PRELIMINARY SITE ASSESSMENT

SR 1100 (BRAWLEY SCHOOL ROAD) IMPROVEMENTS
TIP NO. R-3833C, WBS NO. 34554.2.4

NCDOT PARCEL NO. 74
OWNER: COUNTRY ROADS OF THE CAROLINAS, LLC
2861 CHARLOTTE HIGHWAY
MOORESVILLE, IREDELL COUNTY, NORTH CAROLINA

PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
C/O STANTEC
801 JONES FRANKLIN ROAD SUITE 300
RALEIGH NORTH CAROLINA 27606-3394

PREPARED BY:
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513

PROJECT NUMBER: G18063.02
OCTOBER 27, 2019

FALCON ENGINEERING

October 27, 2019

Mr. A. Dean Sarvis PE
Stantec
801 Jones Franklin Road, Suite 300
Raleigh, North Carolina 27606-3394

Re: **Preliminary Site Assessment**
SR 1100 (Brawley School Road) Improvements
TIP No. R-3833C, WBS No. 34554.2.4
Parcel No. 74
Owner: Country Roads of the Carolinas, LLC
2861 Charlotte Highway
Mooresville, Iredell County, North Carolina

Dear: Mr. Sarvis:

Falcon is pleased to present the following Preliminary Site Assessment in support of the above-mentioned Project. Specifically, Falcon sampled soil in proximity to the project limits on this parcel in general accordance with the approved scope of work. Soils requiring remediation or special handling during construction were not identified.

Falcon recommends if drums, USTs, above ground storage tanks (ASTs), petroleum odors or sheen are observed during any excavation associated with any property involved in the project that all work in the vicinity stop until further assessment takes place. Further assessment can include but is not limited to; sampling the soil and groundwater, excavation, and proper handling and disposal of contaminated soils and groundwater.

Please review this report and advise us if you have any questions or concerns. We appreciate this opportunity to provide services to you and look forward to partnering with you on future projects. If you have any questions, please give Falcon a call at (919) 871-0800.

Sincerely,
FALCON ENGINEERING, INC.

Christopher J. Burkhardt
Environmental Services Manager

Jeremy R. Hamm, PE
Geotechnical Services Manager

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SECTION 1: INTRODUCTION

1.1 DESCRIPTION

Falcon Engineering, Inc. (Falcon) has completed a Preliminary Site Assessment of NCDOT TIP No. R-3833C Parcel No. 74. Parcel No. 74 is addressed as 2861 Charlotte Highway, Mooresville, Iredell County, North Carolina. NCDOT is proposing to improve SR 1100 (Brawley School Road) from SR 1116 (Talbert Road) to 1,000' east of US 21, including improvements to a number of intersecting roads and driveways throughout this corridor. The limits of the assessment are between the existing edge of NCDOT maintained pavement (within the existing NCDOT ROW) where accessible, and the proposed NCDOT ROW and/or easement (whichever boundary represents the largest area). Boring locations were placed in the vicinity of proposed excavations for drainage features, utilities, and roadway/ditch cuts to determine if soils requiring remediation or special handling were present where excavation is planned to take place.

1.2 SCOPE OF WORK

Falcon's scope of work included coordination of; public and private utility location near the proposed borings, geophysical surveys, collecting soil samples with a geoprobe, and laboratory analysis. Samples were analyzed for petroleum via UVF technology.

SECTION 2: HISTORY

2.1 PARCEL USAGE

Falcon performed a Phase I Environmental Site Assessment (ESA) for R-3833C under Project No. G18063.01 dated March 2019. The ESA identified this parcel as a Recognized Environmental Condition (REC) based on the parcel's history as a suspect gas station. Kiser S. Service & Grocery is listed in City Directories at this address in 2000; however, the date of construction for the building is 1957. This commercial building is currently vacant. A concrete island and suspect fill pipes indicating the potential presence of at least one UST were observed at this location. Boards covered the windows blocking interior views. The concrete island is in front of the west facing elevation of the building. This facility is considered a REC based on the suspected presence of a UST and its potential for an unreported release.

2.2 FACILITY IDENTIFICATION NUMBER

A Facility Identification Number was not identified for this parcel.

2.3 GROUNDWATER INCIDENT NUMBER

A Groundwater Incident Number was not identified for this parcel.

SECTION 3: SITE OBSERVATIONS

3.1 GROUNDWATER MONITORING WELLS

Groundwater monitoring wells (MWs) were not observed on this parcel.

3.2 ACTIVE USTS

Active USTs were not observed within the project limits or registered at this parcel. However a suspect former dispenser Island was observed.

3.3 FEATURES APPARENT BEYOND ROW/EASEMENT

USTs, monitoring wells, remediation systems, or hydraulic lifts were not observed within the project limits. However, access to the building was not available. Windows with unobstructed views of the interior were not observed Therefore; USTs and hydraulic lifts on this parcel cannot be ruled out.

SECTION 4: METHODOLOGY

4.1 GEOPHYSICS

Pyramid Geophysical Services (Pyramid) was subcontracted to perform a geophysical survey of the assessment area. The assessment area consists of the property frontage between the existing edge of NCDOT maintained pavement (within the existing NCDOT ROW) where accessible, and the proposed NCDOT ROW and/or easement (whichever boundary represents the largest area). The survey was used to locate private utility lines, as well as possible indications of USTs, and/or their pits.

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 georeferenced and can be overlain on aerial photographs and CADD drawings.

GPR data was acquired across select EM anomalies (where identified), using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Pyramid marked their findings on the surface with paint. 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 to obtain adequate coverage. A copy of the full Geophysical Report is included in the Attachments.

4.2 BORINGS

Regional Probing was subcontracted to advance soil borings using direct push technology. Regional Probing used a truck mounted Geoprobe® 5410 unit mounted on an off-road modified Ford F350 Diesel 4x4. The unit has auger-capabilities and is equipped with a GH-42 soil-probing hammer, with 21,700 pounds of down force and 28,900 pounds of retraction force. The unit has an on-board tank for decontaminating the geoprobe rods before advancing the probe at each sample location.

4.3 SAMPLE PROTOCOL

Prior to initiating sample collection Falcon contacted NC One Call and requested public utility locations be marked around the proposed sample locations. Sampling was in general accordance with the NC Department of Environmental Quality (DEQ) Division of Waste Management's (DWM) "Guidelines for Site Checks, Tank Closure, and Initial Response and Abatement for UST Releases" (March 1, 2007 Version Change 9 – February 1, 2019) guidance document. Sampling strategy was derived based upon the project scope and objectives as outlined above. Red Lab, LLC was selected to perform the UVF laboratory analytical analysis. Appropriate sterile containers were received by Falcon from Red Lab prior to beginning the fieldwork. The containers were labeled appropriately.

A Minirae 3000 photoionization detector (PID) was used to field screen samples for volatile organics to determine if a release had occurred. The instrument was calibrated per manufacturer instructions prior to use. Falcon staff bagged composite soil samples of each boring in approximately two-foot sections. Representative samples were placed in a sealed plastic bag for approximately 10 minutes to allow soil hydrocarbons to reach equilibrium within the headspace prior to scanning with the PID. One sample per boring was collected from the depth of the proposed cut or from the section above the depth of cut with the highest PID reading.

To avoid cross contamination, a new unused pair of non-powdered nitrile gloves was worn while extracting each sample. Samples were placed in the appropriate laboratory provided containers. The labels on each container were then completed so that each provided the date and time of sampling, method of analysis, sample collector, preservative used and sampling location identification. Samples were placed in an ice filled cooler and transported to the lab. Appropriate chain-of-custody procedures, including the completion of necessary forms, were followed.

SECTION 5: RESULTS

5.1 GEOPHYSICS

The geophysical investigation was performed on August 11 and 12, 2019 to investigate for the presence of unknown, metallic underground storage tanks (USTs) beneath the surface. The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of six EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed across areas containing significant metallic interference associated with reinforced concrete. Additional significant buried structures were not identified. Collectively, the geophysical data did not record evidence of metallic USTs within the survey area at Parcel No. 74.

5.2 SAMPLE DATA

Falcon and our subcontractor advanced four borings (B-15, B-16, B-17, and B-18) to 10 feet below ground surface in the area of the suspect former dispenser island. Groundwater was not observed. Please see the Boring Location Plan in the attachments for a visual depiction of the boring locations. The coordinates (latitude and longitude) that correspond to the boring locations are shown below in Table No. 1 Boring Coordinates.

TABLE NO. 1 BORING COORDINATES

Boring	Latitude	Longitude
B-15	35.5771213	-80.8410738
B-16	35.5770668	-80.8410769
B-17	35.5770358	-80.8411138
B-18	35.5770825	-80.841164

The PID screening results are presented in Table No. 2 PID Readings. Borings were field screened with a PID for evidence of volatile organics in sections as indicated in Table No. 2. PID readings for this parcel were consistently 0.0 which can be indicative of mis-calibrated or malfunctioning equipment. Falcon confirmed the PID was calibrated and confirmed normal functioning when VOCs were identifed after placing a permanent marker near the PID sensor. Falcon selected soil samples based on the needs of the project. Red Lab analyzed the selected samples and their full analytical report is attached. The results of the laboratory analysis are summarized in Table No. 3 Summary of UVF Soil Sampling Results.

Petroleum hydrocarbons above State Action Levels were not detected in the samples.

TABLE NO. 2 PID READINGS

Boring	Depth BGS*	PID**
B-15	0-2.5	0.0
	2.5-5	0.0
	5-7.5	0.0
	7.5-10	**0.0**
B-16	0-2.5	0.0
	2.5-5	0.0
	5-7.5	0.0
	7.5-10	**0.0**
B-17	0-2.5	0.0
	2.5-5	0.0
	5-7.5	0.0
	7.5-10	**0.0**
B-18	0-2.5	0.0
	2.5-5	0.0
	5-7.5	0.0
	7.5-10	**0.0**

*BGS = Depth below ground surface in feet
**PID readings are in parts per million
Samples shown in **bold** were selected for analysis

TABLE NO. 3 SUMMARY OF UVF SOIL SAMPLING RESULTS

Sample ID	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
								% light	% mid	% heavy	
B-15	<0.46	<0.46	0.59	0.59	0.59	<0.15	<0.018	0	59.2	40.8	V.Deg.PHC 72%,(FCM),(BO)
B-16	<0.53	<0.53	<0.53	<0.53	<0.11	<0.17	<0.021	0	0	0	Residual HC
B-17	<0.31	<0.31	0.4	0.4	0.49	<0.1	<0.012	0	50.1	49.9	Deg.Fuel 61%,(FCM)
B-18	<0.35	<0.35	<0.35	0.17	0.17	<0.11	<0.014	0	25.8	74.2	Residual HC

Results reported in mg/kg (milligrams per kilogram)

5.3 SAMPLE OBSERVATIONS

Obvious visual indications of a release (stained soils, odors, or oily sheen) were not observed. Table No. 4 Soil Observations lists visual soil observations of color and texture.

TABLE NO. 4 SOIL OBSERVATIONS

Sample ID	Depth	Color	Soil Type
B-15	0-2.5	Red	Sandy Silt (A-4) w/ trace Mica
	2.5-5	Red	Sandy Clayey Silt (A-4)
	5-7.5	Brown	Silty Sand (A-2-4)
	7.5-10	Brown	Slightly Sandy Silt (A-4)
B-16	0-2.5	Red	Clayey Silt (A-5) w/ trace Mica
	2.5-5	Red	Clayey Silt (A-5) w/ trace Mica
	5-7.5	Brown	Slightly Sandy Silt (A-4)
	7.5-10	Red Brown	Sandy Silt (A-4)
B-17	0-2.5	Red	Clayey Silt (A-5) w/ trace Mica
	2.5-5	Red Brown	Slightly Sandy Silt (A-4)
	5-7.5	Brown	Slightly Sandy Silt (A-4) w/ trace Mica
	7.5-10	Brown	Slightly Sandy Silt (A-4) w/ trace Mica
B-18	0-2.5	Red	Clayey Silt (A-5) w/ trace Mica
	2.5-5	Red Brown	Sandy Clayey Silt (A-4) w/ trace Mica
	5-7.5	Red	Clayey Sandy Silt (A-4)
	7.5-10	Brown	Sandy Silt (A-4) w/ trace Mica

Depth is in feet below ground surface

5.4 QUANTITIES CALCULATIONS

Soils requiring quantity calculations were not identified.

SECTION 6: CONCLUSIONS

6.1 INTERPRETATION OF RESULTS

This Preliminary Site Assessment was performed to evaluate the soils in proximity to the project limits on this parcel for the presence of petroleum hydrocarbons. The findings are as follows:

- Soil sampling completed on the parcel did not identify contaminants in the soil sampled at levels requiring remediation.

6.2 GEOPHYSICS

The geophysical data did not record evidence of metallic USTs within the survey area at Parcel No. 74. Falcon does not anticipate USTs will be encountered within the project limits on this parcel during construction.

6.3 SAMPLING

Sampling results did not identify contaminants in the soil which require remediation in the areas sampled. Based on past project experience, Falcon does not anticipate soil remediation or special handling and disposal will be required during construction on this parcel.

6.4 QUANTITIES

Soils requiring quantities calculations were not identified.

SECTION 7: RECOMMENDATIONS

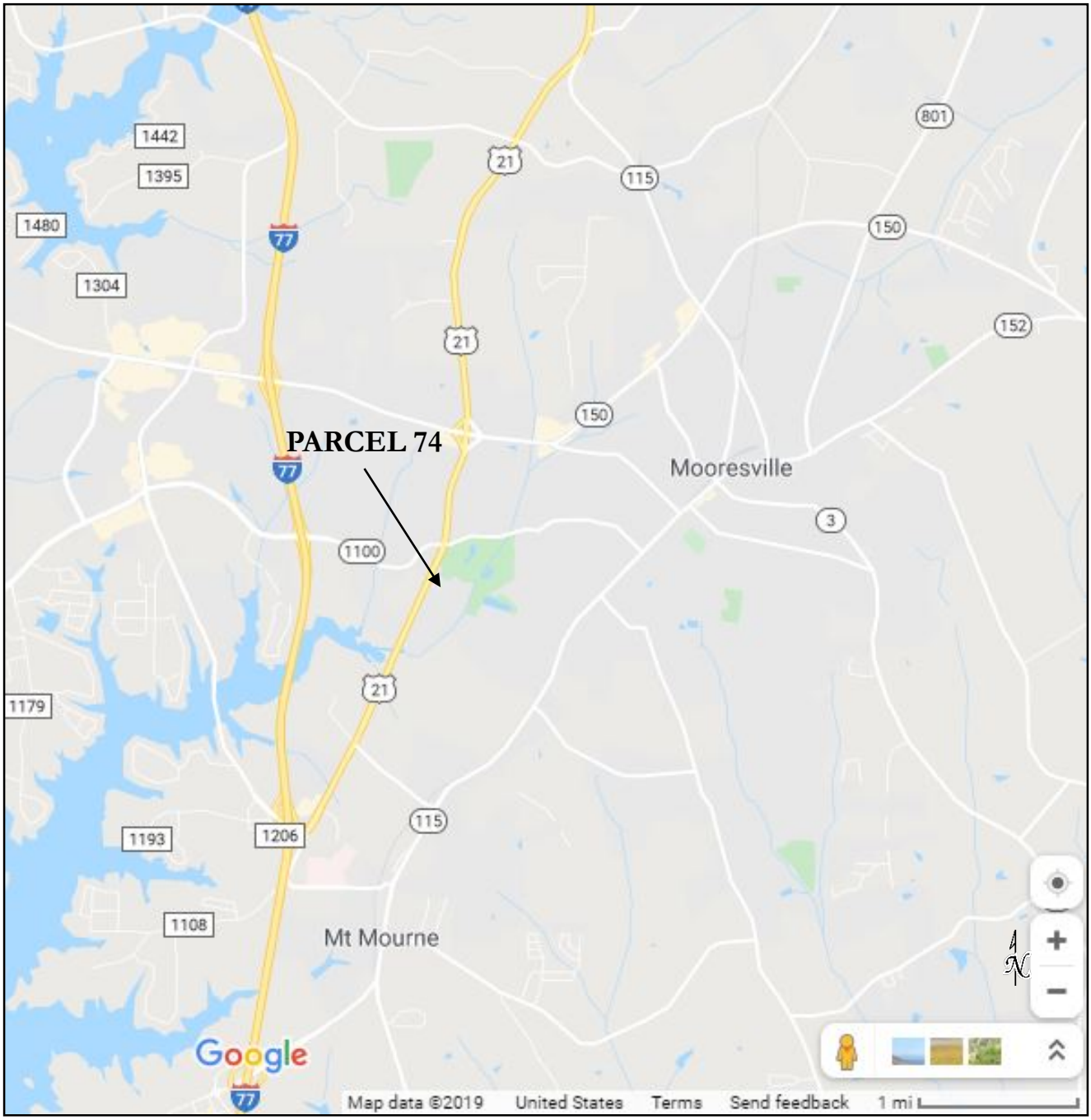
7.1 ADDITIONAL SAMPLING

Contaminants above the Industrial / Commercial Soil Cleanup Levels were not identified; therefore, additional assessment is not warranted at this time. Falcon recommends if drums, USTs, above ground storage tanks (ASTs), petroleum odors or sheen are observed during any excavation associated with any property involved in the project that all work in the vicinity stop until further assessment takes place. Further assessment can include but is not limited to; sampling the soil and groundwater, excavation, and proper handling and disposal of contaminated soils and groundwater.

7.2 SPECIAL HANDLING OF IMPACTED SOIL

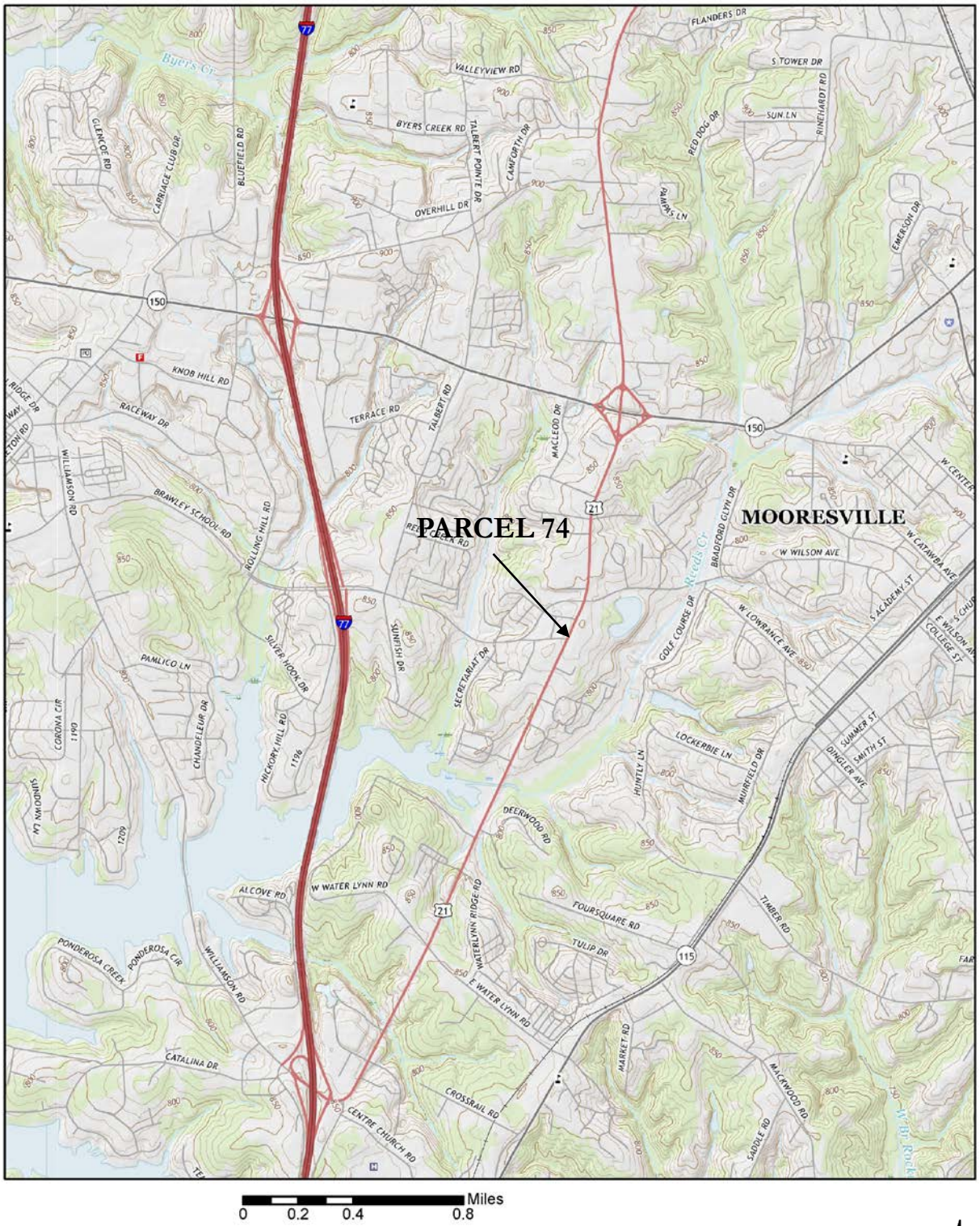
Soils requiring special handling were not identified. If suspect contaminated soils are encountered during construction Falcon and the NCDOT GeoEnvironmental Group should be contacted for proper handling instructions.

NCDOT R-3833C (SR 1100 Improvements)
Preliminary Site Assessment
Parcel 74 Vicinity Map



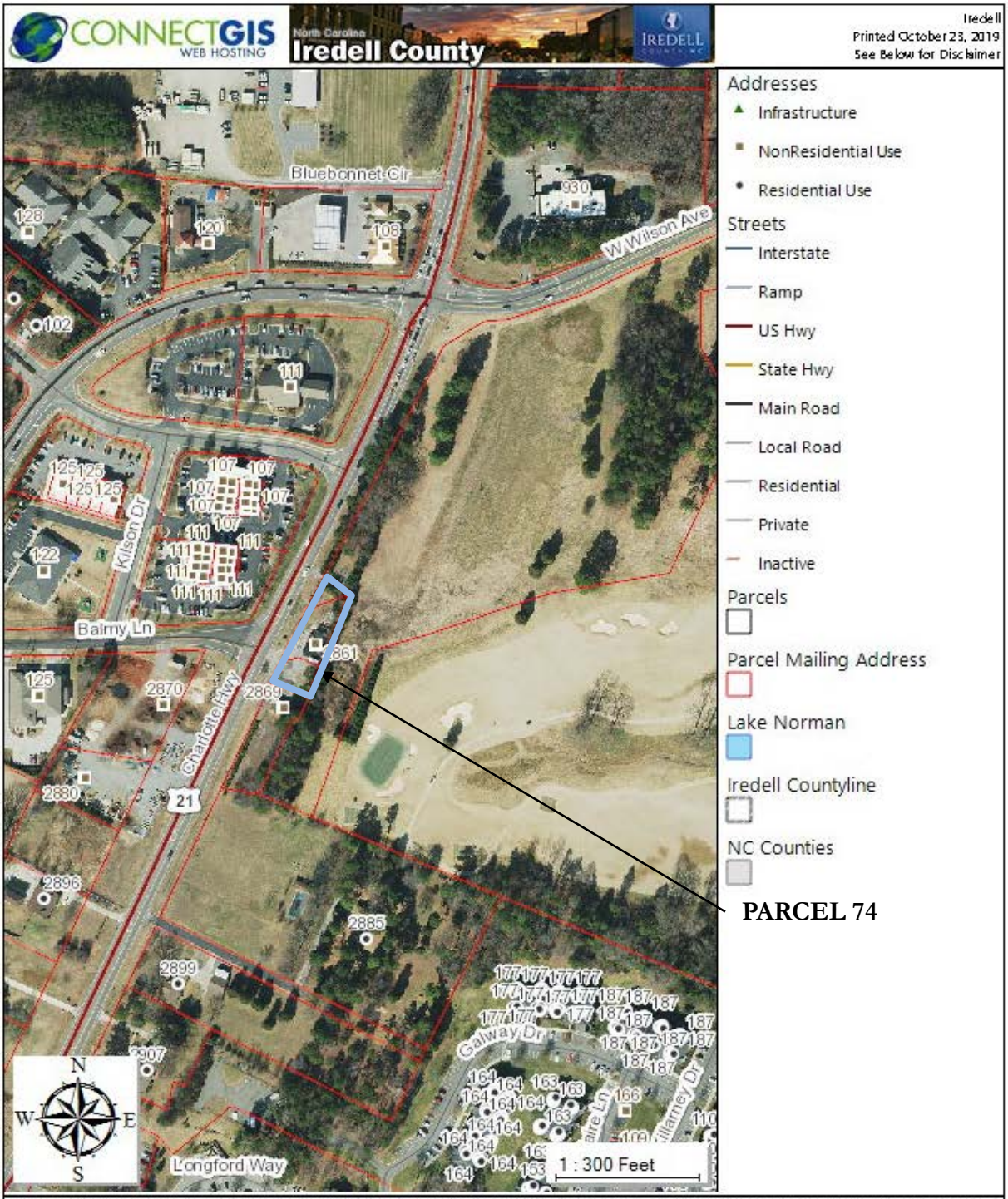
Project No.: G18063.02
Date: October 2019
Source: Google Maps

NCDOT R-3833C (SR 1100 Improvements)
Preliminary Site Assessment
Parcel 74 Topographic Map



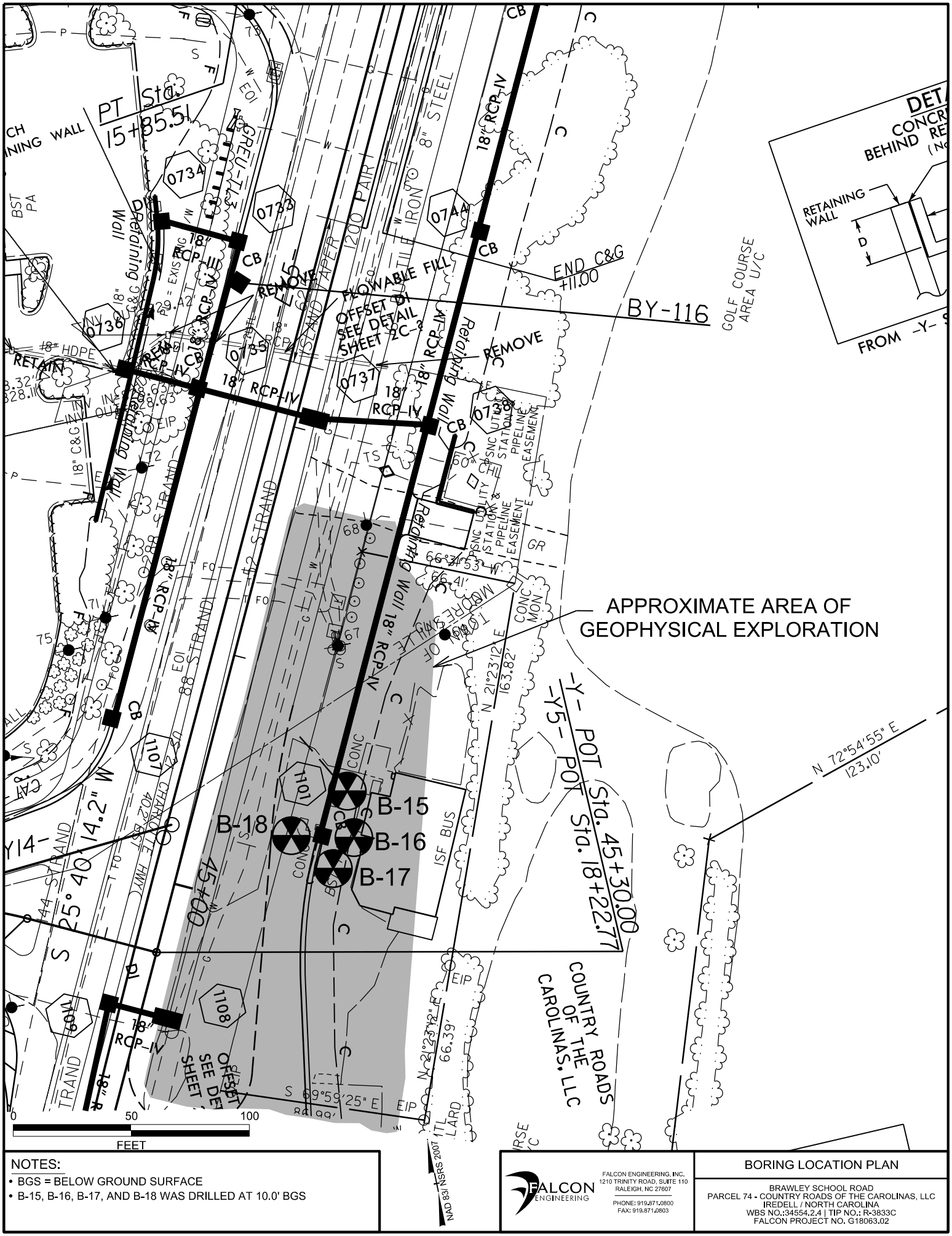
Project No.: G18063.02
Date: October 2019
Source: "Mooresville, NC" 2016 USGS Topographic Map

NCDOT R-3833C (SR 1100 Improvements)
Preliminary Site Assessment
Parcel 74 Location Map



The maps prepared for this website are generated from recorded deeds, plats, and other public records. Users of these maps are hereby notified that the information provided herein should be verified. Iredell County assumes no legal responsibilities for any of the information contained on this site. Users are advised that the use of any of this information is at their own risk. All maps on this site were prepared using a 1000â€™ Grid based upon the North Carolina State Plane Coordinate System from the 1983 North American Datum. The delinquent real property tax overlay is updated monthly. The information presented is not intended to be used or relied upon as official notice of tax liens. For additional information regarding delinquent taxes, contact the Iredell County Tax Collector's Office.

Project No.: G18063.02
Date: October 2019
Source: Iredell County GIS Website



NOTES:

- BGS = BELOW GROUND SURFACE
- B-15, B-16, B-17, AND B-18 WAS DRILLED AT 10.0' BGS

NAD 83/NSRS 2007

FALCON ENGINEERING

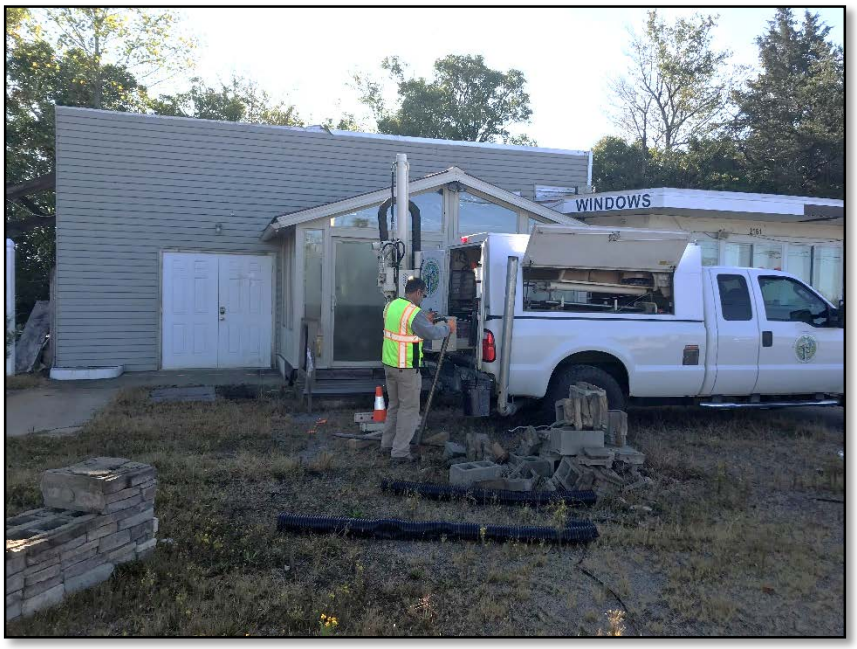
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607

PHONE: 919.871.0800
FAX: 919.871.0803

BORING LOCATION PLAN

BRAWLEY SCHOOL ROAD
PARCEL 74 - COUNTRY ROADS OF THE CAROLINAS, LLC
IREDELL / NORTH CAROLINA
WBS NO.:34554.2.4 | TIP NO.: R-3833C
FALCON PROJECT NO. G18063.02

NCDOT R-3833C (SR 1100 Improvements)
Preliminary Site Assessment
Parcel 74 Site Photographs



Photograph No. 1: General view of Boring B-15.

Photograph No. 2: General view of Boring B-16.

NCDOT R-3833C (SR 1100 Improvements)
Preliminary Site Assessment
Parcel 74 Site Photographs

Photograph No. 3: General view of Boring B-17.

Photograph No. 4: General view of Boring B-18.

QED

AQROS

Hydrocarbon Analysis Results

Client: FALCON
Address: 1210 TRINITY RD SUITE 110
CARY, NC 27513

Samples taken 10/14 - 10/15/2019
Samples extracted 10/14 - 10/15/2019
Samples analysed Wednesday, October 16, 2019

Contact: C. Burkhardt

Operator Harry Wooten

Project: G18063

U00904

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	B15	18.3	<0.46	<0.46	0.59	0.59	0.59	<0.15	<0.018	0	59.2	40.8	V.Deg.PHC 72%,(FCM),(BO)
s	B16	21.3	<0.53	<0.53	<0.53	<0.53	<0.11	<0.17	<0.021	0	0	0	Residual HC
s	B17	12.2	<0.31	<0.31	0.4	0.4	0.49	<0.1	<0.012	0	50.1	49.9	Deg.Fuel 61%,(FCM)
s	B18	14.0	<0.35	<0.35	<0.35	0.17	0.17	<0.11	<0.014	0	25.8	74.2	Residual HC

Initial Calibrator QC check OK

Final FCM QC Check OK 99.1 %

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

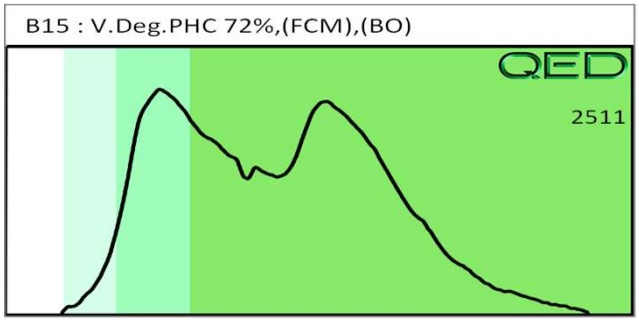
B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

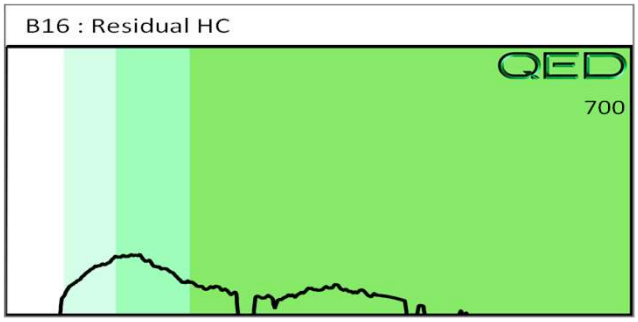
% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

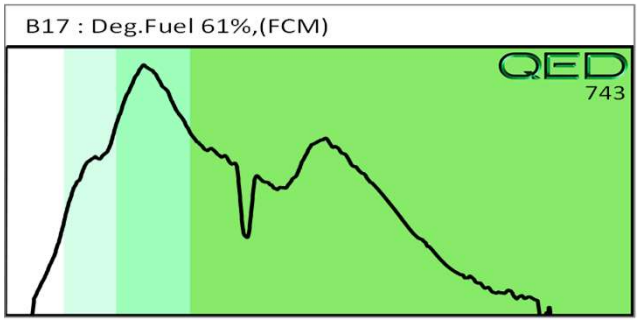
QED Hydrocarbon Fingerprints

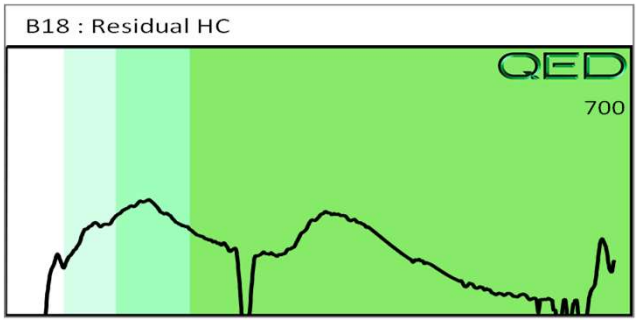
Project: G18063

Wednesday, October 16, 2019









PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2019-260)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION:
PARCEL 74
NCDOT PROJECT R-3833C

2861 CHARLOTTE HIGHWAY, MOORESVILLE, NC

September 6, 2019

Report prepared for: **Christopher J. Burkhardt, PWS**
Falcon Engineers
1210 Trinity Rd. #110
Raleigh, NC 27607

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

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

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

GEOPHYSICAL INVESTIGATION REPORT
Parcel 74 - 2861 Charlotte Highway
Mooresville, Iredell County, North Carolina

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Figures

Appendices

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 Falcon Engineers at Parcel 74, located at 2861 Charlotte Highway in Mooresville, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-3833C). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted from August 11-12, 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 six EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed across areas containing significant metallic interference associated with reinforced concrete. No additional significant buried structures were identified. Collectively, the geophysical data did not record any evidence of metallic USTs within the survey area at Parcel 74.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Falcon Engineers at Parcel 74, located at 2861 Charlotte Highway in Mooresville, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-3833C). The survey was designed to extend from the existing edge of pavement into the proposed ROW and/or easements, whichever distance was greater. Conducted from August 11-12, 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 vacant building surrounded by concrete, gravel, grass, and asphalt surfaces. An aerial photograph showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

FIELD METHODOLOGY

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

According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. Smaller objects (1-foot or less in size) can be detected to a maximum depth of 4 to 5 feet. The EM61 data were digitally collected at approximately 0.8-foot intervals along north-south trending or east-west trending, generally parallel survey lines, spaced five feet apart. The data were downloaded to a

computer and reviewed in the field and office using the Geonics NAV61 and Surfer for Windows Version 15.0 software programs.

GPR data were acquired across select EM anomalies on August 12, 2019, using a Geophysical Survey Systems, Inc. (GSSI) SIR 4000 controller equipped with a 350 MHz HS 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	Known Buried Utility	
2	Sign	
3	Utilities	
4	Reinforced Concrete	✓
5	Building	
6	Reinforced Concrete	✓

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a sign, utilities, reinforced concrete, and a building. EM Anomaly 1 was associated with a known buried utility. This was consistent with site plans provided by the NCDOT, the NC 811 markings on the site, and the other parcels surveyed for this project. As such, the utility was confirmed with reconnaissance GPR only. No formal transects were saved and the utility will not be discussed in the GPR results section. EM Anomalies 4 and 6 were associated with reinforced concrete and were investigated with GPR to confirm the presence of reinforcement within the concrete and that the metallic interference from the reinforcement did not obscure any significant buried structures such as 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 sixteen formal GPR transects were performed at the site.

GPR Transects 1-16 were performed in a grid-like fashion across EM Anomalies 4 and 6. These transects confirmed the presence of reinforcement within the concrete slab. No evidence of any significant buried structures such as USTs was observed.

Collectively, the geophysical data did not record any evidence of metallic USTs within the survey area at Parcel 74. **Figure 4** provides an overlay of the metal detection results on the NCDOT MicroStation engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 74 in Mooresville, 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.
- GPR was performed across areas containing significant metallic interference associated with reinforced concrete. No additional significant buried structures were identified.
- Collectively, the geophysical data did not record any evidence of metallic USTs within the survey area at Parcel 74.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for Falcon Engineers 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 South)

N

PYRAMID GEOPHYSICS

503 INDUSTRIAL AVENUE
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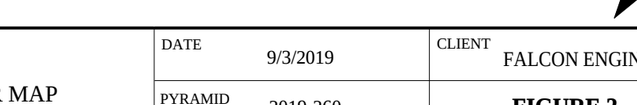
PROJECT: PARCEL 74 MOORESVILLE, NORTH CAROLINA NCDOT PROJECT R-3833C	TITLE: PARCEL 74 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	DATE: 9/3/2019	CLIENT: FALCON ENGINEERS
		PYRAMID PROJECT #: 2019-260	**FIGURE 1**

EM61 METAL DETECTION RESULTS

NO EVIDENCE OF METALLIC USTs 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 August 11, 2019, using a Geonics EM61-MK2 instrument. Verification GPR data were collected using a GSSI SIR 4000 controller equipped with a 350 MHz HS antenna on August 12, 2019.

EM61 Metal Detection Response (millivolts)



N

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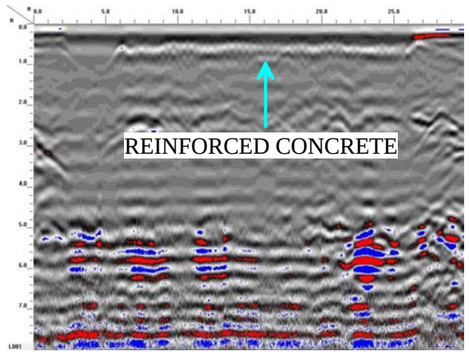
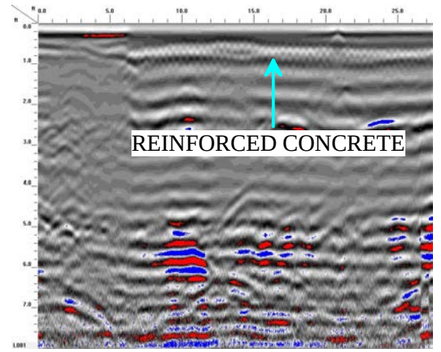
PROJECT	PARCEL 74 MOORESVILLE, NORTH CAROLINA NCDOT PROJECT R-3833C
TITLE	PARCEL 74 - EM61 METAL DETECTION CONTOUR MAP
DATE	9/3/2019
PYRAMID PROJECT #:	2019-260
CLIENT	FALCON ENGINEERS
	FIGURE 2

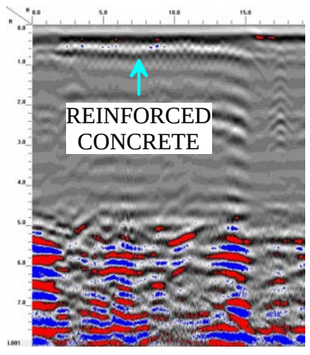
LOCATIONS OF GPR TRANSECTS



GPR TRANSECT 1 (T1)



GPR TRANSECT 9 (T9)



GPR TRANSECT 12 (T12)

N

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PROJECT	PARCEL 74 MOORESVILLE, NORTH CAROLINA NCDOT PROJECT R-3833C
TITLE	PARCEL 74 - GPR TRANSECT LOCATIONS AND SELECT IMAGES
DATE	9/3/2019
PYRAMID PROJECT #:	2019-260
CLIENT	FALCON ENGINEERS
	FIGURE 3

LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PROPOSED PERMANENT UTILITY EASEMENT
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE

MILLIVOLTS (mV)

1000 750 500 400 300 200 150 100 75 60 50 40 30 -90 -100 -200 -400 -5000

0 25 50
FEET

N

TITLE
OVERLAY OF METAL DETECTION RESULTS
ON NCDOT ENGINEERING PLANS

PROJECT
PARCEL 74
MOORESVILLE, NORTH CAROLINA
NCDOT PROJECT R-3833C

PYRAMID GEOPHYSICS
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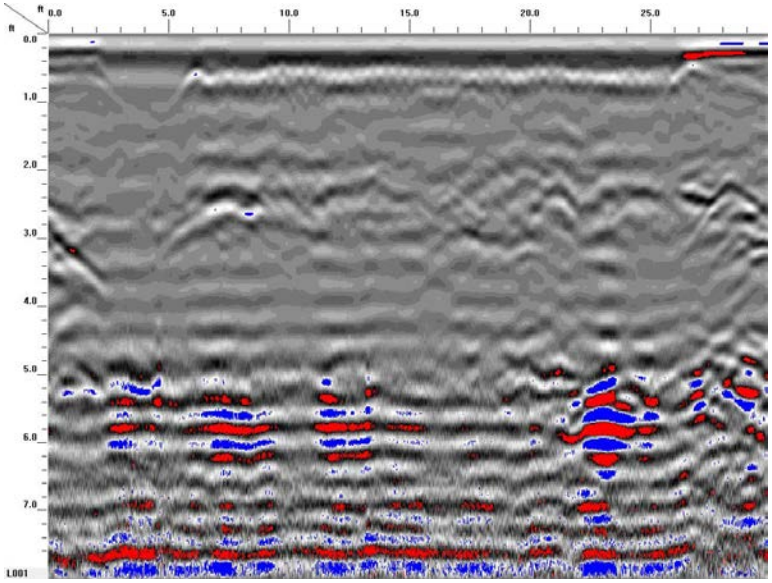
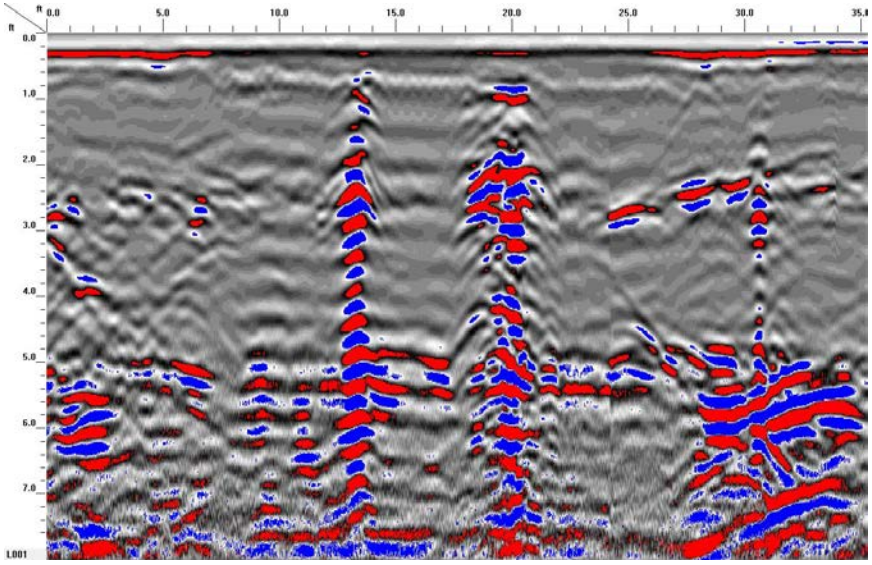
DATE: 09-06-2019	REVISION NO. 0
PYRAMID PROJECT NO. 2019-260	FIGURE NO. 4

Appendix A – GPR Transect Images



GPR TRANSECT 1



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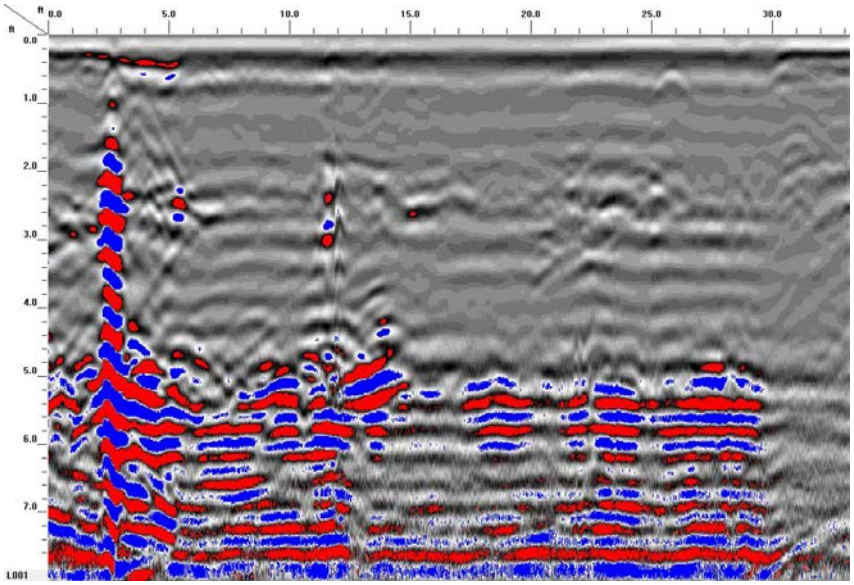
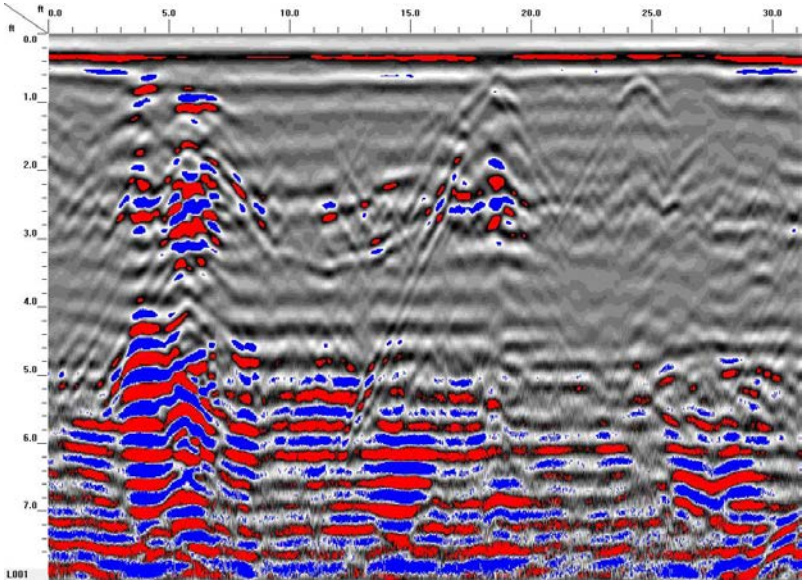
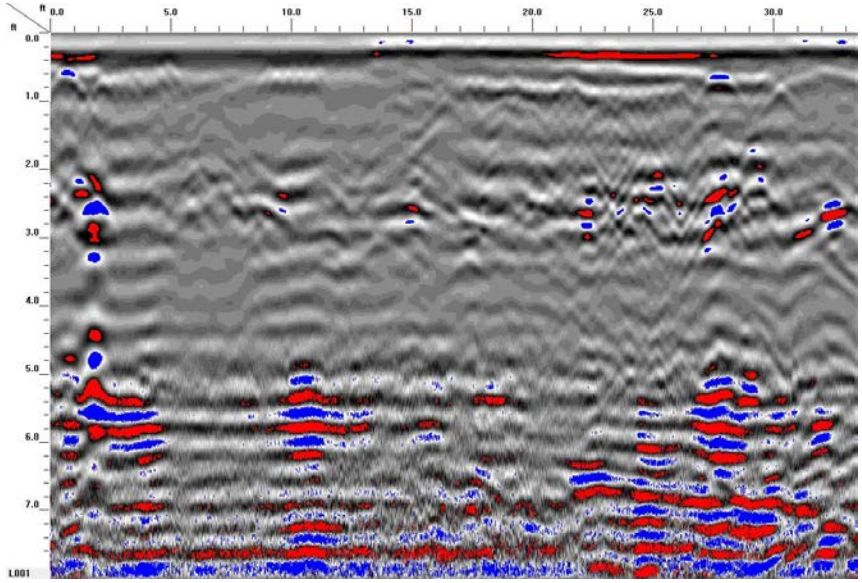


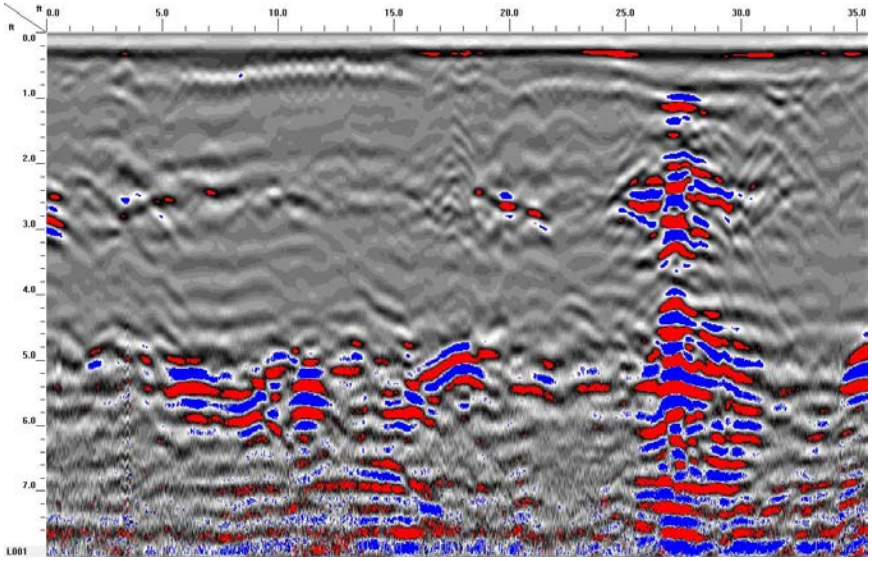
GPR TRANSECT 2



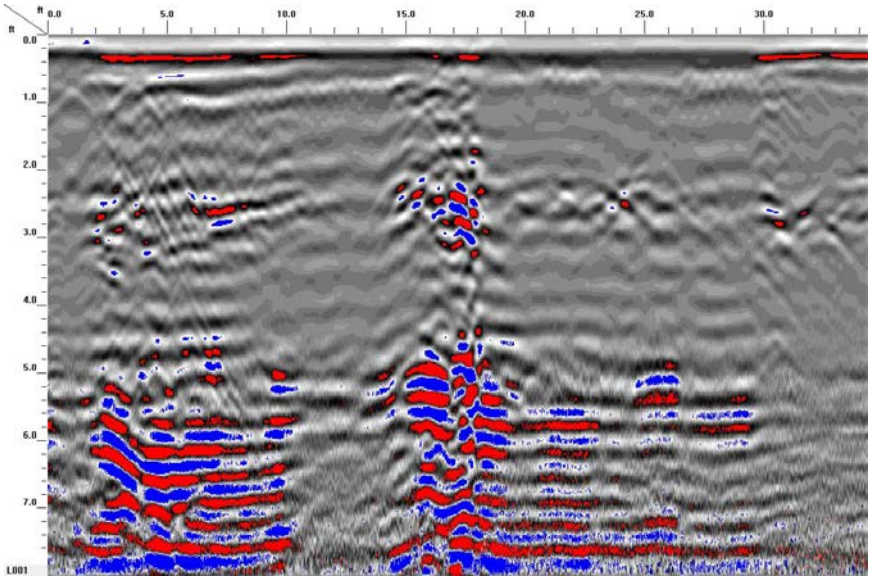
GPR TRANSECT 4



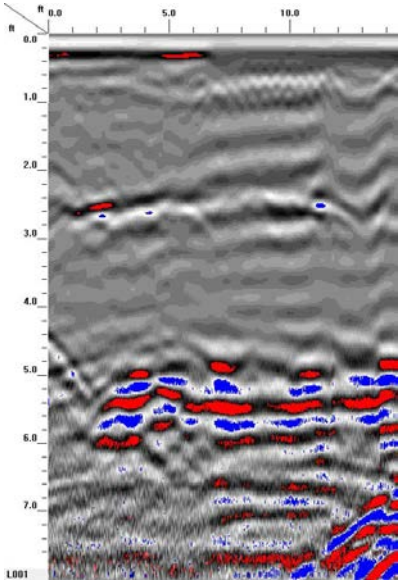
GPR TRANSECT 5



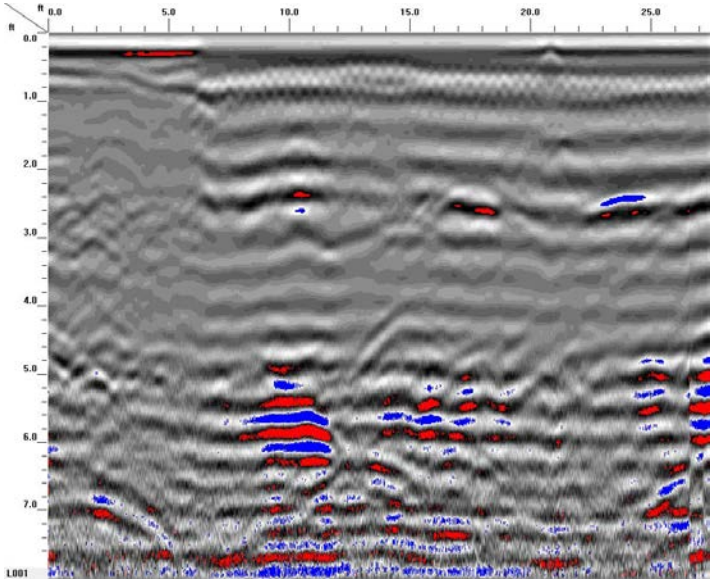
GPR TRANSECT 7



GPR TRANSECT 6



GPR TRANSECT 8



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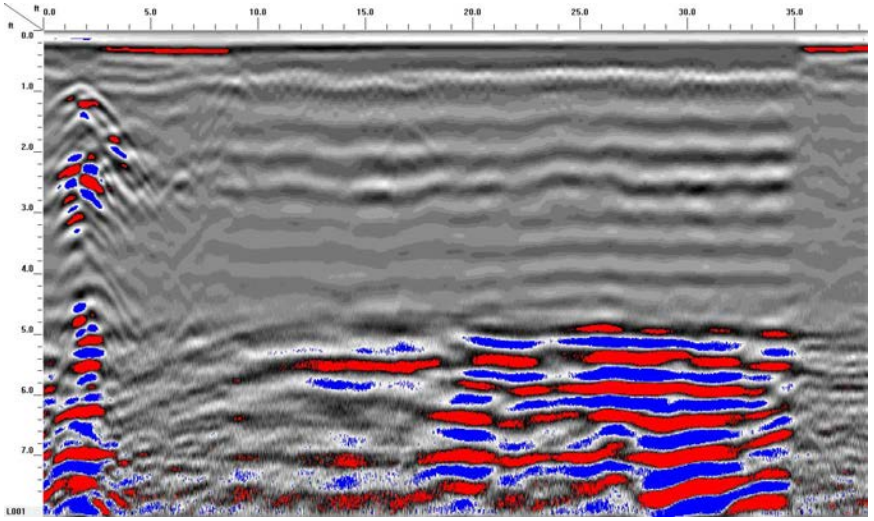

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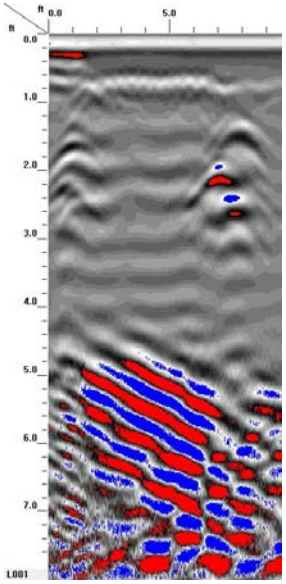
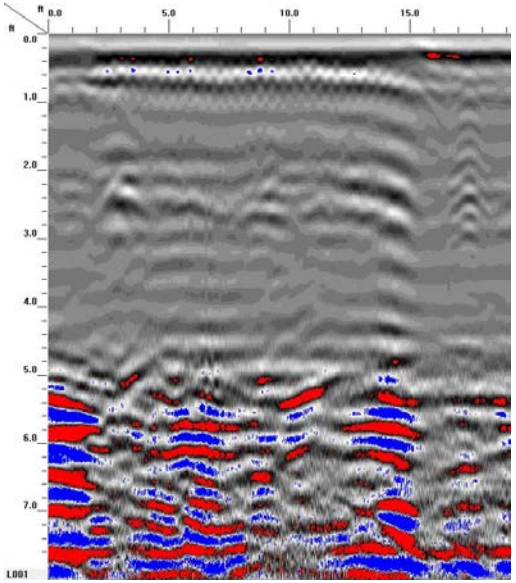
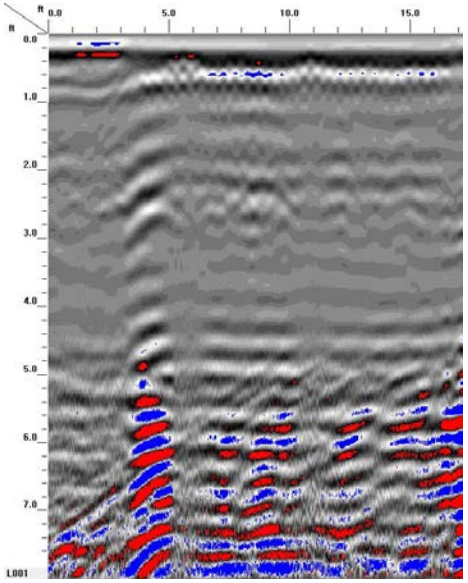


GPR TRANSECT 10



GPR TRANSECT 12



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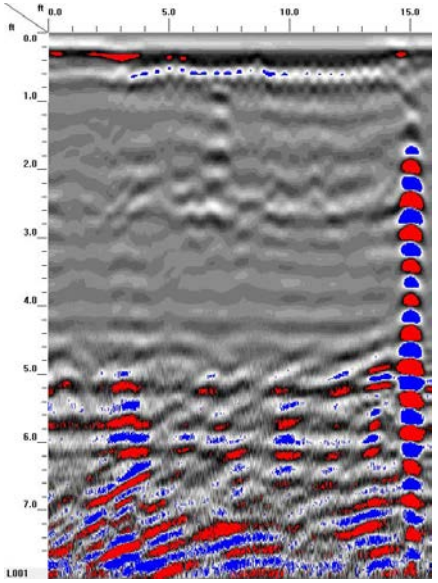

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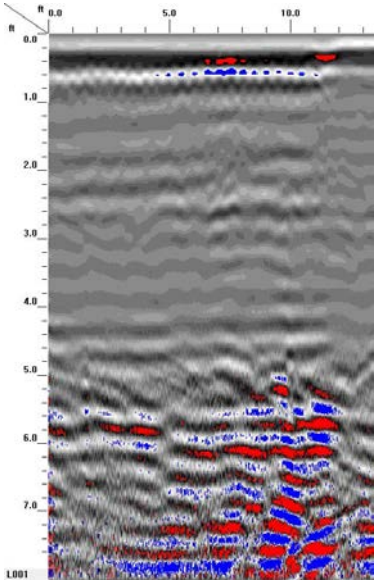
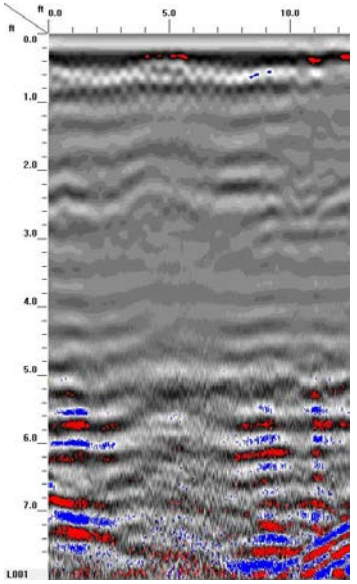


GPR TRANSECT 14



GPR TRANSECT 16