FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881

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NC License #F-0266

October 13, 2017 (revised February 5, 2018)

North Carolina Department of Transportation
Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, North Carolina 27610

Attn.: Mr. Gordon Box, L.G.
GeoEnvironmental Project Manager

Re: State Project: R-2530B
WBS Element: 34446.1.6
NC 24-27 from Bird Road in Albemarle to West of the Pee Dee River

Subject: **Preliminary Site Assessment**
Parcel #024 – A.L. Lowder (Lee & Co)
1970 East Main Street
Albemarle, North Carolina
F&R Project #66V-0092

Dear Mr. Box:

Froehling and Robertson, Inc. (F&R) has completed the authorized Preliminary Site Assessment at the A.L. Lowder property located in Albemarle, North Carolina. The work was performed in general accordance with F&R's Proposal No. 1866-00132, dated June 14, 2017 (and revised June 22, 2017). Notice to Proceed was issued to F&R on July 6, 2017. This report documents our field activities, presents the results of laboratory analysis and provides estimated quantities of petroleum impacted soils. Please do not hesitate to contact us should you have any questions regarding this report.

Sincerely,

FROEHLING & ROBERTSON, INC.

DocuSigned by:
4DB7F275EBFD410...

Clint E. Sorrell
Environmental Scientist

DocuSigned by:
Benjamin A. Whitley
E425D6E8C23545...

NORTH CAROLINA PROFESSIONAL SEAL 038743 ENGINEER BENJAMIN A. WHITLEY

Benjamin A. Whitley, P.E.
GeoEnvironmental Services Manager

FROEHLING & ROBERTSON, INC.

PRELIMINARY SITE ASSESSMENT

A.L. Lowder (Parcel #024)
Lee & Co
1970 East Main Street
Albemarle, North Carolina
State Project: R-2530B
WBS Element: 34446.1.6
F&R Project #66V-0092

October 13, 2017 (revised February 5, 2018)

Prepared for:

North Carolina Department of Transportation
Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, NC 27610

310 Hubert Street Raleigh, North Carolina 27603 919.828.3441

TABLE OF CONTENTS

Preliminary Site Assessment Report
A.L. Lowder Property (Parcel #024)
Albemarle, Stanly County, North Carolina
F&R Project No. 66V-0092

1.0 Introduction

Froehling and Robertson, Inc. (F&R) has prepared this Preliminary Site Assessment (PSA) Report to document soil assessment activities performed at the A.L. Lowder Property addressed as 1970 East Main Street, in Albemarle, Stanly County, North Carolina. The site is located approximately 275 feet west of the E Main Street and Anderson Road intersection as shown in Appendix I, Figures 1 and 2. As indicated in the Request for Technical and Cost Proposal (RFTCP), the site operates as a repair shop and retail store front. According to the NCDEQ Underground Storage Tank (UST) Section Registry, the site has been assigned Facility ID # MO-70. However, information regarding registered USTs was not provided. The RFTCP indicates the site may have operated as a gas station based on the architectural style of the building. In addition, the location of USTs or the former tank basin has not been determined. However, petroleum odors were discovered during a previous geotechnical investigation.

According to the NCDOT within their RFTCP, acquisition of right-of-way is necessary for the proposed NC 24-27 design. As such, the NCDOT requested a PSA be performed to assess the possibility of encountering petroleum impacted soil from known or unknown USTs, and to locate USTs which may exist within proposed easements and right-of-way at the project site.

The PSA was performed in general accordance with F&R's Proposal No. 1866-00132, dated June 14, 2017 (and revised June 22, 2017) with Notice to Proceed issued to F&R by the NCDOT on July 6, 2017. The purpose of this report is to document field activities, present the results of laboratory analysis, and provide estimated quantities of petroleum impacted soils.

The existing on-site structure is one-story in height and reported by the owner to be constructed in several phases. The building is constructed of sheet metal with steel framing on the east side and wood siding with steel framing on the west side. The eastern portion of the building contains two metal roll up doors and an auto repair facility. F&R accessed the interior of the repair shop for evidence of environmental concerns. F&R observed two 500-gallon aboveground storage tanks (ASTs) and two above ground hydraulic lifts. Evidence of floor drains or in-ground-lifts was not observed. The site is bordered to the north by East Main Street; to the south by Stanly County Gymnastics; to the east by a residential structures; and to the west by wooded land. Access to

the site is gained from East Main Street to the north. The remainder of the site consists of an asphalt paved parking lot, a gravel parking lot, and wooded areas.

2.0 Geophysical Survey

Prior to F&R's soil assessment activities, Pyramid Environmental & Engineering, P.C. (Pyramid) conducted a geophysical survey to locate suspect metal underground storage tanks (USTs). The geophysical work was conducted July 21 to July 24, 2017 and was performed within the proposed utility easement (PUE) of East Main Street.

The geophysical investigation consisted of electromagnetic (EM) induction surveys using a Geonics EM61 instrument. Ground-penetrating radar (GPR) investigations of selected EM61 anomalies were investigated using a Geophysical Survey Systems UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. The EM61 data was collected along parallel survey lines spaced approximately 5 feet apart. The data was reviewed in the field to evaluate the possible presence of USTs and later transferred to a desktop computer for further review. Data was collected over most of the planned survey site with the exception of areas immediately adjacent to metallic objects and other obstacles. Isolated EM anomalies were identified on the site, including a sign, a suspected utility building, a vehicle, reinforced concrete, an AC unit, refrigerator/bollards, a manhole, and metal siding. In addition, one probable metallic UST was identified at the western portion of the asphalt paved parking lot. The GPR data suggest that the top of the probable UST is approximately 2.5 to 3.0 feet below ground surface (bgs). Pyramid estimated the probable UST is 5 feet in diameter and 12 feet long, which is approximately 1,500 gallons in size.

Based on the results of the EM and GPR geophysical data, Pyramid observed one anomaly that was interpreted to be the results of a probable metallic UST. The complete geophysical report is attached as Appendix II.

3.0 Site Assessment Activities

F&R visited the site on August 9, 2017 to perform the Preliminary Site Assessment. The assessment consisted of advancing 9 borings into the soils at the project site using direct-push technology (GeoProbe). The boring locations were determined by F&R staff based on the results of the geophysical survey, site features and proposed construction activities (including grading and/or storm drain utility installation). Six of the borings (B-1, B-2 and B-6 through B-9) were advanced on the northwestern portion of the site adjacent to East Main Street. Borings B-3 through B-5 were advanced on the northeastern portion of the site, also adjacent to East Main

Street. The borings were generally advanced to the proposed depth of 10 feet below grade surface (bgs). However, Borings B-3 through B-5 were terminated at depths ranging from 2-8.5 feet bgs, where GeoProbe refusal was encountered due to dense silt mixed with gravel. Borings B-1 and B-6 through B-9, around the probable UST, were advanced to the proposed depth of 12 feet bgs. Photos detailing existing site features are attached as Appendix III and boring locations are depicted in Figure 3 of this report.

Soil sample cores from the borings were collected in disposable, 4-foot long acetate sleeves. The soil samples were visually/manually classified and screened in the field using a calibrated photo-ionization detector (PID) for evidence of petroleum hydrocarbons. Evaluation of VOC concentrations were performed using a MiniRae 3000 PID which produces results in parts per million (ppm). A representative soil sample was collected from two foot sections of each sleeve and placed in a re-sealable plastic bag. The vapors were then allowed to equilibrate in the headspace of each bag for approximately ten minutes prior to measurement with the PID. The measurements were collected by placing the probe tip into the headspace of the bag. PID measurements can be found in the GeoProbe Logs in Appendix IV, as well as in Table 1 in Section 5.0 below.

Generally, the soil sample in each boring which exhibited the highest PID concentration was submitted for laboratory analysis for diesel range organics (DRO), gasoline range organics (GRO), Total BTEX (benzene, toluene, ethylbenzene and xylenes), 16 PAHs (polycyclic aromatic hydrocarbons) and BaP (Benzo(a)pyrene) by Ultraviolet Fluorescence (UVF) technology (RedLab QED Hydrocarbon Analyzer).

The samples were collected in laboratory-supplied sample containers, placed in a cooler with ice, and shipped via UPS to RedLab in Wilmington, North Carolina following standard chain-of custody procedures.

4.0 Subsurface Conditions

As indicated in the attached GeoProbe Logs (Appendix IV), subsurface conditions from existing ground surface to boring termination primarily included various layers of dry to moist to wet, tan-orange-brown-red silty sandy clay, dry tan silt, and dry tan silt with gravel. The borings were generally terminated at the proposed depth of 10 feet below ground surface (bgs), with the exception of the borings around the probable UST, which were terminated at the proposed depth of 12 feet bgs. GeoProbe refusal was encountered in Borings B-3 through B-5 at depths ranging from 2 to 8.5 feet bgs in dense silt mixed with gravel. PID readings generally ranged from 0.5 to

6.2 ppm. However, elevated VOC readings (6.2 to 134.7 ppm) were measured at B-4 and B-7 through B-9 from 6 to 10 feet bgs. Groundwater was not observed during field screening or sample collection activities.

5.0 Analytical Results

As shown in the following table, petroleum hydrocarbons identified as GRO were encountered in the soil samples at eight boring locations advanced at the site (B-1 through B-6, and B-8 through B-9), at depths from 0 to 2 feet bgs (B-5) to 6 to 8/8.5 feet bgs (B-1, B-4, B-6, B-8, and B-9). The GRO concentrations were generally detected at concentrations below the NCDEQ Action Level of 50 mg/kg. GRO concentrations above the NCDEQ Action Level of 50 mg/kg were detected in two of the nine samples submitted (B-4 and B-9).

Petroleum hydrocarbons identified as DRO were encountered in the soil samples at the nine boring locations advanced at the site (B-1 through B-9), at depths from 0 to 2 feet bgs (B-5) to 6 to 8/8.5 feet bgs (B-1, B-4, and B-6 through B-9). The laboratory results indicate that the DRO concentrations ranged from 1.3 mg/kg (B-2) to 94.3 mg/kg (B-9), which are below the NCDEQ Action Level of 100 mg/kg.

Concentrations of BTEX were detected in two boring locations advanced at the site (B-4 and B-9), at depths from 6 to 8 feet bgs (B-8) to 6 to 8.5 feet bgs (B-4). The laboratory results indicate that the BTEX concentrations ranged from 104.1 mg/kg (B-4) to 106 mg/kg (B-9), which are above the total NCDEQ Action Level of 13.8056 mg/kg.

The laboratory analytical results indicate concentrations of the sum of 16 EPA PAHs above the method detection limit, but below the total NCDEQ Action Level of 9,068.816 mg/kg at Borings B-1, B-3, B-4, and B-9. The soil analytical results are summarized in Table 1 below. The laboratory analytical results can also be found in the attached Appendix V of this report.

Table 1
Soil Sampling Analytical Results

Sample ID	Sample Date	Sample Depth (ft bgs)	PID Reading (ppm)	GRO (mg/kg)	DRO (mg/kg)	TPH (mg/kg)	Total BTEX (mg/kg)	Total Aromatics (mg/kg)	16 EPA PAHs (mg/kg)	BaP (mg/kg)
B-1	8/9/17	4-6	1.7	5.1	33.7	38.8	<0.92	16.9	0.95	<0.037
B-1		6-8	5.8	2.4	7.4	9.8	<0.92	3.7	<0.29	<0.037
B-2		2-4	1.4	2.1	1.3	3.4	<0.9	0.98	<0.29	<0.036
B-3		6-7.5	5.7	5.1	20.6	25.7	<0.87	18.5	0.95	<0.035
B-4		6-8.5	338.7	**536.5**	62.6	599.1	**104.1**	32.3	1.8	<0.039
B-5		0-2	1.5	2.1	2.9	5	<1.2	2.2	<0.39	<0.048
B-6		6-8	6.2	12.3	32.5	44.8	<0.98	4.2	<0.32	<0.039
B-7		6-8	40.8	<0.96	24.4	24.4	<0.96	2.2	<0.31	<0.038
B-8		6-8	13.8	42.4	2.3	44.7	<0.94	1.8	<0.3	<0.038
B-9		6-8	134.7	**313.3**	94.3	407.6	**106**	38.2	1.5	<0.04
NCDEQ Action Level				**50**	**100**	**NSE**	**13.8056**	**NSE**	**9,068.816**	**0.088**

GRO concentrations shown in bold exceed the NCDEQ Action Level as outlined in the NCDEQ, DWM, UST Section Guidelines
BTEX concentrations show in bold exceed the total Soil-to-Water MSCC Level for those compounds
ppm = parts per million
GRO = Gasoline Range Organics
DRO = Diesel Range Organics
TPH = Total Petroleum Hydrocarbons
BTEX = Benzene, Toluene, Ethylbenzene and Xylenes
NSE = No Standard Exists

6.0 Conclusions and Recommendations

F&R conducted a PSA at the A.L. Lowder Property addressed as 1970 East Main Street, in Albemarle, Stanly County, North Carolina. A geophysical investigation was performed by Pyramid Environmental & Engineering to investigate the presence and location of USTs in the proposed right-of-way. Based on the results of the geophysical survey, it was determined that one probable metallic UST was present on the western portion of the asphalt paved parking lot.

Nine GeoProbe borings were advanced during the assessment within the PUE, where grading activities and storm drain utilities are proposed in association with the NC 24-27 improvements. Based on the results of laboratory testing and observed PID readings, petroleum impacted soils were encountered in the vicinity of boring locations B-4 and B-9, with GRO concentrations detected above the NCDEQ Action Level from 6 to 8.5 feet bgs. A storm water drainage pipe appears on the proposed improvement plans. In addition, driveway reconstruction and curbline

realignment is depicted, which will likely require re-grading of the existing ground surface during the construction. For the purpose of this assessment, we have estimated an average petroleum-impacted area of 1,016.8 square feet, extending to a depth of 8 feet bgs for Area #1 and 4,164.6 square feet extending to a depth of 8.5 feet bgs for Area #2. These areas account for impacted soils that may be generated during re-grading activities and for unknown below grade utilities that may be installed during construction. These areas were determined by averaging distances between the proposed right-of-way and the existing edge of pavement on the construction drawings (Appendix I, Figure 4). F&R recommends that petroleum impacted soils and USTs removed from the project site be properly managed and disposed of in accordance with NCDEQ rules and regulations.

Table 2
Approximate Volume of Petroleum Impacted Soil

Excavation Location (As Shown on Figure 4)	L x W x D (feet)	Soil Volume (cubic feet)	Soil Volume (tons)
Area #1	L x W varies (1,016.8 SF) X 8 depth	8,134.4	488.1
Area #2	L x W varies (4,164.6 SF) X 8.5' depth	35,399.1	2,123.9
Soil Volume (assuming a soil density of 120 pcf)		**Total**	**2,612.0**

It should be noted that a delineation of the soil contamination was not performed, as this was not included in the proposed scope of work. The above estimates are based on interpretations of soil analytical results, PID readings and our experience with petroleum UST releases. In order to generate estimated quantities of petroleum impacted soils, we have inferred that the contamination has occurred between the existing ground surface and the sample collection depth. The amount of impacted soil can only be determined after excavation or by advancing additional borings and performing additional laboratory analysis to delineate the extents (horizontal and vertical) of contamination.

7.0 Limitations

These services have been performed, under authorization of the North Carolina Department of Transportation for specific application on this project. These services have been performed in accordance with generally accepted environmental and hydrogeological practices. No other

warranty, expressed or implied is made. As with any subsurface investigation, actual conditions exist only at the precise locations from which samples were taken. Certain inferences are based on the results of sampling and related testing to form a professional opinion of conditions in areas beyond those from which samples were taken. Our conclusions and recommendations are based upon information provided to us by others, our sampling and testing results and our site observations. We have not verified the completeness or accuracy of the information provided by others, unless otherwise noted. Our observations are based upon conditions readily visible at the site at the time of our site visits.

Froehling & Robertson, Inc. by virtue of providing the services described in this report, does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state or federal public agencies any conditions at the site that may present a potential danger to public health, safety or the environment. In areas that require notification of local, state, or federal public agencies as required by law, it is the Client's responsibility to so notify.

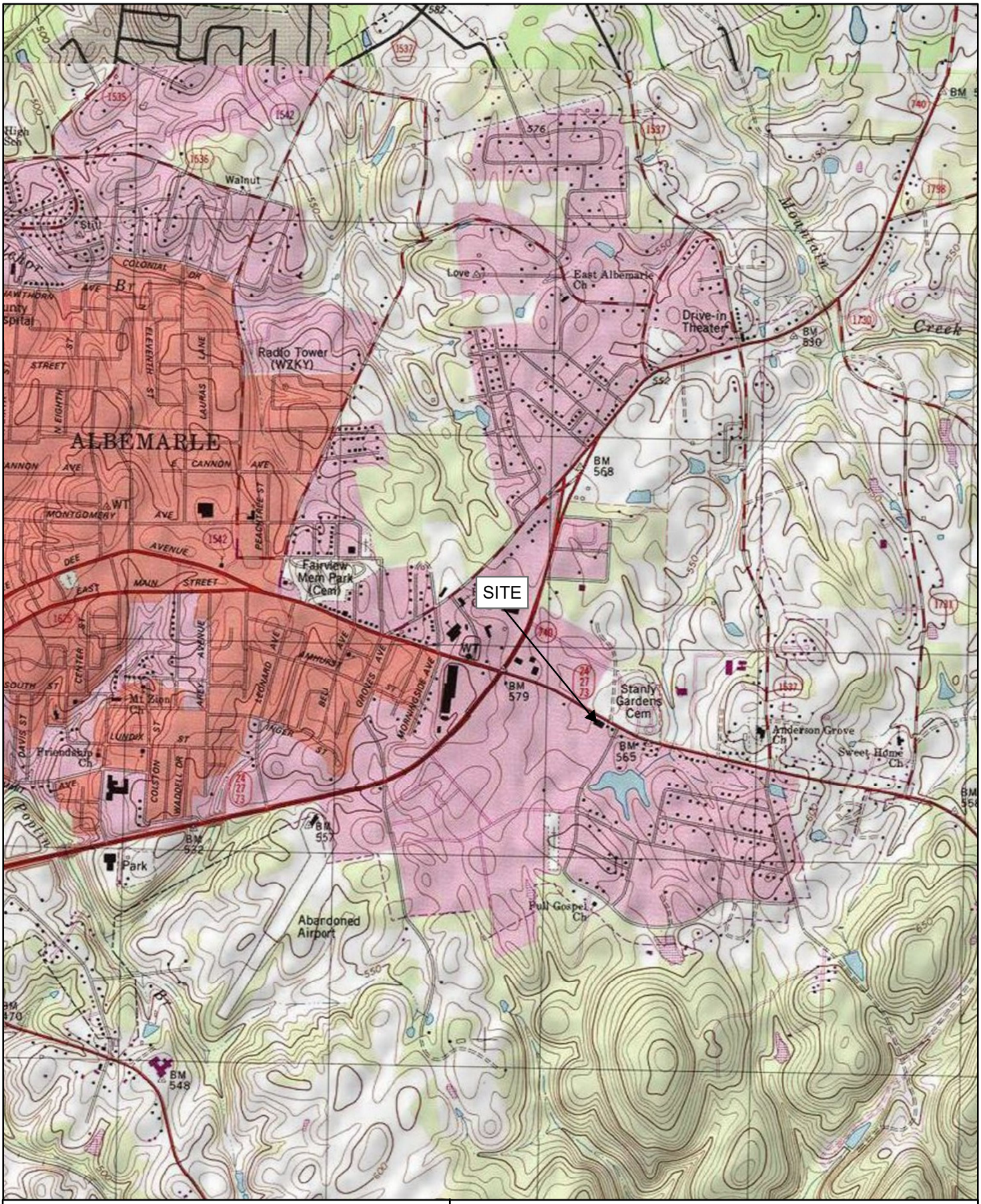
APPENDIX I

Figure No. 1 – TOPOGRAPHIC MAP

Figure No. 2 – SITE VICINITY MAP

Figure No. 3 – LABORATORY RESULTS & BORING LOCATION PLAN

Figure No. 4 – ESTIMATED EXTENTS OF SOIL CONTAMINATION



SITE TOPOGRAPHIC MAP

FROEHLING & ROBERTSON, INC.
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Raleigh, North Carolina 27603-2302 I USA
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Client:	NCDOT
Project:	R-2530B PSAs
Location:	Parcel #024, Albemarle, NC
F&R Project No.:	66V-0092
Data:	USGS 2013
Date:	October 2017 (Revised Feb. 5, 2018)

Disclaimer: F&R makes no warranties or guarantees regarding the accuracy or completeness of geographic features shown on this map. Spatial accuracy of measurement provided by source agencies can be obtained by contacting F&R.

1970 East Main Street - Albemarle, North Carolina

Scale: 1:24,000 1 inch = 2,000 feet

FIGURE No.: 1

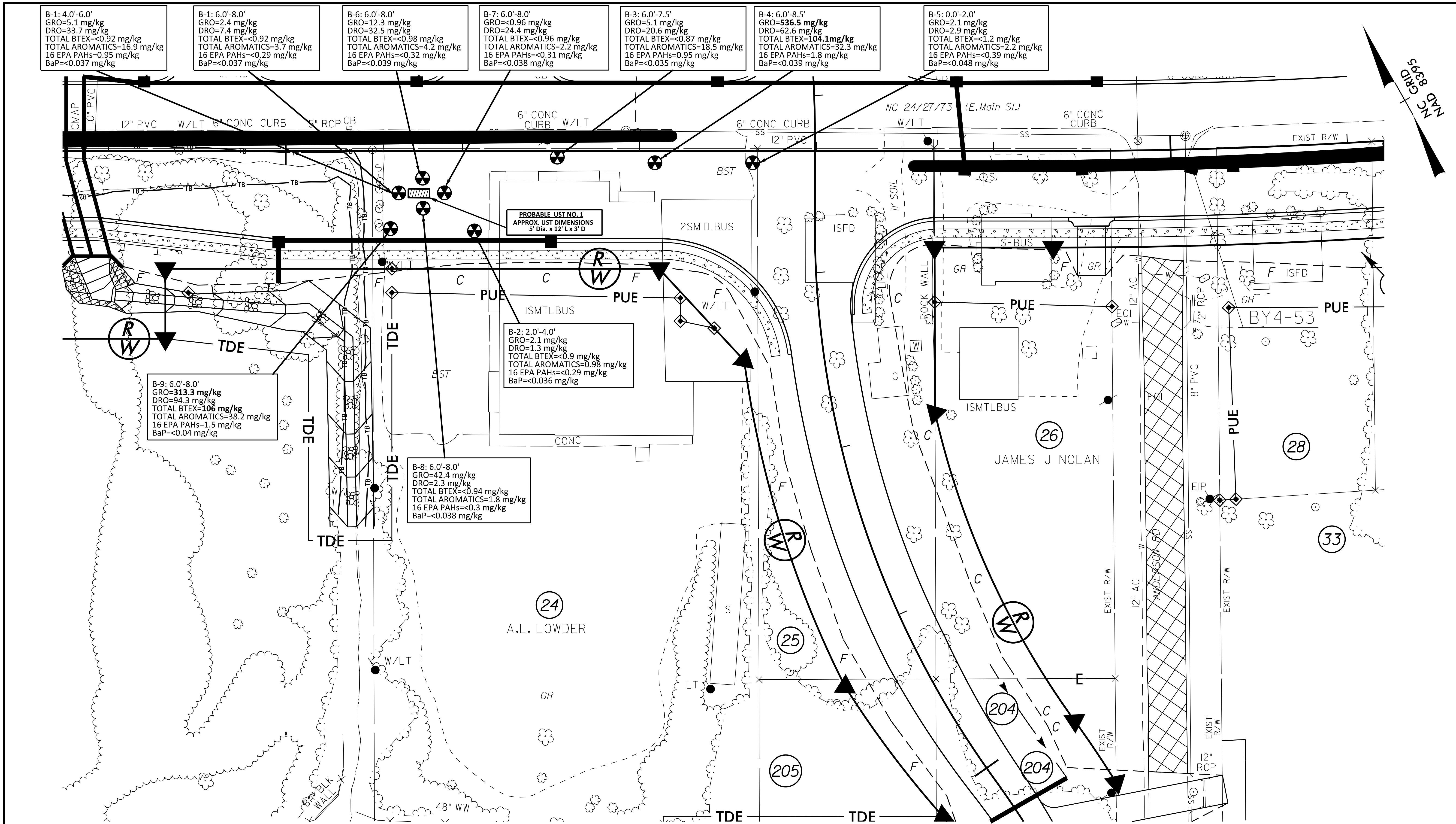
SITE VICINITY MAP

0 100 200 400 600 Feet

FROEHLING & ROBERTSON, INC.
Engineering Stability Since 1881
310 Hubert Street
Raleigh, North Carolina 27603-2302 I USA
T 919.828.3441 I F 919.828.5751

Client:	NCDOT
Project:	R-2530B PSAs
Location:	Parcel #024, Albemarle, NC
F&R Project No.:	66V-0092 1970 East Main Street - Albemarle, North Carolina
Data:	ArcMap Imagery
Date:	October 2017 (Revised Feb. 5, 2018) Scale: 1:2,400 1 inch = 200 feet

FIGURE No.: 2



B-1: 4.0'-6.0'
GRO=5.1 mg/kg
DRO=33.7 mg/kg
TOTAL BTEX=<0.92 mg/kg
TOTAL AROMATICS=16.9 mg/kg
16 EPA PAHs=0.95 mg/kg
BaP=<0.037 mg/kg
B-1: 6.0'-8.0'
GRO=2.4 mg/kg
DRO=7.4 mg/kg
TOTAL BTEX=<0.92 mg/kg
TOTAL AROMATICS=3.7 mg/kg
16 EPA PAHs=<0.29 mg/kg
BaP=<0.037 mg/kg
B-6: 6.0'-8.0'
GRO=12.3 mg/kg
DRO=32.5 mg/kg
TOTAL BTEX=<0.98 mg/kg
TOTAL AROMATICS=4.2 mg/kg
16 EPA PAHs=<0.32 mg/kg
BaP=<0.039 mg/kg
B-7: 6.0'-8.0'
GRO=<0.96 mg/kg
DRO=24.4 mg/kg
TOTAL BTEX=<0.96 mg/kg
TOTAL AROMATICS=2.2 mg/kg
16 EPA PAHs=<0.31 mg/kg
BaP=<0.038 mg/kg
B-3: 6.0'-7.5'
GRO=5.1 mg/kg
DRO=20.6 mg/kg
TOTAL BTEX=<0.87 mg/kg
TOTAL AROMATICS=18.5 mg/kg
16 EPA PAHs=0.95 mg/kg
BaP=<0.035 mg/kg
B-4: 6.0'-8.5'
GRO=**536.5 mg/kg**
DRO=62.6 mg/kg
TOTAL BTEX=**104.1mg/kg**
TOTAL AROMATICS=32.3 mg/kg
16 EPA PAHs=1.8 mg/kg
BaP=<0.039 mg/kg
B-5: 0.0'-2.0'
GRO=2.1 mg/kg
DRO=2.9 mg/kg
TOTAL BTEX=<1.2 mg/kg
TOTAL AROMATICS=2.2 mg/kg
16 EPA PAHs=<0.39 mg/kg
BaP=<0.048 mg/kg
NC GRID NAD 83(95)
NC 24/27/73 (E.Main St.)
12" PVC
W/LT
6" CONC CURB
15" RCP
CB
6" CONC CURB
EXIST R/W
BST
PROBABLE UST NO. 1
APPROX. UST DIMENSIONS
5' Dia. x 12' L x 3' D
2SMTLBUS
ISFD
ISFBUS
ISMTLBUS
PUE
TDE
B-2: 2.0'-4.0'
GRO=2.1 mg/kg
DRO=1.3 mg/kg
TOTAL BTEX=<0.9 mg/kg
TOTAL AROMATICS=0.98 mg/kg
16 EPA PAHs=<0.29 mg/kg
BaP=<0.036 mg/kg
B-9: 6.0'-8.0'
GRO=**313.3 mg/kg**
DRO=94.3 mg/kg
TOTAL BTEX=**106 mg/kg**
TOTAL AROMATICS=38.2 mg/kg
16 EPA PAHs=1.5 mg/kg
BaP=<0.04 mg/kg
B-8: 6.0'-8.0'
GRO=42.4 mg/kg
DRO=2.3 mg/kg
TOTAL BTEX=<0.94 mg/kg
TOTAL AROMATICS=1.8 mg/kg
16 EPA PAHs=<0.3 mg/kg
BaP=<0.038 mg/kg
BY4-53
26
JAMES J NOLAN
28
33
24
A.L. LOWDER
25
204
205
ANDERSON RD
12" AC
8" PVC
12" RCP
48" WW

SCALE (FEET)
0 25' 50'
1"=50'

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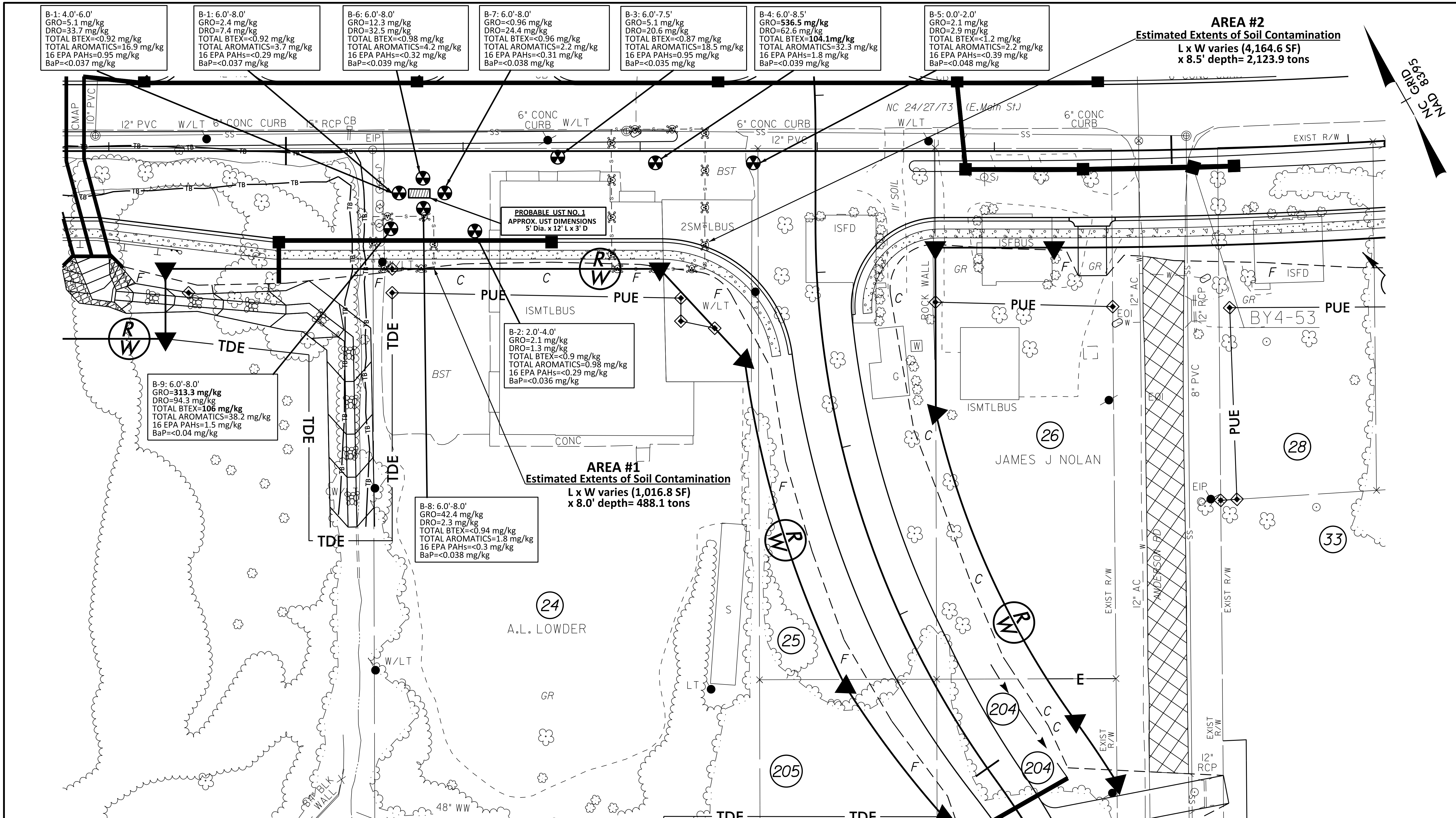
LEGEND

Approximate Geoprobe Boring Location

Sample data shown in bold exceed the NCDEQ Action Level as outlined in the NCDEQ DWM UST Section Guidance

LABORATORY RESULTS & BORING LOCATION PLAN

CLIENT: NCDOT	
PROJECT: R-2530B PSAs	
LOCATION: Albemarle, NC Parcel #024, 1970 East Main Street	
F&R PROJECT No.: 66V-0092	FIGURE No.: 3
DRAWN BY: T. T. Walker	CHECKED BY: B. Whitley, P.E.
DATE: February 2018	SCALE: 1"=50'


B-1: 4.0'-6.0'
GRO=5.1 mg/kg
DRO=33.7 mg/kg
TOTAL BTEX=<0.92 mg/kg
TOTAL AROMATICS=16.9 mg/kg
16 EPA PAHs=0.95 mg/kg
BaP=<0.037 mg/kg
B-1: 6.0'-8.0'
GRO=2.4 mg/kg
DRO=7.4 mg/kg
TOTAL BTEX=<0.92 mg/kg
TOTAL AROMATICS=3.7 mg/kg
16 EPA PAHs=<0.29 mg/kg
BaP=<0.037 mg/kg
B-6: 6.0'-8.0'
GRO=12.3 mg/kg
DRO=32.5 mg/kg
TOTAL BTEX=<0.98 mg/kg
TOTAL AROMATICS=4.2 mg/kg
16 EPA PAHs=<0.32 mg/kg
BaP=<0.039 mg/kg
B-7: 6.0'-8.0'
GRO=<0.96 mg/kg
DRO=24.4 mg/kg
TOTAL BTEX=<0.96 mg/kg
TOTAL AROMATICS=2.2 mg/kg
16 EPA PAHs=<0.31 mg/kg
BaP=<0.038 mg/kg
B-3: 6.0'-7.5'
GRO=5.1 mg/kg
DRO=20.6 mg/kg
TOTAL BTEX=<0.87 mg/kg
TOTAL AROMATICS=18.5 mg/kg
16 EPA PAHs=0.95 mg/kg
BaP=<0.035 mg/kg
B-4: 6.0'-8.5'
GRO=**536.5 mg/kg**
DRO=62.6 mg/kg
TOTAL BTEX=**104.1mg/kg**
TOTAL AROMATICS=32.3 mg/kg
16 EPA PAHs=1.8 mg/kg
BaP=<0.039 mg/kg
B-5: 0.0'-2.0'
GRO=2.1 mg/kg
DRO=2.9 mg/kg
TOTAL BTEX=<1.2 mg/kg
TOTAL AROMATICS=2.2 mg/kg
16 EPA PAHs=<0.39 mg/kg
BaP=<0.048 mg/kg
AREA #2
Estimated Extents of Soil Contamination
L x W varies (4,164.6 SF)
x 8.5' depth= 2,123.9 tons
NC GRID NAD 83/95
PROBABLE UST NO. 1
APPROX. UST DIMENSIONS
5' Dia. x 12' L x 3' D
B-2: 2.0'-4.0'
GRO=2.1 mg/kg
DRO=1.3 mg/kg
TOTAL BTEX=<0.9 mg/kg
TOTAL AROMATICS=0.98 mg/kg
16 EPA PAHs=<0.29 mg/kg
BaP=<0.036 mg/kg
B-9: 6.0'-8.0'
GRO=**313.3 mg/kg**
DRO=94.3 mg/kg
TOTAL BTEX=**106 mg/kg**
TOTAL AROMATICS=38.2 mg/kg
16 EPA PAHs=1.5 mg/kg
BaP=<0.04 mg/kg
AREA #1
Estimated Extents of Soil Contamination
L x W varies (1,016.8 SF)
x 8.0' depth= 488.1 tons
B-8: 6.0'-8.0'
GRO=42.4 mg/kg
DRO=2.3 mg/kg
TOTAL BTEX=<0.94 mg/kg
TOTAL AROMATICS=1.8 mg/kg
16 EPA PAHs=<0.3 mg/kg
BaP=<0.038 mg/kg
NC 24/27/73 (E.Main St.)
6" CONC CURB
12" PVC
W/LT
15" RCP
EIP
BST
2SMTLBUS
ISFD
ISFBUS
ISMTLBUS
ROCK WALL
PUE
TDE
BY4-53
26
JAMES J NOLAN
28
33
24
A.L. LOWDER
25
204
205
ANDERSON RD
12" AC
8" PVC
12" RCP
EXIST R/W
48" WW
8" BLK WALL
GR
CONC
LT
E
SCALE (FEET)
0
25'
50'
1"=50'

SINCE 1881

FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

310 Hubert Street
Raleigh, North Carolina 27603-2302 | USA
T 919.828.3441 | F 919.828.5751
www.fandr.com

LEGEND
☢ Approximate Geoprobe Boring Location
Sample data shown in bold exceed the NCDEQ Action Level as outlined in the NCDEQ DWM UST Section Guidance

ESTIMATED EXTENTS OF SOIL CONTAMINATION		
CLIENT: NCDOT		FIGURE No.: 4
PROJECT: R-2530B PSAs		
LOCATION: Albemarle, NC Parcel #024, 1970 East Main Street		
F&R PROJECT No.: 66V-0092		
DRAWN BY: T. T. Walker	CHECKED BY: B. Whitley, P.E.	
DATE: February 2018	SCALE: 1"=50'	

APPENDIX II

GEOPHYSICAL REPORT PREPARED BY PYRAMID

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2017-203)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 024
NCDOT PROJECT R-2530B

1970 E. MAIN STREET, ALBEMARLE, NC

AUGUST 28, 2017

Report prepared for:

Benjamin Whitley, P.E.
Froehling and Robertson
310 Hubert Street
Raleigh, North Carolina 27603

Prepared by: _____

Eric C. Cross, P.G.
NC License #2181

Reviewed by: _____

Douglas A. Canavello, P.G.
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503 INDUSTRIAL AVENUE, GREENSBORO, NC 27406
P: 336.335.3174 F: 336.691.0648
C257: GEOLOGY C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 024 – 1970 E. Main Street
Albemarle, Stanly 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 Froehling and Robertson, Inc. (F&R) at Parcel 024, located at 1970 E. Main Street, Albemarle, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-2530B). F&R directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to extend from the existing edge of pavement to the proposed ROW lines and/or easement lines within the property, whichever distance was greater. Conducted from July 21-24, 2017, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

Geophysical Results: The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. One EM feature on the west side of the survey area was associated with unknown buried metal, and was investigated further by GPR. GPR provided evidence of an isolated hyperbolic reflector and discreet lateral reflector that are characteristic of a UST. The combined geophysical data resulted in this feature being classified as one probable metallic UST (center point 1653852.47, 583324.27 North Carolina State Plane NAD83, feet). The probable metallic UST was approximately 12 feet long and 5 feet wide at a depth of approximately 2.5-3.0 feet below the ground surface. Collectively, the geophysical data recorded evidence of one probable metallic UST at Parcel 024.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Froehling and Robertson, Inc. (F&R) at Parcel 024, located at 1970 E. Main Street, Albemarle, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-2530B). F&R directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to extend from the existing edge of pavement to the proposed ROW lines and/or easement lines within the property, whichever distance was greater. Conducted from July 21-24, 2017, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a commercial building surrounded by an asphalt parking area and grass medians. An aerial photograph showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

FIELD METHODOLOGY

The geophysical investigation consisted of an electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. Pyramid collected the EM data using a Geonics EM61 metal detector integrated with a Trimble AG-114 GPS antenna. 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 14.0 software programs.

GPR data were acquired across select EM anomalies on July 24, 2017, 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	Sign	
2	**One probable UST**	☑
3	Suspected utility and building	
4	Vehicle	
5	Reinforced concrete	
6	AC unit	
7	Refrigerator/bollards	
8	Manhole	
9	Metal siding	

The majority of the EM anomalies were directly attributed to visible cultural features including a sign, suspected utilities, the building, a vehicle, reinforced concrete, an AC unit, a refrigerator, bollards, a manhole, and metal siding. However, one high-amplitude EM feature was observed on the west side of the survey area (Anomaly 2) that was associated with unknown buried metal. This feature was investigated further by GPR.

Discussion of GPR Results

Figure 3 presents the locations of the formal GPR transects performed at the property, as well as the transect images. A total of two GPR transects were performed at the site. GPR Transects 1-2 were performed across EM Anomaly 2 on the west side of the survey area. These transects showed an isolated hyperbolic reflector and a discreet lateral reflector that are characteristic of a metal UST. The combined EM and GPR data result in this feature being classified as one probable UST. The probable UST was approximately 12 feet long and 5 feet wide at a depth of approximately 2.5-3.0 feet below the ground surface. **Figure 4** presents the location of the probable UST on an aerial map along with a ground-level photograph.

Collectively, the geophysical data recorded evidence of one probable metallic UST at Parcel 024.

Figure 5 provides an overlay of the geophysical survey area onto the NCDOT MicroStation engineering plans (proposed ROW and easements) for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 024 in Albemarle, 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.
- One EM feature on the west side of the survey area was associated with unknown buried metal, and was investigated further by GPR.
- GPR provided evidence of an isolated hyperbolic reflector and discreet lateral reflector that are characteristic of a UST. The combined geophysical data resulted in this feature being classified as one probable metallic UST (center point 1653852.47, 583324.27 North Carolina State Plane NAD83, feet).
- The probable metallic UST was approximately 12 feet long and 5 feet wide at a depth of approximately 2.5-3.0 feet below the ground surface.
- Collectively, the geophysical data recorded evidence of one probable metallic UST at Parcel 024.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for F&R 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.

N

APPROXIMATE BOUNDARIES OF GEOPHYSICAL SURVEY AREA

View of Survey Area
(Facing Approximately Southeast)

View of Survey Area
(Facing Approximately East)

TITLE
PARCEL 024 - GEOPHYSICAL SURVEY
BOUNDARIES AND SITE PHOTOGRAPHS

PROJECT
PARCEL 024
ALBEMARLE, NORTH CAROLINA
NCDOT PROJECT R-2530B

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

DATE 8/24/2017

CLIENT
FROEHLING & ROBERTSON

PYRAMID PROJECT #: 2017-203

FIGURE 1

N

EM61 METAL DETECTION RESULTS

EVIDENCE OF ONE PROBABLE METALLIC UST 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 July 21, 2017, using a Geonics EM61 instrument. Verification GPR data were collected on July 24, 2017, using a GSSI UtilityScan DF unit with a dual frequency 300/800 MHz antenna.

EM61 Metal Detection Response (millivolts)

TITLE
PARCEL 024 -
EM61 RESULTS CONTOUR MAP

PROJECT
PARCEL 024
ALBEMARLE, NORTH CAROLINA
NCDOT PROJECT R-2530B

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

DATE 8/24/2017

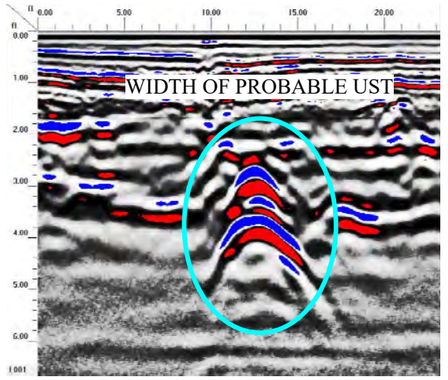
CLIENT FROEHLING & ROBERTSON

PYRAMID PROJECT #: 2017-203

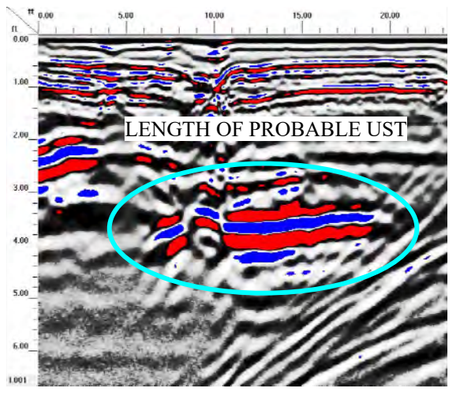
FIGURE 2

N

GPR TRANSECT LOCATIONS



GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)

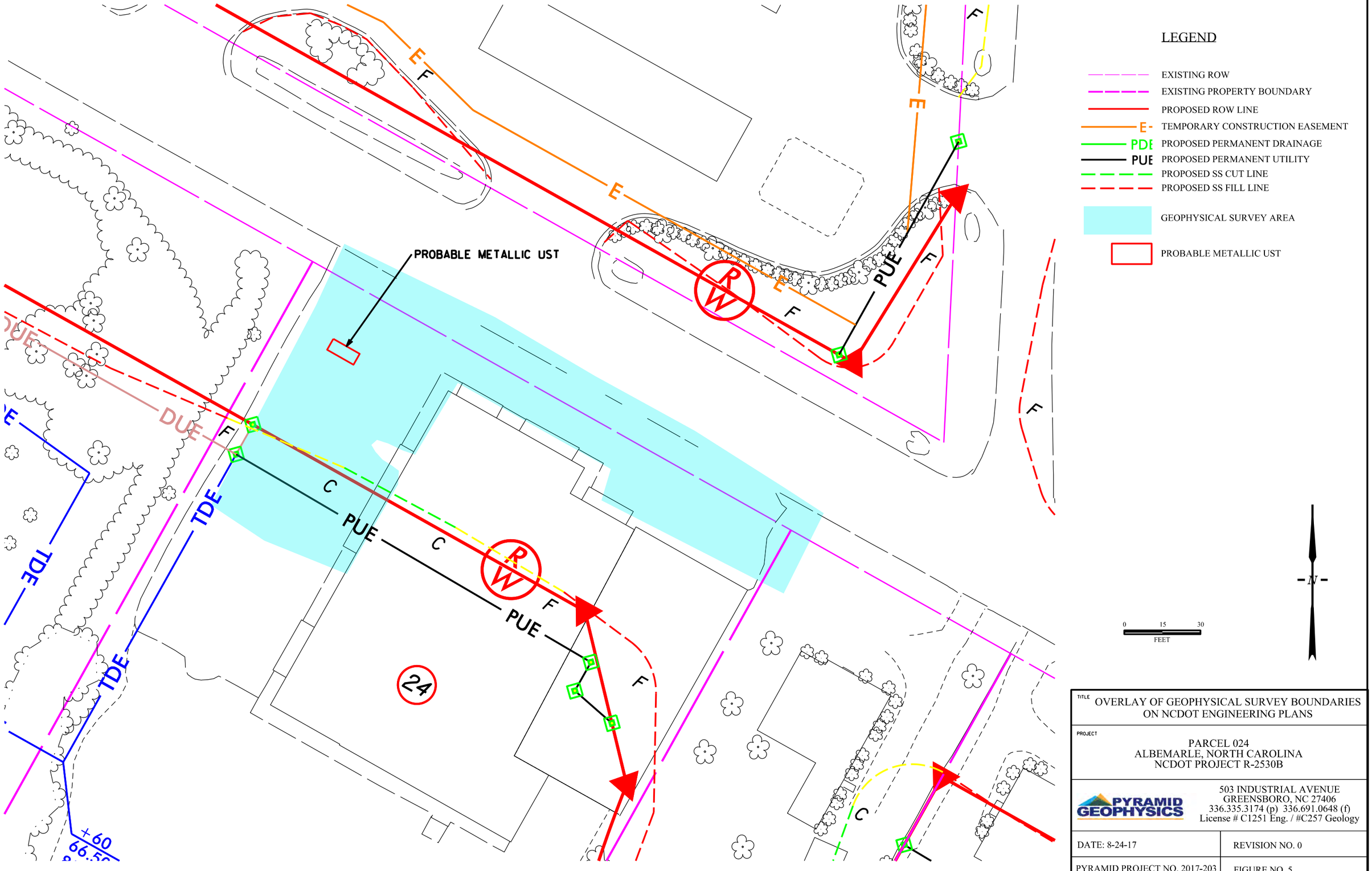
TITLE	PARCEL 024 - GPR TRANSECT LOCATIONS AND IMAGES
PROJECT	PARCEL 024 ALBEMARLE, NORTH CAROLINA NCDOT PROJECT R-2530B
PYRAMID GEOPHYSICS	503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology
DATE 8/24/2017	CLIENT FROEHLING & ROBERTSON
PYRAMID PROJECT #: 2017-203	**FIGURE 3**

N↑

LOCATION OF PROBABLE METALLIC UST

View of Probable UST #1
Facing Approximately Northwest

TITLE	PARCEL 024 - LOCATION AND SIZE OF PROBABLE UST
PROJECT	PARCEL 024 ALBEMARLE, NORTH CAROLINA NCDOT PROJECT R-2530B
PYRAMID GEOPHYSICS	503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology
DATE 8/3/2017	CLIENT FROEHLING & ROBERTSON
PYRAMID PROJECT #: 2017-203	**FIGURE 4**



LEGEND

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

0 15 30
FEET

N

TITLE: OVERLAY OF GEOPHYSICAL SURVEY BOUNDARIES ON NCDOT ENGINEERING PLANS

PROJECT:
PARCEL 024
ALBEMARLE, NORTH CAROLINA
NCDOT PROJECT R-2530B

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

DATE: 8-24-17	REVISION NO. 0
PYRAMID PROJECT NO. 2017-203	FIGURE NO. 5

APPENDIX III

SITE PHOTOS

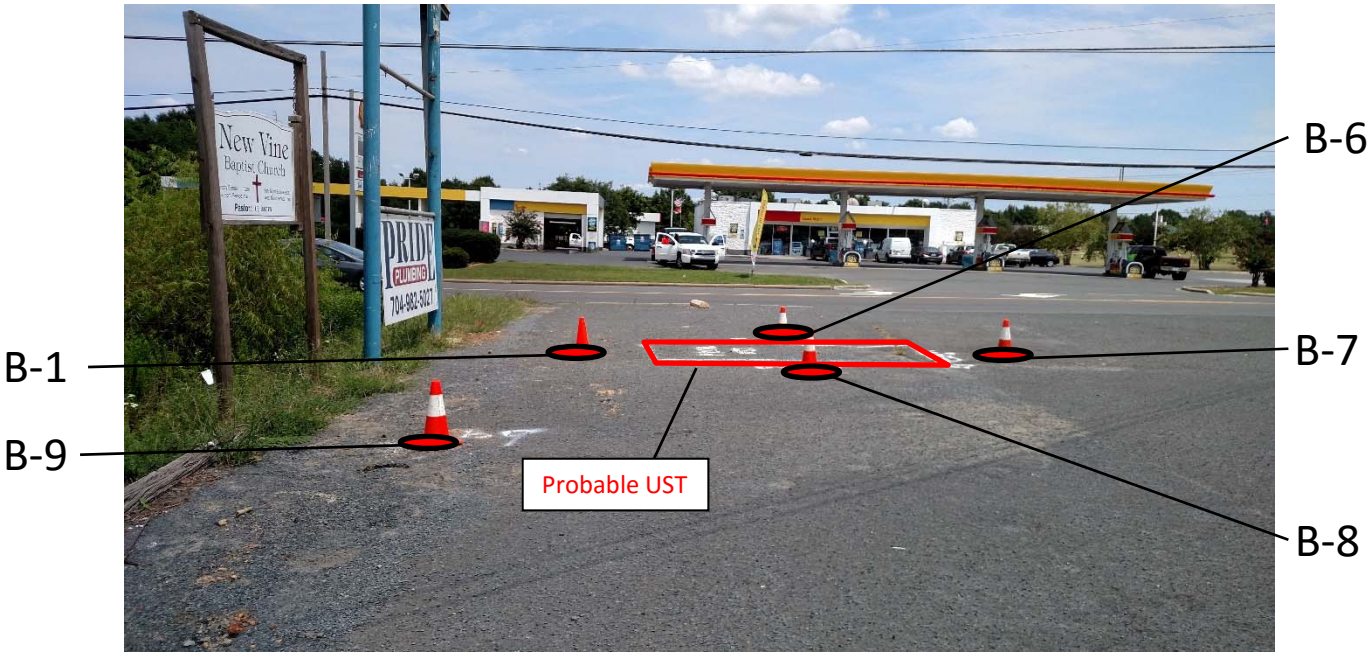


Photo #1: Boring locations B-1, B-6 through B-9, and a probable UST located west of the retail store front, facing northeast.

Photo #2: Boring locations B-2, B-6 through B-8, and a probable UST located west of the retail store front, facing southeast.

Photo #3: Boring locations B-3 and B-4, facing southeast.

Photo #4: Boring locations B-4 and B-5, facing northwest.

APPENDIX IV

GEOPROBE LOGS

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-1 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 12.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist Orange Brown Sandy Silty Clay			Two samples collected for laboratory analysis (4.0-6.0)(6.0-8.0)
	2.0		2.0	1.6	
	4.0	Dry Tan Silty Clay	4.0	1.5	
	6.0	Wet Tan Brown Silty Clay	6.0	1.7	Strong petroleum odor at 6ft
	8.0	Moist Tan Brown Silty Clay	8.0	5.8	
	10.0		10.0	1.9	
	12.0	Geoprobe Boring Terminated at 12 feet.	12.0	1.7	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-2 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 10.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist Tan Orange Sandy Silty Clay			One sample collected for laboratory analysis (2.0-4.0)
	2.0		2.0	1.1	
					No petroleum odors observed.
	4.0	Dry Tan Silt	4.0	1.4	
	6.0		6.0	0.5	
	8.0	Moist Orange Red Silty Clay	8.0	0.8	
	10.0	Geoprobe Boring Terminated at 10 feet.	10.0	1.3	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-3 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 7.5'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Sandy Silty Clay			One sample collected for laboratory analysis (6.0-7.5)
	2.0		2.0	1.4	
	4.0	Moist Gray Silty Clay	4.0	1.6	
	6.0	Dry Tan Silt with Gravel	6.0	1.4	No petroleum odors observed.
	7.5	Geoprobe Boring Terminated by Direct Push Refusal at 7.5 feet.	7.5	5.7	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-4 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 8.5'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Silty Sandy Clay			One sample collected for laboratory analysis (6.0-8.5)
	2.0		2.0	1.4	
	4.0	Dry Brown Tan Silty Clay	4.0	1.8	
	6.0	Dry Tan Silt	6.0	2.6	No petroleum odors observed.
	8.5	Geoprobe Boring Terminated by Direct Push Refusal at 8.5 feet.	8.5	338.7	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-5 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 2.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Dry Silt with Gravel			One sample collected for laboratory analysis (0.0-2.0)
					3 offsets attempted to obtain deeper boring
					No petroleum odors observed.
	2.0	Geoprobe Boring Terminated by Direct Push Refusal at 2 feet.	2.0	1.5	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-6 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 12.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Silty Sandy Clay			One sample collected for laboratory analysis (6.0-8.0)
	2.0		2.0	1.1	
	4.0	Moist Orange Silty Sandy Clay	4.0	1.2	
	6.0	Wet Brown Silty Clay	6.0	1.5	No petroleum odors observed.
	8.0	Moist Brown Silty Clay	8.0	6.2	
	10.0		10.0	1.7	
	12.0	Geoprobe Boring Terminated at 12 feet.	12.0	1.5	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-7 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 12.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Silty Sandy Clay			One sample collected for laboratory analysis (6.0-8.0)
	2.0		2.0	1.8	
	4.0		4.0	1.8	
	6.0	Wet Brown Silty Clay	6.0	2.3	Strong petroleum odor at 6ft
	8.0	Moist Brown Silty Clay	8.0	40.8	
	10.0		10.0	4.6	
	12.0	Geoprobe Boring Terminated at 12 feet.	12.0	2.1	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-8 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 12.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Silty Sandy Clay			One sample collected for laboratory analysis (6-8)
	2.0		2.0	2.1	
	4.0		4.0	2.1	
	6.0	Wet Tan Brown Silty Clay	6.0	1.8	Strong petroleum odor at 6ft
	8.0	Moist Tan Brown Silty Clay	8.0	13.8	
	10.0		10.0	2.8	
	12.0	Geoprobe Boring Terminated at 12 feet.	12.0	2.0	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: P024 B-9 (1 of 1)

Project No: 66V-0092
Client: NCDOT
Project: R2530B PSAs
City/State: ALBEMARLE, NC

Elevation: EXISTING
Total Depth: 12.0'
Boring Location: SEE BORING LOCATION PLAN

Drilling Method: DIRECT PUSH
Hammer Type: Automatic
Date Drilled: 8/9/17
Driller: REGIONAL PROBING

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist Brown Silty Sandy Clay			One sample collected for laboratory analysis (6.0-8.0)
	2.0		2.0	0.6	
	4.0	Dry Tan Silty Clay	4.0	0.8	
	6.0	Dry Tan Brown Silty Clay	6.0	1.0	Strong petroleum odor at 6ft
	8.0	Moist Tan Silty Clay	8.0	134.7	
	10.0		10.0	19.0	
	12.0	Geoprobe Boring Terminated at 12 feet.	12.0	1.7	

GEOPROBE_LOG BORING LOGS - COPY.GPJ F&R.GDT 10/17/17

APPENDIX V

LABORATORY ANALYTICAL RESULTS

QED

REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS

QROS

Hydrocarbon Analysis Results

Client: F&R
Address: 310 HUBERT ST
RALEIGH NC

Contact: BEN WHITLEY

Project: NCDOT - R2530B - P024

Samples taken Wednesday, August 9, 2017
Samples extracted Wednesday, August 9, 2017
Samples analysed Monday, August 14, 2017

Operator NICK HENDRIX

U00902

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	PO24 B-9 (6-8)	40.0	106	313.3	94.3	407.6	38.2	1.5	<0.04	99.5	0.4	0.1	Deg.Gas 55.4%,(FCM),(P)
s	PO24 B-6 (6-8)	39.4	<0.98	12.3	32.5	44.8	4.2	<0.32	<0.039	90.7	8	1.3	Deg.Fuel 80.8%,(FCM)
s	PO24 B-7 (6-8)	38.2	<0.96	<0.96	24.4	24.4	2.2	<0.31	<0.038	95	3.9	1.1	Deg.Fuel 84.7%,(FCM),(P)
s	PO24 B-8 (6-8)	37.7	<0.94	42.4	2.3	44.7	1.8	<0.3	<0.038	97.7	1.9	0.4	Deg Gas 74.9%,(FCM)
s	PO24 B-1 (4-6)	36.6	<0.92	5.1	33.7	38.8	16.9	0.95	<0.037	31.9	60.4	7.8	Deg.PHC 76.6%,(FCM)
s	PO24 B-1 (6-8)	36.6	<0.92	2.4	7.4	9.8	3.7	<0.29	<0.037	61.3	31.8	6.8	Deg.Fuel 80.6%,(FCM)
s	PO24 B-2 (2-4)	36.1	<0.9	2.1	1.3	3.4	0.98	<0.29	<0.036	77.8	18.2	4	Deg Fuel 77.3%,(FCM)
s	PO24 B-5 (0-2)	48.1	<1.2	2.1	2.9	5	2.2	<0.39	<0.048	52.4	33.9	13.8	V.Deg.PHC 75.3%,(FCM)
s	PO24 B-4 (6-8)	38.8	104.1	536.5	62.6	599.1	32.3	1.8	<0.039	95.8	3.8	0.4	Deg Gas + Deg.Fuel 73.7%,(FCM),(PFM)
s	PO24 B-3 (6-7.5)	34.7	<0.87	5.1	20.6	25.7	18.5	0.95	<0.035	30	61.7	8.3	Deg.Fuel 73.1%,(FCM)

Initial Calibrator QC check OK

Final FCM QC Check OK 97.5 %

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

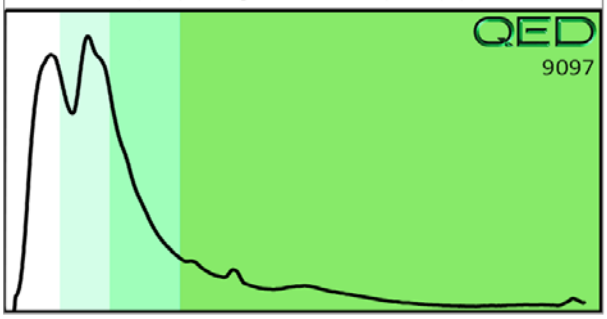
B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

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

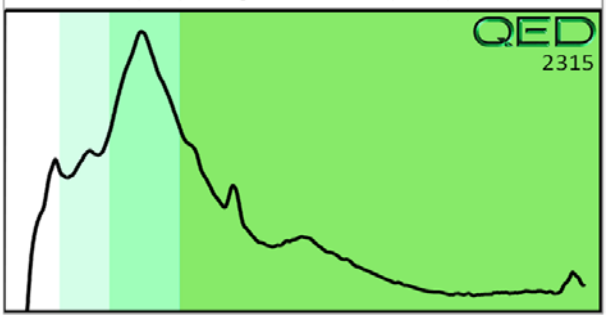
QED Hydrocarbon Fingerprints

Project: NCDOT - R2530B - P024 Monday, August 14, 2017

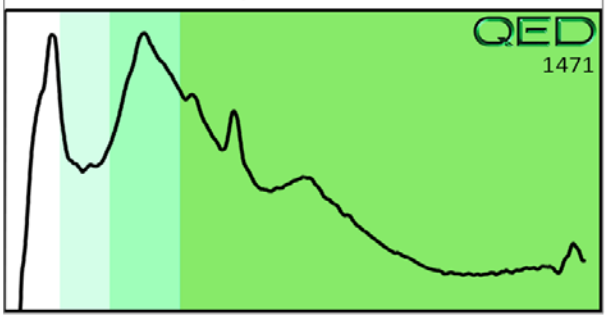
PO24 B-9 (6-8) : Deg.Gas 55.4%,(FCM),(P)



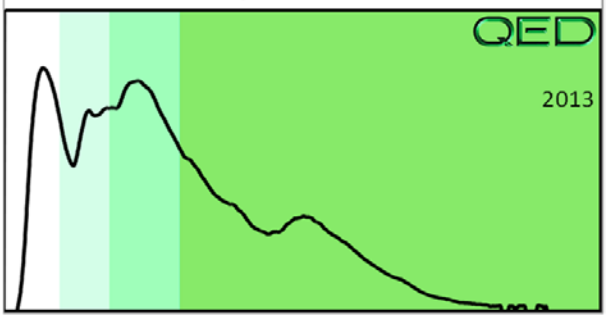
PO24 B-6 (6-8) : Deg.Fuel 80.8%,(FCM)



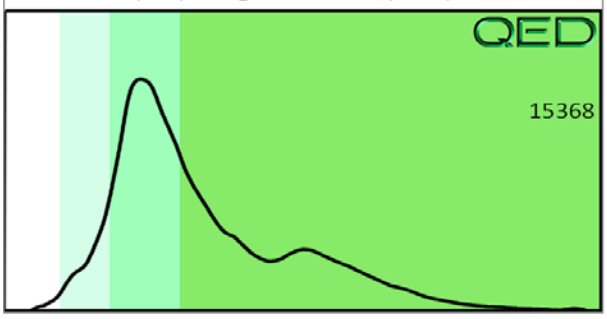
PO24 B-7 (6-8) : Deg.Fuel 84.7%,(FCM),(P)



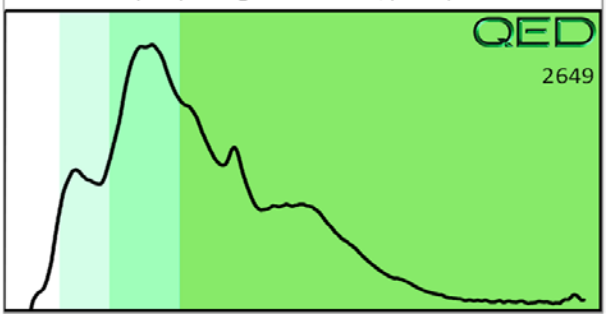
PO24 B-8 (6-8) : Deg Gas 74.9%,(FCM)



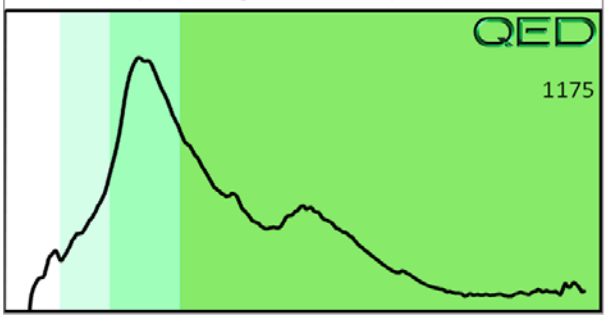
PO24 B-1 (4-6) : Deg.PHC 76.6%,(FCM)



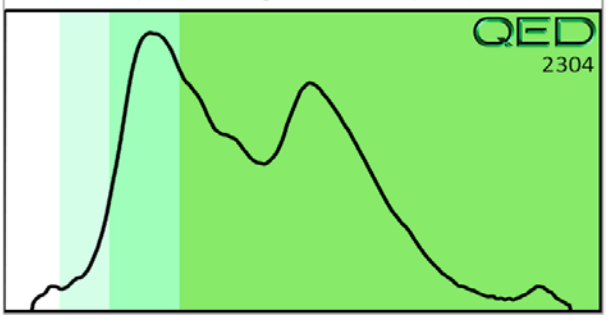
PO24 B-1 (6-8) : Deg.Fuel 80.6%,(FCM)



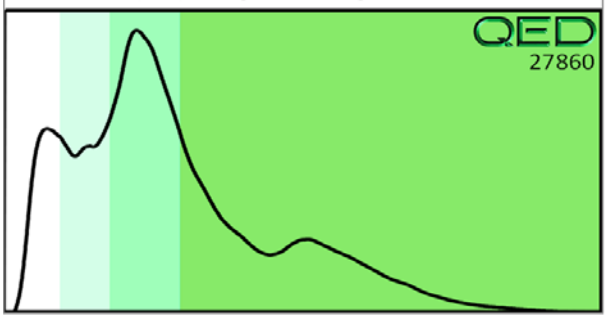
PO24 B-2 (2-4) : Deg Fuel 77.3%,(FCM)



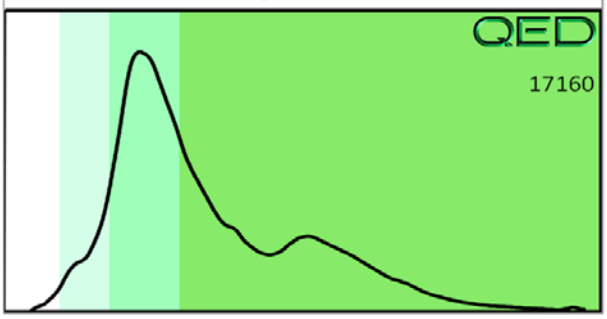
PO24 B-5 (0-2) : V.Deg.PHC 75.3%,(FCM)



PO24 B-4 (6-8) : Deg Gas + Deg.Fuel



PO24 B-3 (6-7.5) : Deg.Fuel 73.1%,(FCM)



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