1.64	5.00	5	09/28/2018 20:52	WG1173054
Chloroethane	U		2.26	25.0	5	09/28/2018 20:52	WG1173054
Chloroform	U		1.62	25.0	5	09/28/2018 20:52	WG1173054
Chloromethane	U		1.38	12.5	5	09/28/2018 20:52	WG1173054
2-Chlorotoluene	U		1.88	5.00	5	09/28/2018 20:52	WG1173054
4-Chlorotoluene	U		1.76	5.00	5	09/28/2018 20:52	WG1173054
1,2-Dibromo-3-Chloropropane	U		6.65	25.0	5	09/28/2018 20:52	WG1173054
1,2-Dibromoethane	U		1.90	5.00	5	09/28/2018 20:52	WG1173054
Dibromomethane	U		1.73	5.00	5	09/28/2018 20:52	WG1173054
1,2-Dichlorobenzene	U		1.74	5.00	5	09/28/2018 20:52	WG1173054
1,3-Dichlorobenzene	U		1.10	5.00	5	09/28/2018 20:52	WG1173054
1,4-Dichlorobenzene	U		1.37	5.00	5	09/28/2018 20:52	WG1173054
Dichlorodifluoromethane	U		2.76	25.0	5	09/28/2018 20:52	WG1173054
1,1-Dichloroethane	U		1.30	5.00	5	09/28/2018 20:52	WG1173054
1,2-Dichloroethane	U		1.80	5.00	5	09/28/2018 20:52	WG1173054
1,1-Dichloroethene	U		1.99	5.00	5	09/28/2018 20:52	WG1173054
cis-1,2-Dichloroethene	U		1.30	5.00	5	09/28/2018 20:52	WG1173054
trans-1,2-Dichloroethene	U		1.98	5.00	5	09/28/2018 20:52	WG1173054
1,2-Dichloropropane	U		1.53	5.00	5	09/28/2018 20:52	WG1173054
1,1-Dichloropropene	U		1.76	5.00	5	09/28/2018 20:52	WG1173054
1,3-Dichloropropane	U		1.83	5.00	5	09/28/2018 20:52	WG1173054
2,2-Dichloropropane	U		1.60	5.00	5	09/28/2018 20:52	WG1173054
Di-isopropyl ether	U		1.60	5.00	5	09/28/2018 20:52	WG1173054
Ethylbenzene	181		1.92	5.00	5	09/28/2018 20:52	WG1173054
Hexachloro-1,3-butadiene	U		1.28	5.00	5	09/28/2018 20:52	WG1173054
Isopropylbenzene	62.0		1.63	5.00	5	09/28/2018 20:52	WG1173054
p-Isopropyltoluene	18.6		1.75	5.00	5	09/28/2018 20:52	WG1173054
2-Butanone (MEK)	U		19.6	50.0	5	09/28/2018 20:52	WG1173054
Methylene Chloride	U		5.00	25.0	5	09/28/2018 20:52	WG1173054
4-Methyl-2-pentanone (MIBK)	U		10.7	50.0	5	09/28/2018 20:52	WG1173054
Methyl tert-butyl ether	U		1.84	5.00	5	09/28/2018 20:52	WG1173054
Naphthalene	87.4		5.00	25.0	5	09/28/2018 20:52	WG1173054
n-Propylbenzene	150		1.74	5.00	5	09/28/2018 20:52	WG1173054
Styrene	U		1.54	5.00	5	09/28/2018 20:52	WG1173054
1,1,1,2-Tetrachloroethane	U		1.92	5.00	5	09/28/2018 20:52	WG1173054
1,1,2,2-Tetrachloroethane	U		0.650	5.00	5	09/28/2018 20:52	WG1173054
Tetrachloroethene	U		1.86	5.00	5	09/28/2018 20:52	WG1173054
Toluene	3.31	J	2.06	5.00	5	09/28/2018 20:52	WG1173054
1,2,3-Trichlorobenzene	U		1.15	5.00	5	09/28/2018 20:52	WG1173054
1,2,4-Trichlorobenzene	U		1.78	5.00	5	09/28/2018 20:52	WG1173054
1,1,1-Trichloroethane	U		1.60	5.00	5	09/28/2018 20:52	WG1173054
1,1,2-Trichloroethane	U		1.92	5.00	5	09/28/2018 20:52	WG1173054
Trichloroethene	U		1.99	5.00	5	09/28/2018 20:52	WG1173054

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		6.00	25.0	5	09/28/2018 20:52	WG1173054
1,2,3-Trichloropropane	U		4.04	12.5	5	09/28/2018 20:52	WG1173054
1,2,4-Trimethylbenzene	955		1.86	5.00	5	09/28/2018 20:52	WG1173054
1,3,5-Trimethylbenzene	147		1.94	5.00	5	09/28/2018 20:52	WG1173054
Vinyl chloride	U		1.30	5.00	5	09/28/2018 20:52	WG1173054
o-Xylene	17.9		1.70	5.00	5	09/28/2018 20:52	WG1173054
m&p-Xylenes	117		3.60	10.0	5	09/28/2018 20:52	WG1173054
(S) Toluene-d8	*102*			*80.0-120*		*09/28/2018 20:52*	WG1173054
(S) Dibromofluoromethane	*105*			*75.0-120*		*09/28/2018 20:52*	WG1173054
(S) a,a,a-Trifluorotoluene	*99.5*			*80.0-120*		*09/28/2018 20:52*	WG1173054
(S) 4-Bromofluorobenzene	*106*			*77.0-126*		*09/28/2018 20:52*	WG1173054

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	U		0.316	1.00	1	09/30/2018 15:36	WG1173376
Acenaphthylene	U		0.309	1.00	1	09/30/2018 15:36	WG1173376
Anthracene	U		0.291	1.00	1	09/30/2018 15:36	WG1173376
Benzidine	U		4.32	10.0	1	09/30/2018 15:36	WG1173376
Benzo(a)anthracene	U		0.0975	1.00	1	09/30/2018 15:36	WG1173376
Benzo(b)fluoranthene	U		0.0896	1.00	1	09/30/2018 15:36	WG1173376
Benzo(k)fluoranthene	U		0.355	1.00	1	09/30/2018 15:36	WG1173376
Benzo(g,h,i)perylene	U		0.161	1.00	1	09/30/2018 15:36	WG1173376
Benzo(a)pyrene	U		0.340	1.00	1	09/30/2018 15:36	WG1173376
Bis(2-chlorethoxy)methane	U		0.329	10.0	1	09/30/2018 15:36	WG1173376
Bis(2-chloroethyl)ether	U		1.62	10.0	1	09/30/2018 15:36	WG1173376
Bis(2-chloroisopropyl)ether	U		0.445	10.0	1	09/30/2018 15:36	WG1173376
4-Bromophenyl-phenylether	U		0.335	10.0	1	09/30/2018 15:36	WG1173376
2-Chloronaphthalene	U	J4	0.330	1.00	1	09/30/2018 15:36	WG1173376
4-Chlorophenyl-phenylether	U		0.303	10.0	1	09/30/2018 15:36	WG1173376
Chrysene	U		0.332	1.00	1	09/30/2018 15:36	WG1173376
Dibenz(a,h)anthracene	U		0.279	1.00	1	09/30/2018 15:36	WG1173376
3,3-Dichlorobenzidine	U		2.02	10.0	1	09/30/2018 15:36	WG1173376
2,4-Dinitrotoluene	U		1.65	10.0	1	09/30/2018 15:36	WG1173376
2,6-Dinitrotoluene	U		0.279	10.0	1	09/30/2018 15:36	WG1173376
Fluoranthene	1.37		0.310	1.00	1	09/30/2018 15:36	WG1173376
Fluorene	U	J4	0.323	1.00	1	09/30/2018 15:36	WG1173376
Hexachlorobenzene	U		0.341	1.00	1	09/30/2018 15:36	WG1173376
Hexachloro-1,3-butadiene	U		0.329	10.0	1	09/30/2018 15:36	WG1173376
Hexachlorocyclopentadiene	U		2.33	10.0	1	09/30/2018 15:36	WG1173376
Hexachloroethane	U		0.365	10.0	1	09/30/2018 15:36	WG1173376
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	09/30/2018 15:36	WG1173376
Isophorone	U		0.272	10.0	1	09/30/2018 15:36	WG1173376
Naphthalene	105		0.372	1.00	1	09/30/2018 15:36	WG1173376
Nitrobenzene	U		0.367	10.0	1	09/30/2018 15:36	WG1173376
n-Nitrosodimethylamine	U		1.26	10.0	1	09/30/2018 15:36	WG1173376
n-Nitrosodiphenylamine	U		1.19	10.0	1	09/30/2018 15:36	WG1173376
n-Nitrosodi-n-propylamine	U		0.403	10.0	1	09/30/2018 15:36	WG1173376
Phenanthrene	1.52		0.366	1.00	1	09/30/2018 15:36	WG1173376
Benzylbutyl phthalate	U		0.275	3.00	1	09/30/2018 15:36	WG1173376
Bis(2-ethylhexyl)phthalate	U		0.709	3.00	1	09/30/2018 15:36	WG1173376
Di-n-butyl phthalate	U		0.266	3.00	1	09/30/2018 15:36	WG1173376
Diethyl phthalate	U		0.282	3.00	1	09/30/2018 15:36	WG1173376
Dimethyl phthalate	U		0.283	3.00	1	09/30/2018 15:36	WG1173376
Di-n-octyl phthalate	U		0.278	3.00	1	09/30/2018 15:36	WG1173376
Pyrene	1.56		0.330	1.00	1	09/30/2018 15:36	WG1173376

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	0.355	10.0	1	09/30/2018 15:36	WG1173376
4-Chloro-3-methylphenol	U		0.263	10.0	1	09/30/2018 15:36	WG1173376
2-Chlorophenol	U		0.283	10.0	1	09/30/2018 15:36	WG1173376
2,4-Dichlorophenol	U		0.284	10.0	1	09/30/2018 15:36	WG1173376
2,4-Dimethylphenol	U		0.624	10.0	1	09/30/2018 15:36	WG1173376
4,6-Dinitro-2-methylphenol	U		2.62	10.0	1	09/30/2018 15:36	WG1173376
2,4-Dinitrophenol	U		3.25	10.0	1	09/30/2018 15:36	WG1173376
2-Nitrophenol	U		0.320	10.0	1	09/30/2018 15:36	WG1173376
4-Nitrophenol	U		2.01	10.0	1	09/30/2018 15:36	WG1173376
Pentachlorophenol	U		0.313	10.0	1	09/30/2018 15:36	WG1173376
Phenol	U		0.334	10.0	1	09/30/2018 15:36	WG1173376
2,4,6-Trichlorophenol	U		0.297	10.0	1	09/30/2018 15:36	WG1173376
(S) Nitrobenzene-d5	*99.7*			*15.0-314*		*09/30/2018 15:36*	WG1173376
(S) 2-Fluorobiphenyl	*62.2*			*22.0-127*		*09/30/2018 15:36*	WG1173376
(S) p-Terphenyl-d14	*58.7*			*29.0-141*		*09/30/2018 15:36*	WG1173376
(S) Phenol-d5	*117*			*8.00-424*		*09/30/2018 15:36*	WG1173376
(S) 2-Fluorophenol	*64.5*			*10.0-120*		*09/30/2018 15:36*	WG1173376
(S) 2,4,6-Tribromophenol	*38.3*			*10.0-153*		*09/30/2018 15:36*	WG1173376

Method Blank (MB)

(MB) R3346330-4 09/28/18 14:53

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		10.0	50.0
Acrylonitrile	U		1.87	10.0
Acrolein	U		8.87	50.0
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) R3346330-4 09/28/18 14:53

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	*102*			*80.0-120*
(S) Dibromofluoromethane	*105*			*75.0-120*
(S) 4-Bromofluorobenzene	*102*			*77.0-126*
(S) a,a,a-Trifluorotoluene	*103*			*80.0-120*

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

(LCS) R3346330-1 09/28/18 13:38 • (LCSD) R3346330-2 09/28/18 13:57

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	139	139	111	111	19.0-160			0.248	27
Acrylonitrile	125	133	136	106	108	55.0-149			2.01	20
Benzene	25.0	22.9	23.5	91.7	93.9	70.0-123			2.42	20
Bromobenzene	25.0	25.4	25.5	101	102	73.0-121			0.416	20
Bromodichloromethane	25.0	24.0	24.1	95.9	96.5	75.0-120			0.661	20
Bromoform	25.0	26.6	26.6	107	106	68.0-132			0.271	20

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

(LCS) R3346330-1 09/28/18 13:38 • (LCSD) R3346330-2 09/28/18 13:57

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 %
Bromomethane	25.0	26.1	25.7	104	103	10.0-160			1.42	25
n-Butylbenzene	25.0	23.9	24.4	95.4	97.7	73.0-125			2.36	20
sec-Butylbenzene	25.0	24.2	24.8	96.8	99.1	75.0-125			2.31	20
tert-Butylbenzene	25.0	25.6	26.1	102	104	76.0-124			1.96	20
Carbon tetrachloride	25.0	24.7	25.3	98.8	101	68.0-126			2.59	20
Chlorobenzene	25.0	24.4	23.7	97.6	94.7	80.0-121			3.02	20
Chlorodibromomethane	25.0	24.8	24.0	99.2	95.9	77.0-125			3.38	20
Chloroethane	25.0	25.6	24.6	102	98.2	47.0-150			4.13	20
Chloroform	25.0	24.0	24.8	96.1	99.2	73.0-120			3.21	20
Chloromethane	25.0	30.7	31.1	123	124	41.0-142			1.16	20
2-Chlorotoluene	25.0	25.5	25.7	102	103	76.0-123			1.02	20
4-Chlorotoluene	25.0	25.3	25.6	101	102	75.0-122			1.23	20
1,2-Dibromo-3-Chloropropane	25.0	23.8	23.8	95.2	95.2	58.0-134			0.0506	20
1,2-Dibromoethane	25.0	25.0	23.8	100	95.3	80.0-122			4.91	20
Dibromomethane	25.0	24.5	24.4	97.8	97.7	80.0-120			0.141	20
1,2-Dichlorobenzene	25.0	23.6	24.3	94.3	97.0	79.0-121			2.80	20
1,3-Dichlorobenzene	25.0	24.0	24.4	96.2	97.7	79.0-120			1.58	20
1,4-Dichlorobenzene	25.0	23.8	24.2	95.1	96.8	79.0-120			1.71	20
Dichlorodifluoromethane	25.0	28.6	28.8	114	115	51.0-149			0.759	20
1,1-Dichloroethane	25.0	24.5	24.5	97.9	98.0	70.0-126			0.0873	20
1,2-Dichloroethane	25.0	26.0	26.3	104	105	70.0-128			1.15	20
1,1-Dichloroethene	25.0	23.6	23.9	94.2	95.8	71.0-124			1.62	20
cis-1,2-Dichloroethene	25.0	23.3	23.5	93.1	94.1	73.0-120			1.03	20
trans-1,2-Dichloroethene	25.0	23.8	24.2	95.3	97.0	73.0-120			1.72	20
1,2-Dichloropropane	25.0	23.8	23.9	95.0	95.5	77.0-125			0.515	20
1,1-Dichloropropene	25.0	24.4	24.7	97.8	98.7	74.0-126			1.01	20
1,3-Dichloropropane	25.0	24.3	23.9	97.2	95.8	80.0-120			1.47	20
2,2-Dichloropropane	25.0	23.1	24.5	92.4	97.8	58.0-130			5.65	20
Di-isopropyl ether	25.0	26.1	27.0	104	108	58.0-138			3.24	20
Ethylbenzene	25.0	24.9	24.1	99.7	96.4	79.0-123			3.34	20
Hexachloro-1,3-butadiene	25.0	24.6	25.8	98.5	103	54.0-138			4.69	20
Isopropylbenzene	25.0	25.7	26.2	103	105	76.0-127			1.96	20
p-Isopropyltoluene	25.0	25.4	25.8	102	103	76.0-125			1.61	20
2-Butanone (MEK)	125	139	138	111	111	44.0-160			0.174	20
Acrolein	125	131	154	105	123	10.0-160			16.2	26
Methylene Chloride	25.0	25.0	23.9	100	95.6	67.0-120			4.69	20
4-Methyl-2-pentanone (MIBK)	125	144	138	115	110	68.0-142			4.38	20
Methyl tert-butyl ether	25.0	23.8	25.1	95.1	101	68.0-125			5.48	20
Naphthalene	25.0	22.8	23.1	91.2	92.4	54.0-135			1.31	20
n-Propylbenzene	25.0	25.3	25.4	101	102	77.0-124			0.652	20

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

(LCS) R3346330-1 09/28/18 13:38 • (LCSD) R3346330-2 09/28/18 13:57

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	27.9	27.5	111	110	73.0-130			1.24	20
1,1,1,2-Tetrachloroethane	25.0	24.7	23.7	99.0	95.0	75.0-125			4.14	20
1,1,2,2-Tetrachloroethane	25.0	25.3	25.0	101	100	65.0-130			1.20	20
Tetrachloroethene	25.0	24.4	23.7	97.7	94.8	72.0-132			3.03	20
Toluene	25.0	23.1	22.3	92.6	89.4	79.0-120			3.53	20
1,2,3-Trichlorobenzene	25.0	23.7	24.1	95.0	96.5	50.0-138			1.58	20
1,2,4-Trichlorobenzene	25.0	24.1	24.8	96.4	99.4	57.0-137			3.03	20
1,1,1-Trichloroethane	25.0	25.9	26.1	104	104	73.0-124			0.717	20
1,1,2-Trichloroethane	25.0	25.0	24.2	100	96.9	80.0-120			3.29	20
Trichloroethene	25.0	23.8	23.7	95.2	95.0	78.0-124			0.256	20
Trichlorofluoromethane	25.0	27.3	26.7	109	107	59.0-147			2.42	20
1,2,3-Trichloropropane	25.0	26.6	26.0	106	104	73.0-130			2.40	20
1,2,4-Trimethylbenzene	25.0	24.8	25.2	99.0	101	76.0-121			1.85	20
1,3,5-Trimethylbenzene	25.0	25.8	25.9	103	104	76.0-122			0.492	20
Vinyl chloride	25.0	26.1	27.1	104	109	67.0-131			4.11	20
o-Xylene	25.0	24.6	24.1	98.4	96.6	80.0-122			1.90	20
m&p-Xylenes	50.0	50.0	48.5	99.9	96.9	80.0-122			3.07	20
(S) Toluene-d8				*104*	*99.4*	*80.0-120*				
(S) Dibromofluoromethane				*103*	*104*	*75.0-120*				
(S) 4-Bromofluorobenzene				*105*	*105*	*77.0-126*				
(S) a,a,a-Trifluorotoluene				*101*	*101*	*80.0-120*				

Method Blank (MB)

(MB) R3346398-3 09/30/18 14:49

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) R3346398-3 09/30/18 14:49

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL 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	*54.8*			*15.0-314*
(S) 2-Fluorobiphenyl	*48.1*			*22.0-127*
(S) p-Terphenyl-d14	*51.9*			*29.0-141*
(S) Phenol-d5	*23.4*			*8.00-424*
(S) 2-Fluorophenol	*34.0*			*10.0-120*
(S) 2,4,6-Tribromophenol	*43.5*			*10.0-153*

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

(LCS) R3346398-1 09/30/18 14:02 • (LCSD) R3346398-2 09/30/18 14:26

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 %
Acenaphthene	50.0	31.1	25.6	62.2	51.2	47.0-145			19.4	48
Acenaphthylene	50.0	31.3	25.5	62.6	51.0	33.0-145			20.4	74
Anthracene	50.0	29.6	26.7	59.2	53.4	27.0-133			10.3	66
Benzidine	50.0	7.41	5.97	14.8	11.9	1.00-120			21.5	36
Benzo(a)anthracene	50.0	31.6	28.6	63.2	57.2	33.0-143			9.97	53
Benzo(b)fluoranthene	50.0	34.2	28.5	68.4	57.0	24.0-159			18.2	71
Benzo(k)fluoranthene	50.0	32.3	30.7	64.6	61.4	11.0-162			5.08	63
Benzo(g,h,i)perylene	50.0	35.0	31.5	70.0	63.0	1.00-219			10.5	97
Benzo(a)pyrene	50.0	33.1	29.3	66.2	58.6	17.0-163			12.2	72
Bis(2-chlorethoxy)methane	50.0	28.3	24.5	56.6	49.0	1.00-219			14.4	54
Bis(2-chloroethyl)ether	50.0	22.9	18.6	45.8	37.2	33.0-185			20.7	108
Bis(2-chloroisopropyl)ether	50.0	27.1	21.3	54.2	42.6	36.0-166			24.0	76
4-Bromophenyl-phenylether	50.0	33.0	30.7	66.0	61.4	53.0-127			7.22	43
2-Chloronaphthalene	50.0	30.3	24.8	60.6	49.6	60.0-120		J4	20.0	24

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

(LCS) R3346398-1 09/30/18 14:02 • (LCSD) R3346398-2 09/30/18 14:26

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	34.2	28.6	68.4	57.2	25.0-158			17.8	61
Chrysene	50.0	33.2	30.1	66.4	60.2	17.0-168			9.79	87
Dibenz(a,h)anthracene	50.0	34.0	30.2	68.0	60.4	1.00-227			11.8	126
3,3-Dichlorobenzidine	50.0	32.6	29.6	65.2	59.2	1.00-262			9.65	108
2,4-Dinitrotoluene	50.0	34.7	30.5	69.4	61.0	39.0-139			12.9	42
2,6-Dinitrotoluene	50.0	33.6	29.7	67.2	59.4	50.0-158			12.3	48
Fluoranthene	50.0	35.8	31.8	71.6	63.6	26.0-137			11.8	66
Fluorene	50.0	32.7	27.4	65.4	54.8	59.0-121		J4	17.6	38
Hexachlorobenzene	50.0	38.8	35.3	77.6	70.6	1.00-152			9.45	55
Hexachloro-1,3-butadiene	50.0	28.4	23.7	56.8	47.4	24.0-120			18.0	62
Hexachlorocyclopentadiene	50.0	27.3	22.2	54.6	44.4	10.0-120			20.6	31
Hexachloroethane	50.0	25.5	21.0	51.0	42.0	40.0-120			19.4	52
Indeno(1,2,3-cd)pyrene	50.0	35.8	32.1	71.6	64.2	1.00-171			10.9	99
Isophorone	50.0	32.1	27.5	64.2	55.0	21.0-196			15.4	93
Naphthalene	50.0	25.7	20.5	51.4	41.0	21.0-133			22.5	65
Nitrobenzene	50.0	33.1	27.5	66.2	55.0	35.0-180			18.5	62
n-Nitrosodimethylamine	50.0	17.7	13.0	35.4	26.0	10.0-120			30.6	34
n-Nitrosodiphenylamine	50.0	32.4	29.2	64.8	58.4	44.0-120			10.4	21
n-Nitrosodi-n-propylamine	50.0	34.1	28.2	68.2	56.4	1.00-230			18.9	87
Phenanthrene	50.0	32.3	28.9	64.6	57.8	54.0-120			11.1	39
Benzylbutyl phthalate	50.0	19.6	17.4	39.2	34.8	1.00-152			11.9	60
Bis(2-ethylhexyl)phthalate	50.0	29.4	26.7	58.8	53.4	8.00-158			9.63	82
Di-n-butyl phthalate	50.0	29.3	26.0	58.6	52.0	1.00-120			11.9	47
Diethyl phthalate	50.0	24.2	21.7	48.4	43.4	1.00-120			10.9	100
Dimethyl phthalate	50.0	11.8	10.7	23.6	21.4	1.00-120			9.78	183
Di-n-octyl phthalate	50.0	31.7	28.2	63.4	56.4	4.00-146			11.7	69
Pyrene	50.0	34.1	30.3	68.2	60.6	52.0-120			11.8	49
1,2,4-Trichlorobenzene	50.0	26.6	20.6	53.2	41.2	44.0-142		J4	25.4	50
4-Chloro-3-methylphenol	50.0	31.7	31.0	63.4	62.0	22.0-147			2.23	73
2-Chlorophenol	50.0	28.3	26.3	56.6	52.6	23.0-134			7.33	61
2,4-Dichlorophenol	50.0	31.8	29.8	63.6	59.6	39.0-135			6.49	50
2,4-Dimethylphenol	50.0	32.5	30.1	65.0	60.2	32.0-120			7.67	58
4,6-Dinitro-2-methylphenol	50.0	35.9	35.8	71.8	71.6	1.00-181			0.279	203
2,4-Dinitrophenol	50.0	26.3	27.2	52.6	54.4	1.00-191			3.36	132
2-Nitrophenol	50.0	31.4	30.7	62.8	61.4	29.0-182			2.25	55
4-Nitrophenol	50.0	13.1	13.1	26.2	26.2	1.00-132			0.000	131
Pentachlorophenol	50.0	30.2	29.5	60.4	59.0	14.0-176			2.35	86
Phenol	50.0	14.8	15.3	29.6	30.6	5.00-120			3.32	64
2,4,6-Trichlorophenol	50.0	35.5	32.6	71.0	65.2	37.0-144			8.52	58
(S) Nitrobenzene-d5				*61.8*	*51.6*	*15.0-314*				

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

(LCS) R3346398-1 09/30/18 14:02 • (LCSD) R3346398-2 09/30/18 14:26

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				*59.4*	*49.0*	*22.0-127*				
(S) p-Terphenyl-d14				*63.5*	*56.9*	*29.0-141*				
(S) Phenol-d5				*26.9*	*27.1*	*8.00-424*				
(S) 2-Fluorophenol				*41.4*	*39.9*	*10.0-120*				
(S) 2,4,6-Tribromophenol				*70.5*	*66.5*	*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.

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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
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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

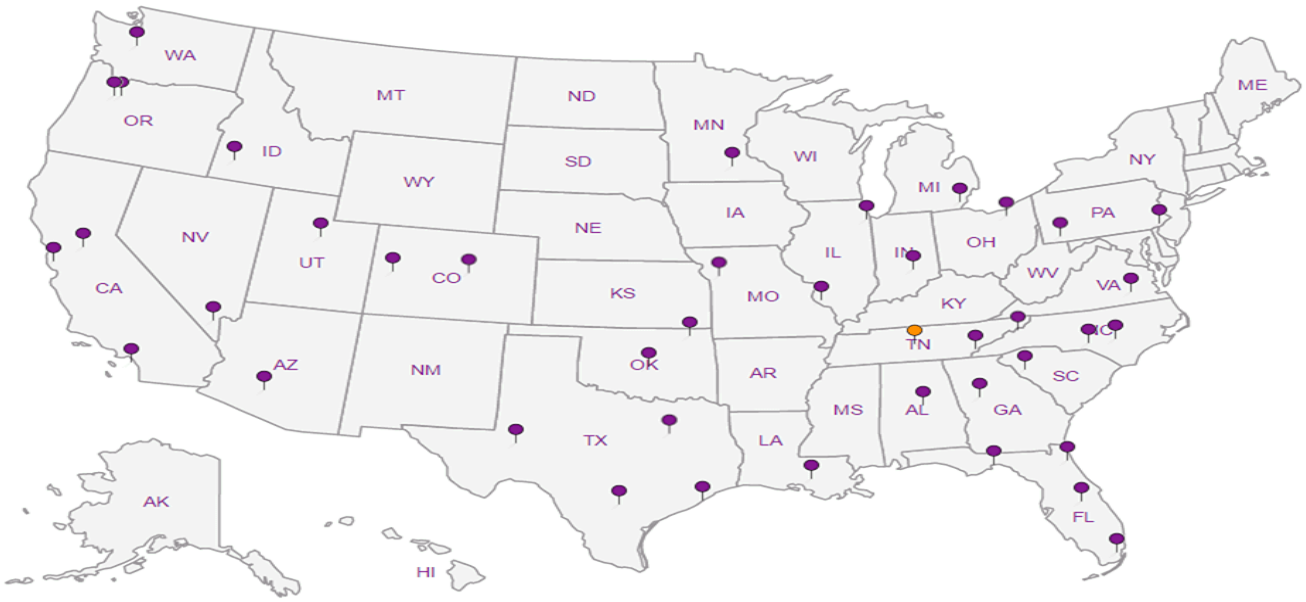
Third Party Federal Accreditations

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.



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# L1029585

E170

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

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: Gollsboro, N.C.

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

Client Project # R3203.00

Lab Project #

Collected by (print): Gary A. Fischer

Site/Facility ID #

P.O. #

Collected by (signature): Gary A. Fischer

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-22-2	Grab	GW		9/24/18	1435	5	X	X		-01

Analysis / Container / Preservative

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

RAD SCREEN: <0.5 mR/hr 4430 3428 7672

pH ____ Temp ____

Flow ____ Other ____

Remarks: FedEx # 4430 3428 7672 625-BNA's

Hold #

Condition: (lab use only) OK

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

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ ____

Temp: 5.8+1=5.9°C Bottles Received: 5

Date: 9/27/18 Time: 9:00

COC Seal Intact: / Y ___N ___NA

pH Checked: NCF:

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: MIDATLRNC	SDG#	L1029585	
Cooler Received/Opened On: 09/27/18	Temperature:	5.9	
Received By: Kevin Turner			
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?			

Mid Atlantic
Engineering & Environmental Solutions

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PRELIMINARY SITE ASSESSMENT REPORT

DELMUS BRIDGERS-FAMILY LIMITED PARTNERSHIP PROPER

PARCEL NO. 24

Location:

Delmus Bridgers-Family Limited Partnership Property
1003 N. Berkeley Boulevard
Goldsboro, North Carolina 27534
Wayne County PIN 3519744701.00

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
DELMUS BRIDGERS-FAMILY LIMITED PARTNERSHIP PROPERTY
PARCEL NO. 24
TIP NO: U-5724
WBS ELEMENT: 54016.1.2
WAYNE COUNTY
WAYNE COUNTY PIN 3519744701.00

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

SITE:
Delmus Bridgers-Family Limited Partnership Property
1003 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

Mid Atlantic
Engineering & Environmental Solutions

409 Rogers View Court
Raleigh, NC 27610
office 919.250.9918
facsimile 919.250.9950
MAAONLINE.COM

PRELIMINARY SITE ASSESSMENT REPORT
DELMUS BRIDGERS-FAMILY LIMITED PARTNERSHIP PROPERTY
PARCEL NO. 24
TIP NO: U-5724
WBS ELEMENT: 54016.1.2
WAYNE COUNTY
WAYNE COUNTY PIN 3519744701.00

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

Mid-Atlantic Associates Job No. 000R3203.00

October 30, 2018

Prepared For:

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

Prepared By:

MID-ATLANTIC ASSOCIATES, INC.

DocuSigned by:
5F022D5841FC438...

NORTH CAROLINA LICENSED SEAL 1336 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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TABLES

DRAWINGS

APPENDICES

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 Delmus Bridgers-Family Limited Partnership property (Subject Site), located at 1003 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 is currently a paved driveway and parking serving the adjacent shopping center. Ray's Auto repair service is located directly adjacent to and to the northwest of the property.

The NCDOT contracted with Mid-Atlantic to perform the PSA due to the possible historical use of petroleum or other regulated substances on the 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 commercial area of Goldsboro. It is currently developed with an asphalt-paved driveway and parking area for an adjacent shopping center. Ray's Auto, a vehicle repair business, is located directly adjacent to and to the northwest of the parcel. The Subject Site is bounded to the northeast by a commercial strip mall, to the southeast (across N. Berkeley Blvd.) by commercial enterprises, and to the southwest by Scott's Automotive (Parcel No. 22). 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, the Subject Site appears to be used for agricultural purposes in 1959 through at least 1967. The 1978 photo shows that several structures have been constructed on the property, including two that are no longer present. According to the "Comprehensive Site Assessment" (CSA) report (**Appendix A**) dated January 14, 1992, and prepared by Contractors and Engineers Services, Inc. (CES), two 10,000-gallon capacity gasoline USTs were installed at this site in June of 1969 and operated in conjunction with a service station until March of 1981, and were removed in August of 1989. Although no maps were provided in the copy of the report available, the report text stated that monitoring well MW-1 was located in the center of the former tank basin. However, the location of this well is not shown on the drawings in the reports readily available, which are included in **Appendix A**. Although it is not clearly visible, the 1980 aerial photo appears to show pump islands located to the southeast of the building and northwest of Berkeley Boulevard. The 1990 aerial photo shows that the building has been replaced by a larger building, apparently in its current configuration. Historical aerial photographs from NCDOT and Google Earth are included as **Appendix B**.

2.2 Facility ID Numbers

According to the UST Registration Office, there are no records of the reported historical USTs associated with the property address. Therefore, the USTs were not registered and no Facility ID Number is associated with the address.

2.3 Groundwater Incident Numbers

The Delmus Bridgers/Cash Farm Supplies UST incident (Incident No. 6695) is associated with this property. A release was discovered in 1989 upon removal of two 10,000 gallon capacity USTs. The incident was classified as low risk and closed in 2013 with a Notice of Residual Petroleum.

3.0 SITE OBSERVATIONS

3.1 Groundwater Monitoring Wells

Mid-Atlantic observed several historical groundwater monitoring wells on the Subject Site, two of which were located in the proposed right of way acquisition area or temporary construction easement (MW-2 and MW-3). The locations of these wells are shown on **Drawing 3.1**. Mid-Atlantic's technician opened the well covers and discovered that the wells are two inches in diameter and constructed of PVC. Well construction records, which are shown in CES's CSA report in **Appendix A**, show the wells as 11 feet deep. The wells have not been abandoned and the manholes and pads are still intact. A copy of the 2013 Monitoring Report, which includes a site map showing the locations of the monitoring wells constructed in association with Incident No. 6695, is provided in **Appendix A**.

3.2 Active USTs

No "Active" USTs were identified on site during our reconnaissance.

According to the owner of Scott's Automotive (next door, Parcel 22), lifts are located in the service bays at Ray's Auto facility, but these lifts are the above-ground, electric type. Based on the age of the building (built between 1980 and 1990), it is possible that these bays once utilized in-ground reservoir-type lifts.

3.3 Features Apparent Beyond ROW/Easement

Four additional monitoring wells were observed during the August 22, 2018 site reconnaissance. On the drawing provided in the 2013 Monitoring Report in **Appendix A**, two of these wells are listed as MW-5 (which is slightly outside of the parcel property line) and MW-11A. The other two wells, which are not on the drawing, are located close to MW-11A. The use of these wells is unknown. Monitoring well MW-4, which is shown on Drawing 3.1, could not be located.

Although an apparent remedial well was observed (RMW-1 on Parcel 22), no evidence of a remedial system was observed on site.

4.0 METHODS

The PSA field activities included a geophysical survey of the proposed right-of-way and temporary 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) from 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 24, NCDOT Project U-5724" dated September 6, 2018 and included in **Appendix C.** 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 placed on the Subject Site in areas of the right of way and construction easement. Sampling locations were evenly spaced within these areas. Two of the borings (SB-24-5 and SB-24-6) were placed near the area where the geophysical survey and surface expressions (cuts in the pavement) indicated the presence of an apparent former pump island.

4.2.1 Soil Sampling Activities

On September 24, 2018, Mid-Atlantic mobilized to the site to oversee the advancement of seven soil borings on the parcel. The work was completed during the same mobilization as sampling conducted for Parcels 5, 17, and 22. Sampling locations are shown on **Drawing 3.1**.

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 (note: the water table was typically found in the 3 to 4 ft BLS range). The soils were classified for soil type and screened at approximate two-foot intervals using the PID. Boring Logs **(Appendix D)** 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 to dark 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

One temporary monitoring well (TMW-24-4) was installed in boring the SB-24-4 location, which exhibited elevated PID readings and a strong petroleum odor. 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 3.9 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 seven soil samples were collected for laboratory analysis in accordance with the Mid-Atlantic procedures located in **Appendix E.** 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-24-4 using the methods described in **Appendix E**. 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

As shown in **Appendix C**, the geophysical survey found evidence characteristic of metal reinforcement (rebar or the like) beneath the apparent former pump island, but did not find evidence of USTs existing within the area of the survey. The USTs were reportedly removed in 1989.

5.1.2 Hydraulic Lifts

Ray's Auto has service bays that utilize vehicle lifts. However, according to the owner of Scott's Automotive, these are above-ground, electric lifts (note: the owner stated that Ray's Auto has closed and another business is in the process of opening up). Based on the age of the building (built between 1980 and 1990), it is possible that these bays once utilized in-ground reservoir-type lifts. The service bays area inside of Ray's Auto could not be assessed during the geophysical survey due to spatial inaccessibility of the geophysical equipment and automotive work being conducted within the bays.

5.1.3 Monitoring Wells

Mid-Atlantic observed several historical groundwater monitoring wells on the Subject Site, two of which were located in the proposed right of way acquisition area or construction easement (MW-2 and MW-3). These wells have not been abandoned. See Section 3.1 for further information.

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 F** and summarized (along with PID readings) in **Table 5.1**, TPH GRO were detected in all of the seven samples at concentrations exceeding the UVF analyzer's detection limit. However, none of the samples exhibited concentrations exceeding the NCDEQ Action Level of 50 mg/kg. TPH DRO were detected in all seven 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 F**. 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 laboratory report for the groundwater sample collected from temporary monitoring well TMW-24-4 is provided in **Appendix G** 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 more volatile constituents (e.g., benzene) are not present in the sample and the constituents detected in the sample are more representative of an older plume that has degraded over time. The impacted groundwater is likely related to the historical incident No. 6695 associated with the former UST system on site.

5.2.2 Depth

As documented in the soil boring logs and laboratory analytical reports, petroleum-impacted soil is present in the vadose zone, but concentrations do not exceed North Carolina's regulatory action levels. The depth to water in the borings ranged from approximately 3.5 feet to approximately 4.6 feet BLS. The water table may be higher than normal due to Hurricane Florence recently passing through.

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 3.5 to 4.5 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 encountered, but not at concentrations exceeding NCDEQ's Action Levels for TPH. Given the shallow water table and the excavation required for drainage or other utility installations, it is possible that relatively small quantities of petroleum-contaminated waste (soils and/or groundwater) could be generated during road improvement activities.

6.0 CONCLUSIONS

6.1 Interpretation of Results

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

- A historical release of petroleum that occurred from a former UST system on site has impacted the groundwater beneath the site. Based on the depth to groundwater (approximately 3.5 to 4.6 feet BLS, with potential for natural fluctuations), it is possible that impacted soil and/or groundwater could 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:

- The geophysical survey found evidence characteristic of metal reinforcement (rebar or the like) beneath the apparent former pump island, but did not find evidence of USTs existing within the area of the survey. The USTs were reportedly removed in 1989.
- Although the service bays of Ray's Auto are reported to have above-ground electric lifts, it is possible that in-ground reservoir lifts could have been historically used there. These areas could not be accessed during the geophysical survey.

6.3 Sampling

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

- Based on the seven soil borings advanced at the site, vadose zone contamination was not encountered at concentrations exceeding North Carolina's regulatory action levels, but small quantities of soil waste could be generated if soils in the saturated zone are excavated for utility installation;

- Petroleum-impacted groundwater exceeding the NCGQS was encountered in a temporary well installed at location TMW-24-4. This contamination is likely associated with the historical UST system release on the site.

6.4 Groundwater

- Given the depth to groundwater (generally in the 3.5 to 4.5 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.

6.5 Quantities

- During the advancement of the soil borings completed for this PSA, petroleum-impacted soil was encountered, but not at concentrations exceeding NCDEQ's Action Levels for TPH. Given the shallow water table and the excavation required for drainage or other utility installations, it is possible that relatively small quantities of petroleum-contaminated waste (soils and/or groundwater) could be generated during road improvement activities.

7.0 RECOMMENDATIONS

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

- If utility construction is to take place in the current location of the service bays of Ray's Auto, additional investigation should be conducted to determine if in-ground hydraulic lifts exist in this area;

- If encountered during drainage or other utility installation, residual soil contamination should be properly managed and disposed; and

- Since impacted groundwater is present at a relatively shallow depth (3.5 to 4.5 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

Mid Atlantic
Engineering & Environmental Solutions

TABLE 5.1
SOIL SAMPLING RESULTS
DELMUS BRIDGERS-FAMILY LIMITED PARTNERSHIP 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-24-1	9/24/2018	2 - 3	2.30	0.86	13.8
SB-24-2	9/24/2018	2 - 3	1.20	1.4	29
SB-24-3	9/24/2018	2 - 3	10.20	0.94	12.2
SB-24-4	9/24/2018	2 - 3	158.90	10.6	17.7
SB-24-5	9/24/2018	2 - 3	115.60	24.1	2.3
SB-24-6	9/24/2018	2 - 3	20.60	5.4	96.7
SB-24-7	9/24/2018	3 - 4	0.00	1.7	0.84

Notes:

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

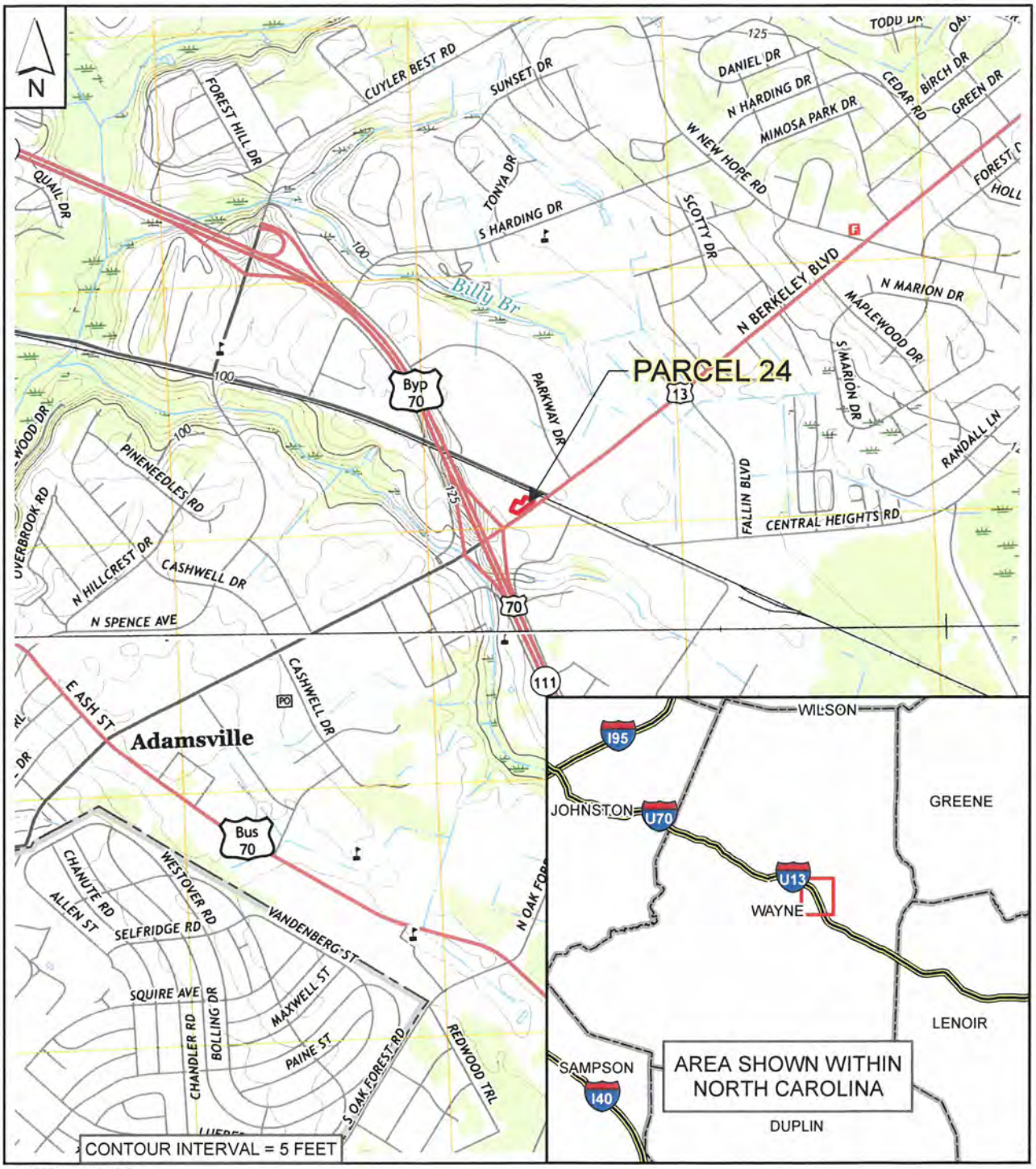
TABLE 5.2
SUMMARY OF CHEMICAL CONSTITUENTS DETECTED IN GROUNDWATER THAT EXCEED NC GROUNDWATER QUALITY STANDARDS
DELMUS BRIDGERS-FAMILY LIMITED PARTNERSHIP PROPERTY (PARCEL 24)
NCDOT: U-5724 GOLDSBORO PSA
GOLDSBORO, NORTH CAROLINA
MID-ATLANTIC JOB NO. R3203.00

CHEMICAL CONSTITUENT	CONCENTRATION (µg/L)	
	TMW-24-4 9/24/2018	**NC Groundwater Quality Standards**
Volatile Organic Compounds - SM 6200B		
Ethylbenzene	**1,210**	600
Isopropylbenzene	**200**	70
Naphthalene	**809**	6
n-Propylbenzene	**483**	70
1,2,4-Trimethylbenzene	**1,870**	400
1,3,5-Trimethylbenzene	**412**	400
Xylenes, total	**1,873**	500
Semi Volatile Organic Compounds - EPA Method 625		
Naphthalene	**448**	6

Notes:
(µg/L) = Microgram per liter (parts per billion)

DRAWINGS

Mid Atlantic
Engineering & Environmental Solutions



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.

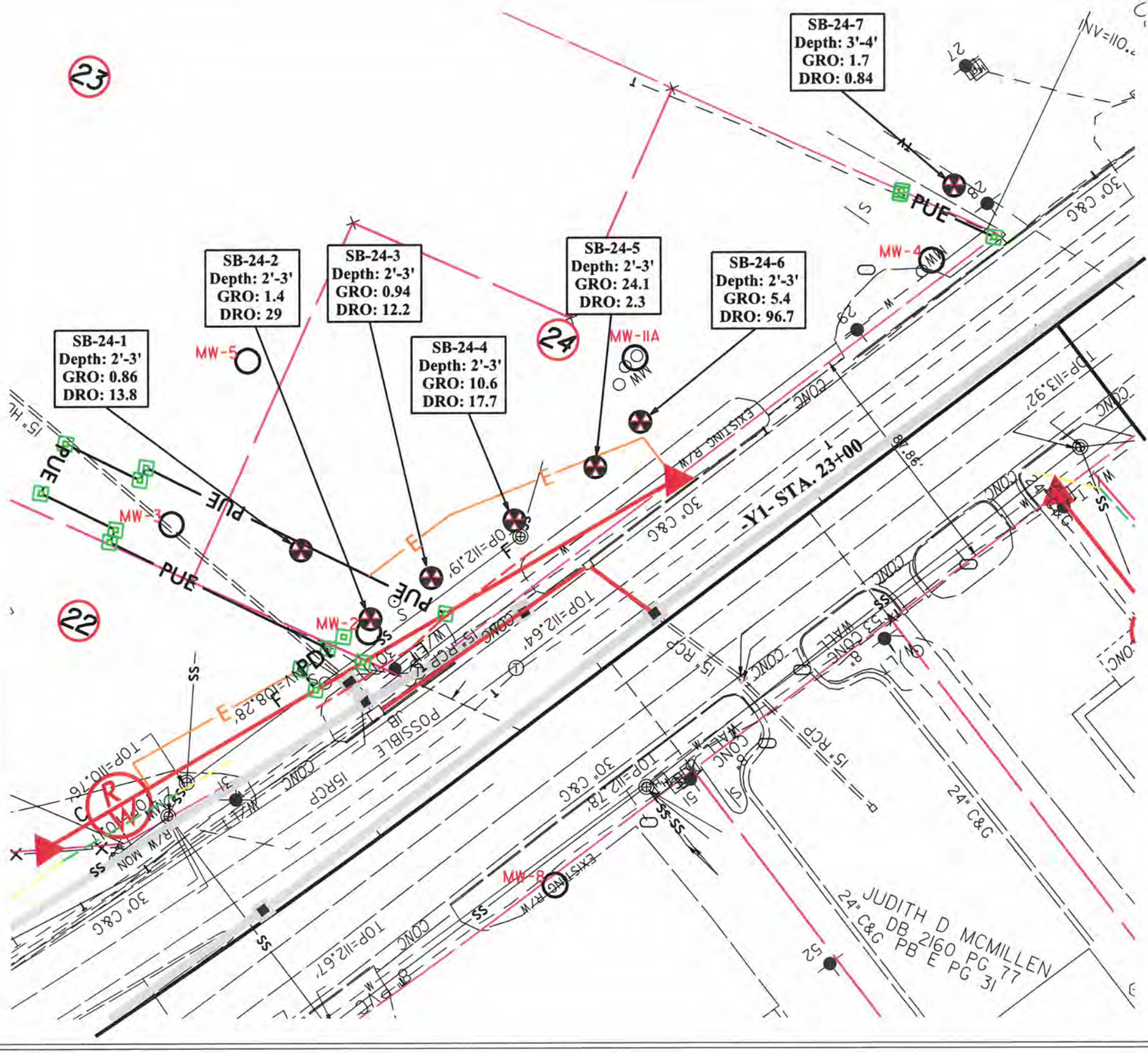
SCALE:1:24,000

0 1,000 2,000 4,000 Feet

Mid Atlantic Engineering & Environmental Solutions

TOPOGRAPHIC SITE MAP
PARCEL 24
DELMUS BRIDGERS-FAMILY LIMITED PARTNERSHIP
1003 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-R3203.00-04
APPROVAL: DW	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
- MW- EXISTING 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: BSM
ENGINEER CHECK BY: BSM
APPROVED BY: DN

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

SOIL SAMPLE MAP
DELMUS BRIDGERS–FAMILY
LIMITED PARTNERSHIP PROPERTY
(PARCEL 24)
NCDOT PROJECT U–5724
1003 NORTH BERKELEY BLVD.
GOLDSBORO, NC

Mid Atlantic
Engineering & Environmental Solutions

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

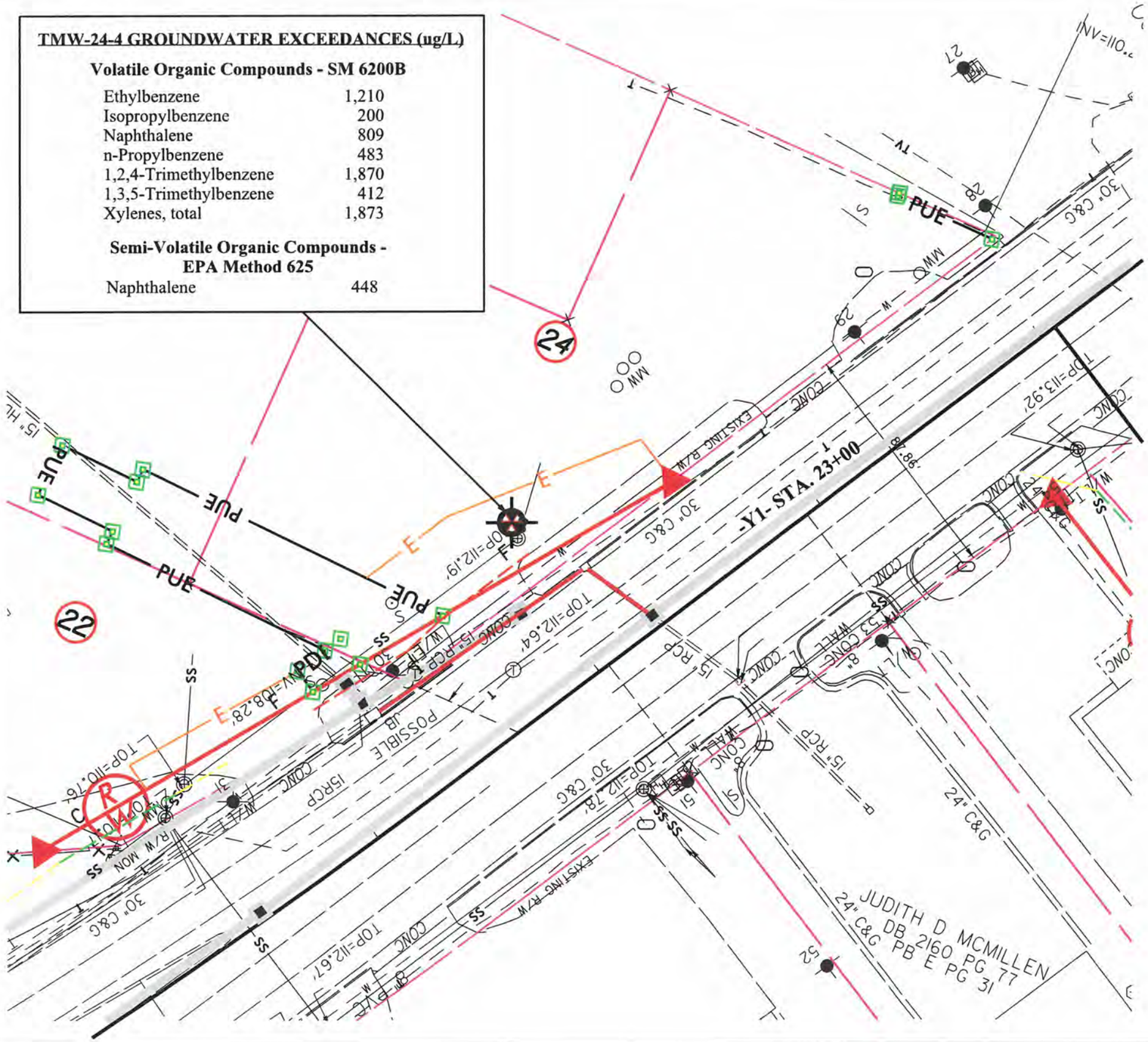
TMW-24-4 GROUNDWATER EXCEEDANCES (ug/L)

Volatile Organic Compounds - SM 6200B

Ethylbenzene	1,210
Isopropylbenzene	200
Naphthalene	809
n-Propylbenzene	483
1,2,4-Trimethylbenzene	1,870
1,3,5-Trimethylbenzene	412
Xylenes, total	1,873

Semi-Volatile Organic Compounds - EPA Method 625

Naphthalene	448



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

*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 3
DWG NO: 5.1

GROUNDWATER SAMPLING MAP
DELMUS BRIDGERS-FAMILY
LIMITED PARTNERSHIP PROPERTY
(PARCEL 24)
NCDOT PROJECT U-5724
1003 NORTH BERKELEY BLVD.
GOLDSBORO, NC

Mid Atlantic
Engineering & Environmental Solutions

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

APPENDIX A

HISTORICAL REPORTS FOR INCIDENT NO. 6695

Mid Atlantic
Engineering & Environmental Solutions

1456

BRYAN K.
JONES CONSULTING ENGINEERS, P.A.
Carolina Commerce Center
2815 North William Street, Suite E
Goldsboro, NC 27530
Phone: 919.221.5222
Fax: 919.242.8666
Email: bkjones@nc.rr.com

MONITORING REPORT

CASH FARM SUPPLIES/DELMUS BRIDGER'S SITE
1003 NORTH BERKELEY BLVD., WAYNE COUNTY, NC
INCIDENT NUMBER: 6695
RISK CLASSIFICATION: INTERMEDIATE
RANKING: I 140-D

DATE OF REPORT
19 JULY 2013

UST OWNER/OPERATOR & PROPERTY OWNER
MR. DELMUS BRIDGERS
CASH FARM SUPPLIES
P.O. BOX 10848
GOLDSBORO, NORTH CAROLINA 27532
(919) 778-1882

CONSULTANT
BRYAN K. JONES CONSULTING ENGINEERS, P.A.
CAROLINA COMMERCE CENTER
2815 NORTH WILLIAM STREET, SUITE E
GOLDSBORO, NORTH CAROLINA
(919) 221-5222

RELEASE INFORMATION
DATE DISCOVERED: 26 APRIL 1991
LATITUDE/LONGITUDE: N35-22-46.2/W77-56-05.63

Received
Waro DWM
JUL 23 2013

6695
Wayne

Bullock, Scott

From: Robert Jones [rjones186@nc.rr.com]
Sent: Monday, May 21, 2012 10:59 AM
To: Bullock, Scott
Cc: Jones Engineering
Subject: Cash Farm Supply/Delmus Hardware

Scott,

Just thought I would update you on the status of the Monitoring Report. I'm waiting on Paul, Delmus's son to find evidence of the last time they used the tanks so I can finish the eligibility form. As I mentioned before, the hardware store caught fire several years ago and burnt up all their files.

Robert A. Jones, B.S.C.E., C.P.E.S.C.
Bryan K. Jones Consulting Engineers, P.A.
Carolina Commerce Center
2815 North William Street, Suite E
Goldsboro, NC 27530
(919)222-1604

BRYAN K.
JONES CONSULTING ENGINEERS, P.A.
Carolina Commerce Center
2815 North William Street, Suite E
Goldsboro, NC 27530
Phone: 919.221.5222
Fax: 919.242.8666
Email: bkjones@nc.rr.com

REPORT PREPARED BY: _____

Robert A. Jones, B.S.C.E., C.P.E.S.C.

_____

Bryan K. Jones, P.E.

CERTIFICATION

NORTH CAROLINA PROFESSIONAL SEAL 030261 ENGINEER BRYAN K. JONES

I, Bryan K. Jones *, a Professional Engineer for Bryan K. Jones Consulting Engineers, P.A., do certify that the information contained in this report is correct and accurate to the best of my knowledge.*

Bryan K. Jones Consulting Engineers, P.A. is licensed to practice engineering in North Carolina. The certification number of the company is C-3065 *.*

BRYAN K.
JONES CONSULTING ENGINEERS, P.A.
Carolina Commerce Center
2815 North William Street, Suite E
Goldsboro, NC 27530
Phone: 919.221.5222
Fax: 919.242.8666
Email: bkjones@nc.rr.com

MONITORING REPORT

CASH FARM SUPPLIES/DELMUS BRIDGER'S SITE
1003 NORTH BERKELEY BLVD., WAYNE COUNTY, NC
INCIDENT NUMBER: 6695
RISK CLASSIFICATION: INTERMEDIATE
RANKING: I 140-D

DATE OF REPORT
19 JULY 2013

I. INTRODUCTION

A. ***Site Location****. Cash Farm Supplies (Delmus Hardware) is located at the southwest corner of Highway 70 West and Highway 581, Goldsboro, NC. A location map showing the site location can be seen in Appendix A, Enclosure 1.*

B. Underground Storage Tanks. *Two (2) 10,000-gallon underground storage tanks (UST) used to store gasoline were installed in June 1969. On 26 April 1991 during a tank closure, groundwater samples were collected for laboratory analysis. Lab results on the collected water samples were sent to the Division of Environmental Management (DEM) in Washington. On 31 May 1991 Delmus Bridgers was issued a Notice Of Violation(NOV) from the DEM and was requested to conduct a Comprehensive Site Assessment (CSA). The CSA was completed and a report, dated 14 January 1992 was submitted to the DEM. The site was recently issued a NORR dated 1 May 2012 requesting a Groundwater Monitoring Report be conducted.*

II. GROUNDWATER SAMPLING RESULTS

A. ***Summary of Current Groundwater Sampling Results.*** *A total of ten (10) monitoring wells were sampled from wells sampled for previous groundwater investigations. These wells are identified as MW-11A, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9, & MW-10. Three of the wells, MW-7, MW-8, & MW-9 had been destroyed from construction activity which had taken place over the years so only seven (7) of the ten (10) wells were sampled. A map showing the well locations can be seen in Appendix A, Enclosure 2. Laboratory results can be seen in Appendix B. A table summarizing these results is shown below:*

Date Sampled	*Sample Location*	*Parameter Exceeding 2L Standard*	*Concentration ug/l*	*2L Standard ug/l*	*Laboratory Method*
6/26/2013	*MW-11A*		*ND*		*8260B*
6/26/2013	*MW-2*		*ND*		*8260B*
6/26/2013	*MW-3*		*ND*		*8260B*
6/26/2013	*MW-4*		*ND*		*8260B*
6/26/2013	*MW-5*		*ND*		*8260B*
6/26/2013	*MW-6*	*Benzene*	*8.1*	*1.0*	*8260B*
		Ethylbenzene	*450*	*600*	
		Toluene	*23*	*600*	
		Xylenes	*690*	*500*	
6/26/2013	*MW-7*		*NS*		
6/26/2013	*MW-8*		*NS*		
6/26/2013	*MW-9*		*NS*		
6/26/2013	*MW-10*		*ND*		*8260B*

Note:

ug/l = part per billion

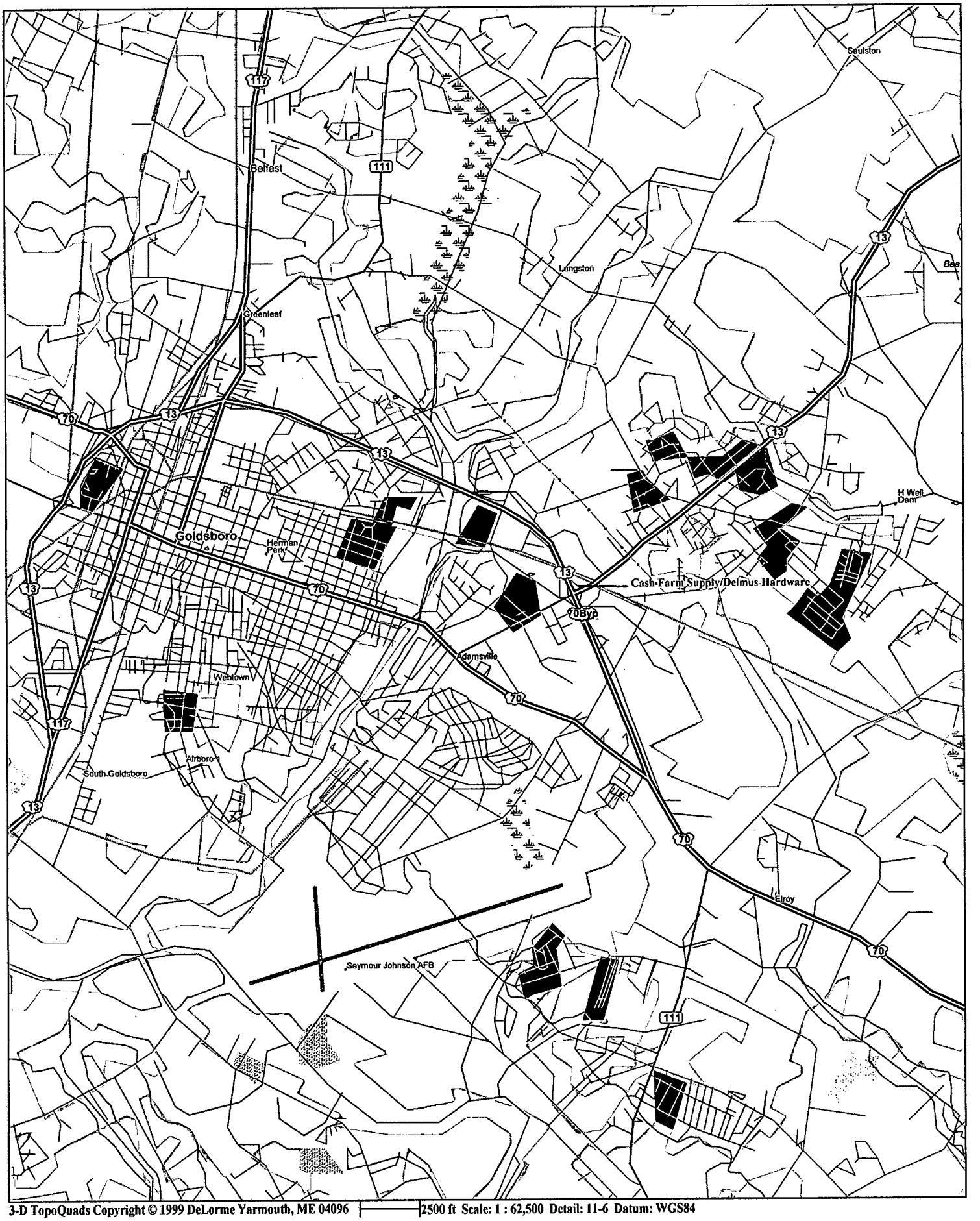
ND = No parameters detected

NS = Not sampled due to well being destroyed

8.1 = Highlighted numbers exceed 15A NCAC 02L .0202 groundwater standards

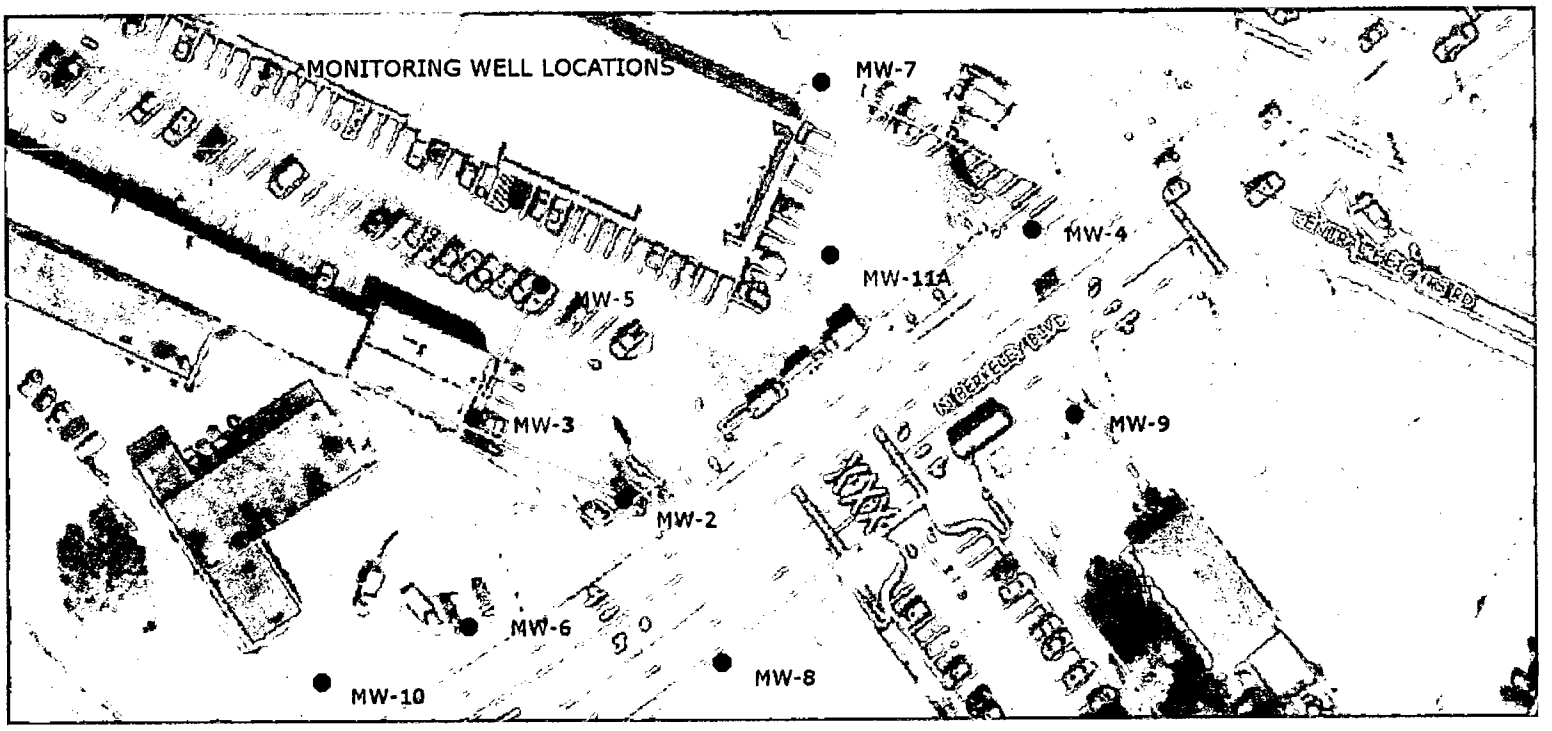
III. CONCLUSIONS/SUMMARY

A. Ten monitoring wells were selected for groundwater collection. Three of the wells had been destroyed so only seven of the existing wells were sampled. Out of the seven wells sampled, only one well, MW-6, had parameters detected by the laboratory using Method 8260B. This well had two parameters detected which exceeded the 15A NCAC 02L .0202 groundwater standard. These were Benzene and total Xylenes.



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 2500 ft Scale: 1 : 62,500 Detail: 11-6 Datum: WGS84

Appendix A, Enclosure 1



AIREAL VIEW OF MONITORING WELL LOCATIONS

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362

15 January 1992

Mr. Richard Powers, Hydrogeologist
Div. of Environmental Management
Groundwater Section
P. O. Box 2188
Washington, N C 27889-2188

Re: Comprehensive Site Assessment (CSA)
Berkeley Junction Shopping Center
1003 North Berkeley Boulevard
Goldsboro, North Carolina, Wayne County
Facility I. D. #0-005592

Dear Mr. Powers:

Enclosed for your review and approval are three copies of subject Comprehensive Site Assessment for Berkeley Junction Shopping Center, Goldsboro, North Carolina.

Very truly yours,

CONTRACTORS & ENGINEERS SERVICES, INC.

Robert A. Jones, Engineer

(delmus.lw2)

Enclosure
(3 copies)

cc Delmus Bridgers

69
2063

CONTRACTORS AND ENGINEERS SERVICES, INC.

COMPREHENSIVE SITE ASSESSMENT (CSA)
BERKELEY JUNCTION SHOPPING CENTER
1003 NORTH BERKELEY BOULEVARD
GOLDSBORO, NORTH CAROLINA, WAYNE COUNTY
FACILITY I. D. #0-005592

14 January 1992

NORTH CAROLINA PROFESSIONAL SEAL 4014 ENGINEER JOHN D. GRADY, JR.

Robert A. Jones, Engineer

John D. Grady, Jr., P. E.
President

RECEIVED
WASHINGTON OFFICE
JAN 16 1992
D. E. M.

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362

COMPREHENSIVE SITE ASSESSMENT (CSA)
BERKELEY JUNCTION SHOPPING CENTER
1003 NORTH BERKELEY BOULEVARD
GOLDSBORO, NORTH CAROLINA, WAYNE COUNTY
FACILITY I. D. #0-005592

14 January 1992

I. INTRODUCTION

This report covers the operations and findings to-date for an unscheduled discharge from an underground storage tank (UST) containing petroleum product at subject facility, located at 1003 North Berkeley Boulevard, Goldsboro, N. C. The purpose of the CSA is twofold: (1) Define the extent of soil and groundwater contamination in order to provide the necessary information for a Corrective Action Plan (CAP); (2) Separate the area of contamination at subject site from an isolated event of soil and groundwater contamination, which occurred approximately six (6) to seven (7) hundred feet northeast of the site and is currently known as the Happy Store.

II. SITE HISTORY

A. The UST's formerly located at subject site were first installed in June of 1969, and were used in conjunction with a service station which operated from June 1969 until March 1981.

B. On 25 August 1989, Mr. Jim Crumpler of Crumpler Construction Company excavated and removed two (2) ten thousand

(10,000) gallon gasoline tanks. In December 1990, Mr. Crumpler hand-delivered analytical results from two (2) composite soil samples collected from the excavated pit to the Groundwater Section at the Washington Regional Office. One of the two composite samples had a concentration of 32 parts per million (ppm) which is above the 10 ppm action level established by the Division of Environmental Management (DEM). As a result, DEM in a letter to Mr. Delmus Bridgers, dated 4 March 1991, recommended groundwater samples from the tank pit area be collected and analyzed per EPA Method 602 (with xylenes and MTBE).

C. On 7 March 1991, Mr. Bridgers submitted an Application for Permit to Construct Monitoring Wells to DEM; and subsequently retained the services of Contractors and Engineers Services, Inc., (CES) to install the monitoring wells and collect the recommended samples.

D. On 1 April 1991, CES installed three (3) temporary monitoring wells at locations recommended by DEM. See enclosed Drawing 795, 2/2. These wells are identified as TW-1, TW-2 and TW-3. Samples taken from the wells were analyzed per EPA Method 602 (with xylenes and MTBE), and the results sent to DEM on 26 April 1991.

E. On 31 May 1991, DEM issued Mr. Bridgers a Notice of Violation (NOV) of State groundwater standards, and advised that

he comply with the necessary requirements in order to assess the extent of contamination. As a result of the NOV, Mr. Bridgers retained the services of CES to perform the CSA.

III. CONTAMINANT SOURCE INVENTORY

A. Potential Petroleum Hydrocarbon Sources on Site. There are presently no potential sources of petroleum hydrocarbon on site. The only sources which existed prior to this report were the two (2) UST's removed in August 1989.

B. Potential Off-Site/Upgradient Sources. Potential for contamination from offsite sources exist approximately three hundred (300) feet east from subject site. This site, currently known as the Happy Store, was formerly the location of the Sav-A-Ton gasoline station. On 25 March 1988, Triton, Inc. (owners of Sav-A-Ton) were issued a Notice of Noncompliance by DEM for the contamination of groundwater from leaking above-ground fuel tanks and related underground piping. To-date, this site is still contaminated; and, due to the direction of groundwater flow within the area, poses a threat to property downgradient.

IV. POTENTIAL RECEPTORS/SITE UTILITIES

A. Local Land Ownership and Population Density. Subject property is owned by Delmus Bridgers, and is located within

the Goldsboro City Limits along the east side of the city boundary line. Population density is approximately 33,000.

B. Surrounding Land Use. Berkeley Junction Shopping Center is bordered on the northeast by Atlantic and East Railroad (AER). The property northeast of AER and adjacent to NCSR 1560 is owned and operated by Lowe's Hardware. Northeast of subject property and located at the intersection of Berkeley Blvd. and Miller Road is the property on which the Happy Store is located. Southwest of the Happy Store and east of subject site lies an apartment complex. Southwest of subject site is the location of Saul's Wheel Alignment & Motor Service. See Drawing 795, 1/2.

C. Downgradient Water Supply Wells. There are no active wells within 1500 feet of the contamination source. All water used within this area is supplied by the City of Goldsboro.

D. Municipal Water Lines. All water lines within proximity of the site are shown on enclosed Drawing 795, 2/2.

E. Location of Structures Potentially at Risk from Free-Product or Vapor Hazards. At the current stage of investigation, no free-product has been observed. All structures at potential risk from free-product and associated vapors, should they occur, are shown on enclosed Drawing 795, 2/2.

F. Site Utility Lines. All utility lines located on subject site and adjacent right of ways are shown on enclosed Drawing 795, 2/2. All preferential migration pathways for

contaminants are indicated on the enclosed drawing, either by invert elevation of the utilities or notes which state the direction of the preferential pathway.

V. SITE TOPOGRAPHY AND SURFACE WATER FEATURES

A. Base Map of Regional Topography. A base map showing the regional topography and site location is shown in Appendix I, Figure 1.

B. Base Map of Site Topography. A base map showing the site topography, sources of contamination and surface water features (if present) is shown on enclosed Drawing 795, Sheet 1/2.

C. Land Cover, Direction of Drainage and Storm Drains. The site cover consists of asphalt paving with a section of property located behind the shopping complex existing as a grassed area used for storage. The contamination plume on subject site lies under existing asphalt. Drainage of the property is in a southwest direction with a slope of approximately 1%. One storm drain is located near the southeast edge of the property adjacent to Berkeley Blvd., and drains southwest along Berkeley Blvd. See Drawing 795, 2/2.

VI. SITE SOILS AND GEOLOGY

A. Soil Boring Results

1. A total of ten (10) soil borings were performed during the site assessment. All ten borings were performed

for the installation of monitoring wells MW-1 through MW-10. See enclosed Drawing 795, 1/2, for location. Boring logs can be found in Appendix I, Enclosures 1 - 10, and are classified using the Unified Soil Classification System.

2. Nine (9) of the ten (10) soil borings (MW-2 - MW-10) indicate a relatively uniform layering of soils consisting of silty sands (SM), silty sand-poorly graded sand mixture (SM-SP), and a poorly graded sand (SP). Silty sands occupy the top layer and range from five (5) to seven (7) feet in thickness. The second layer consists of a silty sand-poorly graded sand, ranges in depth from five (5) to nine (9) feet, and varies in thickness from one-half (0.5) foot to two (2) feet. Borings into the third layer terminated at eleven (11) feet. This layer has been identified as a poorly graded sand, and ranged in thickness from two (2) to six (6) feet.

3. The soil boring for MW-1 was made within the former tank site, and showed a well graded sand backfill to a depth of seven (7) feet. The remaining four (4) feet of the boring was identified as a silty sand-poorly graded sand mixture.

B. Cross-Sections of Soil Borings. See enclosed Drawing 795, 1/2.

C. Geologic Formation of the Site and Surrounding Region

1. Wayne County is located within the Coastal Plains of Eastern North Carolina. The area is characterized by gently rolling land, with the largest amount of relief located near rivers and streams.

2. The Goldsboro area is mostly occupied by outcrops of the Black Creek Formation along the Neuse River (Richards 1950). The type of soils and minerals found in the Black Creek Formation consist of thinly laminated clay layers and lenses of sand (Pusey 1960). Mica and Lignite are common, also, to include Marcasite or Pyrite which occur as concentrations, disseminated grains, or as replacement minerals in lignitized wood fragments (Pusey 1960). Glauconite and occasional specimens of Foraminifera are in minor amounts in the lower part of the formation (Pusey 1960).

3. The soils located in the area of Berkeley Junction Shopping Center are characteristic of the upper section of the Black Creek Formation.

VII. EXTENT OF SOIL CONTAMINATION

A. Soil samples were collected from seven (7) of the ten (10) borings, and are identified as MW-1 through MW-7. The vertical extent of each borehole was checked with an Organic Vapor Analyzer (OVA) in order to locate the depth

containing the highest Total Petroleum Hydrocarbon (TPH) level. The depth of each sample collected was eleven (11) feet for each boring. Out of the seven samples submitted for analysis, four (4) contained TPH levels exceeding the State action level of ten (10) ppm, and are identified as MW-1, MW-2, MW-4 and MW-6. Respective TPH levels for each sample analyzed are 1392, 821, 28.4 and 950 ppm. The estimated plume boundary for soil contamination is shown on enclosed Drawing 795, 2/2, along with the tabulated results. Laboratory results along with chain of custody forms can be found in Appendix I, Enclosures 11-13. Headspace reading recorded from OVA readings can be found in Appendix I, Enclosure 14.

VIII. SITE HYDROGEOLOGY

A. Monitoring Well Network. A total of ten (10) monitoring wells circumvent the former UST location. Two (2) of the ten wells were placed off site along the southern edge of Berkeley Blvd. in order to see if groundwater contamination had spread in that direction. Monitoring well locations can be found on enclosed Drawing 795, 1/2. Well construction records can be found in Appendix I, Enclosures 15 - 24.

B. Static Water Level Measurements. All wells were measured based on an assumed finished floor elevation of 100.00 of

the existing shopping center complex. The top of each well casing was shot with a Wild Nak-0 Level. The depth to the water table was then measured with a Solinst electric tape. This measurement was then deducted from the top of well casing elevation to obtain the static water level. Two sets of static water level measurements were made. The first set of measurements were made on 23 October 1991, followed by a final measurement on 31 December 1991. Flow direction in both instances reveals a groundwater gradient sloping in a northeast to southwest direction. The flow nets for each measurement period can be found on enclosed Drawing 795, 2/2, and Drawing 795, 2/1, along with the tabulated measurements for each well.

C. Aquifer Test. A slug test was performed on 18 December 1991 by using the Hvorslev method. The test was performed using monitoring well MW-2, and yielded a hydraulic conductivity of 7.84×10^{-5} ft./sec. or 2.39×10^{-4} cm/sec.

D. Anisotropy. As shown on Drawing 795, 1/2, the aquifer down to eleven (11) feet exhibits a series of layered sedimentary soils identified as an SM, SM-SP, and SP. No confining layers were encountered during the borings. Due to the higher vertical effective stress in these soils, and

the corresponding horizontal particle alignment of the silt particles, the horizontal permeability within this area should exceed the vertical.

E. Seasonal Fluctuation in Groundwater Flow. Two separate measurements of groundwater flow direction indicate that flow is in a northeast to southwest direction. Each set of groundwater contours exhibits the same pattern; and, due to the natural steep surface gradient within this area, any reversal from the existing east to west direction is not anticipated. See enclosed Drawings 795, 1/2 and 2/2.

IX. EXTENT OF GROUNDWATER CONTAMINATION

A. Horizontal Extent of Contamination.

1. Ten (10) monitoring wells were installed on and adjacent to subject site. Only three (3) of the ten monitoring wells showed evidence of groundwater contamination with respect to petroleum hydrocarbons found in gasoline. These three wells are identified as MW-1, MW-2 and MW-6. Laboratory results along with chain of custody forms can be found in Appendix 1, Enclosures 25 - 29.

2. The highest TPH level was found in MW-2 with a TPH of 151.0 ppm. MW-6 had a TPH of 51.0 ppm, and MW-1 had a TPH of 32.7 ppm. With MW-1 being located in the center of the old tank site, and MW-2 being located 165 feet

downgradient from MW-1, it would appear that the main body of contamination is migrating in a northeast to southwest direction. It should be noted, however, that samples collected during the preliminary site assessment on 1 April 1991 indicated varying levels of TPH within the area of the old tank site. One sample taken on 1 April came from Temporary Well TW-1 and measured 8.58 ppm TPH. This well was located next to the present location of MW-1 which on 28 October 1991 had a TPH of 32.7 ppm. The remaining two (2) temporary wells (TW-2 and TW-3) had respective TPH levels of 150 ppm and 76.2 ppm. When this data is reviewed, it appears that there are scattered locations within the plume that have higher concentrations of TPH than others, making it difficult to plot isoconcentration contours.

3. The plume is being drawn in a northeast to southwest direction along a groundwater gradient of approximately 0.5%. It is suspected that the main reason for the drawn-out appearance of the plume - aside from the gradient along which it is travelling - is due to the underground utilities located along subject site creating preferential pathways for the contaminants.

4. One of the main concerns of the CSA was to determine if contamination had spread from the Happy Store site onto

subject site, or if contamination had spread from subject site east across Berkeley Blvd., and was responsible for reported groundwater contamination located within the existing apartment complex. In order to isolate the plume within subject site, Monitoring Wells MW-4, MW-7, MW-8 and MW-9 were installed. Wells MW-8 and MW-9 were placed on the east side of Berkeley Blvd. bordering the apartment complex property. Monitoring Wells MW-4 and MW-7 were placed on the northeast side of subject site. All four wells were non-contaminated with respect to petroleum compounds found in gasoline. As a result, the groundwater contamination found on subject site does appear to be confined to the area designated on enclosed Drawing 795, 2/2, and does not appear to be responsible for the reported contamination within the apartment complex.

B. Vertical Extent of Contamination. Boring logs did not reveal a confining layer down to a depth of eleven (11) feet; therefore, the actual vertical extent of contamination is not known with regard to water table fluctuation. Depths to the groundwater have remained at approximately six (6) feet below ground surface during the course of our investigation. See enclosed Drawing 795, 1/2. A water sample collected at subject site by DEM on

22 February 1988 (and identified as TW-4 on Drawing 795, 2/2) indicated the water table was six (6) feet below land surface. See Appendix 1, Enclosure 30. Soil samples collected from Borings MW-1 through MW-7 were taken at a depth of eleven (11) feet, and all samples analyzed revealed petroleum hydrocarbon levels ranging from 6.13 ppm to 1392 ppm. This would, therefore, indicate that the vertical extent of groundwater contamination extends down to this depth in some places.

X. PRELIMINARY EXPOSURE ASSESSMENT

A. Major Contaminants

1. The major contaminants found in the groundwater were benzene, ethylbenzene, toluene, xylenes and methyl-tertiary-butyl ether (MTBE). Benzene, a Group A carcinogen[1], was found with levels ranging from 82 ppb to 1140 ppb. The half-life of benzene in soils and aquifer materials may be less than one year[2-4], which some studies have shown the half-life of benzene (as gasoline) to be 36 days[5].

2. There is currently no hard evidence to suggest that the remaining four hydrocarbons (ethylbenzene, toluene, xylenes and MTBE) are carcenogenic; however, xylene and toluene both are reported to produce nervous system effects at high doses.[5]

B. Risk of Potential Health Effects

1. The risk of potential health effects appears to be minimal. The plume is confined under asphalt, and does not appear to have spread under any existing structures. No free-product has been observed in any of the wells being monitored.

2. There are currently no domestic wells being used within 1500 feet of the site which could cause alarm as a human exposure pathway. The only possible future source of contact with the contamination source will exist when the City of Goldsboro extends their sewer system as shown on enclosed Drawing 795, 2/2. As a result, the City has been informed of the situation.

XI. PRELIMINARY EVALUATION OF REMEDIAL ALTERNATIVES

A. Remedial Alternative No. 1. Alternative No. 1 would be to install a recovery well and pump within the plume and create a cone of depression, thus drawing the contaminated groundwater to a control point and preventing migration of the plume. An insitu soil venting system would be installed in order to remove vapors from the soil. The main advantage of this method is the containment of the plume. Disadvantages lie with the shape of the plume itself. The plume is longitudinal in shape; and, due to its length versus width, the majority of the cone of

depression would extend into uncontaminated regions north and south of the plume. If this method was employed, two recovery wells would probably be necessary (one upgradient and one downgradient) in order to have a positive effect on recovery of groundwater contamination. Estimated cost for this alternative, excluding reports, can be found in Appendix I, Enclosure 31.

B. Remedial Alternative No. 2. Alternative No. 2 would employ the same method for soil remediation as Remedial Alternative No. 1. However, the method for recovery of contaminated groundwater would consist of a trench system extending the length of the plume. The proposed trench will be approximately eight feet deep and will have a four-inch slotted PVC pipe extending along the trench base. A recovery pump will be installed at the downgradient end of the trench. The trench will be approximately 300 feet long with the first 150 feet being installed adjacent to the proposed sewer line being installed by the City. By laying the PVC pipe in conjunction with the sewer line, the cost to the client will be cut in half. There are no foreseen disadvantages to this alternative. Advantages would be a more effective recovery system, thus reducing long term operations and cost. Estimated cost for this alternative,

excluding reports, can be found in Appendix I, Enclosure 32.

Prepared by:

Robert A. Jones, Engineer

NORTH CAROLINA PROFESSIONAL SEAL 4014 ENGINEER JOHN D. GRADY, JR.

John D. Grady, Jr., P. E.
President

(delmus.lw2)

Enclosures

REFERENCES

1. ATSDR. Toxicological Profile for Benzene. Draft. Agency for Toxic Substances and Disease Registry. Oak Ridge National Laboratory, Oak Ridge, TN, 1987

2. Wilson, B. H., G. B. Smith, and J. F. Reese. "Biotransformation of Selected Alkyl-benzenes and Halogenated Hydrocarbons in Methanogenic Aquifer Material: A Micro-cosm Study." Environ. Sci. and Technol. 20(10):997-1002 (1986).

3. Barker, J. F., E. A. Sudicky, C. I. Mayfield, R. W. Gillham, G. C. Patrick, and K. L. Berry-Spark. "The Fate and Persistence of Aromatic Hydrocarbons Dissolved in Groundwater: Results From Controlled Field Experiments," in Environmental Concerns in the Petroleum Industry. American Association of Petroleum Geologists, 1989.

4. Lee, R. F., and C. Ryan. "Microbial Degradation of Organochlorine Compounds in Estuarine Water and Sediment," in Proceedings of Microbial Degradation of Pollutants in Marine Environments. EPA 600/9-79-012, 1979, pp. 443-450.

5. Calabrese, Edward J., and Paul T. Kastecki. Hydrocarbon Contaminated Soils. Lewis Publishers, Michigan, 1991

2	.6096
3	.9144
4	1.2192
5	1.5240
6	1.8288
7	2.1336
8	2.4384
9	2.7432
10	3.0480

To convert feet to meters multiply by .3048

To convert meters to feet multiply by 3.2808

(SOUTHEAST GOLDSBORO)
5454 IV SW

SCALE 1:24 000

UTM GRID AND 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 2 METERS
NATIONAL GEODETIC VERTICAL DATUM OF 1929
CONTROL ELEVATIONS SHOWN TO THE NEAREST 0.1 METER
OTHER ELEVATIONS SHOWN TO THE NEAREST 0.5 METER

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

© INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1983

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U. S. Route
State Route

NORTHEAST GOLDSBORO, N. C.

NW/4 GOLDSBORO 15' QUADRANGLE
35077-D8-TM-024

1983

DMA 5454 IV NW—SERIES V842

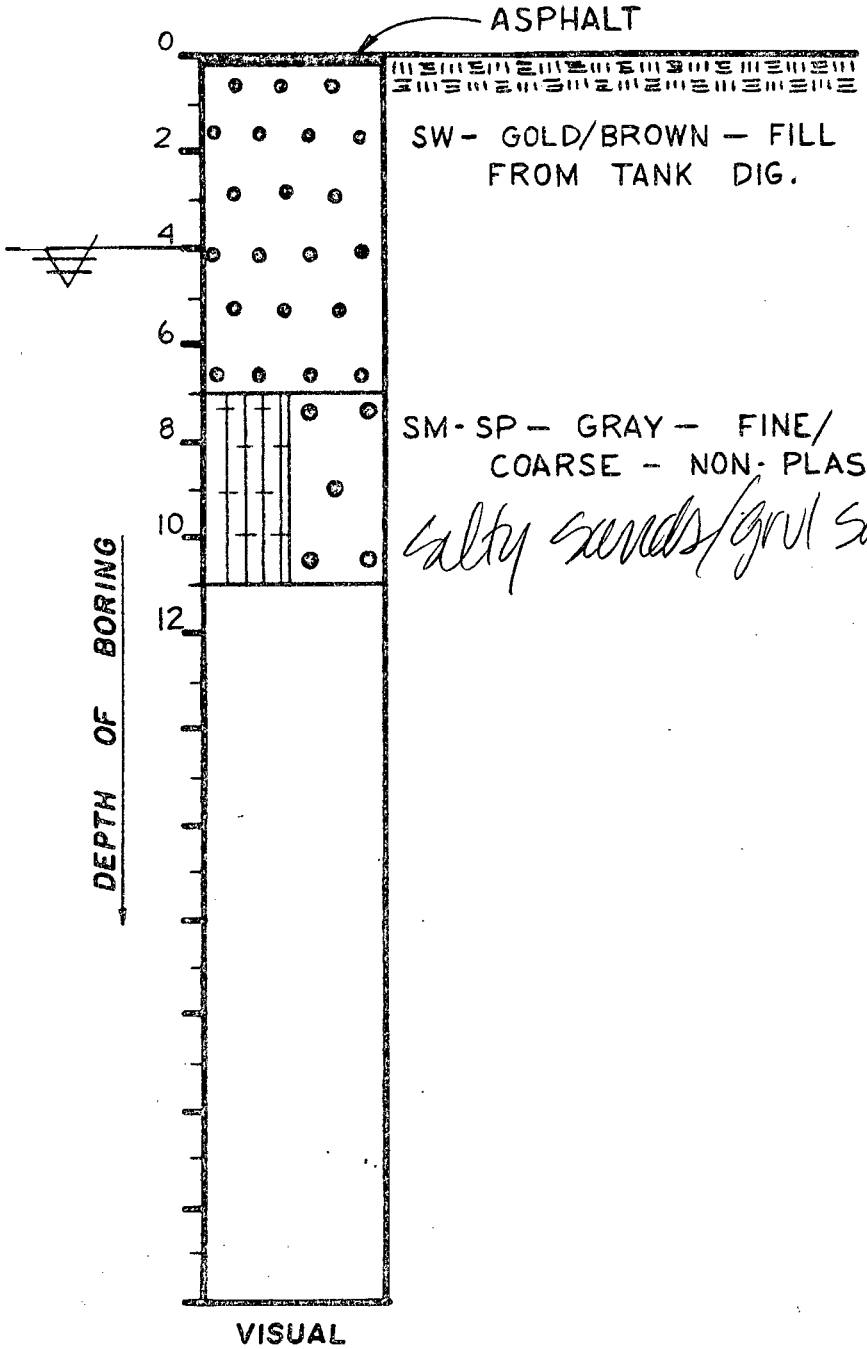
FIGURE 1

APPENDIX I

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



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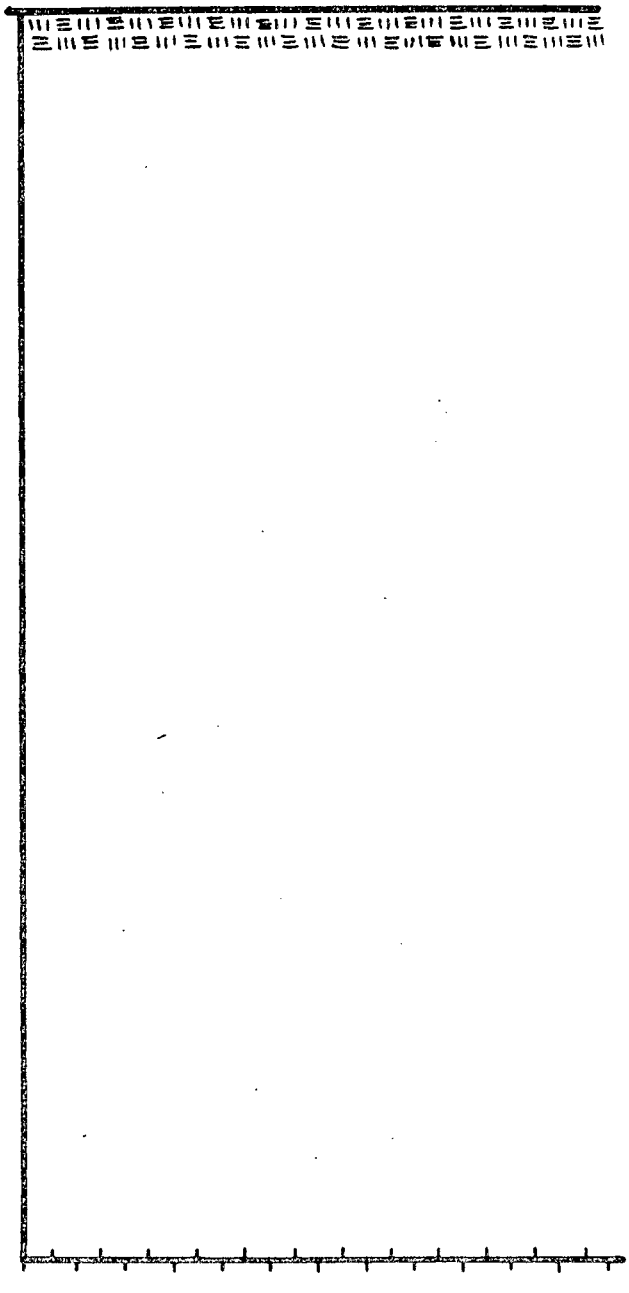


PENETRATION RESISTANCE
ASTM D-1586

BORE HOLE Nº 1

· JOB LOCATION: GOLDSBORO, NC.
· CLIENT: DELMUS BRIDGERS
· DATE: 9-12-91 JOB Nº:

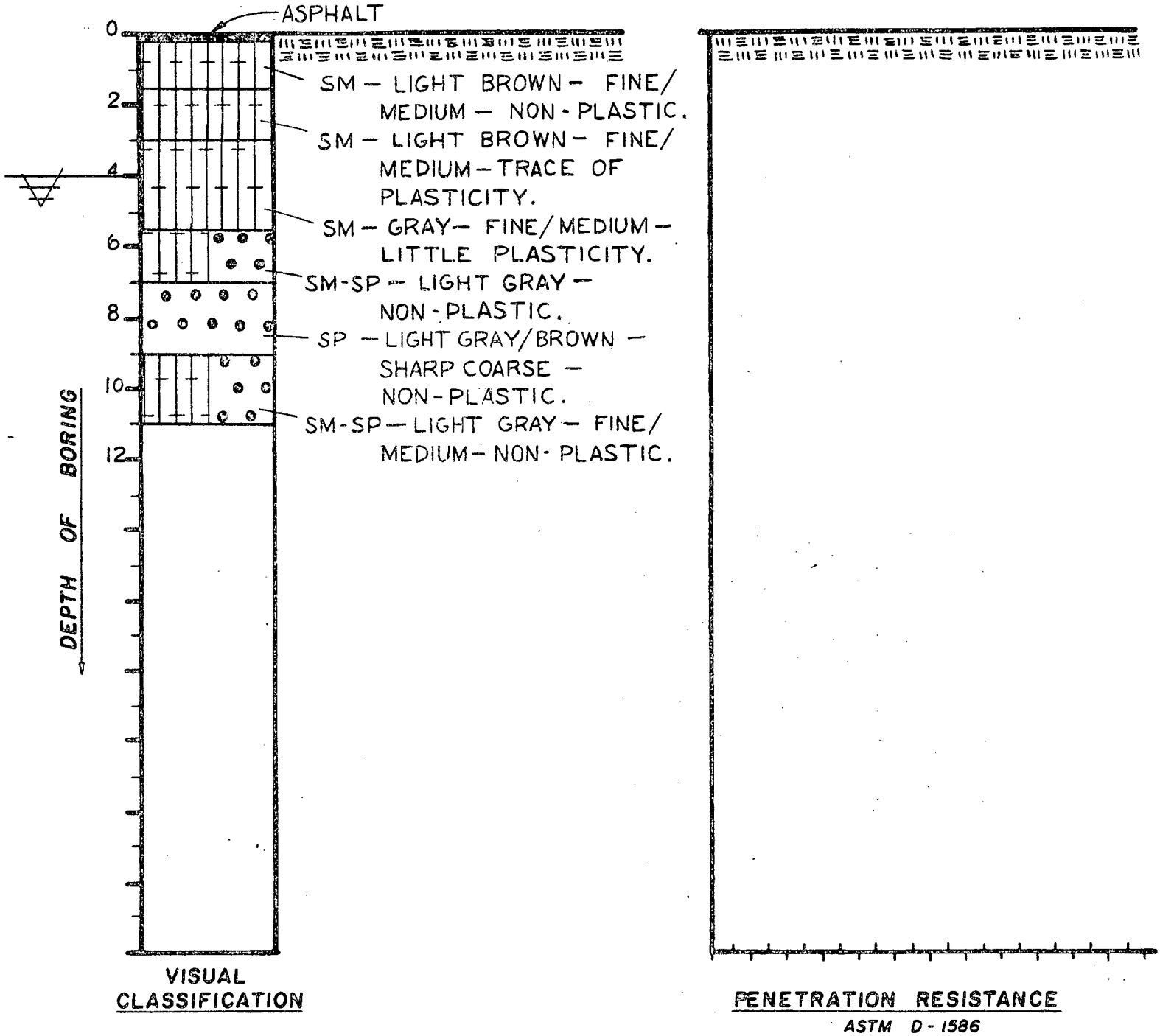
NOTE:

ENCLOSURE 1

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



VISUAL CLASSIFICATION

PENETRATION RESISTANCE
ASTM D-1586

BORE HOLE Nº 2

· JOB LOCATION: GOLDSBORO, NC.
· CLIENT: DELMUS BRIDGERS
· DATE: 9-12-91 JOB Nº:

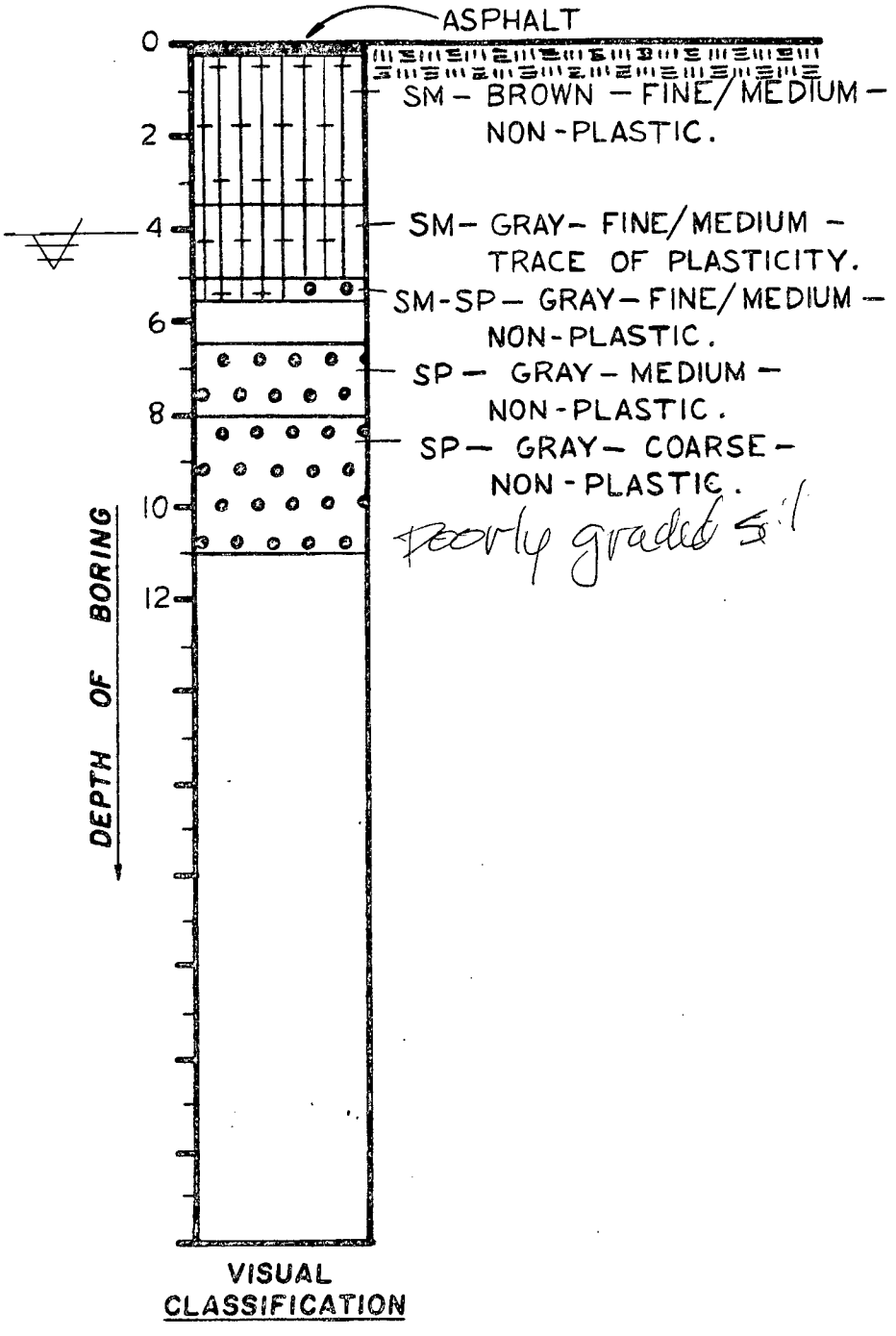
NOTE:

ENCLOSURE 2

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



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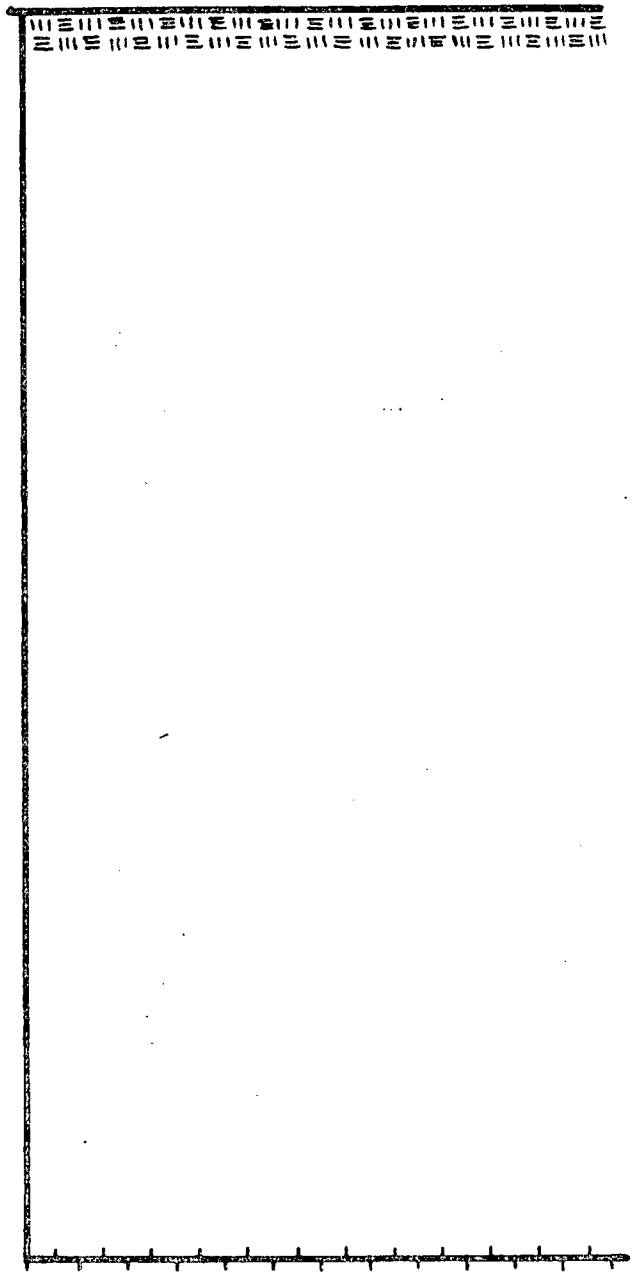


PENETRATION RESISTANCE
ASTM D-1586

BORE HOLE Nº 3

JOB LOCATION: GOLDSBORO, NC.
CLIENT: DELMUS BRIDGERS
DATE: 9-12-91 JOB Nº:

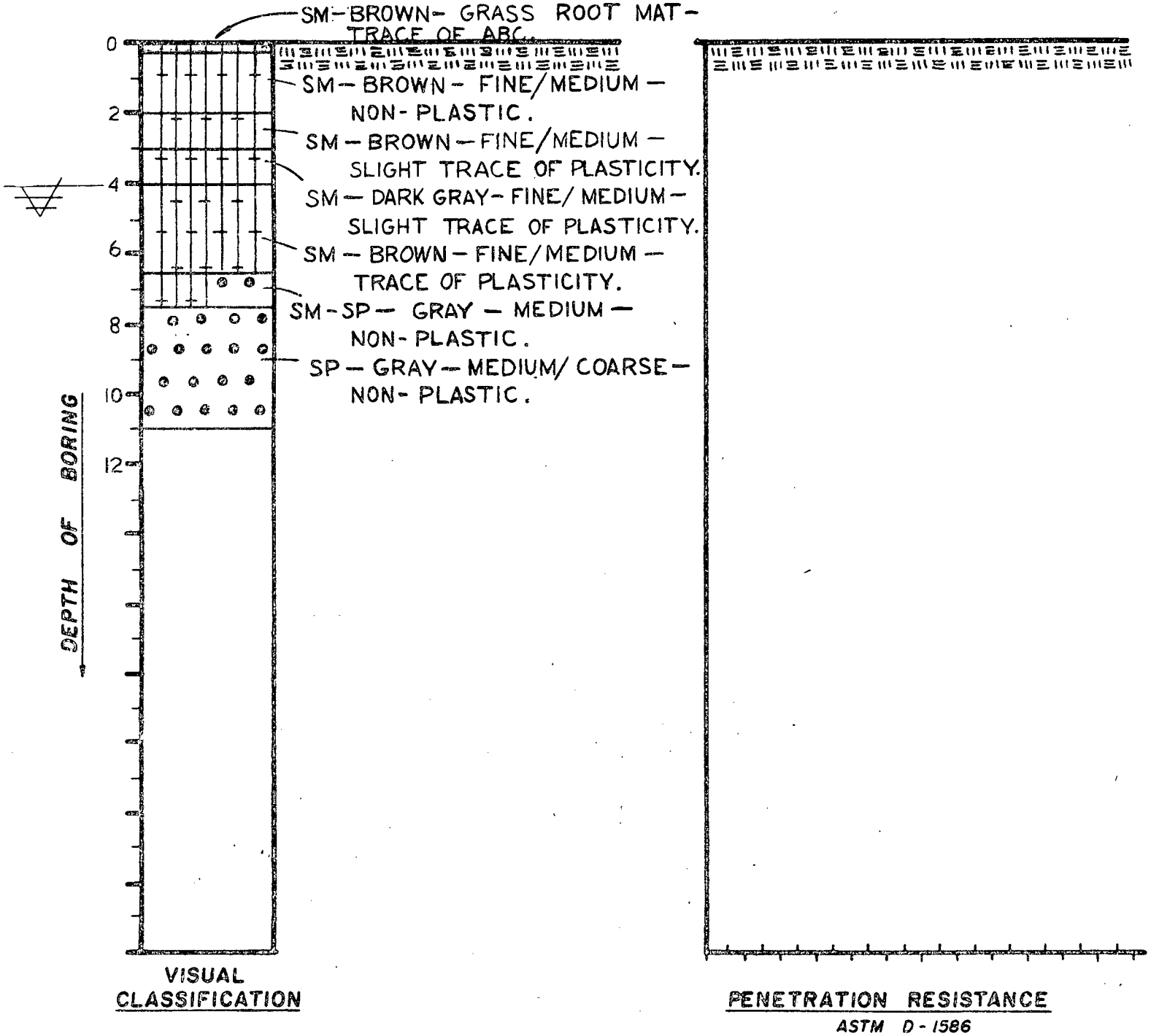
NOTE:

ENCLOSURE 3

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



BORE HOLE Nº 4

JOB LOCATION: GOLDSBORO, NC
CLIENT: DELMUS BRIDGERS
DATE: 9-13-91 JOB Nº:

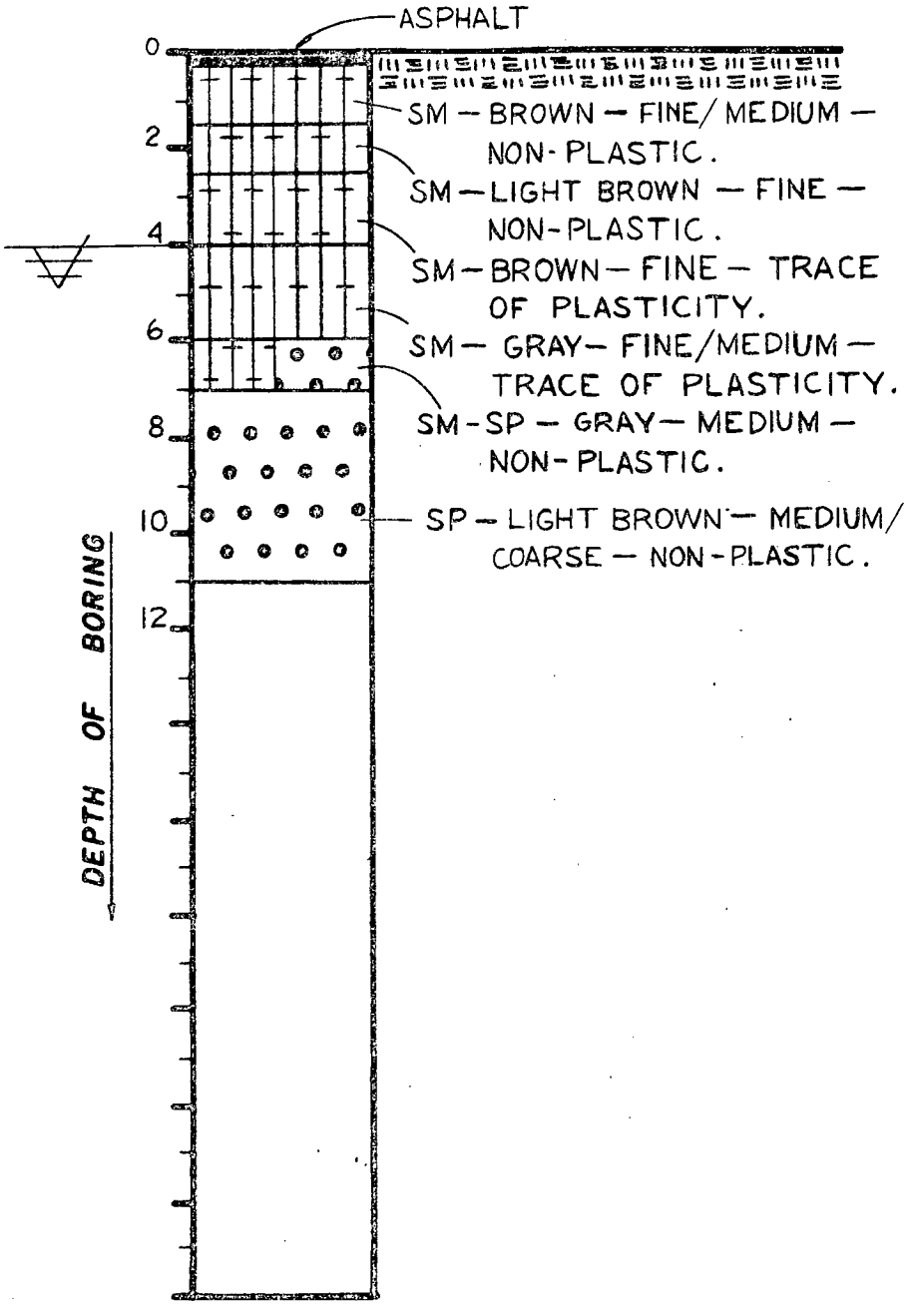
NOTE:

ENCLOSURE 4

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



VISUAL CLASSIFICATION

PENETRATION RESISTANCE
ASTM D-1586

BORE HOLE Nº 5

JOB LOCATION: GOLDSBORO, NC.
CLIENT: DELMUS BRIDGERS
DATE: 9-13-91 JOB Nº:

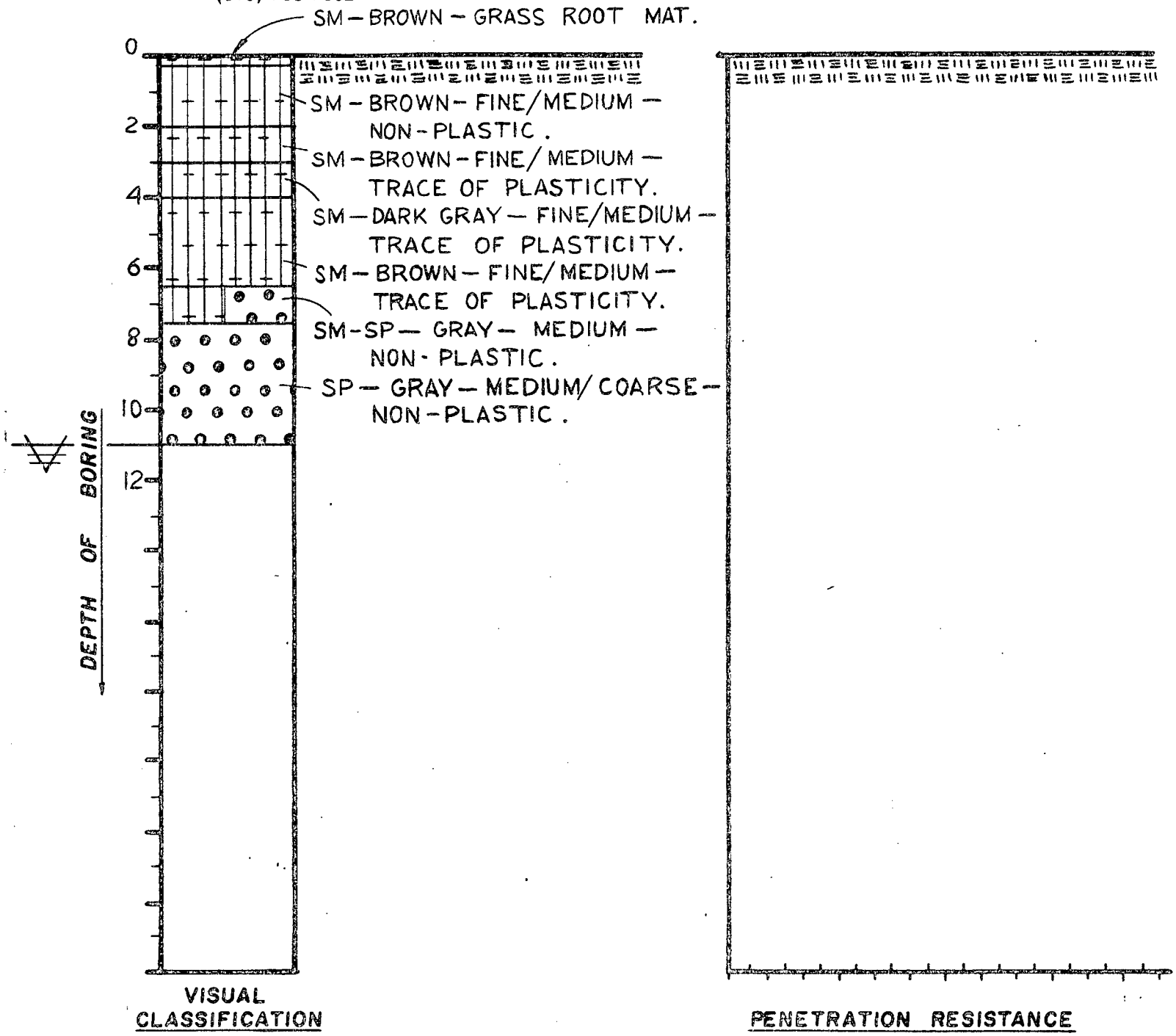
NOTE:

ENCLOSURE 5

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



VISUAL CLASSIFICATION

PENETRATION RESISTANCE
ASTM D-1586

BORE HOLE Nº 6

JOB LOCATION: GOLDSBORO, NC
CLIENT: DELMUS BRIDGERS
DATE: 9-13-91 *JOB Nº:*

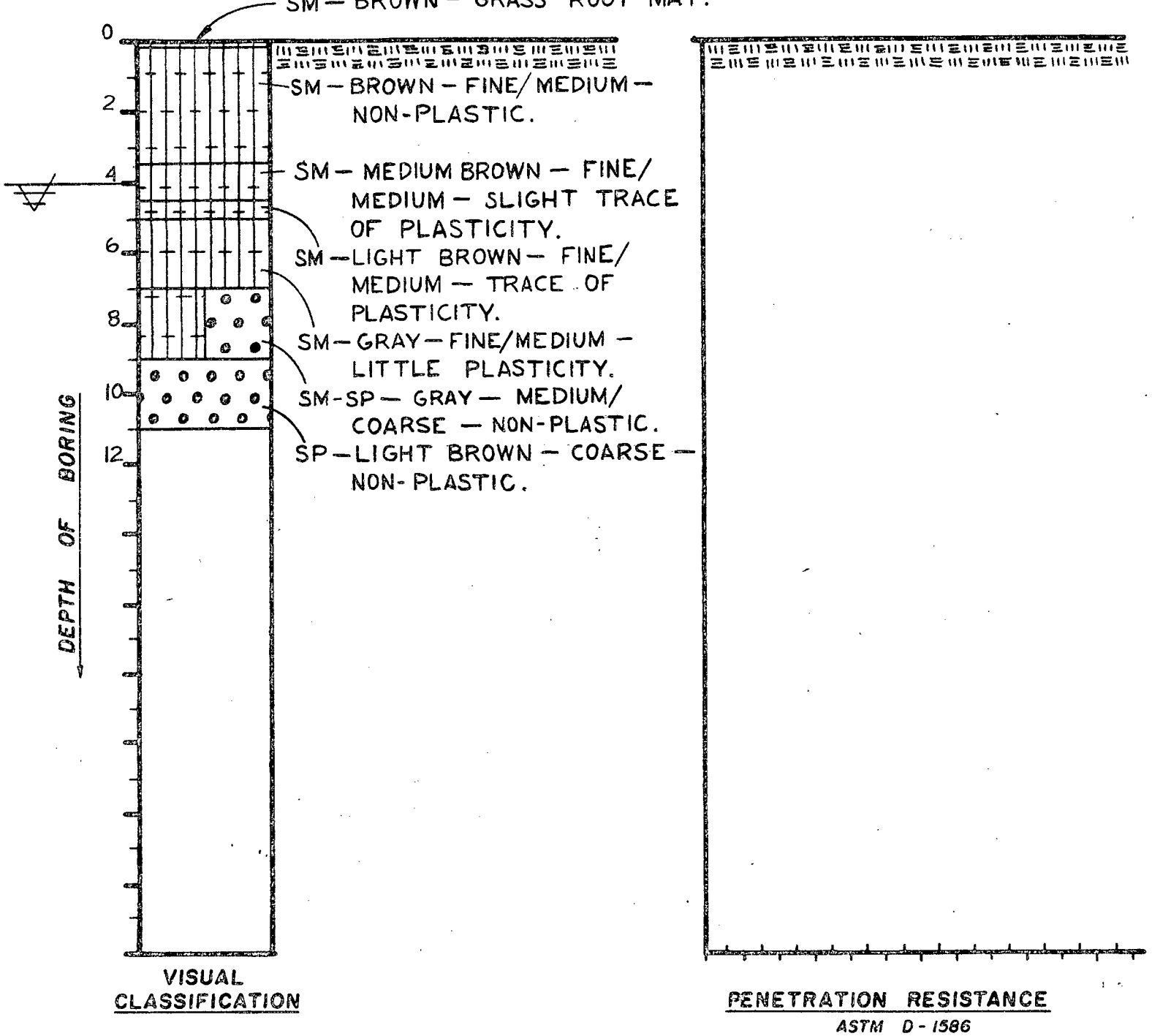
NOTE:

ENCLOSURE 6

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



VISUAL CLASSIFICATION

PENETRATION RESISTANCE
ASTM D - 1586

BORE HOLE Nº 7

JOB LOCATION: GOLDSBORO, NC.
CLIENT: DELMUS BRIDGERS
DATE: 9-13-91 JOB Nº:

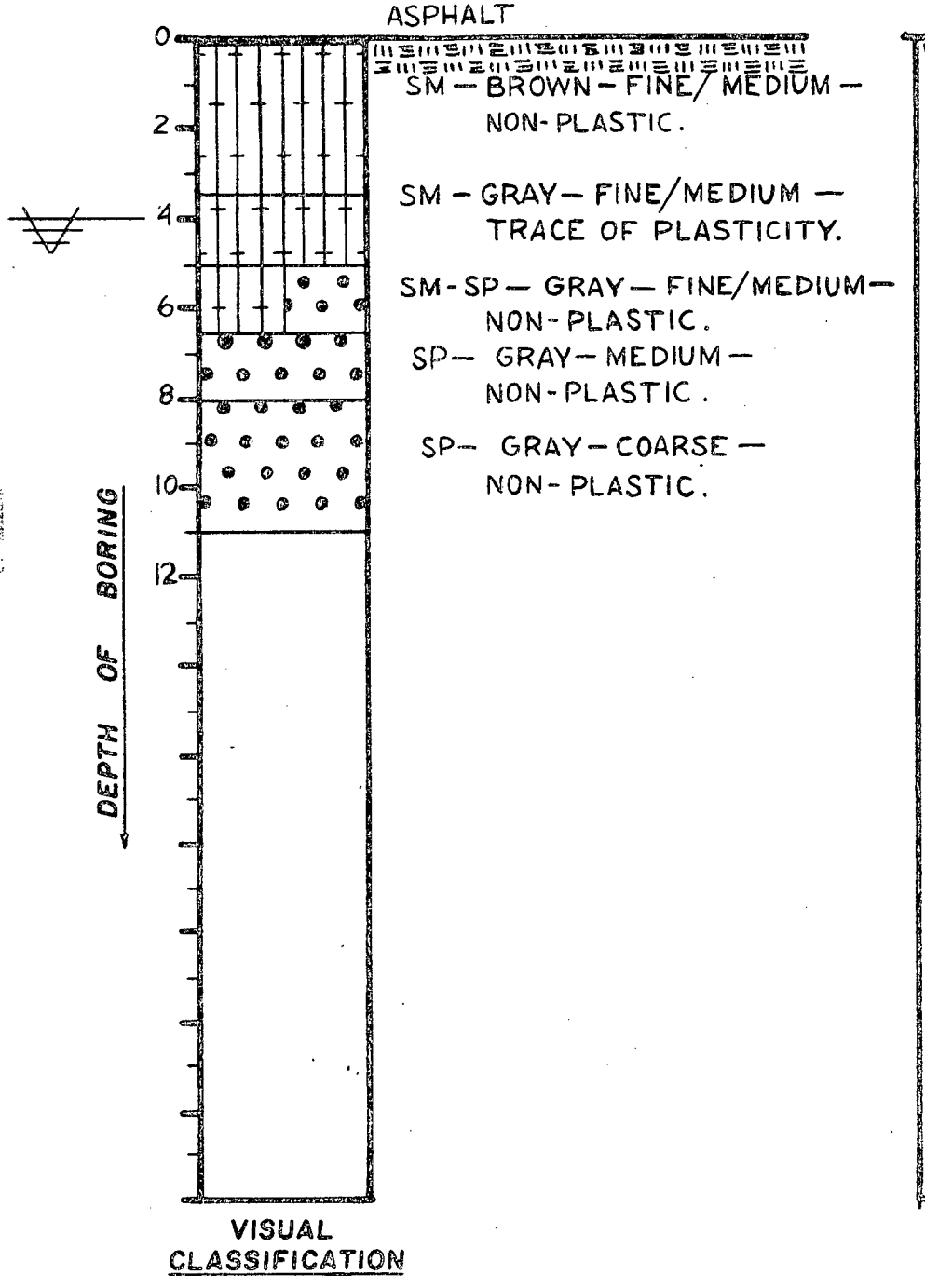
NOTE:

ENCLOSURE 7

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



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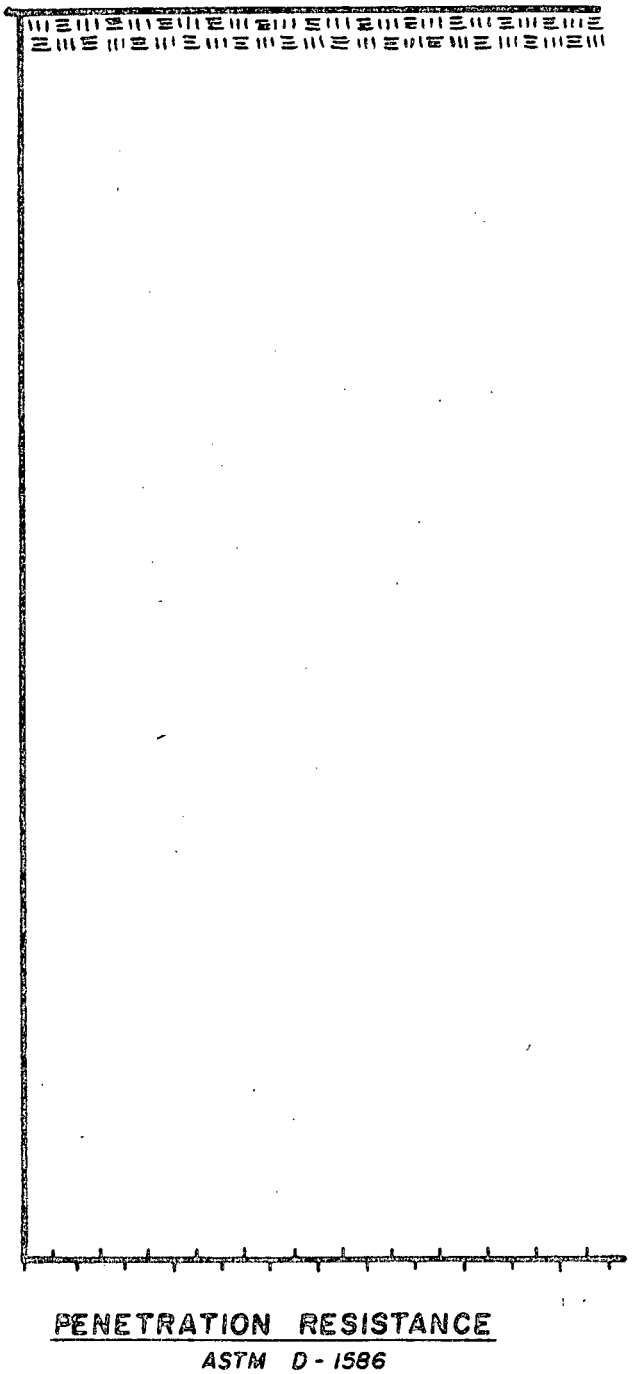

PENETRATION RESISTANCE
ASTM D-1586

BORE HOLE Nº 8

· JOB LOCATION: GOLDSBORO, NC
· CLIENT: DELMUS BRIDGERS
· DATE: 10-17-91 JOB Nº:

NOTE:

ENCLOSURE 8

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
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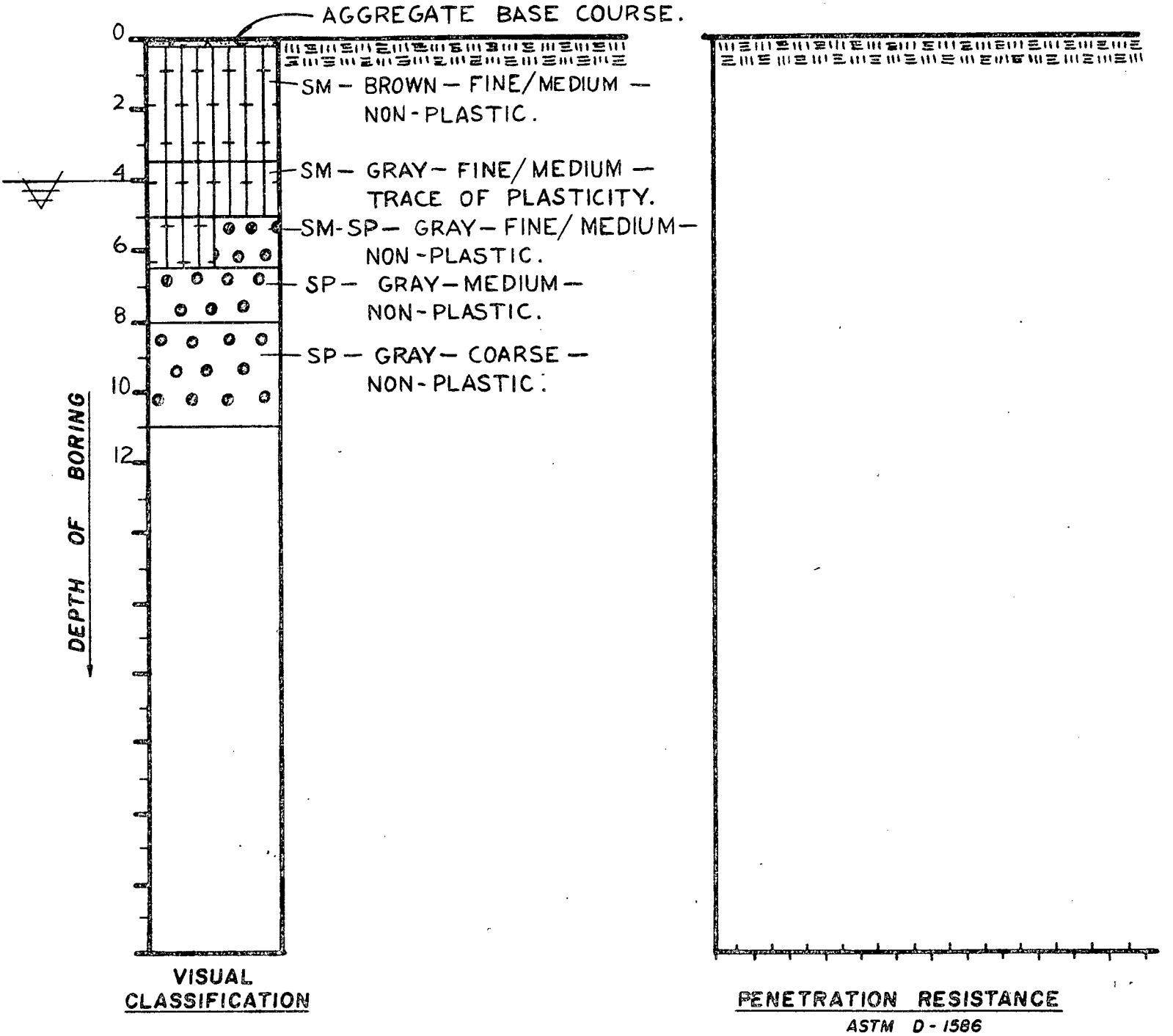


BORE HOLE Nº 9

· JOB LOCATION: GOLDSBORO, NC.
· CLIENT: DELMUS BRIDGERS
· DATE: 10-21-91 JOB Nº:

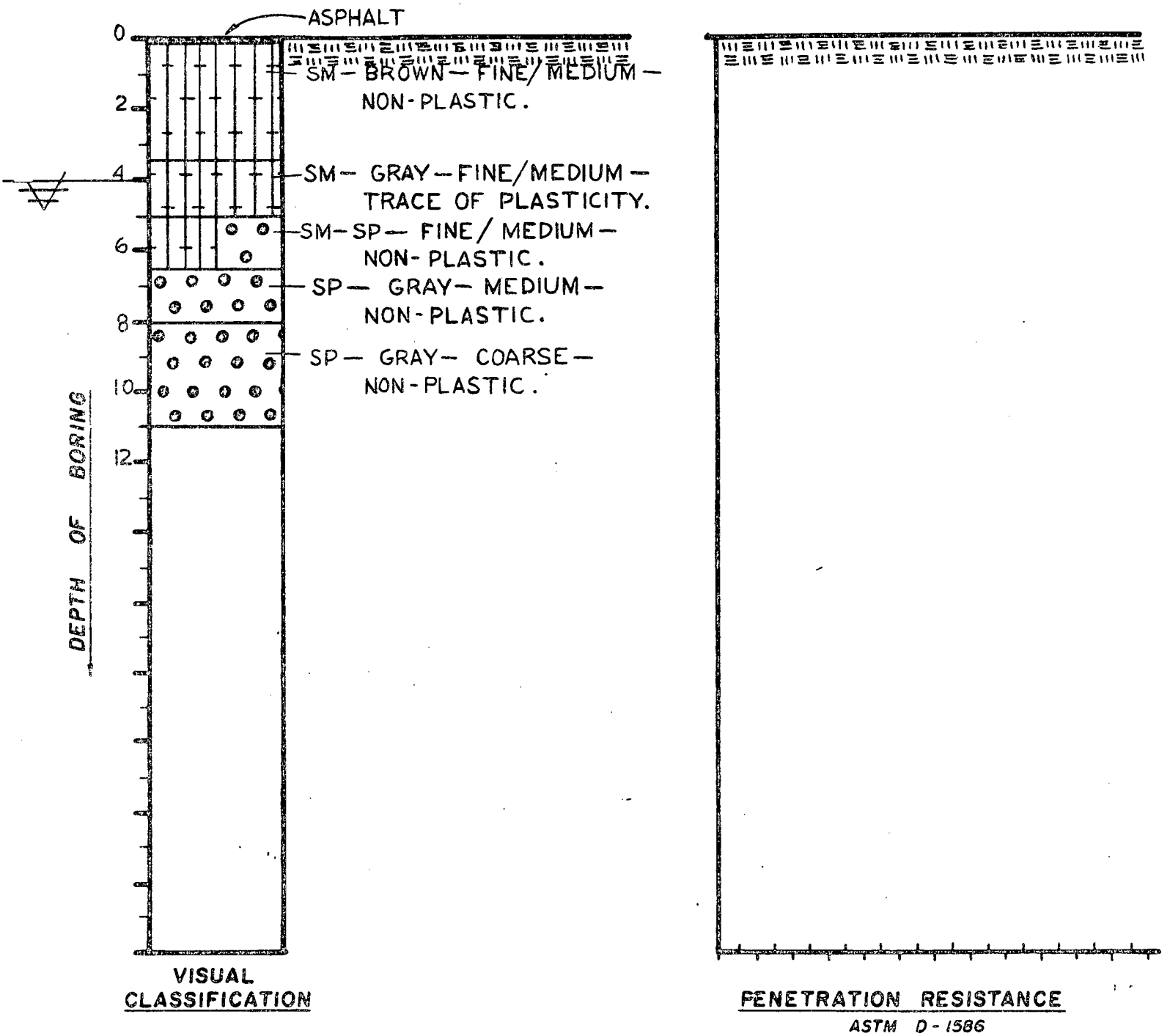
NOTE:

ENCLOSURE 9

CONTRACTORS AND ENGINEERS SERVICES, INC.

1304 NORTH WILLIAM STREET
P. O. BOX 762
GOLDSBORO, NORTH CAROLINA 27533-0762

TELEPHONE: (919) 735-7355
(919) 735-7362



BORE HOLE Nº 10

JOB LOCATION: GOLDSBORO, NC.
CLIENT: DELMUS BRIDGERS
DATE: 10-21-91 JOB Nº:

NOTE:

ENCLOSURE 10

SOUTHERN TESTING AND RESEARCH LABORATORIES, INC.
3709 AIRPORT DRIVE - WILSON, NC 27893
PHONE (919) 237-4175

REPORT OF ANALYSIS

LAB SAMPLE NO.(s): 4045A1-4

DATE OF REPORT: 91/09/20

RECEIVED FROM

DATE RECEIVED : 91/09/16

NAM : ROBERT JONES
ORG : CONTRACTORS & ENGINEERS SERVC. INC.
ADD : P.O. BOX 762
CSZ : GOLDSBORO, NC 27530

ACCOUNT NO.: 14136

TELEPHONE : 735-7355

SAMPLE(s) of: SOIL for Total Petroleum Hydrocarbon (TPH) analysis.

MARKED A: MW-1 (11') CES 576 B: MW-2 (11') CES 577

C: MW-3 (11') CES 578 D: MW-4 (11') CES 579

-----SAMPLE/TEST NO.------->	A: 4045A1	B: 4045A2	C: 4045A3	D: 4045A4
ANALYSIS				
1. TPH w/ BTEX distinction (Water--EPA602 P&T/GC/PID/HECD) (Soil --SW846-5030/8020 P&T/GC/PID/HECD)				
Total TPH as Gasoline (ppm):	1,392	821	6.13	28.4
Benzene (ppm):	0.430	8.37	<0.011	<0.012
Chlorobenzene (ppm):	<0.012	<0.011	<0.011	<0.012
1,2-Dichlorobenzene (ppm):	<0.012	<0.011	<0.011	<0.012
1,3-Dichlorobenzene (ppm):	<0.012	<0.011	<0.011	<0.012
1,4-Dichlorobenzene (ppm):	<0.012	<0.011	<0.011	<0.012
Ethylbenzene (ppm):	11.12	55.60	0.051	0.219
Toluene (ppm):	23.91	134.15	<0.011	1.28
+ Xylenes (ppm):	16.15	18.89	0.096	0.538
+ MTBE (ppm):				
+ EDB (ppm):				
2. TPH w/o BTEX distinction (Water--SW846-3510/8015 Micro Liq-Liq Ext/HRGC/FID) (Soil --SW846-3550/8015 Micro Sonic Ext/HRGC/FID)				
Low-to-Medium Boiling (ppm): (gasoline, kerosene, jet fuel, etc.)				
Higher Boiling (ppm): (diesel, fuel oil, *motor oil, etc.)				

*motor oil det. limit = : 25 ppm

COMMENTS:

LAB USE ONLY----------
ANALYSTs: DM
PICKUP: N RUSH: N
TIME: MILES:
T: D:
I:

Reviewed and Approved

Name: Thomas A. Dean, Jr., Ph.D.
Title: Manager, Environmental Department

ENCLOSURE 11

v11/90

SOUTHERN TESTING AND RESEARCH LABORATORIES, INC.
[illegible] DRIVE - WILSON, NC 2789[illegible]
PHONE (919) 237-4175

REPORT OF ANALYSIS

LAB SAMPLE NO.(s): 4045A5-7

DATE OF REPORT: 91/09/20

RECEIVED FROM

DATE RECEIVED : 91/09/16

NAM : ROBERT JONES
ORG : CONTRACTORS & ENGINEERS SERVC. INC.
DD : P.O. BOX 762
CSZ : GOLDSBORO, NC 27530

ACCOUNT NO.: 14136

TELEPHONE : 735-7355

SAMPLE(s) of: SOIL for Total Petroleum Hydrocarbon (TPH) analysis.

MARKED A: MW-5 (11') CES 580 B: MW-6 (11') CES 581

C: MW-7 (11') CES 582 D:

-----SAMPLE/TEST NO.--------> A: 4045A5 B: 4045A6 C: 4045A7 D:				
ANALYSIS				
1. TPH w/ BTEX distinction (Water--EPA602 P&T/GC/PID/HECD) (Soil --SW846-5030/8020 P&T/GC/PID/HECD)				
Total TPH as Gasoline	(ppm):	7.56	950	7.44
Benzene	(ppm):	<0.013	0.112	0.022
Chlorobenzene	(ppm):	<0.013	<0.012	<0.013
1,2-Dichlorobenzene	(ppm):	<0.013	<0.012	<0.013
1,3-Dichlorobenzene	(ppm):	<0.013	<0.012	<0.013
1,4-Dichlorobenzene	(ppm):	<0.013	<0.012	<0.013
Ethylbenzene	(ppm):	0.026	4.80	0.063
Toluene	(ppm):	0.022	0.375	0.164
+ Xylenes	(ppm):	<0.039	5.580	0.123
+ MTBE	(ppm):			
+ EDB	(ppm):			
2. TPH w/o BTEX distinction (Water--SW846-3510/8015 Micro Liq-Liq Ext/HRGC/FID) (Soil --SW846-3550/8015 Micro Sonic Ext/HRGC/FID)				
Low-to-Medium Boiling (gasoline, kerosene, jet fuel, etc.)	(ppm):			
Higher Boiling (diesel, fuel oil, *motor oil, etc.)	(ppm):			

*motor oil det. limit = : 25 ppm

COMMENTS:

LAB USE ONLY----------
ANALYSTs: DM
PICKUP: N RUSH: N
TIME: MILES:
D:

Reviewed and Approved

Name: Thomas A. Dean, Jr., Ph.D.
Title: Manager, Environmental Department

ENCLOSURE 12

11/90

TESTING and RESEARCH LABORATORIES, Inc.
3709 Airport Drive, Wilson, NC 27893
Phone: 919-237-4175 • FAX: 919-237-9341

4136

SAMPLE SUBMISSION FORM

4045A1-7

Contact (and results to): Robert Jones

Company: Contractors and Eng. Serv. Inc.

Address: P.O. Box 762
Goldsboro, N. C. 27533

Phone No.: (919) 735-7355

Invoice address: (if different from above)

Date Submitted: 9-16-91

Purchase order No.:

Priority

	Surcharge	
• Normal (7 - 10 work days)	none	✓
• Rush	50%	
• Emergency (24 hours)	100%	

Southern Testing Contact:

Total No. samples submitted: (Group samples together that require same analyses)

SAMPLE DESCRIPTION	SAMPLE MARKS	ANALYSES REQUESTED (Please indicate Catalog Numbers)	EXPECTED LEVELS
MW-1 (11')	CES- 576 1	ES-60	
MW-2 (11')	CES- 577 2	ES-60	
MW-3 (11')	CES- 578 3	ES-60	
MW-4 (11')	CES- 579 4	ES-60	
MW-5 (11')	CES- 580 5	ES-60	
MW-6 (11')	CES- 581 6	ES-60	
MW-7 (11')	CES- 582 7	ES-60	
Completed CES	9/20/91	Donald Tomasselli	

These samples are submitted subject to the Terms and Conditions set forth in the current Southern Testing Fee Schedule

SPECIAL INSTRUCTIONS:

Submitted by: (Signature)

Received at STARL by: Margo English (Signature)

ENCLOSURE 13

Rev. 1-91

DEPTH (FT.)	BOREHOLE TPH - PPM									
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
1	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
5	10	18	0	0	0	20	0	0	0	0
7	325	22	0	10	0	100	0	0	0	0
9	1000+	500	0	18	0	475	0	0	0	0
11	1000+	715	5	21	4	900	3	0	0	0

BOREHOLE ANALYSIS USING ORGANIC VAPOR ANALYZER.
ALL READINGS ARE IN PARTS PER MILLION (PPM).

(delmus.lw2)

ENCLOSURE 14

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-1

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Goldsboro

1003 N. Berkeley Blvd.
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers

ADDRESS P. O. Box 10848
(Street or Route No.)

Goldsboro NC 27532
City or Town State Zip Code

3. DATE DRILLED 9-12-91 USE OF WELL Monitoring

4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 4 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	0	To 4 Ft.	2"	Sch. 40	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth		Material	Method
From	0	To 2.5 Ft.	Neat Cement	
From		To Ft.		

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From	4'	To 11 Ft.	2 in.	.018 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

	Depth		Size	Material
From	3.5	To 11 Ft.		Washed Sand
From		To Ft.		

14. REMARKS: Hole Plug 2.5 - 3.5'

Depth From	Depth To	DRILLING LOG Formation Description
0	2"	Asphalt
2"	7'	Gold-Br. SW
		Fill from Tank Dig
7'	11'	Gray SM-SP, F-C, Non-PL

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 15

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 23 October 1991
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REVISED 2/90

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-2

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Goldsboro
1003 N. Berkeley Blvd.
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers
ADDRESS P. O. Box 10848 (Street or Route No.)
Goldsboro (City or Town) NC (State) 27532 (Zip Code)

3. DATE DRILLED 9-12-91 USE OF WELL Monitoring

4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 4 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	4		2"	Sch.40	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0	2.5		Neat Cement	

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	4	11		2 in.	.018 in.	PVC
				in.	in.	
				in.	in.	

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	3.5	11			Washed Sand

14. REMARKS: Hole Plug 2.5 - 3.5'

DRILLING LOG

Depth From	To	Formation Description
0	- 1.75"	Asphalt
1.75"	- 1.5'	Lt.Brown, SM, F-M, Non-PL
1.5'	- 3'	Lt.Brown, SM, F-M, Trace of PL
3'	- 5.5'	Gray, SM, F-M, Little PL
5.5'	- 7'	Lt.Gray, SM-SP, Non PL
7'	- 9'	Lt.Gray-Br, SP, Sharp C. N.P.
9'	- 11'	Lt.Gray, SM-SP, F-M, N.P.

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 16

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

23 October 1991
DATE

GW-1 REVISED 2/90

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-3

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Goldsboro
1003 N. Berkeley Blvd.
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers
ADDRESS P. O. Box 10848 (Street or Route No.)
Goldsboro (City or Town) NC (State) 27532 (Zip Code)

3. DATE DRILLED 9-12-91 USE OF WELL Monitoring
4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 4 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): N/A METHOD OF TEST N/A
8. WATER ZONES (depth): N/A
9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
From	0	To 4 Ft.	2"	Sch.40	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth From	To	Material	Method
From	0	To 2.5 Ft.	Neat Cement	
From		To Ft.		

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
From	4	To 11 Ft.	2 in.	.018 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
From	3.5	To 11 Ft.		Washed Sand
From		To Ft.		

14. REMARKS: Hole Plug 2.5 - 3.5'

Depth From	To	DRILLING LOG Formation Description
0	- 1.75"	Asphalt
1.75"	- 3.5'	Brown, SM, F-M, Non PL
3.5'	- 5'	Gray, SM, F-M, Trace of PL
5'	- 5.5'	Gray, SM-SP, F-M, Non PL
6.5'	- 8'	Gray, SP, Med., Non PL
8'	- 11'	Gray, SP, Coarse, Non PL

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 17

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Julian Richardson — 23 October 1991
SIGNATURE OF CONTRACTOR OR AGENT — DATE

GW-1 REVISED 2/90

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-4

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Goldsboro
1003 N. Berkeley Blvd.
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers
ADDRESS P. O. Box 10848 (Street or Route No.)
Goldsboro, (City or Town) NC (State) 27532 (Zip Code)

3. DATE DRILLED 9-13-91 USE OF WELL Monitoring

4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 4 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0	4 Ft.	2"	Sch.40	PVC
		Ft.			
		Ft.			

11. GROUT:

	Depth From	To	Material	Method
	0	2.5 Ft.	Neat Cement	
		Ft.		

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	4	11 Ft.	2 in.	.018 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
	3.5	11 Ft.		Washed Sand
		Ft.		

14. REMARKS. Hole Plug 2.5 - 3.5'

DRILLING LOG

Depth From	To	Formation Description
0	- 2"	Br., SM, Grass R/M
		Trace of ABC
2"	- 2'	Br, SM, F-M, NP
2'	- 3'	Br. SM, F-M, Slight Trace of PL
3'	- 4'	Dk.Gray, SM, F-M, Slight
		Trace of PL
4'	- 6.5'	Br., SM, F-M, Tr. of PL
6.5'	- 7.5'	Gray, SM-SP, Med., Non PL
7.5'	- 11'	Gray, SP, Med-C, Non PL

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 18

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 23 October 1991
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REVISED 2-80
Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-5

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1 WELL LOCATION: (Show sketch of the location below)

Nearest Town: Goldsboro

1003 N. Berkeley Blvd.
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers

ADDRESS P. O. Box 10848 (Street or Route No.)

Goldsboro (City or Town) NC (State) 27532 (Zip Code)

3. DATE DRILLED 9-13-91 USE OF WELL Monitoring

4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL 4 FT. ☐ above ☒ below TOP OF CASING.

TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
From	0	4 Ft.	2"	Sch. 40	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth From	To	Material	Method
From	0	To 2.5 Ft.	Neat Cement	
From		To Ft.		

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
From	4	To 11 Ft.	2 in.	.018 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
From	3.5	To 11 Ft.		Washed Sand
From		To Ft.		

14. REMARKS: Hole Plug 2.5 - 3.5'

Depth From	To	DRILLING LOG Formation Description
0	- 2"	Asphalt
2"	- 1.5'	Brown, SM, F-M, Non PL
1.5'	- 2.5'	Lt.Brown, SM, F, Non-PL
2.5'	- 4'	Brown, SM, Fine, Tr. of PL
4'	- 6'	Gray, SM, F-M, Tr. of PL
6'	- 7'	Gray, SM-SP, Med., Non PL
7'	- 11'	Lt.Brown, SP, Med. to C, Non-PL

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 19

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 23 October 1991
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REVISED 2/90

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-6

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Goldsboro
1003 N. Berkeley Blvd.
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers
ADDRESS P. O. Box 10848 (Street or Route No.)
Goldsboro NC 27532
City or Town State Zip Code

3. DATE DRILLED 9-13-91 USE OF WELL Monitoring

4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 11' FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0	4 Ft.	2"	Sch.40	PVC
		Ft.			
		Ft.			

11. GROUT:

	Depth From	To	Material	Method
	0	2.5 Ft	Neat Cement	
		Ft.		

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	4	11 Ft.	2 in.	.018 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
	3.5	11 Ft		Washed Sand
		Ft		

14. REMARKS: Hole Plug 2.5 - 3.5'

Depth From	To	DRILLING LOG Formation Description
0	- 2"	Br., SM, Grass, RM
2"	- 2'	Brown, SM, F-M, NP
2'	- 3'	Brown, SM, F-M, Tr. of PL
3'	- 4'	Dk.Gray, SM, F-M, Tr. of PL
4'	- 6.5'	Br., SM, F-M, Tr. of PL
6.5'	- 7.5'	Gray, SM-SP, Med., Non PL
7.5'	- 11'	Gray, SP, Med. to Coarse, Non PL

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 20

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 23 October 1991
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REVISED 2/90

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-7

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Goldsboro
1003 N. Berkeley Blvd.
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers

ADDRESS P. O. Box 10848 (Street or Route No.)

Goldsboro (City or Town) NC (State) 27532 (Zip Code)

3. DATE DRILLED 9-13-91 USE OF WELL Monitoring

4. TOTAL DEPTH _____ CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 4 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0	4 Ft.	2"	Sch.40	PVC
		Ft.			
		Ft.			

11. GROUT:

	Depth From	To	Material	Method
	0	2.5 Ft.	Neat Cement	
		Ft.		

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	4	11 Ft.	2 in.	.018 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
	3.5	11 Ft.		Washed Sand
		Ft.		

14. REMARKS: Hole Plug 2.5 - 3.5'

DRILLING LOG

Depth From	To	Formation Description
0	- 2"	Brown, SM, Grass, R/M
2"	- 3.5'	Brown, SM, F-M, Non PL
3.5'	- 4.5'	Med.Brown, SM, F-M, Slight Tr. of PL
4.5'	- 5'	Lt.Brown, SM, F-M, Tr. of PL
5'	- 7'	Gray, SM, F-M, Little PL
7'	- 9'	Gray, SM-SP, Med. to Coarse, Non PL
9'	- 11'	Lt.Brown, SP, Coarse, Non PL

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 21

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 23 October 1991
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REVISED 2/90

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-8

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Goldsboro
1003 N. Berkeley
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers
ADDRESS P. O. Box 10848 (Street or Route No.)
Goldsboro NC 27532
City or Town State Zip Code

3. DATE DRILLED 10-17-91 USE OF WELL Monitoring

4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 4 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0	4 Ft.	2"	Sch.40	PVC
		Ft.			
		Ft.			

11. GROUT:

	Depth From	To	Material	Method
	0	2.5 Ft.	Neat Cement	
		Ft.		

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	4	11 Ft.	2 in.	.018 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

	Depth From	To	Size	Material
	3.5	11 Ft.		Washed Sand
		Ft.		

14. REMARKS Hole Plug 2.5 - 3.5'

DRILLING LOG

Depth From	To	Formation Description
0	- 1"	Asphalt
1"	- 3.5'	Brown, SM, F-M, Non PL
3.5'	- 5'	Gray, SM, F-M, Trace of PL
5'	- 6.5'	Gray, SM-SP, F-M, Non PL
6.5'	- 8'	Gray, SP, Med., Non PL
8'	- 11'	Gray, SP, Coarse, Non PL

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 22

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Julius Bradley Jr. 23 October 1991
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REVISED 2/90

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-9

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Goldsboro

1003 N. Berkeley
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers

ADDRESS P. O. Box 10848 (Street or Route No.)

Goldsboro (City or Town) NC (State) 27532 (Zip Code)

3. DATE DRILLED 10-21-91 USE OF WELL Monitoring

4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 4 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To		Diameter	Wall Thickness or Weight/Ft.	Material
From	0	4	Ft.	2"	Sch.40	PVC
From			Ft.			
From			Ft.			

11. GROUT:

	Depth From	To		Material	Method
From	0	2.5	Ft.	Neat Cement	
From			Ft.		

12. SCREEN:

	Depth From	To		Diameter		Slot Size		Material
From	4	11	Ft.	2	in.	.018	in.	PVC
From			Ft.		in.		in.	
From			Ft.		in.		in.	

13. GRAVEL PACK:

	Depth From	To		Size	Material
From	3.5	11	Ft.		Washed Sand
From			Ft.		

14. REMARKS: Hole Plug 2.5 - 3.5'

Depth From	To	DRILLING LOG Formation Description
0	- 2"	ABC
2"	- 3.5'	Brown, SM, F-M, Non PL
3.5'	- 5'	Gray, SM, F-M, Trace of PL
5'	- 6.5'	Gray, SM-SP, F-M, Non PL
6.5'	- 8'	Gray, SP, Med., Non PL
8'	- 11'	Gray, SP, Coarse, Non PL

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 23

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT — DATE: 23 October 1991

GW-1 REVISED 2-90

Submit original to Division of Environmental Management and copy to well owner.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-10

DRILLING CONTRACTOR Contractors & Engineers Services, Inc.

DRILLER REGISTRATION NUMBER 863

STATE WELL CONSTRUCTION PERMIT NUMBER: 95-0327-WM-0171

1 WELL LOCATION: (Show sketch of the location below)

Nearest Town: Goldsboro

1003 N. Berkeley
(Road, Community, or Subdivision and Lot No.)

County: Wayne

2. OWNER Delmus Bridgers

ADDRESS P. O. Box 10848
(Street or Route No.)

Goldsboro NC 27532
City or Town State Zip Code

3. DATE DRILLED 10-21-91 USE OF WELL Monitoring

4. TOTAL DEPTH 11' CUTTINGS COLLECTED ☐ Yes ☒ No

5 DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 4 FT: ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 0 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount N/A

10. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	4		2"	Sch.40	PVC

11. GROUT:

	Depth From	To	Ft.	Material	Method
	0	2.5		Neat Cement	

12. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	4	11		2 in.	.018 in.	PVC
				in.	in.	
				in.	in.	

13. GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	3.5	11			Washed Sand

14. REMARKS Hole Plug 2.5 - 3.5'

DRILLING LOG

Depth From	To	Formation Description
0	- 1"	Asphalt
1"	- 3.5'	Brown, SM, F-M, Non PL
3.5'	- 5'	Gray, SM, F-M, Trace of PL
5'	- 6.5'	Gray, SM-SP, F-M, Non PL
6.5'	- 8'	Gray, SP, Med., Non PL
8'	- 11'	Gray, SP, Coarse, Non PL

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

SEE ENCLOSURE 1

ENCLOSURE 24

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

23 October 1991
DATE

GW-1 REVISED 2/90

Submit original to Division of Environmental Management and copy to well owner.

SOUTHERN TESTING AND RESEARCH LABORATORIES, INC.
3709 AIRPORT DRIVE - WILSON, NC 27893
PHONE (919) 237-4175

REPORT OF ANALYSIS

LAB SAMPLE NO.(s): 4959A1-4 — DATE OF REPORT: 91/11/04

RECEIVED FROM — DATE RECEIVED : 91/10/28

NAM : ROBERT JONES — ACCOUNT NO.: 14136
ORG : CONTRACTORS & ENGINEERS SERVICES
ADD : P.O. BOX 762 — TELEPHONE : 735-7355
CSZ : GOLDSBORO, NC 27533

SAMPLE(s) of: WATER for Total Petroleum Hydrocarbon (TPH) analysis.

MARKED A: CES 599 — B: CES 600

C: CES 601 — D: CES 602

-----SAMPLE/TEST NO.------->	A: 4959A1	B: 4959A2	C: 4959A3	D: 4959A4
ANALYSIS				
1. TPH w/ BTEX distinction (Water--EPA602 P&T/GC/PID/HECD) (Soil --SW846-5030/8020 P&T/GC/PID/HECD)				
Total TPH as Gasoline (ppm):	32.7	151.0	<0.05	<0.010
Benzene (ppm):	1.14	0.744	<0.0025	<0.0005
Chlorobenzene (ppm):	<0.0025	<0.0025	<0.0025	<0.0005
1,2-Dichlorobenzene (ppm):	<0.0025	<0.0025	<0.0025	<0.0005
1,3-Dichlorobenzene (ppm):	<0.0025	<0.0025	<0.0025	<0.0005
1,4-Dichlorobenzene (ppm):	<0.0025	<0.0025	<0.0025	<0.0005
Ethylbenzene (ppm):	0.350	0.335	<0.0025	<0.0005
Toluene (ppm):	0.602	4.91	<0.0025	<0.0005
+ Xylenes (ppm):	0.528	3.74	<0.0075	<0.0015
+ MTBE (ppm):	4.50	0.06	<0.0025	<0.0005
+ EDB (ppm):	<0.0025	<0.0025	<0.0025	<0.0005
2. TPH w/o BTEX distinction (Water--SW846-3510/8015 Micro Liq-Liq Ext/HRGC/FID) (Soil --SW846-3550/8015 Micro Sonic Ext/HRGC/FID)				
Low-to-Medium Boiling (ppm): (gasoline, kerosene, jet fuel, etc.)				
Higher Boiling (ppm): (diesel, fuel oil, *motor oil, etc.)				

*motor oil det. limit = : ppm

COMMENTS:

LAB USE ONLY----------
ANALYSTs: DM
PICKUP: N RUSH: N
TIME: MILES:
T: D:
I:

Reviewed and Approved

Name: Thomas A. Dean, Jr., Ph.D.
Title: Manager, Environmental Department

ENCLOSURE 25

v11/90

SOUTHERN TESTING AND RESEARCH LABORATORIES, INC.
3709 AIRPORT DRIVE - WILSON, NC 27893
PHONE (919) 237-4175

REPORT OF ANALYSIS

LAB SAMPLE NO.(s): 4959A5-7 DATE OF REPORT: 91/11/04

RECEIVED FROM DATE RECEIVED : 91/10/28

NAM : ROBERT JONES ACCOUNT NO.: 14136
IRG : CONTRACTORS & ENGINEERS SERVICES
ADD : P.O. BOX 762 TELEPHONE : 735-7355
CSZ : GOLDSBORO, NC 27533

SAMPLE(s) of: WATER for Total Petroleum Hydrocarbon (TPH) analysis.

MARKED A: CES 603 B: CES 604

C: CES 605 D:

-----SAMPLE/TEST NO.-------->	A: 4959A5	B: 4959A6	C: 4959A7	D:
ANALYSIS				
1. TPH w/ BTEX distinction (Water--EPA602 P&T/GC/PID/HECD) (Soil --SW846-5030/8020 P&T/GC/PID/HECD)				
Total TPH as Gasoline (ppm):	<0.010	51.0	<0.010	
Benzene (ppm):	<0.0005	0.082	<0.0005	
Chlorobenzene (ppm):	<0.0005	<0.0025	<0.0005	
1,2-Dichlorobenzene (ppm):	<0.0005	<0.0025	<0.0005	
1,3-Dichlorobenzene (ppm):	<0.0005	<0.0025	<0.0005	
1,4-Dichlorobenzene (ppm):	<0.0005	<0.0025	<0.0005	
Ethylbenzene (ppm):	<0.0005	0.340	<0.0005	
Toluene (ppm):	<0.0005	0.057	<0.0005	
+ Xylenes (ppm):	<0.0015	0.376	<0.0015	
+ MTBE (ppm):	<0.0005	<0.0025	<0.0005	
+ EDB (ppm):	<0.0005	<0.0025	<0.0005	
2. TPH w/o BTEX distinction (Water--SW846-3510/8015 Micro Liq-Liq Ext/HRGC/FID) (Soil --SW846-3550/8015 Micro Sonic Ext/HRGC/FID)				
Low-to-Medium Boiling (ppm): (gasoline, kerosene, jet fuel, etc.)				
Higher Boiling (ppm): (diesel, fuel oil, *motor oil, etc.)				

*motor oil det. limit = : ppm

COMMENTS:

LAB USE ONLY----------
ANALYSTs: DM
PICKUP: N RUSH: N
TIME: MILES:
T: D:
I:

Reviewed and Approved

Name: Thomas A. Dean, Jr., Ph.D.
Title: Manager, Environmental Department

ENCLOSURE 26

v11/90

STING and RESEARCH LABO..ATORIES, Inc.
3703 Airport Drive, Wilson, NC 27893
Phone: 919-237-4175 • FAX: 919-237-9341

SAMPLE SUBMISSION FORM

4959A1-7

Robert Jones
Contractors and Eng. Serv. Inc.
P.O. Box 762
Goldsboro, N. C. 27533

Phone No. : (919) 735-7355

Invoice address: (if different from above)

Date Submitted : 10-28-91

Purchase order No.:

Priority — Surcharge
- o Normal (7 - 10 work days) — none
- o Rush — 50%
- o Emergency (24 hours) — 100%

Southern Testing Contact:

Total No. samples submitted: (Group samples together that require same analyses)

SAMPLE DESCRIPTION	SAMPLE MARKS	ANALYSES REQUESTED (Please indicate Catalog Numbers)	EXPECTED LEVELS
H_2O	CES- 599 1	TPH with BTX MTBE EDB EO-60 EO-62 EO-64	
"	CES- 600 2	"	
"	CES- 601 3	"	
"	CES- 602 4	"	
"	CES- 603 5	"	
"	CES- 604 6	"	
"	CES- 605 7	"	
H_2O	~~CES- 606~~	~~EO-60 EO-64~~	

Completed 11/4/91 Dana Morrissett

These samples are submitted subject to the Terms and Conditions set forth in the current Southern Testing Fee Schedule

SPECIAL INSTRUCTIONS:

Submitted by: (Signature)

Received at STARL by: Mary English (Signature)

Rev. 1-91

ENCLOSURE 27

SOUTHERN TES[illegible]NG AND RESEARCH LABORATORI[illegible]S. INC.
3709 AI[illegible]/ORT DRIVE - WILSON. NC 2[illegible]3
PHONE (919) 237-4175 FAX (919) 237-9341

PURGEABLE AROMATICS: 602

LAB SAMPLE NO.(s): 4865A1-3

DATE OF REPORT: 91/10/24

RECEIVED FROM

DATE RECEIVED : 91/10/23

NAM : ROBERT JONES
ORG : CONTRACTORS & ENGINEERS SERV. INC.
ADD : P.O. BOX 762
CSZ : GOLDSBORO. NC 27530

ACCOUNT NO.: 14136

TELEPHONE : 919-735-7355

* AMENDED REPORT 10-29-91

SAMPLE(s) of: WATER

MARKED A: CES-594 B: CES-595

C: CES-596 D:

COMPOUND	UNITS: (ppm)	A: 4865A1	B: 4865A2	C: 4865A3	D:
METHOD 602 PURGEABLES					
Benzene		<0.0005	<0.0005	<0.0005	
Chlorobenzene		<0.0005	<0.0005	<0.0005	
1,2-Dichlorobenzene		<0.0005	<0.0005	<0.0005	
1,3-Dichlorobenzene		<0.0005	<0.0005	<0.0005	
1,4-Dichlorobenzene		<0.0005	<0.0005	<0.0005	
Ethylbenzene		<0.0005	<0.0005	<0.0005	
Toluene		<0.0005	<0.0005	<0.0005	
OTHER PURGEABLE ORGANICS-----					
XYLENES		<0.0015	<0.0015	<0.0015	
MTBE *		<0.0005	<0.0005	<0.0005	
EDB *		<0.0005	<0.0005	<0.0005	

COMMENTS:

LAB USE ONLY----------
ANALYSTs: DM
PICKUP: N RUSH: N
TIME: MILES:
T: D:
I:

Reviewed and Approved
Thomas A. Dean, Jr., Ph.D.
Manager, Environmental Department

ENCLOSURE 28

ERN TESTING and RESEARCH LABORATORIES, Inc.
3709 Airport Drive, Wilson, NC 27893
Phone: 919-237-4175 • FAX: 919-237-9341

SAMPLE SUBMISSION FORM

14136 4865A1-3

Client Contact (Send results to): Robert Jones

Company: Contractors & Engineers Serv. Inc.

Address: P.O. Box 762
Goldsboro, N.C. 27530

Phone No.: (919) 735-7355

Invoice address: (if different from above)

Date Submitted: 10-23-91

Purchase order No.:

Priority

	Surcharge	
• Normal (7 - 10 work days)	none	X
• Rush	50%	
• Emergency (24 hours)	100%	

Southern Testing Contact:

Total No. samples submitted: (Group samples together that require same analyses)

SAMPLE DESCRIPTION	SAMPLE MARKS	ANALYSES REQUESTED (Please indicate Catalog Numbers)	EXPECTED LEVELS
H_2O	CES- 5941 1	EC-60	
H_2O	CES- 5915 2	EC-60	
H_2O	CES- 5916 3	EC-60	
	CES-		
	CES-		
Completed	CES- 10/24/91	Done Morrissey	
	CES-		
	CES-		

These samples are submitted subject to the Terms and Conditions set forth in the current Southern Testing Fee Schedule.

SPECIAL INSTRUCTIONS:

Submitted by: (Signature)

Received at STARL by: Margo English (Signature)

Rev. 1/91

ENCLOSURE 29

N.C. DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT

DEM

GROUNDWATER FIELD/LAB FORM

COUNTY: WAYNE

QUAD NO. P-31i SERIAL NO.

LAT. 352250 LONG. 775600

4

LAB NUMBER 8G180

DATE RECEIVED 2-22-88 Time 8:30

Rec'd by: [signature] From: Bus, (Courier)

Other

DATA ENTRY BY: [initials] CK: [initials]

DATE REPORTED: 3/16/88

Report to: ARO, FRO, MRO, RRO, (WaRO), WIRO, WSRO, Kinston FO, Other:

SAMPLE PRIORITY

☒ ROUTINE ☐ EMERGENCY

HMW

Shipped by: Bus, (Courier), Other

COLLECTOR(S): R. POWERS DATE 021888 TIME 1505 PURPOSE: BASELINE, COMPLAINT, COMPLIANCE, (LUST), OTHER (circle one)

FIELD ANALYSES

pH 400 ______ Spec. Cond. 94 ______ at 25°C

Temp. 10 ______ °C Odor ______

Appearance ______ Taste ______

Field Analysis By: ______

Owner: DELMUS BRIDGES - BERKLEY JUNCTION SHP. CNTR. OAKTON APTS

Location of site: IN FRONT OF E+M AUTOMOTIVE INCIDENT

Description of sampling point: BOREHOLE # 2

Sampling Method: BAILER (pump, bailer, etc.)

Sample Interval: 6' BLS

Remarks: (pumping time, air temp, etc.)

LABORATORY ANALYSES

	BOD5 310	mg/l
	COD High 340	mg/l
	COD Low 335	mg/l
	Coliform:MF Fecal 31616	/100ml
	Coliform:MF Total 31504	/100ml
	TOC 680	mg/l
	Turbidity 76	NTU
	pH 403	units
	Alkalinity to pH 4.5 410	mg/l
	Alkalinity to pH 8.3 415	mg/l
	Carbonate 445	mg/l
	Bicarbonate 440	mg/l
	Arsenic:Total 1002	ug/l
	Carbon dioxide 405	mg/l
	Chloride 940	mg/l
	Chromium:Hex 1032	ug/l
	Color:True 80	Pt-Co
	Cyanide 720	mg/l

	Diss. Solids 70300	mg/l
	Fluoride 951	mg/l
	Hardness:Total 900	mg/l
	Hardness (non-carb) 902	mg/l
	Phenols 32730	ug/l
	Specific Cond. 95	uMhos/cm²
	Sulfate 945	mg/l
	Sulfide 745	mg/l
	NH3 as N 610	mg/l
	TKN as N 625	mg/l
	NO2 + NO3 as N 630	mg/l
	P:Total as P 665	mg/l

	Ag - Silver 1077	ug/l
	Al - Aluminum 1105	ug/l
	Ba - Barium 1007	ug/l
	Ca - Calcium 916	mg/l
	Cd - Cadmium 1027	ug/l
	Chromium:Total 1034	ug/l
	Cu - Copper 1042	ug/l
	Fe - Iron 1045	ug/l
	Hg - Mercury 71900	ug/l
	K - Potassium 937	mg/l
	Mg - Magnesium 927	mg/l
	Mn - Manganese 1055	ug/l
	Na - Sodium 929	mg/l
	Ni - Nickel 1067	ug/l
	Pb - Lead 1051	ug/l
	Se - Selenium 1147	ug/l
	Zn - Zinc 1092	ug/l

	Organochlorine Pesticides
	Organophosphorus Pesticides
	Acid Herbicides
	Base / Neutral Extractable Organics
	Acid Extractable Organics
X	Purgeable Organics (VOA bottle)
X	1,2 - Dibromoethane (EDB)
X	MTBE
X	BENZENE
X	TOLUENE
X	XYLENE

RECEIVED WASHINGTON OFFICE MAR 21 1988 DEM

Lab Comments: No Volatile Organics detected by GC/Hall/PID

ENCLOSURE 30

GW-54 Revised 7/85 For Dissolved Analysis - submit filtered sample and write "DIS" in block White copy - Headquarters Pink copy Yellow copy - Lab

ANALYSIS OF REMEDIAL ALTERNATIVE
(All Cost in Thousands of Dollars)

Remedial Alternatives	Alternative No. 1
Groundwater Treatment System (GWTS)	$ 30 - 45
In Situ Soil Treatment System	10 - 15
Electrical Cost (4-year estimate)	10 - 12
Laboratory Cost (water & soil analysis)	20 - 30
	$ 70 - 102

ENCLOSURE 31

ANALYSIS OF REMEDIAL ALTERNATIVE
(All Cost in Thousands of Dollars)

Remedial Alternatives	Alternative No. 2
Groundwater Treatment System (GWTS)	$ 30 - 45
In Situ Soil Treatment System	10 - 15
Electrical Cost (3-year estimate)	8 - 9
Laboratory Cost (water & soil analysis)	15 - 23
	$ 63 - 92

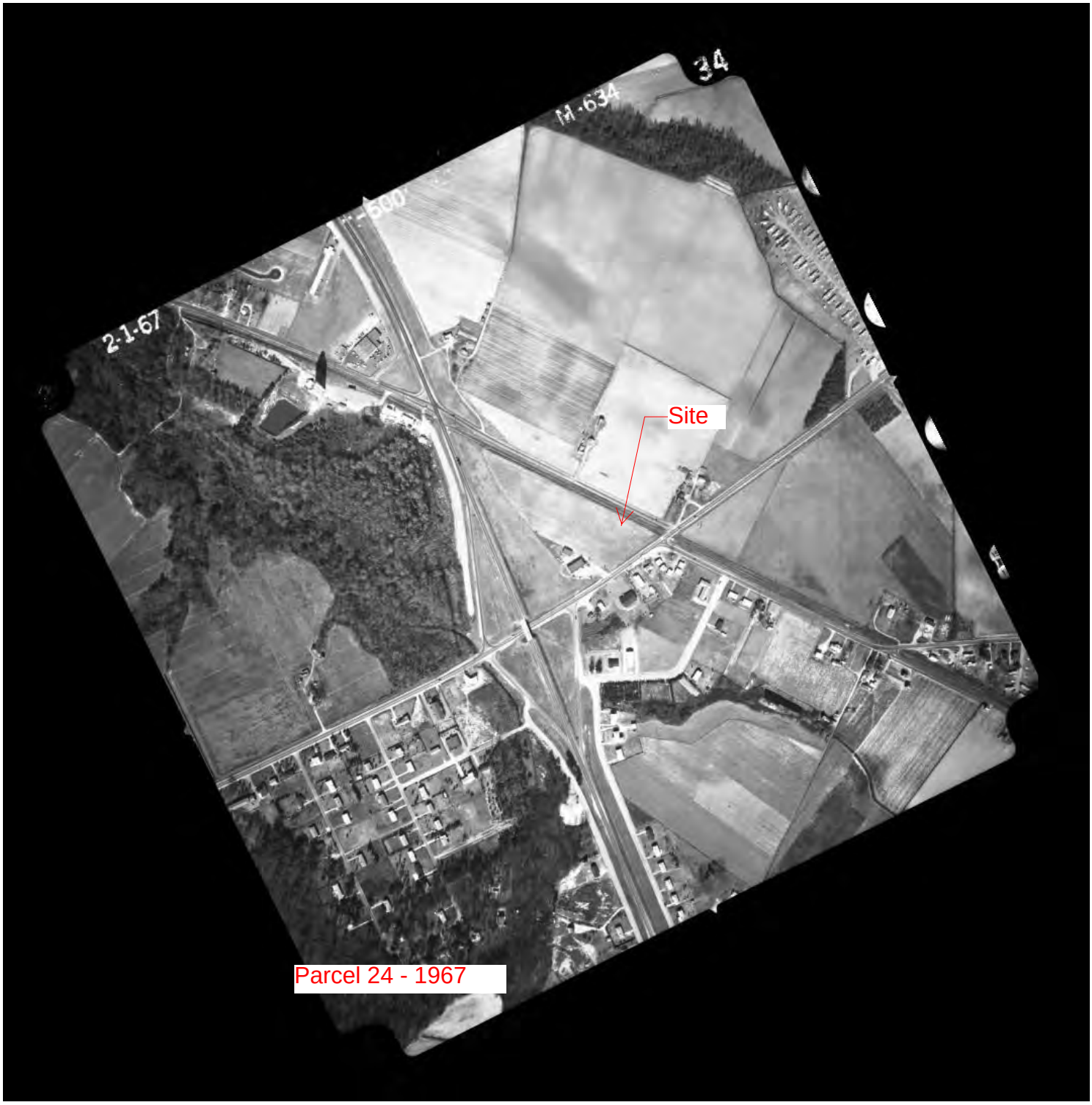
ENCLOSURE 32

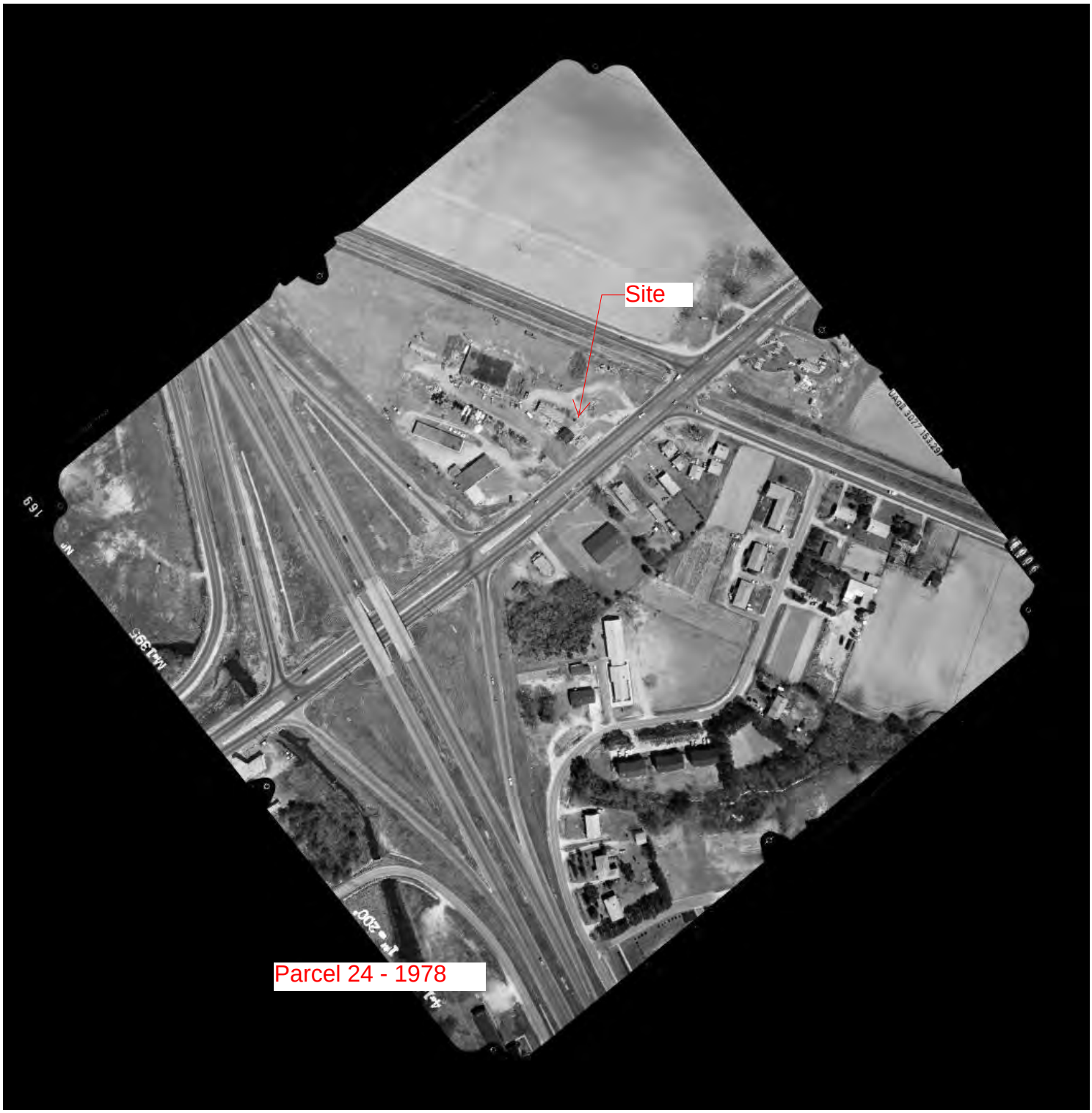
APPENDIX B

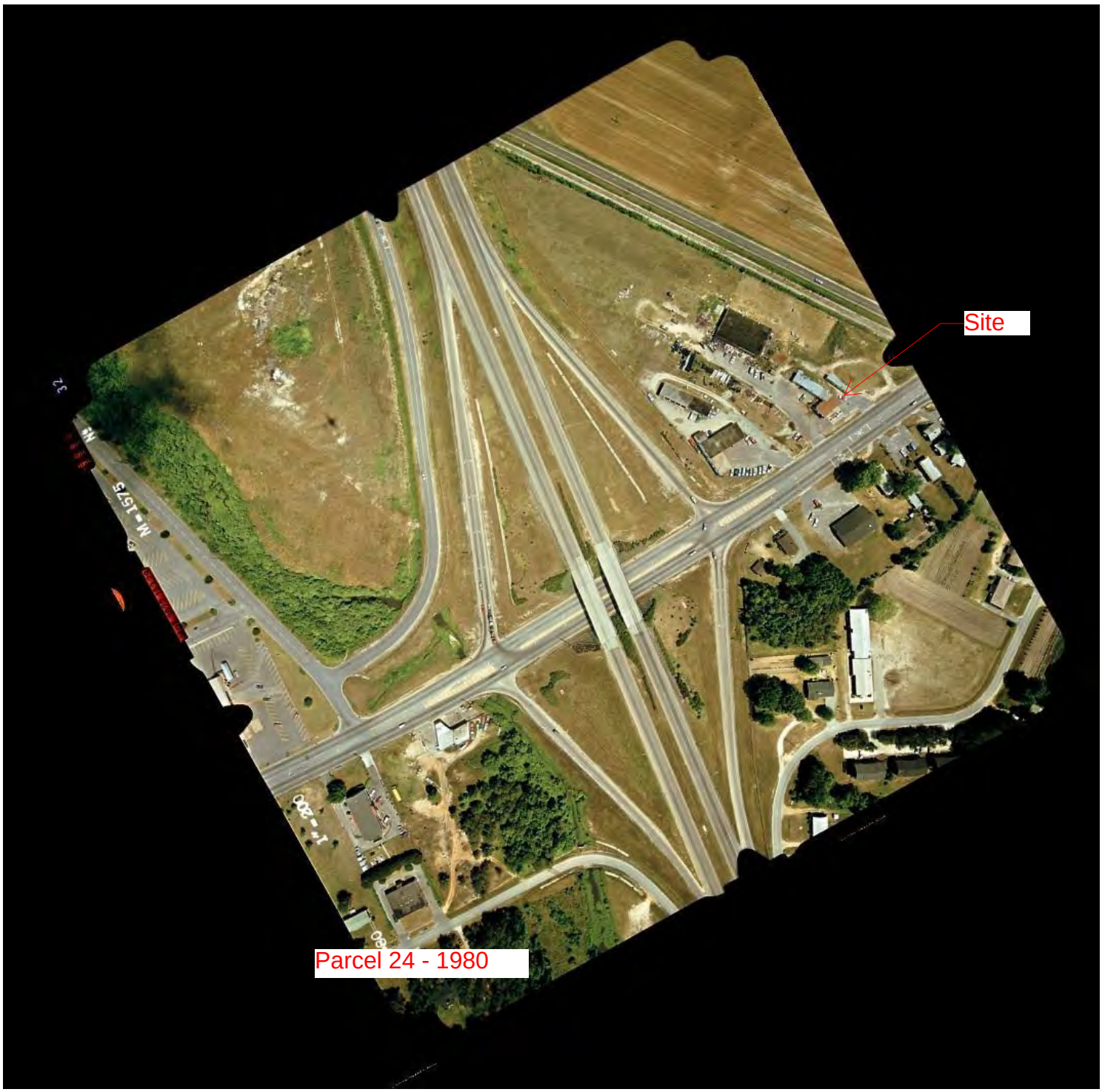
HISTORICAL AERIALS & SITE PHOTO LOG

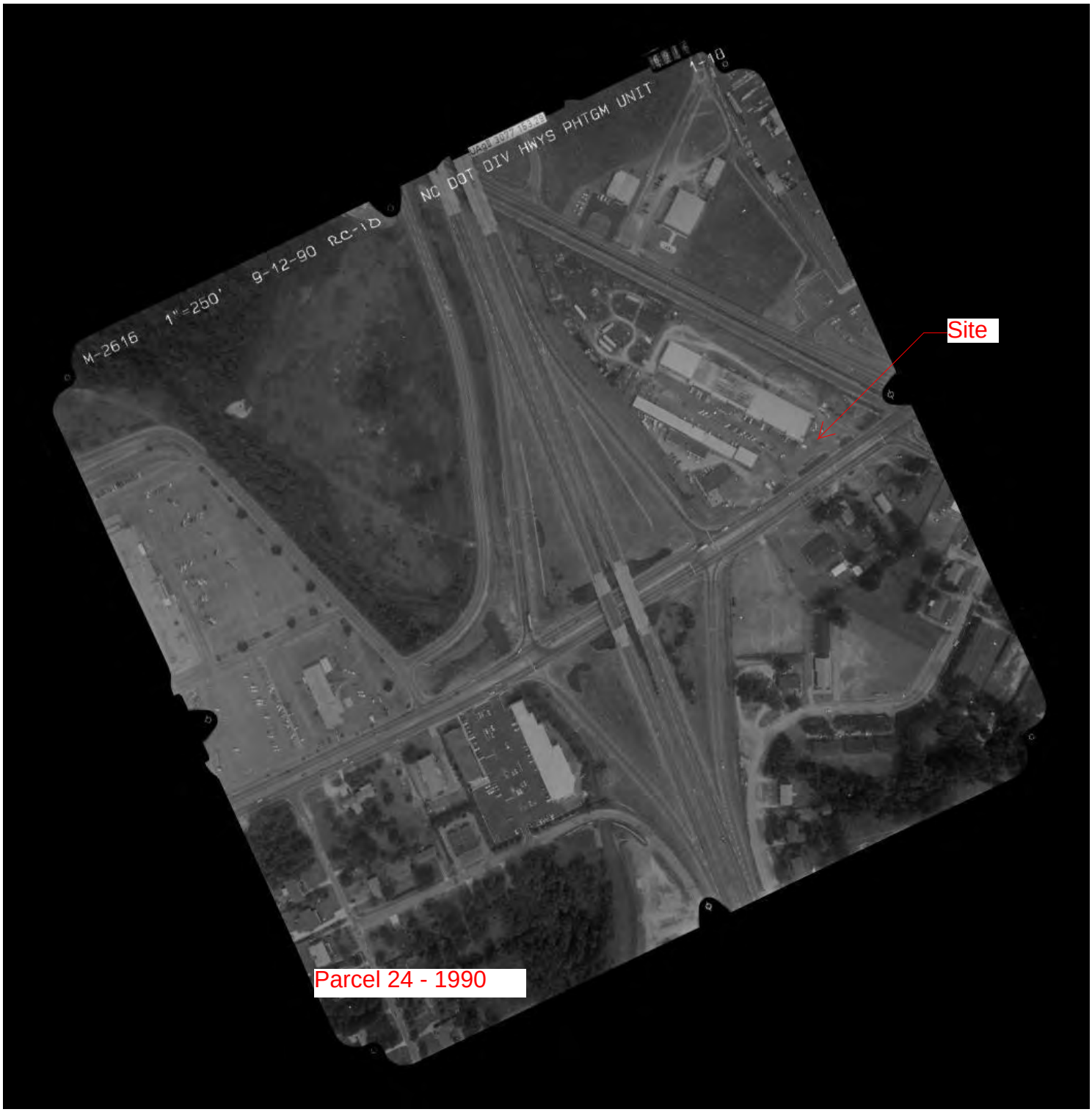
Mid Atlantic
Engineering & Environmental Solutions

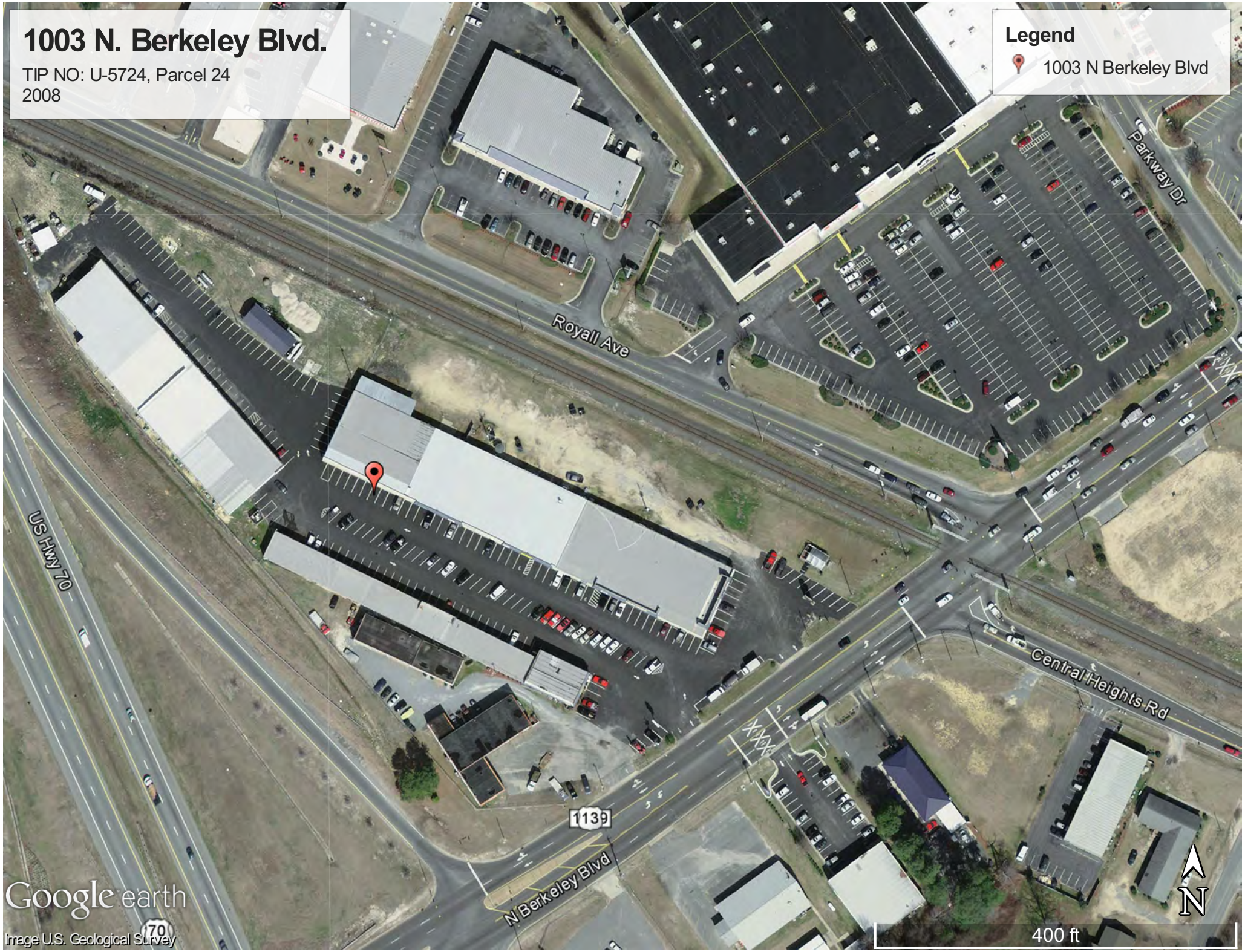

Site
Parcel 24 - 1959
112


34
M-634
2-1-67
Site
Parcel 24 - 1967


Site
Parcel 24 - 1978


Site
Parcel 24 - 1980


M-2616 1"=250' 9-12-90 RC-1D
NC DOT DIV HWYS PHTGM UNIT
1-10
Site
Parcel 24 - 1990


1003 N. Berkeley Blvd.
TIP NO: U-5724, Parcel 24
2008
Legend
1003 N Berkeley Blvd
Royall Ave
Parkway Dr
US Hwy 70
Central Heights Rd
1139
N Berkeley Blvd
70
Google earth
Image U.S. Geological Survey
N
400 ft

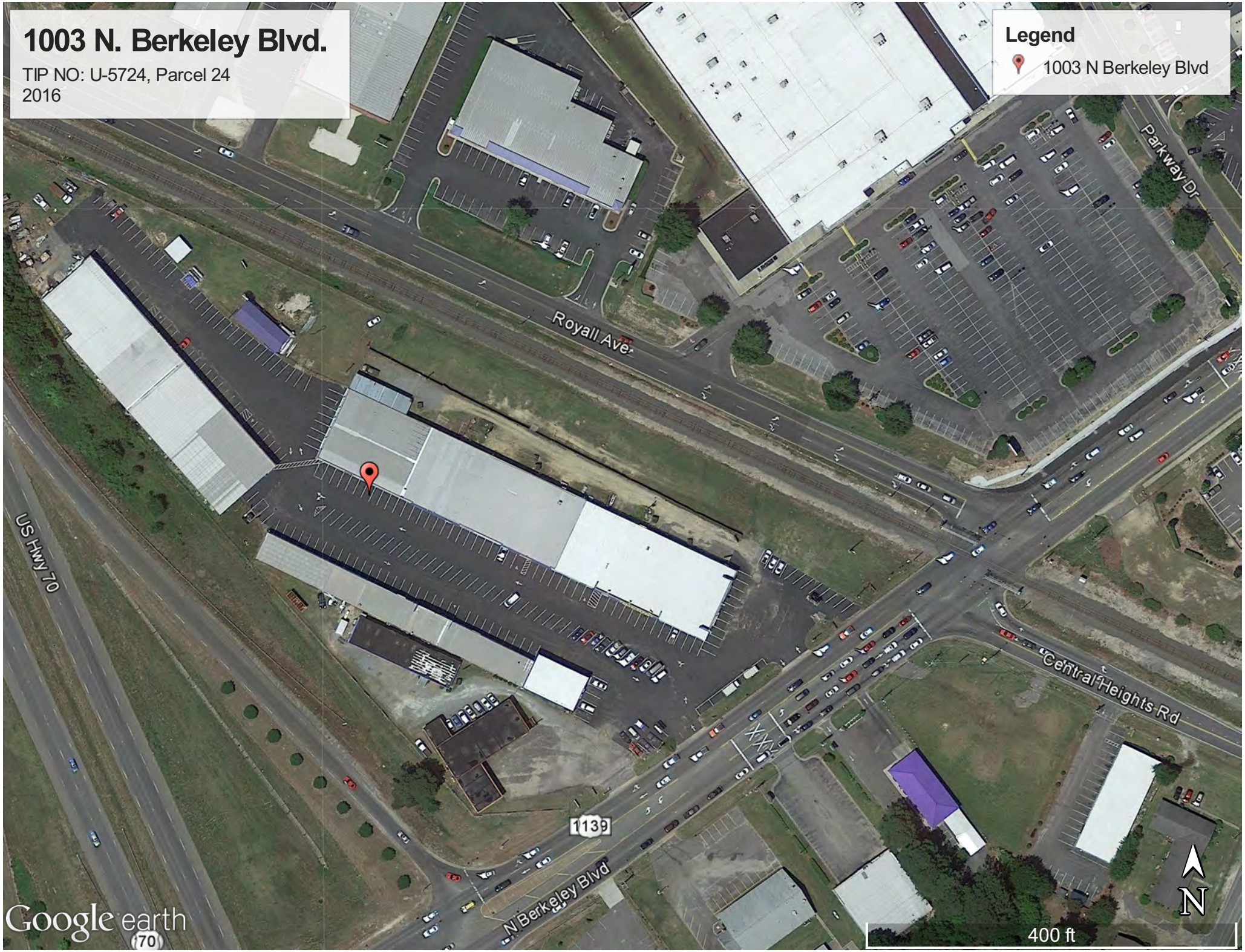

1003 N. Berkeley Blvd.
TIP NO: U-5724, Parcel 24
2016
Legend
1003 N Berkeley Blvd
Royall Ave
Parkway Dr
US Hwy 70
Central Heights Rd
1139
N Berkeley Blvd
Google earth
70
N
400 ft

Photo 1 – A general view of site, looking west from Berkeley Boulevard.
(photo courtesy of Google Earth)

Photo 2 – Apparent former pump island area, looking southwest.

Photo 3 – A view of well MW-2 (not abandoned), looking northwest.

Photo 4 – A view of well MW-3 (not abandoned), adjacent to Ray's Auto, looking northwest.

Photo 5 – A view of well MW-11A (middle, not abandoned) and two unknown wells (to the right and left of MW-11A), looking north.

APPENDIX C

GEOPHYSICAL REPORT

Mid Atlantic
Engineering & Environmental Solutions

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2018-230)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 24
NCDOT PROJECT U-5724 (54016.1.2)

1003 NORTH BERKELEY BOULEVARD, GOLDSBORO, NC

SEPTEMBER 6, 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 24 – 1003 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 24, located at 1003 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 eighteen EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. Four EM anomalies were associated with suspected reinforced concrete, a well, or vehicle interference and were further investigated with GPR. GPR verified the presence of metal reinforcement beneath the asphalt at the location of an apparent former pump island (based on surface expressions such as cuts in the existing asphalt). GPR identified buried utilities extending away from the apparent pump island (possible former power or product lines). No evidence of larger structures was observed. The remaining GPR transects did not record any evidence of significant buried structures. Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 24.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Mid-Atlantic Associates, Inc. at Parcel 24, located at 1003 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 an active service garage in a shopping plaza surrounded by grass, asphalt, and gravel surfaces. 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	Well	☑
2	Vehicles	☑
3	Sign	
4	Manhole	
5	Reinforced Concrete	☑
6	Vehicles	☑
7	Sign	
8	Drop Inlet	
9	Sign	
10	Suspected Utility	
11	Manhole	
12	Utilities/Well	
13	Guy Wires	
14	Sign	
15	Utility/Sign	
16	Utility	
17	Water Meter	
18	Trailer/Signs	

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including wells, vehicles, signs, a drop inlet, utilities, manholes, guy wires, a water meter, and a trailer. Anomaly 1 was associated with a well and was further investigated with GPR. Anomaly 2 and Anomaly 6 were associated with vehicles on the site and were further investigated with GPR. Anomaly 5 was associated with reinforced concrete and was further investigated with GPR to confirm the presence of metal reinforcement and that no larger structures are present beneath the reinforcement.

Discussion of GPR Results

Figure 3 presents the locations of the GPR transects performed at the property, as well as the transect images. A total of five GPR transects were recorded. Transects 1-3 were

collected across EM Anomalies 5-6. These transects showed evidence of metal reinforcement and did not show any signs of larger structures beneath the reinforcement. This area containing metal reinforcement exhibited a surface expression that appeared to be associated with a former pump island. GPR identified buried utilities extending away from the apparent former pump island (possible former power or product lines). These lines were traced outside of the area of interest, but did not lead to any apparent USTs.

Transect 4 was collected across EM Anomaly 1. This transect showed a small hyperbolic reflector associated with a well and did not show any signs of larger structures.

Transect 5 was collected across EM Anomaly 2. This transect showed no evidence of significant buried structures.

Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 24. **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 24 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.
- The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface.
- Four EM anomalies were associated with suspected reinforced concrete, a well, or vehicle interference and were further investigated with GPR.
- GPR verified the presence of metal reinforcement beneath the asphalt at the location of an apparent former pump island (based on surface expressions such as cuts in the existing asphalt). GPR identified buried utilities extending away from the apparent pump island (possible former power or product lines). No evidence of

larger structures was observed.

- The remaining GPR transects did not record any evidence of significant buried structures.
- Collectively, the geophysical data did not record any evidence of metallic USTs at Parcel 24.

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)

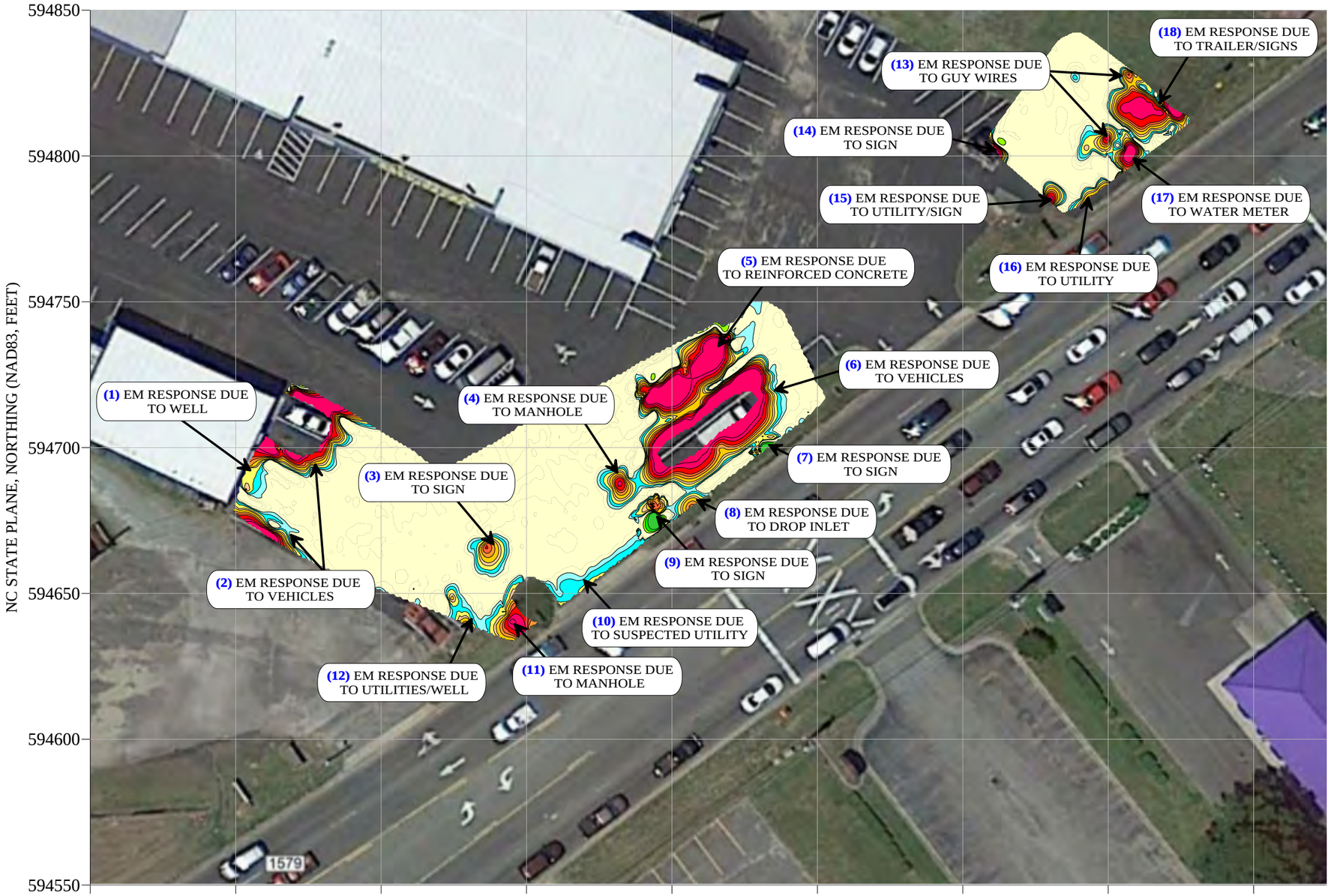
View of Survey Area
(Facing Approximately Southwest)

N

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

PROJECT	PARCEL 24 GOLDSBORO, NORTH CAROLINA NCDOT PROJECT U-5724
TITLE	PARCEL 24 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS
DATE	8/22/2018
PYRAMID PROJECT #:	2018-230
CLIENT	MID-ATLANTIC ASSOCIATES, INC.
	FIGURE 1

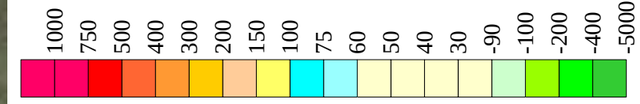
EM61 METAL DETECTION RESULTS



NO EVIDENCE OF UNKNOWN METALLIC USTs OBSERVED.

The southwestern portion of 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 northeastern portion of the contour plot shows the bottom coil data results of the EM61 instrument in millivolts (mV), which provide a stronger metallic response of the instrument and do not incorporate the top coil. Differential data (difference between top and bottom coils) were not used for the NE area due to interference. 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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503 INDUSTRIAL AVENUE
GREENSBORO, NC 27460
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

PROJECT: PARCEL 24
GOLDSBORO, NORTH CAROLINA
NCDOT PROJECT U-5724

TITLE: PARCEL 24 - EM61 METAL DETECTION CONTOUR MAP

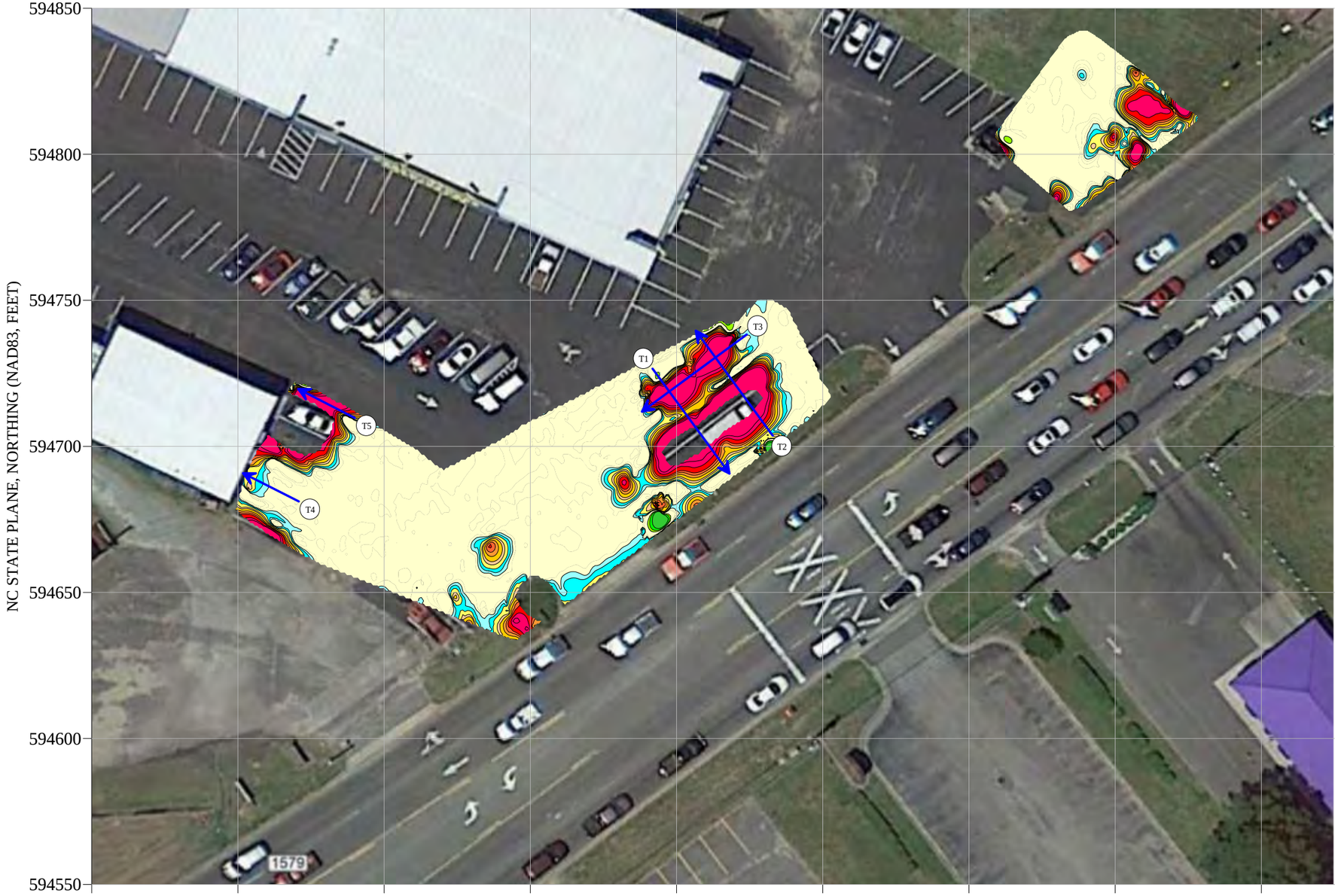
DATE: 8/22/2018

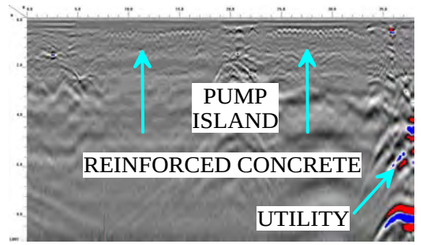
PYRAMID PROJECT #: 2018-230

CLIENT: MID-ATLANTIC ASSOCIATES, INC.

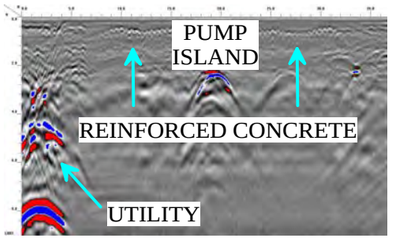
FIGURE 2

LOCATIONS OF GPR TRANSECTS

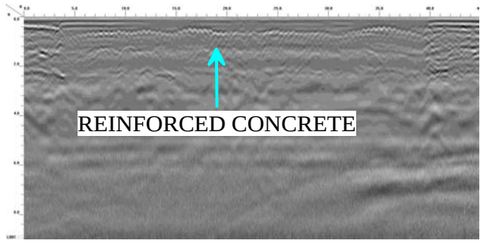




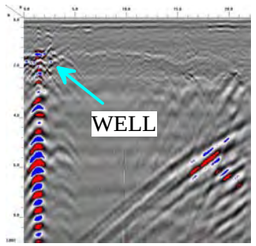
GPR TRANSECT 1 (T1)



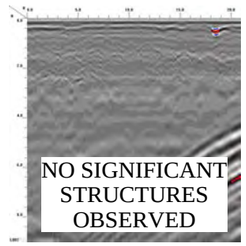
GPR TRANSECT 2 (T2)



GPR TRANSECT 3 (T3)



GPR TRANSECT 4 (T4)



GPR TRANSECT 5 (T5)

*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 24 GOLDSBORO, NORTH CAROLINA NCDOT PROJECT U-5724	TITLE: PARCEL 24 - GPR TRANSECT LOCATIONS AND IMAGES	DATE: 8/23/2018	CLIENT: MID-ATLANTIC ASSOCIATES, INC.
		PYRAMID PROJECT #: 2018-230	**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

0 40 80

FEET

N

TITLE

OVERLAY OF GEOPHYSICAL SURVEY BOUNDARIES ON NCDOT ENGINEERING PLANS

PROJECT

PARCEL 24
GOLDSBORO, NORTH CAROLINA
NCDOT PROJECT U-5724

PYRAMID GEOPHYSICS
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27406
336.335.3174 (p) 336.691.0648 (f)
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DATE: 09-07-2018	REVISION NO. 0
PYRAMID PROJECT NO. 2018-230	FIGURE NO. 4

APPENDIX D

BORING LOGS

Mid Atlantic
Engineering & Environmental Solutions

Mid Atlantic Engineering & Environmental Solutions
409 Rogers View Ct.
Raleigh NC 27610
Ph: (919) 250-9918

LOG OF BORING: SB-24-1

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
				ASPHALT/ GRAVEL		
	NONE	0.40		LIGHT BROWN VERY FINE SAND AND CLAY		
2	NONE	2.30	YES			2
	NONE	1.80		TAN CLAY FINE TO MEDIUM SAND		
4						4
	NONE	3.40		TAN SLIGHTLY SILTY FINE TO MEDIUM SAND 5'-10' MACRACORE ONLY 2.5FT OF RECOVERY		
6						6
8						8
10				BORING TERMINATED AT 10 FT-BGS WATER IN BOREHOLE AT 3.6 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-24-2

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
				ASPHALT/ GRAVEL		
	NONE	0.60		LIGHT BROWN VERY FINE TO MEDIUM SAND AND CLAY		
2	NONE	1.20	YES			2
4	NONE	0.90		TAN SLIGHTLY CLAYEY VERY FINE TO COARSE SAND		4
6	STRONG	1,390		TAN SLIGHTLY SILTY FINE TO COARSE SAND 5'-10' MACROCORE ONLY 1.5 FT OF RECOVERY		6
8						8
10				BORING TERMINATED AT 10 FT-BGS WATER LEVEL IN BOREHOLE 3.5 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-24-3

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
				ASPHALT/ GRAVEL		
	NONE	8.60		LIGHT BROWN VERY FINE SAND		
2	NONE	10.20	YES	LIGHT BROWN VERY FINE TO MEDIUM SAND AND CLAY		2
4	NONE	16.40		LIGHT GREY (PETROLEUM STAINED) VERY FINE TO COARSE SAND AND CLAY		4
6						6
8	VERY STRONG	5000+		TAN SLIGHTLY SILTY FINE TO COARSE SAND 5'-10' MACROCORE ONLY 1.5FT OF RECOVERY		8
10				BORING TERMINATED AT 10 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-24-4/TMW-24-4

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):	3.9
Date Completed:	9/24/2018	Monitoring Equipment:	RKI GX6000 PID	MAA Field Staff:	GARY FISCHER

FT-BGS	SAMPLING INTERVAL, ODOR	PID (PPM)	SAMPLE TO LABORATORY	SOIL DESCRIPTION (COLOR, TEXTURE, MOISTURE, ETC.)	CONSTRUCTION DETAILS	FT-BGS
				ASPHALT/GRAVEL		
	NONE	3.40		LIGHT BROWN VERY FINE SAND	1-IN PVC TEMP WELL	
2	MODERATE	158.90	YES	LIGHT BROWN VERY FINE TO MEDIUM SAND AND CLAY		2
4	VERY STRONG	5,000+		TAN FINE TO COARSE SAND AND CLAY		4
6		1695			SCREEN 2 FT-12 F	6
8	VERY STRONG			TAN FINE TO COARSE SAND 5-10' MACRACORE ONLY 2.5FT RECOVERY	WATER LEVEL 3.9 FT	8
10				BORING TERMINATED AT 10 FT-BGS WATER IN BOREHOLE AT 3.8FT-BGS AFTER ALL BORINGS WERE COMPLETED FOR PARCEL 24 THE DRILLERS CAME BACK TO SB-24-4 AND MACROCORED TO 12 FT-BGS AND SET TMW		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-24-5

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:	9/24/2018	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, ODOR	PID (PPM)	SAMPLE TO LABORATORY	SOIL DESCRIPTION (COLOR, TEXTURE, MOISTURE, ETC.)	CONSTRUCTION DETAILS	FT-BGS
				ASPHALT/GRAVEL		
	NONE	9.90		LIGHT BROWN CLAYEY FINE TO COARSE SAND		
2	MODERATE	115.60	YES			2
4	MODERATE	142.50		TAN FINE TO COARSE SAND AND CLAY		4
6	STRONG	1230		TAN SLIGHTLY FINE TO COARSE SAND 5-10' MACRACORE ONLY 1FT RECOVERY		6
8						8
10				BORING TERMINATED AT 10 FT-BGS WATER IN BOREHOLE AT 4.2 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-24-6

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, ODOR	PID (PPM)	SAMPLE TO LABORATORY	SOIL DESCRIPTION (COLOR, TEXTURE, MOISTURE, ETC.)	CONSTRUCTION DETAILS	FT-BGS
				ASPHALT/GRAVEL		
	NONE	10.90		LIGHT BROWN VERY FINE SAND		
2	MILD	20.60	YES	LIGHT BROWN CLAYEY VERY FINE TO MEDIUM SAND		2
4	MILD	33.10				4
				TAN CLAYEY FINE TO COARSE SAND		
6	VERY STRONG	2980		TAN SILTY FINE TO COARSE SAND 5-10' MACRACORE ONLY 1.5 FT RECOVERY		6
8						8
10				BORING TERMINATED AT 10 FT-BGS WATER IN BOREHOLE AT 4.0 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-24-7

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, ODOR	PID (PPM)	SAMPLE TO LABORATORY	SOIL DESCRIPTION (COLOR, TEXTURE, MOISTURE, ETC.)	CONSTRUCTION DETAILS	FT-BGS
				GRASS/TOPSOIL		
	NONE	0.00				
2				MEDIUM BROWN SLIGHTLY CLAYEY FINE SAND		2
	NONE	0.00	YES			
4	NONE	0.20		TAN VERY FINE SAND AND CLAY		4
6						6
	NONE	0.6		TAN SLIGHTLY CLAYEY FINE TO COARSE SAND 5-10' MACRACORE ONLY 2FT RECOVERY		
8						8
10				BORING TERMINATED AT 10 FT-BGS WATER IN BOREHOLE AT 4.6 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

APPENDIX E

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 F

SOIL LABORATORY ANALYTICAL REPORTS AND LAB 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-24-1 (2'-3')	17.8	<0.45	0.86	13.8	14.7	10.3	0.55	<0.018	11.2	73	15.8	Deg Fuel 89.1%,(FCM),(BO)
s	SB-24-2 (2'-3')	19.8	<0.5	1.4	29	30.4	23.9	1.3	0.025	7.9	77.5	14.6	Deg Fuel 77%,(FCM),(BO)
s	SB-24-3 (2'-3')	9.3	<0.23	0.94	12.2	13.1	9.4	0.49	<0.009	11.3	74.4	14.4	No Match found
s	SB-24-4 (2'-3')	18.3	<0.46	10.6	17.7	28.3	10.4	0.47	<0.018	77.2	19.2	3.6	V.Deg.Diesel 84.5%,(FCM)
s	SB-24-5 (2'-3')	10.3	3.7	24.1	2.3	26.4	1.3	<0.08	<0.01	95.3	3.7	1	Deg.PHC 71.9%,(FCM)
s	SB-24-6 (2'-3')	56.9	<1.4	5.4	96.7	102.1	46.6	5.3	0.19	12.1	72.6	15.2	Road Tar 92.3%,(FCM),(BO)
s	SB-24-7 (3'-4')	19.4	<0.49	1.7	0.84	2.54	0.51	<0.16	<0.019	80.4	12.6	7	V.Deg.PHC 88.4%,(FCM),(BO),(P)
s													
s													
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

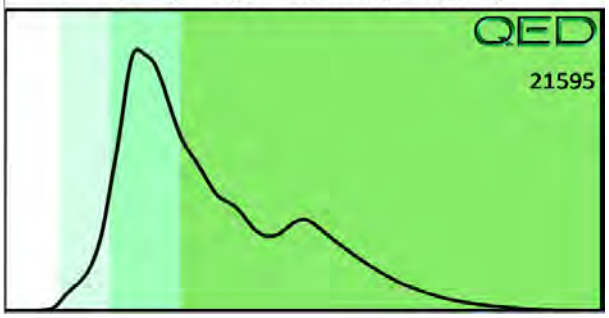
B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

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

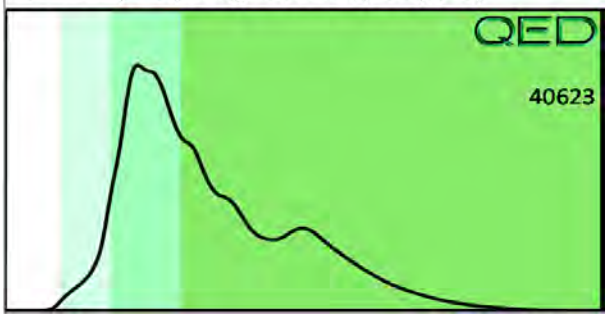
QED Hydrocarbon Fingerprints

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

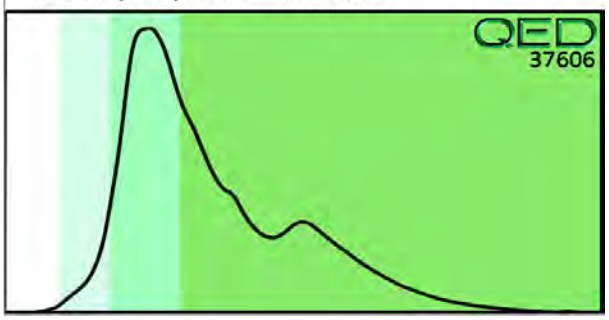
SB-24-1 (2'-3') : Deg Fuel 89.1%,(FCM),(BO)



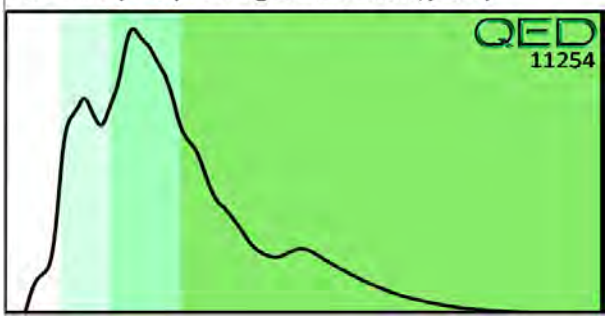
SB-24-2 (2'-3') : Deg Fuel 77%,(FCM),(BO)



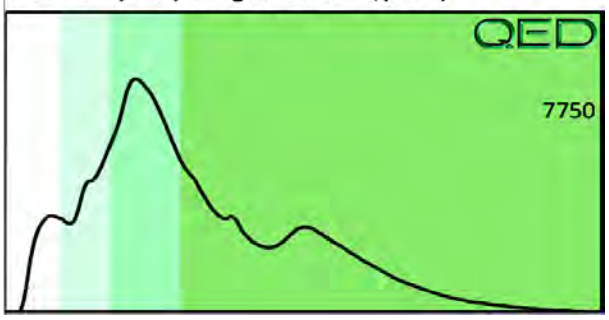
SB-24-3 (2'-3') : No Match found



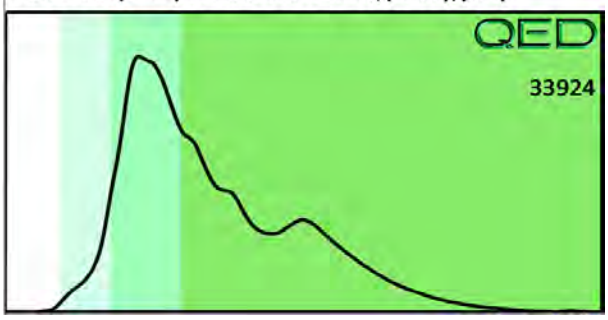
SB-24-4 (2'-3') : V.Deg.Diesel 84.5%,(FCM)



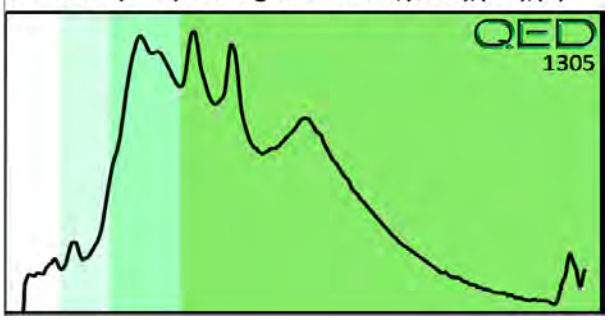
SB-24-5 (2'-3') : Deg.PHC 71.9%,(FCM)



SB-24-6 (2'-3') : Road Tar 92.3%,(FCM),(BO)



SB-24-7 (3'-4') : V.Deg.PHC 88.4%,(FCM),(BO),(P)



APPENDIX G

GROUNDWATER LABORATORY ANALYTICAL REPORT AND CHAIN OF CUSTODY RECORD

Mid Atlantic
Engineering & Environmental Solutions

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

October 02, 2018

Mid-Atlantic Associates, Inc.

Sample Delivery Group:	L1029619
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-24-4 L1029619-01 GW

Collected by	Collected date/time	Received date/time
Cory A. Fisher	09/24/18 14:10	09/27/18 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 6200B-1997	WG1173661	50	09/30/18 19:00	09/30/18 19:00	JAH
Semi Volatile Organic Compounds (GC/MS) by Method 625.1	WG1173376	1.25	09/29/18 17:49	09/30/18 15:59	LEA
Semi Volatile Organic Compounds (GC/MS) by Method 625.1	WG1173376	12.5	09/29/18 17:49	09/30/18 22:51	LEA

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	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		500	2500	50	09/30/2018 19:00	WG1173661
Acrolein	U		444	2500	50	09/30/2018 19:00	WG1173661
Acrylonitrile	U		93.5	500	50	09/30/2018 19:00	WG1173661
Benzene	U		16.6	50.0	50	09/30/2018 19:00	WG1173661
Bromobenzene	U		17.6	50.0	50	09/30/2018 19:00	WG1173661
Bromodichloromethane	U		19.0	50.0	50	09/30/2018 19:00	WG1173661
Bromoform	U		23.4	50.0	50	09/30/2018 19:00	WG1173661
Bromomethane	U		43.3	250	50	09/30/2018 19:00	WG1173661
n-Butylbenzene	U		18.0	50.0	50	09/30/2018 19:00	WG1173661
sec-Butylbenzene	27.7	J	18.2	50.0	50	09/30/2018 19:00	WG1173661
tert-Butylbenzene	U		20.0	50.0	50	09/30/2018 19:00	WG1173661
Carbon tetrachloride	U		19.0	50.0	50	09/30/2018 19:00	WG1173661
Chlorobenzene	U		17.4	50.0	50	09/30/2018 19:00	WG1173661
Chlorodibromomethane	U		16.4	50.0	50	09/30/2018 19:00	WG1173661
Chloroethane	U		22.6	250	50	09/30/2018 19:00	WG1173661
Chloroform	U		16.2	250	50	09/30/2018 19:00	WG1173661
Chloromethane	U		13.8	125	50	09/30/2018 19:00	WG1173661
2-Chlorotoluene	U		18.8	50.0	50	09/30/2018 19:00	WG1173661
4-Chlorotoluene	U		17.6	50.0	50	09/30/2018 19:00	WG1173661
1,2-Dibromo-3-Chloropropane	U		66.5	250	50	09/30/2018 19:00	WG1173661
1,2-Dibromoethane	U		19.0	50.0	50	09/30/2018 19:00	WG1173661
Dibromomethane	U		17.3	50.0	50	09/30/2018 19:00	WG1173661
1,2-Dichlorobenzene	U		17.4	50.0	50	09/30/2018 19:00	WG1173661
1,3-Dichlorobenzene	U		11.0	50.0	50	09/30/2018 19:00	WG1173661
1,4-Dichlorobenzene	U		13.7	50.0	50	09/30/2018 19:00	WG1173661
Dichlorodifluoromethane	U		27.6	250	50	09/30/2018 19:00	WG1173661
1,1-Dichloroethane	U		13.0	50.0	50	09/30/2018 19:00	WG1173661
1,2-Dichloroethane	U		18.0	50.0	50	09/30/2018 19:00	WG1173661
1,1-Dichloroethene	U		19.9	50.0	50	09/30/2018 19:00	WG1173661
cis-1,2-Dichloroethene	U		13.0	50.0	50	09/30/2018 19:00	WG1173661
trans-1,2-Dichloroethene	U		19.8	50.0	50	09/30/2018 19:00	WG1173661
1,2-Dichloropropane	U		15.3	50.0	50	09/30/2018 19:00	WG1173661
1,1-Dichloropropene	U		17.6	50.0	50	09/30/2018 19:00	WG1173661
1,3-Dichloropropane	U		18.3	50.0	50	09/30/2018 19:00	WG1173661
2,2-Dichloropropane	U		16.0	50.0	50	09/30/2018 19:00	WG1173661
Di-isopropyl ether	U		16.0	50.0	50	09/30/2018 19:00	WG1173661
Ethylbenzene	1210		19.2	50.0	50	09/30/2018 19:00	WG1173661
Hexachloro-1,3-butadiene	U		12.8	50.0	50	09/30/2018 19:00	WG1173661
Isopropylbenzene	200		16.3	50.0	50	09/30/2018 19:00	WG1173661
p-Isopropyltoluene	U		17.5	50.0	50	09/30/2018 19:00	WG1173661
2-Butanone (MEK)	U		196	500	50	09/30/2018 19:00	WG1173661
Methylene Chloride	U		50.0	250	50	09/30/2018 19:00	WG1173661
4-Methyl-2-pentanone (MIBK)	U		107	500	50	09/30/2018 19:00	WG1173661
Methyl tert-butyl ether	U		18.4	50.0	50	09/30/2018 19:00	WG1173661
Naphthalene	809		50.0	250	50	09/30/2018 19:00	WG1173661
n-Propylbenzene	483		17.4	50.0	50	09/30/2018 19:00	WG1173661
Styrene	U		15.4	50.0	50	09/30/2018 19:00	WG1173661
1,1,1,2-Tetrachloroethane	U		19.2	50.0	50	09/30/2018 19:00	WG1173661
1,1,2,2-Tetrachloroethane	U		6.50	50.0	50	09/30/2018 19:00	WG1173661
Tetrachloroethene	U		18.6	50.0	50	09/30/2018 19:00	WG1173661
Toluene	48.2	J	20.6	50.0	50	09/30/2018 19:00	WG1173661
1,2,3-Trichlorobenzene	U		11.5	50.0	50	09/30/2018 19:00	WG1173661
1,2,4-Trichlorobenzene	U		17.8	50.0	50	09/30/2018 19:00	WG1173661
1,1,1-Trichloroethane	U		16.0	50.0	50	09/30/2018 19:00	WG1173661
1,1,2-Trichloroethane	U		19.2	50.0	50	09/30/2018 19:00	WG1173661
Trichloroethene	U		19.9	50.0	50	09/30/2018 19:00	WG1173661

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	09/30/2018 19:00	WG1173661
1,2,3-Trichloropropane	U		40.4	125	50	09/30/2018 19:00	WG1173661
1,2,4-Trimethylbenzene	1870		18.6	50.0	50	09/30/2018 19:00	WG1173661
1,3,5-Trimethylbenzene	412		19.4	50.0	50	09/30/2018 19:00	WG1173661
Vinyl chloride	U		13.0	50.0	50	09/30/2018 19:00	WG1173661
o-Xylene	303		17.0	50.0	50	09/30/2018 19:00	WG1173661
m&p-Xylenes	1570		36.0	100	50	09/30/2018 19:00	WG1173661
(S) Toluene-d8	*99.7*			*80.0-120*		*09/30/2018 19:00*	WG1173661
(S) Dibromofluoromethane	*105*			*75.0-120*		*09/30/2018 19:00*	WG1173661
(S) a,a,a-Trifluorotoluene	*99.2*			*80.0-120*		*09/30/2018 19:00*	WG1173661
(S) 4-Bromofluorobenzene	*106*			*77.0-126*		*09/30/2018 19:00*	WG1173661

Sample Narrative:

L1029619-01 WG1173661: Non-target compounds too high to run at a lower dilution.

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	1.17	J	0.395	1.25	1.25	09/30/2018 15:59	WG1173376
Acenaphthylene	U		0.386	1.25	1.25	09/30/2018 15:59	WG1173376
Anthracene	U		0.364	1.25	1.25	09/30/2018 15:59	WG1173376
Benzidine	U		5.40	12.5	1.25	09/30/2018 15:59	WG1173376
Benzo(a)anthracene	U		0.122	1.25	1.25	09/30/2018 15:59	WG1173376
Benzo(b)fluoranthene	U		0.112	1.25	1.25	09/30/2018 15:59	WG1173376
Benzo(k)fluoranthene	U		0.444	1.25	1.25	09/30/2018 15:59	WG1173376
Benzo(g,h,i)perylene	U		0.201	1.25	1.25	09/30/2018 15:59	WG1173376
Benzo(a)pyrene	U		0.425	1.25	1.25	09/30/2018 15:59	WG1173376
Bis(2-chlorethoxy)methane	U		0.411	12.5	1.25	09/30/2018 15:59	WG1173376
Bis(2-chloroethyl)ether	U		2.02	12.5	1.25	09/30/2018 15:59	WG1173376
Bis(2-chloroisopropyl)ether	U		0.556	12.5	1.25	09/30/2018 15:59	WG1173376
4-Bromophenyl-phenylether	U		0.419	12.5	1.25	09/30/2018 15:59	WG1173376
2-Chloronaphthalene	U	J4	0.413	1.25	1.25	09/30/2018 15:59	WG1173376
4-Chlorophenyl-phenylether	U		0.379	12.5	1.25	09/30/2018 15:59	WG1173376
Chrysene	U		0.415	1.25	1.25	09/30/2018 15:59	WG1173376
Dibenz(a,h)anthracene	U		0.349	1.25	1.25	09/30/2018 15:59	WG1173376
3,3-Dichlorobenzidine	U		2.53	12.5	1.25	09/30/2018 15:59	WG1173376
2,4-Dinitrotoluene	U		2.06	12.5	1.25	09/30/2018 15:59	WG1173376
2,6-Dinitrotoluene	U		0.349	12.5	1.25	09/30/2018 15:59	WG1173376
Fluoranthene	U		0.388	1.25	1.25	09/30/2018 15:59	WG1173376
Fluorene	1.36	J4	0.404	1.25	1.25	09/30/2018 15:59	WG1173376
Hexachlorobenzene	U		0.426	1.25	1.25	09/30/2018 15:59	WG1173376
Hexachloro-1,3-butadiene	U		0.411	12.5	1.25	09/30/2018 15:59	WG1173376
Hexachlorocyclopentadiene	U		2.91	12.5	1.25	09/30/2018 15:59	WG1173376
Hexachloroethane	U		0.456	12.5	1.25	09/30/2018 15:59	WG1173376
Indeno(1,2,3-cd)pyrene	U		0.349	1.25	1.25	09/30/2018 15:59	WG1173376
Isophorone	U		0.340	12.5	1.25	09/30/2018 15:59	WG1173376
Naphthalene	448		4.65	12.5	12.5	09/30/2018 22:51	WG1173376
Nitrobenzene	U		0.459	12.5	1.25	09/30/2018 15:59	WG1173376
n-Nitrosodimethylamine	U		1.58	12.5	1.25	09/30/2018 15:59	WG1173376
n-Nitrosodiphenylamine	U		1.49	12.5	1.25	09/30/2018 15:59	WG1173376
n-Nitrosodi-n-propylamine	U		0.504	12.5	1.25	09/30/2018 15:59	WG1173376
Phenanthrene	1.25	J	0.458	1.25	1.25	09/30/2018 15:59	WG1173376
Benzylbutyl phthalate	U		0.344	3.75	1.25	09/30/2018 15:59	WG1173376
Bis(2-ethylhexyl)phthalate	U		0.886	3.75	1.25	09/30/2018 15:59	WG1173376
Di-n-butyl phthalate	U		0.333	3.75	1.25	09/30/2018 15:59	WG1173376
Diethyl phthalate	U		0.353	3.75	1.25	09/30/2018 15:59	WG1173376

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	
Dimethyl phthalate	U		0.354	3.75	1.25	09/30/2018 15:59	WG1173376
Di-n-octyl phthalate	U		0.347	3.75	1.25	09/30/2018 15:59	WG1173376
Pyrene	U		0.413	1.25	1.25	09/30/2018 15:59	WG1173376
1,2,4-Trichlorobenzene	U	J4	0.444	12.5	1.25	09/30/2018 15:59	WG1173376
4-Chloro-3-methylphenol	U		0.329	12.5	1.25	09/30/2018 15:59	WG1173376
2-Chlorophenol	U		0.354	12.5	1.25	09/30/2018 15:59	WG1173376
2,4-Dichlorophenol	U		0.355	12.5	1.25	09/30/2018 15:59	WG1173376
2,4-Dimethylphenol	U		0.780	12.5	1.25	09/30/2018 15:59	WG1173376
4,6-Dinitro-2-methylphenol	U		3.28	12.5	1.25	09/30/2018 15:59	WG1173376
2,4-Dinitrophenol	U		4.06	12.5	1.25	09/30/2018 15:59	WG1173376
2-Nitrophenol	U		0.400	12.5	1.25	09/30/2018 15:59	WG1173376
4-Nitrophenol	U		2.51	12.5	1.25	09/30/2018 15:59	WG1173376
Pentachlorophenol	U		0.391	12.5	1.25	09/30/2018 15:59	WG1173376
Phenol	U		0.418	12.5	1.25	09/30/2018 15:59	WG1173376
2,4,6-Trichlorophenol	U		0.371	12.5	1.25	09/30/2018 15:59	WG1173376
(S) Nitrobenzene-d5	*79.3*			*15.0-314*		*09/30/2018 15:59*	WG1173376
(S) Nitrobenzene-d5	*82.4*			*15.0-314*		*09/30/2018 22:51*	WG1173376
(S) 2-Fluorobiphenyl	*55.6*			*22.0-127*		*09/30/2018 15:59*	WG1173376
(S) 2-Fluorobiphenyl	*53.4*			*22.0-127*		*09/30/2018 22:51*	WG1173376
(S) p-Terphenyl-d14	*58.6*			*29.0-141*		*09/30/2018 15:59*	WG1173376
(S) p-Terphenyl-d14	*58.2*			*29.0-141*		*09/30/2018 22:51*	WG1173376
(S) Phenol-d5	*33.7*			*8.00-424*		*09/30/2018 15:59*	WG1173376
(S) Phenol-d5	*28.1*			*8.00-424*		*09/30/2018 22:51*	WG1173376
(S) 2-Fluorophenol	*44.4*			*10.0-120*		*09/30/2018 15:59*	WG1173376
(S) 2-Fluorophenol	*28.0*			*10.0-120*		*09/30/2018 22:51*	WG1173376
(S) 2,4,6-Tribromophenol	*55.2*			*10.0-153*		*09/30/2018 15:59*	WG1173376
(S) 2,4,6-Tribromophenol	*45.6*			*10.0-153*		*09/30/2018 22:51*	WG1173376

Sample Narrative:

L1029619-01 WG1173376: Dilution due to sample volume

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3346795-3 09/30/18 14:05

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) R3346795-3 09/30/18 14:05

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	*99.2*			*80.0-120*
(S) Dibromofluoromethane	*106*			*75.0-120*
(S) a,a,a-Trifluorotoluene	*98.1*			*80.0-120*
(S) 4-Bromofluorobenzene	*98.1*			*77.0-126*

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

(LCS) R3346795-1 09/30/18 12:50 • (LCSD) R3346795-2 09/30/18 13:09

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	123	129	98.2	103	19.0-160			5.24	27
Acrolein	125	143	154	114	123	10.0-160			7.64	26
Acrylonitrile	125	103	106	82.6	85.0	55.0-149			2.92	20
Benzene	25.0	23.2	23.1	92.8	92.3	70.0-123			0.483	20
Bromobenzene	25.0	24.4	24.2	97.8	96.8	73.0-121			1.03	20
Bromodichloromethane	25.0	23.1	22.7	92.3	90.9	75.0-120			1.55	20

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

(LCS) R3346795-1 09/30/18 12:50 • (LCSD) R3346795-2 09/30/18 13:09

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	24.4	24.9	97.5	99.4	68.0-132			1.92	20
Bromomethane	25.0	24.9	24.5	99.4	97.9	10.0-160			1.56	25
n-Butylbenzene	25.0	23.4	24.0	93.6	95.8	73.0-125			2.36	20
sec-Butylbenzene	25.0	23.7	23.8	94.8	95.3	75.0-125			0.600	20
tert-Butylbenzene	25.0	24.7	25.0	98.8	100	76.0-124			1.37	20
Carbon tetrachloride	25.0	23.3	22.7	93.0	90.6	68.0-126			2.63	20
Chlorobenzene	25.0	23.4	23.9	93.7	95.6	80.0-121			1.99	20
Chlorodibromomethane	25.0	23.7	23.5	94.6	94.1	77.0-125			0.621	20
Chloroethane	25.0	24.2	23.9	96.7	95.6	47.0-150			1.10	20
Chloroform	25.0	23.4	23.4	93.4	93.6	73.0-120			0.128	20
Chloromethane	25.0	28.5	27.5	114	110	41.0-142			3.58	20
2-Chlorotoluene	25.0	24.1	24.2	96.4	96.8	76.0-123			0.395	20
4-Chlorotoluene	25.0	24.4	24.3	97.7	97.3	75.0-122			0.416	20
1,2-Dibromo-3-Chloropropane	25.0	23.3	23.2	93.1	92.9	58.0-134			0.262	20
1,2-Dibromoethane	25.0	23.5	24.2	94.1	96.8	80.0-122			2.83	20
Dibromomethane	25.0	23.5	23.8	93.9	95.4	80.0-120			1.55	20
1,2-Dichlorobenzene	25.0	23.7	23.8	94.8	95.1	79.0-121			0.259	20
1,3-Dichlorobenzene	25.0	23.9	24.1	95.7	96.3	79.0-120			0.606	20
1,4-Dichlorobenzene	25.0	24.0	23.9	95.9	95.6	79.0-120			0.390	20
Dichlorodifluoromethane	25.0	27.2	27.3	109	109	51.0-149			0.127	20
1,1-Dichloroethane	25.0	23.8	24.2	95.0	96.8	70.0-126			1.83	20
1,2-Dichloroethane	25.0	23.6	23.8	94.6	95.2	70.0-128			0.631	20
1,1-Dichloroethene	25.0	23.6	23.6	94.3	94.3	71.0-124			0.0572	20
cis-1,2-Dichloroethene	25.0	22.7	22.9	90.7	91.6	73.0-120			0.953	20
trans-1,2-Dichloroethene	25.0	23.5	23.9	93.8	95.5	73.0-120			1.74	20
1,2-Dichloropropane	25.0	23.8	23.6	95.3	94.3	77.0-125			1.00	20
1,1-Dichloropropene	25.0	23.8	24.0	95.2	96.0	74.0-126			0.906	20
1,3-Dichloropropane	25.0	24.0	24.5	96.1	97.9	80.0-120			1.76	20
2,2-Dichloropropane	25.0	22.9	21.8	91.5	87.1	58.0-130			4.96	20
Di-isopropyl ether	25.0	24.1	24.0	96.3	96.1	58.0-138			0.158	20
Ethylbenzene	25.0	24.0	24.5	95.9	98.2	79.0-123			2.37	20
Hexachloro-1,3-butadiene	25.0	21.4	23.0	85.5	92.0	54.0-138			7.27	20
Isopropylbenzene	25.0	25.0	25.0	100	100	76.0-127			0.0624	20
p-Isopropyltoluene	25.0	24.5	24.7	97.9	98.7	76.0-125			0.834	20
2-Butanone (MEK)	125	120	126	95.7	101	44.0-160			5.20	20
Methylene Chloride	25.0	23.1	23.8	92.3	95.2	67.0-120			3.11	20
4-Methyl-2-pentanone (MIBK)	125	127	124	102	99.6	68.0-142			2.18	20
Methyl tert-butyl ether	25.0	23.3	23.2	93.3	93.0	68.0-125			0.382	20
Naphthalene	25.0	23.0	23.3	91.8	93.0	54.0-135			1.28	20
n-Propylbenzene	25.0	24.4	24.7	97.7	99.0	77.0-124			1.33	20

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

(LCS) R3346795-1 09/30/18 12:50 • (LCSD) R3346795-2 09/30/18 13:09

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	26.7	26.7	107	107	73.0-130			0.00696	20
1,1,1,2-Tetrachloroethane	25.0	23.1	23.2	92.4	92.6	75.0-125			0.242	20
1,1,2,2-Tetrachloroethane	25.0	24.8	24.1	99.4	96.3	65.0-130			3.12	20
Tetrachloroethene	25.0	23.5	24.0	94.0	96.0	72.0-132			2.10	20
Toluene	25.0	23.0	23.2	91.8	92.9	79.0-120			1.14	20
1,2,3-Trichlorobenzene	25.0	22.1	22.8	88.6	91.0	50.0-138			2.72	20
1,2,4-Trichlorobenzene	25.0	22.7	23.7	90.6	94.7	57.0-137			4.43	20
1,1,1-Trichloroethane	25.0	24.5	23.4	98.0	93.5	73.0-124			4.67	20
1,1,2-Trichloroethane	25.0	24.7	24.6	98.7	98.3	80.0-120			0.390	20
Trichloroethene	25.0	23.2	23.4	92.8	93.5	78.0-124			0.707	20
Trichlorofluoromethane	25.0	24.9	24.7	99.6	98.8	59.0-147			0.891	20
1,2,3-Trichloropropane	25.0	24.8	24.8	99.1	99.2	73.0-130			0.0807	20
1,2,4-Trimethylbenzene	25.0	24.0	23.8	96.0	95.2	76.0-121			0.835	20
1,3,5-Trimethylbenzene	25.0	24.5	24.3	98.0	97.1	76.0-122			0.906	20
Vinyl chloride	25.0	25.5	25.3	102	101	67.0-131			1.05	20
o-Xylene	25.0	24.0	24.1	95.9	96.3	80.0-122			0.375	20
m&p-Xylenes	50.0	48.8	49.8	97.6	99.6	80.0-122			2.03	20
(S) Toluene-d8				*102*	*102*	*80.0-120*				
(S) Dibromofluoromethane				*99.1*	*99.7*	*75.0-120*				
(S) a,a,a-Trifluorotoluene				*101*	*98.2*	*80.0-120*				
(S) 4-Bromofluorobenzene				*101*	*101*	*77.0-126*				

Method Blank (MB)

(MB) R3346398-3 09/30/18 14:49

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) R3346398-3 09/30/18 14:49

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL 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	*54.8*			*15.0-314*
(S) 2-Fluorobiphenyl	*48.1*			*22.0-127*
(S) p-Terphenyl-d14	*51.9*			*29.0-141*
(S) Phenol-d5	*23.4*			*8.00-424*
(S) 2-Fluorophenol	*34.0*			*10.0-120*
(S) 2,4,6-Tribromophenol	*43.5*			*10.0-153*

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

(LCS) R3346398-1 09/30/18 14:02 • (LCSD) R3346398-2 09/30/18 14:26

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 %
Acenaphthene	50.0	31.1	25.6	62.2	51.2	47.0-145			19.4	48
Acenaphthylene	50.0	31.3	25.5	62.6	51.0	33.0-145			20.4	74
Anthracene	50.0	29.6	26.7	59.2	53.4	27.0-133			10.3	66
Benzidine	50.0	7.41	5.97	14.8	11.9	1.00-120			21.5	36
Benzo(a)anthracene	50.0	31.6	28.6	63.2	57.2	33.0-143			9.97	53
Benzo(b)fluoranthene	50.0	34.2	28.5	68.4	57.0	24.0-159			18.2	71
Benzo(k)fluoranthene	50.0	32.3	30.7	64.6	61.4	11.0-162			5.08	63
Benzo(g,h,i)perylene	50.0	35.0	31.5	70.0	63.0	1.00-219			10.5	97
Benzo(a)pyrene	50.0	33.1	29.3	66.2	58.6	17.0-163			12.2	72
Bis(2-chlorethoxy)methane	50.0	28.3	24.5	56.6	49.0	1.00-219			14.4	54
Bis(2-chloroethyl)ether	50.0	22.9	18.6	45.8	37.2	33.0-185			20.7	108
Bis(2-chloroisopropyl)ether	50.0	27.1	21.3	54.2	42.6	36.0-166			24.0	76
4-Bromophenyl-phenylether	50.0	33.0	30.7	66.0	61.4	53.0-127			7.22	43
2-Chloronaphthalene	50.0	30.3	24.8	60.6	49.6	60.0-120		J4	20.0	24

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

(LCS) R3346398-1 09/30/18 14:02 • (LCSD) R3346398-2 09/30/18 14:26

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	34.2	28.6	68.4	57.2	25.0-158			17.8	61
Chrysene	50.0	33.2	30.1	66.4	60.2	17.0-168			9.79	87
Dibenz(a,h)anthracene	50.0	34.0	30.2	68.0	60.4	1.00-227			11.8	126
3,3-Dichlorobenzidine	50.0	32.6	29.6	65.2	59.2	1.00-262			9.65	108
2,4-Dinitrotoluene	50.0	34.7	30.5	69.4	61.0	39.0-139			12.9	42
2,6-Dinitrotoluene	50.0	33.6	29.7	67.2	59.4	50.0-158			12.3	48
Fluoranthene	50.0	35.8	31.8	71.6	63.6	26.0-137			11.8	66
Fluorene	50.0	32.7	27.4	65.4	54.8	59.0-121		J4	17.6	38
Hexachlorobenzene	50.0	38.8	35.3	77.6	70.6	1.00-152			9.45	55
Hexachloro-1,3-butadiene	50.0	28.4	23.7	56.8	47.4	24.0-120			18.0	62
Hexachlorocyclopentadiene	50.0	27.3	22.2	54.6	44.4	10.0-120			20.6	31
Hexachloroethane	50.0	25.5	21.0	51.0	42.0	40.0-120			19.4	52
Indeno(1,2,3-cd)pyrene	50.0	35.8	32.1	71.6	64.2	1.00-171			10.9	99
Isophorone	50.0	32.1	27.5	64.2	55.0	21.0-196			15.4	93
Naphthalene	50.0	25.7	20.5	51.4	41.0	21.0-133			22.5	65
Nitrobenzene	50.0	33.1	27.5	66.2	55.0	35.0-180			18.5	62
n-Nitrosodimethylamine	50.0	17.7	13.0	35.4	26.0	10.0-120			30.6	34
n-Nitrosodiphenylamine	50.0	32.4	29.2	64.8	58.4	44.0-120			10.4	21
n-Nitrosodi-n-propylamine	50.0	34.1	28.2	68.2	56.4	1.00-230			18.9	87
Phenanthrene	50.0	32.3	28.9	64.6	57.8	54.0-120			11.1	39
Benzylbutyl phthalate	50.0	19.6	17.4	39.2	34.8	1.00-152			11.9	60
Bis(2-ethylhexyl)phthalate	50.0	29.4	26.7	58.8	53.4	8.00-158			9.63	82
Di-n-butyl phthalate	50.0	29.3	26.0	58.6	52.0	1.00-120			11.9	47
Diethyl phthalate	50.0	24.2	21.7	48.4	43.4	1.00-120			10.9	100
Dimethyl phthalate	50.0	11.8	10.7	23.6	21.4	1.00-120			9.78	183
Di-n-octyl phthalate	50.0	31.7	28.2	63.4	56.4	4.00-146			11.7	69
Pyrene	50.0	34.1	30.3	68.2	60.6	52.0-120			11.8	49
1,2,4-Trichlorobenzene	50.0	26.6	20.6	53.2	41.2	44.0-142		J4	25.4	50
4-Chloro-3-methylphenol	50.0	31.7	31.0	63.4	62.0	22.0-147			2.23	73
2-Chlorophenol	50.0	28.3	26.3	56.6	52.6	23.0-134			7.33	61
2,4-Dichlorophenol	50.0	31.8	29.8	63.6	59.6	39.0-135			6.49	50
2,4-Dimethylphenol	50.0	32.5	30.1	65.0	60.2	32.0-120			7.67	58
4,6-Dinitro-2-methylphenol	50.0	35.9	35.8	71.8	71.6	1.00-181			0.279	203
2,4-Dinitrophenol	50.0	26.3	27.2	52.6	54.4	1.00-191			3.36	132
2-Nitrophenol	50.0	31.4	30.7	62.8	61.4	29.0-182			2.25	55
4-Nitrophenol	50.0	13.1	13.1	26.2	26.2	1.00-132			0.000	131
Pentachlorophenol	50.0	30.2	29.5	60.4	59.0	14.0-176			2.35	86
Phenol	50.0	14.8	15.3	29.6	30.6	5.00-120			3.32	64
2,4,6-Trichlorophenol	50.0	35.5	32.6	71.0	65.2	37.0-144			8.52	58
(S) Nitrobenzene-d5				*61.8*	*51.6*	*15.0-314*				

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

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

(LCS) R3346398-1 09/30/18 14:02 • (LCSD) R3346398-2 09/30/18 14:26

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				*59.4*	*49.0*	*22.0-127*				
(S) p-Terphenyl-d14				*63.5*	*56.9*	*29.0-141*				
(S) Phenol-d5				*26.9*	*27.1*	*8.00-424*				
(S) 2-Fluorophenol				*41.4*	*39.9*	*10.0-120*				
(S) 2,4,6-Tribromophenol				*70.5*	*66.5*	*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

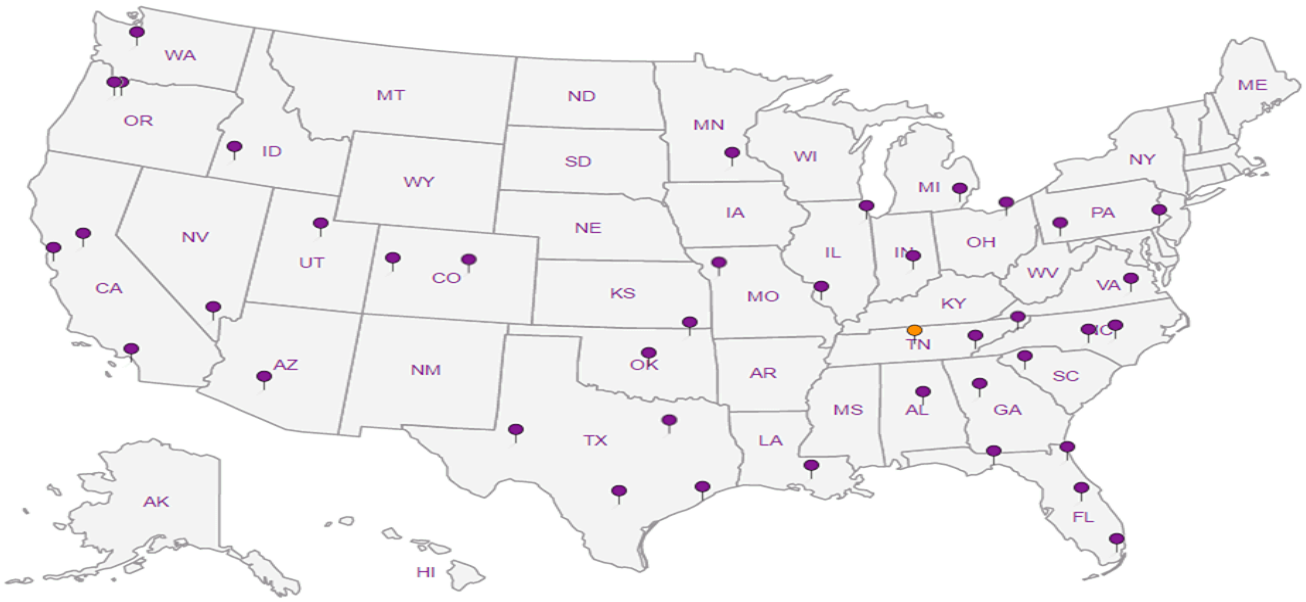
Third Party Federal Accreditations

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, N.C.

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

Client Project # **R3203.00**

Lab Project #

Collected by (print): Gary A. Fischer

Site/Facility ID #

P.O. #

Collected by (signature):

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
TMW-24-4	Grab	GW		9/24/18	1410	5	X	X

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LAB 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# L1629619

E173

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

Rem./Contaminant	Sample # (lab only)
	-01

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other 625 - BNA's

RAD SCREEN: <0.5 mR/hr

Remarks: Fed Ex # 4430 3428 7694
4430 3428 7694

pH ____ Temp ____
Flow ____ Other ____

Hold #

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Amy Lynch	9/26/18	1430	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) SCL

Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐ ____

Temp: 0.5 = +.2 °C Bottles Received: 5

Date: 9/27/18 Time: 9:00

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#	L1029619
Cooler Received/Opened On: 09/27/18		Temperature:	0.7
Received By: Kevin Turner			
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?			