Draper Aden Associates
Engineering • Surveying • Environmental Services

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July 23, 2019

Mr. Craig Haden
North Carolina Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

Reference: Preliminary Site Assessment for the Barnes Family Property (Revision 1)
13726 Buffalo Road
Clayton, Johnston County, North Carolina
State Project: W-5704E
WBS Element 44850.1.5
DAA Project No. 18110172-010701

Dear Mr. Haden:

Draper Aden Associates (DAA) completed the Preliminary Site Assessment conducted at the above-referenced property on July 1, 2019. DAA performed the work in accordance with the Technical and Cost proposal dated September 10, 2018, and the North Carolina Department of Transportation's (NCDOT's) Notice to Proceed dated September 12, 2018. Activities associated with the assessment consisted of conducting a geophysical investigation and collecting soil samples for analysis. The purpose of this report is to document the field activities, present the laboratory analyses, and provide recommendations regarding the property.

Location and Description

The Barnes Family Property is located at 13726 Buffalo Road in Clayton, Johnston County, North Carolina. The property is situated in the western quadrant of the intersection of Buffalo Road and Covered Bridge Road (**Figure 1**). The available information indicates this site is the Charles Barnes Store, which is a convenience store and automotive fueling station. Two underground storage tanks (USTs) and four above ground storage tanks (ASTs) are located at the property. Three kerosene and diesel ASTs are located on the south side of the building and one propane AST is located on the north side of the building. The building is a two-story wood-framed structure and the site is predominantly covered with a gravel and asphalt covering (**Figure 2**). According to the personnel at the store, a former motor oil changing station is located south of the building along Covered Bridge Road. According to the NCDOT, a new right-of-way acquisition will occur for road improvements. Based on the presence of USTs and ASTs, NCDOT requested that DAA conduct a

Preliminary Site Assessment (PSA) on the proposed right-of-way. The proposed right-of-way (study area) will affect the front portion of the property, but will not affect the buildings, USTs, ASTs, or dispensers.

The scope of work as defined in the Request for Technical and Cost Proposal was to evaluate the proposed right-of-way with respect to the presence of known and unknown USTs, and assess whether contamination exists within the study area. An estimate of the quantity of impacted soil is to be provided if impacted soils are encountered.

DAA reviewed the on-line NCDEQ Incident Management database and no incident has been assigned to the site.

DAA also examined the UST registration database to obtain UST ownership information. According to the database, the site operates under Facility Number 00-0-0000014922 and includes two 8,000-gallon gasoline USTs installed in 1971. The owner and operator of the tanks are:

Owner
Lona H. Barnes
13726 Buffalo Road
Clayton, NC 27520

Operator
Charles Barnes Store
13726 Buffalo Road
Clayton, NC 27520

Geophysical Survey

Prior to DAA's mobilization to the site, Pyramid Environmental & Engineering of Greensboro, NC (Pyramid) conducted a geophysical survey in the study area to determine if unknown USTs were present in the study area. The geophysical survey consisted of an electromagnetic survey using a Geonics EM61 time-domain electromagnetic (EM) induction meter to locate buried metallic objects, and ground penetrating radar (GPR) using a Geophysical Survey Systems Inc. Utility Scan DF with a dual frequency 300/800 MHz antenna. Pyramid used the instruments specifically to locate USTs.

The geophysical team laid out a survey grid along the study area with the X-axis oriented approximately parallel to Covered Bridge Road and the Y-axis oriented approximately parallel to Buffalo Road. **Figure 1** of the geophysical survey report in **Attachment A** shows the EM survey area.

The EM survey lines were spaced five feet apart and the instruments collected magnetic data continuously along each survey line with a data logger. After collection, Pyramid reviewed the data in the field with graphical user interface computer software. Following the EM, a GPR survey was conducted to further evaluate any notable metallic anomalies. GPR transects are shown on **Figure 3** of **Attachment A**.

Pyramid detected several anomalies in the study area. The survey generally attributed the anomalies to visible cultural features, metallic debris, underground utilities, signage, or vehicles. One anomaly was noted on the west side of the study area that was not readily classified; therefore, the anomaly was given a No Confidence designation. The NCDOT defines a No Confidence designation as an anomaly that is noted, but is not characteristic of a UST. The collective geophysical data did not record any evidence of unknown metallic USTs at the site. **Attachment A** presents Pyramid's detailed report of findings and interpretations.

Site Assessment Activities

On July 1, 2019, DAA mobilized to the site to conduct a Geoprobe® direct-push investigation to evaluate subsurface soil and groundwater conditions on the property to a depth of 10 feet below ground surface (ft bgs) or groundwater, whichever was shallower. Prior to DAA's mobilization, Pyramid and NC One Call located the underground utilities within the study area. DAA advanced 10 direct-push holes (SB-1 through SB-10) at select locations throughout the proposed right-of-way (**Figure 2)**. The soil boring logs are included as **Attachment B**. The borings were located to evaluate the subsurface conditions in the study area (see digital images in **Attachment C**).

The lithology observed from the direct-push samples was generally consistent throughout the study area. The ground surface was covered with about 6 inches of asphalt or topsoil. Below this surface cover was approximately 10 ft of light brown to reddish brown silty to sandy clay. Bedrock and groundwater were not encountered in any of the borings. Each boring was backfilled with a mix of bentonite (swelling clay to seal the boring) and drill cuttings to the surface after completion.

According to the 1985 Geologic Map of North Carolina, the site is within the Piedmont Physiographic Province in North Carolina. The strata indicated for this area are terrace deposits of sand and clay overlying a biotite gneiss and schist.

Continuous sampling using a Geoprobe® resulted in good recovery of soil samples from the direct-push holes. DAA collected, documented, and contained soil samples in four-foot long acetate sleeves inside the direct-push Macro-Core® sampler. The soils observed at the site are consistent with the terrace deposits identified in the area (see **Attachment B**).

Each of the sleeves was divided into two-foot long sections for soil sample screening. Soil from each two-foot interval was placed in a resealable plastic bag and the bag was set aside for volatilization of organic compounds from the soil to the bag headspace. A photoionization detector (PID) probe was inserted into the bag and the reading was recorded (**Table 1**).

DAA submitted, for laboratory analysis, one soil sample from each of the 10 borings at the depth interval with the highest PID reading measured at the time of collection (**Table 1**). Soil samples from SB-1 did not exhibit elevated PID readings; therefore, the soil sample at the mid-point depth was submitted for analysis. The soil samples were submitted to REDLab in Wilmington, North

Carolina, for analysis of total petroleum hydrocarbons (TPH) diesel range organics (DRO) and gasoline range organics (GRO) using ultraviolet fluorescence (UVF) methodology.

Analytical Results

Table 1 summarizes the soil laboratory results for the 10 soil samples for TPH DRO/GRO, and **Attachment D** presents the complete laboratory reports**.** All 10 soil samples contained detectable GRO compounds ranging from 0.71 milligrams per kilogram (mg/kg) to 468 mg/kg (**Figure 3**). All but one of the soil samples contained detectable DRO concentrations ranging from 1.4 mg/kg to 2,169 mg/kg (**Figure 3**). The action levels are 50 mg/kg for GRO and 100 mg/kg for DRO[1]. Six of the soil samples analyzed for this site contained DRO or GRO concentrations above their respective action levels (**Table 1**).

Contaminated Soil Volume Estimate

The UVF analytical results (**Table 1)** of the soil samples collected on July 1, 2019, indicate that six of the soil samples contained DRO and/or GRO concentrations above the action level. Therefore, DAA made an estimate of the volume of soil requiring possible remediation.

To estimate the volume of soil requiring possible remediation, DAA considered only the soil samples that contained a DRO and/or GRO concentration above the respective action levels. The thickness of the potentially contaminated soil was estimated from the UVF results and field screening, which indicated a thickness of 2 feet at a depth of 8 to 10 ft bgs (**Table 1**). Two areas of the site contained soil contamination above the action levels. After estimating the potential contamination geometry using field observations and experience with similar sites and geology, DAA measured the affected sections on **Figure 3** by using CAD software, which indicated an area of approximately 460 ft^2 on the north side of the study area and 4,660 ft^2 on the east and south sides of the study area. Estimating a 2-foot contamination thickness, this calculates to a volume of about 35 bank cubic yards (cy) on the north side and 345 cy on the east and south sides, for an estimated total of 379[380] bank cy.

The use of DRO and GRO concentrations to determine UST closure and immediate soil removal is a valid analytical method. However, cleanup beyond the closure is governed by risk-based methods that are based on individual constituents and do not correlate with DRO and GRO concentrations. Because of the uncertainty associated with risk-based closure criteria, the actual volume of contaminated soil that may need to be removed and / or remediated could be different than the DRO- / GRO-based estimation presented herein.

[1] NCDEQ, *Guidelines for North Carolina Action Limits for Total Petroleum Hydrocarbons (TPH)*, July 26, 2016,

Conclusions and Recommendations

DAA conducted a Preliminary Site Assessment to evaluate the Barnes Family Property located at 13726 Buffalo Road in Clayton, Johnston County, North Carolina. A geophysical survey conducted at the site did not indicate the presence of unknown metallic USTs within the study area.

Ten soil borings were advanced to evaluate the subsurface soil conditions within the site. Six of the 10 soil samples analyzed contained a GRO or DRO concentration above the respective action level resulting in an estimated total contaminated soil volume of 380 cy (refer to note above regarding risk-based closure). The contaminated soil occurs at a depth of approximately 10 ft bgs. According to the NCDOT plan sheets (see **Figure 2**), the site is within a fill section for construction. As a result, no exposure to potentially contaminated soil is anticipated during road construction.

Because TPH-DRO and GRO were detected above the action level in the soil samples, DAA recommends that a copy of this report be submitted to the Division of Waste Management, UST Section, in the Raleigh Regional Office.

DAA appreciates the opportunity to work with the NCDOT on this project. If you have any questions, please contact us at (919) 827-0864.

Sincerely,

DocuSigned by:
Michael Branson
942B7ACDE09841E...

NORTH CAROLINA LICENSED SEAL 467 GEOLOGIST MICHAEL W. BRANSON

Draper Aden Associates

Michael W. Branson
7/24/2019

William D. Newcomb

Michael W. Branson, P.G.
Project Manager

William D. Newcomb, P.G.
Senior Hydrogeologist

Attachments
- Table
- Figures
  - Figure 1 – Vicinity Map
  - Figure 2 – Site Map
  - Figure 3 – Soil Analytical Results Map
- Attachment A – Geophysical Report
- Attachment B – Boring Logs
- Attachment C – Photographs
- Attachment D – Laboratory Report

TABLE

TABLE 1
SOIL FIELD SCREENING AND ANALYTICAL RESULTS
BARNES FAMILY PROPERTY
CLAYTON, JOHNSTON COUNTY, NORTH CAROLINA
STATE PROJECT: W-5704E
WBS ELEMENT 44850.1.5
DAA PROJECT NO. 18110172-010701

SAMPLE ID	DEPTH (ft)	PID READING (ppm)	SAMPLE ID	ANALYTICAL RESULTS (mg/kg)	
				UVF GRO	UVF DRO
Action Level (mg/kg)				50	100
SB-1	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	0.0	SB-1	**1.3**	**1.4**
	6 - 8	0.0			
	8 - 10	0.0			
SB-2	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	0.0			
	6 - 8	0.4			
	8 - 10	88.0	SB-2	**19.7**	**130**
SB-3	0 - 2	0.4			
	2 - 4	0.0			
	4 - 6	0.7			
	6 - 8	29.4			
	8 - 10	121.8	SB-3	**10.7**	**43.6**
SB-4	0 - 2	0.6			
	2 - 4	0.9			
	4 - 6	4.2			
	6 - 8	23.9			
	8 - 10	362.7	SB-4	**95.8**	**399.4**
SB-5	0 - 2	6.9			
	2 - 4	8.6			
	4 - 6	17.6			
	6 - 8	28.1			
	8 - 10	429.2	SB-5	**76.9**	**24.4**
SB-6	0 - 2	12.8			
	2 - 4	21.2			
	4 - 6	41.4			
	6 - 8	47.3			
	8 - 10	1,751	SB-6	**468**	**620.5**

TABLE 1
SOIL FIELD SCREENING AND ANALYTICAL RESULTS
BARNES FAMILY PROPERTY
CLAYTON, JOHNSTON COUNTY, NORTH CAROLINA
STATE PROJECT: W-5704E
WBS ELEMENT 44850.1.5
DAA PROJECT NO. 18110172-010701

SAMPLE ID	DEPTH (ft)	PID READING (ppm)	SAMPLE ID	ANALYTICAL RESULTS (mg/kg)	
				UVF GRO	UVF DRO
Action Level (mg/kg)				50	100
SB-7	0 - 2	0.7			
	2 - 4	0.4			
	4 - 6	0.7			
	6 - 8	0.7			
	8 - 10	693.8	SB-7	**149.5**	**28.4**
SB-8	0 - 2	0.4			
	2 - 4	0.4			
	4 - 6	0.3			
	6 - 8	0.6			
	8 - 10	65.1	SB-8	**18.9**	**9.4**
SB-9	0 - 2	0.1			
	2 - 4	0.1			
	4 - 6	0.1			
	6 - 8	0.2			
	8 - 10	511.4	SB-9	**353.7**	**2169**
SB-10	0 - 2	0.2			
	2 - 4	0.2			
	4 - 6	0.1			
	6 - 8	0.2			
	8 - 10	0.7	SB-10	**0.71**	<0.52

1) ft - feet

2) ppm - parts per million

3) PID - photoionization detector

4) mg/kg - milligrams per kilogram

5) UVF DRO - Diesel range organics by ultraviolet fluorescence (UVF)

6) UVF GRO - Gasoline range organics by UVF

7) Action level for TPH based upon NCDEQ memo *Guidelines for North Carolina Action Limits for Total Petroleum Hydrocarbons* - July 29, 2016. VOC action levels based on Maximum Soil Contaminant Concentrations.

8) Soil samples were collected on July 1, 2019.

9) **Bold** values are above the detection level.

10) Shaded values are above the applicable action level.

FIGURES

PROJECT NUMBER 18110172-010701

CHECKED BY WDN

PROJECT MANAGER MWB

DATE JULY 2019

FILE NCDOT BARNES FAMILY PSA

N

SCALE 1:24,000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

SOURCE: U.S. GEOLOGICAL SURVEY 7.5 MIN QUADRANGLE: CLAYTON, NC (1993) AND FLOWERS, NC (1998)

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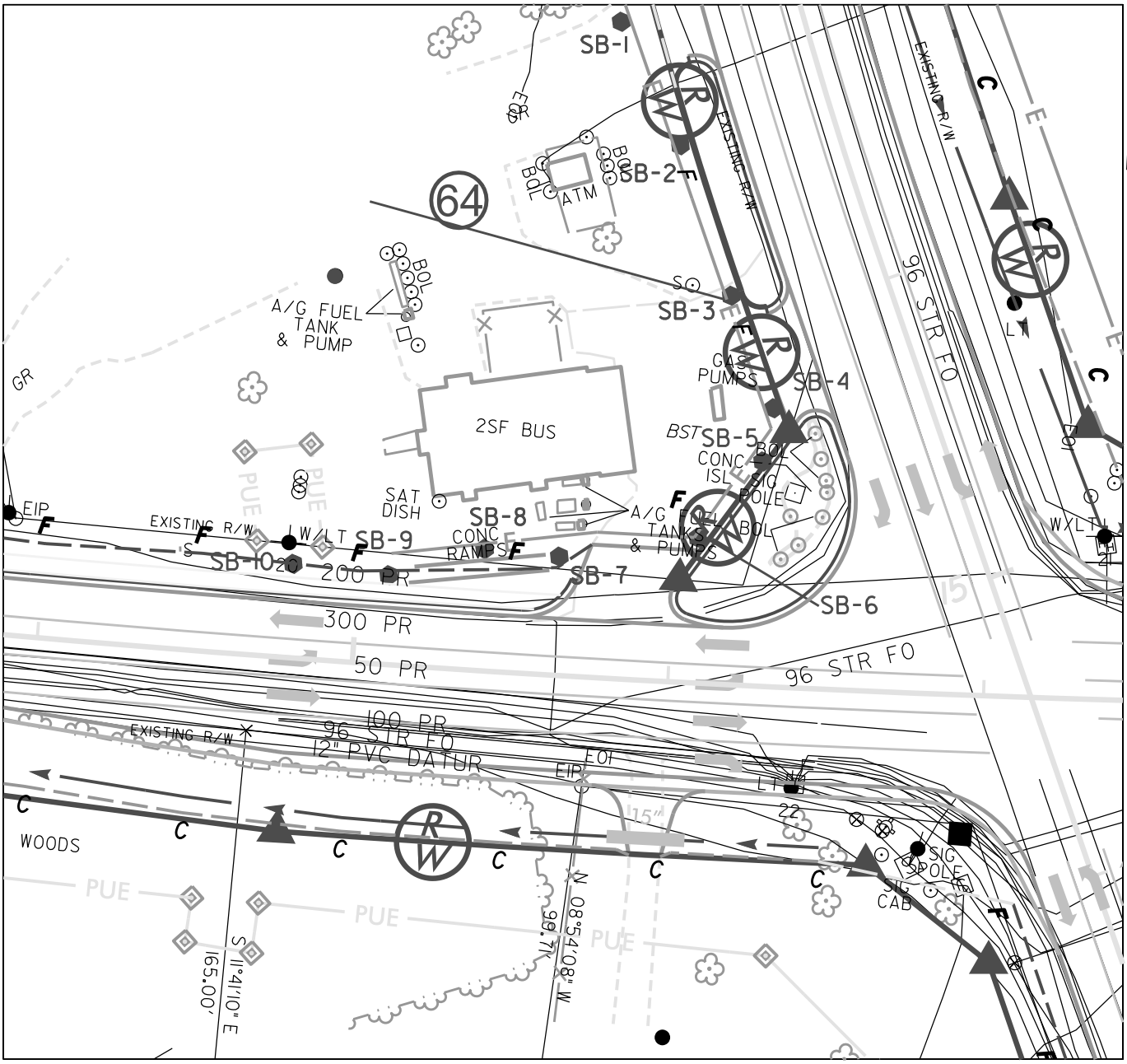
VICINITY MAP

BARNES FAMILY PROPERTY
13726 BUFFALO ROAD
CLAYTON, NORTH CAROLINA

FIGURE 1

PROJECT NUMBER	DRAFTER	CHECKED BY	PROJECT MANAGER	DATE	FILE
1811172-010701	MWB		MWB	APRIL 2018	



LEGEND

SB-1 ● SOIL SAMPLE LOCATION AND IDENTIFICATION

0 25 50
APPROXIMATE SCALE (FEET)

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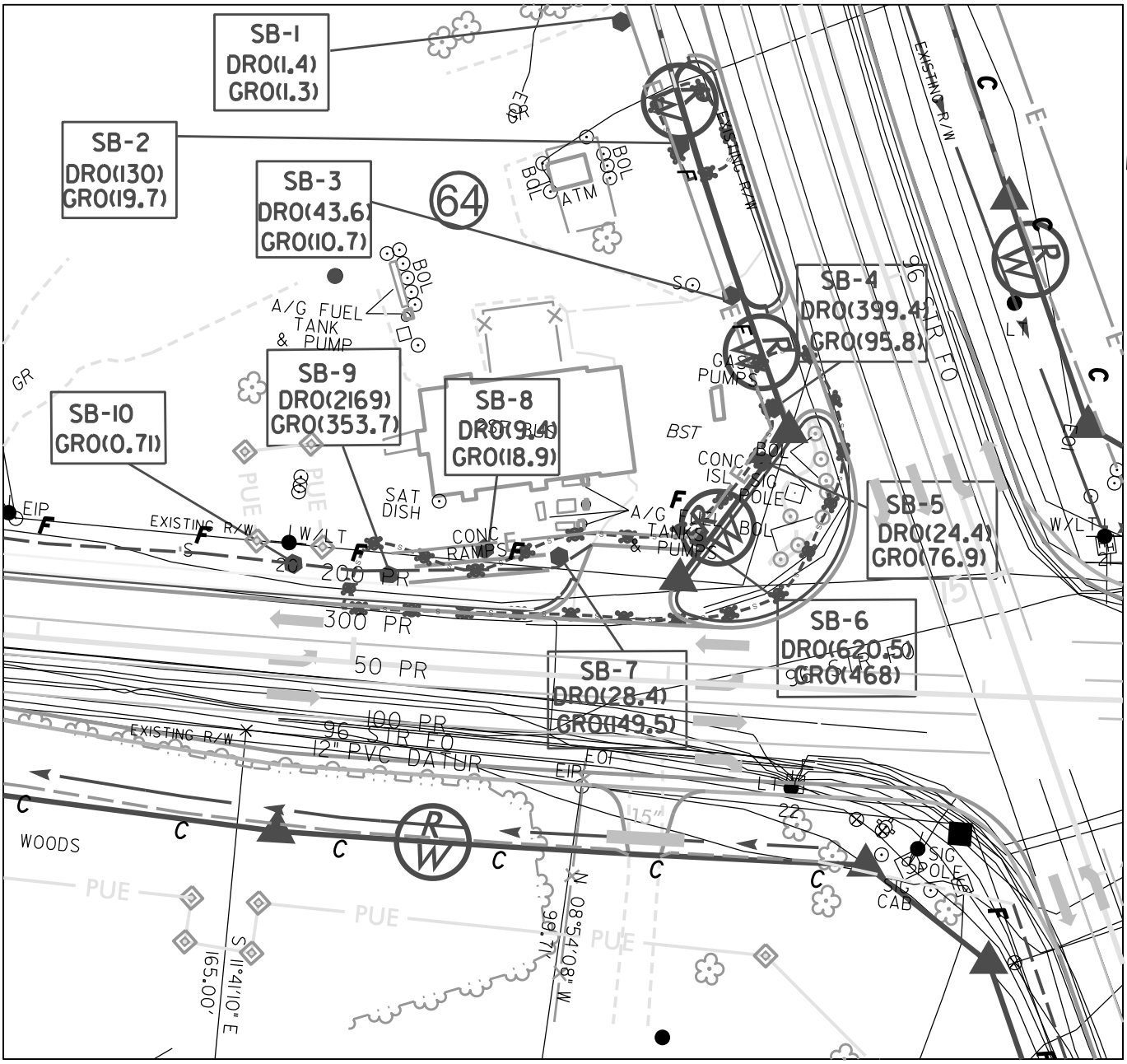
SITE MAP

BARNES FAMILY PROPERTY
13726 BUFFALO ROAD
CLAYTON, NORTH CAROLINA

FIGURE 2

PROJECT NUMBER	DRAFTER	CHECKED BY	PROJECT MANAGER	DATE	FILE
181101.72-010701	MWB		MWB	APRIL 2018	



LEGEND

SB-1 — SOIL SAMPLE LOCATION AND IDENTIFICATION

DRO(123) — DETECTED DIESEL RANGE ORGANICS IN (MG/KG)

GRO(123) — DETECTED GASOLINE RANGE ORGANICS IN (MG/KG)

ESTIMATED EXTENT OF SOIL CONTAMINTION IN RIGHT-OF-WAY

0 25 50
APPROXIMATE SCALE (FEET)

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SOIL ANALYTICAL RESULTS MAP

BARNES FAMILY PROPERTY
13726 BUFFALO ROAD
CLAYTON, NORTH CAROLINA

FIGURE 3

ATTACHMENT A

Geophysical Report

PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2018-256)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 64
NCDOT PROJECT W-5704E

13726 BUFFALO ROAD, CLAYTON, NC

June 21, 2019

Report prepared for: **Mr. Mike Branson, P.G.**
Draper Aden
114 Edinburgh South, Suite 200
Cary, NC 27511

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

Reviewed by: _____
Douglas A. Canavello, P.G.
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C257: GEOLOGY C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 64 - 13726 Buffalo Road
Clayton, Johnston County, North Carolina

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Figures

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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 Draper Aden at Parcel 64 located at 13726 Buffalo Road in Clayton, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project W-5704E). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted on June 19, 2019, 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 five EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. A no confidence anomaly was identified in the southwest portion of the survey area. This anomaly is likely the result of smaller buried metallic debris. The area around the reinforced concrete ramp in the southern portion of the survey area showed evidence of buried debris. Collectively, the geophysical data recorded evidence of one no confidence anomaly at Parcel 64. No evidence of unknown metallic USTs was observed. A tank pit with active USTs was located outside of the survey area.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Draper Aden at Parcel 64 located at 13726 Buffalo Road in Clayton, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project W-5704E). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted on June 19, 2019, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a gas station surrounded by grass, gravel, and asphalt surfaces. A tank pit containing active USTs was located outside of the survey area. 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 June 19, 2019, 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	Vehicles	✓
2	Metal Utility Pole	
3	Reinforced Concrete Ramp/Buried Debris	✓
4	AST	✓
5	**No Confidence Anomaly**	✓

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including vehicles, a metal utility pole, a reinforced concrete ramp, and an AST. EM Anomaly 5 was a medium- to high-amplitude elongated anomaly and was further investigated with GPR to investigate for the presence of a UST. GPR was performed around the areas of vehicles, the AST, and the reinforced concrete ramp to verify that the interference from the surface metal did not obscure any evidence of USTs.

Discussion of GPR Results

Figure 3 presents the locations of the formal GPR transects performed at the property as well as select transect images. All of the transect images are included in **Appendix A**. A total of seven GPR transects were performed at the property. GPR Transect 1 was performed across EM Anomaly 5. This transect showed discrete hyperbolic reflectors, indicative of utilities, on the margins of the anomaly. Due to the evidence of buried metal in the EM data and the lack of GPR evidence of a buried structure, this anomaly is classified as a no confidence anomaly. This anomaly is likely a result of smaller buried metallic debris.

The remaining transects were performed around areas of significant surface metal (vehicles, an AST, and the reinforced concrete ramp). No evidence of USTs was observed. GPR Transects 2-4 were performed around the reinforced concrete ramp (EM Anomaly 3) and showed scattered hyperbolic and repeating reflectors consistent with buried debris. No evidence of USTs was observed.

Collectively, the geophysical data recorded evidence of one no confidence anomaly at Parcel 64. No evidence of unknown metallic USTs was observed. A tank pit with active USTs was located outside of the survey area.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 64 in Clayton, 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.
- A no confidence anomaly was identified in the southwest portion of the survey area. This anomaly is likely the result of smaller buried metallic debris.
- The area around the reinforced concrete ramp in the southern portion of the survey area showed evidence of buried debris.
- Collectively, the geophysical data recorded evidence of one no confidence anomaly at Parcel 64. No evidence of unknown metallic USTs was observed. A tank pit with active USTs was located outside of the survey area.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for Draper Aden 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 North)

View of Survey Area
(Facing Approximately East)

N

PYRAMID GEOPHYSICS
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27406
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

PROJECT	PARCEL 64 CLAYTON, NORTH CAROLINA NCDOT PROJECT W-5704E
TITLE	PARCEL 64 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS
DATE	6/19/2019
PYRAMID PROJECT #:	2018-256
CLIENT	DRAPER ADEN ASSOCIATES
	FIGURE 1

EM61 METAL DETECTION RESULTS

EVIDENCE OF ONE NO CONFIDENCE ANOMALY WAS 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 EM data were collected on June 19, 2019, using a Geonics EM61-MK2 instrument.Verification GPR data were collected using a GSSI UtilityScan DF instrument with a dual frequency 300/800 MHz antenna on June 19, 2019.

EM61 Metal Detection Response (millivolts)

N

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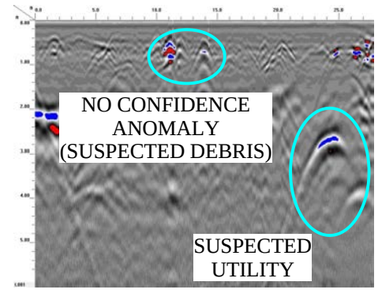
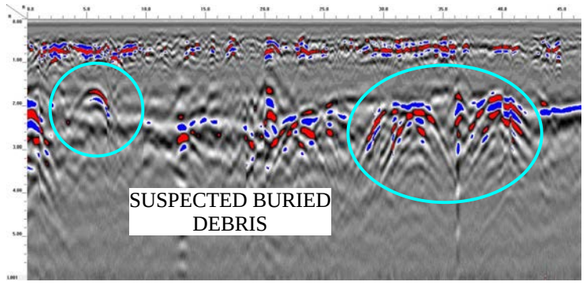
License # C1251 Eng. / License # C257 Geology

PROJECT: PARCEL 64 CLAYTON, NORTH CAROLINA NCDOT PROJECT W-5704E	TITLE: PARCEL 64 - EM61 METAL DETECTION CONTOUR MAP	DATE: 6/19/2019	CLIENT: DRAPER ADEN ASSOCIATES
		PYRAMID PROJECT #: 2018-256	**FIGURE 2**

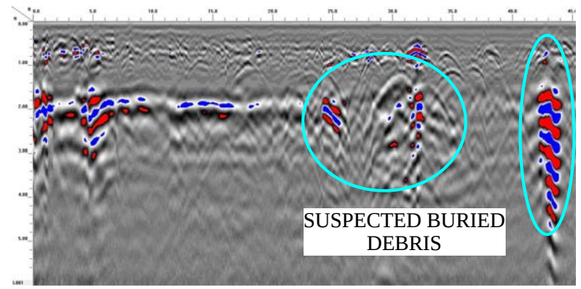
LOCATIONS OF GPR TRANSECTS



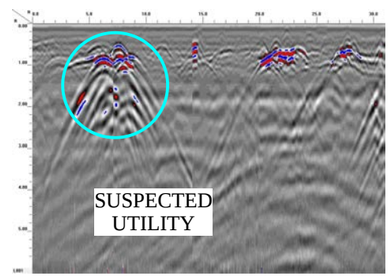
GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)



GPR TRANSECT 3 (T3)



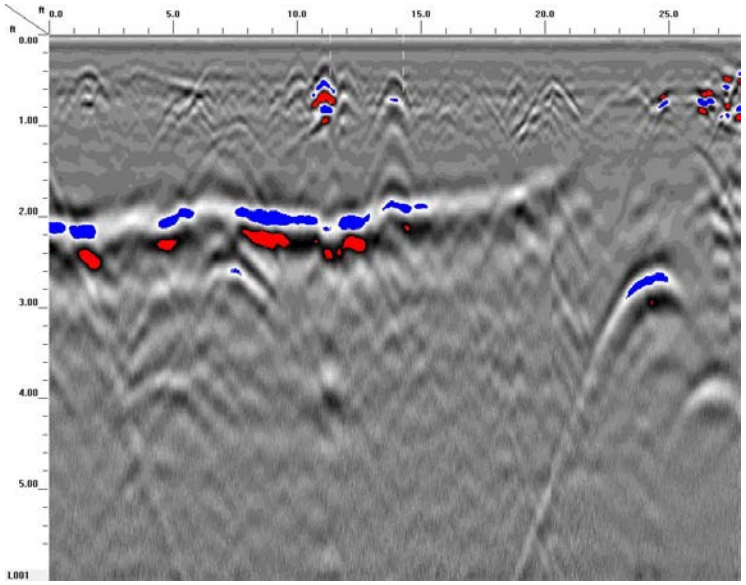
GPR TRANSECT 7 (T7)

N

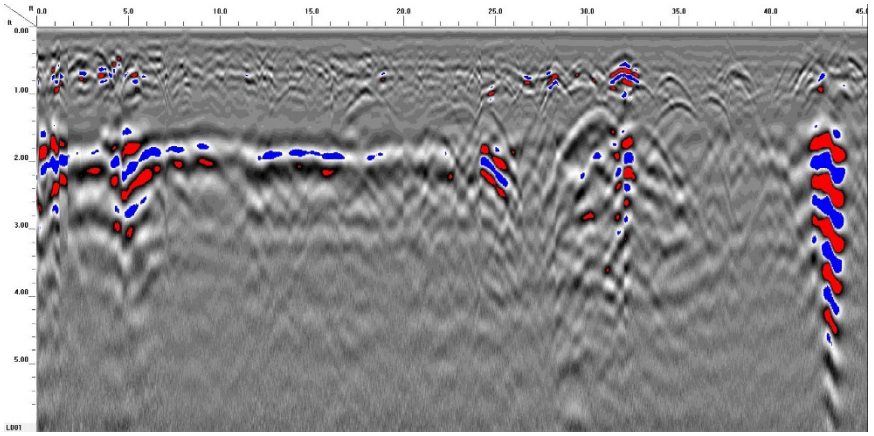
PYRAMID GEOPHYSICS
503 INDUSTRIAL AVENUE
GREENSBORO, NC 27406
(336) 335-3174 (p) (336) 691-0648 (f)
License # C1251 Eng. / License # C257 Geology

PROJECT	PARCEL 64 CLAYTON, NORTH CAROLINA NCDOT PROJECT W-5704E
TITLE	PARCEL 64 - GPR TRANSECT LOCATIONS AND SELECT IMAGES
DATE	6/19/2019
PYRAMID PROJECT #:	2018-256
CLIENT	DRAPER ADEN ASSOCIATES
	FIGURE 3

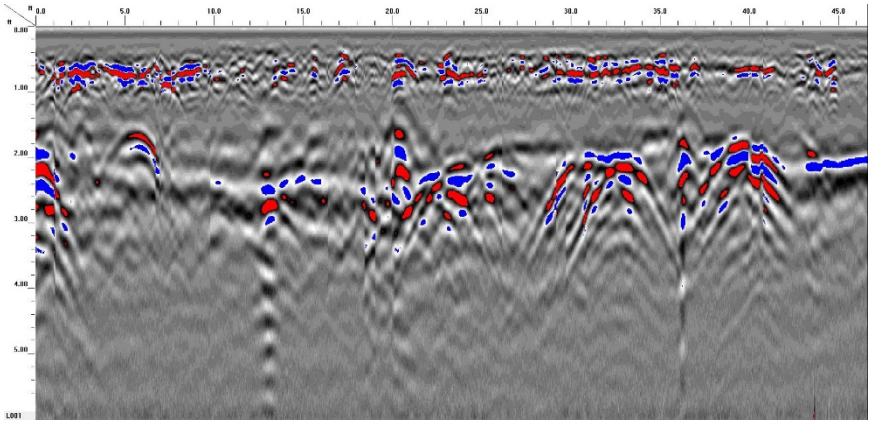
Appendix A – GPR Transect Images



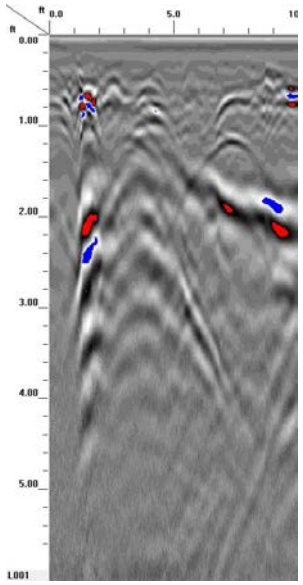
GPR TRANSECT 1



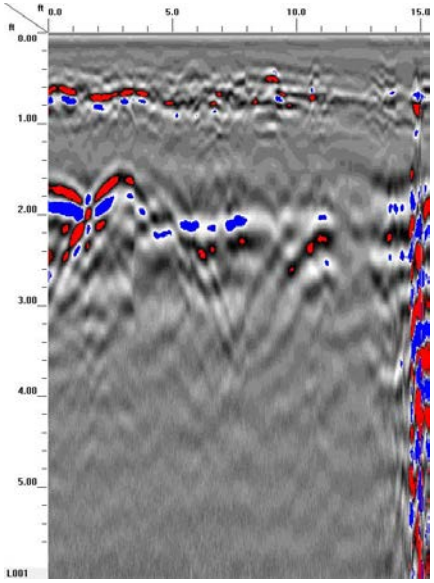
GPR TRANSECT 3



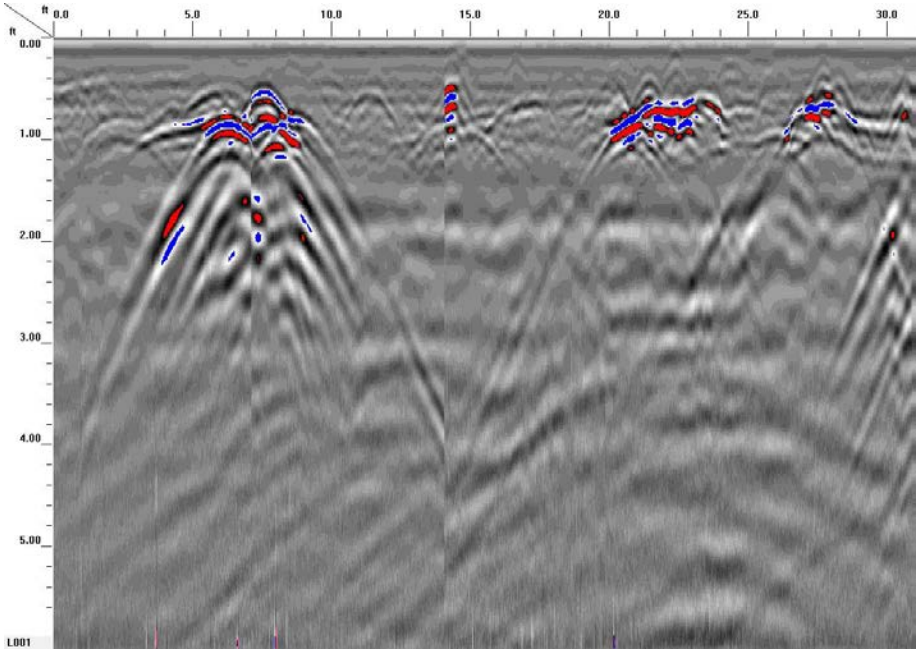
GPR TRANSECT 2



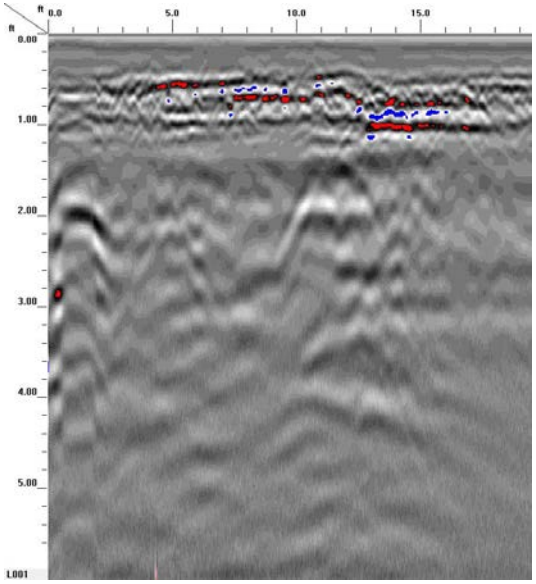
GPR TRANSECT 4



GPR TRANSECT 5



GPR TRANSECT 7



GPR TRANSECT 6

ATTACHMENT B

Boring Logs

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-1

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)	LITHOLOGIC DESCRIPTION:	Notes:
0–2	SB-1-6	100	0.0	CL — Light brown, fine-grained sandy clay	
2–4			0.0		
4–6			0.0		
6–8		100	0.0	CL — Red silty clay with light brown mottling	
8–10			0.0		

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-2

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)	LITHOLOGIC DESCRIPTION:	Notes:
0–2	SB-2-10	100	0.0	CL — Tan silty clay	
2–4			0.0	CL — Brown fine-grained sandy clay	
4–6			0.0		
6–8		100	0.4	CL — Red sandy clay with light brown mottling	
8–10			88.0		

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-3

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)	LITHOLOGIC DESCRIPTION:		Notes:
0			0.4	CL	Tan silty clay	
2		100	0.0			
4			0.7			
6			29.4	CL	Red sandy clay with light brown mottling	
8		100	121.8			
10	SB-3-10					

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-4

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)	LITHOLOGIC DESCRIPTION:		Notes:
0			0.6	Asphalt	Asphalt	
2		80	0.4			
4			4.2	Brown, fine-grained sandy clay clay	CL	
6			23.9			
8		80	362.0	Tan silty clay	CL	
10	SB-4-10					

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-5

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)		LITHOLOGIC DESCRIPTION:	Notes:
0				Asphalt	Asphalt	
2		100	6.9			
			8.6			
4				CL	Brown, fine-grained sandy clay clay	
			176.0			
6						
			28.1			
8		100				
			429.0	CL	Tan to gray silty clay	
10	SBP-5-10					

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-6

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)	LITHOLOGIC DESCRIPTION:			Notes:
0					Asphalt	Asphalt	
2		100	12.8				
			21.2				
4					CL	Brown silty clay	
			41.4				
6							
			47.3				
8		100					
			1751.0		CL	Gray silty clay	
10	SB-6-10						

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-7

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)	LITHOLOGIC DESCRIPTION:		Notes:
0			0.7	CL	Tan silty clay	
2		100	0.4	CL	Brown, fine-grained sandy clay clay	
4			0.7			
6			0.7	CL	Tan silty clay with brown mottling; some petroleum odors	
8		100	694.0	CL	Gray silty clay; some petroleum odors	
10	SB-7-10					

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-8

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)			LITHOLOGIC DESCRIPTION:	Notes:
0							
2		100	0.4	0.4	CL	Brown silty clay	
4							
6			0.5		CL	Brownish red fine-grained sandy clay; some petroleum odors	
8		100	0.6				
10	SB-8-10		65.1		CL	Gray fine-grained sandy clay; some petroleum odors	

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-9

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)	LITHOLOGIC DESCRIPTION:			Notes:
0			0.1		CL	Tan silty clay	
2		100	0.1				
4			0.1		CL	Brownish red silty clay	
6			0.2				
8		100	511.0		CL	Gray fine-grained sandy clay; some petroleum odors	
10	SB-9-10						

Draper Aden Associates
Engineering • Surveying • Environmental Services

BORING ID: SB-10

BORING LOCATION: Barnes Family	PROJECT NUMBER: 18110172-010701
DRILLING CONTRACTOR: Larry Opper	DATE: 7/1/2019
DRILLING METHOD: Direct Push	TOTAL DEPTH (ft bgs): 10'
DRILLING EQUIPMENT: Geoprobe	NORTHING: EASTING:
BOREHOLE DIAMETER: 3"	DEPTH TO WATER (ft bgs):
LOGGED BY: Daniel Beall	

DEPTH (ft bgs)	SAMPLES: Sample ID	SAMPLES: Recovery %	PID/FID Reading (ppm)	LITHOLOGIC DESCRIPTION:			Notes:
0	SB-10-10	100	0.2		CL	Tan silty clay	
2			0.2		CL	Brownish red silty clay	
4			0.1				
6		100	0.2		CL	Tan silty clay	
8			0.7				
10							

ATTACHMENT C

Photographs

PHOTO 1- VIEW OF SOIL BORING LOOKING SOUTH

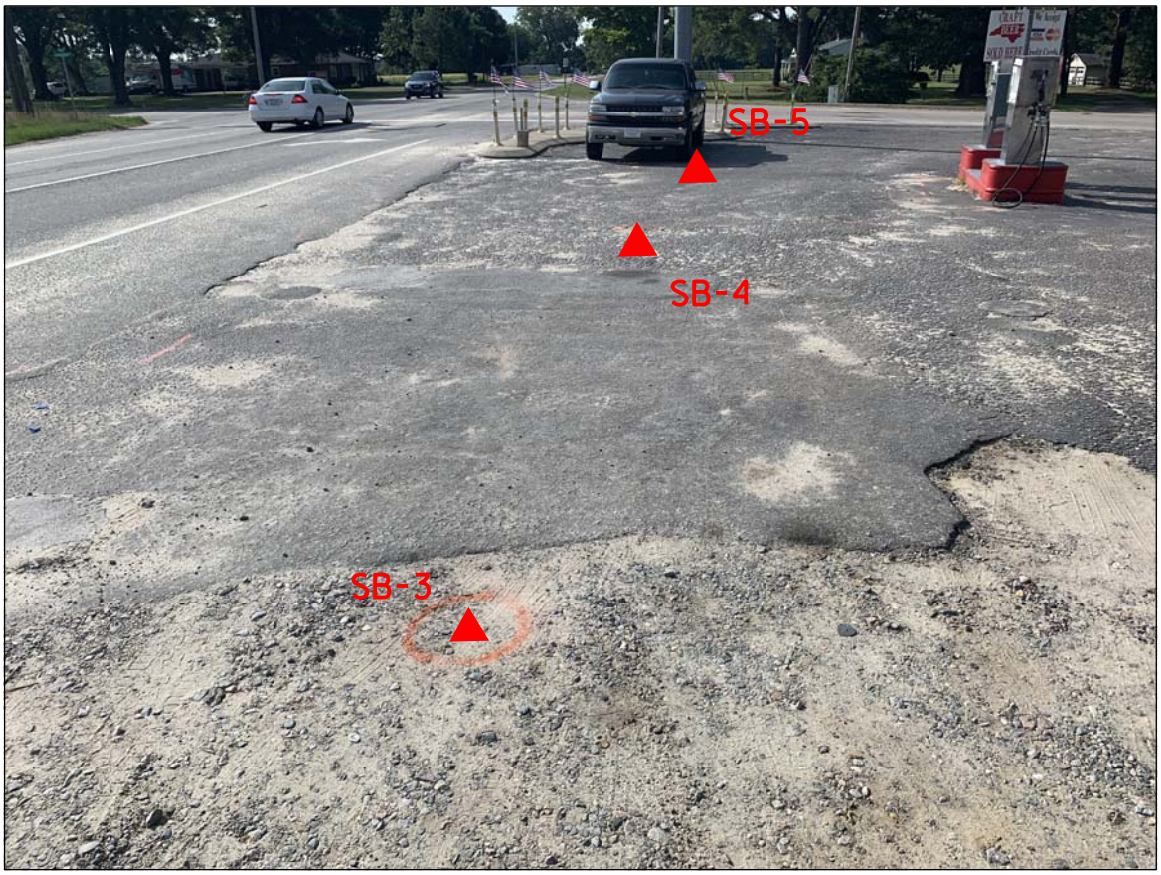


PHOTO 2 - VIEW OF SOIL BORING LOOKING SOUTH

PHOTO 3 - VIEW OF SOIL BORING LOOKING SOUTHEAST

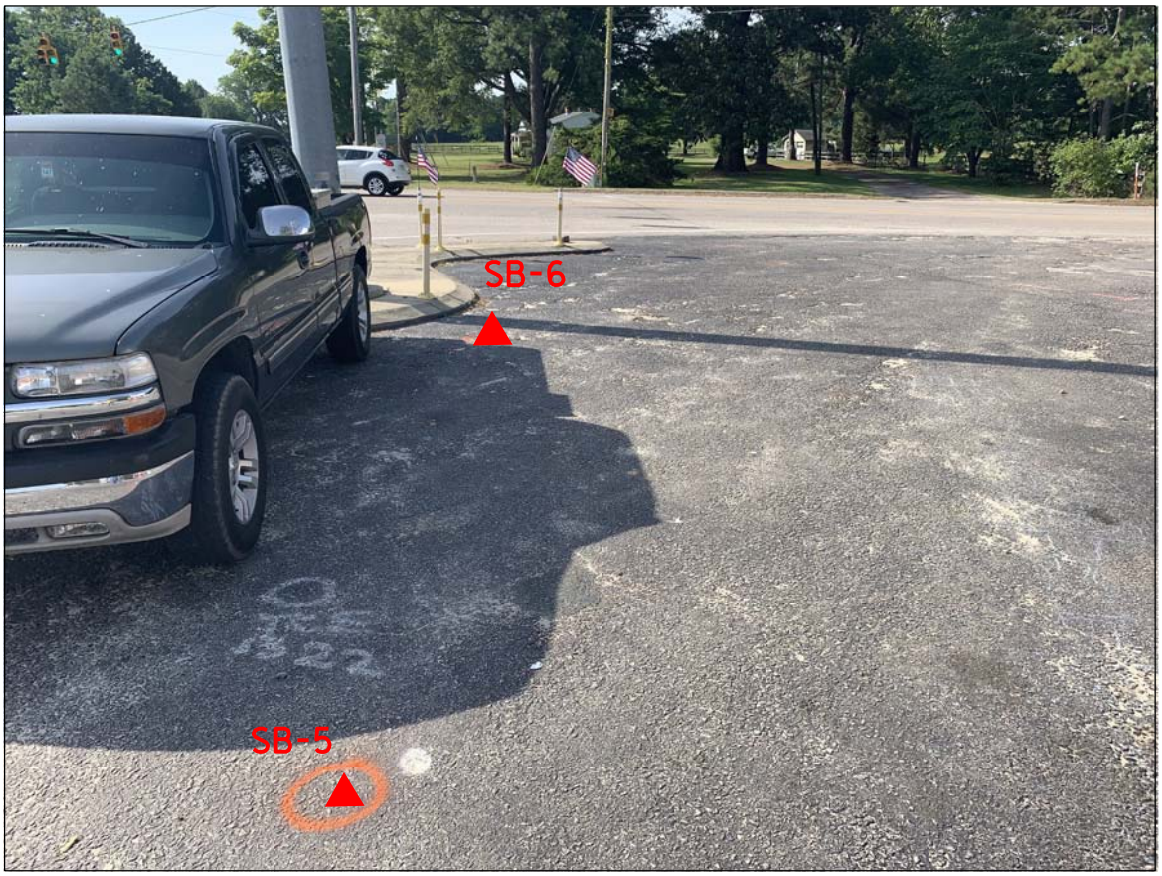


PHOTO 4 - VIEW OF SOIL BORING LOOKING SOUTH

PHOTO 5 - VIEW OF SOIL BORING LOOKING WEST

PHOTO 6 - VIEW OF SOIL BORING LOOKING WEST

PHOTO 7- VIEW OF SOIL BORING LOOKING SOUTHWEST

ATTACHMENT D

Laboratory Report

QED

REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS

AQROS

Hydrocarbon Analysis Results

Client: DRAPER ADEN
Address: 114 EDINBURGH S DR
CARY NC 27511

Samples taken Monday, July 1, 2019
Samples extracted Monday, July 1, 2019
Samples analysed Wednesday, July 3, 2019

Contact: MIKE BRANSON, DANIEL BEAL

Operator JENN RYAN

Project: 18110172 BARNES STORE

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	SB - 1 - 6	23.4	<0.59	1.3	1.4	2.7	0.68	<0.19	<0.023	74.3	20.3	5.4	Road Tar 90%,(FCM)
s	SB - 2 - 10	20.0	<0.5	19.7	130	149.7	6.3	0.25	<0.02	99.8	0.2	0	Deg.Kerosene 89.5%,(FCM)
s	SB - 3 - 10	18.6	4.1	10.7	43.6	54.3	1.7	<0.15	<0.019	99.8	0.2	0	Deg.Kerosene 93%,(FCM)
s	SB - 4 - 10	18.7	<0.47	95.8	399.4	495.2	21.2	0.83	<0.019	99.7	0.2	0.1	Deg.Kerosene 88.1%,(FCM)
s	SB - 5 - 10	20.6	<0.52	76.9	24.4	101.3	58.9	2.3	<0.021	94.3	4.3	1.4	No Match found
s	SB - 6 - 10	53.2	82.9	468	620.5	1088.5	213.3	8.2	<0.053	99.2	0.6	0.3	No Match found
s	SB - 7 - 10	20.0	<0.5	149.5	28.4	177.9	195.8	7.4	<0.02	97.4	2.1	0.6	No Match found
s	SB - 8 - 10	21.1	<0.53	18.9	9.4	28.3	6.4	0.23	<0.021	98.7	1.1	0.2	Deg.Diesel 92.8%,(FCM)
s	SB - 9 - 10	19.7	<0.49	353.7	2169	2523	1294	48.6	<0.02	-	-	-	V.Deg.Kerosene,(FCM),(OCR)
s	SB - 10 - 10	20.8	<0.52	0.71	<0.52	0.71	<0.1	<0.17	<0.021	97.9	2.1	0	Residual HC

Initial Calibrator QC check OK

Final FCM QC Check OK 103.1 %

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.

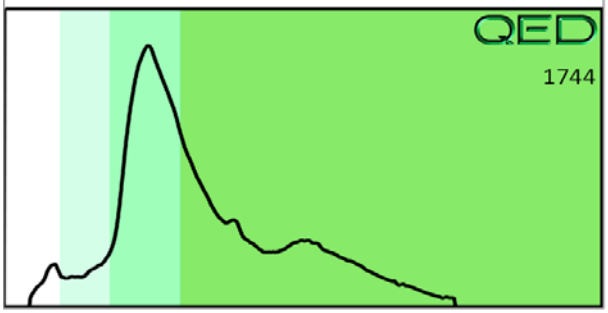
% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

QED Hydrocarbon Fingerprints

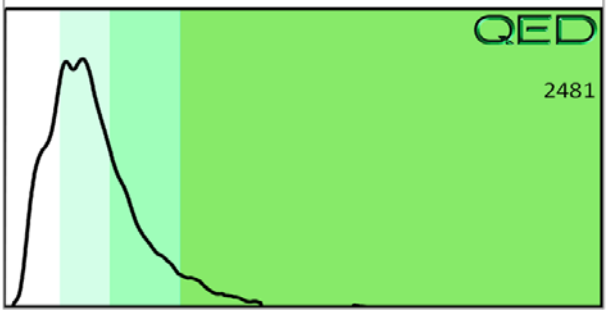
Project: 18110172 BARNES STORE

Wednesday, July 3, 2019

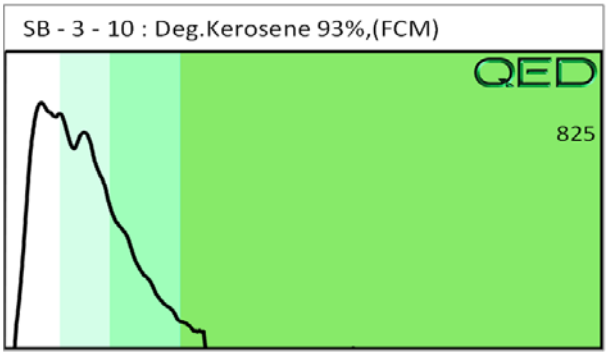
SB - 1 - 6 : Road Tar 90%,(FCM)



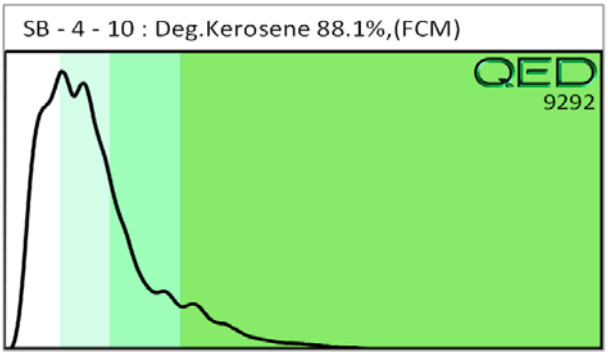
SB - 2 - 10 : Deg.Kerosene 89.5%,(FCM)



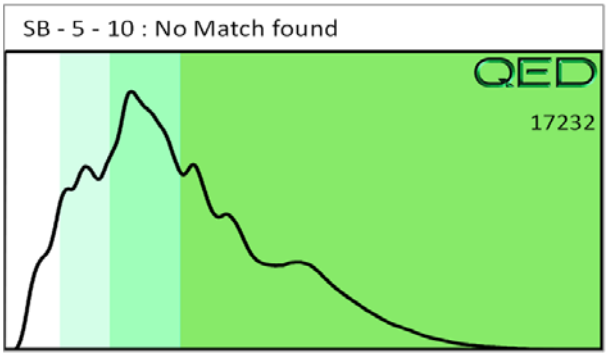
SB - 3 - 10 : Deg.Kerosene 93%,(FCM)



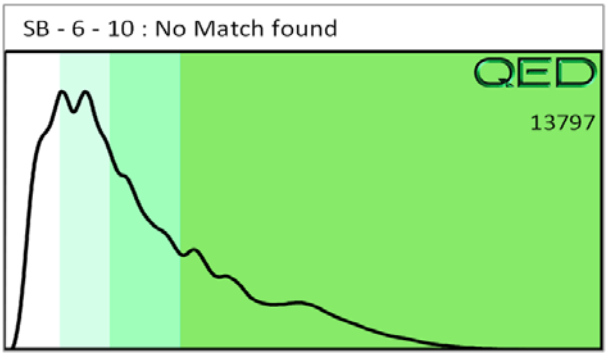
SB - 4 - 10 : Deg.Kerosene 88.1%,(FCM)



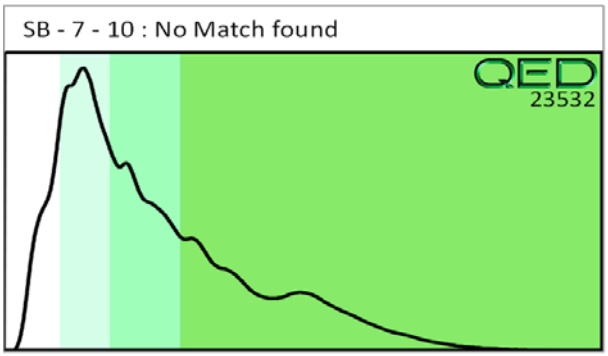
SB - 5 - 10 : No Match found



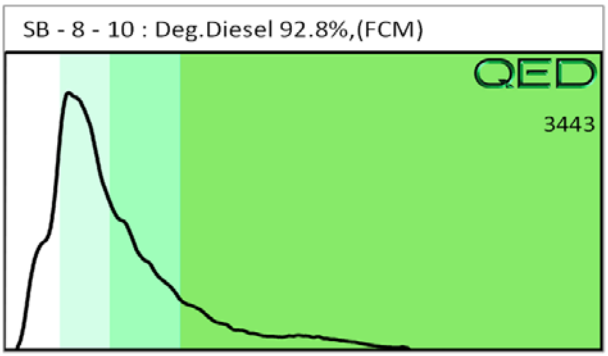
SB - 6 - 10 : No Match found



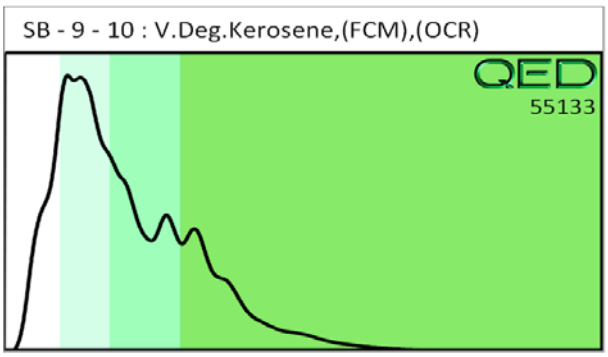
SB - 7 - 10 : No Match found



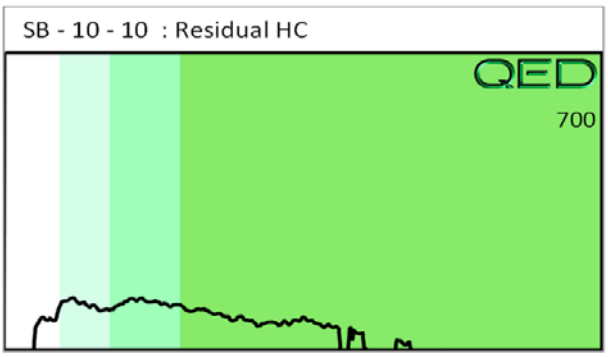
SB - 8 - 10 : Deg.Diesel 92.8%,(FCM)



SB - 9 - 10 : V.Deg.Kerosene,(FCM),(OCR)



SB - 10 - 10 : Residual HC



B129

Client Name:	DRAPER ADEN
Address:	114 EDINBURGH S. dr. CARY NC 27511
Contact:	MIKE BRANSON + DANIEL BEALL
Project Ref.:	1B11 0172 BARNES STORE
Email:	MBranson@dea.com + dbeall@dea.com
Phone #:	
Collected by:	DANIEL BEALL

REDLAB™
RAPID ENVIRONMENTAL DIAGNOSTICS

RED Lab, LLC
5598 Marvin K Moss Lane
MARBIONC Bldg, Suite 2003
Wilmington, NC 28409

Each UVF sample will be analyzed for total BTEX, GRO, DRO, TPH, PAH total aromatics and BaP. Standard GC Analyses are for BTEX and Chlorinated Solvents: VC, 1,1 DCE, 1,2 cis DCE, 1,2 trans DCE, TCE, and PCE. Specify target analytes in the space provided below.

CHAIN OF CUSTODY AND ANALYTICAL REQUEST FORM

Sample Collection Date/Time	TAT Requested 24 Hour	TAT Requested 48 Hour	Analysis Type UVF	Analysis Type GC	Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
7/1/19 0935		x	x			SB-1-6	54.4	43.3	11.1
0950						SB-2-10	56.8	43.8	13
1005						SB-3-10	58.5	44.5	14
1020						SB-4-10	57.9	44	13.9
1040						SB-5-10	56.4	43.8	12.6
1135						SB-6-10	59.1	43.7	15.4
1210						SB-7-10	57.2	44.2	13
1225						SB-8-10	56.3	44	12.3
1235						SB-9-10	57.3	44.1	13.2
1255						SB-10-10	56.9	44.4	12.5

COMMENTS/REQUESTS:

TARGET GC/UVF ANALYTES:

Relinquished by		Accepted by	Date/Time
DANIEL BEALL		FEDEX	7/2/19 1000
Relinquished by		Accepted by	Date/Time

RED Lab USE ONLY

10

Ref. No 061319A

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

July 2, 2018

MEMORANDUM TO: Addison Gainey, PE
Project Team Lead
Division 4

FROM: Craig Haden
DocuSigned by: Craig Haden AE4AE3FF131F404...
GeoEnvironmental Project Manager
GeoEnvironmental Section
Geotechnical Engineering Unit

TIP NO: W-5704E
WBS: 44850.1.5
COUNTY: JOHNSTON
DIVISION 4
DESCRIPTION: SR 1700 (Covered Bridge Rd) between 0.1 miles west of SR 2685 (Helena Lane) and 0.1 miles west of SR 1703 (Murphrey Rd) Safety Improvements

SUBJECT: **GeoEnvironmental Planning Report**

The GeoEnvironmental Section of the Geotechnical Engineering Unit performed a Phase I field investigation on June 28, 2018 for the above referenced project to identify geoenvironmental sites of concern. The purpose of this report is to document sites of concern within the project study area that are or may be contaminated. These sites of concern should be included in the environmental planning document in an effort to assist the project stakeholders in reducing or avoiding impacts to these sites. Sites of concern may include, but are not limited to, underground storage tank (UST) sites, dry cleaning facilities, hazardous waste sites, regulated landfills and unregulated dumpsites.

Findings

One (1) site of concern was identified within the proposed study area. We anticipate low monetary and scheduling impacts resulting from these sites. See the following table and figure for details.

Please note that discovery of additional sites not recorded by regulatory agencies and not reasonably discernible during the project reconnaissance may occur. The GeoEnvironmental Section should be notified immediately after discovery of such sites so their potential impact(s) may be assessed.

If there are questions regarding the geoenvironmental issues, please contact me, at 919-707-6871

Mailing Address:
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RALEIGH, NC 27699-1589

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Location:
1020 BIRCH RIDGE DRIVE
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row-notify@ncdot.gov
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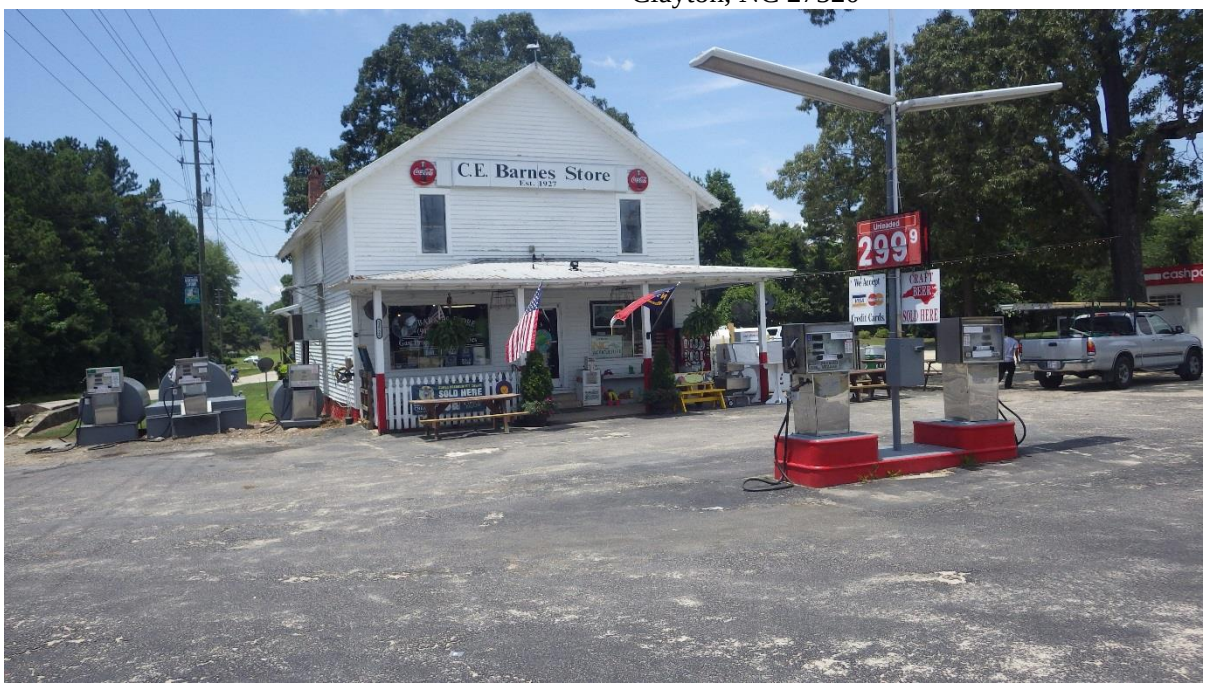
File

(01) Property Name:
Charles Barnes Store
13726 Buffalo Rd
Clayton, NC 27520

Facility ID: 00-0-0000014922
Incident Type/Number: N/A

Property Owner:
Charles Barnes Family Trust. Lona Barnes Trustee
7428 Walnut Grove Ln
Zebulon , NC 27527

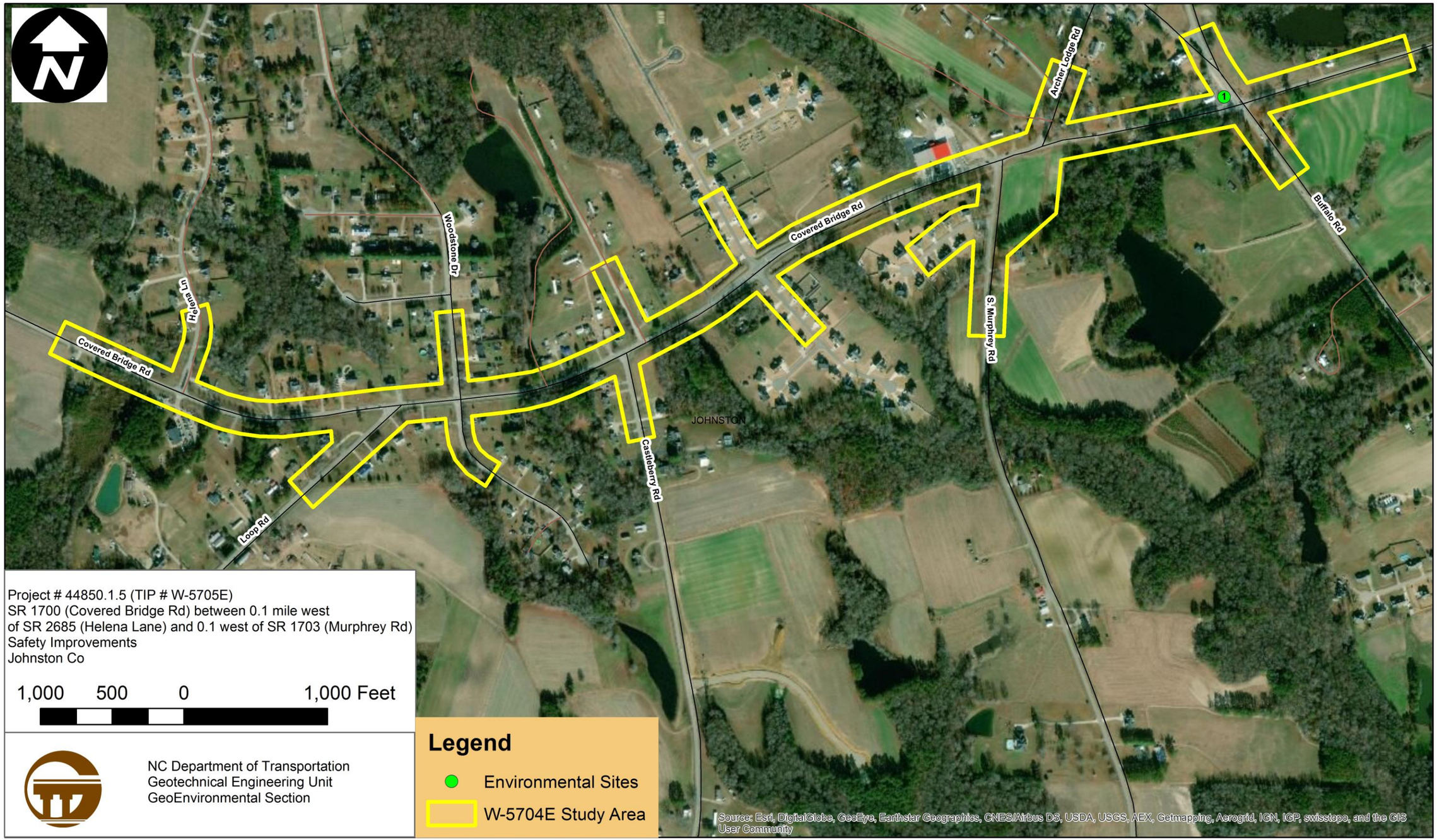
UST Owner:
Lona Barnes
13726 Buffalo Rd
Clayton, NC 27520



Anticipated Impacts: Low

This facility is an active gas station/convenience store. It is located on the northwest quadrant of Buffalo Rd and Covered Bridge Rd. According to the UST Section Registry there are two (2) UST currently in use. There are also three (3) ASTs currently in use. The USTs are located on the north side of the building. The ASTs are located on the south side of the building with the dispensers directly in front of them. The pump island for the USTs is located in front of the building approximately 40 feet from the edge of pavement on Buffalo Rd There are no known incidents associated with this facility.

Appendix A
Location of GeoEnvironmental Sites of Concern



Project # 44850.1.5 (TIP # W-5705E)
SR 1700 (Covered Bridge Rd) between 0.1 mile west
of SR 2685 (Helena Lane) and 0.1 west of SR 1703 (Murphrey Rd)
Safety Improvements
Johnston Co

1,000 500 0 1,000 Feet

NC Department of Transportation
Geotechnical Engineering Unit
GeoEnvironmental Section

Legend

- Environmental Sites
- W-5704E Study Area