

PRELIMINARY SITE ASSESSMENT

**PARCEL 7 – WGT PROPERTIES, LLC
102 BELL FORK RD.
JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA**

**TIP NUMBER. U-5728
WBS NUMBER: 54019.1.1
DESCRIPTION: US 17 BUSINESS (MARINE BLVD.) TO SR 1308 (BELL FORK
RD.) INTERSECTION IMPROVEMENTS**

PREPARED FOR:



**NCDOT GEOTECHNICAL ENGINEERING UNIT
GEOENVIRONMENTAL SECTION
1589 MSC
RALEIGH, NORTH CAROLINA 27699-1589**

JANUARY 25, 2019

PREPARED BY:

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CATLIN PROJECT NO. 218123

**CORPORATE GEOLOGY LICENSE CERTIFICATION NO. C-118
CORPORATE LICENSURE NO. FOR ENGINEERING SERVICES C-0585**

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APPENDIX B	BORING LOGS
APPENDIX C	LABORATORY REPORT AND CHAIN OF CUSTODY RECORD

**PRELIMINARY SITE ASSESSMENT
FOR
PARCEL 7 – WGT PROPERTIES, LLC
102 BELL FORK RD.
JACKSONVILLE, NORTH CAROLINA**

**TIP NUMBER: U-5728
WBS NUMBER: 54019.1.1**

JANUARY 25, 2019

1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) is planning construction activities and acquisition of the right-of-way (ROW) and/or easement is necessary for roadway improvements in Jacksonville, North Carolina (TIP Number U-5728, WBS Number 54019.1.1). NCDOT has indicated a site investigation is necessary to determine if underground storage tanks (UST) and/or contaminated soils are present.

2.0 PURPOSE OF INVESTIGATION AND DESCRIPTION

CATLIN Engineers and Scientists (CATLIN) was retained by the NCDOT Geotechnical Engineering Unit to provide a field investigation concluding with a Preliminary Site Assessment (PSA) for the above site. In response to a request for proposal by Mr. John Pilipchuk, L.G. P.E. and Mr. Craig Haden dated October 24, 2018, CATLIN submitted a proposal for conducting an investigation at Parcel 7 – WGT Properties, LLC, 102 Bell Fork Rd. along the NCDOT Project “*US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements*” in Jacksonville, North Carolina. Sheet 1 illustrates the general location of the site. The NCDOT Conventional Plan Sheet symbols are provided on Sheet 2.

According to NCDOT acquisition of the ROW is necessary for roadway construction (TIP Number U-5728) and specifically at the above referenced parcel (Parcel 7). A site investigation was requested before ROW acquisition and roadway construction. No USTs have been identified within the proposed ROW and/or easement(s).

The work scope as requested includes:

- Conduct a database search for any North Carolina Department of Environmental Quality (NCDEQ) reports associated with the properties.
- Locate all USTs and determine approximate size and contents (if any).
- Determine if contaminated soils are present.

- Test soil for contaminants relevant to the site's past use and/or possible release(s). For petroleum contaminants, Ultra-Violet Fluorescence (UVF) analysis is the preferred testing method.
- Include (as a standard delivery item) the RedLab graphs in reports and send the GeoEnvironmental Section a copy of the RedLab Excel file(s).
- If contamination is evident, estimate the quantity of impacted soils and indicate the approximate area of soil contamination on a site map.
- Provide a MicroStation file with the location of soil borings, USTs, soil contamination and monitoring wells.
- Prepare a report including field activities, findings, and recommendations for each site and submit one electronic copy to the NCDOT GeoEnvironmental Section.

This report documents our activities and findings at Parcel 7: WGT Properties, LLC, 102 Bell Fork Rd. Jacksonville, North Carolina.

3.0 METHODS

Proposed boring/sample locations were discussed and agreed upon before boring advancement.

The NCDEQ Laserfiche WebLink and GIS Maps were searched for documents/incidents at the site. Maps searched included: Debris Sites, UST Registered Tanks, Dry Cleaning Solvent Act, Hazardous Waste Sites, UST Incidents, Inactive Hazardous Sites, Manufactured Gas Plants, Pre-regulatory Landfills, Brownfields Sites and Boundaries, and Federal Remediation Sites.

CATLIN coordinated geophysical activities with Pyramid Geophysical Services (Pyramid). The geophysical investigation methods and site photographs are detailed in the Pyramid geophysical survey report provided in Appendix A.

CATLIN proposed utilizing QROS UVF On-Site Rapid Measurement Techniques and Tools (QED™ Analyzer) by RedLab to evaluate potential for petroleum and Poly Aromatic Hydrocarbon (PAH) impacts to soil in a cost effective manner. Soil samples collected from above the approximate water table depth with total petroleum hydrocarbon (TPH) concentrations greater than 100 milligrams per kilogram (mg/kg) diesel range organics (DRO) or 50 mg/kg gasoline range organics (GRO) will be considered contaminated for estimated impacted vadose soil volume calculations. Contaminated soil volume is estimated from the surface to the water table and/or the midpoint distance between a "clean" sample location and contaminated sample location or the property line/easement.

Borings advanced during this investigation are identified with "SB7-" and numbered sequentially "1," "2," "3", and "4". Soil samples for analysis per

QROS QED™ Analyzer were identified by boring number and depth [example: SB7-1 (3')]. CATLIN's field activities at the site began and concluded on November 29, 2018.

3.1 FIELD METHODS

All field work was conducted in general accordance with state and federal guidelines and industry standards.

Underground utility locating was coordinated by CATLIN personnel. The North Carolina One Call Center (NC-1-Call) was contacted for underground utility location. The areas around the proposed boring locations were checked and underground utilities were indicated by NC-1-Call personnel.

CATLIN personnel gathered subsurface soil data by Direct Push Technology boring advancement using a PowerProbe 9600 (PowerProbe). When using the PowerProbe, the borings are advanced to depth by static force and a hydraulic percussion hammer. Two and one-quarter inch diameter by four-foot length steel is used as casing. Soil samples are continuously collected in one and one-half inch clear liners. Liners are removed from the casing and then cut in half longitudinally to allow for visual/manual classification utilizing the Unified Soil Classification System (USCS). Boring information was recorded on field logs and transferred to boring logs (see Appendix B). Soils were removed from the liner in two (2) foot intervals and placed in sealable polyethylene bags for organic volatile (headspace) analysis (OVA) utilizing a MiniRAE 3000 Photoionization Detector. The OVA results were documented on field logs and are included on the boring logs in Appendix B. Soil samples were selected and packed in appropriate glassware for analysis. One (1) soil sample was collected from each soil boring location.

New disposable nitrile gloves were worn during sampling activities. Soils selected for QROS QED™ analysis were placed into new glassware provided by QROS. All samples were placed on ice in an insulated cooler for transportation to RedLab in Wilmington, NC. Sample integrity was maintained by following proper Chain of Custody (COC) procedures. A copy of the COC is provided following the analytical report in Appendix C.

Boreholes were abandoned to the surface in grassy areas and just below existing asphalt in asphalt areas using three-eighth inch bentonite chips. Bentonite and water were poured into the borehole simultaneously to facilitate hydration. Boreholes in asphalt were finished with asphalt patch to the surface.

3.2 ANALYTICAL TESTING

The QROS QED™ Analyzer methods have been approved by the NCDEQ for petroleum contamination determination. Complete QROS QED™ procedures are on file with the NCDEQ and are available upon request. The QROS QED™ analysis was conducted by RedLab personnel at their laboratory in Wilmington, North Carolina. QROS QED™ analysis provides Total Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), DRO, GRO, TPH, total Aromatics (C10-C35) and Total 16 EPA PAH concentrations.

Following boring advancement, selected soils were placed in the appropriately labeled glassware. In an attempt to provide information regarding possible petroleum compound impact(s) to soils and/or groundwater with reasonable analytical expense, soil samples were analyzed using UVF and groundwater samples were analyzed using EPA Methods 6200B and 625.

A total of four (4) soil samples were submitted to RedLab. The COC documentation is included in Appendix C.

4.0 FIELD ACTIVITIES

4.1 CURRENT SITE CONDITIONS AND FIELD OBSERVATIONS

The property at this location includes an asphalt parking lot and a building utilized for motorcycle repairs, fabrication, and sales by Combat Cycles.

Photographs taken during the geophysical investigation are included in the geophysical survey report provided in Appendix A.

Sheet 3 illustrates the subject site with soil boring and sample locations.

4.2 SOIL SAMPLING

A total of four (4) borings were advanced as part of this investigation. Four (4) soil samples were collected from, one (1) from each boring, and submitted for analysis. Boring/sample locations are illustrated on Sheet 3. Boring logs are included in Appendix B.

Soil borings SB7-1 and SB7-3 were advanced to eight (8) feet below land surface (BLS) and terminated in wet clayey sand. Borings SB7-2 and SB7-4 were terminated at four (4) feet BLS in moist sandy clay. Soils were collected continuously to boring termination. After retrieving the drive, soil was visually/manually classified for USCS classification.

Soil samples collected from each boring for analysis were packed in the appropriate glassware, labeled, and placed in a cooler on ice. Borings were located at/near proposed drainage features. A total of four (4) soil samples were submitted to RedLab for QED™ analysis. The COC documentation is included in Appendix C.

4.3 SURVEYING

Boring/sample locations were recorded utilizing a Trimble® global positioning survey instrument and data collector. Boring coordinates are on the boring logs provided in Appendix B. Boring locations are indicated on plan sheets provided by NCDOT and are included on Sheet 3.

5.0 RESULTS

Database Search

No recorded incidents were identified at 102 Bell Fork Road, the Parcel 7 site.

Geophysical Investigation

The purpose of the geophysical survey was to evaluate the potential presence of metal USTs and vent pipes in the accessible areas of the NCDOT ROW and/or easement at Parcel 7.

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A number of EM anomalies were identified. All the EM anomalies were directly attributed to visible cultural features at the ground surface. Collectively, the geophysical data recorded no evidence of metallic USTs at Parcel 7. The complete geophysical survey report by Pyramid is included in Appendix A.

Soil

A mix of sands and clays were encountered across the site to four (4) feet BLS. Generally, clay content decreased with depth beyond four (4) feet deep. Borings terminated at four (4) BLS were in clays and borings terminated at eight (8) feet BLS were in clayey sands. A petroleum/hydrocarbon odor was noted in boring SB7-1 at 1.1 to 4 feet BLS and in boring SB7-2 from 1.8 to 2.5 feet BLS. No elevated OVA readings/measurements were recorded. Complete boring logs are provided in Appendix B.

The complete analytical report is provided in Appendix C. Soil sample locations are illustrated on Sheet 3. No TPH DRO or GRO concentrations were detected above 0.52 milligrams per kilogram (mg/kg). Boring locations and soil sample results are summarized on Table 1 and Sheet 4.

6.0 SUMMARY AND CONCLUSIONS

The Parcel 7 site at 102 Bell Fork Road in Jacksonville, NC is currently used by Combat Cycles for motorcycle repairs, fabrication, and sales. Historical use is unknown but no signs of USTs were identified during site reconnaissance or through geophysical surveying. Database searches did not reveal any reported incidents at the site. Soil samples (4) did not reveal TPH DRO/GRO impacts. The proposed construction at the site is not suspected to encounter contaminated soil or groundwater.

7.0 LIMITATIONS

This report is based on the agreed work scope and a review of available data from limited sampling. It is possible that this investigation may have failed to reveal the presence of contamination in the project area where such contamination may exist. Although CATLIN has used accepted methods appropriate for soil sampling, CATLIN cannot guarantee that additional soil and/or groundwater contamination does not exist.

8.0 SIGNATURES

(Document Not Considered Final Unless All Signatures Are Completed)

DocuSigned by:
Benjamin J Ashba
DAC04414197D4F0



2/4/2019

Benjamin J. Ashba, P.G.
Project Manager

DocuSigned by:
Christian B. Alexander
11877EE40AAE4A3...

Christian B. Alexander
Project Geologist

TABLE

TABLE 1
SUMMARY OF SOIL LABORATORY RESULTS
ULTRA-VIOLET FLUORESCENCE BY QROS QED™ ANALYZER

PARCEL 7 – WGT PROPERTIES, LLC, PROPERTY
102 BELL FORK RD, JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA

Boring ID	Northing	Easting	Sample ID	Contaminant of Concern	TPH GRO	TPH DRO
				Date Collected		
SB 7 - 1	373,884	2,478,883	SB 7 - 1 (3')	11/29/2018	<0.47	<0.19
SB 7 - 2	373,895	2,478,911	SB 7 - 2 (3')	11/29/2018	<0.49	<0.2
SB 7 - 3	373,874	2,478,939	SB 7 - 3 (3')	11/29/2018	<0.52	0.07
SB 7 - 4	373,861	2,478,963	SB 7 - 4 (3')	11/29/2018	<0.49	<0.2
STATE ACTION LEVELS					50	100

Sample depth provided in parantheses as part of the Sample ID.

TPH GRO = Total Petroleum Hydrocarbons Gasoline Range Organics

TPH DRO = Total Petroleum Hydrocarbons Diesel Range Organics

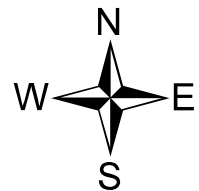
All results and State Action Levels in milligrams per kilogram (mg/kg).

< = Less than method detection limit

SHEETS



SCALE



STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
CONVENTIONAL PLAN SHEET SYMBOLS**BOUNDARIES AND PROPERTY:**

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EP
Computed Property Corner	----- X
Property Monument	□ EQM
Parcel/Sequence Number	⑫3
Existing Fence Line	-X-X-X-
Proposed Woven Wire Fence	-----○-----
Proposed Chain Link Fence	-----□-----
Proposed Barbed Wire Fence	-----◇-----
Existing Wetland Boundary	-----WLB-----
Proposed Wetland Boundary	-----WLB-----
Existing Endangered Animal Boundary	-----EAB-----
Existing Endangered Plant Boundary	-----EPB-----
Existing Historic Property Boundary	-----HPB-----
Known Contamination Area: Soil	-----S-----
Potential Contamination Area: Soil	-----S-----
Known Contamination Area: Water	-----W-----
Potential Contamination Area: Water	-----W-----
Contaminated Site: Known or Potential	-----

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	✕
Foundation	□
Area Outline	□
Cemetery	□ +
Building	□ +
School	□ +
Church	□ +
Dam	-----

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	-----
Jurisdictional Stream	----- JS
Buffer Zone 1	----- BZ 1
Buffer Zone 2	----- BZ 2
Flow Arrow	-----
Disappearing Stream	-----
Spring	-----
Wetland	-----
Proposed Lateral, Tail, Head Ditch	-----
False Sump	-----

RAILROADS:*Note: Not to Scale***S.U.E. = Subsurface Utility Engineering*

Standard Gauge	-----
RR Signal Milepost	-----
Switch	-----
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	◆
Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	◆
Exist Permanent Easement Pin and Cap	◇
New Permanent Easement Pin and Cap	◆
Vertical Benchmark	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
New Right of Way Line	-----
New Right of Way Line with Pin and Cap	-----
New Right of Way Line with Concrete or Granite R/W Marker	-----
New Control of Access Line with Concrete C/A Marker	-----
Existing Control of Access	-----
New Control of Access	-----
Existing Easement Line	-----
New Temporary Construction Easement	-----
New Temporary Drainage Easement	-----
New Permanent Drainage Easement	-----
New Permanent Drainage / Utility Easement	-----
New Permanent Utility Easement	-----
New Temporary Utility Easement	-----
New Aerial Utility Easement	-----

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----
Proposed Slope Stakes Fill	-----
Proposed Curb Ramp	-----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	-----
Pavement Removal	-----

VEGETATION:

Single Tree	-----
Single Shrub	-----

Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	-----

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	-----
Bridge Wing Wall, Head Wall and End Wall	-----
MINOR:	
Head and End Wall	-----
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	-----
Paved Ditch Gutter	-----
Storm Sewer Manhole	-----
Storm Sewer	-----

UTILITIES:

POWER:	
Existing Power Pole	-----
Proposed Power Pole	-----
Existing Joint Use Pole	-----
Proposed Joint Use Pole	-----
Power Manhole	-----
Power Line Tower	-----
Power Transformer	-----
U/G Power Cable Hand Hole	-----
H-Frame Pole	-----
U/G Power Line LOS B (S.U.E.*)	-----
U/G Power Line LOS C (S.U.E.*)	-----
U/G Power Line LOS D (S.U.E.*)	-----

TELEPHONE:

Existing Telephone Pole	-----
Proposed Telephone Pole	-----
Telephone Manhole	-----
Telephone Pedestal	-----
Telephone Cell Tower	-----
U/G Telephone Cable Hand Hole	-----
U/G Telephone Cable LOS B (S.U.E.*)	-----
U/G Telephone Cable LOS C (S.U.E.*)	-----
U/G Telephone Cable LOS D (S.U.E.*)	-----
U/G Telephone Conduit LOS B (S.U.E.*)	-----
U/G Telephone Conduit LOS C (S.U.E.*)	-----
U/G Telephone Conduit LOS D (S.U.E.*)	-----
U/G Fiber Optics Cable LOS B (S.U.E.*)	-----
U/G Fiber Optics Cable LOS C (S.U.E.*)	-----
U/G Fiber Optics Cable LOS D (S.U.E.*)	-----

WATER:

Water Manhole	-----
Water Meter	-----
Water Valve	-----
Water Hydrant	-----
U/G Water Line LOS B (S.U.E.*)	-----
U/G Water Line LOS C (S.U.E.*)	-----
U/G Water Line LOS D (S.U.E.*)	-----
Above Ground Water Line	-----

TV:

TV Pedestal	-----
TV Tower	-----
U/G TV Cable Hand Hole	-----
U/G TV Cable LOS B (S.U.E.*)	-----
U/G TV Cable LOS C (S.U.E.*)	-----
U/G TV Cable LOS D (S.U.E.*)	-----
U/G Fiber Optic Cable LOS B (S.U.E.*)	-----
U/G Fiber Optic Cable LOS C (S.U.E.*)	-----
U/G Fiber Optic Cable LOS D (S.U.E.*)	-----

GAS:

Gas Valve	-----
Gas Meter	-----
U/G Gas Line LOS B (S.U.E.*)	-----
U/G Gas Line LOS C (S.U.E.*)	-----
U/G Gas Line LOS D (S.U.E.*)	-----
Above Ground Gas Line	-----

SANITARY SEWER:

Sanitary Sewer Manhole	-----
Sanitary Sewer Cleanout	-----
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
SS Forced Main Line LOS B (S.U.E.*)	-----
SS Forced Main Line LOS C (S.U.E.*)	-----
SS Forced Main Line LOS D (S.U.E.*)	-----

MISCELLANEOUS:

Utility Pole	-----
Utility Pole with Base	-----
Utility Located Object	-----
Utility Traffic Signal Box	-----
Utility Unknown U/G Line LOS B (S.U.E.*)	-----
U/G Tank; Water, Gas, Oil	-----
Underground Storage Tank, Approx. Loc.	-----
A/G Tank; Water, Gas, Oil	-----
Geoenvironmental Boring	-----
U/G Test Hole LOS A (S.U.E.*)	-----
Abandoned According to Utility Records	-----
End of Information	-----

SOIL SAMPLES COLLECTED AT ALL BORING LOCATIONS.
ADAPTED FROM PLAN SHEETS PROVIDED BY NCDOT.
ALL SOIL LABORATORY RESULTS WERE BELOW
APPLICABLE STANDARDS.



PREPARED BY
CATLIN
Engineers and Scientists
Wilmington, North Carolina

PROJ #: 218123



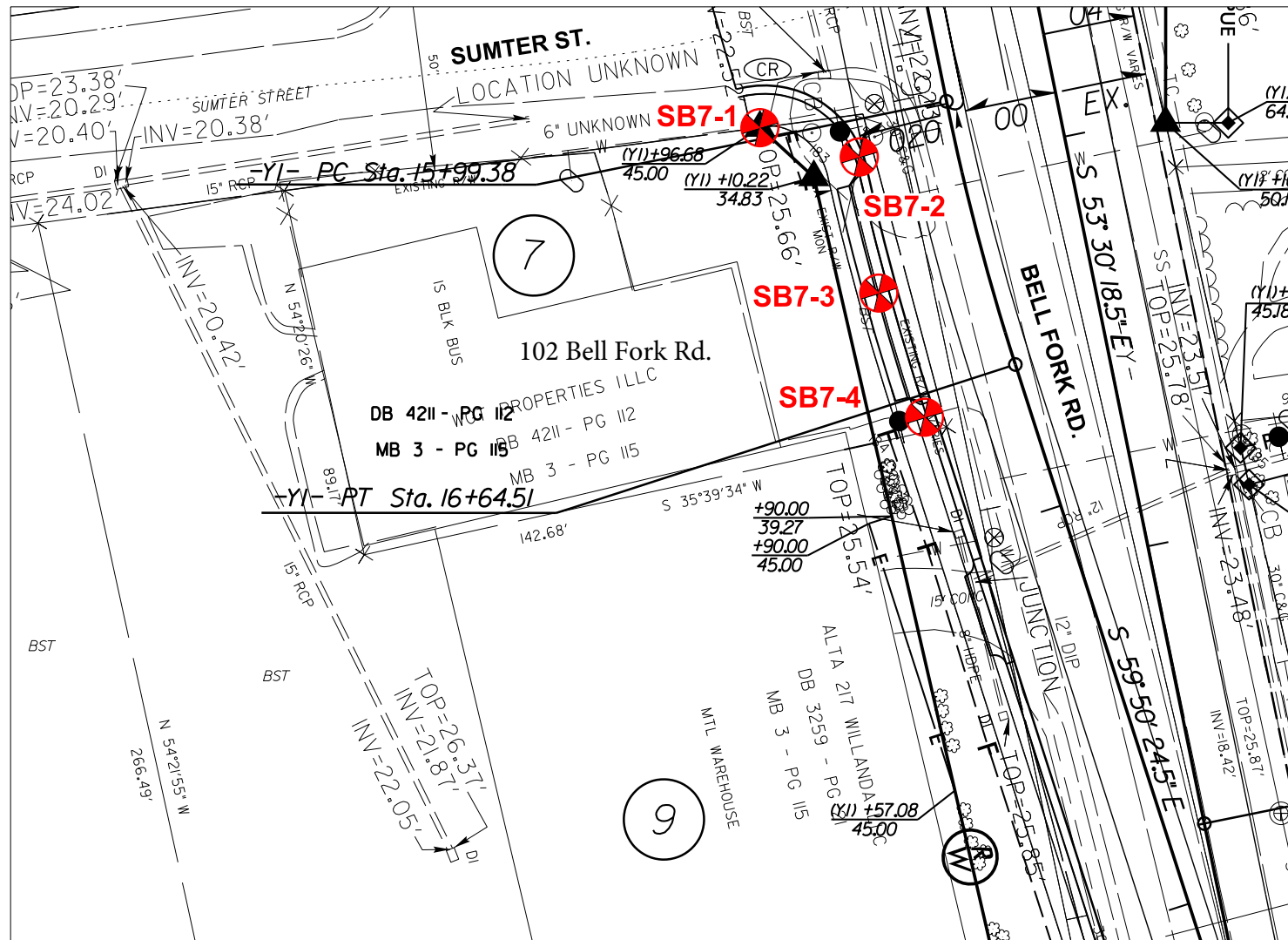
SCALE IN FEET

TIP NO.: R-5020A

COUNTY:	ONSLOW
---------	--------

3

SAMPLE LOCATIONS



PREPARED BY

CATLIN

Engineers and Scientists

Wilmington, North Carolina

PROJ #: 218123

40

20

0

40

SCALE IN FEET

WBS NO.: W-54019.1.1

TIP NO.: R-5020A

COUNTY: ONSLOW

SHEET
4

SUMMARIZED ANALYTICAL RESULTS

LEGEND

EXISTING

DESCRIPTION

SOIL SAMPLE

SOIL SAMPLE DEPTH

NOTES:
ADAPTED FROM PLAN SHEETS PROVIDED BY NCDOT.
ALL LABORATORY RESULTS WERE BELOW APPLICABLE STANDARDS.

SUMMARY OF SOIL LABORATORY RESULTS
ULTRA-VIOLET FLUORESCENCE BY QROS QED™ ANALYZER

PARCEL 7 – WGT PROPERTIES, LLC, PROPERTY
102 BELL FORK RD, JACKSONVILLE, ONSLOW COUNTY, NORTH CAROLINA

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STATE ACTION LEVELS					50	100

Sample depth provided in parantheses as part of the Sample ID.
TPH GRO = Total Petroleum Hydrocarbons Gasoline Range Organics
TPH DRO = Total Petroleum Hydrocarbons Diesel Range Organics
All results and State Action Levels in milligrams per kilogram (mg/kg).
<= Less than method detection limit

S:\218123\1\ NCDOT Mills PSAs U-5728\20181008_Latest_Files\SITE PLANS

APPENDICES

APPENDIX A
PYRAMID GEOPHYSICAL SURVEY



PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2018-317)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION: PARCEL 7 NCDOT PROJECT U-5728 (54019.1.1)

102 BELL FORK ROAD, JACKSONVILLE, NC
NOVEMBER 30, 2018

Report prepared for: Ben Ashba
Catlin Engineers & Scientists
220 Old Dairy Road
Wilmington, NC 28405

Prepared by: _____

A handwritten signature in black ink, appearing to read "E. Cross".

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

Reviewed by: _____

A handwritten signature in black ink, appearing to read "Doug Canavella".

Douglas A. Canavella, P.G.
NC License #1066

GEOPHYSICAL INVESTIGATION REPORT
Parcel 7 – 102 Bell Fork Road
Jacksonville, Onslow County, North Carolina

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Figures

- Figure 1 – Parcel 7 - Geophysical Survey Boundaries and Site Photographs
Figure 2 – Parcel 7 - EM61 Results Contour Map
Figure 3 – Parcel 7 - GPR Transect Locations and Images

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 Catlin Engineers & Scientists at Parcel 7, located at 102 Bell Fork Road, in Jacksonville, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project U-5728). 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 November 26, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

Geophysical Results: The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of eight EM anomalies were identified. The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface. Collectively, the geophysical data recorded no evidence of metallic USTs at Parcel 7.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for Catlin Engineers & Scientists at Parcel 7, located at 102 Bell Fork Road, in Jacksonville, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project U-5728). 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 November 26, 2018, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a small commercial building surrounded by asphalt and grass 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 November 26, 2018, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Data were collected both in reconnaissance fashion as well as along formal transect lines across EM features. The GPR data were viewed in real-time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 6 feet, based on dielectric constants calculated by the DF unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the DF unit for post-processing and figure generation.

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

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

DISCUSSION OF RESULTS

Discussion of EM Results

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

LIST OF METALLIC ANOMALIES IDENTIFIED BY EM SURVEY

Metallic Anomaly #	Cause of Anomaly	Investigated with GPR
1	Post	
2	Drop Inlet	
3	Sign	
4	Hydrant	
5	Vehicle	✓
6	Suspected Utility	✓
7	Downspout	✓
8	Vehicle	✓

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a post, a drop inlet, a sign, a hydrant, vehicles and a downspout. EM Anomalies 5, 7, and 8 were associated with vehicles and an adjacent downspout at the site. These anomalies were further investigated with GPR to confirm that the EM interference observed was a result of the vehicles and downspout and did not obscure any significant structures, such as USTs.

EM Anomaly 6 was further investigated with GPR to confirm that the anomaly was the result of a utility.

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 five formal GPR transects were collected at the site. GPR Transects 1-4 were performed across EM Anomalies 5, 6, 7, and 8 to investigate whether the vehicles and adjacent downspout obscured any significant structures, such as USTs. No evidence of significant structures was observed.

GPR Transect 5 observed a low-amplitude reflector consistent with a potential utility. It should be noted that, as per the MicroStation utility maps provided by Catlin, this anomaly is in the vicinity of a water line.

Collectively, the geophysical data recorded no evidence of metallic USTs at Parcel 7.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 7 in Jacksonville, 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.
- Several EM anomalies were associated with vehicle interference, a downspout, and a utility and were further investigated with GPR.
- GPR verified that the EM anomalies caused by vehicle interference and the downspout did not reveal larger subsurface structures such as USTs. GPR also verified the presence of the utility.
- Collectively, the geophysical data recorded no evidence of metallic USTs at Parcel 7.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for Catlin Engineers & Scientists 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 West)



View of Survey Area
(Facing Approximately North)



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

PROJECT
PARCEL 7
JACKSONVILLE, NORTH CAROLINA
NCDOT PROJECT U-5728

TITLE
PARCEL 7 - GEOPHYSICAL
SURVEY BOUNDARIES AND SITE PHOTOGRAPHS

DATE
11/26/2018
PYRAMID
PROJECT #: 2018-317

CLIENT
Catlin Engineers &
Scientists
FIGURE 1

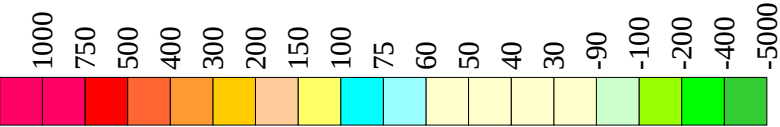
EM61 METAL DETECTION RESULTS



NO EVIDENCE OF METALLIC
USTs OBSERVED.

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM data were collected on November 26, 2018, 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 November 26, 2018.

EM61 Metal Detection Response
(millivolts)



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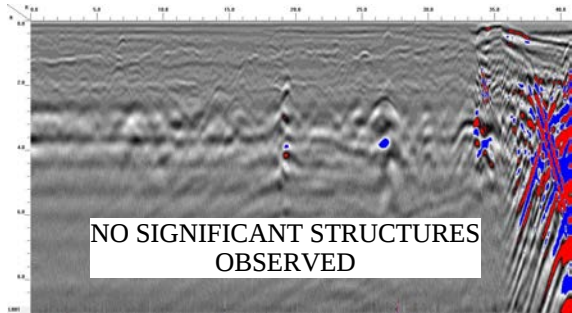
PROJECT
PARCEL 7
JACKSONVILLE, NORTH CAROLINA
NCDOT PROJECT U-5728

TITLE
PARCEL 7 -
EM61 METAL DETECTION CONTOUR MAP

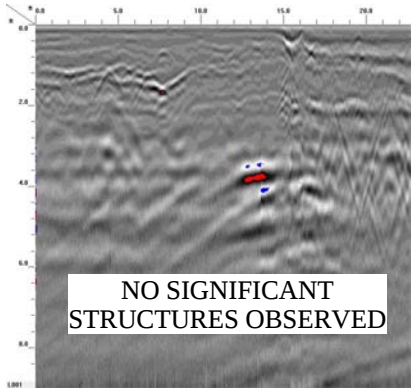
DATE
11/26/2018
PYRAMID
PROJECT #:
2018-317

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FIGURE 2

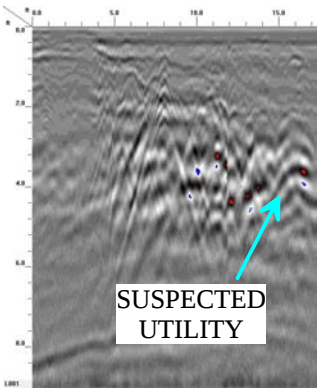
LOCATIONS OF GPR TRANSECTS



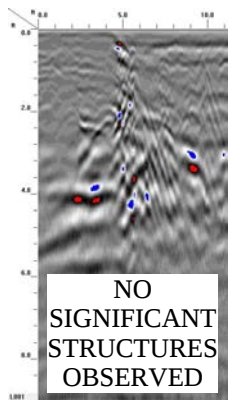
GPR TRANSECT 1 (T1)



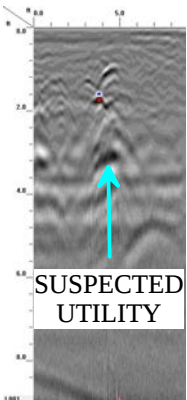
GPR TRANSECT 2 (T2)



GPR TRANSECT 3 (T3)



GPR TRANSECT 4 (T4)



GPR TRANSECT 5 (T5)



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PROJECT
PARCEL 7
JACKSONVILLE, NORTH CAROLINA
NCDOT PROJECT U-5728

TITLE
PARCEL 7 -
GPR TRANSECT LOCATIONS AND IMAGES

DATE
11/26/2018
PYRAMID
PROJECT #:
2018-317

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FIGURE 3

APPENDIX B
BORING LOGS

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements		LOGGED BY: C. Alexander	BORING ID:
		DRILLER: William J. Miller	SB7-1
NORTHING: 373,884	EASTING: 2,478,883	CREW: E. Swain	
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308	LAND ELEV.: NM	
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 8.0
START DATE: 11/29/18	FINISH DATE: 11/29/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 250 500 750 1,000					
0.0							LAND SURFACE	0.0
		M	▲1.0		SW		Gray to dk. gray, silty to clayey, f. SAND w/ gravel from 0-0.4' w/ HCO -Moist	1.1
2.0								
		W	▲1.0	SB7-1 (3')	CL		Dk. gray to gray. sandy, CLAY, med. plas. w/ orange mottling from 3.5-6.8 w/ HCO from 1.1-4' -Moist; wet from 1.7-3.2'; moist from 3.2-6.8'	
4.0								
		M	▲1.2					
6.0								
		W	▲1.2		SC		Gray, clayey, f. SAND -Wet	6.8
8.0							BORING TERMINATED AT DEPTH 8.0 ft in clayey, f. SAND	8.0

▽ = 0hr. DTW

▼ = 24hr. DTW

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements		LOGGED BY: C. Alexander	BORING ID:
		DRILLER: William J. Miller	SB7-2
NORTHING: 373,895	EASTING: 2,478,911	CREW: E. Swain	
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 4.0
START DATE: 11/29/18	FINISH DATE: 11/29/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT 0.5 0.5 0.5 0.5	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
0.0			0 250 500 750 1,000				LAND SURFACE	0.0
		M	▲0.7		SW		Tan, silty to clayey, f. SAND w/ gravel from 0.4-1.1' -Moist	1.6
2.0		M	▲1.1	SB7-2 (3')	CL		Tan to gray, sandy, CLAY, med. plas. w/ HCO from 1.8-2.5' -Moist	4.0
4.0							BORING TERMINATED AT DEPTH 4.0 ft in sandy, CLAY, med. plas.	

▽ = 0hr. DTW

▼ = 24hr. DTW

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements		LOGGED BY: C. Alexander	BORING ID:
		DRILLER: William J. Miller	SB7-3
NORTHING: 373,874	EASTING: 2,478,939	CREW: E. Swain	
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 8.0
START DATE: 11/29/18	FINISH DATE: 11/29/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 250 500 750 1,000					
0.0							LAND SURFACE	0.0
		M	▲0.5		SW		Tan to dk. gray, silty to clayey, f. SAND w/ gravel from 0-0.7' w/ slight HCO -Moist	
2.0								2.1
		M	▲1.3	SB7-3 (3')				
4.0					CL		Dk. gray to gray, sandy, CLAY, med. plas. -Moist	
		M	▲1.3					
6.0								6.8
		W	▲1.2		SC		Gray, clayey to silty, f. SAND -Wet	
8.0							BORING TERMINATED AT DEPTH 8.0 ft in clayey to silty, f. SAND	

▽ = 0hr. DTW

▼ = 24hr. DTW

CATLIN ENVIRO. LOG_218123_US17@BELLFORK.GPJ CATLIN.GDT 1/4/19

BORING LOG



218123
Wilmington, NC

SHEET 1 OF 1

PROJECT NO.: 218123	STATE: NC	COUNTY: ONSLOW	LOCATION: Jacksonville
PROJECT NAME: US 17 Business (Marine Blvd) at SR 1308 (Bell Fork Rd) Intersection Improvements			LOGGED BY: C. Alexander
			DRILLER: William J. Miller
NORTHING: 373,861	EASTING: 2,478,963	CREW: E. Swain	BORING ID: SB7-4
SYSTEM: NCSP NAD 83 (ft)	BORING LOCATION: SR 1308		LAND ELEV.: NM
DRILL MACHINE: Power Probe	METHOD: DPT	0 HOUR DTW: N/A	BORING DEPTH: 4.0
START DATE: 11/29/18	FINISH DATE: 11/29/18	24 HOUR DTW: N/A	WATER DEPTH: --

DEPTH	BLOW COUNT	MOI.	SCREENING RESULTS (ppm)	LAB. ID.	USCS	LOG	SOIL AND ROCK DESCRIPTION	ELEVATION
	0.5 0.5 0.5 0.5		0 250 500 750 1,000					
0.0							LAND SURFACE	0.0
		M	▲0.5		SW		Tan to gray, silty to clayey, f. SAND w/ gravel from 0.2-1.7' -Moist	
2.0								
		M	▲0.8	SB7-4 (3')	CL		Tan to gray, sandy, CLAY, med. plas. w/ orange mottling -Moist	2.3
4.0							BORING TERMINATED AT DEPTH 4.0 ft in sandy, CLAY, med. plas.	4.0

▽ = 0hr. DTW

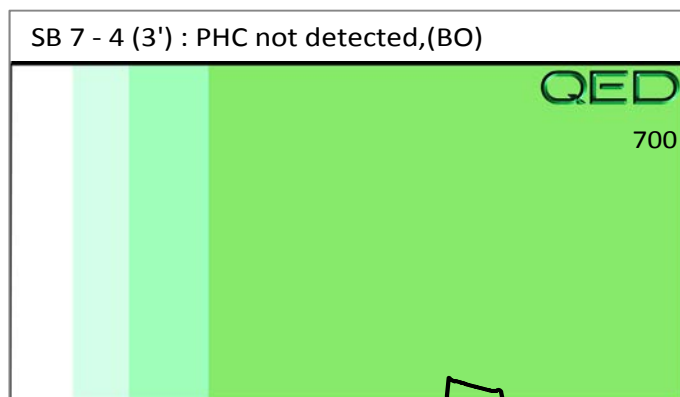
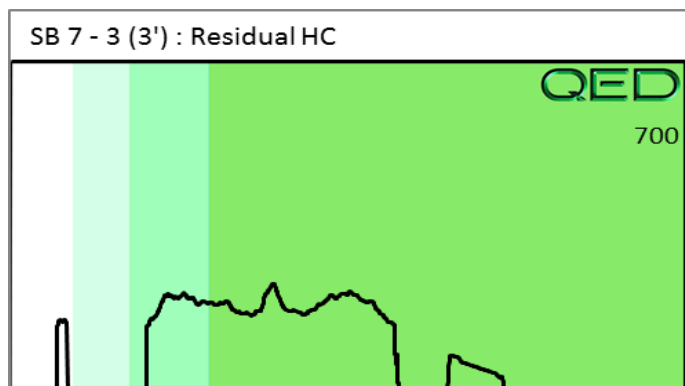
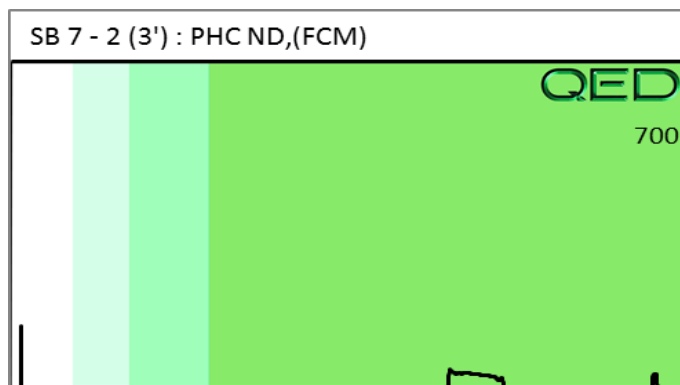
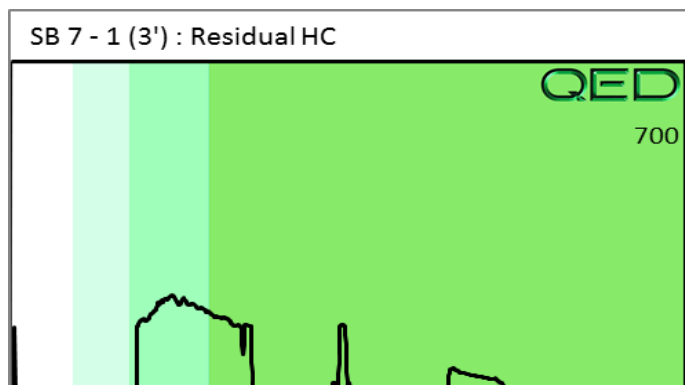
▼ = 24hr. DTW

APPENDIX C

LABORATORY REPORT AND CHAIN OF CUSTODY RECORD



(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present



1348

Client Name:	Catlin Engineers & Scientists
Address:	220 Old Dairy Rd. Wilmington, NC 28405
Contact:	Ben Ashba
Project Ref.:	218123(7)
Email:	ben.ashba@catlinusa.com
Phone #:	(910) 452-5861
Collected by:	C. Alexander

REDLAB™

RAPID ENVIRONMENTAL DIAGNOSTICS

CHAIN OF CUSTODY AND ANALYTICAL REQUEST FORM

RED Lab, LLC 5598 Marvin K Moss Lane MARBIONC Bldg, Suite 2003 Wilmington, NC 28409	Each sample will be analyzed for BTEX, GRO, DRO, TPH, PAH total aromatics and BaP
--	---