

Via NC DOT FTS

November 30, 2022

NC DOT Geotechnical Unit
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

Attention: Mr. Ashley Cox, LG

Re: Phase II Investigation Report – Parcel 2/2A
NC DOT State Project No. R-5600
WBS Element No. 45818.1.FR1
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Dear Ashley:

Please find the attached PDF copy of the Phase II Investigation report for the Samuel Clemmons property (Parcel 2/2A) located in Sylva, Jackson County, North Carolina. Please return via DocuSign for final signatures. If you have any questions or need additional information, please contact us at (704) 586-0007.

Sincerely,

Hart & Hickman, PC



David Graham, PG
Senior Project Geologist



Matt Bramblett, PE
Principal

Attachment

Phase II Investigation NC DOT Parcel 2/2A

**413 W. Main St.
Sylva, Jackson County
North Carolina**

**H&H Job No. ROW-704
State Project: R-5600
WBS Element No. 45818.1.FR1
November 30, 2022**



**#C-1269 Engineering
#-245 Geology**

**Phase II Investigation – Parcel 2/2A
413 W. Main St.
Sylva, Jackson County
North Carolina
H&H Job No. ROW-704**

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Phase II Investigation – Parcel 2/2A
413 W. Main St.
Sylva, Jackson County
North Carolina
H&H Job No. ROW-704

1.0 Introduction and Background

Hart & Hickman, PC (H&H) has prepared this Phase II Investigation (Phase II) report documenting assessment activities performed at the Samuel Clemmons property located at 413 W. Main St. (Parcel 2/2A) in Sylva, Jackson County, North Carolina. This assessment was conducted on behalf of the North Carolina Department of Transportation (NC DOT) in accordance with H&H's August 17, 2022 proposal.

This assessment was conducted to evaluate the potential for underground storage tank (UST) systems and impacted soil on proposed right-of-way and construction easement areas on Parcel 2/2A related to proposed road improvements along W. Main St. (State Project R-5600). This NC DOT road improvement project includes new curb and gutters, sidewalks, etc. Parcel 2/2A is currently occupied by Sam's Motor Sales, Inc. and an asphalt parking lot. Historical use consisted of auto sales, potential former auto service, and a potential former gas station. A site location map is included as Figure 1, and a site map is presented as Figure 2. NC DOT's plan sheet depicting Parcel 2/2A is included in Appendix A.

H&H searched the North Carolina Department of Environmental Quality (NC DEQ) Laserfiche website and NC DEQ UST databases for incident files related to the Parcel 2/2A property address to better target UST system areas and to check for previously reported impacts. No UST incident files were identified for Parcel 2/2A on NC DEQ's Laserfiche website. Based on the NC DEQ Registered Tank Database, there were no USTs registered on the property consisting of Parcel 2/2A. The property owner stated that Parcel 2A was a gas station in the past. However, no evidence of USTs was found onsite during the geophysical survey.

The Phase II assessment activities conducted by H&H on Parcel 2/2A are discussed below.

2.0 Geophysical Survey

Prior to advancing soil borings, H&H reviewed the results of a geophysical survey performed on Parcel 2/2A by Pyramid Geophysical Services (Pyramid) on September 26 and 27, 2022. Pyramid utilized electromagnetic (EM) induction-metal technology and ground penetrating radar (GPR) technology to identify potential geophysical anomalies and potential USTs at the site. A total of four EM anomalies were identified at the site. The EM anomalies were attributed to known surface metallic objects, such as reinforced concrete or above-ground metal structures (i.e. fencing, metal posts, etc.) that were not characteristic signatures of USTs. The EM/GPR results indicated that no USTs were identified on Parcels 2/2A. Pyramid's report, including figures depicting the results of the EM/GPR survey, is provided in Appendix B.

3.0 Soil Assessment

3.1 Soil Sampling

H&H contracted with Geologic Exploration, Inc. (GEX) of Statesville, North Carolina to advance soil borings on Parcel 2A. Soil sampling was to be conducted on Parcel 2 as well. However, as NC DOT is aware, the property owner refused access for H&H to collect soil samples. On October 11, 2022, 3 soil borings (SB-2A-1 through SB-2A-3) were advanced by GEX on Parcel 2A using a direct push technology (DPT) drill rig. Prior to conducting soil borings, underground utilities were marked by the NC 811 public utility locator and by Pyramid for private underground utilities. Borings were cleared to five feet by hand auger prior to using the DPT rig.

In general, the soil borings were advanced to depths of 15 ft below ground surface (bgs). To facilitate the selection of soil samples for laboratory analysis, soil from each boring was field screened continuously for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). Additionally, H&H observed the soil for visual and olfactory indications of impacts. Based on field screening, there were indications of potential impacts in borings SB-2A-1 through SB-2A-3. PID readings were significantly higher near the capillary fringe and/or below the water table (estimated 10 to 12 ft bgs at the time of our assessment) in borings SB-

2A-1 through SB-2A-3. Soil samples were collected at various depths between 0 ft to 2 ft and 6 ft to 8 ft bgs. Soil boring logs are included in Appendix C. GPS coordinate data for the soil borings are summarized in Table 1, and the boring locations are shown on Figure 2.

H&H submitted a total of three soil samples from borings SB-2A-1 through SB-2A-3 on Parcel 2A for laboratory analysis. The soil samples were placed into laboratory supplied sample containers using nitrile glove-covered hands. The containers were then labeled as to content, analyses requested, sample date and time, and sampler's name. The samples were placed in an iced cooler upon collection and were subsequently submitted to Red Lab, LLC of Wilmington, NC under standard chain-of-custody protocol for analysis of total petroleum hydrocarbons (TPH) as gasoline-range organics (GRO) and diesel-range organics (DRO) using QED ultraviolet fluorescence (UVF) technology. Soil sample depths and analytical results are summarized in Table 2. Laboratory analytical data sheets and chain-of-custody documentation are provided in Appendix D. The analytical results are discussed below.

Upon completion of soil sampling activities, the soil borings were filled with bentonite pellets, and the surfaces were patched with concrete or soil to match the existing surface.

3.2 Soil Analytical Results

Concentrations of TPH DRO (ranging from 0.71 mg/kg to 87.5 mg/kg) were detected in soil samples collected from borings SB-2A-1 through SB-2A-3. These concentrations are below the NC DEQ Action Level for TPH DRO of 100 mg/kg. TPH GRO was detected in soil sample SB-2A-3 at a concentration of 73 mg/kg, which exceeds the NC DEQ Action Level for TPH GRO of 50 mg/kg. TPH data are depicted on Figure 2.

Based on the above soil sample results, H&H estimates the following amount of impacted soil above the NC DEQ Action Levels is present on Parcel 2A:

- H&H estimates there are roughly 130 cubic yards (200 tons) of soil impacted with TPH GRO between 5 ft and 12 ft near boring SB-2A-3 on the northeastern portion of Parcel 2A.

The estimated depth of impacted soils is based on field screening results up to the approximate water table. However, field screening and lab results did not provide information that fully defines the impacted soil interval or extent. Therefore, impacts may extend beyond the depths and amounts indicated above. The approximate area of impacted soil is shown on Figure 2.

Although laboratory analytical results indicate soil impacts below NC DEQ Action Levels in borings SB-2A-1 and SB-2A-2, significant PID readings from these borings indicate the potential for soil impacts below 12 ft bgs. The elevated PID readings are likely due to impacted groundwater and historical groundwater table fluctuations creating a contamination smear zone near the water table. If impacted soil is encountered near Parcel 2A during the NC DOT construction activities, it should be properly managed and disposed.

4.0 Summary and Regulatory Considerations

H&H has reviewed available NC DEQ files, geophysical survey results, and analytical results of soil samples collected at the Parcel 2/2A property in Sylva, Jackson County, North Carolina. Parcel 2/2A is currently occupied by Sam's Motor Sales, Inc. and an asphalt parking lot. Historical use consisted of auto sales, potential former auto service, and a potential former gas station. However, no evidence of USTs was found onsite during the geophysical survey.

Analytical results of soil samples collected by H&H on Parcel 2A indicate concentrations of TPH GRO above the NC DEQ Action Level in the SB-2A-3 (6-8) soil sample. Soil sampling was to be conducted on Parcel 2 as well. However, as NC DOT is aware, the property owner refused access to collect soil samples. Based on field screening and laboratory analytical results, H&H estimates there are roughly 130 cubic yards (200 tons) of soil impacted with TPH GRO between 5 ft and 12 ft near boring SB-2A-3 in the northeastern portion of Parcel 2A.

NC DOT plans indicate a proposed undercut for road improvement activities in proposed NC DOT work areas near Parcel 2/2A. Impacted media encountered during road construction activities should be properly managed and disposed at a permitted facility. If groundwater is

encountered and dewatering activities are required during NC DOT construction activities, the groundwater should be characterized and properly managed, if found to be impacted. The depth to water ranged from approximately 10 ft to 12 ft below grade at the time of H&H's assessment. If a UST is encountered during construction activities, the UST system(s) and their contents should be removed in accordance with NC DEQ regulations and be properly disposed.

5.0 Signature Page

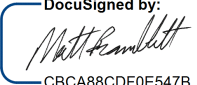
This report was prepared by:

DocuSigned by:
 12/05/2022
9E6EAD6E6BA34BE...

David Graham, PG
Senior Project Geologist for
Hart & Hickman, PC



This report was reviewed by:

DocuSigned by:
 CBCA88CDE0E547B

Matt Bramblett, PE
Principal and Project Manager for
Hart & Hickman, PC

Not considered final unless all signatures are completed.

Table 1 (Page 1 of 1)
Soil Boring GPS Coordinate Data
NC DOT Parcel 2A
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Sample ID	Latitude	Longitude
SB-2A-1	35.373739	-83.220154
SB-2A-2	35.373753	-83.220099
SB-2A-3	35.373757	-83.220042

Notes:

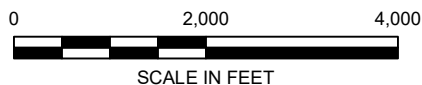
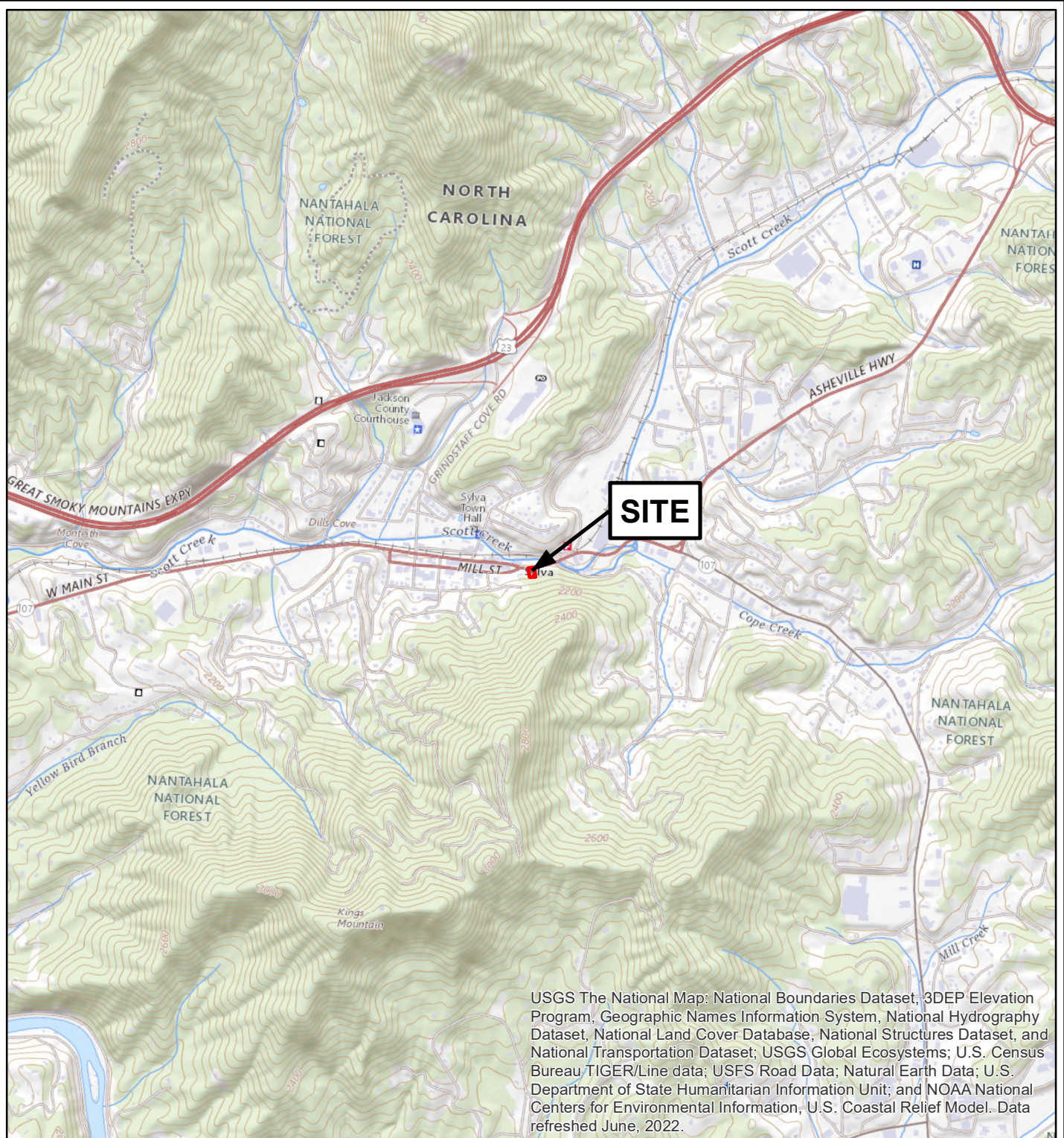
GPS coordinate data points collected using a Trimble GeoExplorer 6000 series unit with external satellite for increased accuracy.

Table 2 (Page 1 of 1)
Soil Analytical Results
NC DOT Parcel 2A
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Sample ID	SB-2A-1	SB-2A-2	SB-2A-3	Action Level
Sample Depth (ft)	2-4	0-2	6-8	
Sample Date	10/11/2022	10/11/2022	10/11/2022	
<u>TPH DRO/GRO (UVF) (mg/kg)</u>				
Diesel-Range Organics (DRO)	58.5	0.71	87.5	100
Gasoline-Range Organics (GRO)	<0.53	<0.59	73	50

Notes:

UVF = QED Ultraviolet Fluorescence Technology
Bold values exceed NCDEQ Action Levels.
TPH = Total Petroleum Hydrocarbons; DEQ = Department of Environmental Quality
DRO = Diesel-Range Organics
GRO = Gasoline-Range Organics



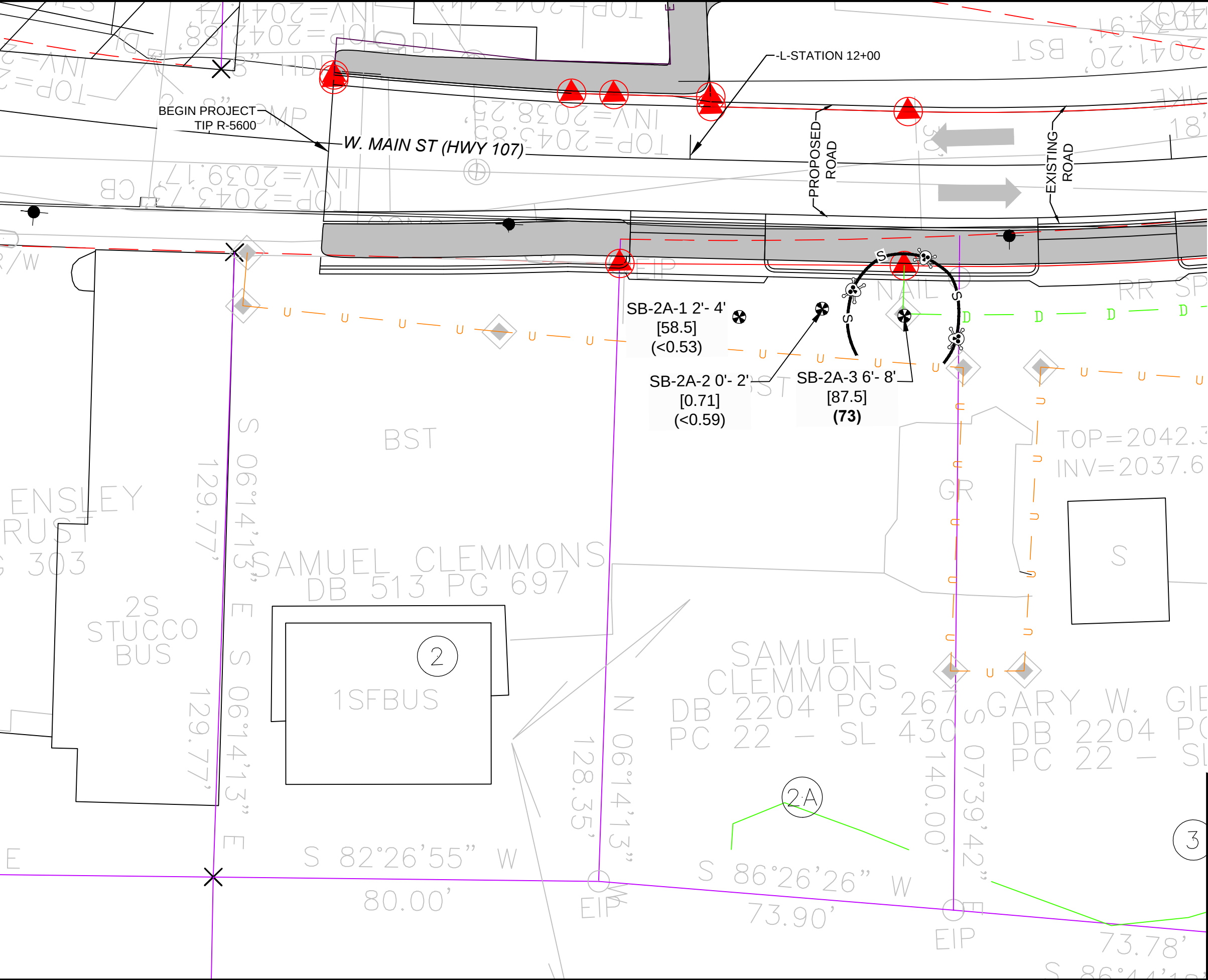
U.S.G.S. QUADRANGLE MAP

SYLVA SOUTH, NORTH CAROLINA 2022

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

TITLE		SITE LOCATION MAP	
PROJECT		NCDOT PARCEL 2/2A 413 W. MAIN ST SYLVA, NORTH CAROLINA	
 SMARTER ENVIRONMENTAL SOLUTIONS		2923 South Tryon Street - Suite 100 Charlotte, North Carolina 28203 704-586-0007 (p) 704-586-0373 (f) License # C-1269 / # C-245 Geology	
DATE: 10-5-22		REVISION NO: 0	
JOB NO: ROW-704		FIGURE NO: 1	

S:\AAA-Master Projects\NC DOT Right-of-Way -ROW\ROW-704 Jackson County Phase 1\FIGURES\ROW-704 Site Maps 100422_recover.dwg, PARCEL 2, 11/14/2022 10:25:45 AM, imarbuery



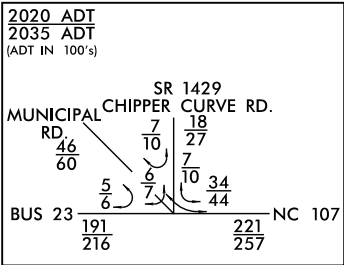
- LEGEND
- PROPERTY LINE
 - VEGETATION / WOODED
 - EXISTING RIGHT-OF-WAY
 - PROPOSED RIGHT-OF-WAY
 - PROPOSED UTILITY EASEMENT
 - PROPOSED DRAINAGE EASEMENT
 - NC DOT PARCEL ID
 - UTILITY POLE
 - SOIL BORING LOCATION
 - SB-2A-1 2'-4' SAMPLE ID/DEPTH
 - [58.5] DIESEL RANGE TPH (mg/kg)
 - (<0.53) GASOLINE RANGE TPH (mg/kg)
 - KNOWN SOIL CONTAMINATION
 - PROPOSED SIDEWALK

- NOTE:
- BOLD** EXCEEDS NC DEQ ACTION LEVELS.
 - TPH = TOTAL PETROLEUM HYDROCARBONS.

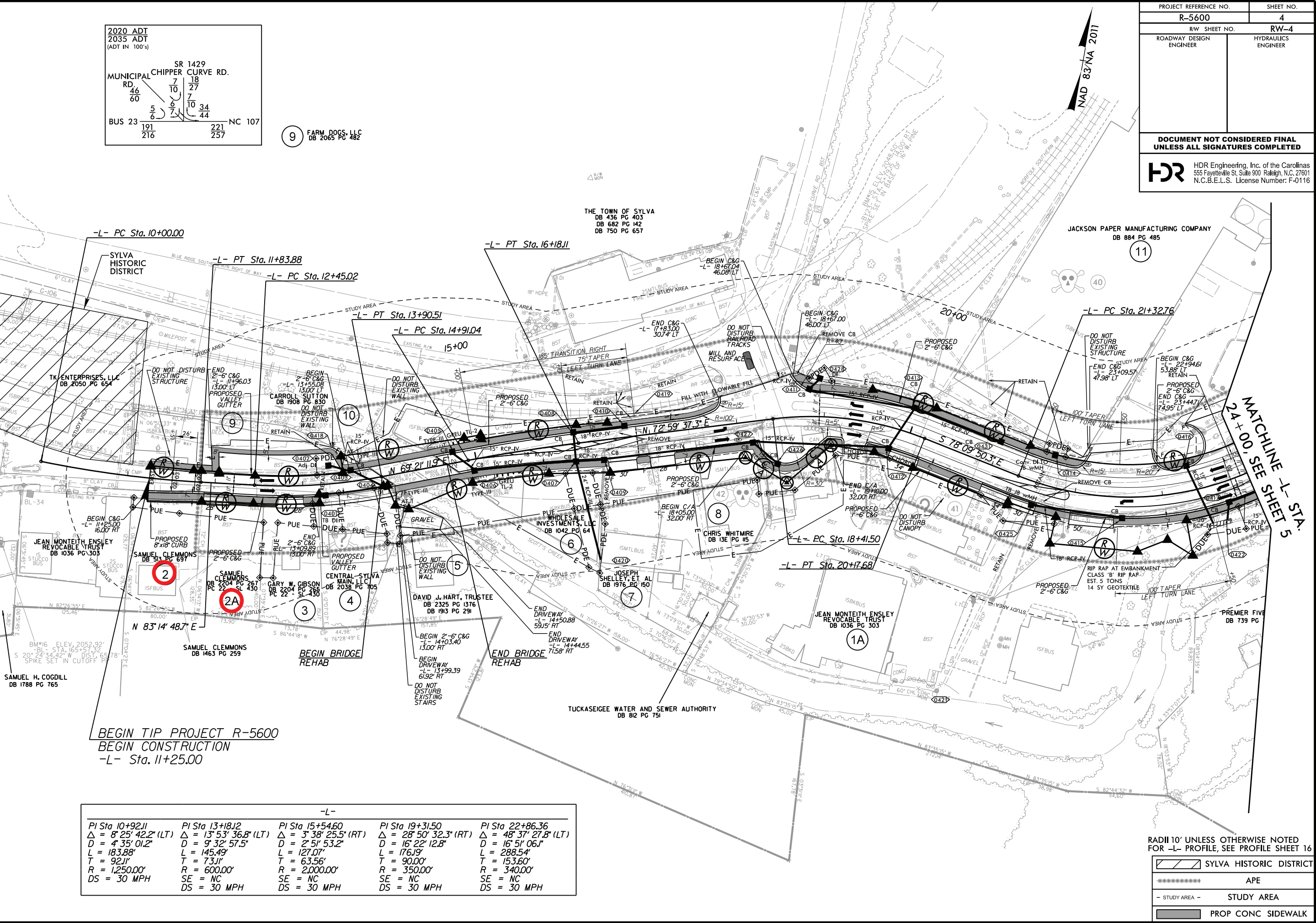


TITLE SITE MAP AND SOIL ANALYTICAL RESULTS	
PROJECT NC DOT PARCEL 2/2A 413 W. MAIN STREET SYLVA, JACKSON COUNTY, NORTH CAROLINA	
hart hickman SMARTER ENVIRONMENTAL SOLUTIONS 2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f) License # C-1269 / #C-245 Geology	
DATE: 10-24-22	REVISION NO. 0
JOB NO. ROW-704	FIGURE NO. 2

Appendix A
NC DOT Preliminary Plan



9 FARM DOGS, LLC
DB 2065 PG 482



BEGIN TIP PROJECT R-5600
BEGIN CONSTRUCTION
-L- Sta. 11+25.00

-L-				
PI Sta 10+92.11	PI Sta 13+18.12	PI Sta 15+54.60	PI Sta 19+31.50	PI Sta 22+86.36
$\Delta = 8' 25' 42.2''$ (LT)	$\Delta = 13' 53' 36.8''$ (LT)	$\Delta = 3' 38' 25.5''$ (RT)	$\Delta = 28' 50' 32.3''$ (RT)	$\Delta = 48' 37' 27.8''$ (LT)
$D = 4' 35' 01.2''$	$D = 9' 32' 57.5''$	$D = 2' 51' 53.2''$	$D = 16' 22' 12.8''$	$D = 16' 51' 06.1''$
$L = 183.88'$	$L = 145.49'$	$L = 127.07'$	$L = 176.19'$	$L = 288.54'$
$T = 92.11'$	$T = 73.11'$	$T = 63.56'$	$T = 90.00'$	$T = 153.60'$
$R = 1,250.00'$	$R = 600.00'$	$R = 2,000.00'$	$R = 350.00'$	$R = 340.00'$
$DS = 30$ MPH	$SE = NC$ $DS = 30$ MPH	$SE = NC$ $DS = 30$ MPH	$SE = NC$ $DS = 30$ MPH	$SE = NC$ $DS = 30$ MPH

RADII 10' UNLESS OTHERWISE NOTED
FOR -L- PROFILE, SEE PROFILE SHEET 16

	SYLVA HISTORIC DISTRICT
*****	APE
- STUDY AREA -	STUDY AREA
	PROP CONC SIDEWALK

REVISIONS
10/20/2021 PARCEL 1 REMOVED; TCE REVISED; PARCEL 2
7/29/2022 PARCELS 4 & 5, ROW REVISED AND DUE ADDED; PARCELS 2A, 3, 4 DUE REVISED; PARCELS 3 & 4 PUE REVISED; PARCEL 9 PDE ADDED
PLOT DRIVER: NCDOT.pdf_color_eng_50.ppt DATE: 7/29/2022 TIME: 1:53:11 PM
USER: ASNIDER
FILE: \

Appendix B
Pyramid Geophysical Survey Report



PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2022-260)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION: PARCELS 2 & 2A NCDOT PROJECT R-5600 (45818.1.FR1)

413 WEST MAIN STREET, SYLVA, NC

October 21, 2022

Report prepared for: David Graham, P.G.
Hart & Hickman, P.C.
2923 South Tryon Street, Suite 100
Charlotte, NC 28203

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 Canavello".

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
Parcels 2 & 2A - 413 West Main Street
Sylva, Jackson County, North Carolina

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- Figure 2 – Parcels 2 & 2A - EM61 Metal Detection Contour Map
- Figure 3 – Parcels 2 & 2A - GPR Transect Locations and Select Images
- Figure 4 – Overlay of Metal Detection Results on NCDOT Engineering Plans

Appendices

- Appendix A – GPR Transect 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 Geophysical Services (Pyramid), a department within Pyramid Environmental & Engineering, P.C., conducted a geophysical investigation for Hart & Hickman, P.C. (Hart & Hickman) at Parcels 2 & 2A, located at 413 West Main Street, in Sylva, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5600). 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 September 26-27, 2022, 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 four EM anomalies were identified. All of the EM anomalies were directly attributed to visible cultural features at the ground surface. GPR was performed across and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant structures such as USTs. The geophysical survey identified evidence of utilities and/or smaller fragments of buried debris. Collectively, the geophysical data recorded no evidence of metallic USTs at Parcels 2 & 2A.

INTRODUCTION

Pyramid Geophysical Services (Pyramid), a department within Pyramid Environmental & Engineering, P.C., conducted a geophysical investigation for Hart & Hickman, P.C. (Hart & Hickman) at Parcels 2 & 2A, located at 413 West Main Street, in Sylva, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5600). 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 September 26-27, 2022, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site consisted of an active vehicle repair shop surrounded by asphalt and concrete 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 September 27, 2022, using a Geophysical Survey Systems, Inc. (GSSI) SIR 4000 unit 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 SIR 4000 unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the SIR 4000 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:

Metallic Anomaly #	Cause of Anomaly	Investigated with GPR
1	Building	✓
2	Fence	
3	Utility	
4	Reinforced Concrete	✓

All of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a building, a fence, a utility, and reinforced concrete. GPR was performed across and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant 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 seven formal GPR transects were performed at the site.

GPR Transects 1-7 were performed across and around areas of significant metallic interference. GPR Transects 2-7 confirmed the presence of reinforcement within the concrete. None of these transects showed evidence of significant structures such as USTs. Evidence of utilities and/or smaller fragments of buried debris was also observed.

Collectively, the geophysical data recorded no evidence of metallic USTs at Parcels 2 & 2A. **Figure 4** provides an overlay of the metal detection results on the NCDOT engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcels 2 & 2A in Sylva, 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.
- All of the EM anomalies were directly attributed to visible cultural features at the ground surface.
- GPR was performed across and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant structures such as USTs.
- The geophysical survey identified evidence of utilities and/or smaller fragments of buried debris.
- Collectively, the geophysical data recorded no evidence of metallic USTs at Parcels 2 & 2A.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for Hart & Hickman, P.C. 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 East)



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

PROJECT

PARCELS 2 & 2A
SYLVA, NORTH CAROLINA
NCDOT PROJECT R-5600

TITLE

PARCELS 2 & 2A -
GEOPHYSICAL SURVEY BOUNDARIES
AND SITE PHOTOGRAPHS

DATE

9/30/2022

CLIENT

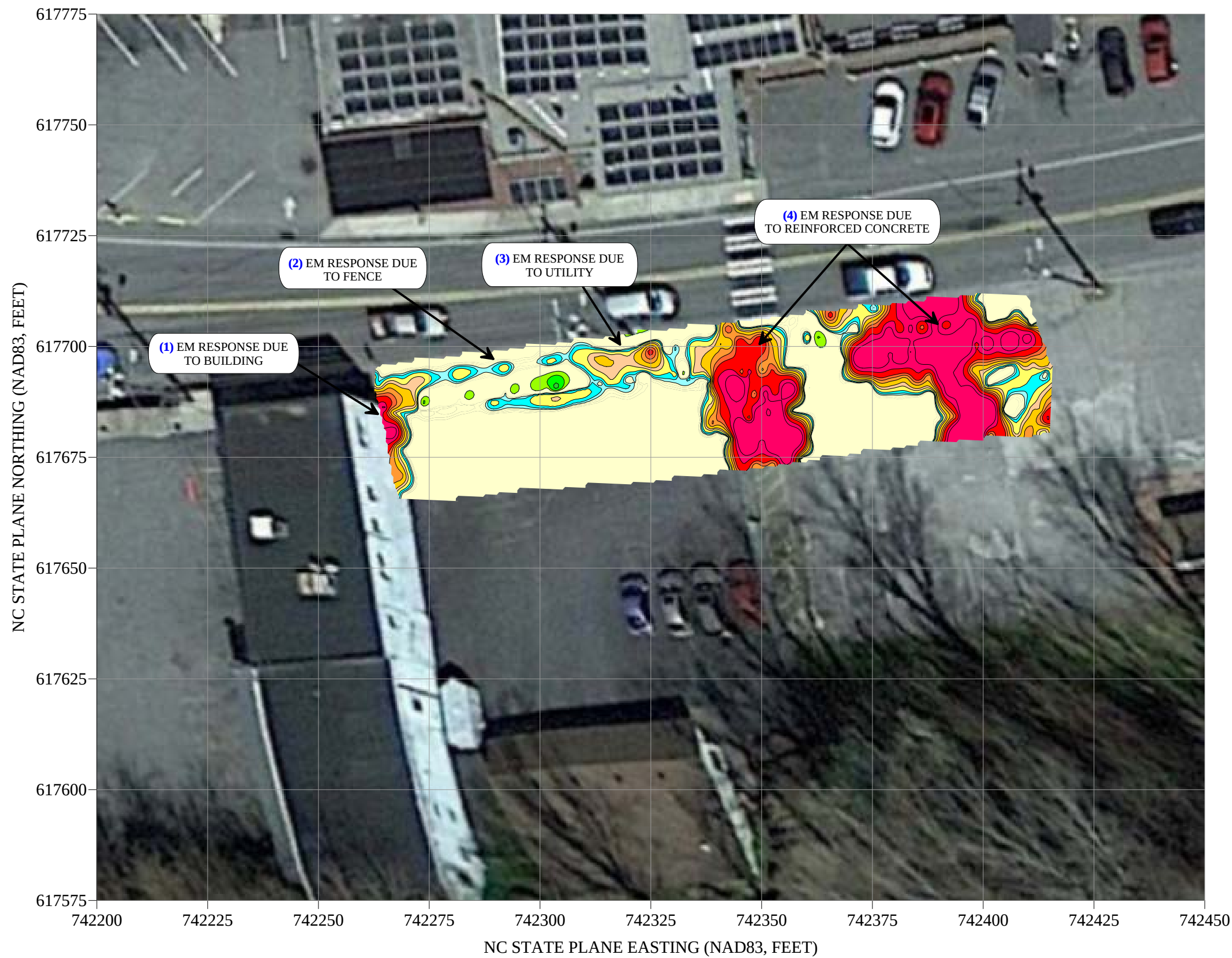
HART & HICKMAN

PYRAMID
PROJECT #:

2022-260

FIGURE 1

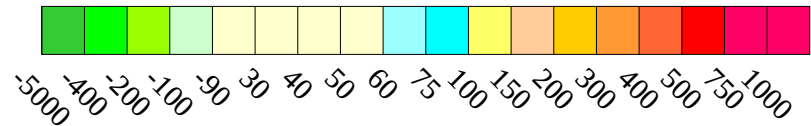
EM61 METAL DETECTION RESULTS



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 September 26, 2022, using a Geonics EM61-MK2 instrument. Verification GPR data were collected using a GSSI SIR 4000 instrument with a 350 MHz HS antenna on September 27, 2022.

EM61 Metal Detection Response
(millivolts)



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

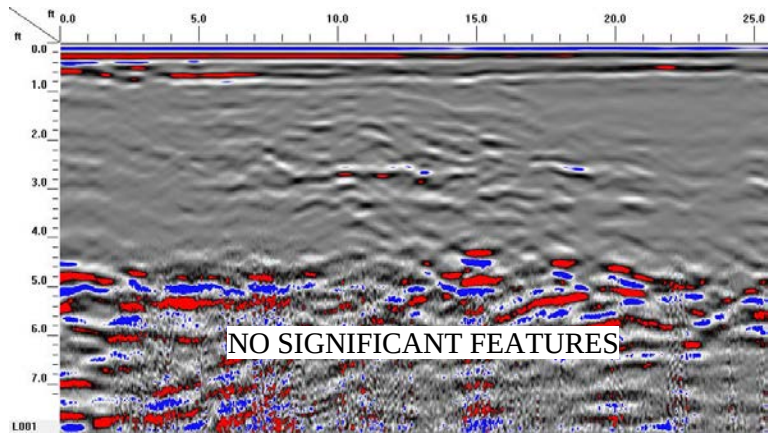
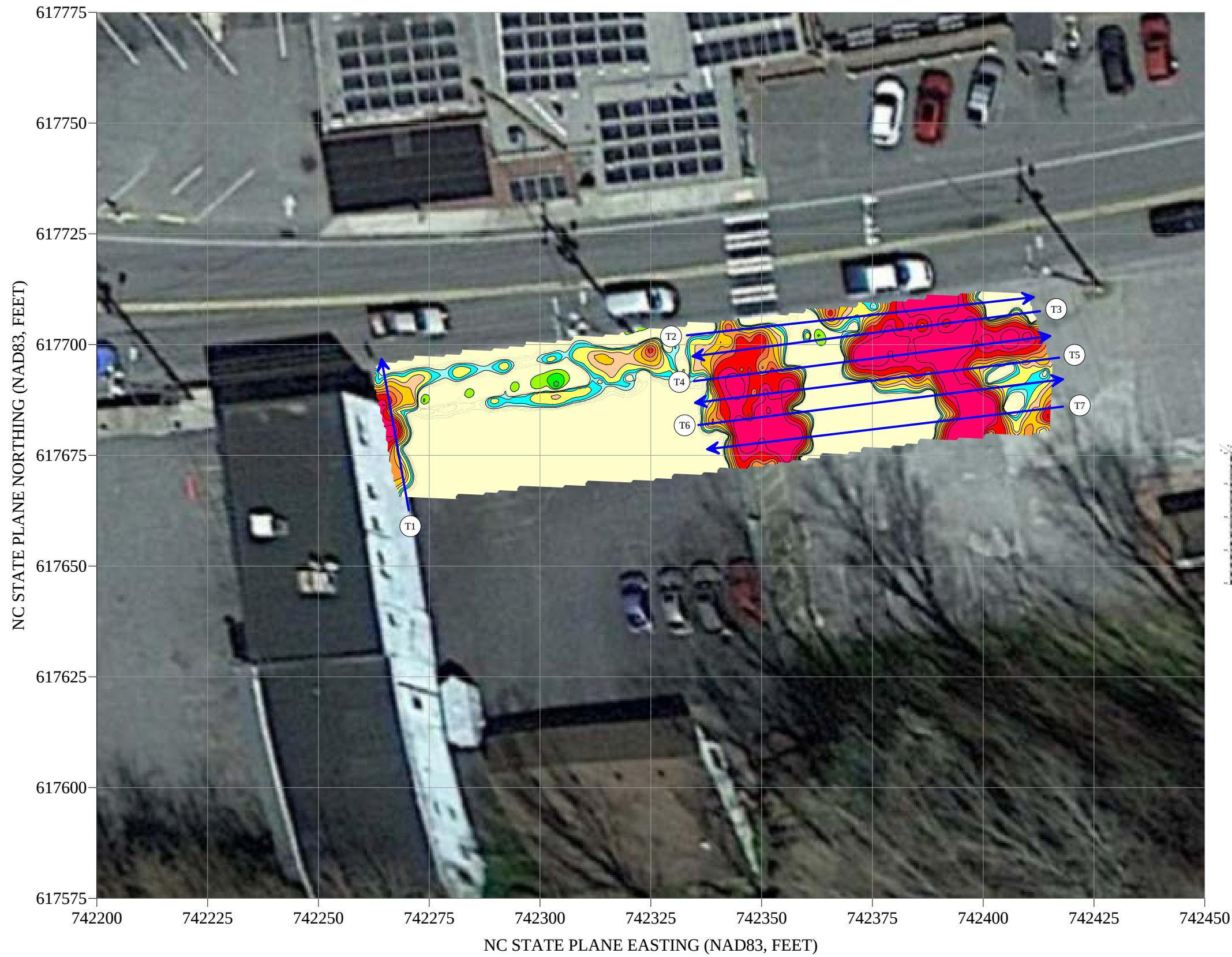
PROJECT
PARCELS 2 & 2A
SYLVA, NORTH CAROLINA
NCDOT PROJECT R-5600

TITLE
PARCELS 2 & 2A -
EM61 METAL DETECTION CONTOUR MAP

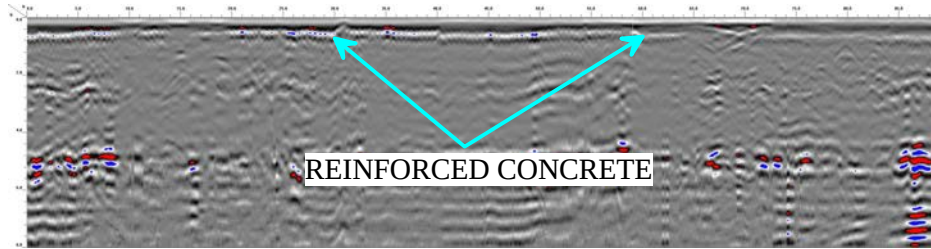
DATE
9/30/2022
PYRAMID
PROJECT #:
2022-260

CLIENT
HART & HICKMAN
FIGURE 2

GPR TRANSECT LOCATIONS



GPR TRANSECT 1 (T1)



GPR TRANSECT 2 (T2)



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

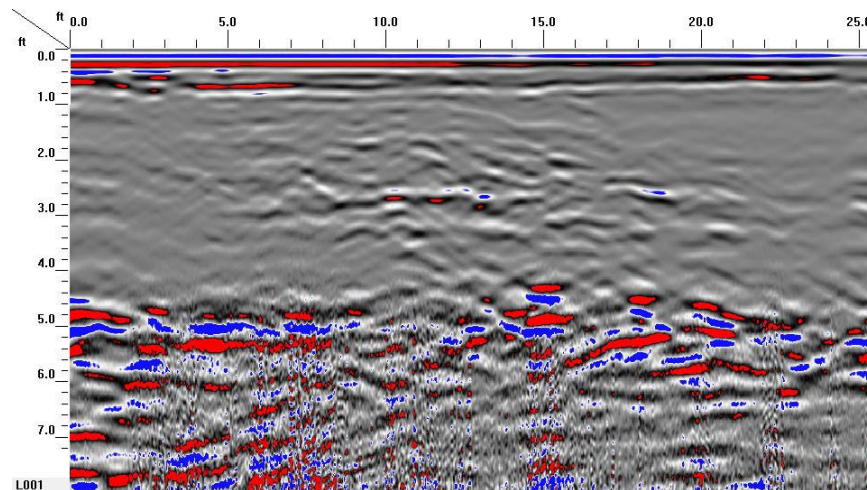
PROJECT
PARCELS 2 & 2A
SYLVA, NORTH CAROLINA
NCDOT PROJECT R-5600

TITLE
PARCELS 2 & 2A -
GPR TRANSECT LOCATIONS AND SELECT IMAGES

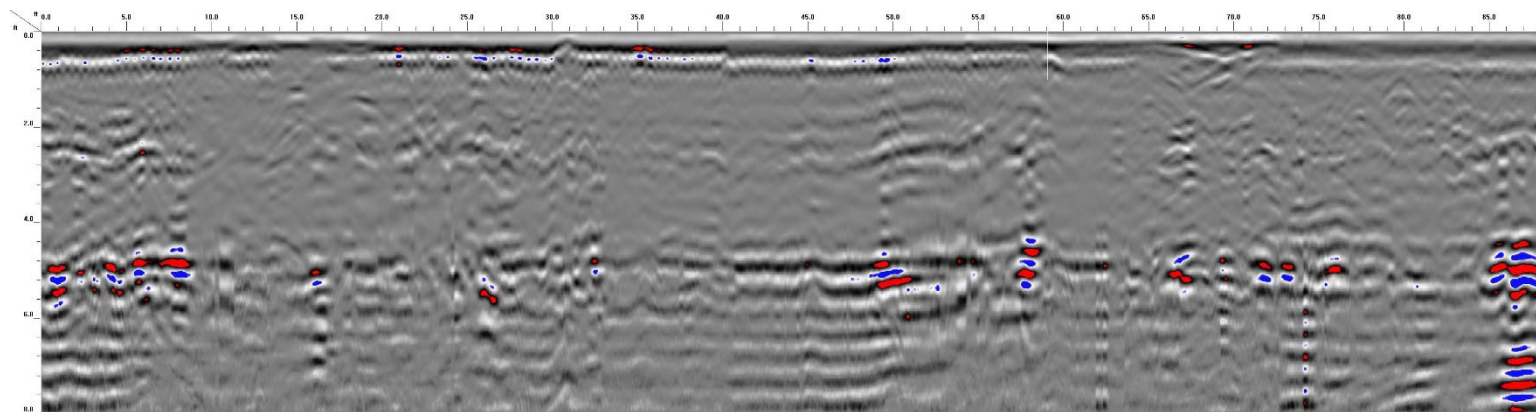
DATE
9/30/2022
PYRAMID
PROJECT #: 2022-260

CLIENT
HART & HICKMAN
FIGURE 3

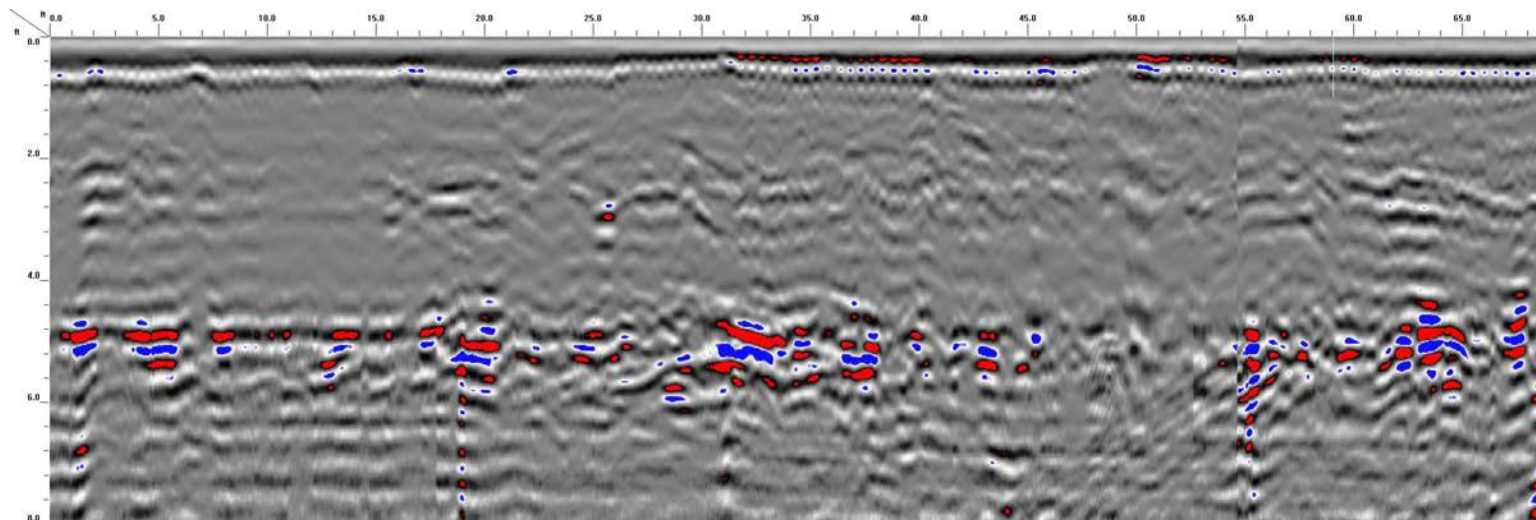
Appendix A – GPR Transect Images



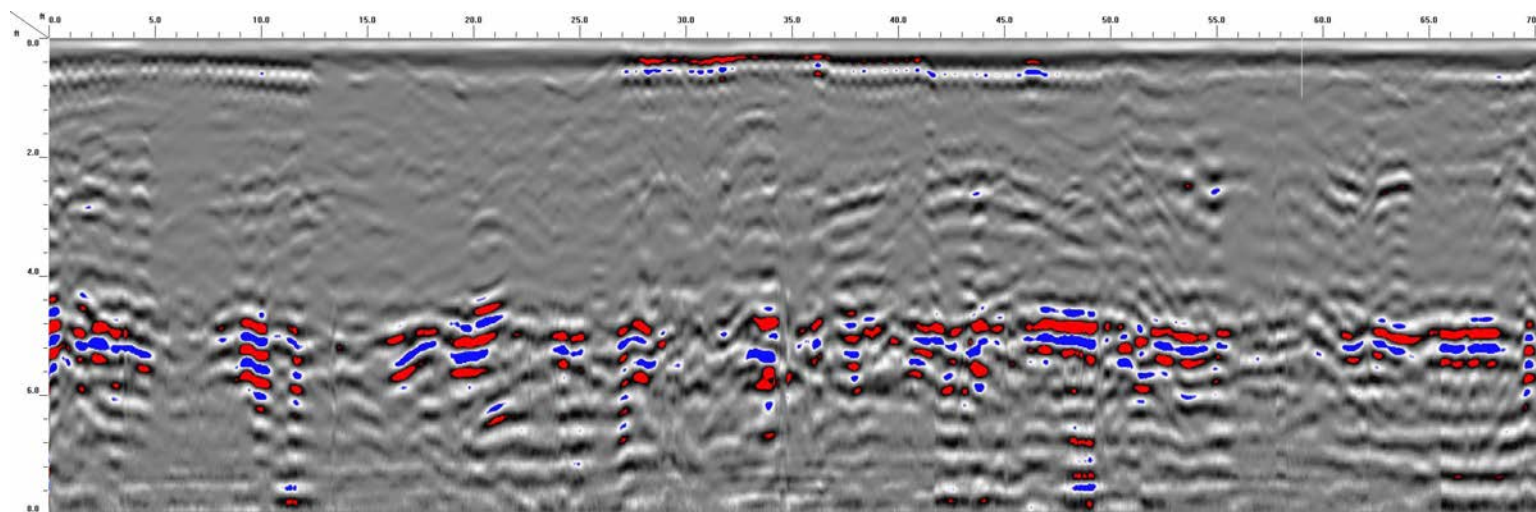
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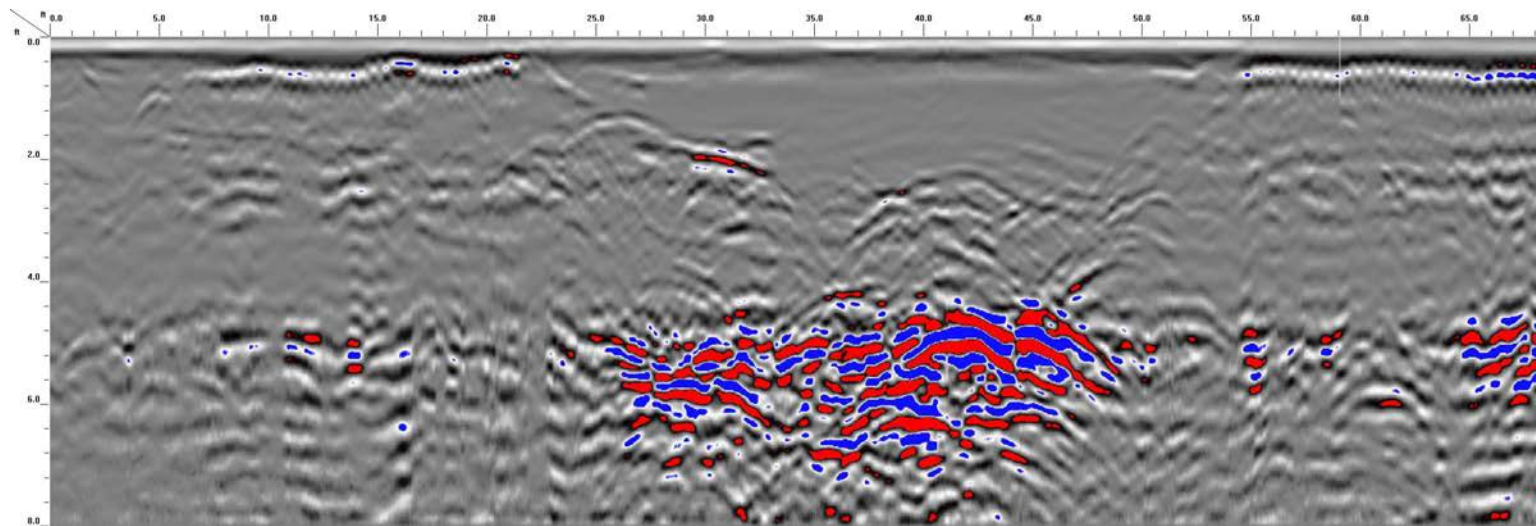
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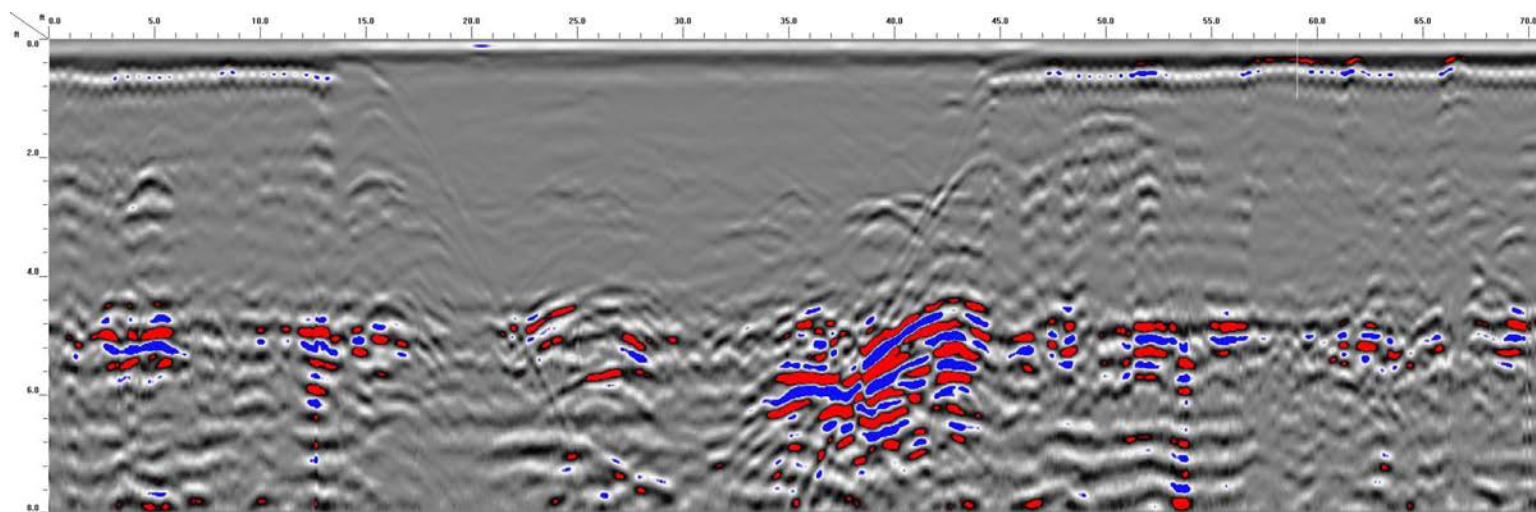
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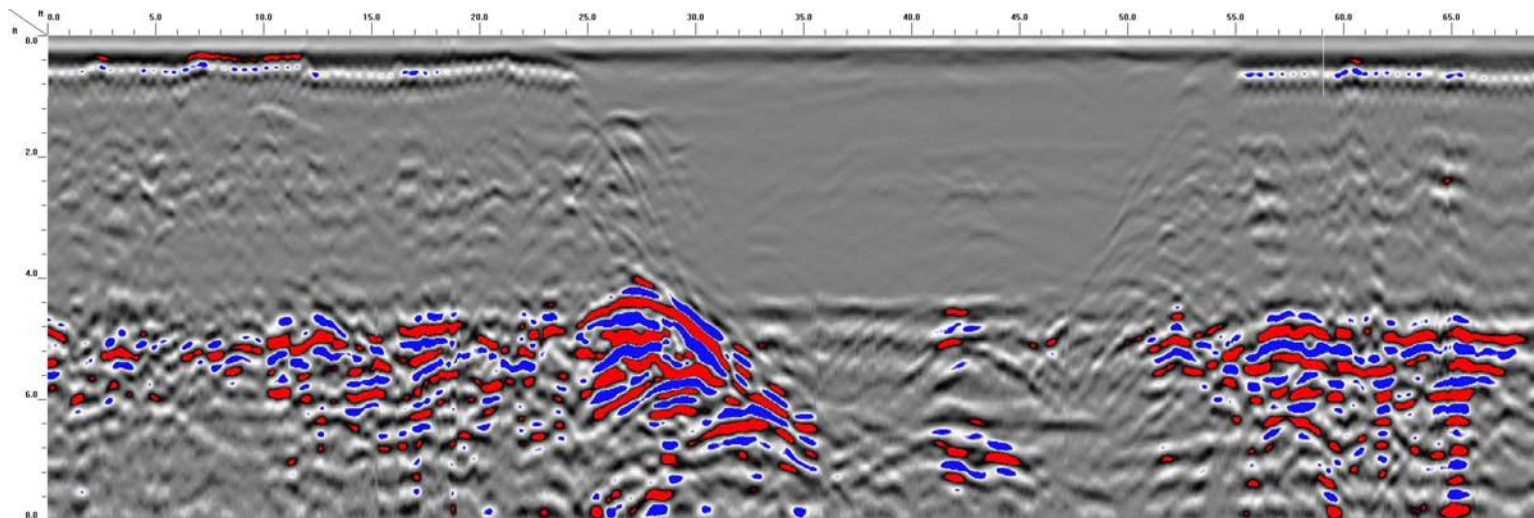
GPR TRANSECT 4



GPR TRANSECT 5



GPR TRANSECT 6



GPR TRANSECT 7

Appendix C
Soil Boring Logs

Client: NC DOT
 Project: ROW-704
 Address: Parcel 2A - 413 W. Main Street Sylva, North Carolina

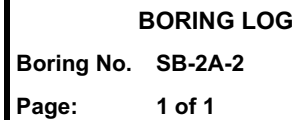
BORING LOG
 Boring No. SB-2A-1
 Page: 1 of 1

Drilling Start Date: 10/11/22
 Drilling End Date: 10/11/22
 Drilling Company: GEX
 Drilling Method: Direct Push
 Drilling Equipment: GeoProbe 7822 DT
 Driller: David Hall
 Logged By: ABM

Boring Depth (ft): 15.0
 Boring Diameter (in): 2.25
 Sampling Method(s): Direct Push, Grab
 DTW During Drilling (ft): 12.0
 DTW After Drilling (ft):
 Ground Surface Elev. (ft):
 Location (X,Y):

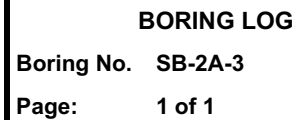
DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0				GR			5.00	(0') Asphalt (0.25') Well-graded SAND (SW); mostly fine to coarse grained sand, trace silt, loose, moist, dark gray	2.3		0
								(2') SILT (ML); some fine to coarse sand, little clay, soft, moist, reddish-brown	2.6	SB-2A-1	
									5.0		5
5				DP			5.00	(5') SILT (ML); some fine to coarse sand, little clay, soft, moist, reddish-brown	4.2		
									3.8		
								(9') Clayey SILT (ML); little fine sand, little clay, soft, moist, reddish-brown	3.3		10
10				DP			5.00	(12') Clayey SILT (ML); little fine sand, little clay, soft, wet, reddish-brown	415.1		
								(13') Well-graded SAND (SW); mostly fine grained sand, trace silt, moist, white and gray marbling; saprolitic texture; petroleum odor	81.5		15
15								(15') Boring terminated			
											20

NOTES: Hole precleared to 5' by GEX using hand auger.



Boring Depth (ft):	15.0
Boring Diameter (in):	2.25
Sampling Method(s):	Direct Push, Grab
DTW During Drilling (ft):	12.0
DTW After Drilling (ft):	
Ground Surface Elev. (ft):	
Location (X,Y):	

NOTES: Hole precleared to 5' by GEX using hand auger.



Boring Depth (ft):	15.0
Boring Diameter (in):	2.25
Sampling Method(s):	Direct Push, Grab
DTW During Drilling (ft):	10.0
DTW After Drilling (ft):	
Ground Surface Elev. (ft):	
Location (X,Y):	

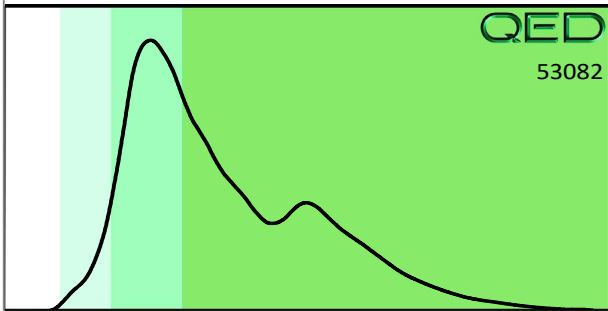
NOTES: Hole precleared to 5' by GEX using hand auger.

Appendix D
Laboratory Analytical Report

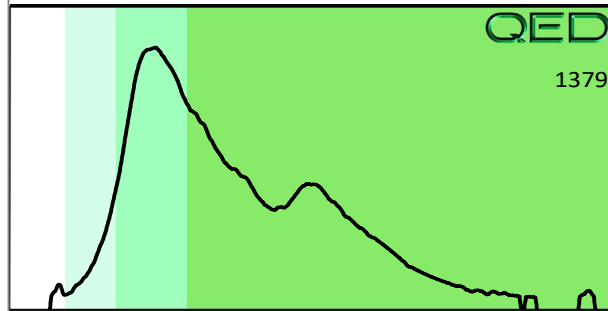


(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

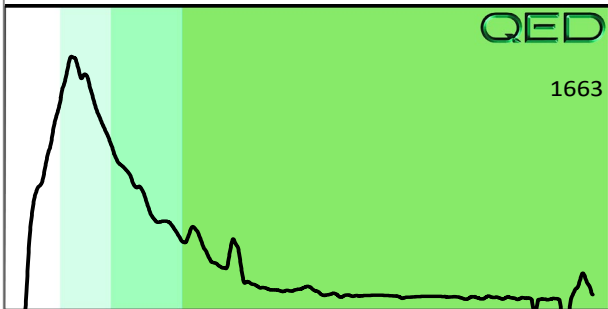
SB-2A-1 (2-4) : Road Tar 90.3%,(FCM),(BO)



SB-2A-2 (0-2) : V.Deg.PHC 83.3%,(FCM)



SB-2A-3 (6-8) : Deg.Diesel 72.4%,(FCM)



Client Name:						DOT					
Address:						2923 S. Tryon St. Ste 100 Charlotte NC 28203					
Contact:						Dawe Graham					
Project Ref.:						ROW-704					
Email:						dgraham@hart-hickman.com					
Phone #:						704-887-4630					
Collected by:						Adam Michalak					
 RAPID ENVIRONMENTAL DIAGNOSTICS											
CHAIN OF CUSTODY AND ANALYTICAL REQUEST FORM											
Sample Collection		TAT Requested		Analysis Type		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.	
Date/Time	24 Hour	48 Hour	UVF	GC							
10/11/22 1500		X	X		AM	SBA-1 (2-4)	53.0	40.9	12.1		
10/11/22 1530		↓	↓		↓	SBA-2 (3-2)	55.0	43.9	11.1		
10/11/22 1600		↓	↓		↓	SBA-3 (6-8)	52.3	39.5	12.8		
COMMENTS/REQUESTS: Report to MDLs B's flags						TARGET GC/UVF ANALYTES:					
Relinquished by						Accepted by			Date/Time		
Adam Michalak						Fred EX			10/13/22 1100		
Relinquished by						Accepted by			Date/Time		
						M.M.			10/14/22 1050		
RED Lab USE ONLY											
Ref. No. 118											

Via NC DOT FTS

November 30, 2022

NC DOT Geotechnical Unit
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

Attention: Mr. Ashley Cox, LG

Re: Phase II Investigation Report – Parcel 24
NC DOT State Project No. R-5600
WBS Element No. 45818.1.FR1
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Dear Ashley:

Please find the attached PDF copy of the Phase II Investigation report for the Alpine Sylva, LLC property (Parcel 24) located in Sylva, Jackson County, North Carolina. Please return via DocuSign for final signatures. If you have any questions or need additional information, please contact us at (704) 586-0007.

Sincerely,

Hart & Hickman, PC



David Graham, PG
Senior Project Geologist



Matt Bramblett, PE
Principal

Attachment

Phase II Investigation NC DOT Parcel 24

**28 W. Main St.
Sylva, Jackson County
North Carolina**

**H&H Job No. ROW-704
State Project: R-5600
WBS Element No. 45818.1.FR1
November 30, 2022**



**#C-1269 Engineering
#-245 Geology**

**Phase II Investigation – Parcel 24
28 W. Main St.
Sylva, Jackson County
North Carolina
H&H Job No. ROW-704**

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Appendix B	Pyramid Geophysical Survey Report
Appendix C	Soil Boring Logs, Well Construction Record, and Well Abandonment Record
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Appendix E	Groundwater Sampling Records

Phase II Investigation – Parcel 24
28 W. Main St.
Sylva, Jackson County
North Carolina
H&H Job No. ROW-704

1.0 Introduction and Background

Hart & Hickman, PC (H&H) has prepared this Phase II Investigation (Phase II) report documenting assessment activities performed at the Alpine Sylva, LLC property (Parcel 24) located at 28 W. Main St. in Sylva, Jackson County, North Carolina. This assessment was conducted on behalf of the North Carolina Department of Transportation (NC DOT) in accordance with H&H's August 17, 2022 proposal.

This assessment was conducted to evaluate the potential for underground storage tank (UST) systems and impacted soil and groundwater in proposed right-of-way and construction easement areas on Parcel 24 related to proposed road improvements along W. Main St. and Asheville Highway (Hwy 23) to the east of the site (State Project R-5600). This NC DOT road improvement project includes new curb and gutters, stormwater drainage piping, sidewalks, etc. Parcel 24 is currently an unoccupied vacant lot with asphalt parking, concrete slabs (former building footprint), and grassy areas. A site location map is included as Figure 1, and a site map is presented as Figure 2. NC DOT's plan sheet depicting Parcel 24 is included in Appendix A.

H&H searched the North Carolina Department of Environmental Quality (NC DEQ) Laserfiche website and NC DEQ UST databases for incident files related to the Parcel 24 property address to better target UST system areas and to check for previously reported impacts. No UST Incident files were identified for Parcel 24 on NC DEQ's Laserfiche website. Based on the NC DEQ Registered Tank Database, there were no USTs registered on the property for Parcel 24. One permanent monitoring well (MW-Parcel 24) is located near the center of the property within proposed DOT work areas. According to Maura Clark, Incident Manager with the NC DEQ UST section, the site was formerly occupied by the Sylva Gulf Station (formerly identified as 54 W. Main Street). One 2,000-gallon gasoline UST and two 3,000-gallon gasoline USTs were removed from the site in

December 1990. No release was reported at the site. No UST incident files are available for the former Sylva Gulf Station.

The Phase II assessment activities conducted by H&H on Parcel 24 are discussed below.

2.0 Geophysical Survey

Prior to advancing soil borings, H&H reviewed the results of a geophysical survey performed on Parcel 24 by Pyramid Geophysical Services (Pyramid) on September 26 through September 28, 2022. Pyramid utilized electromagnetic (EM) induction-metal technology and ground penetrating radar (GPR) technology to identify potential geophysical anomalies and potential USTs at the site. A total of seven EM anomalies were identified. Certain EM anomalies were attributed to known surface metallic objects such as reinforced concrete or above-ground metal structures (i.e. drop inlets, metal sign, etc.) that were not characteristic signatures of USTs. However, the EM/GPR survey detected one probable and one possible UST on Parcel 24. The probable UST dimensions are approximately 9.5 ft long by 5.5 ft wide, and the possible UST is approximately 9.5 ft long by 5.5 ft wide. There were no visual indications of the probable and possible USTs. Pyramid's report, including figures depicting the results of the EM/GPR survey, is provided in Appendix B.

3.0 Soil Assessment

3.1 Soil Sampling

H&H contracted with Geologic Exploration, Inc. (GEX) of Statesville, North Carolina to advance soil borings on Parcel 24. On October 12, 2022, eight soil borings (SB-24-1 through SB-24-8) were advanced by GEX on Parcel 24 near the probable and possible USTs and within the proposed right of way and the easement areas using a direct push technology (DPT) drill rig. Prior to conducting soil borings, underground utilities were marked by the NC 811 public utility locator and by Pyramid for private underground utilities. Borings were also cleared to five feet by hand auger prior to using the DPT rig.

The soil borings were advanced to depths ranging from 3 ft to 15 ft below ground surface (bgs). Shallow groundwater was encountered at approximately 3.5 to 6 ft bgs in several borings at the site at the time of our assessment. A temporary monitoring well (TMW-1) was installed in boring SB-24-5 to evaluate shallow groundwater near the potential USTs noted above (see Section 4.0 below). To facilitate the selection of soil samples for laboratory analysis, soil from each boring was field screened continuously for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). Additionally, H&H observed the soil for visual and olfactory indications of impacts. Based on field screening, there were indications of potential impacts in borings SB-24-5 and SB-24-6. PID readings were significantly higher in the capillary fringe near the water table in borings SB-24-5 and SB-24-6. Soil samples were collected at various depth intervals between 0 ft and 4 ft bgs. Soil boring logs are included in Appendix C. GPS coordinate data for the soil borings and temporary/existing monitoring wells are summarized in Table 1, and the boring locations are shown on Figure 2.

H&H submitted a total of eight soil samples from borings SB-24-1 through SB-24-8 on Parcel 24 for laboratory analysis. The soil samples were placed into laboratory supplied sample containers using nitrile glove-covered hands. The containers were then labeled as to content, analyses requested, sample date and time, and sampler's name. The samples were placed in an iced cooler upon collection and were subsequently submitted to Red Lab, LLC of Wilmington, NC under standard chain-of-custody protocol for analysis of total petroleum hydrocarbons (TPH) as gasoline-range organics (GRO) and diesel-range organics (DRO) using QED ultraviolet fluorescence (UVF) technology. Soil sample depths and analytical results are summarized in Table 2. Laboratory analytical data sheets and chain-of-custody documentation are provided in Appendix D. The analytical results are discussed below.

Upon completion of soil sampling activities the soil borings were filled with bentonite pellets and patched with asphalt or soil to match the existing ground surface.

3.2 Soil Analytical Results

Concentrations of TPH DRO (ranging from 1.3 mg/kg to 1,143 mg/kg) were detected in soil samples collected from borings SB-24-2 through SB-24-8. Concentrations of TPH GRO (6.6 mg/kg and 143.6 mg/kg) were detected in borings SB-24-6 and SB-24-5, respectively. TPH DRO and GRO concentrations exceed the NC DEQ Action Levels of 100 mg/kg and 50 mg/kg, respectively, in soil sample SB-24-5 (2-3 ft). TPH data are depicted on Figure 2.

Based on the above soil sample results, H&H estimates the following amount of impacted soil above the NC DEQ Action Levels is present on Parcel 24:

- H&H estimates there are roughly 200 cubic yards (300 tons) of soil impacted with TPH DRO and GRO between the surface and 5 ft near boring SB-24-5, near the probable and possible USTs.

The estimated depth of impacted soils is based on field screening results up to the approximate water table. However, field screening and lab results did not provide information that fully defines the impacted soil interval or extent. Therefore, impacts may extend beyond the depths and amounts indicated above. The approximate area of impacted soil is shown on Figure 2.

Although laboratory analytical results indicate soil impacts below NC DEQ Action Levels in SB-24-6, significant PID readings from the boring indicate the potential for soil impacts below 2 ft bgs. The elevated PID readings are likely due to impacted groundwater and historical groundwater table fluctuations creating a contamination smear zone near the water table. If impacted soil is encountered on Parcel 24 during the NC DOT construction activities, it should be properly managed and disposed at a permitted facility.

4.0 Groundwater Assessment

4.1 Groundwater Sampling

Upon completion of soil sampling activities, impacted soil boring SB-24-5 was converted into temporary monitoring well TMW-1. As noted above, H&H identified existing monitoring well MW-Parcel 24 near the center of proposed NC DOT right of way and construction easement areas on Parcel 24 during Phase II field activities at the site. The monitoring well tag located in MW-Parcel 24 indicated that the well was installed to a total depth of 14 ft bgs with a screened interval from 4 ft bgs to 14 ft bgs. Based on conversations between H&H and NC DOT, H&H sampled MW- Parcel 24.

Temporary well TMW-1 was installed in soil boring SB-24-5 using the DPT macrocore sampler. The temporary monitoring well was installed to a total depth of 8 ft bgs with 3 ft of one-inch diameter PVC well casing and 5 ft of 0.010-inch slotted PVC pre-packed well screen set to bracket the water table. Additional sand filter pack was placed from the bottom of the well boring to approximately 1 ft above the top of the well screen, and up to 1 ft of bentonite was placed above the sand.

Once the monitoring well was installed, H&H developed the well by removing 3 to 5 well volumes. After development activities, the well was allowed to equilibrate, and an electronic water level indicator was used to measure the depth to groundwater relative to the top of casing. The depth to water was approximately 5.71 ft bgs in TMW-1 and 2.84 ft bgs in MW-Parcel 24. Therefore, the water table was approximately 3 to 6 ft below grade in these two wells. Monitoring well construction data and water level data are included in Table 3.

Groundwater samples were then collected from TMW-1 and MW-Parcel 24 utilizing low-flow/low stress purging techniques using a peristaltic pump and dedicated polyethylene tubing. Groundwater was removed at a rate no greater than 200 milliliters per minute. H&H utilized a water quality meter to collect measurements of pH, temperature, dissolved oxygen, oxidation reduction potential (ORP), turbidity, and specific conductivity at various intervals during the purging process. Purging was considered complete when the parameters stabilized ($\text{pH} \pm 0.1$

SU, conductivity varied no more than 5%) or the well was purged dry (TMW-1) due to slow recharge.

The groundwater samples were then collected directly into laboratory-supplied sample containers. The samples were delivered to Waypoint Analytical under standard chain of custody protocol for analysis of VOCs by EPA Method 8260 and polynuclear aromatic hydrocarbons (PAHs) using EPA Method 8270. The groundwater sample analytical results are summarized in Table 4. Groundwater Sampling Records are included in Appendix E.

Upon completion of groundwater sampling activities, temporary groundwater monitoring well TMW-1 was abandoned in accordance with NC DEQ guidelines, and the surface was patched with asphalt to match the existing ground surface. The well boring log, well construction record, and well abandonment record for TMW-1 are included in Appendix C.

4.2 Groundwater Analytical Results

Low level concentrations of petroleum-related VOCs and PAHs were detected in the groundwater samples collected from wells TMW-1 and MW-Parcel 24. Concentrations of naphthalene (9.52 µg/L and 25.7 µg/L) were detected in MW-Parcel 24 and TMW-1, respectively, above the 2L Standard of 6 µg/L for naphthalene. A concentration of 1-methylnaphthalene (17.5 ug/L) was also detected in TMW-1 above its 2L Standard of 1 µg/L. No other detected VOCS or PAHs exceeded the 2L Standards.

Based on laboratory analytical results for wells TMW-1 and MW-Parcel 24, groundwater is impacted above 2L Standards and/or NC Surface Water Criteria at the site. If impacted groundwater is encountered and dewatering activities are required during NC DOT construction activities, the groundwater should be properly managed via NPDES permitted discharge or containerization and disposal at a permitted facility. A rough estimate of the horizontal extent of impacted groundwater is shown on Figure 3, but this extent is not based on actual data.

5.0 Summary and Regulatory Considerations

H&H has reviewed available NC DEQ files, geophysical survey results, and analytical results of soil and groundwater samples collected at the Parcel 24 property located at 28 W. Main St. in Sylva, Jackson County, North Carolina. Parcel 24 is currently an unoccupied vacant lot with asphalt parking, concrete slabs, and grassy areas. According to information provided by NC DEQ, the site was formerly occupied by the Sylva Gulf Station. Three gasoline USTs were removed from the site in December 1990. No release was reported at the site. No UST incident files are available for the former Sylva Gulf Station. One existing permanent monitoring well is located near the center of the property within proposed NC DOT work areas.

Based on the geophysical survey, one probable UST and one possible UST are located on the eastern portion of Parcel 24 within proposed NC DOT work areas. Analytical results of soil samples collected by H&H indicate concentrations of TPH DRO and/or GRO above the NC DEQ Action Levels in one soil sample (SB-24-5 2-3 ft) collected on Parcel 24. Based on field screening and laboratory analytical results, H&H estimates there are roughly 200 cubic yards (300 tons) of soil impacted with TPH DRO and GRO between the surface and 5 ft near boring SB-24-5 which is adjacent to the probable and possible USTs. Analytical results of groundwater samples collected from one temporary monitoring well and one permanent monitoring well indicate concentrations of petroleum-related constituents above the 2L Standards and /or NC surface water criteria on Parcel 24.

NC DOT plans indicate a proposed cut/fill and installation of storm drainage piping as part of road improvement activities in proposed NC DOT work areas near Parcel 24. Impacted media encountered during road construction activities should be properly managed and disposed at a permitted facility. If impacted groundwater is encountered and dewatering activities are required during NC DOT construction activities, the groundwater should be characterized and properly managed via NPDES permit or disposed at permitted facility. The depth to water ranged from approximately 3 ft to 6 ft below grade at the time of H&H's assessment. If a UST is encountered during construction activities, the UST system(s) and their contents should be removed in accordance with NC DEQ regulations and be properly disposed.

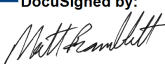
6.0 Signature Page

This report was prepared by:

DocuSigned by:
 12/05/2022
9F6FAD6E6BA34BE...
David Graham, PG
Senior Project Geologist for
Hart & Hickman, PC



This report was reviewed by:

DocuSigned by:

09CA88CDF0E547B...
Matt Bramblett, PE
Principal and Project Manager for
Hart & Hickman, PC

Not considered final unless all signatures are completed.

Table 1 (Page 1 of 1)
Soil Boring and Monitoring Well GPS Coordinate Data
NC DOT Parcel 24
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Sample ID	Latitude	Longitude
SB-24-1	35.374940	-83.214016
SB-24-2	35.374888	-83.213897
SB-24-3	35.374968	-83.213878
SB-24-4	35.374867	-83.213745
SB-24-5/TMW-1	35.374894	-83.213657
SB-24-6	35.374943	-83.213634
SB-24-7	35.375076	-83.213423
SB-24-8	35.375202	-83.213374
MW-Parcel 24	35.374875	-83.213778

Notes:

GPS coordinate data points collected using a Trimble GeoExplorer 6000 series unit with external satellite for increased accuracy.

Table 2 (Page 1 of 1)
Soil Analytical Results
NC DOT Parcel 24
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Sample ID	SB-24-1	SB-24-2	SB-24-3	SB-24-4	SB-24-5	SB-24-6	SB-24-7	SB-24-8	Action Levels
Sample Depth (ft)	2-4	0-2	0-2	0-2	2-3	2-3	2-3	2-3	
Sample Date	10/12/2022	10/12/2022	10/12/2022	10/12/2022	10/12/2022	10/12/2022	10/12/2022	10/12/2022	
<u>TPH DRO/GRO (UVF) (mg/kg)</u>									
Diesel-Range Organics (DRO)	<0.5	31.5	10.4	8.5	1,143	52.8	1.3	17.1	100
Gasoline-Range Organics (GRO)	<0.5	<0.61	<0.52	<0.53	143.6	6.6	<0.58	<0.52	50

Notes:
UVF = QED Ultraviolet Fluorescence Technology
Bold values exceed NCDEQ Action Levels.
TPH = Total Petroleum Hydrocarbons
DRO = Diesel Range Organics
GRO = Gasoline Range Organics

Table 3 (Page 1 of 1)
Summary of Well Construction and Water Level Data
NC DOT Parcel 24
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Monitoring Well ID	Screened Interval (ft bgs)	Total Depth (ft bgs)	Depth to Water (ft bgs)
MW-Parcel 24*	4-14	10.95	2.84
TMW-1	3-8	9.71	5.71

Notes:

bgs = below ground surface

* = Existing monitoring well installed by others. Data obtained from well tag.

Table 4 (Page 1 of 1)
Summary of Groundwater Analytical Results
NC DOT Parcel 24
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Sample ID	MW-Parcel 24	TMW-1 (24)	NC 2L Standards ¹	NC UST GCL ²	NC 2B Standards ³	Water Quality Criteria ⁴
Date	10/19/2022	10/14/2022				
Units	µg/L					
<u>VOCs (8260)</u>						
Benzene	0.570	0.266 J	1	5,000	51	NE
n-Butylbenzene	1.01	0.439 J	70	5,900	NE	3.9
sec-Butylbenzene	1.76	2.30	70	8,800	NE	NE
tert-Butylbenzene	2.50	1.59 J	70	14,750	NE	NE
Ethylbenzene	46.1	1.25	600	80,000	NE	97
Isopropylbenzene	6.25	1.48 J	70	30,500	NE	250
Naphthalene	9.52	<u>25.7</u>	6	6,000	NE	12
n-Propylbenzene	8.31	1.06	70	26,100	NE	80
Toluene	<0.220	0.239 J	600	260,000	0.36	NE
<u>PAHs (8270)</u>						
1-Methylnaphthalene	<7.55	<u>17.5</u>	1	1,000	NE	2.6
2-Methylnaphthalene	<7.13	9.20 J	30	12,000	NE	85
Naphthalene	<8.12	<u>15.1</u>	6	6,000	NE	12

Notes:

1) NC DEQ 15A NCAC 2L .0202 Groundwater Quality Standards (2L Standards) (April 2022).

2) NC DEQ Division of Waste Management (DWM) Underground Storage Tank (UST) Section, Gross Contamination Levels (GCLs) for Groundwater (September 2022).

3) NC DEQ Water Quality Standards for Surface Waters - Class C/Trout (Tr) (July 2021).

4) Lower of EPA Recommended Water Quality Criteria for Aquatic Life & Human Health - Class C/Tr or NC In-Stream Target Values for Surface Water - Class C/Tr (July 2021).

The nearest discharge is to a Class C/Tr surface water body (Cope Creek). Based on the classification of the receiving water body, surface water standards and criteria are based on Class C/Tr surface water standards.

Bold concentrations exceed the 2L Standard.

Underlined concentrations exceed surface water quality criteria.

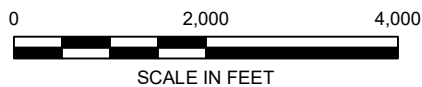
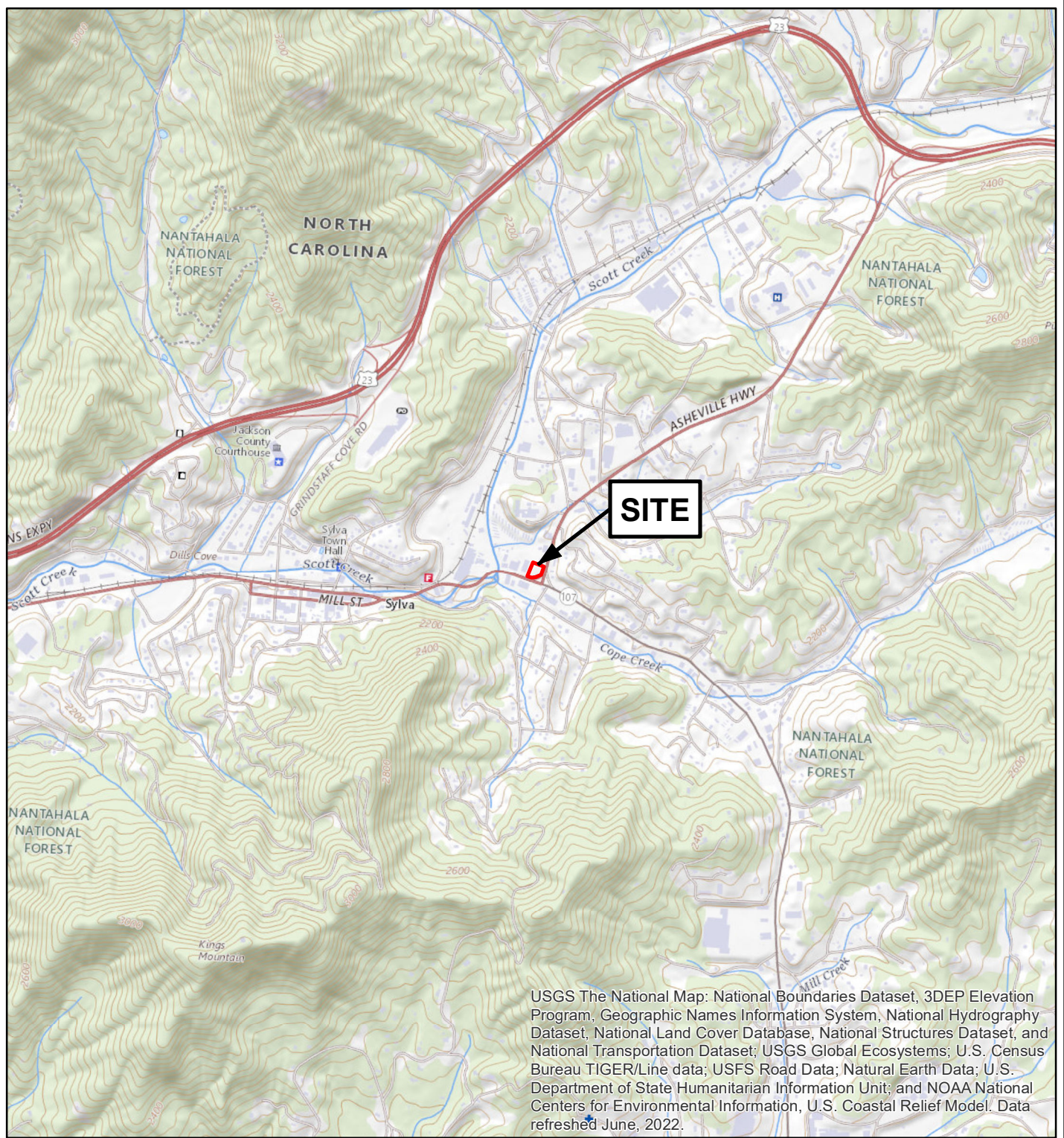
Only constituents detected in at least one sample are shown.

EPA Method follows parameter in parentheses.

VOCs = volatile organic compounds; PAHs = polynuclear aromatic hydrocarbons

NE = not established

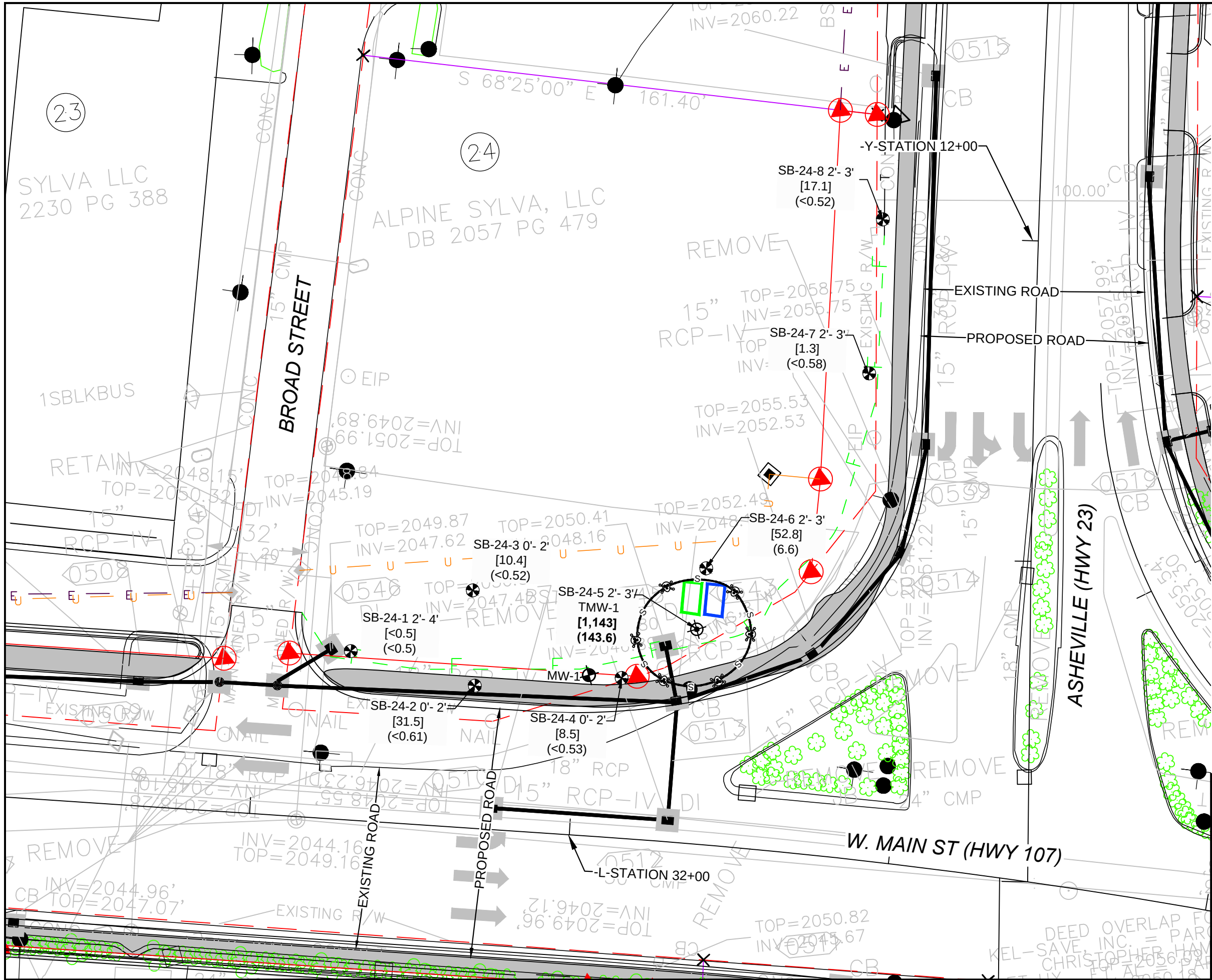
J = estimated value above the method detection limit but below the reporting limit



U.S.G.S. QUADRANGLE MAP
SYLVA NORTH, NORTH CAROLINA 2022
 QUADRANGLE
 7.5 MINUTE SERIES (TOPOGRAPHIC)

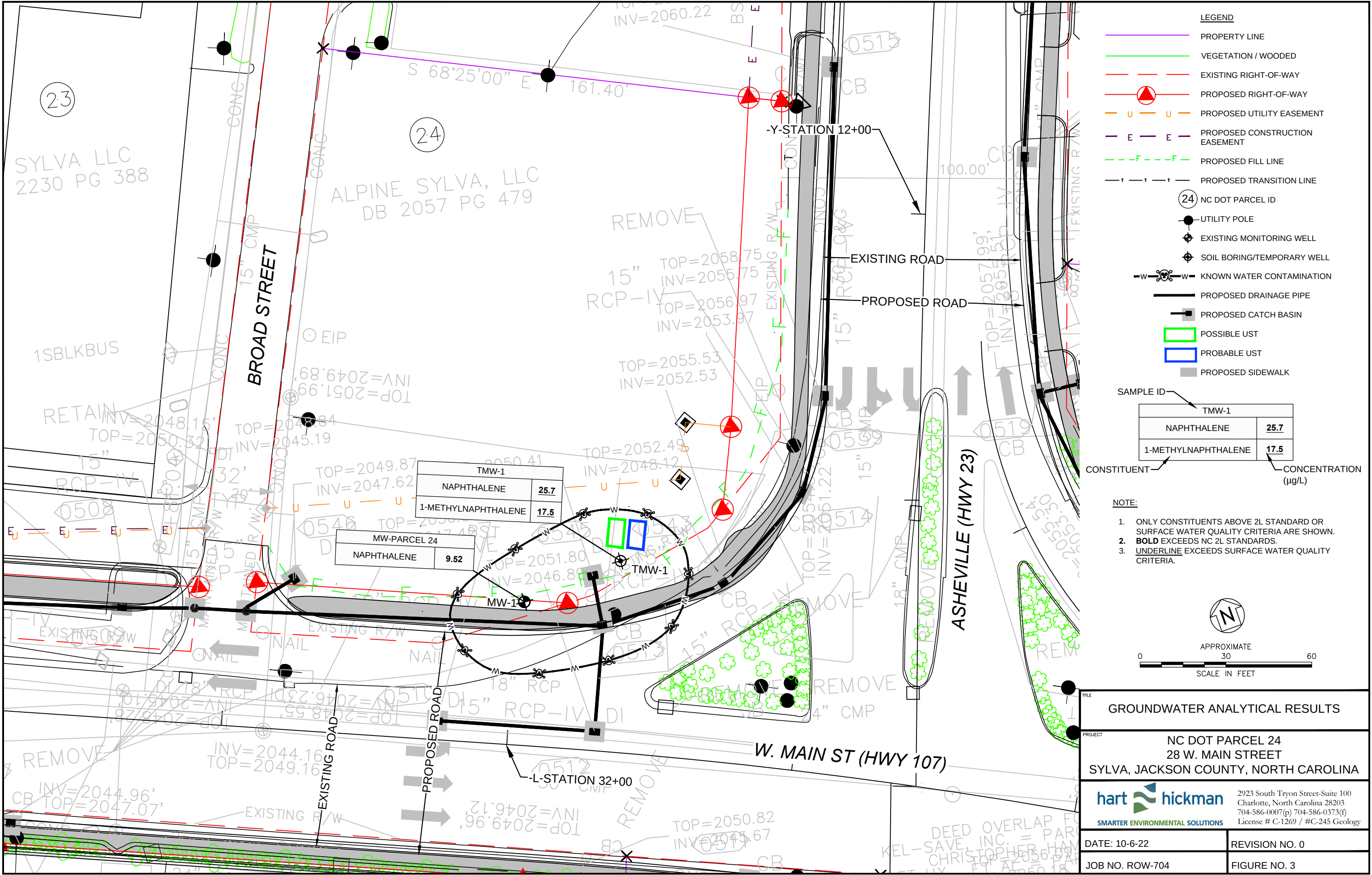
TITLE SITE LOCATION MAP	
PROJECT NCDOT PARCEL 24 28 W MAIN ST SYLVA, NORTH CAROLINA	
 2923 South Tryon Street - Suite 100 Charlotte, North Carolina 28203 704-586-0007 (p) 704-586-0373 (f) License # C-1269 / # C-245 Geology	
DATE: 10-5-22	REVISION NO: 0
JOB NO: ROW-704	FIGURE NO: 1

S:\AAA-Master Projects\NC DOT Right-of-Way - ROW\ROW-704 Jackson County Phase 1\FIGURES\ROW-704 Site Maps 100422_recover.dwg, PARCEL 24, 11/16/2022 7:44:30 AM, marbluary



LEGEND	
	PROPERTY LINE
	VEGETATION / WOODED
	EXISTING RIGHT-OF-WAY
	PROPOSED RIGHT-OF-WAY
	PROPOSED UTILITY EASEMENT
	PROPOSED CONSTRUCTION EASEMENT
	PROPOSED FILL LINE
	PROPOSED TRANSITION LINE
	NC DOT PARCEL ID
	UTILITY POLE
	EXISTING MONITORING WELL
	SOIL BORING/TEMPORARY WELL
	SOIL BORING LOCATION
SB-24-8 2'-3' SAMPLE ID/DEPTH	
[17.1] DIESEL RANGE TPH (mg/kg)	
(<0.52) GASOLINE RANGE TPH (mg/kg)	
	KNOWN SOIL CONTAMINATION
	PROPOSED DRAINAGE PIPE
	PROPOSED CATCH BASIN
	POSSIBLE UST
	PROBABLE UST
	PROPOSED SIDEWALK
NOTE:	
1. BOLD EXCEEDS NC DEQ ACTION LEVELS.	
2. TPH = TOTAL PETROLEUM HYDROCARBONS.	
0 30 60 SCALE IN FEET	
TITLE SITE MAP AND SOIL ANALYTICAL RESULTS	
PROJECT NC DOT PARCEL 24 28 W. MAIN STREET SYLVA, JACKSON COUNTY, NORTH CAROLINA	
 SMARTER ENVIRONMENTAL SOLUTIONS	
2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f) License # C-1269 / #C-245 Geology	
DATE: 10-6-22	REVISION NO. 0
JOB NO. ROW-704	FIGURE NO. 2

S:\AAA-Master Projects\NC DOT Right-of-Way - ROW\ROW-704 Jackson County Phase 1\FIGURES\ROW-704 Site Maps 100422_recover.dwg, PARCEL 24 (2), 11/29/2022 9:15:57 AM, tmarbury



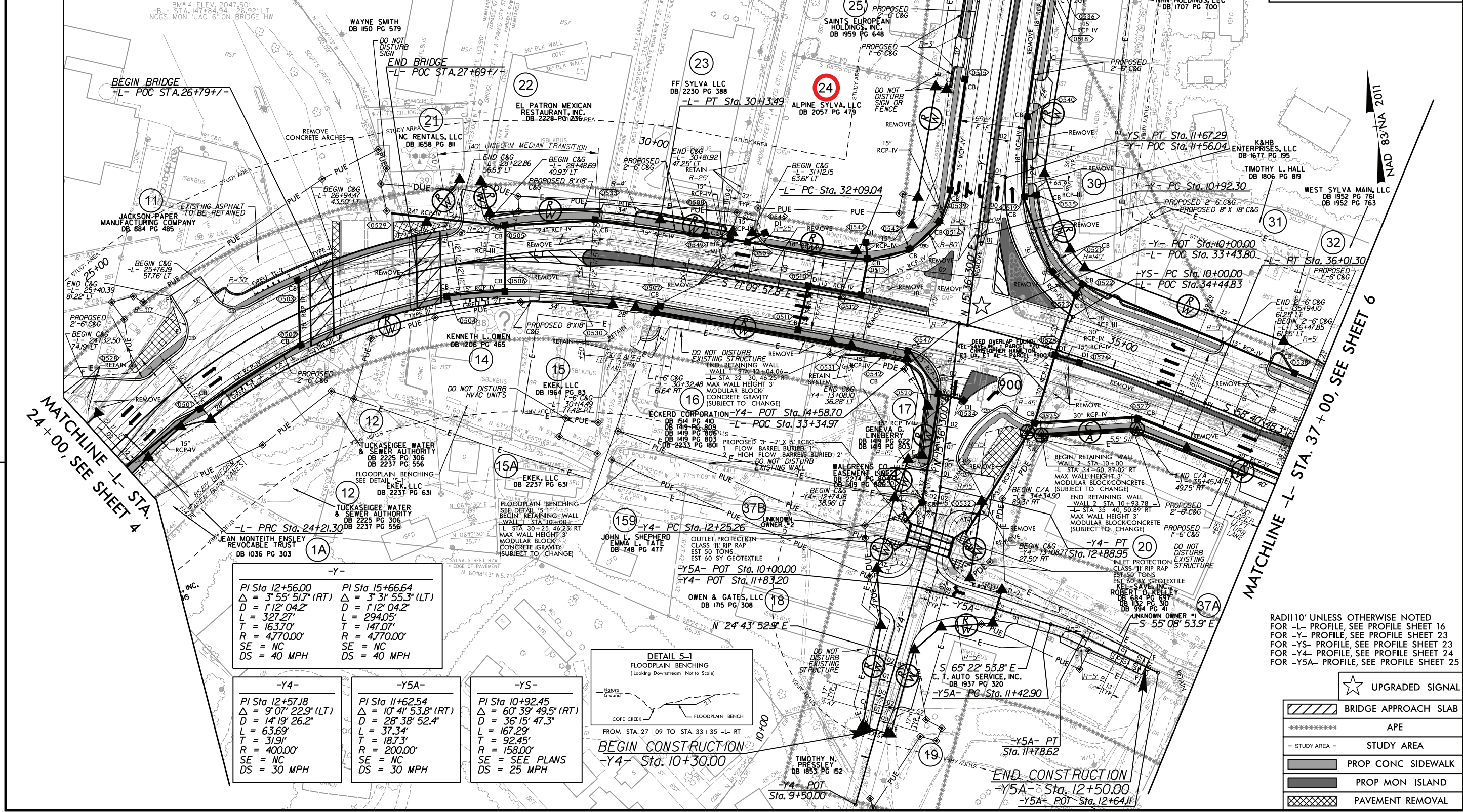
Appendix A
NC DOT Preliminary Plan

2020 ADT 2035 ADT (ADT IN 100's)	BUS 23 ASHEVILLE HWY. 266 300
NC 107	221 257
	69 79
	194 218
	343 392
	8 9
	4 5
	14 17
	SR 1355 SUNRISE PARK

$PI Sta 22+86.36$ $\Delta = 48' 37" 27.8" (LT)$ $D = 16' 51" 06"$ $L = 288.54'$ $T = 153.60'$ $R = 340.00'$ $SE = NC$ $DS = 30 MPH$	$PI Sta 27+43.07$ $\Delta = 55' 37" 20.3" (RT)$ $D = 9' 23' 33.9"$ $L = 592.18'$ $T = 321.77'$ $R = 610.00'$ $SE = NC$ $DS = 30 MPH$	$PI Sta 34+05.95$ $\Delta = 12' 29' 09.5" (RT)$ $D = 3' 10' 59.2"$ $L = 392.26'$ $T = 196.91'$ $R = 1,800.00'$ $SE = 03$ $DS = 30 MPH$
--	---	---

UNITED COMMUNITY BANK DB 1622 PG 542
THE FISH CAMPA, LLC DB 2170 PG 196
CHRISTOPHER HAMILTON, ET UX, ET AL DB 2303 PG 1452 DB 2232 PG 475 DB 2274 PG 804 DB 1419 PG 806

PROJECT REFERENCE NO. R-5600	SHEET NO. 5
RW SHEET NO. RW-5	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
HDR Engineering, Inc. of the Carolinas 555 Fayetteville St, Suite 900 Raleigh, N.C. 27601 N.C.B.E.L.S. License Number: F-0116	

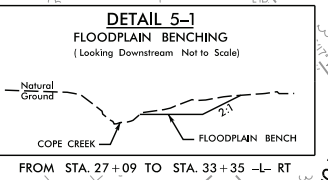


$PI Sta 12+56.00$ $\Delta = 3' 55' 51.7" (RT)$ $D = 1' 12' 04.2"$ $L = 327.27'$ $T = 163.70'$ $R = 4,770.00'$ $SE = NC$ $DS = 40 MPH$	$PI Sta 15+66.64$ $\Delta = 3' 31' 55.3" (LT)$ $D = 1' 12' 04.2"$ $L = 294.05'$ $T = 147.07'$ $R = 4,770.00'$ $SE = NC$ $DS = 40 MPH$
--	--

$PI Sta 12+57.18$ $\Delta = 9' 07' 22.9" (LT)$ $D = 14' 19' 26.2"$ $L = 63.69'$ $T = 31.91'$ $R = 400.00'$ $SE = NC$ $DS = 30 MPH$

$PI Sta 11+62.54$ $\Delta = 10' 41' 53.8" (RT)$ $D = 28' 38' 52.4"$ $L = 37.34'$ $T = 187.3'$ $R = 200.00'$ $SE = NC$ $DS = 30 MPH$
--

$PI Sta 10+92.45$ $\Delta = 60' 39' 49.5" (RT)$ $D = 36' 15' 47.3"$ $L = 167.29'$ $T = 92.45'$ $R = 158.00'$ $SE = SEE PLANS$ $DS = 25 MPH$
--



RADII 10' UNLESS OTHERWISE NOTED
FOR -L- PROFILE, SEE PROFILE SHEET 16
FOR -Y- PROFILE, SEE PROFILE SHEET 23
FOR -YS- PROFILE, SEE PROFILE SHEET 23
FOR -Y4- PROFILE, SEE PROFILE SHEET 24
FOR -Y5A- PROFILE, SEE PROFILE SHEET 25

	UPGRADED SIGNAL
	BRIDGE APPROACH SLAB
	***** APE
	- STUDY AREA - STUDY AREA
	PROP CONC SIDEWALK
	PROP MON ISLAND
	PAVEMENT REMOVAL

10/25/2021 ROW AND PUE REVISED: PARCELS 15, 16, 17, 18, 19, 20, 37A, 37B, & 159 COMBINED INTO PARCEL 20
218/2022 PARCEL OWNERS 12 & 13 COMBINED INTO PARCEL OWNERS 20, 33 & 34 COMBINED INTO PARCEL 20
7/29/2022 PARCEL 37B ADDED: PARCELS 15, 16, 17, 18, 19, 20, 37A, 37B, & 159 BOUNDARIES REVISED

PLOT DRIVER: NCDOT.pdf_color_eng_50.plt
PENTABLE: R5600.dshp fl.tbl
DATE: 7/29/2022 TIME: 1:53:20 PM
USER: ASNIDER
FILE: \

Appendix B
Pyramid Geophysical Survey Report



PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2022-260)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION: PARCEL 24 NCDOT PROJECT R-5600 (45818.1.FR1)

28 WEST MAIN STREET, SYLVA, NC

October 21, 2022

Report prepared for: David Graham, P.G.
Hart & Hickman, P.C.
2923 South Tryon Street, Suite 100
Charlotte, NC 28203

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

503 INDUSTRIAL AVENUE, GREENSBORO, NC 27406

P: 336.335.3174 F: 336.691.0648

C257: GEOLOGY

C1251: ENGINEERING

GEOPHYSICAL INVESTIGATION REPORT
Parcel 24 - 28 West Main Street
Sylva, Jackson County, North Carolina

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Executive Summary	1
Introduction.....	2
Field Methodology.....	2
Discussion of Results.....	3
<i>Discussion of EM Results</i>	3
<i>Discussion of GPR Results</i>	4
Summary & Conclusions	5
Limitations	6

Figures

- Figure 1 – Parcel 24 - Geophysical Survey Boundaries and Site Photographs
- Figure 2 – Parcel 24 - EM61 Metal Detection Contour Map
- Figure 3 – Parcel 24 - GPR Transect Locations and Select Images
- Figure 4 – Parcel 24 - Locations and Sizes of One Probable UST and One Possible UST
- Figure 5 – Overlay of Metal Detection Results & One Probable and One Possible UST
on NCDOT Engineering Plans

Appendices

- Appendix A – GPR Transect 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 Geophysical Services (Pyramid), a department within Pyramid Environmental & Engineering, P.C., conducted a geophysical investigation for Hart & Hickman, P.C. (Hart & Hickman) at Parcel 24, located at 28 West Main Street, in Sylva, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5600). 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 September 26-28, 2022, 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 seven 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 and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant structures such as USTs. The geophysical survey identified evidence of utilities and/or smaller fragments of buried debris. Additionally, evidence of reinforcement beneath the asphalt was observed.

One probable and one possible UST were observed in the southeastern portion of the parcel. Probable UST #1 is approximately 9.5 feet long by 5.5 feet wide. Possible UST #1 is approximately 9.5 feet long by 5.5 feet wide. Collectively, the geophysical data recorded evidence of one probable and one possible UST at Parcel 24.

INTRODUCTION

Pyramid Geophysical Services (Pyramid), a department within Pyramid Environmental & Engineering, P.C., conducted a geophysical investigation for Hart & Hickman, P.C. (Hart & Hickman) at Parcel 24, located at 28 West Main Street, in Sylva, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5600). 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 September 26-28, 2022, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site consisted of a former building foundation 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 September 28, 2022, using a Geophysical Survey Systems, Inc. (GSSI) SIR 4000 unit 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 SIR 4000 unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the SIR 4000 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:

Metallic Anomaly #	Cause of Anomaly	Investigated with GPR
1	Drop Inlet	
2	Reinforced Concrete	✓
3	Floor Drain	
4	Suspected Debris or Utility	✓
5	Cut Pipe	
6	Sign/Utility	
7	One Probable and One Possible UST	✓

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including a drop inlet, reinforced concrete, a floor drain, a cut pipe, a sign, and a utility. GPR was performed across and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant structures such as USTs. GPR was also performed across EM Anomalies 4 and 7 to investigate whether the anomalies were the result of more significant 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 ten formal GPR transects were performed at the site.

GPR Transects 1 and 2 were performed across EM Anomaly 4. GPR Transects 7-10 were performed as general reconnaissance scans at the request of Hart & Hickman. None of these transects showed evidence of significant structures such as USTs. Evidence of utilities and/or smaller fragments of buried debris was observed. Additionally, GPR Transects 7-10 showed signs of reinforcement below the asphalt.

GPR Transect 3 confirmed the presence of reinforcement within the concrete. This transect showed no evidence of significant structures such as USTs. Evidence of utilities and/or smaller fragments of buried debris was also observed.

GPR Transects 4-6 were performed across EM Anomaly 7. GPR Transect 4 showed a large, high-amplitude hyperbolic reflector and a large, high-amplitude semi-hyperbolic reflector. GPR Transects 5-6 each showed a high-amplitude lateral reflector. These reflectors are typical of USTs. Probable UST #1 is approximately 9.5 feet long by 5.5 feet wide. Possible UST #1 is approximately 9.5 feet long by 5.5 feet wide. **Figure 4** provides the locations and sizes of one probable and one possible UST, overlain on an aerial, along with ground-level photographs.

Collectively, the geophysical data recorded evidence of one probable and one possible USTs at Parcel 24. **Figure 5** provides an overlay of the metal detection results and one probable and one possible UST on the NCDOT engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 24 in Sylva, 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 and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant structures such as USTs.
- The geophysical survey identified evidence of utilities and/or smaller fragments of buried debris. Additionally, evidence of reinforcement beneath the asphalt was observed.
- One probable and one possible UST were observed in the southeastern portion of the parcel. Probable UST #1 is approximately 9.5 feet long by 5.5 feet wide. Possible UST #1 is approximately 9.5 feet long by 5.5 feet wide.
- Collectively, the geophysical data recorded evidence of one probable and one

possible UST at Parcel 24.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for Hart & Hickman, P.C. 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 East)



View of Survey Area (Facing Approximately North)



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PROJECT
PARCEL 24
SYLVA, NORTH CAROLINA
NCDOT PROJECT R-5600

TITLE
PARCEL 24 -
GEOPHYSICAL SURVEY BOUNDARIES
AND SITE PHOTOGRAPHS

DATE
9/30/2022
PYRAMID
PROJECT #:
2022-260

CLIENT
HART & HICKMAN
FIGURE 1

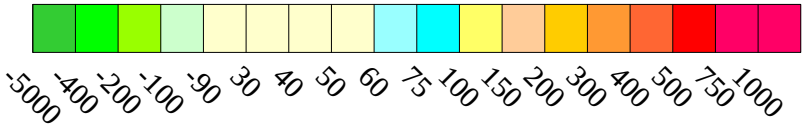
EM61 METAL DETECTION RESULTS



EVIDENCE OF ONE PROBABLE AND ONE POSSIBLE UST 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 September 26, 2022, using a Geonics EM61-MK2 instrument. Verification GPR data were collected using a GSSI SIR 4000 instrument with a 350 MHz HS antenna on September 28, 2022.

EM61 Metal Detection Response (millivolts)



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PROJECT
PARCEL 24
SYLVA, NORTH CAROLINA
NCDOT PROJECT R-5600

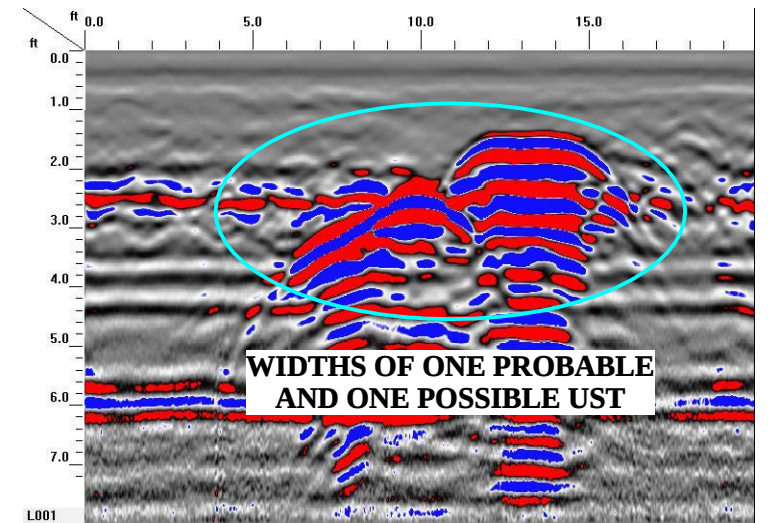
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PARCEL 24 -
EM61 METAL DETECTION CONTOUR MAP

DATE
9/30/2022
PYRAMID
PROJECT #:
2022-260

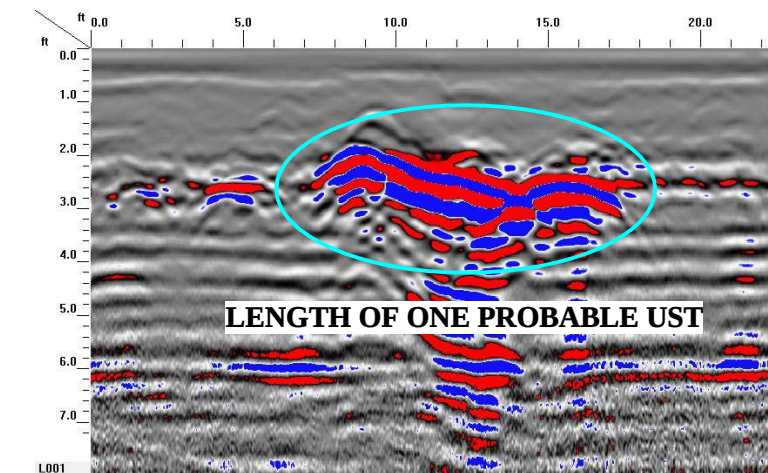
CLIENT
HART & HICKMAN
FIGURE 2



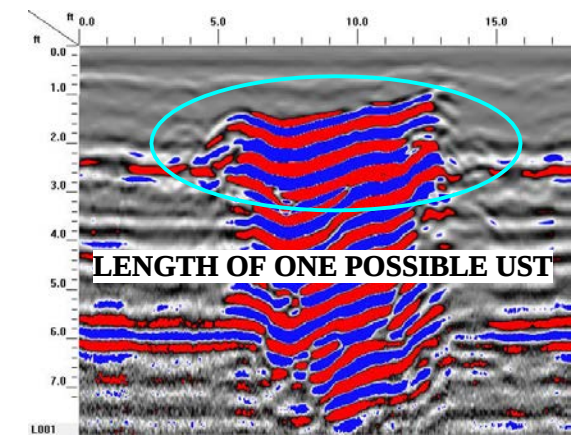
GPR TRANSECT LOCATIONS



GPR TRANSECT 4 (T4)



GPR TRANSECT 5 (T5)



GPR TRANSECT 6 (T6)



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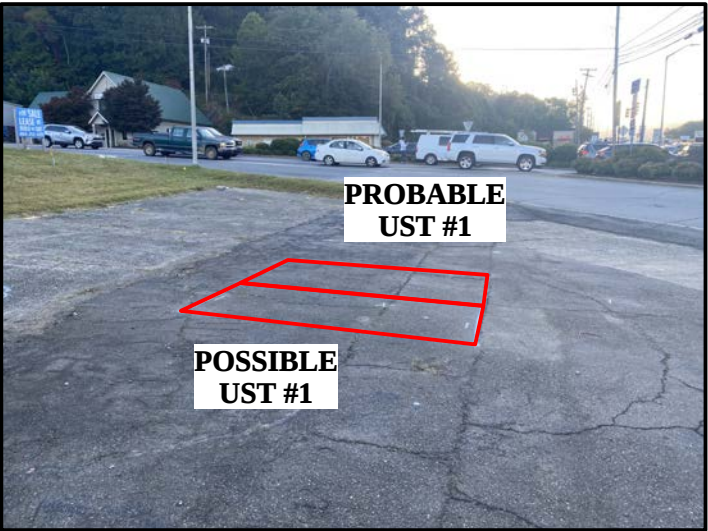
PROJECT
PARCEL 24
SYLVA, NORTH CAROLINA
NCDOT PROJECT R-5600

TITLE
PARCEL 24 -
GPR TRANSECT LOCATIONS AND SELECT IMAGES

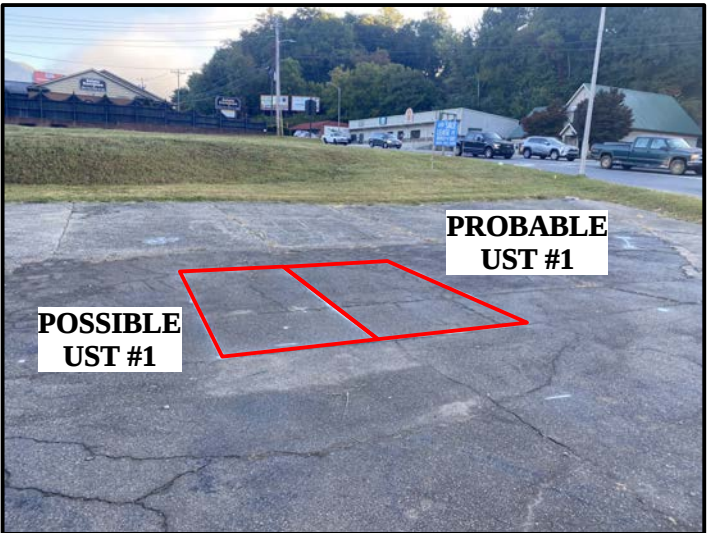
DATE
9/30/2022
PYRAMID
PROJECT #:
2022-260

CLIENT
HART & HICKMAN
FIGURE 3

LOCATIONS OF ONE PROBABLE UST AND ONE POSSIBLE UST

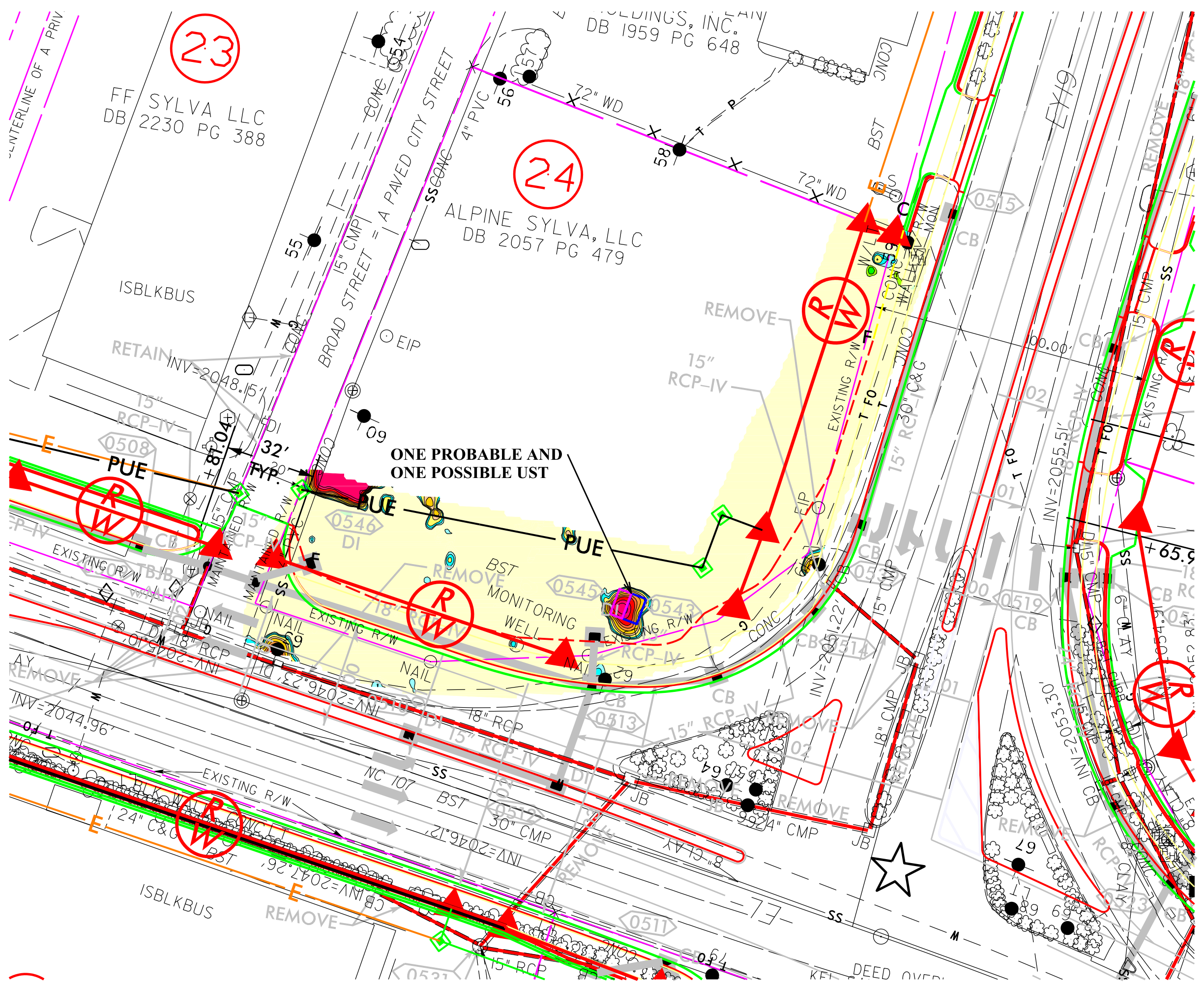


View of One Probable and One Possible UST
(Facing Approximately East)



View of One Probable and One Possible UST
(Facing Approximately Northeast)

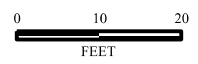
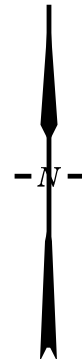




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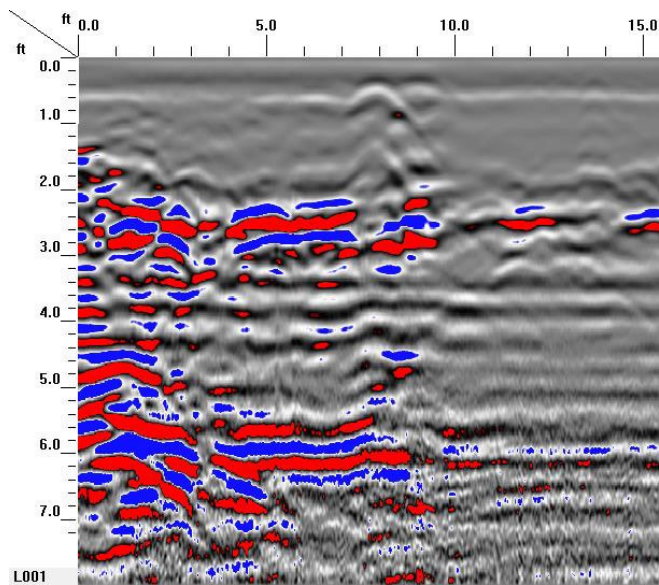
- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PUE PERMANENT UTILITY EASEMENT
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- PROBABLE UST
- POSSIBLE UST

MILLIVOLTS (mV)

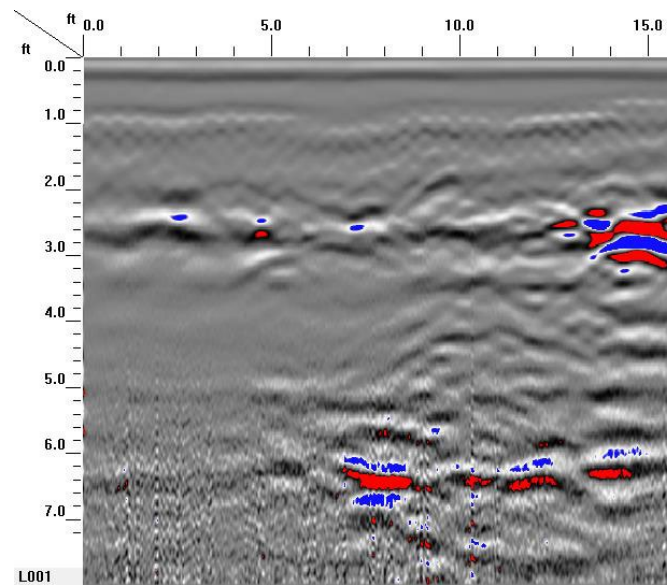


TITLE OVERLAY OF METAL DETECTION RESULTS & ONE PROBABLE AND ONE POSSIBLE UST ON NCDOT ENGINEERING PLANS	
PROJECT PARCEL 24 SYLVA, NORTH CAROLINA NCDOT PROJECT R-5600	
503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology	
DATE: 10-3-2022	REVISION NO. 0
PYRAMID PROJECT NO. 2022-260	FIGURE NO. 5

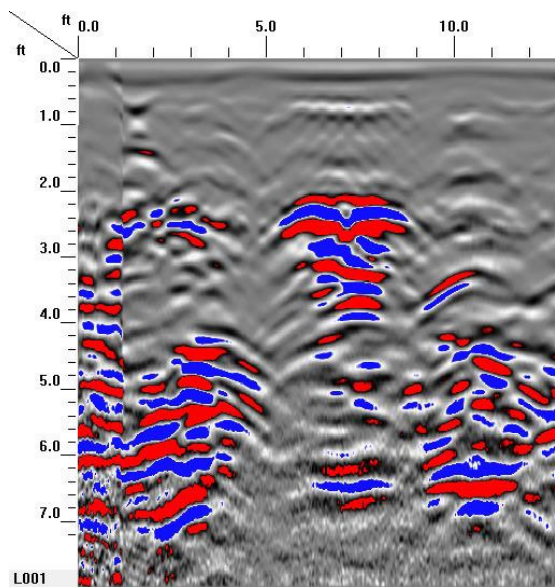
Appendix A – GPR Transect Images



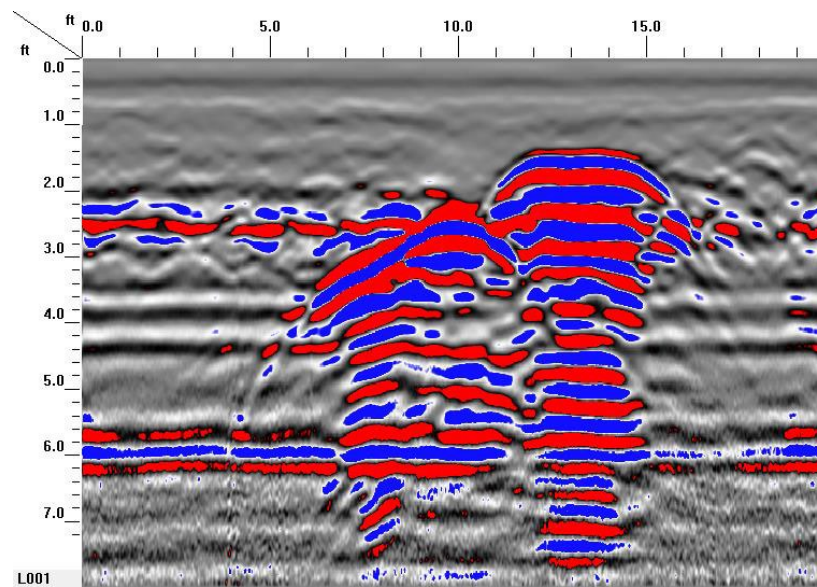
GPR TRANSECT 1



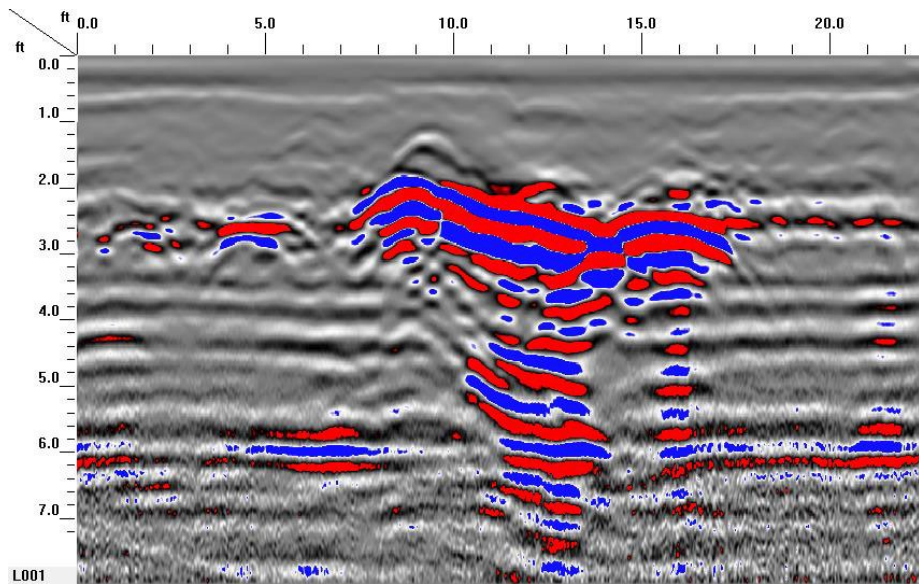
GPR TRANSECT 3



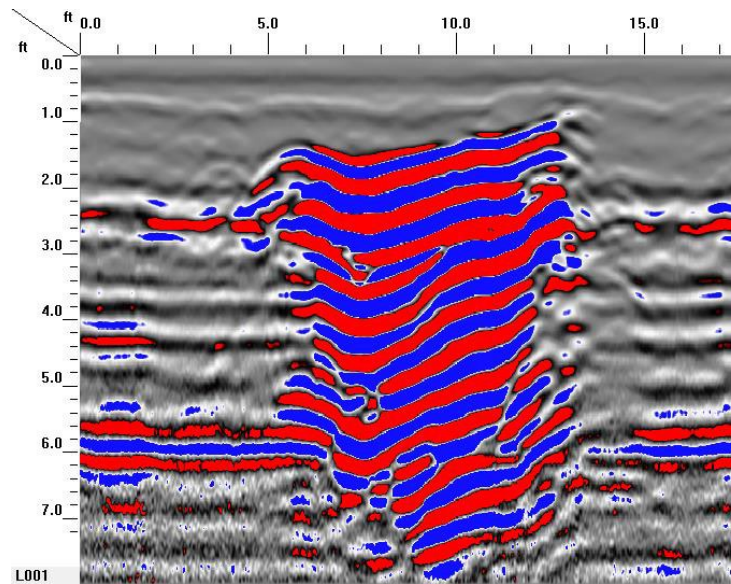
GPR TRANSECT 2



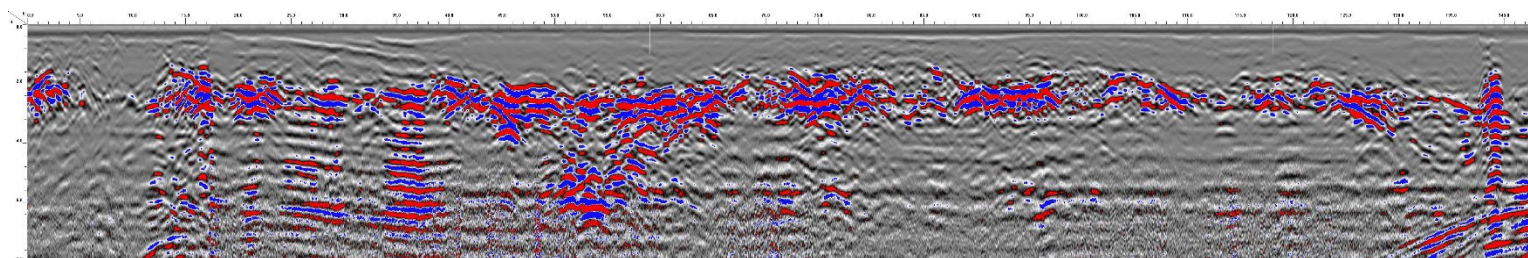
GPR TRANSECT 4



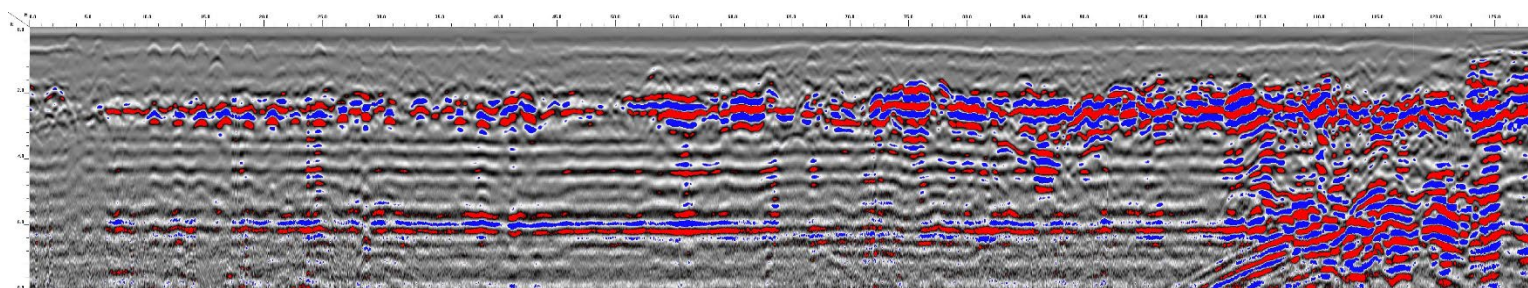
GPR TRANSECT 5



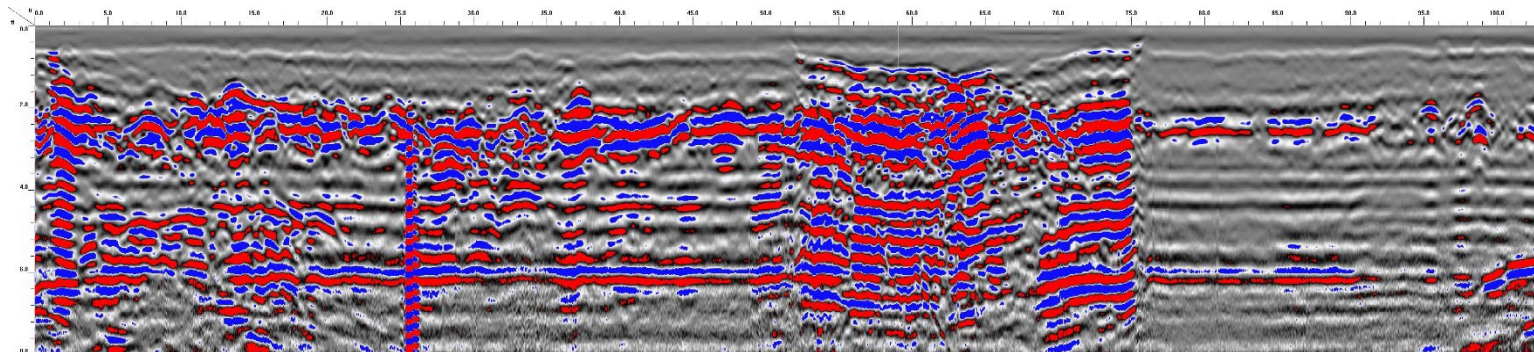
GPR TRANSECT 6



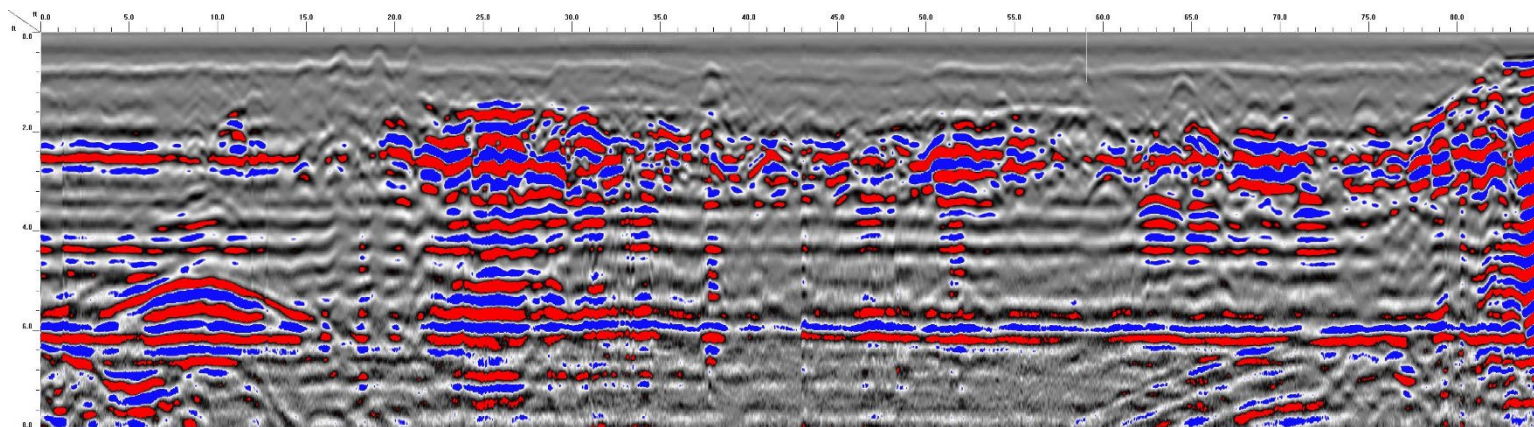
GPR TRANSECT 7



GPR TRANSECT 8



GPR TRANSECT 9



GPR TRANSECT 10

Appendix C

Soil Boring Logs, Well Construction Record, and Well Abandonment Record

Client: NC DOT
 Project: ROW-704
 Address: Parcel 24 - 28 W. Main Street,
 Sylva, North Carolina

BORING LOG
 Boring No. SB-24-1
 Page: 1 of 1

Drilling Start Date: 10/12/22
 Drilling End Date: 10/12/22
 Drilling Company: GEX
 Drilling Method: Direct Push
 Drilling Equipment: GeoProbe 7822 DT
 Driller: David Hall
 Logged By: ABM

Boring Depth (ft): 8.0
 Boring Diameter (in): 2.25
 Sampling Method(s): Direct Push, Grab
 DTW During Drilling (ft): 6.0
 DTW After Drilling (ft):
 Ground Surface Elev. (ft):
 Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0				GR			5.00	(0') Asphalt (0.25') SILT (ML); some fine sand, some clay, soft, moist, dark brown	5.3		0
								(2') Clayey SILT (ML); trace coarse sand, soft, moist, light gray with orange-brown	6.6	SB-24-1	
								(4') Quartz rock encountered - mechanically broken; slight iron staining present	4.6		
								(4.5') Clayey SILT (ML); trace coarse gravel, trace coarse sand, soft, moist, light gray with orange-brown, wet at 6'			
5				DP			5.00				5
								(7') Clayey SILT (ML); some coarse sand, stiff, moist, reddish-brown with dark brown, saprolitic (foliated structure)			
								(8') Boring terminated			
10											10

NOTES: Hole precleared to 5' by GEX using hand auger. Refusal at 8'.

Client: NC DOT
 Project: ROW-704
 Address: Parcel 24 - 28 W. Main, Street
 Sylva, North Carolina

BORING LOG
 Boring No. SB-24-2
 Page: 1 of 1

Drilling Start Date: 10/12/22
 Drilling End Date: 10/12/22
 Drilling Company: GEX
 Drilling Method: Direct Push
 Drilling Equipment: GeoProbe 7822 DT
 Driller: David Hall
 Logged By: ABM

Boring Depth (ft): 15.0
 Boring Diameter (in): 2.25
 Sampling Method(s): Direct Push, Grab
 DTW During Drilling (ft): 4.0
 DTW After Drilling (ft):
 Ground Surface Elev. (ft):
 Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0				GR			5.00	(0') Asphalt (0.17') Concrete (0.5') SILT (ML); some fine to coarse sand, some clay, soft, moist, dark brown, wet at 4'	6.4	SB-24-2	0
5				DP			5.00	(6') SILT (ML); trace fine sand, soft, wet, blue-gray, color change to red-brown at 8'	5.8		5
10				DP			5.00	(13') SILT (ML); trace fine sand, soft, wet, medium brown with white and yellow, saprolitic (remnant foliation visible)			10
15								(15') Boring terminated			15
20											20

NOTES: Hole precleared to 5' by GEX using hand auger.

Client: NC DOT
 Project: ROW-704
 Address: Parcel 24 - 28 W. Main Street,
 Sylva, North Carolina

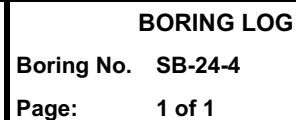
BORING LOG
 Boring No. SB-24-3
 Page: 1 of 1

Drilling Start Date: 10/12/22
 Drilling End Date: 10/12/22
 Drilling Company: GEX
 Drilling Method: Direct Push
 Drilling Equipment: GeoProbe 7822 DT
 Driller: David Hall
 Logged By: ABM

Boring Depth (ft): 8.0
 Boring Diameter (in): 2.25
 Sampling Method(s): Direct Push, Grab
 DTW During Drilling (ft): 4.0
 DTW After Drilling (ft):
 Ground Surface Elev. (ft):
 Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0				GR			5.00	(0') Asphalt (0.17') Concrete (0.5') SILT (ML); some fine to coarse sand, some clay, soft, moist, dark brown with slight red	3.9	SB-24-3	0
								(2') SILT (ML); trace coarse sand, some clay, soft, moist, light gray with light brown, wet at 4'	2.2		
								(4') Clayey SILT (ML); trace coarse gravel, trace coarse sand, soft, wet, medium brown with reddish-brown and black			
5				DP			3.00	(7') SILT (ML); trace coarse gravel, some coarse sand, some clay, soft, wet, medium brown with light brown and yellow, saprolitic (foliation visible)			5
								(8') Boring terminated			
10											10

NOTES: Hole precleared to 5' by GEX using hand auger. Refusal at 8'.



Boring Depth (ft):	8.0
Boring Diameter (in):	2.25
Sampling Method(s):	Direct Push, Grab
DTW During Drilling (ft):	3.5
DTW After Drilling (ft):	
Ground Surface Elev. (ft):	
Location (X,Y):	

NOTES: Hole precleared to 5' using hand auger.

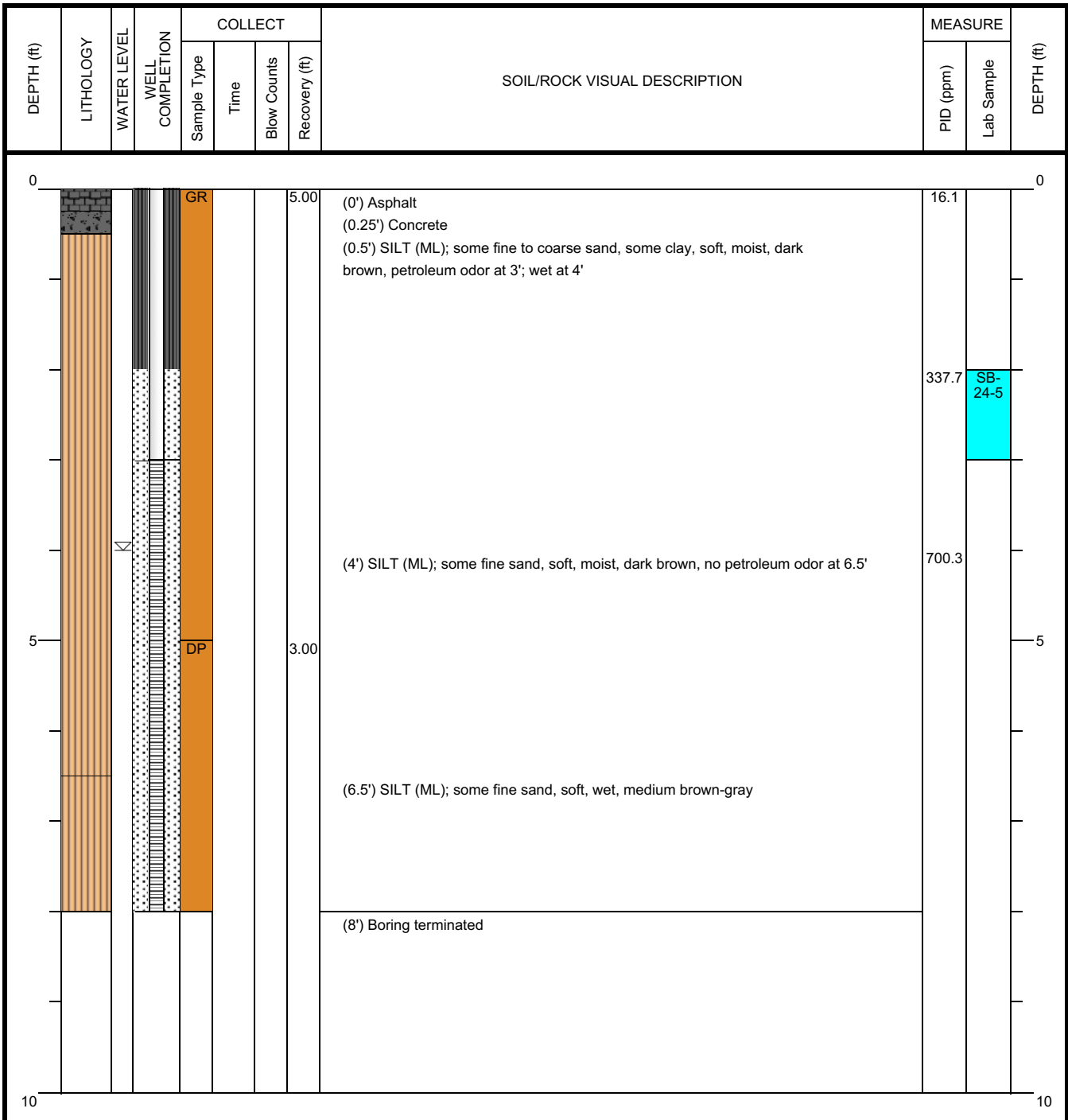
Client: NC DOT
 Project: ROW-704
 Address: Parcel 24 - 28 W. Main Street,
 Sylva, North Carolina

WELL LOG
 Well No. SB-24-5/TMW-1
 Page: 1 of 1

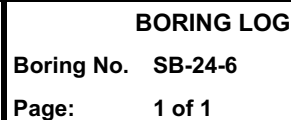
Drilling Start Date: 10/12/22
 Drilling End Date: 10/12/22
 Drilling Company: GEX
 Drilling Method: Direct Push
 Drilling Equipment: GeoProbe 7822 DT
 Driller: David Hall
 Logged By: ABM

Boring Depth (ft): 8.0
 Boring Diameter (in): 2.25
 Sampling Method(s): DP, GR
 DTW During Drilling (ft): 4.0
 DTW After Drilling (ft):
 Top of Casing Elev. (ft):
 Location (X,Y):

Well Depth (ft): 8.0
 Well Diameter (in): 1.0
 Screen Slot (in): 0.010
 Riser Material: Sch 40 PVC
 Screen Material: Sch 40 PVC Slotted
 Seal Material(s): Bent. Pellets
 Filter Pack: Sand Pack



NOTES: Hole precleared to 5' by GEX using hand auger.



Boring Depth (ft):	8.0
Boring Diameter (in):	2.25
Sampling Method(s):	Direct Push, Grab
DTW During Drilling (ft):	4.0
DTW After Drilling (ft):	
Ground Surface Elev. (ft):	
Location (X,Y):	

NOTES: Hole precleared to 5' by GEX using hand auger.

Client: NC DOT
 Project: ROW-704
 Address: Parcel 24 - 28 W. Main Street,
 Sylva, North Carolina

BORING LOG
 Boring No. SB-24-7
 Page: 1 of 1

Drilling Start Date: 10/12/22	Boring Depth (ft): 3.0
Drilling End Date: 10/12/22	Boring Diameter (in): 3.25
Drilling Company: GEX	Sampling Method(s): Grab
Drilling Method: Hand Auger	DTW During Drilling (ft):
Drilling Equipment: Hand Auger	DTW After Drilling (ft):
Driller: David Hall	Ground Surface Elev. (ft):
Logged By: ABM	Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0				GR			3.00	(0') ORGANIC SOIL (OL); (grass) (0.17') SILT (ML); some fine gravel, some fine sand, soft, dry, dark brown	3.2		0
1								(1') SILT (ML); some fine sand, medium stiff, dry, reddish-brown			1
2								(2.5') Fine Gravelly SILT (ML); some fine sand, medium stiff, dry, reddish-brown	4.1	SB-24-7	2
3								(3') Boring terminated			3
4											4
5											5

NOTES: Refusal at 3' due to quartz gravel.

Client: NC DOT
 Project: ROW-704
 Address: Parcel 24 - 28 W. Main Street,
 Sylva, North Carolina

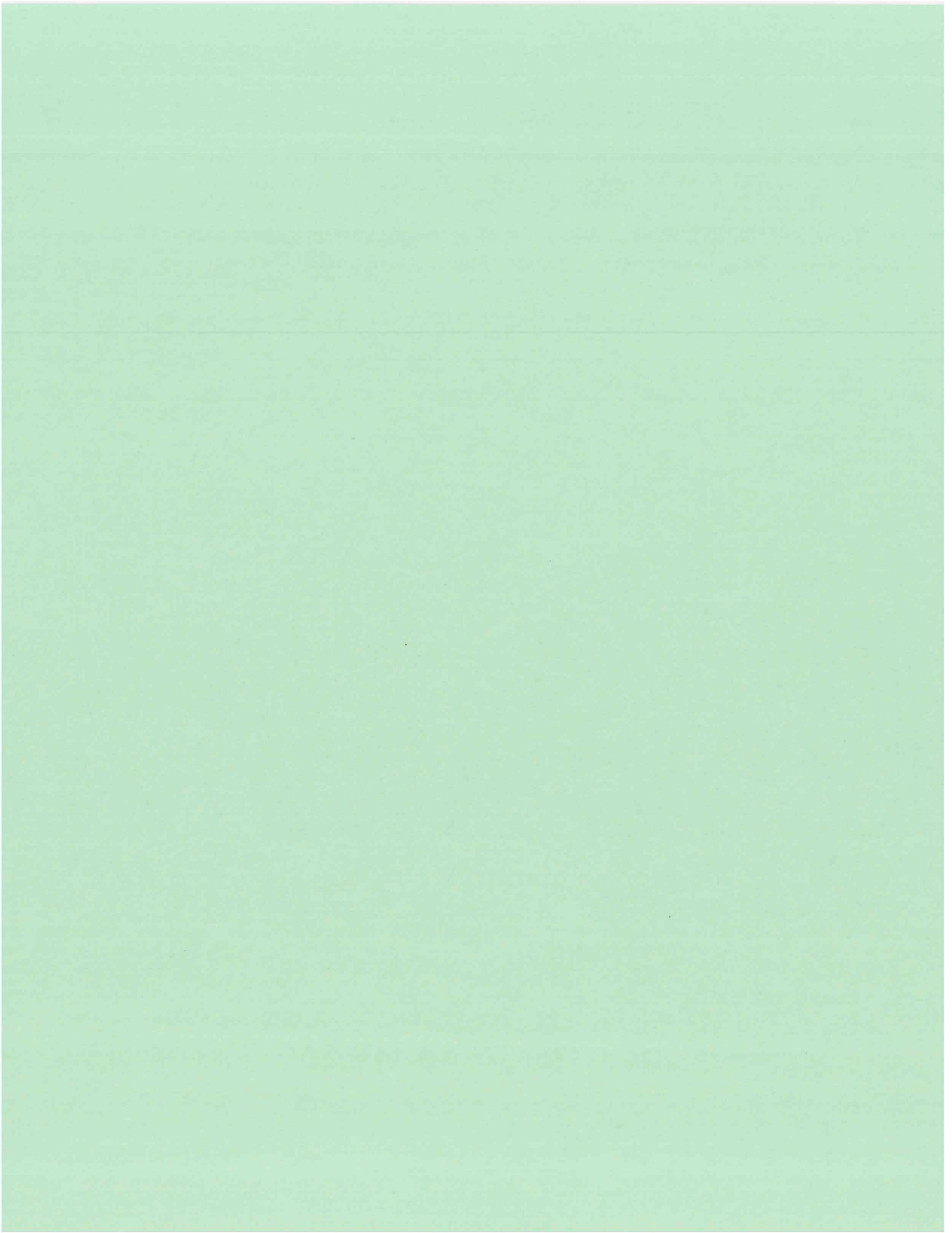
BORING LOG
 Boring No. SB-24-8
 Page: 1 of 1

Drilling Start Date: 10/12/22
 Drilling End Date: 10/12/22
 Drilling Company: GEX
 Drilling Method: Hand Auger
 Drilling Equipment: Hand Auger
 Driller: David Hall
 Logged By: ABM

Boring Depth (ft): 3.0
 Boring Diameter (in): 3.25
 Sampling Method(s): Grab
 DTW During Drilling (ft):
 DTW After Drilling (ft):
 Ground Surface Elev. (ft):
 Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0				GR			3.00	(0') ORGANIC SOIL (OL); (grass) (0.17') SILT (ML); some fine gravel, some fine sand, soft, dry, dark brown	2.7		0
1								(1') SILT (ML); some fine sand, medium stiff, dry, reddish-brown			1
2								(2.5') Fine Gravelly SILT (ML); some fine sand, medium stiff, dry, reddish-brown	3.6	SB-24-8	2
3								(3') Boring terminated			3
4											4
5											5

NOTES: Refusal at 3' due to quartz gravel.



WELL CONSTRUCTION RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

DAVID HALL

Well Contractor Name

A - 4459

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION

Company Name

2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.)

3. Well Use (check well use):

Water Supply Well:

- ☐ Agricultural ☐ Municipal/Public
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single)
☐ Industrial/Commercial ☐ Residential Water Supply (shared)
☐ Irrigation

Non-Water Supply Well:

- ☒ Monitoring ☐ Recovery

Injection Well:

- ☐ Aquifer Recharge ☐ Groundwater Remediation
☐ Aquifer Storage and Recovery ☐ Salinity Barrier
☐ Aquifer Test ☐ Stormwater Drainage
☐ Experimental Technology ☐ Subsidence Control
☐ Geothermal (Closed Loop) ☐ Tracer
☐ Geothermal (Heating/Cooling Return) ☐ Other (explain under #21 Remarks)

4. Date Well(s) Completed: 10/12/22 Well ID# TMW-1

5a. Well Location:

NCDOT - PARCEL 24

Facility/Owner Name

Facility ID# (if applicable)

28 WEST MAIN STREET SYLVA 28779

Physical Address, City, and Zip

JACKSON

County

Parcel Identification No. (PIN)

5b. Latitude and Longitude in degrees/minutes/seconds or decimal degrees:
(if well field, one lat/long is sufficient)

35° 22' 24.60" N 83° 13' 13.22" W

6. Is (are) the well(s): ☐ Permanent or ☒ Temporary

7. Is this a repair to an existing well: ☐ Yes or ☒ No

If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.

8. Number of wells constructed: 1

For multiple injection or non-water supply wells ONLY with the same construction, you can submit one form.

9. Total well depth below land surface: 8.0 (ft.)

For multiple wells list all depths if different (example- 3@200' and 2@100')

10. Static water level below top of casing: (ft.)

If water level is above casing, use "-"

11. Borehole diameter: 2.25 (in.)

12. Well construction method: DPT

(i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

13a. Yield (gpm) Method of test:

13b. Disinfection type: Amount:

For Internal Use ONLY:

14. WATER ZONES

FROM	TO	DESCRIPTION
ft.	ft.	
ft.	ft.	

15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		

16. INNER CASING OR TUBING (geothermal closed-loop)

FROM	TO	DIAMETER	THICKNESS	MATERIAL
ft.	ft.	in.		
ft.	ft.	in.		

17. SCREEN

FROM	TO	DIAMETER	SLOT SIZE	THICKNESS	MATERIAL
ft.	ft.	in.			
ft.	ft.	in.			

18. GROUT

FROM	TO	MATERIAL	EMPLACEMENT METHOD & AMOUNT
ft.	ft.		
ft.	ft.		
ft.	ft.		

19. SAND/GRAVEL PACK (if applicable)

FROM	TO	MATERIAL	EMPLACEMENT METHOD
ft.	ft.		
ft.	ft.		

20. DRILLING LOG (attach additional sheets if necessary)

FROM	TO	DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)
0.0 ft.	8.0 ft.	DIRECT PUSH
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	
ft.	ft.	

21. REMARKS

22. Certification:

Signature of Certified Well Contractor

11/02/22

Date

By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

23. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

24a. For All Wells: Submit this form within 30 days of completion of well construction to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit a copy of this form within 30 days of completion of well construction to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

WELL ABANDONMENT RECORD

This form can be used for single or multiple wells

1. Well Contractor Information:

DAVID HALL

Well Contractor Name (or well owner personally abandoning well on his/her property)

A - 4459

NC Well Contractor Certification Number

GEOLOGIC EXPLORATION

Company Name

2. Well Construction Permit #:

List all applicable well construction permits (i.e. County, State, Variance, etc.) if known

3. Well use (check well use):

Water Supply Well:

- | | |
|--|--|
| ☐ Agricultural | ☐ Municipal/Public |
| ☐ Geothermal (Heating/Cooling Supply) | ☐ Residential Water Supply (single) |
| ☐ Industrial/Commercial | ☐ Residential Water Supply (shared) |
| ☐ Irrigation | |

Non-Water Supply Well:

- | | |
|--|-----------------------------------|
| ☒ Monitoring | ☐ Recovery |
|--|-----------------------------------|

Injection Well:

- | | |
|--|---|
| ☐ Aquifer Recharge | ☐ Groundwater Remediation |
| ☐ Aquifer Storage and Recovery | ☐ Salinity Barrier |
| ☐ Aquifer Test | ☐ Stormwater Drainage |
| ☐ Experimental Technology | ☐ Subsidence Control |
| ☐ Geothermal (Closed Loop) | ☐ Tracer |
| ☐ Geothermal (Heating/Cooling Return) | ☐ Other (explain under 7g) |

4. Date well(s) abandoned: 10/14/22

5a. Well location:

NCDOT - PARCEL 24

Facility/Owner Name

Facility ID# (if applicable)

28 WEST MAIN STREET SYLVA 28779

Physical Address, City, and Zip

JACKSON

County

Parcel Identification No. (PIN)

5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient)

35° 22' 24.60" N 83° 13' 13.22" W

CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED

Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction abandonment, you can submit one form.

6a. Well ID#: TMW-1

6b. Total well depth: 8.0 (ft.)

6c. Borehole diameter: 2.25 (in.)

6d. Water level below ground surface: (ft.)

6e. Outer casing length (if known): (ft.)

6f. Inner casing/tubing length (if known): (ft.)

6g. Screen length (if known): (ft.)

For Internal Use ONLY:

WELL ABANDONMENT DETAILS

7a. Number of wells being abandoned: 1

For multiple injection or non-water supply wells ONLY with the same construction abandonment, you can submit one form.

7b. Approximate volume of water remaining in well(s): (gal.)

FOR WATER SUPPLY WELLS ONLY:

7c. Type of disinfectant used:

7d. Amount of disinfectant used:

7e. Sealing materials used (check all that apply):

- | | |
|--|---|
| ☐ Neat Cement Grout | ☐ Bentonite Chips or Pellets |
| ☐ Sand Cement Grout | ☐ Dry Clay |
| ☐ Concrete Grout | ☐ Drill Cuttings |
| ☐ Specialty Grout | ☐ Gravel |
| ☒ Bentonite Slurry | ☐ Other (explain under 7g) |

7f. For each material selected above, provide amount of materials used:

1.0 GALLONS

7g. Provide a brief description of the abandonment procedure:

ABANDONED VIA TREMIE PIPE WITH BENTONITE SLURRY

8. Certification:



11/02/22

Signature of Certified Well Contractor or Well Owner

Date

By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.

9. Site diagram or additional well details:

You may use the back of this page to provide additional well site details or well abandonment details. You may also attach additional pages if necessary.

SUBMITTAL INSTRUCTIONS

10a. For All Wells: Submit this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Information Processing Unit,
1617 Mail Service Center, Raleigh, NC 27699-1617

10b. For Injection Wells: In addition to sending the form to the address in 10a above, also submit one copy of this form within 30 days of completion of well abandonment to the following:

Division of Water Quality, Underground Injection Control Program,
1636 Mail Service Center, Raleigh, NC 27699-1636

10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where abandoned.

Appendix D
Laboratory Analytical Reports



Hydrocarbon Analysis Results

Client: HART & HICKMAN
Address: 2923 SOUTH TRYON ST. SUITE 100
 CHARLOTTE NC 28203

Samples taken
Samples extracted
Samples analysed

Wednesday, October 12, 2022
 Wednesday, October 12, 2022
 Friday, October 14, 2022

Contact: DAVE GRAHAM

Operator

TORI KELLY

Project: ROW.704

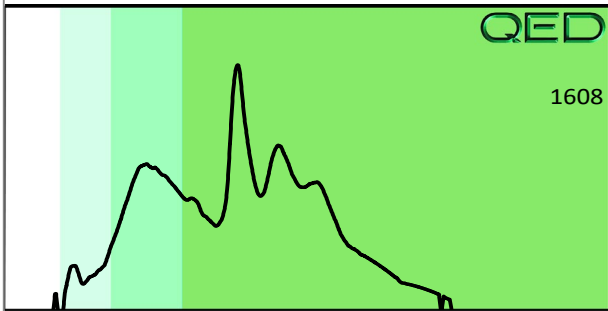
													U04049	
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match	
										% light	% mid	% heavy		
s	SB-24-1 (2-4)	20.2	<0.5	<0.5	<0.5	<0.5	<0.1	<0.16	<0.02	0	57.3	42.7	Residual HC,(P)	
s	SB-24-2 (0-2)	24.5	<0.61	<0.61	31.5	31.5	24.4	1.6	<0.025	0	89.8	10.2	Deg Fuel 69%,(FCM),(BO)	
s	SB-24-3 (0-2)	20.8	<0.52	<0.52	10.4	10.4	4.2	0.22	<0.021	0	78.7	21.3	Deg.PHC 86.6%,(FCM)	
s	SB-24-4 (0-2)	21.1	<0.53	<0.53	8.5	8.5	4.9	0.26	<0.021	0	82.7	17.3	Deg Fuel 92.5%,(FCM)	
s	SB-24-5 (2-3)	270.0	<13.5	143.6	1143	1287	37.4	<2.2	<0.27	99.3	0.7	0	Undeg.Kerosene 85.4%,(FCM)	
s	SB-24-6 (2-3)	21.3	<0.53	6.6	52.8	59.4	1.7	<0.17	<0.021	99.8	0.2	0	Undeg.Kerosene 88.4%,(FCM)	
s	SB-24-7 (2-3)	23.0	<0.58	<0.58	1.3	1.3	0.61	<0.18	<0.023	0	64.5	35.5	V.Deg.PHC 94.5%,(FCM)	
s	SB-24-8 (2-3)	20.8	<0.52	<0.52	17.1	17.1	12.4	0.66	<0.021	0	90.4	9.6	Deg Fuel 80.6%,(FCM)	
	Initial Calibrator QC check			OK		Final FCM QC Check					OK		101.7 %	

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

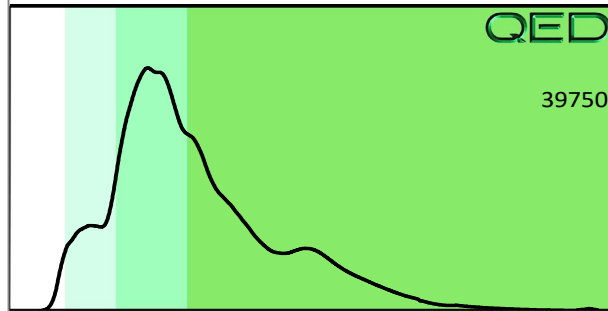
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

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

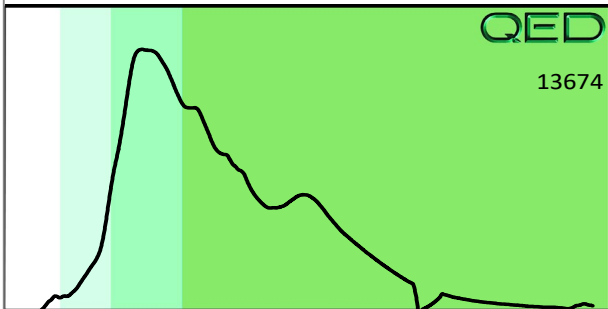
SB-24-1 (2-4) : Residual HC,(P)



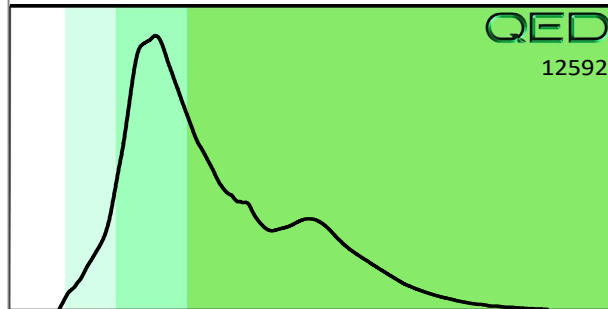
SB-24-2 (0-2) : Deg Fuel 69%,(FCM),(BO)



SB-24-3 (0-2) : Deg.PHC 86.6%,(FCM)



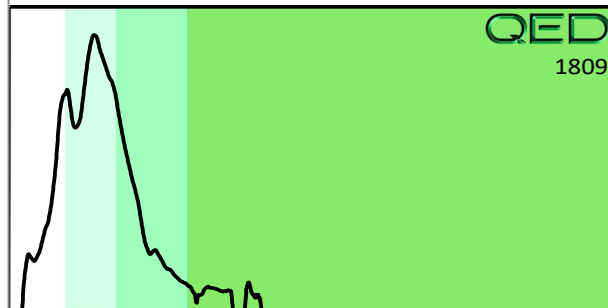
SB-24-4 (0-2) : Deg Fuel 92.5%,(FCM)



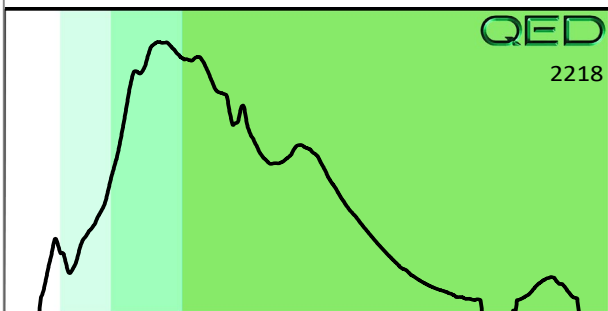
SB-24-5 (2-3) : Undeg.Kerosene 85.4%,(FCM)



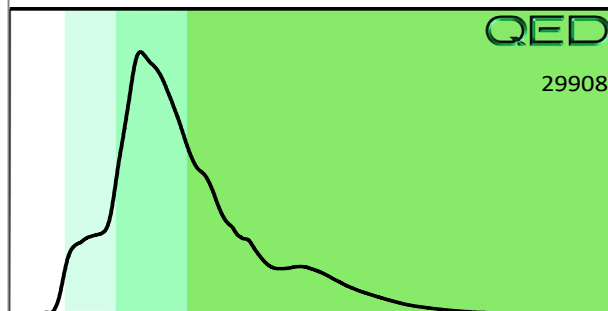
SB-24-6 (2-3) : Undeg.Kerosene 88.4%,(FCM)



SB-24-7 (2-3) : V.Deg.PHC 94.5%,(FCM)



SB-24-8 (2-3) : Deg Fuel 80.6%,(FCM)



Client Name:	DOT
Address:	2923 So. Tryon St. Ste 100 Charlotte NC 28203
Contact:	Dave Graham
Project Ref.:	ROW-704
Email:	dgraham@earthcheman.com
Phone #:	704-887-4630
Collected by:	Adam Michalek



RED Lab, LLC
105 Portwatch Way
Suite F
Wilmington, NC 28412

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	TAT Requested		Analysis Type		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	Date/Time	24 Hour	48 Hour	UVF	GC				
	10/12/22 1000		X	X		AM SB-24-1 (2-4)	51.8	38.9	12.9
	10/12/22 1030					SB-24-2 (0-2)	49.6	39.0	10.6
	10/12/22 1100					SB-24-3 (0-2)	52.5	40.0	12.5
	10/12/22 1130					SB-24-4 (0-2)	51.4	39.1	12.3
	10/12/22 1200					SB-24-5 (2-3)	52.5	40.0	12.5
	10/12/22 1230					SB-24-6 (2-3)	56.0	43.8	12.2
	10/12/22 1300					SB-24-7 (2-3)	49.9	38.6	11.3
	10/12/22 1330		↓	↓	↓	SB-24-8 (2-3)	54.7	42.2	12.5

COMMENTS/REQUESTS: Report to MDLs & "J" flags			TARGET GC/UVF ANALYTES:		
Relinquished by		Accepted by		Date/Time	RED Lab USE ONLY Ref. No
Adam Michalek		Fed Ex		10/13/22 1100	
Relinquished by		Accepted by		Date/Time	
		MM	10/14/22	1050	

10/27/2022

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC, 28203

Ref: Analytical Testing
Lab Report Number: 22-293-2100
Client Project Description: ROW.704

Dear David Graham:

Waypoint Analytical, LLC (Charlotte) received sample(s) on 10/20/2022 for the analyses presented in the following report.

The above referenced project has been analyzed per your instructions. The analyses were performed in accordance with the applicable analytical method.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, method validations, instrumentation maintenance and calibration for all parameters were performed in accordance with guidelines established by the USEPA (including 40 CFR 136 Method Update Rule May 2021) unless otherwise indicated.

Certain parameters (chlorine, pH, dissolved oxygen, sulfite...) are required to be analyzed within 15 minutes of sampling. Usually, but not always, any field parameter analyzed at the laboratory is outside of this holding time. Refer to sample analysis time for confirmation of holding time compliance.

The results are shown on the attached Report of Analysis(s). Results for solid matrices are reported on an as-received basis unless otherwise indicated. This report shall not be reproduced except in full and relates only to the samples included in this report.

Please do not hesitate to contact me or client services if you have any questions or need additional information.

Sincerely,



Angela D Overcash
Senior Project Manager



Certification Summary

Laboratory ID: WP CNC: Waypoint Analytical Carolina, Inc. (C), Charlotte, NC

State	Program	Lab ID	Expiration Date
North Carolina	State Program	37735	07/31/2023
North Carolina	State Program	402	12/31/2022
South Carolina	State Program	99012	07/31/2023
South Carolina	State Program	99012	12/31/2022



Sample Summary Table

Report Number: 22-293-2100

Client Project Description: ROW.704

Lab No	Client Sample ID	Matrix	Date Collected	Date Received
91183	TMW-1 (24)	Aqueous	10/14/2022 13:00	10/20/2022 12:49
91187	MW-Parcel 24	Aqueous	10/19/2022 10:00	10/20/2022 12:49

Summary of Detected Analytes

Project: ROW.704

Report Number: 22-293-2100

Client Sample ID	Lab Sample ID					
Method	Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
TMW-1 (24)	V 91183					
8260D	Benzene	0.266	µg/L	0.180	10/25/2022 04:42	J
8260D	n-Butylbenzene	0.439	µg/L	0.185	10/25/2022 04:42	J
8260D	sec-Butyl benzene	2.30	µg/L	0.200	10/25/2022 04:42	
8260D	tert-Butyl benzene	1.59	µg/L	0.920	10/25/2022 04:42	J
8260D	Ethylbenzene	1.25	µg/L	0.170	10/25/2022 04:42	
8260D	Isopropylbenzene	1.48	µg/L	0.180	10/25/2022 04:42	J
8260D	Naphthalene	25.7	µg/L	0.470	10/25/2022 04:42	
8260D	n-Propylbenzene	1.06	µg/L	0.190	10/25/2022 04:42	
8260D	Toluene	0.239	µg/L	0.220	10/25/2022 04:42	J
8270E	1-Methylnaphthalene	17.5	µg/L	7.62	10/24/2022 21:34	
8270E	2-Methylnaphthalene	9.20	µg/L	7.20	10/24/2022 21:34	J
8270E	Naphthalene	15.1	µg/L	8.20	10/24/2022 21:34	
MW-Parcel 24	V 91187					
8260D	Benzene	0.570	µg/L	0.180	10/25/2022 07:24	
8260D	n-Butylbenzene	1.01	µg/L	0.185	10/25/2022 07:24	
8260D	sec-Butyl benzene	1.76	µg/L	0.200	10/25/2022 07:24	
8260D	tert-Butyl benzene	2.50	µg/L	0.920	10/25/2022 07:24	
8260D	Ethylbenzene	46.1	µg/L	0.170	10/25/2022 07:24	
8260D	Isopropylbenzene	6.25	µg/L	0.180	10/25/2022 07:24	
8260D	Naphthalene	9.52	µg/L	0.470	10/25/2022 07:24	
8260D	n-Propylbenzene	8.31	µg/L	0.190	10/25/2022 07:24	



Client: Hart & Hickman (Charlotte)
Project: ROW.704
Lab Report Number: 22-293-2100
Date: 10/27/2022

CASE NARRATIVE

Volatile Organic Compounds - GC/MS Method 8260D

Analyte: Ethanol

QC Batch No: V25504/V25503

Relative Percent Difference (RPD) for the duplicate analysis was outside of the allowable QC limits.

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : 22-293-2100

REPORT OF ANALYSIS

Lab No : 91183

Matrix: Aqueous

Sample ID : TMW-1 (24)

Sampled: 10/14/2022 13:00

Analytical Method: 8260D

Prep Batch(es): V25503 10/24/22 14:00

Prep Method: 5030B

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Acetone	<1.80	µg/L	1.80	5.00	1	10/25/22 04:42	MSA	V25504
Acrolein	<2.00	µg/L	2.00	5.00	1	10/25/22 04:42	MSA	V25504
Acrylonitrile	<0.230	µg/L	0.230	5.00	1	10/25/22 04:42	MSA	V25504
Benzene	0.266 J	µg/L	0.180	0.500	1	10/25/22 04:42	MSA	V25504
Bromobenzene	<0.210	µg/L	0.210	0.500	1	10/25/22 04:42	MSA	V25504
Bromochloromethane	<0.420	µg/L	0.420	1.00	1	10/25/22 04:42	MSA	V25504
Bromodichloromethane	<0.160	µg/L	0.160	0.500	1	10/25/22 04:42	MSA	V25504
Bromoform	<1.50	µg/L	1.50	5.00	1	10/25/22 04:42	MSA	V25504
Bromomethane	<0.280	µg/L	0.280	1.00	1	10/25/22 04:42	MSA	V25504
n-Butylbenzene	0.439 J	µg/L	0.185	1.00	1	10/25/22 04:42	MSA	V25504
sec-Butyl benzene	2.30	µg/L	0.200	0.500	1	10/25/22 04:42	MSA	V25504
tert-Butyl benzene	1.59 J	µg/L	0.920	2.00	1	10/25/22 04:42	MSA	V25504
Carbon Disulfide	<0.150	µg/L	0.150	5.00	1	10/25/22 04:42	MSA	V25504
Carbon Tetrachloride	<0.180	µg/L	0.180	0.500	1	10/25/22 04:42	MSA	V25504
Chlorobenzene	<0.190	µg/L	0.190	0.500	1	10/25/22 04:42	MSA	V25504
Chlorodibromomethane	<0.190	µg/L	0.190	0.500	1	10/25/22 04:42	MSA	V25504
Chloroethane	<0.430	µg/L	0.430	1.00	1	10/25/22 04:42	MSA	V25504
Chloroform	<0.220	µg/L	0.220	0.500	1	10/25/22 04:42	MSA	V25504
Chloromethane	<0.220	µg/L	0.220	0.500	1	10/25/22 04:42	MSA	V25504
2-Chlorotoluene	<0.200	µg/L	0.200	0.500	1	10/25/22 04:42	MSA	V25504
4-Chlorotoluene	<0.200	µg/L	0.200	0.500	1	10/25/22 04:42	MSA	V25504
Di-Isopropyl Ether (DIPE)	<0.960	µg/L	0.960	5.00	1	10/25/22 04:42	MSA	V25504

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : **22-293-2100**

REPORT OF ANALYSIS

Lab No : **91183**

Matrix: **Aqueous**

Sample ID : **TMW-1 (24)**

Sampled: **10/14/2022 13:00**

Analytical Method: 8260D

Prep Batch(es): **V25503** 10/24/22 14:00

Prep Method: 5030B

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
1,2-Dibromo-3-Chloropropane	<1.10	µg/L	1.10	2.00	1	10/25/22 04:42	MSA	V25504
1,2-Dibromoethane	<0.200	µg/L	0.200	0.500	1	10/25/22 04:42	MSA	V25504
Dibromomethane	<0.230	µg/L	0.230	0.500	1	10/25/22 04:42	MSA	V25504
1,2-Dichlorobenzene	<0.220	µg/L	0.220	0.500	1	10/25/22 04:42	MSA	V25504
1,3-Dichlorobenzene	<0.190	µg/L	0.190	0.500	1	10/25/22 04:42	MSA	V25504
1,4-Dichlorobenzene	<0.210	µg/L	0.210	0.500	1	10/25/22 04:42	MSA	V25504
Dichlorodifluoromethane	<1.20	µg/L	1.20	5.00	1	10/25/22 04:42	MSA	V25504
1,1-Dichloroethane	<0.240	µg/L	0.240	0.500	1	10/25/22 04:42	MSA	V25504
1,2-Dichloroethane	<0.150	µg/L	0.150	0.500	1	10/25/22 04:42	MSA	V25504
1,1-Dichloroethene	<0.150	µg/L	0.150	0.500	1	10/25/22 04:42	MSA	V25504
cis-1,2-Dichloroethene	<0.200	µg/L	0.200	0.500	1	10/25/22 04:42	MSA	V25504
trans-1,2-Dichloroethene	<0.180	µg/L	0.180	0.500	1	10/25/22 04:42	MSA	V25504
1,2-Dichloropropane	<0.190	µg/L	0.190	0.500	1	10/25/22 04:42	MSA	V25504
1,3-Dichloropropane	<0.130	µg/L	0.130	0.500	1	10/25/22 04:42	MSA	V25504
2,2-Dichloropropane	<0.210	µg/L	0.210	2.00	1	10/25/22 04:42	MSA	V25504
1,1-Dichloropropene	<0.200	µg/L	0.200	0.500	1	10/25/22 04:42	MSA	V25504
cis-1,3-Dichloropropene	<0.210	µg/L	0.210	0.500	1	10/25/22 04:42	MSA	V25504
trans-1,3-Dichloropropene	<0.150	µg/L	0.150	0.500	1	10/25/22 04:42	MSA	V25504
Ethanol	<42.0	µg/L	42.0	200	1	10/25/22 04:42	MSA	V25504
Ethylbenzene	1.25	µg/L	0.170	0.500	1	10/25/22 04:42	MSA	V25504
Ethyl Tertiary Butyl Ether (ETBE)	<1.80	µg/L	1.80	10.0	1	10/25/22 04:42	MSA	V25504
Hexachlorobutadiene	<0.350	µg/L	0.350	2.00	1	10/25/22 04:42	MSA	V25504

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : **22-293-2100**

REPORT OF ANALYSIS

Lab No : **91183**

Matrix: **Aqueous**

Sample ID : **TMW-1 (24)**

Sampled: **10/14/2022 13:00**

Analytical Method: 8260D

Prep Batch(es): **V25503** 10/24/22 14:00

Prep Method: 5030B

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
n-Hexane	<1.30	µg/L	1.30	10.0	1	10/25/22 04:42	MSA	V25504
2-Hexanone	<0.380	µg/L	0.380	5.00	1	10/25/22 04:42	MSA	V25504
Isopropylbenzene	1.48 J	µg/L	0.180	5.00	1	10/25/22 04:42	MSA	V25504
4-Isopropyl toluene	<0.089	µg/L	0.089	0.500	1	10/25/22 04:42	MSA	V25504
Methyl Ethyl Ketone (MEK)	<0.710	µg/L	0.710	5.00	1	10/25/22 04:42	MSA	V25504
Methyl tert-butyl ether (MTBE)	<0.140	µg/L	0.140	0.500	1	10/25/22 04:42	MSA	V25504
4-Methyl-2-Pentanone	<1.00	µg/L	1.00	5.00	1	10/25/22 04:42	MSA	V25504
Methylene Chloride	<0.330	µg/L	0.330	1.00	1	10/25/22 04:42	MSA	V25504
Naphthalene	25.7	µg/L	0.470	1.00	1	10/25/22 04:42	MSA	V25504
n-Propylbenzene	1.06	µg/L	0.190	0.500	1	10/25/22 04:42	MSA	V25504
Styrene	<0.220	µg/L	0.220	0.500	1	10/25/22 04:42	MSA	V25504
1,1,1,2-Tetrachloroethane	<0.160	µg/L	0.160	0.500	1	10/25/22 04:42	MSA	V25504
1,1,2,2-Tetrachloroethane	<0.160	µg/L	0.160	0.500	1	10/25/22 04:42	MSA	V25504
Tetrachloroethene	<0.220	µg/L	0.220	0.500	1	10/25/22 04:42	MSA	V25504
Toluene	0.239 J	µg/L	0.220	0.500	1	10/25/22 04:42	MSA	V25504
1,2,3-Trichlorobenzene	<0.380	µg/L	0.380	2.00	1	10/25/22 04:42	MSA	V25504
1,2,4-Trichlorobenzene	<0.310	µg/L	0.310	1.00	1	10/25/22 04:42	MSA	V25504
1,1,1-Trichloroethane	<0.160	µg/L	0.160	0.500	1	10/25/22 04:42	MSA	V25504
1,1,2-Trichloroethane	<0.096	µg/L	0.096	0.500	1	10/25/22 04:42	MSA	V25504
Trichloroethene	<0.180	µg/L	0.180	0.500	1	10/25/22 04:42	MSA	V25504
Trichlorofluoromethane	<0.180	µg/L	0.180	0.500	1	10/25/22 04:42	MSA	V25504
1,2,3-Trichloropropane	<0.270	µg/L	0.270	1.00	1	10/25/22 04:42	MSA	V25504

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : 22-293-2100

REPORT OF ANALYSIS

Lab No : 91183

Matrix: Aqueous

Sample ID : TMW-1 (24)

Sampled: 10/14/2022 13:00

Analytical Method: 8260D **Prep Batch(es):** V25503 10/24/22 14:00
Prep Method: 5030B

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
1,3,5-Trimethylbenzene	<0.180	µg/L	0.180	0.500	1	10/25/22 04:42	MSA	V25504
Vinyl Acetate	<1.00	µg/L	1.00	2.00	1	10/25/22 04:42	MSA	V25504
Vinyl Chloride	<0.170	µg/L	0.170	0.500	1	10/25/22 04:42	MSA	V25504
o-Xylene	<0.210	µg/L	0.210	0.500	1	10/25/22 04:42	MSA	V25504
m,p-Xylene	<0.420	µg/L	0.420	1.00	1	10/25/22 04:42	MSA	V25504
Xylene (Total)	<0.21	µg/L	0.210	0.500	1	10/25/22 04:42		V25504

Analytical Method: 8270E **Prep Batch(es):** V25610 10/21/22 08:59
Prep Method: 3510C

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Acenaphthene	<7.37	µg/L	7.37	20.7	1	10/24/22 21:34	JMV	V25611
Acenaphthylene	<7.18	µg/L	7.18	20.7	1	10/24/22 21:34	JMV	V25611
Anthracene	<6.83	µg/L	6.83	10.4	1	10/24/22 21:34	JMV	V25611
Benzo(a)anthracene	<5.88	µg/L	5.88	10.4	1	10/24/22 21:34	JMV	V25611
Benzo(a)pyrene	<4.86	µg/L	4.86	10.4	1	10/24/22 21:34	JMV	V25611
Benzo(b)fluoranthene	<4.70	µg/L	4.70	10.4	1	10/24/22 21:34	JMV	V25611
Benzo(g,h,i)perylene	<4.41	µg/L	4.41	10.4	1	10/24/22 21:34	JMV	V25611
Benzo(k)fluoranthene	<4.87	µg/L	4.87	10.4	1	10/24/22 21:34	JMV	V25611
Chrysene	<5.60	µg/L	5.60	10.4	1	10/24/22 21:34	JMV	V25611
Dibenz(a,h)anthracene	<6.22	µg/L	6.22	20.7	1	10/24/22 21:34	JMV	V25611
Fluoranthene	<6.27	µg/L	6.27	10.4	1	10/24/22 21:34	JMV	V25611

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : **22-293-2100**

REPORT OF ANALYSIS

Lab No : **91183**

Matrix: **Aqueous**

Sample ID : **TMW-1 (24)**

Sampled: **10/14/2022 13:00**

Analytical Method: 8270E

Prep Batch(es): **V25610** 10/21/22 08:59

Prep Method: 3510C

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Fluorene	<7.56	µg/L	7.56	10.4	1	10/24/22 21:34	JMV	V25611
Indeno(1,2,3-cd)pyrene	<6.45	µg/L	6.45	10.4	1	10/24/22 21:34	JMV	V25611
1-Methylnaphthalene	17.5	µg/L	7.62	10.4	1	10/24/22 21:34	JMV	V25611
2-Methylnaphthalene	9.20 J	µg/L	7.20	10.4	1	10/24/22 21:34	JMV	V25611
Naphthalene	15.1	µg/L	8.20	10.4	1	10/24/22 21:34	JMV	V25611
Phenanthrene	<6.59	µg/L	6.59	10.4	1	10/24/22 21:34	JMV	V25611
Pyrene	<5.64	µg/L	5.64	10.4	1	10/24/22 21:34	JMV	V25611
Surrogate: 2-Fluorobiphenyl	74.7		Limits: 44-119%		1	10/24/22 21:34	JMV	V25611
Surrogate: Nitrobenzene-d5	61.0		Limits: 44-120%		1	10/24/22 21:34	JMV	V25611
Surrogate: 4-Terphenyl-d14	91.9		Limits: 50-134%		1	10/24/22 21:34	JMV	V25611

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : 22-293-2100

REPORT OF ANALYSIS

Lab No : 91187

Matrix: Aqueous

Sample ID : MW-Parcel 24

Sampled: 10/19/2022 10:00

Analytical Method: 8260D

Prep Batch(es): V25503 10/24/22 14:00

Prep Method: 5030B

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Acetone	<1.80	µg/L	1.80	5.00	1	10/25/22 07:24	MSA	V25504
Acrolein	<2.00	µg/L	2.00	5.00	1	10/25/22 07:24	MSA	V25504
Acrylonitrile	<0.230	µg/L	0.230	5.00	1	10/25/22 07:24	MSA	V25504
Benzene	0.570	µg/L	0.180	0.500	1	10/25/22 07:24	MSA	V25504
Bromobenzene	<0.210	µg/L	0.210	0.500	1	10/25/22 07:24	MSA	V25504
Bromochloromethane	<0.420	µg/L	0.420	1.00	1	10/25/22 07:24	MSA	V25504
Bromodichloromethane	<0.160	µg/L	0.160	0.500	1	10/25/22 07:24	MSA	V25504
Bromoform	<1.50	µg/L	1.50	5.00	1	10/25/22 07:24	MSA	V25504
Bromomethane	<0.280	µg/L	0.280	1.00	1	10/25/22 07:24	MSA	V25504
n-Butylbenzene	1.01	µg/L	0.185	1.00	1	10/25/22 07:24	MSA	V25504
sec-Butyl benzene	1.76	µg/L	0.200	0.500	1	10/25/22 07:24	MSA	V25504
tert-Butyl benzene	2.50	µg/L	0.920	2.00	1	10/25/22 07:24	MSA	V25504
Carbon Disulfide	<0.150	µg/L	0.150	5.00	1	10/25/22 07:24	MSA	V25504
Carbon Tetrachloride	<0.180	µg/L	0.180	0.500	1	10/25/22 07:24	MSA	V25504
Chlorobenzene	<0.190	µg/L	0.190	0.500	1	10/25/22 07:24	MSA	V25504
Chlorodibromomethane	<0.190	µg/L	0.190	0.500	1	10/25/22 07:24	MSA	V25504
Chloroethane	<0.430	µg/L	0.430	1.00	1	10/25/22 07:24	MSA	V25504
Chloroform	<0.220	µg/L	0.220	0.500	1	10/25/22 07:24	MSA	V25504
Chloromethane	<0.220	µg/L	0.220	0.500	1	10/25/22 07:24	MSA	V25504
2-Chlorotoluene	<0.200	µg/L	0.200	0.500	1	10/25/22 07:24	MSA	V25504
4-Chlorotoluene	<0.200	µg/L	0.200	0.500	1	10/25/22 07:24	MSA	V25504
Di-Isopropyl Ether (DIPE)	<0.960	µg/L	0.960	5.00	1	10/25/22 07:24	MSA	V25504

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : **22-293-2100**

REPORT OF ANALYSIS

Lab No : **91187**

Matrix: **Aqueous**

Sample ID : **MW-Parcel 24**

Sampled: **10/19/2022 10:00**

Analytical Method: 8260D

Prep Batch(es): **V25503** 10/24/22 14:00

Prep Method: 5030B

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
1,2-Dibromo-3-Chloropropane	<1.10	µg/L	1.10	2.00	1	10/25/22 07:24	MSA	V25504
1,2-Dibromoethane	<0.200	µg/L	0.200	0.500	1	10/25/22 07:24	MSA	V25504
Dibromomethane	<0.230	µg/L	0.230	0.500	1	10/25/22 07:24	MSA	V25504
1,2-Dichlorobenzene	<0.220	µg/L	0.220	0.500	1	10/25/22 07:24	MSA	V25504
1,3-Dichlorobenzene	<0.190	µg/L	0.190	0.500	1	10/25/22 07:24	MSA	V25504
1,4-Dichlorobenzene	<0.210	µg/L	0.210	0.500	1	10/25/22 07:24	MSA	V25504
Dichlorodifluoromethane	<1.20	µg/L	1.20	5.00	1	10/25/22 07:24	MSA	V25504
1,1-Dichloroethane	<0.240	µg/L	0.240	0.500	1	10/25/22 07:24	MSA	V25504
1,2-Dichloroethane	<0.150	µg/L	0.150	0.500	1	10/25/22 07:24	MSA	V25504
1,1-Dichloroethene	<0.150	µg/L	0.150	0.500	1	10/25/22 07:24	MSA	V25504
cis-1,2-Dichloroethene	<0.200	µg/L	0.200	0.500	1	10/25/22 07:24	MSA	V25504
trans-1,2-Dichloroethene	<0.180	µg/L	0.180	0.500	1	10/25/22 07:24	MSA	V25504
1,2-Dichloropropane	<0.190	µg/L	0.190	0.500	1	10/25/22 07:24	MSA	V25504
1,3-Dichloropropane	<0.130	µg/L	0.130	0.500	1	10/25/22 07:24	MSA	V25504
2,2-Dichloropropane	<0.210	µg/L	0.210	2.00	1	10/25/22 07:24	MSA	V25504
1,1-Dichloropropene	<0.200	µg/L	0.200	0.500	1	10/25/22 07:24	MSA	V25504
cis-1,3-Dichloropropene	<0.210	µg/L	0.210	0.500	1	10/25/22 07:24	MSA	V25504
trans-1,3-Dichloropropene	<0.150	µg/L	0.150	0.500	1	10/25/22 07:24	MSA	V25504
Ethanol	<42.0	µg/L	42.0	200	1	10/25/22 07:24	MSA	V25504
Ethylbenzene	46.1	µg/L	0.170	0.500	1	10/25/22 07:24	MSA	V25504
Ethyl Tertiary Butyl Ether (ETBE)	<1.80	µg/L	1.80	10.0	1	10/25/22 07:24	MSA	V25504
Hexachlorobutadiene	<0.350	µg/L	0.350	2.00	1	10/25/22 07:24	MSA	V25504

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : 22-293-2100

REPORT OF ANALYSIS

Lab No : 91187

Matrix: Aqueous

Sample ID : MW-Parcel 24

Sampled: 10/19/2022 10:00

Analytical Method: 8260D

Prep Batch(es): V25503 10/24/22 14:00

Prep Method: 5030B

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
n-Hexane	<1.30	µg/L	1.30	10.0	1	10/25/22 07:24	MSA	V25504
2-Hexanone	<0.380	µg/L	0.380	5.00	1	10/25/22 07:24	MSA	V25504
Isopropylbenzene	6.25	µg/L	0.180	5.00	1	10/25/22 07:24	MSA	V25504
4-Isopropyl toluene	<0.089	µg/L	0.089	0.500	1	10/25/22 07:24	MSA	V25504
Methyl Ethyl Ketone (MEK)	<0.710	µg/L	0.710	5.00	1	10/25/22 07:24	MSA	V25504
Methyl tert-butyl ether (MTBE)	<0.140	µg/L	0.140	0.500	1	10/25/22 07:24	MSA	V25504
4-Methyl-2-Pentanone	<1.00	µg/L	1.00	5.00	1	10/25/22 07:24	MSA	V25504
Methylene Chloride	<0.330	µg/L	0.330	1.00	1	10/25/22 07:24	MSA	V25504
Naphthalene	9.52	µg/L	0.470	1.00	1	10/25/22 07:24	MSA	V25504
n-Propylbenzene	8.31	µg/L	0.190	0.500	1	10/25/22 07:24	MSA	V25504
Styrene	<0.220	µg/L	0.220	0.500	1	10/25/22 07:24	MSA	V25504
1,1,1,2-Tetrachloroethane	<0.160	µg/L	0.160	0.500	1	10/25/22 07:24	MSA	V25504
1,1,2,2-Tetrachloroethane	<0.160	µg/L	0.160	0.500	1	10/25/22 07:24	MSA	V25504
Tetrachloroethene	<0.220	µg/L	0.220	0.500	1	10/25/22 07:24	MSA	V25504
Toluene	<0.220	µg/L	0.220	0.500	1	10/25/22 07:24	MSA	V25504
1,2,3-Trichlorobenzene	<0.380	µg/L	0.380	2.00	1	10/25/22 07:24	MSA	V25504
1,2,4-Trichlorobenzene	<0.310	µg/L	0.310	1.00	1	10/25/22 07:24	MSA	V25504
1,1,1-Trichloroethane	<0.160	µg/L	0.160	0.500	1	10/25/22 07:24	MSA	V25504
1,1,2-Trichloroethane	<0.096	µg/L	0.096	0.500	1	10/25/22 07:24	MSA	V25504
Trichloroethene	<0.180	µg/L	0.180	0.500	1	10/25/22 07:24	MSA	V25504
Trichlorofluoromethane	<0.180	µg/L	0.180	0.500	1	10/25/22 07:24	MSA	V25504
1,2,3-Trichloropropane	<0.270	µg/L	0.270	1.00	1	10/25/22 07:24	MSA	V25504

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : 22-293-2100

REPORT OF ANALYSIS

Lab No : 91187

Matrix: Aqueous

Sample ID : MW-Parcel 24

Sampled: 10/19/2022 10:00

Analytical Method: 8260D **Prep Batch(es):** V25503 10/24/22 14:00
Prep Method: 5030B

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
1,3,5-Trimethylbenzene	<0.180	µg/L	0.180	0.500	1	10/25/22 07:24	MSA	V25504
Vinyl Acetate	<1.00	µg/L	1.00	2.00	1	10/25/22 07:24	MSA	V25504
Vinyl Chloride	<0.170	µg/L	0.170	0.500	1	10/25/22 07:24	MSA	V25504
o-Xylene	<0.210	µg/L	0.210	0.500	1	10/25/22 07:24	MSA	V25504
m,p-Xylene	<0.420	µg/L	0.420	1.00	1	10/25/22 07:24	MSA	V25504
Xylene (Total)	<0.21	µg/L	0.210	0.500	1	10/25/22 07:24		V25504

Analytical Method: 8270E **Prep Batch(es):** V25610 10/21/22 08:59
Prep Method: 3510C

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Acenaphthene	<7.33	µg/L	7.33	20.6	1	10/24/22 23:04	JMV	V25611
Acenaphthylene	<7.15	µg/L	7.15	20.6	1	10/24/22 23:04	JMV	V25611
Anthracene	<6.77	µg/L	6.77	10.3	1	10/24/22 23:04	JMV	V25611
Benzo(a)anthracene	<5.82	µg/L	5.82	10.3	1	10/24/22 23:04	JMV	V25611
Benzo(a)pyrene	<4.81	µg/L	4.81	10.3	1	10/24/22 23:04	JMV	V25611
Benzo(b)fluoranthene	<4.66	µg/L	4.66	10.3	1	10/24/22 23:04	JMV	V25611
Benzo(g,h,i)perylene	<4.37	µg/L	4.37	10.3	1	10/24/22 23:04	JMV	V25611
Benzo(k)fluoranthene	<4.82	µg/L	4.82	10.3	1	10/24/22 23:04	JMV	V25611
Chrysene	<5.54	µg/L	5.54	10.3	1	10/24/22 23:04	JMV	V25611
Dibenz(a,h)anthracene	<6.19	µg/L	6.19	20.6	1	10/24/22 23:04	JMV	V25611
Fluoranthene	<6.21	µg/L	6.21	10.3	1	10/24/22 23:04	JMV	V25611

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

01102

Hart & Hickman (Charlotte)
David Graham
2923 South Tryon St. Ste 100
Charlotte, NC 28203

Project ROW.704

Information :

Report Date : 10/27/2022
Received : 10/20/2022

Report Number : **22-293-2100**

REPORT OF ANALYSIS

Lab No : **91187**

Matrix: **Aqueous**

Sample ID : **MW-Parcel 24**

Sampled: **10/19/2022 10:00**

Analytical Method: 8270E

Prep Batch(es): **V25610** 10/21/22 08:59

Prep Method: 3510C

Test	Results	Units	MDL	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Fluorene	<7.49	µg/L	7.49	10.3	1	10/24/22 23:04	JMV	V25611
Indeno(1,2,3-cd)pyrene	<6.39	µg/L	6.39	10.3	1	10/24/22 23:04	JMV	V25611
1-Methylnaphthalene	<7.55	µg/L	7.55	10.3	1	10/24/22 23:04	JMV	V25611
2-Methylnaphthalene	<7.13	µg/L	7.13	10.3	1	10/24/22 23:04	JMV	V25611
Naphthalene	<8.12	µg/L	8.12	10.3	1	10/24/22 23:04	JMV	V25611
Phenanthrene	<6.53	µg/L	6.53	10.3	1	10/24/22 23:04	JMV	V25611
Pyrene	<5.58	µg/L	5.58	10.3	1	10/24/22 23:04	JMV	V25611
Surrogate: 2-Fluorobiphenyl	81.6		Limits: 44-119%		1	10/24/22 23:04	JMV	V25611
Surrogate: Nitrobenzene-d5	68.5		Limits: 44-120%		1	10/24/22 23:04	JMV	V25611
Surrogate: 4-Terphenyl-d14	98.3		Limits: 50-134%		1	10/24/22 23:04	JMV	V25611

**Qualifiers/
Definitions**

DF Dilution Factor
MQL Method Quantitation Limit

J Estimated value

Quality Control Data

Client ID: Hart & Hickman (Charlotte)
Project Description: ROW.704
Report No: 22-293-2100

QC Prep: V25503
QC Prep Batch Method: 5030B
QC Analytical Batch(es): V25504
Analysis Method: 8260D
Analysis Description: Volatile Organic Compounds - GC/MS

Lab Reagent Blank LRB-V25503 Matrix: AQU
Associated Lab Samples: 91183, 91187

Parameter	Units	Blank Result	MDL	MQL	Analyzed	% Recovery	% Rec Limits
Acetone	µg/L	<1.80	1.80	5.00	10/25/22 01:32		
Acrolein	µg/L	<2.00	2.00	5.00	10/25/22 01:32		
Acrylonitrile	µg/L	<0.230	0.230	5.00	10/25/22 01:32		
Benzene	µg/L	<0.180	0.180	0.500	10/25/22 01:32		
Bromobenzene	µg/L	<0.210	0.210	0.500	10/25/22 01:32		
Bromochloromethane	µg/L	<0.420	0.420	1.00	10/25/22 01:32		
Bromodichloromethane	µg/L	<0.160	0.160	0.500	10/25/22 01:32		
Bromoform	µg/L	<1.50	1.50	5.00	10/25/22 01:32		
Bromomethane	µg/L	<0.280	0.280	1.00	10/25/22 01:32		
n-Butylbenzene	µg/L	<0.185	0.185	1.00	10/25/22 01:32		
sec-Butyl benzene	µg/L	<0.200	0.200	0.500	10/25/22 01:32		
tert-Butyl benzene	µg/L	<0.920	0.920	2.00	10/25/22 01:32		
Carbon Disulfide	µg/L	<0.150	0.150	5.00	10/25/22 01:32		
Carbon Tetrachloride	µg/L	<0.180	0.180	0.500	10/25/22 01:32		
Chlorobenzene	µg/L	<0.190	0.190	0.500	10/25/22 01:32		
Chlorodibromomethane	µg/L	<0.190	0.190	0.500	10/25/22 01:32		
Chloroethane	µg/L	<0.430	0.430	1.00	10/25/22 01:32		
Chloroform	µg/L	<0.220	0.220	0.500	10/25/22 01:32		
Chloromethane	µg/L	<0.220	0.220	0.500	10/25/22 01:32		
2-Chlorotoluene	µg/L	<0.200	0.200	0.500	10/25/22 01:32		
4-Chlorotoluene	µg/L	<0.200	0.200	0.500	10/25/22 01:32		
Di-Isopropyl Ether (DIPE)	µg/L	<0.960	0.960	5.00	10/25/22 01:32		
1,2-Dibromo-3-Chloropropane	µg/L	<1.10	1.10	2.00	10/25/22 01:32		
1,2-Dibromoethane	µg/L	<0.200	0.200	0.500	10/25/22 01:32		
Dibromomethane	µg/L	<0.230	0.230	0.500	10/25/22 01:32		
1,2-Dichlorobenzene	µg/L	<0.220	0.220	0.500	10/25/22 01:32		
1,3-Dichlorobenzene	µg/L	<0.190	0.190	0.500	10/25/22 01:32		

Quality Control Data

Client ID: Hart & Hickman (Charlotte)
Project Description: ROW.704
Report No: 22-293-2100

QC Prep: V25503
QC Prep Batch Method: 5030B
QC Analytical Batch(es): V25504
Analysis Method: 8260D
Analysis Description: Volatile Organic Compounds - GC/MS

Lab Reagent Blank LRB-V25503 Matrix: AQU
Associated Lab Samples: 91183, 91187

Parameter	Units	Blank Result	MDL	MQL	Analyzed	% Recovery	% Rec Limits
1,4-Dichlorobenzene	µg/L	<0.210	0.210	0.500	10/25/22 01:32		
Dichlorodifluoromethane	µg/L	<1.20	1.20	5.00	10/25/22 01:32		
1,1-Dichloroethane	µg/L	<0.240	0.240	0.500	10/25/22 01:32		
1,2-Dichloroethane	µg/L	<0.150	0.150	0.500	10/25/22 01:32		
1,1-Dichloroethene	µg/L	<0.150	0.150	0.500	10/25/22 01:32		
cis-1,2-Dichloroethene	µg/L	<0.200	0.200	0.500	10/25/22 01:32		
trans-1,2-Dichloroethene	µg/L	<0.180	0.180	0.500	10/25/22 01:32		
1,2-Dichloropropane	µg/L	<0.190	0.190	0.500	10/25/22 01:32		
1,3-Dichloropropane	µg/L	<0.130	0.130	0.500	10/25/22 01:32		
2,2-Dichloropropane	µg/L	<0.210	0.210	2.00	10/25/22 01:32		
1,1-Dichloropropene	µg/L	<0.200	0.200	0.500	10/25/22 01:32		
cis-1,3-Dichloropropene	µg/L	<0.210	0.210	0.500	10/25/22 01:32		
trans-1,3-Dichloropropene	µg/L	<0.150	0.150	0.500	10/25/22 01:32		
Ethanol	µg/L	<42.0	42.0	200	10/25/22 01:32		
Ethylbenzene	µg/L	<0.170	0.170	0.500	10/25/22 01:32		
Ethyl Tertiary Butyl Ether (ETBE)	µg/L	<1.80	1.80	10.0	10/25/22 01:32		
Hexachlorobutadiene	µg/L	<0.350	0.350	2.00	10/25/22 01:32		
n-Hexane	µg/L	<1.30	1.30	10.0	10/25/22 01:32		
2-Hexanone	µg/L	<0.380	0.380	5.00	10/25/22 01:32		
Isopropylbenzene	µg/L	<0.180	0.180	5.00	10/25/22 01:32		
4-Isopropyl toluene	µg/L	<0.089	0.089	0.500	10/25/22 01:32		
Methyl Ethyl Ketone (MEK)	µg/L	<0.710	0.710	5.00	10/25/22 01:32		
Methyl tert-butyl ether (MTBE)	µg/L	<0.140	0.140	0.500	10/25/22 01:32		
4-Methyl-2-Pentanone	µg/L	<1.00	1.00	5.00	10/25/22 01:32		
Methylene Chloride	µg/L	<0.330	0.330	1.00	10/25/22 01:32		
Naphthalene	µg/L	<0.470	0.470	1.00	10/25/22 01:32		
n-Propylbenzene	µg/L	<0.190	0.190	0.500	10/25/22 01:32		

Quality Control Data

Client ID: Hart & Hickman (Charlotte)
Project Description: ROW.704
Report No: 22-293-2100

QC Prep: V25503
QC Prep Batch Method: 5030B
QC Analytical Batch(es): V25504
Analysis Method: 8260D
Analysis Description: Volatile Organic Compounds - GC/MS

Lab Reagent Blank LRB-V25503 Matrix: AQU
Associated Lab Samples: 91183, 91187

Parameter	Units	Blank Result	MDL	MQL	Analyzed	% Recovery	% Rec Limits
Styrene	µg/L	<0.220	0.220	0.500	10/25/22 01:32		
1,1,1,2-Tetrachloroethane	µg/L	<0.160	0.160	0.500	10/25/22 01:32		
1,1,2,2-Tetrachloroethane	µg/L	<0.160	0.160	0.500	10/25/22 01:32		
Tetrachloroethene	µg/L	<0.220	0.220	0.500	10/25/22 01:32		
Toluene	µg/L	<0.220	0.220	0.500	10/25/22 01:32		
1,2,3-Trichlorobenzene	µg/L	<0.380	0.380	2.00	10/25/22 01:32		
1,2,4-Trichlorobenzene	µg/L	<0.310	0.310	1.00	10/25/22 01:32		
1,1,1-Trichloroethane	µg/L	<0.160	0.160	0.500	10/25/22 01:32		
1,1,2-Trichloroethane	µg/L	<0.096	0.096	0.500	10/25/22 01:32		
Trichloroethene	µg/L	<0.180	0.180	0.500	10/25/22 01:32		
Trichlorofluoromethane	µg/L	<0.180	0.180	0.500	10/25/22 01:32		
1,2,3-Trichloropropane	µg/L	<0.270	0.270	1.00	10/25/22 01:32		
1,3,5-Trimethylbenzene	µg/L	<0.180	0.180	0.500	10/25/22 01:32		
Vinyl Acetate	µg/L	<1.00	1.00	2.00	10/25/22 01:32		
Vinyl Chloride	µg/L	<0.170	0.170	0.500	10/25/22 01:32		
o-Xylene	µg/L	<0.210	0.210	0.500	10/25/22 01:32		
m,p-Xylene	µg/L	<0.420	0.420	1.00	10/25/22 01:32		
4-Bromofluorobenzene (S)					10/25/22 01:32	100	80-124
Dibromofluoromethane (S)					10/25/22 01:32	98.8	75-129
1,2-Dichloroethane - d4 (S)					10/25/22 01:32	102	63-136
Toluene-d8 (S)					10/25/22 01:32	98.8	77-123

Laboratory Control Sample & LCSD LCS-V25503 LCSD-V25503

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS %Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD
Acetone	µg/L	40.0	40.3	38.1	101	95.2	40-166	5.6	20

Quality Control Data

Client ID: Hart & Hickman (Charlotte)
Project Description: ROW.704
Report No: 22-293-2100

QC Prep: V25503 **QC Analytical Batch(es):** V25504
QC Prep Batch Method: 5030B **Analysis Method:** 8260D
Analysis Description: Volatile Organic Compounds - GC/MS

Laboratory Control Sample & LCSD LCS-V25503 LCSD-V25503

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS %Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD
Acrolein	µg/L	40.0	36.1	36.5	90.2	91.2	70-130	1.1	20
Acrylonitrile	µg/L	40.0	37.5	39.9	93.7	99.7	81-127	6.2	20
Benzene	µg/L	20.0	19.2	18.4	96.0	92.0	77-128	4.2	20
Bromobenzene	µg/L	20.0	18.4	18.1	92.0	90.5	78-129	1.6	20
Bromochloromethane	µg/L	20.0	19.5	18.6	97.5	93.0	78-135	4.7	20
Bromodichloromethane	µg/L	20.0	19.9	20.0	99.5	100	76-138	0.5	20
Bromoform	µg/L	20.0	18.7	18.3	93.5	91.5	71-135	2.1	20
Bromomethane	µg/L	20.0	20.5	20.6	103	103	41-168	0.4	20
n-Butylbenzene	µg/L	20.0	19.3	18.7	96.5	93.5	68-134	3.1	20
sec-Butyl benzene	µg/L	20.0	19.2	19.1	96.0	95.5	71-131	0.5	20
tert-Butyl benzene	µg/L	20.0	19.6	19.4	98.0	97.0	70-132	1.0	20
Carbon Disulfide	µg/L	20.0	19.2	18.7	96.0	93.5	59-135	2.6	20
Carbon Tetrachloride	µg/L	20.0	18.4	18.6	92.0	93.0	72-142	1.0	20
Chlorobenzene	µg/L	20.0	19.3	18.7	96.5	93.5	78-119	3.1	20
Chlorodibromomethane	µg/L	20.0	19.9	20.1	99.5	101	75-134	1.0	20
Chloroethane	µg/L	20.0	20.5	20.3	103	102	57-142	0.9	20
Chloroform	µg/L	20.0	18.9	18.9	94.5	94.5	77-130	0.0	20
Chloromethane	µg/L	20.0	17.6	17.0	88.0	85.0	47-145	3.4	20
2-Chlorotoluene	µg/L	20.0	19.3	18.7	96.5	93.5	74-126	3.1	20
4-Chlorotoluene	µg/L	20.0	19.1	18.8	95.5	94.0	78-129	1.5	20
Di-Isopropyl Ether (DIPE)	µg/L	20.0	19.1	19.1	95.5	95.5	60-154	0.0	20
1,2-Dibromo-3-Chloropropane	µg/L	20.0	17.6	19.8	88.0	99.0	63-134	11.7	20
1,2-Dibromoethane	µg/L	20.0	20.1	20.4	101	102	77-135	1.4	20
Dibromomethane	µg/L	20.0	18.2	18.3	91.0	91.5	76-138	0.5	20
1,2-Dichlorobenzene	µg/L	20.0	19.4	18.5	97.0	92.5	78-128	4.7	20
1,3-Dichlorobenzene	µg/L	20.0	19.2	18.9	96.0	94.5	77-125	1.5	20

Quality Control Data

Client ID: Hart & Hickman (Charlotte)
Project Description: ROW.704
Report No: 22-293-2100

QC Prep: V25503 **QC Analytical Batch(es):** V25504
QC Prep Batch Method: 5030B **Analysis Method:** 8260D
Analysis Description: Volatile Organic Compounds - GC/MS

Laboratory Control Sample & LCSD LCS-V25503 LCSD-V25503

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS %Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD
1,4-Dichlorobenzene	µg/L	20.0	19.0	19.0	95.0	95.0	75-126	0.0	20
Dichlorodifluoromethane	µg/L	20.0	19.6	18.8	98.0	94.0	28-163	4.1	20
1,1-Dichloroethane	µg/L	20.0	19.0	18.6	95.0	93.0	70-130	2.1	20
1,2-Dichloroethane	µg/L	20.0	17.5	17.8	87.5	89.0	68-131	1.6	20
1,1-Dichloroethene	µg/L	20.0	19.5	18.9	97.5	94.5	70-154	3.1	20
cis-1,2-Dichloroethene	µg/L	20.0	19.0	18.4	95.0	92.0	76-141	3.2	20
trans-1,2-Dichloroethene	µg/L	20.0	19.2	18.9	96.0	94.5	76-135	1.5	20
1,2-Dichloropropane	µg/L	20.0	19.0	18.6	95.0	93.0	77-130	2.1	20
1,3-Dichloropropane	µg/L	20.0	19.9	19.3	99.5	96.5	76-132	3.0	20
2,2-Dichloropropane	µg/L	20.0	17.9	17.3	89.5	86.5	29-149	3.4	20
1,1-Dichloropropene	µg/L	20.0	19.3	18.3	96.5	91.5	71-136	5.3	20
cis-1,3-Dichloropropene	µg/L	20.0	18.9	19.3	94.5	96.5	65-140	2.0	20
trans-1,3-Dichloropropene	µg/L	20.0	19.4	19.3	97.0	96.5	67-140	0.5	20
Ethanol	µg/L	500	355	437	71.0	87.4	70-130	20.7*	20
Ethylbenzene	µg/L	20.0	19.1	18.5	95.5	92.5	80-127	3.1	20
Ethyl Tertiary Butyl Ether (ETBE)	µg/L	40.0	39.0	38.6	97.5	96.5	70-130	1.0	20
Hexachlorobutadiene	µg/L	20.0	18.8	18.9	94.0	94.5	61-134	0.5	20
n-Hexane	µg/L	20.0	18.7	18.8	93.5	94.0	70-130	0.5	20
2-Hexanone	µg/L	20.0	18.0	18.0	90.0	90.0	64-137	0.0	20
Isopropylbenzene	µg/L	20.0	19.5	18.8	97.5	94.0	70-130	3.6	20
4-Isopropyl toluene	µg/L	20.0	19.6	18.8	98.0	94.0	69-132	4.1	20
Methyl Ethyl Ketone (MEK)	µg/L	20.0	20.6	20.3	103	102	71-134	1.4	20
Methyl tert-butyl ether (MTBE)	µg/L	20.0	19.3	19.2	96.5	96.0	68-135	0.5	20
4-Methyl-2-Pentanone	µg/L	20.0	18.0	18.9	90.0	94.5	69-134	4.8	20
Methylene Chloride	µg/L	20.0	19.7	19.4	98.5	97.0	73-131	1.5	20
Naphthalene	µg/L	20.0	17.6	17.9	88.0	89.5	64-136	1.6	20

Quality Control Data

Client ID: Hart & Hickman (Charlotte)
Project Description: ROW.704
Report No: 22-293-2100

QC Prep: V25503 **QC Analytical Batch(es):** V25504
QC Prep Batch Method: 5030B **Analysis Method:** 8260D
Analysis Description: Volatile Organic Compounds - GC/MS

Laboratory Control Sample & LCSD LCS-V25503 LCSD-V25503

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS %Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD
n-Propylbenzene	µg/L	20.0	19.5	19.0	97.5	95.0	72-132	2.5	20
Styrene	µg/L	20.0	19.8	18.8	99.0	94.0	78-129	5.1	20
1,1,1,2-Tetrachloroethane	µg/L	20.0	20.0	19.6	100	98.0	79-134	2.0	20
1,1,2,2-Tetrachloroethane	µg/L	20.0	18.5	19.8	92.5	99.0	62-127	6.7	20
Tetrachloroethene	µg/L	20.0	19.2	18.3	96.0	91.5	80-129	4.8	20
Toluene	µg/L	20.0	18.7	18.0	93.5	90.0	76-131	3.8	20
1,2,3-Trichlorobenzene	µg/L	20.0	19.0	19.2	95.0	96.0	58-144	1.0	20
1,2,4-Trichlorobenzene	µg/L	20.0	19.1	19.5	95.5	97.5	66-139	2.0	20
1,1,1-Trichloroethane	µg/L	20.0	19.3	18.9	96.5	94.5	75-135	2.0	20
1,1,2-Trichloroethane	µg/L	20.0	19.2	19.8	96.0	99.0	70-140	3.0	20
Trichloroethene	µg/L	20.0	20.0	19.8	100	99.0	77-133	1.0	20
Trichlorofluoromethane	µg/L	20.0	20.4	19.8	102	99.0	62-148	2.9	20
1,2,3-Trichloropropane	µg/L	20.0	19.1	19.3	95.5	96.5	71-127	1.0	20
1,3,5-Trimethylbenzene	µg/L	20.0	19.4	19.0	97.0	95.0	75-131	2.0	20
Vinyl Acetate	µg/L	20.0	17.3	18.2	86.5	91.0	34-167	5.0	20
Vinyl Chloride	µg/L	20.0	19.8	18.7	99.0	93.5	57-141	5.7	20
o-Xylene	µg/L	20.0	19.4	18.7	97.0	93.5	78-128	3.6	20
m,p-Xylene	µg/L	40.0	39.1	37.6	97.7	94.0	77-133	3.9	20
4-Bromofluorobenzene (S)					102	100	80-124		
Dibromofluoromethane (S)					101	101	75-129		
1,2-Dichloroethane - d4 (S)					99.8	99.0	63-136		
Toluene-d8 (S)					99.8	98.8	77-123		

Quality Control Data

Client ID: Hart & Hickman (Charlotte)
Project Description: ROW.704
Report No: 22-293-2100

QC Prep: V25610
QC Prep Batch Method: 3510C
QC Analytical Batch(es): V25611
Analysis Method: 8270E
Analysis Description: Semivolatile Organic Compounds - GC/MS

Lab Reagent Blank LRB-V25610 Matrix: AQU
Associated Lab Samples: 91183, 91187

Parameter	Units	Blank Result	MDL	MQL	Analyzed	% Recovery	% Rec Limits
Acenaphthene	µg/L	<7.12	7.12	20.0	10/24/22 12:46		
Acenaphthylene	µg/L	<6.94	6.94	20.0	10/24/22 12:46		
Anthracene	µg/L	<6.57	6.57	10.0	10/24/22 12:46		
Benzo(a)anthracene	µg/L	<5.65	5.65	10.0	10/24/22 12:46		
Benzo(a)pyrene	µg/L	<4.67	4.67	10.0	10/24/22 12:46		
Benzo(b)fluoranthene	µg/L	<4.52	4.52	10.0	10/24/22 12:46		
Benzo(g,h,i)perylene	µg/L	<4.24	4.24	10.0	10/24/22 12:46		
Benzo(k)fluoranthene	µg/L	<4.68	4.68	10.0	10/24/22 12:46		
Chrysene	µg/L	<5.38	5.38	10.0	10/24/22 12:46		
Dibenz(a,h)anthracene	µg/L	<6.01	6.01	20.0	10/24/22 12:46		
Fluoranthene	µg/L	<6.03	6.03	10.0	10/24/22 12:46		
Fluorene	µg/L	<7.27	7.27	10.0	10/24/22 12:46		
Indeno(1,2,3-cd)pyrene	µg/L	<6.20	6.20	10.0	10/24/22 12:46		
1-Methylnaphthalene	µg/L	<7.33	7.33	10.0	10/24/22 12:46		
2-Methylnaphthalene	µg/L	<6.92	6.92	10.0	10/24/22 12:46		
Naphthalene	µg/L	<7.88	7.88	10.0	10/24/22 12:46		
Phenanthrene	µg/L	<6.34	6.34	10.0	10/24/22 12:46		
Pyrene	µg/L	<5.42	5.42	10.0	10/24/22 12:46		
2-Fluorobiphenyl (S)					10/24/22 12:46	70.8	44-119
Nitrobenzene-d5 (S)					10/24/22 12:46	61.2	44-120
4-Terphenyl-d14 (S)					10/24/22 12:46	94.2	50-134

Laboratory Control Sample & LCSD LCS-V25610 LCSD-V25610

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS %Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD
Acenaphthene	µg/L	50.0	35.2	41.0	70.4	82.0	38-117	15.2	20.0

Quality Control Data

Client ID: Hart & Hickman (Charlotte)
Project Description: ROW.704
Report No: 22-293-2100

QC Prep: V25610 **QC Analytical Batch(es):** V25611
QC Prep Batch Method: 3510C **Analysis Method:** 8270E
Analysis Description: Semivolatile Organic Compounds - GC/MS

Laboratory Control Sample & LCSD LCS-V25610 LCSD-V25610

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS %Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD
Acenaphthylene	µg/L	50.0	34.5	40.2	69.0	80.4	41-130	15.2	20.0
Anthracene	µg/L	50.0	39.4	43.5	78.8	87.0	57-123	9.8	20.0
Benzo(a)anthracene	µg/L	50.0	39.4	42.5	78.8	85.0	58-125	7.5	20.0
Benzo(a)pyrene	µg/L	50.0	46.1	50.1	92.2	100	54-128	8.3	20.0
Benzo(b)fluoranthene	µg/L	50.0	42.5	46.3	85.0	92.6	53-131	8.5	20.0
Benzo(g,h,i)perylene	µg/L	50.0	39.4	43.1	78.8	86.2	50-134	8.9	20.0
Benzo(k)fluoranthene	µg/L	50.0	42.1	45.6	84.2	91.2	53-131	7.9	20.0
Chrysene	µg/L	50.0	39.9	44.0	79.8	88.0	59-123	9.7	20.0
Dibenz(a,h)anthracene	µg/L	50.0	31.6	35.2	63.2	70.4	51-134	10.7	20.0
Fluoranthene	µg/L	50.0	39.7	43.3	79.4	86.6	57-128	8.6	20.0
Fluorene	µg/L	50.0	36.9	43.2	73.8	86.4	52-124	15.7	20.0
Indeno(1,2,3-cd)pyrene	µg/L	50.0	39.6	43.1	79.2	86.2	52-134	8.4	20.0
1-Methylnaphthalene	µg/L	50.0	28.7	33.0	57.4	66.0	41-119	13.9	20.0
2-Methylnaphthalene	µg/L	50.0	27.6	31.6	55.2	63.2	40-121	13.5	20.0
Naphthalene	µg/L	50.0	26.5	30.4	53.0	60.8	40-121	13.7	20.0
Phenanthrene	µg/L	50.0	39.8	44.0	79.6	88.0	59-120	10.0	20.0
Pyrene	µg/L	50.0	41.3	45.6	82.6	91.2	57-126	9.8	20.0
2-Fluorobiphenyl (S)					67.0	77.6	44-119		
Nitrobenzene-d5 (S)					51.8	58.8	44-120		
4-Terphenyl-d14 (S)					85.8	92.0	50-134		

Shipment Receipt Form

Customer Number: **01102**

Customer Name: **Hart & Hickman (Charlotte)**

Report Number: **22-293-2100**

Shipping Method

☐ Fed Ex	☐ US Postal	☒ Lab	☐ Other :	
☐ UPS	☐ Client	☐ Courier	Thermometer ID:	IRT-15 3.8 C

Shipping container/cooler uncompromised?	☒ Yes	☐ No	
Number of coolers/boxes received	1		
Custody seals intact on shipping container/cooler?	☐ Yes	☐ No	☒ Not Present
Custody seals intact on sample bottles?	☐ Yes	☐ No	☒ Not Present
Chain of Custody (COC) present?	☒ Yes	☐ No	
COC agrees with sample label(s)?	☒ Yes	☐ No	
COC properly completed	☒ Yes	☐ No	
Samples in proper containers?	☒ Yes	☐ No	
Sample containers intact?	☒ Yes	☐ No	
Sufficient sample volume for indicated test(s)?	☒ Yes	☐ No	
All samples received within holding time?	☒ Yes	☐ No	
Cooler temperature in compliance?	☒ Yes	☐ No	
Cooler/Samples arrived at the laboratory on ice. Samples were considered acceptable as cooling process had begun.	☒ Yes	☐ No	
Water - Sample containers properly preserved	☒ Yes	☐ No	☐ N/A
Water - VOA vials free of headspace	☒ Yes	☐ No	☐ N/A
Trip Blanks received with VOAs	☐ Yes	☒ No	☐ N/A
Soil VOA method 5035 – compliance criteria met	☐ Yes	☐ No	☒ N/A
☐ High concentration container (48 hr)	☐ Low concentration EnCore samplers (48 hr)		
☐ High concentration pre-weighed (methanol -14 d)	☐ Low conc pre-weighed vials (Sod Bis -14 d)		
Special precautions or instructions included?	☐ Yes	☒ No	

Comments:

Signature:

Angela D Overcash

Date & Time:

10/27/2022 10:24:58

[illegible]

Appendix E
Groundwater Sampling Records

LOW-FLOW GROUNDWATER SAMPLING RECORD

Stabilization Criteria

Primary:
 pH +/- 0.1 unit
 S. Cond. +/- 5%
 Turb. +/- 10% (<10 NTUs for metals)
 Water Level: slight or stable
 drawdown during purging

Secondary:
 DO +/- 0.2 mg/L
 ORP +/- 20 mV

Job No: ROW-704

Well ID: MW-Parcel 24

Well Location: Parcel 24

Date: 10/19/22

Facility Name: DOT Right of Way

Top of Casing Elevation (ft msl): _____ Casing Material: PVC Volume of Water Per Well Volume: _____ gallons

Total Well Depth (ftTOC): 14 Depth to Water (ftTOC): 2.84 Well Diameter: 2 inch

Sampling Personnel: ABM, _____ Screen Interval (ftTOC): 4 - 14

Type of Pump: Peristaltic Tubing Material: Polyethylene Pump/Tubing set at: 10.5 ft

Weather Conditions: Sunny, 30 F NOTES: Screen interval is per the well construction tag

GROUNDWATER SAMPLING PARAMETERS

Time	Water Level	Volume Pumped	Pumping Rate	DO (mg/l)	Temp. (°C)	S. Cond. (µS/cm)	pH (SU)	ORP (mV)	Turbidity (NTU)
09:40	3.02	0.75 L	150 mL/min	0.00	22.4	371.0	6.33	-199.9	44.70
09:45	3.02	1.50 L	150 mL/min	0.00	22.2	372.5	6.26	-206.4	42.10
09:50	3.03	2.25 L	150 mL/min	0.00	22.6	370.7	6.23	-208.0	41.80
09:55	3.03	3.00 L	150 mL/min	0.00	22.7	369.8	6.21	-210.1	40.30

Other Sample Parameters: _____

Sampled at: 10:00 Parameters taken with: YSI Pro Plus and Hach 2100Q

Sample Delivered to: Lab by ABM at _____

Field Filtration: ☒ Yes ☐ No If yes, which sample parameters were field filtered: _____

Sample Parameter Containers (Types, Number of Containers, Preservatives): 3 40- mL VOA 8260, 2 1 L Amber 8270

LOW-FLOW GROUNDWATER SAMPLING RECORD

Stabilization Criteria

Primary:
 pH +/- 0.1 unit
 S. Cond. +/- 5%
 Turb. +/- 10% (<10 NTUs for metals)
 Water Level: slight or stable
 drawdown during purging

Secondary:
 DO +/- 0.2 mg/L
 ORP +/- 20 mV

Job No: ROW-704

Well ID: TMW-1

Well Location: Parcel 24

Date: 10/14/22

Facility Name: DOT Right of Way

Top of Casing Elevation (ft msl): _____ Casing Material: PVC Volume of Water Per Well Volume: _____ gallons

Total Well Depth (ftTOC): 8 Depth to Water (ftTOC): 5.71 Well Diameter: 1 inch

Sampling Personnel: ABM, _____ Screen Interval (ftTOC): 3 - 8

Type of Pump: Peristaltic Tubing Material: Polyethylene Pump/Tubing set at: 7 ft

Weather Conditions: Sunny, 60s NOTES: Slower recharge - sampled early

Riser height: 1.86' above ground surface

GROUNDWATER SAMPLING PARAMETERS

<u>Time</u>	<u>Water Level</u>	<u>Volume Pumped</u>	<u>Pumping Rate</u>	<u>DO (mg/l)</u>	<u>Temp. (°C)</u>	<u>S. Cond. (µS/cm)</u>	<u>pH (SU)</u>	<u>ORP (mV)</u>	<u>Turbidity (NTU)</u>
12:50	7.12	0.75 L	150 mL/min	0.20	24.8	434.2	6.52	-245.6	471.00
12:55	8.82	1.50 L	150 mL/min	1.88	24.7	452.6	6.32	-205.1	131.00

Other Sample Parameters: _____

Sampled at: 13:00 Parameters taken with: YSI Pro Plus and Hach 2100Q

Sample Delivered to: Lab by ABM at _____

Field Filtration: ☐ Yes ☒ No If yes, which sample parameters were field filtered: _____

Sample Parameter Containers (Types, Number of Containers, Preservatives): 3 40- mL VOA 8260, 2 1 L Amber 8270

Via NC DOT FTS

November 30, 2022

NC DOT Geotechnical Unit
GeoEnvironmental Section
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

Attention: Mr. Ashley Cox, LG

Re: Phase II Investigation Report – Parcel 3
NC DOT State Project No. R-5600
WBS Element No. 45818.1.FR1
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Dear Ashley:

Please find the attached PDF copy of the Phase II Investigation report for the Gary Gibson property (Parcel 3) located in Sylva, Jackson County, North Carolina. Please return via DocuSign for final signatures. If you have any questions or need additional information, please contact us at (704) 586-0007.

Sincerely,

Hart & Hickman, PC



David Graham, PG
Senior Project Geologist



Matt Bramblett, PE
Principal

Attachment

Phase II Investigation NC DOT Parcel 3

**399 W. Main St.
Sylva, Jackson County
North Carolina**

**H&H Job No. ROW-704
State Project: R-5600
WBS Element No. 45818.1.FR1
November 30, 2022**



SMARTER ENVIRONMENTAL SOLUTIONS

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#-245 Geology**

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**Phase II Investigation – Parcel 3
399 W. Main St.
Sylva, Jackson County
North Carolina
H&H Job No. ROW-704**

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Figure 2 Site Map and Soil Analytical Results

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Appendix C Soil Boring Logs

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Phase II Investigation – Parcel 3
399 W. Main St.
Sylva, Jackson County
North Carolina
H&H Job No. ROW-704

1.0 Introduction and Background

Hart & Hickman, PC (H&H) has prepared this Phase II Investigation (Phase II) report documenting assessment activities performed at the Gary Gibson property (Parcel 3) located at 399 W. Main St. in Sylva, Jackson County, North Carolina. This assessment was conducted on behalf of the North Carolina Department of Transportation (NC DOT) in accordance with H&H's August 17, 2022 proposal.

This assessment was conducted to evaluate the potential for underground storage tank (UST) systems and impacted soil on proposed right-of-way and construction easement areas on Parcel 3 related to proposed road improvements along W. Main St. (State Project R-5600). This NC DOT road improvement project includes new curb and gutters, sidewalks, etc. along W. Main St. near the subject site. Parcel 3 is currently occupied by a small retail or office building and a parking lot. A site location map is included as Figure 1, and a site map is presented as Figure 2. NC DOT's plan sheet depicting Parcel 3 is included in Appendix A.

H&H searched the North Carolina Department of Environmental Quality (NC DEQ) Laserfiche website and NC DEQ UST databases for incident files related to the Parcel 3 property address to better target UST system areas and to check for previously reported impacts. No UST incident files were identified for Parcel 3 on NC DEQ's Laserfiche website. Based on the NC DEQ Registered Tank Database, there were no USTs registered on the property consisting of Parcel 3.

The Phase II assessment activities conducted by H&H on Parcel 3 are discussed below.

2.0 Geophysical Survey

Prior to advancing soil borings, H&H reviewed the results of a geophysical survey performed on Parcel 3 by Pyramid Geophysical Services (Pyramid) on September 26 and 27, 2022. Pyramid utilized electromagnetic (EM) induction-metal technology and ground penetrating radar (GPR) technology to identify potential geophysical anomalies and potential USTs at the site. A total of three EM anomalies were identified at the site. The EM anomalies were attributed to known surface metallic objects, such as reinforced concrete or above-ground metal structures (i.e. survey markers, etc.) that were not characteristic signatures of USTs. The EM/GPR results indicated that no USTs were identified on Parcel 3. Pyramid's report, including figures depicting the results of the EM/GPR survey, is provided in Appendix B.

3.0 Soil Assessment

3.1 Soil Sampling

H&H contracted with Geologic Exploration, Inc. (GEX) of Statesville, North Carolina to advance soil borings on Parcel 3. On October 11, 2022, three soil borings (SB-3-1 through SB-3-3) were advanced on Parcel 3 using a direct push technology (DPT) drill rig. Prior to conducting soil borings, underground utilities were marked by the NC 811 public utility locator and by Pyramid for private underground utilities. Borings were cleared to five feet by hand auger prior to using DPT.

The soil borings were advanced to depths ranging from 9.5 ft to 15 ft below ground surface (bgs). Two borings were advanced to shallower depths due to DPT refusal, and one of the soil borings was advanced to 15 ft bgs to evaluate the depth to groundwater at the site. To facilitate the selection of soil samples for laboratory analysis, soil from each boring was field screened continuously for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). Additionally, H&H observed the soil for visual and olfactory indications of impacts. Based on field screening, there were indications of potential impacts in borings SB-3-1 and SB-3-2. PID readings were significantly higher near the capillary fringe and/or below the water table in borings SB-3-1 and SB-3-2. Based on the expected shallow soil disturbance associated with DOT's project in this area, soil samples were collected at shallow depths of 0 ft to 2 ft or 2 ft to 4 ft bgs. Soil boring logs

are included in Appendix C. GPS coordinate data for the soil borings are summarized in Table 1, and the boring locations are shown on Figure 2.

H&H submitted one soil sample from each of the borings SB-3-1 through SB-3-3 for laboratory analysis. The soil samples were placed into laboratory-supplied sample containers using nitrile glove-covered hands. The containers were then labeled as to content, analyses requested, sample date and time, and sampler's name. The samples were placed in an iced cooler upon collection and were submitted to Red Lab, LLC of Wilmington, NC under standard chain-of-custody protocol for analysis of total petroleum hydrocarbons (TPH) as gasoline-range organics (GRO) and diesel-range organics (DRO) using QED ultraviolet fluorescence (UVF) technology. Soil sample depths and analytical results are summarized in Table 2. Laboratory analytical data sheets and chain-of-custody documentation are provided in Appendix D. The analytical results are discussed below.

Upon completion of soil sampling activities, the soil borings were filled with bentonite pellets, and the surfaces were patched to match the existing surface.

3.2 Soil Analytical Results

Concentrations of TPH DRO (ranging from 0.52 mg/kg to 11.7 mg/kg) were detected in soil samples collected from borings SB-3-1 and SB-3-3. The DRO concentrations in both soil samples did not exceed NC DEQ Action Level of 100 mg/kg. TPH GRO was not detected in the soil samples collected. TPH data are depicted on Figure 2.

Although laboratory analytical results indicate soil impacts below NC DEQ Action Levels in borings SB-3-1 and SB-3-2, significant PID readings from these borings indicate the potential for soil impacts below 8 ft bgs in SB-3-1 and 12 ft bgs in SB-3-2. The elevated PID readings are likely due to impacted groundwater and historical groundwater table fluctuations creating a contamination smear zone near the water table. If impacted soil is encountered near Parcel 3 during the NC DOT construction activities, it should be properly managed and disposed.

4.0 Summary and Regulatory Considerations

H&H has reviewed available NC DEQ files, geophysical survey results, and analytical results of soil samples collected at the Parcel 3 property in Sylva, Jackson County, North Carolina. Parcel 3 is currently occupied by a small retail or office building and a parking lot.

Based on the geophysical survey, no USTs were suspected on Parcel 3. Based on H&H's shallow soil assessment results, TPH DRO and TPH GRO were not detected above NC DEQ Action Levels on Parcel 3. However, impacts may be present, particularly in the capillary fringe and near the water table at depths greater than 8 ft. The depth to water was estimated to be approximately 12 ft bgs on Parcel 3 at the time of H&H's assessment.

NC DOT plans indicate proposed undercut for road improvement activities in proposed NC DOT work areas near Parcel 3. Impacted media encountered during road construction activities, if any, should be properly managed and disposed at a permitted facility. If groundwater is encountered and dewatering activities are required during NC DOT construction activities, the groundwater should be characterized and properly managed, if found to be impacted. If a UST is encountered during construction activities, the UST system(s) and their contents should be removed in accordance with NC DEQ regulations and be properly disposed.

5.0 Signature Page

This report was prepared by:

DocuSigned by:
David Graham
9F6FAD6E6BA34BE...

David Graham, PG
Senior Project Geologist for
Hart & Hickman, PC



This report was reviewed by:

DocuSigned by:
Matt Bramblett
CBCA88CDF6E547B...

Matt Bramblett, PE
Principal and Project Manager for
Hart & Hickman, PC

Not considered final unless all signatures are completed.

Table 1 (Page 1 of 1)
Soil Boring GPS Coordinate Data
NC DOT Parcel 3
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Sample ID	Latitude	Longitude
SB-3-1	35.373667	-83.219948
SB-3-2	35.373778	-83.219932
SB-3-3	35.373797	-83.219826

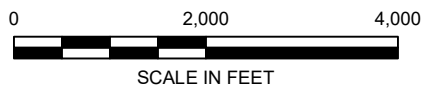
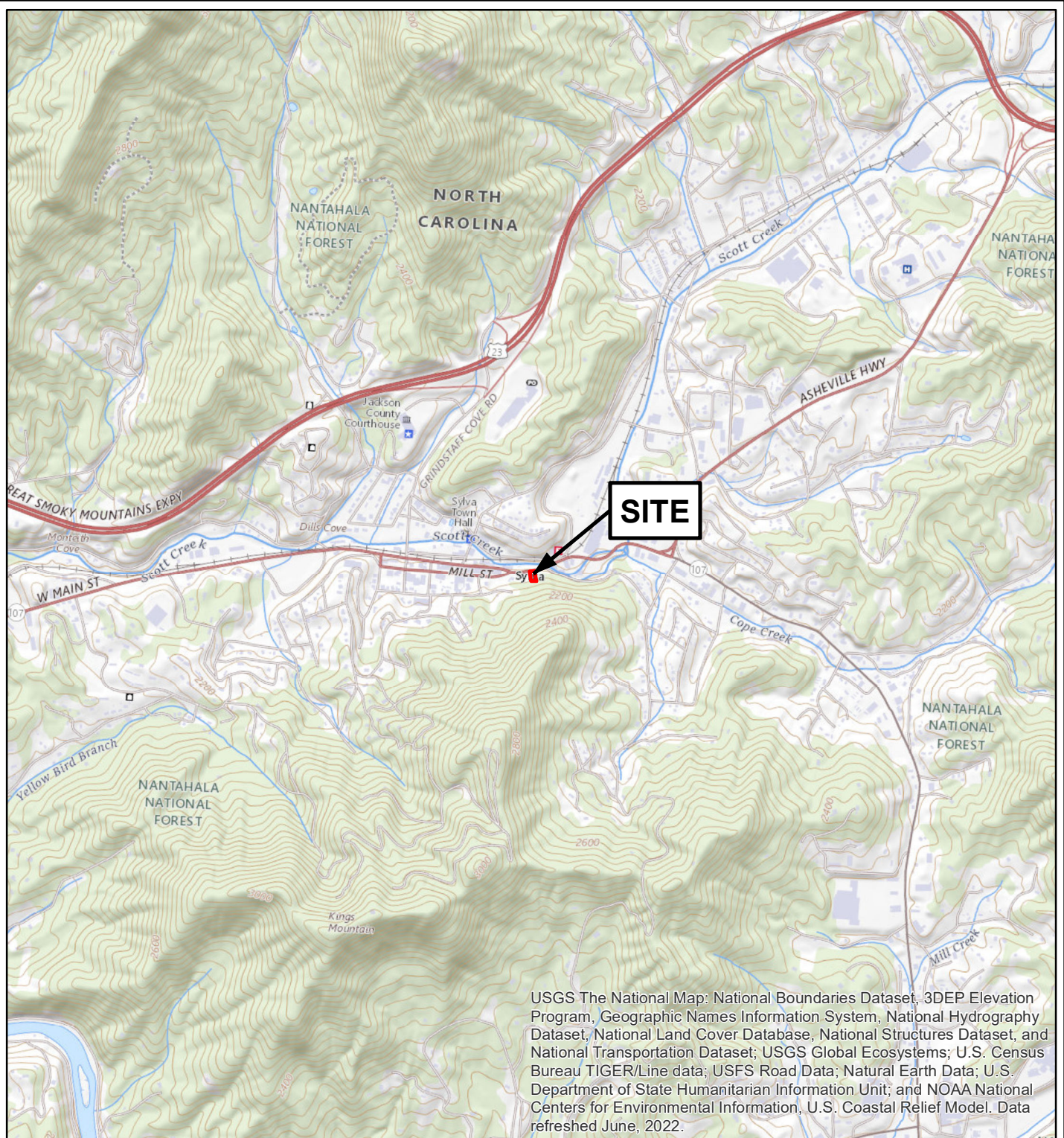
Notes:

GPS coordinate data points collected using a Trimble GeoExplorer 6000 series unit with external satellite for increased accuracy.

Table 2 (Page 1 of 1)
Soil Analytical Results
NC DOT Parcel 3
Sylva, Jackson County, North Carolina
H&H Job No. ROW-704

Sample ID	SB-3-1	SB-3-2	SB-3-3	Action Levels
Sample Depth (ft)	0-2	0-2	2-4	
Sample Date	10/11/2022	10/11/2022	10/11/2022	
<u>TPH DRO/GRO (UVF) (mg/kg)</u>				
Diesel-Range Organics (DRO)	0.52	<0.53	11.7	100
Gasoline-Range Organics (GRO)	<0.3	<0.53	<0.51	50

Notes:
 UVF = QED Ultraviolet Fluorescence Technology
Bold values exceed NCDEQ Action Levels.
 TPH = Total Petroleum Hydrocarbons
 DRO = Diesel-Range Organics
 GRO = Gasoline-Range Organics



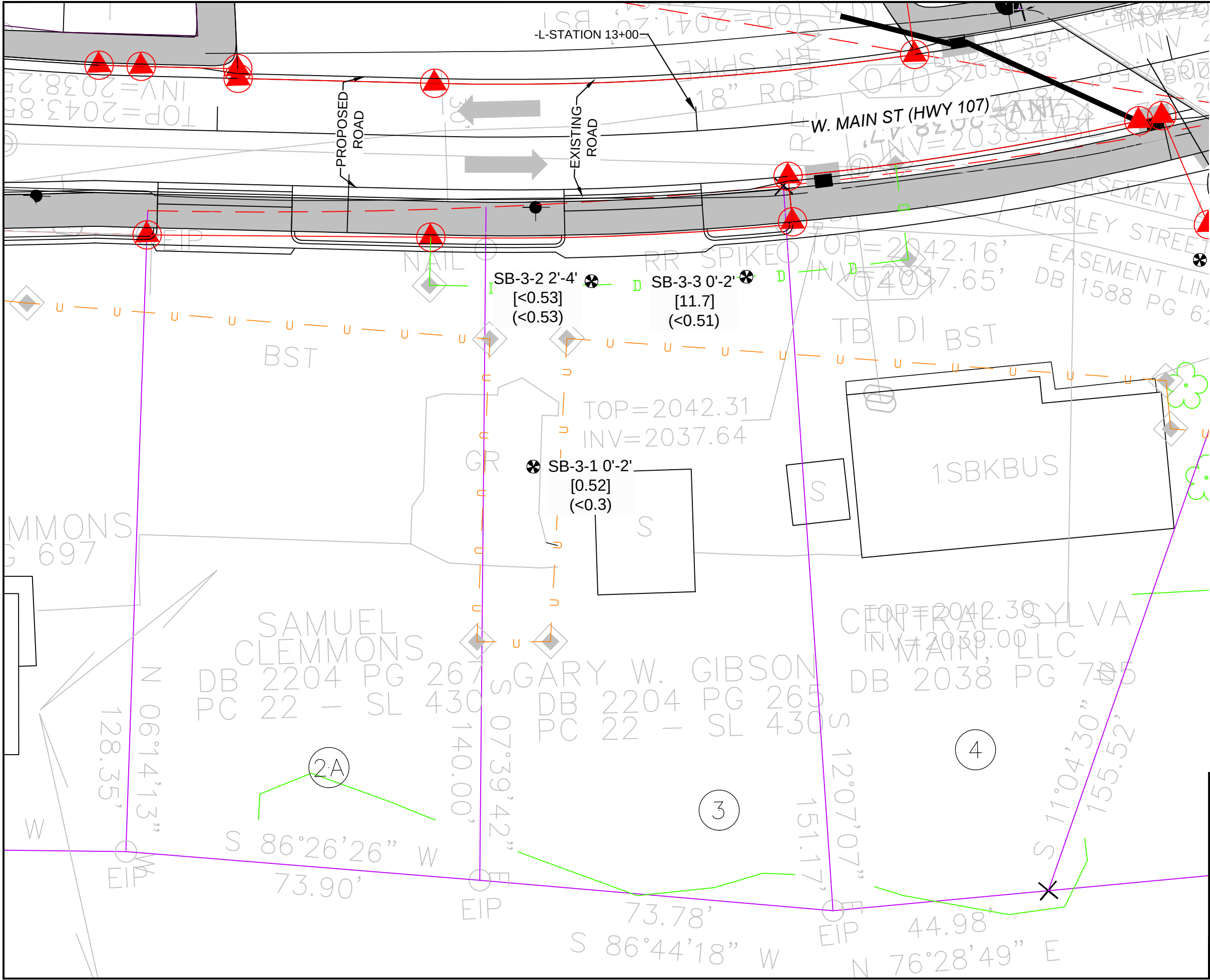
U.S.G.S. QUADRANGLE MAP

SYLVA SOUTH, NORTH CAROLINA 2022

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

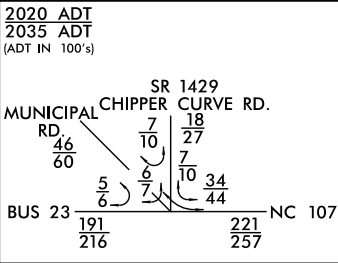
TITLE		SITE LOCATION MAP	
PROJECT		NCDOT PARCEL 3 399 W. MAIN ST SYLVA, NORTH CAROLINA	
 SMARTER ENVIRONMENTAL SOLUTIONS		2923 South Tryon Street - Suite 100 Charlotte, North Carolina 28203 704-586-0007 (p) 704-586-0373 (f) License # C-1269 / # C-245 Geology	
DATE: 10-5-22		REVISION NO: 0	
JOB NO: ROW-704		FIGURE NO: 1	

S:\AAA-Master Projects\NC DOT Right-of-Way -ROW\ROW-704 Jackson County Phase 1\FIGURES\ROW-704 Site Maps 100422_recover.dwg, PARCEL 3, 11/14/2022 10:28:11 AM, imarbury

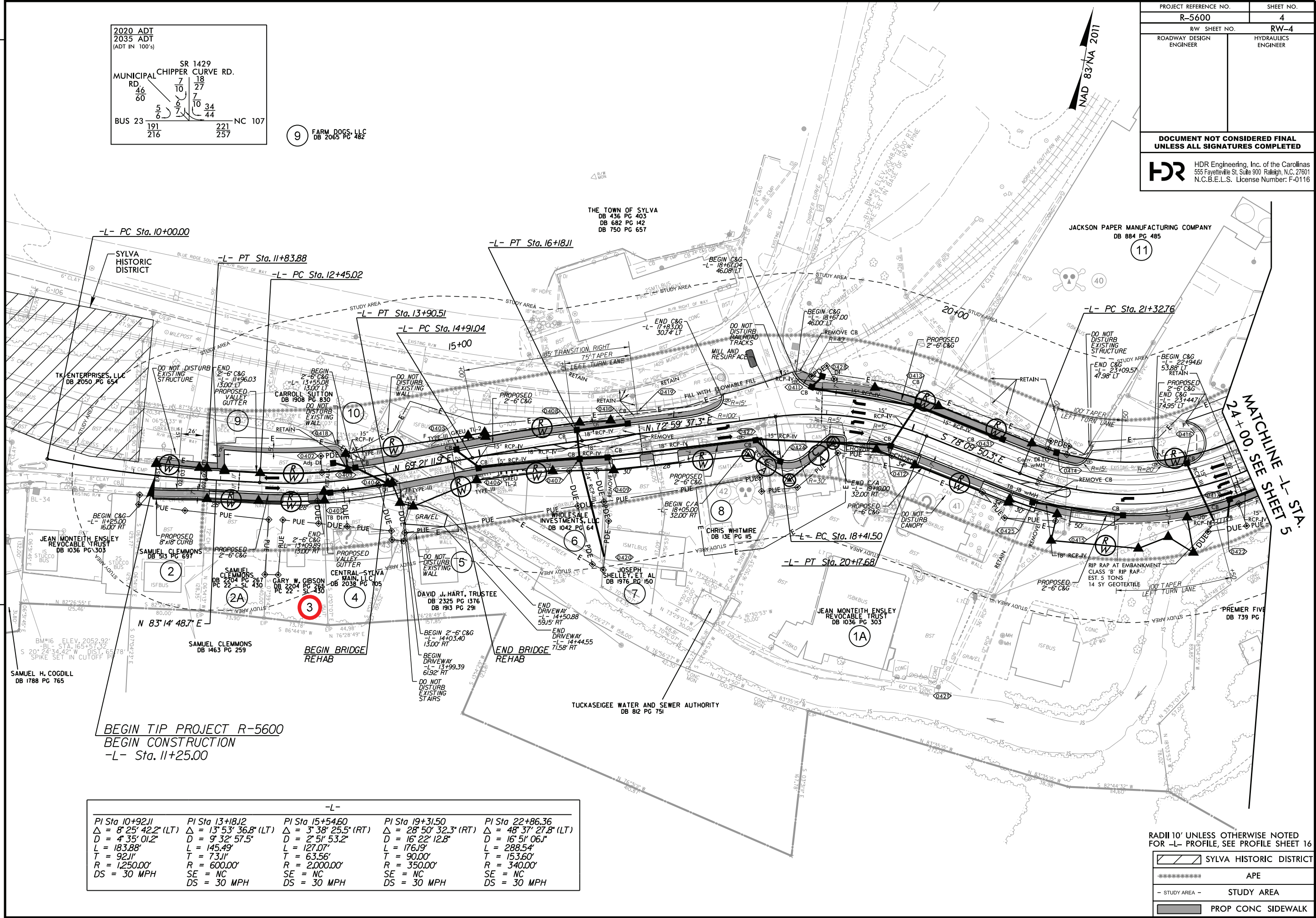


TITLE SITE MAP AND SOIL ANALYTICAL RESULTS	
PROJECT NC DOT PARCEL 3 399 W. MAIN STREET SYLVA, JACKSON COUNTY, NORTH CAROLINA	
hart hickman SMARTER ENVIRONMENTAL SOLUTIONS 2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f) License # C-1269 / #C-245 Geology	
DATE: 10-6-22	REVISION NO. 0
JOB NO. ROW-704	FIGURE NO. 2

Appendix A
NC DOT Preliminary Plan



9 FARM DOGS, LLC
DB 2065 PG 482



BEGIN TIP PROJECT R-5600
BEGIN CONSTRUCTION
-L- Sta. 11+25.00

-L-				
PI Sta 10+92.11	PI Sta 13+18.12	PI Sta 15+54.60	PI Sta 19+31.50	PI Sta 22+86.36
Δ = 8° 25' 42.2" (LT)	Δ = 13° 53' 36.8" (LT)	Δ = 3° 38' 25.5" (RT)	Δ = 28° 50' 32.3" (RT)	Δ = 48° 37' 27.8" (LT)
D = 4° 35' 01.2"	D = 9° 32' 57.5"	D = 2° 51' 53.2"	D = 16° 22' 12.8"	D = 16° 51' 06.1"
L = 183.88'	L = 145.49'	L = 127.07'	L = 176.19'	L = 288.54'
T = 92.11'	T = 73.11'	T = 63.56'	T = 90.00'	T = 153.60'
R = 1,250.00'	R = 600.00'	R = 2,000.00'	R = 350.00'	R = 340.00'
SE = NC	SE = NC	SE = NC	SE = NC	SE = NC
DS = 30 MPH	DS = 30 MPH	DS = 30 MPH	DS = 30 MPH	DS = 30 MPH

RADII 10' UNLESS OTHERWISE NOTED
FOR -L- PROFILE, SEE PROFILE SHEET 16

	SYLVA HISTORIC DISTRICT
*****	APE
- STUDY AREA -	STUDY AREA
	PROP CONC SIDEWALK

REVISIONS

10/20/2021 PARCEL 1 REMOVED; TCE REVISED; PARCEL 2
7/29/2022 PARCELS 4 & 5, ROW REVISED AND DUE ADDED; PARCELS 2A, 3, 4 DUE REVISED; PARCELS 3 & 4 PUE REVISED; PARCEL 9 PDE ADDED

PLOT DRIVER: NCDOT.pdf_color_eng_50.ppt
USER: ASNIDER
DATE: 7/29/2022
TIME: 1:53:11 PM
FILE: \

Appendix B
Pyramid Geophysical Survey Report



PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2022-260)

GEOPHYSICAL SURVEY

METALLIC UST INVESTIGATION: PARCEL 3 NCDOT PROJECT R-5600 (45818.1.FR1)

399 WEST MAIN STREET, SYLVA, NC

October 21, 2022

Report prepared for: David Graham, P.G.
Hart & Hickman, P.C.
2923 South Tryon Street, Suite 100
Charlotte, NC 28203

Prepared by: _____

A handwritten signature in black ink, appearing to read "E. Cross", written over a horizontal line.

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

Reviewed by: _____

A handwritten signature in black ink, appearing to read "Doug Canavella", written over a horizontal line.

Douglas A. Canavella, 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 3 - 399 West Main Street
Sylva, Jackson County, North Carolina

Table of Contents

Executive Summary	1
Introduction.....	2
Field Methodology.....	2
Discussion of Results.....	3
<i>Discussion of EM Results</i>	3
<i>Discussion of GPR Results</i>	4
Summary & Conclusions	5
Limitations	5

Figures

- Figure 1 – Parcel 3 - Geophysical Survey Boundaries and Site Photographs
- Figure 2 – Parcel 3 - EM61 Metal Detection Contour Map
- Figure 3 – Parcel 3 - GPR Transect Locations and Select Images
- Figure 4 – Overlay of Metal Detection Results on NCDOT Engineering Plans

Appendices

- Appendix A – GPR Transect 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 Geophysical Services (Pyramid), a department within Pyramid Environmental & Engineering, P.C., conducted a geophysical investigation for Hart & Hickman, P.C. (Hart & Hickman) at Parcel 3, located at 399 West Main Street, in Sylva, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5600). 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 September 26-27, 2022, 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 three 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 and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant structures such as USTs. The geophysical survey identified evidence of utilities and/or smaller fragments of buried debris. Collectively, the geophysical data recorded no evidence metallic USTs at Parcel 3.

INTRODUCTION

Pyramid Geophysical Services (Pyramid), a department within Pyramid Environmental & Engineering, P.C., conducted a geophysical investigation for Hart & Hickman, P.C. (Hart & Hickman) at Parcel 3, located at 399 West Main Street, in Sylva, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project R-5600). 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 September 26-27, 2022, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site consisted of two small buildings surrounded by asphalt, concrete, 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 September 27, 2022, using a Geophysical Survey Systems, Inc. (GSSI) SIR 4000 unit 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 SIR 4000 unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the SIR 4000 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:

Metallic Anomaly #	Cause of Anomaly	Investigated with GPR
1	Survey Markers	
2	Suspected Buried Debris	✓
3	Reinforced Concrete	✓

The majority of the EM anomalies were directly attributed to visible cultural features at the ground surface, including survey markers and reinforced concrete. GPR was performed across and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant structures such as USTs. GPR was also performed across EM Anomaly 2 to investigate whether the anomaly was the result of a more significant structure such as a UST.

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 ten formal GPR transects were performed at the site.

GPR Transects 1-8 and 10 confirmed the presence of reinforcement within the concrete. GPR Transect 9 was performed across EM Anomaly 2. None of these transects showed evidence of significant structures such as USTs. Evidence of utilities and/or smaller fragments of buried debris was also observed.

Collectively, the geophysical data recorded no evidence metallic USTs at Parcel 3. **Figure 4** provides an overlay of the metal detection results and four known USTs on the NCDOT engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 3 in Sylva, 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 and around all sources of significant metallic interference to confirm the presence of reinforcement within the concrete and to confirm that the interference did not obscure any significant structures such as USTs.
- The geophysical survey identified evidence of utilities and/or smaller fragments of buried debris.
- Collectively, the geophysical data recorded no evidence metallic USTs at Parcel 3.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for Hart & Hickman, P.C. 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 East)

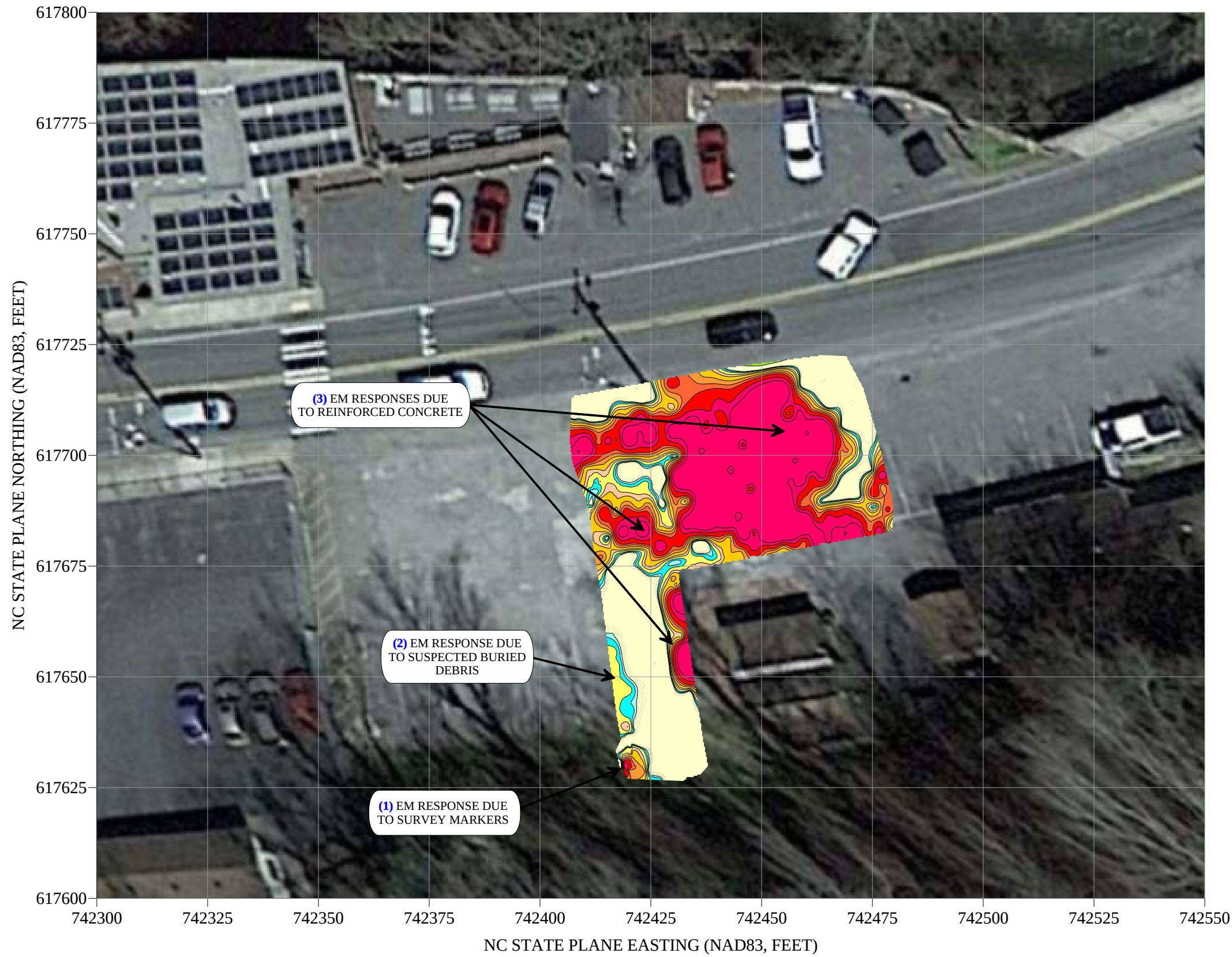


View of Survey Area (Facing Approximately Southeast)



 503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	PROJECT PARCEL 3 SYLVA, NORTH CAROLINA NCDOT PROJECT R-5600	TITLE PARCEL 3 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	DATE 9/30/2022	CLIENT HART & HICKMAN
			PYRAMID PROJECT #: 2022-260	FIGURE 1

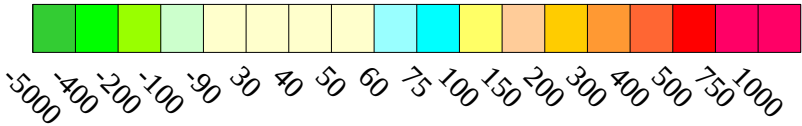
EM61 METAL DETECTION RESULTS



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 September 26, 2022, using a Geonics EM61-MK2 instrument. Verification GPR data were collected using a GSSI SIR 4000 instrument with a 350 MHz HS antenna on September 27, 2022.

EM61 Metal Detection Response (millivolts)



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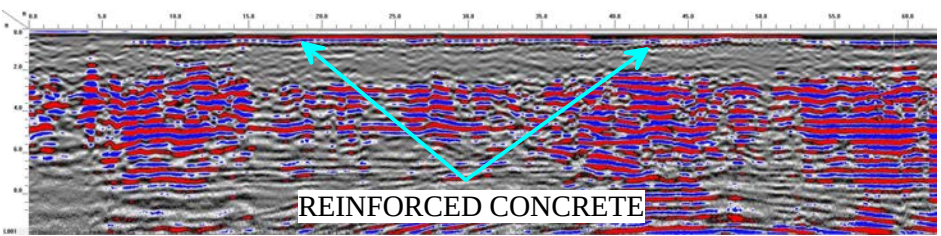
PROJECT
PARCEL 3
SYLVA, NORTH CAROLINA
NCDOT PROJECT R-5600

TITLE
PARCEL 3 -
EM61 METAL DETECTION CONTOUR MAP

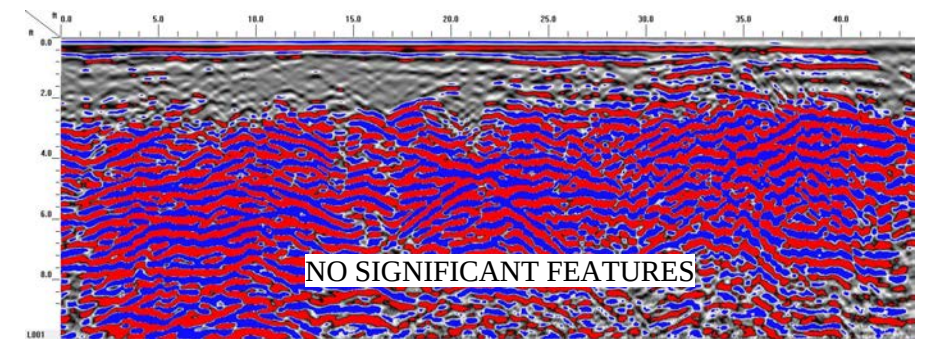
DATE
9/30/2022
PYRAMID
PROJECT #: 2022-260

CLIENT
HART & HICKMAN
FIGURE 2

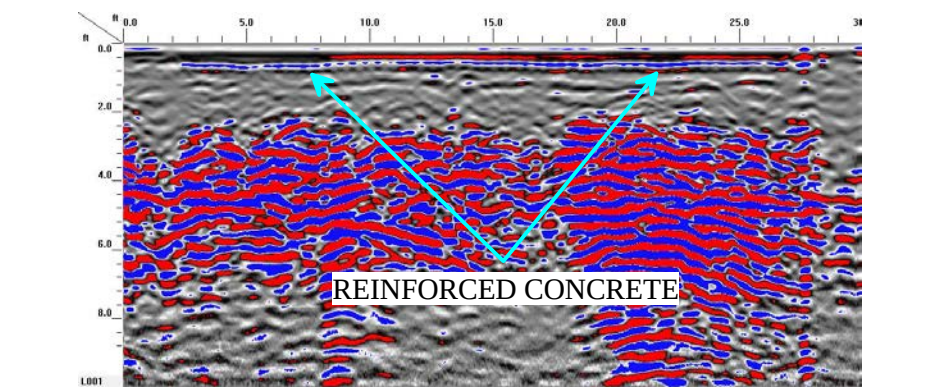
GPR TRANSECT LOCATIONS



GPR TRANSECT 2 (T2)



GPR TRANSECT 9 (T9)



GPR TRANSECT 10 (T10)



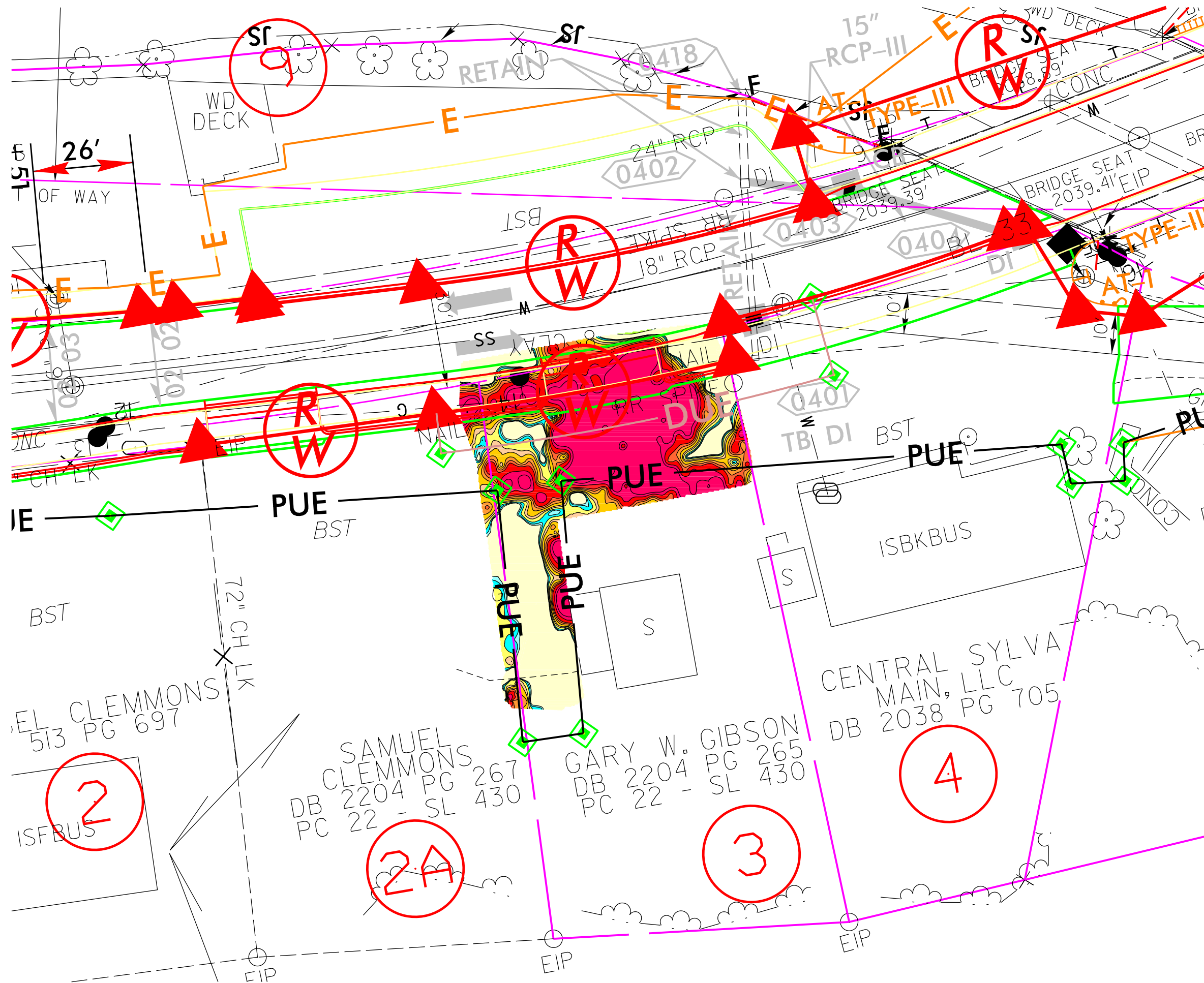
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PROJECT
PARCEL 3
SYLVA, NORTH CAROLINA
NCDOT PROJECT R-5600

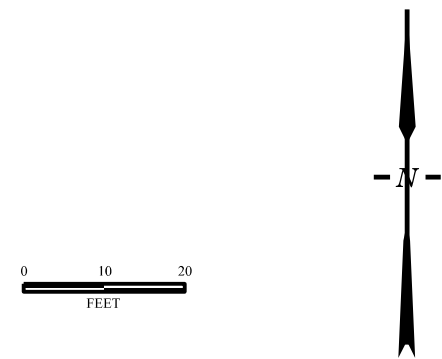
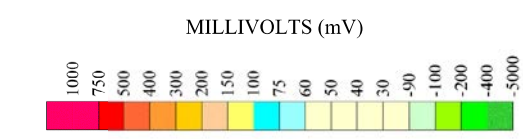
TITLE
PARCEL 3 -
GPR TRANSECT LOCATIONS AND SELECT IMAGES

DATE
9/30/2022
PYRAMID
PROJECT #:
2022-260

CLIENT
HART & HICKMAN
FIGURE 3

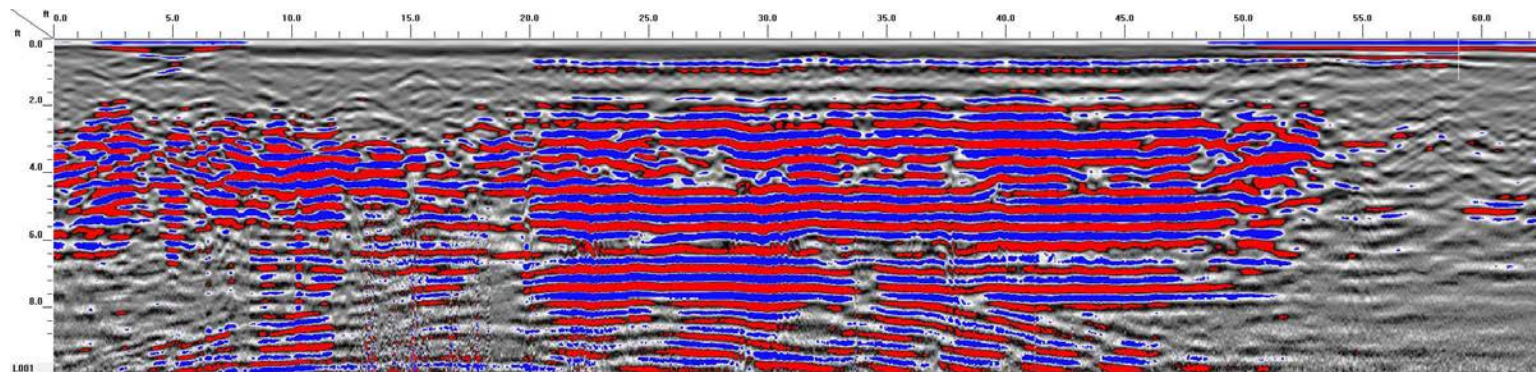


- LEGEND
- EXISTING ROW
 - EXISTING PROPERTY BOUNDARY
 - PROPOSED ROW LINE
 - E TEMPORARY CONSTRUCTION EASEMENT
 - PUE - PERMANENT UTILITY EASEMENT
 - PROPOSED SS CUT LINE
 - PROPOSED SS FILL LINE

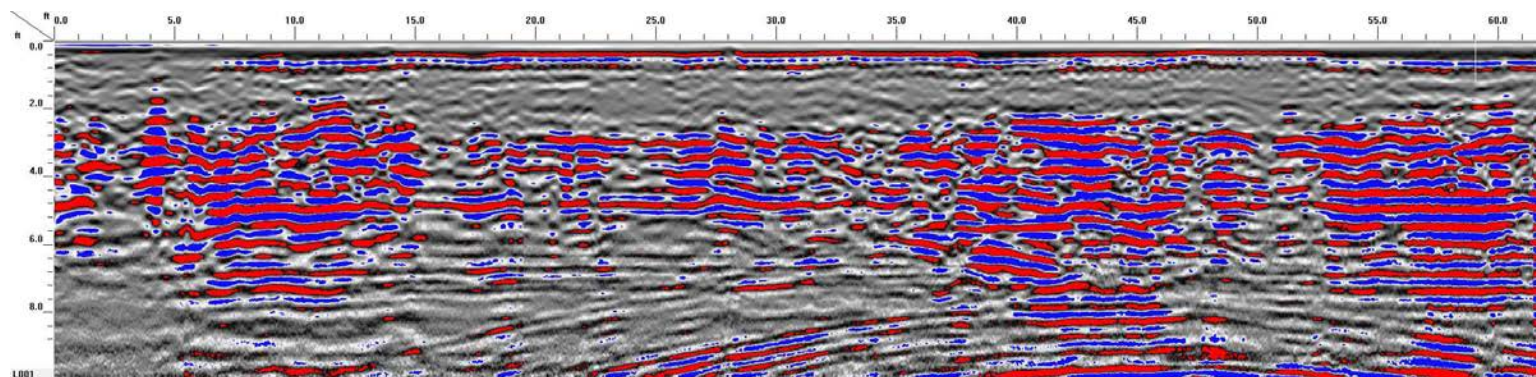


TITLE OVERLAY OF METAL DETECTION RESULTS ON NCDOT ENGINEERING PLANS	
PROJECT PARCEL 3 SYLVA, NORTH CAROLINA NCDOT PROJECT R-5600	
 503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology	
DATE: 10-3-2022	REVISION NO. 0
PYRAMID PROJECT NO. 2022-260	FIGURE NO. 4

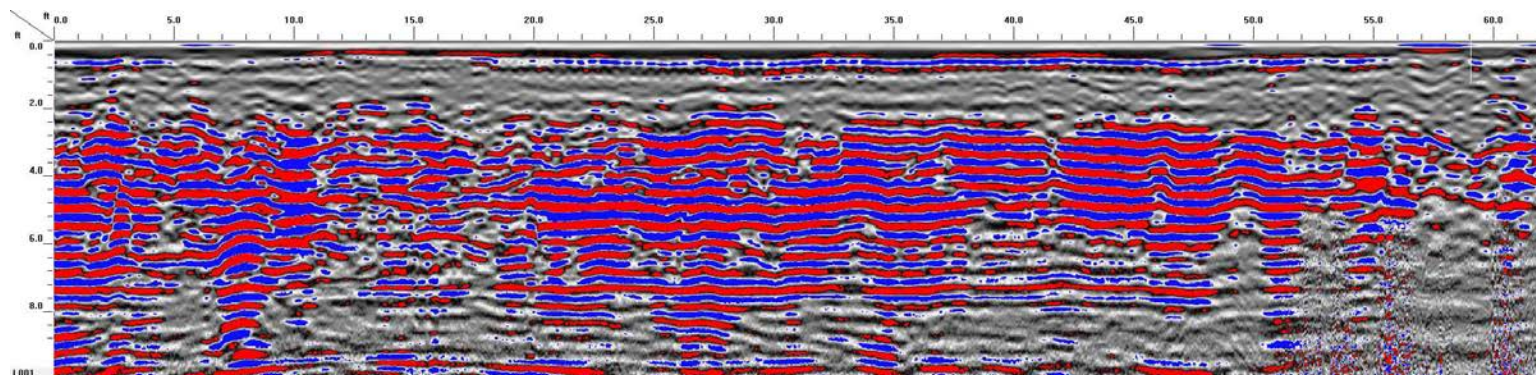
Appendix A – GPR Transect Images



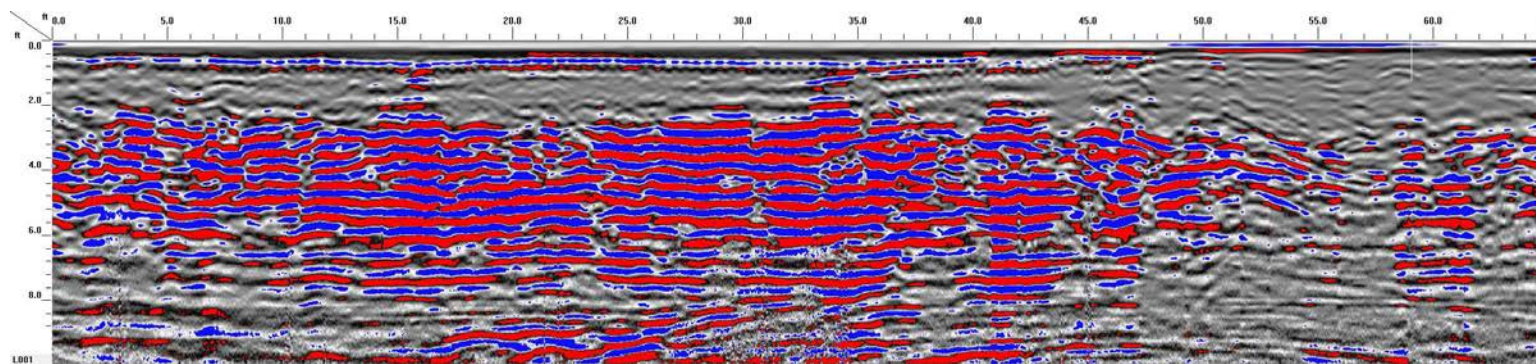
GPR TRANSECT 1



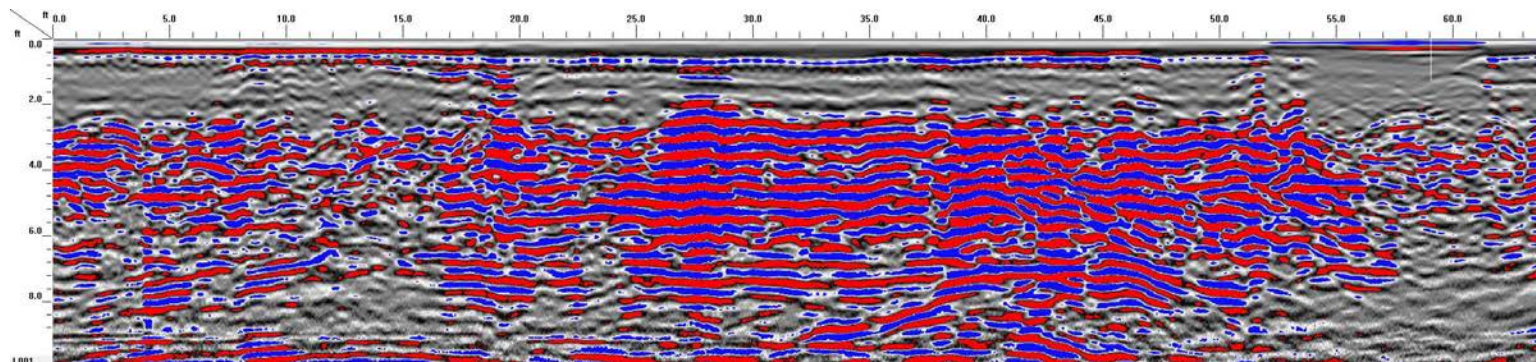
GPR TRANSECT 2



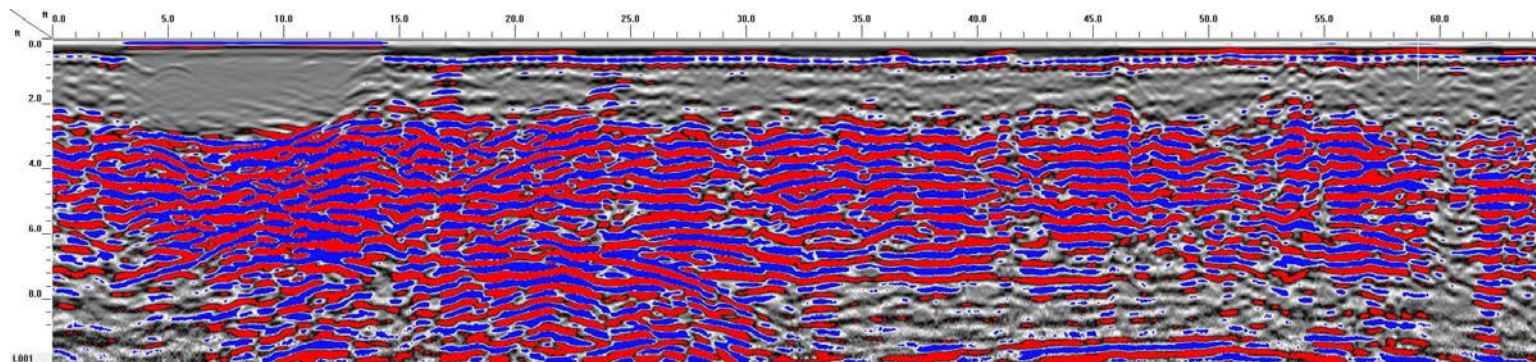
GPR TRANSECT 3



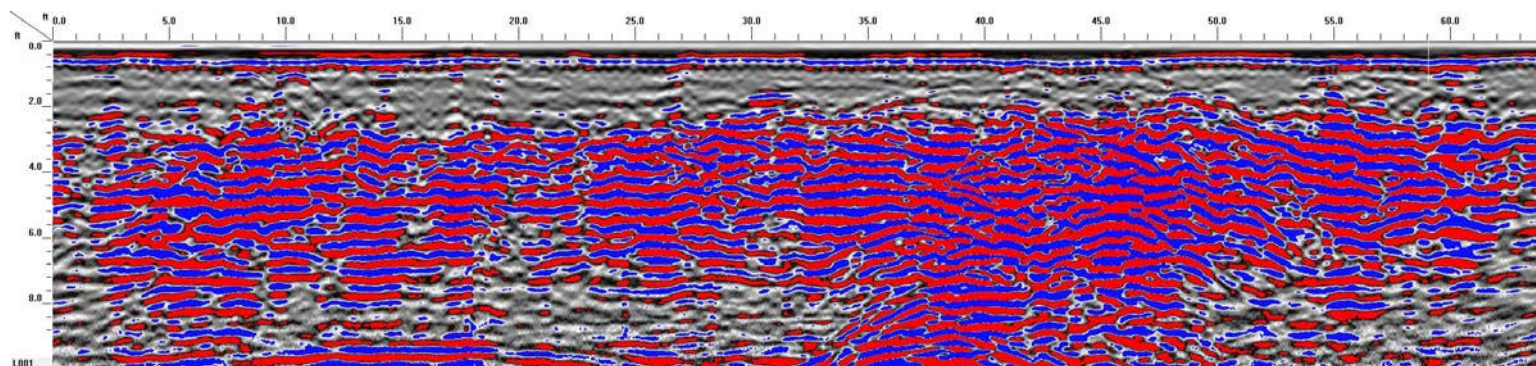
GPR TRANSECT 4



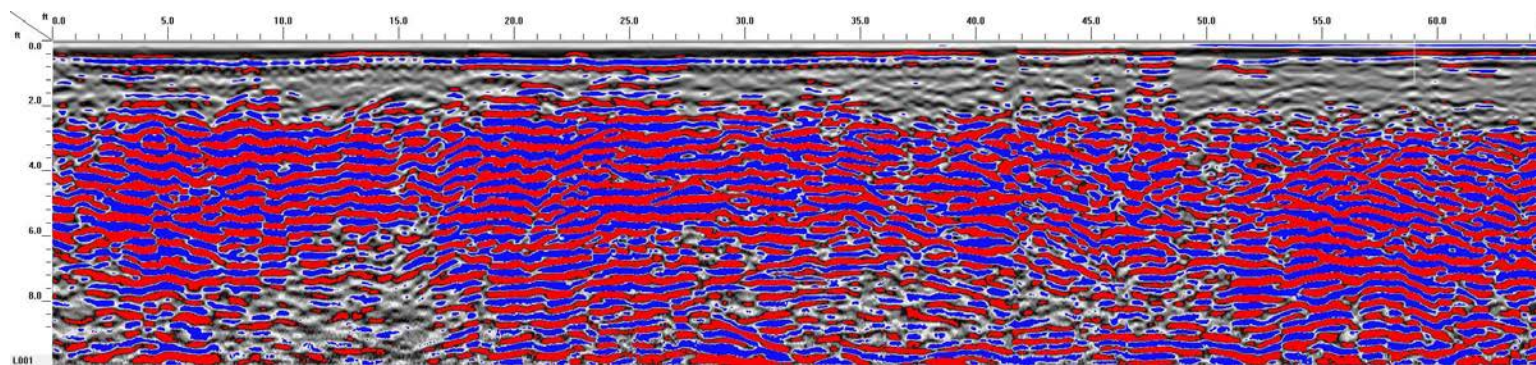
GPR TRANSECT 5



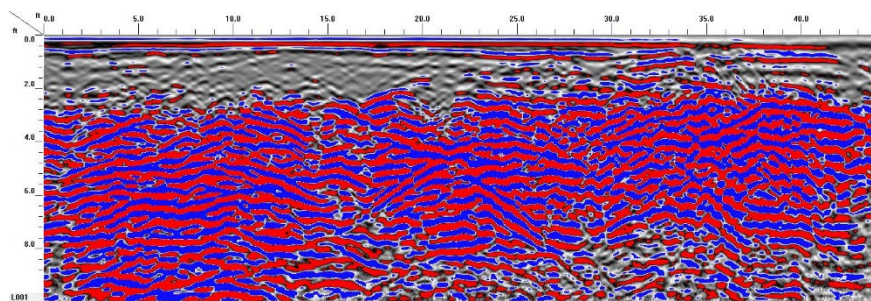
GPR TRANSECT 6



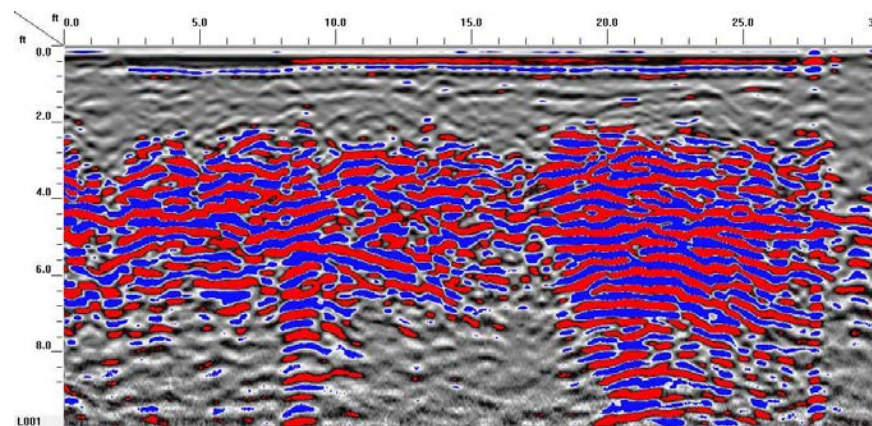
GPR TRANSECT 7



GPR TRANSECT 8



GPR TRANSECT 9



GPR TRANSECT 10

Appendix C
Soil Boring Logs

Client: NC DOT
 Project: ROW-704
 Address: Parcel 3 - 399 W. Main Street Sylva, North Carolina

BORING LOG
 Boring No. SB-3-1
 Page: 1 of 1

Drilling Start Date: 10/11/22
 Drilling End Date: 10/11/22
 Drilling Company: GEX
 Drilling Method: Direct Push
 Drilling Equipment: GeoProbe 7822 DT
 Driller: David Hall
 Logged By: ABM

Boring Depth (ft): 13.0
 Boring Diameter (in): 2.25
 Sampling Method(s): Direct Push, Grab
 DTW During Drilling (ft): 12.0
 DTW After Drilling (ft):
 Ground Surface Elev. (ft):
 Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0				GR			5.00	(0') Fill: Gravel (0.25') Well-graded SAND (SW); mostly fine to coarse grained sand, trace silt, loose, moist, medium brown	8.1	SB-3-1	0
								(4') SILT (ML); some fine to coarse sand, soft, moist, medium brown with orange with slight dark brown, stiff by 6'	2.6		
				DP			5.00		4.8		
									6.1		
									90.5		
				DP			3.00	(10') As Above	396.3		10
								(11') BEDROCK: Quartz rock - mechanically broken in 11' - 11.5' intervals; natural breaks at 11.5' - 12'; wet at 12'			
								(12') BEDROCK: wet; friable in hand; black; dark brown; red-brown; saprolitic - heavily weathered foliated rock remains; strong petroleum odor	792.8		
								(13') Boring terminated			
15											15

NOTES: Hole precleared to 5' by GEX using hand auger. Refusal at 13'.

Client: NC DOT
 Project: ROW-704
 Address: Parcel 3 - 399 W. Main Street Sylva, North Carolina

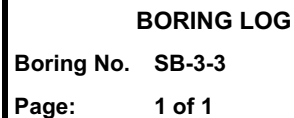
BORING LOG
 Boring No. SB-3-2
 Page: 1 of 1

Drilling Start Date: 10/11/22
 Drilling End Date: 10/11/22
 Drilling Company: GEX
 Drilling Method: Direct Push
 Drilling Equipment: GeoProbe 7822 DT
 Driller: David Hall
 Logged By: ABM

Boring Depth (ft): 15.0
 Boring Diameter (in): 2.25
 Sampling Method(s): Direct Push, Grab
 DTW During Drilling (ft): 12.0
 DTW After Drilling (ft):
 Ground Surface Elev. (ft):
 Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0				GR			5.00	(0') Concrete: reinforced with rebar (0.5') Well-graded SAND (SW); mostly fine to coarse grained sand, little silt, loose, moist, dark brown (2') SILT (ML); some fine to coarse sand, little clay, soft, moist, red-brown	5.9		0
				DP			5.00			SB-3-2	
5				DP			5.00				
10								(12') Well-graded SAND (SW); mostly fine to coarse grained sand, medium dense, wet, medium brown with white and yellow, with rock fragments (quartz) (14') Well-graded SAND (SW); mostly fine to coarse grained sand, trace silt, medium dense, moist, white and gray marbling; saprolitic (15') Boring terminated	1,524		10
15									39.5		15
20											20

NOTES: Hole precleared to 5' by GEX using hand auger.



Boring Depth (ft):	9.5
Boring Diameter (in):	2.25
Sampling Method(s):	Direct Push, Grab
DTW During Drilling (ft):	
DTW After Drilling (ft):	
Ground Surface Elev. (ft):	
Location (X,Y):	

NOTES: Hole precleared to 5' by GEX using hand auger. Refusal at 9.5' due to large quartz rock.

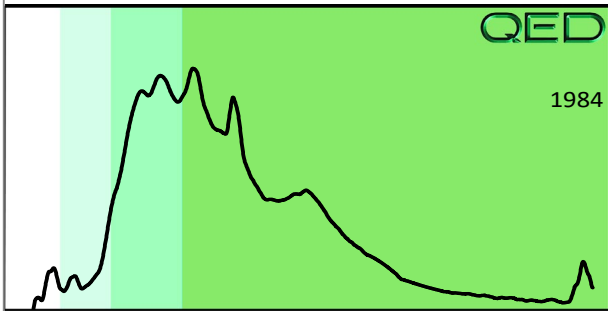
Appendix D

Laboratory Analytical Report

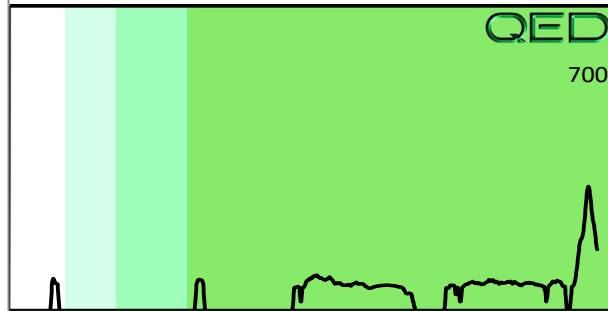


(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

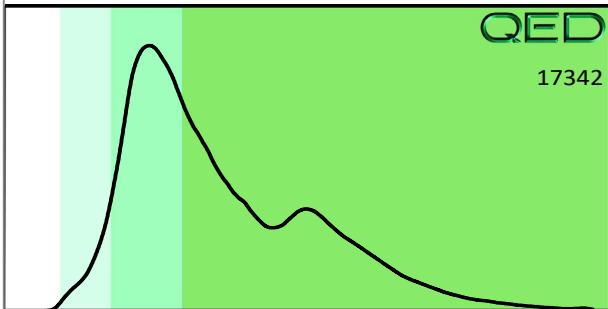
SB-3-1 0-2) : Pyrogenic HC 92.6%,(FCM),(P)



SB-3-2 (2-4) : PHC not detected,(BO)



SB-3-3 (0-2) : Road Tar 91.7%,(FCM)



Client Name:		DOT						RED Lab, LLC 105 Portwatch Way Suite F Wilmington, NC 28412 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.		
Address:		2923 S. Tryon St. Ste 100 Charlotte, NC 28203								
Contact:		Dave Graham								
Project Ref.:		ROW-704								
Email:		dgraham@hart-hickman.com								
Phone #:		704-887-4630								
Collected by:		Adam Michalek								
CHAIN OF CUSTODY AND ANALYTICAL REQUEST FORM										
Sample Collection		TAT Requested		Analysis Type		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
Date/Time	24 Hour	48 Hour	UVF	GC						
10/11/22 1630		X	X		AM	SB-3-1 0-2	55.6	43.8	11.8	
10/11/22 1700		↓	↓		↓	SB-3-2 (2-4)	56.2	44.0	12.2	
10/11/22 1730		↓	↓		↓	SB-3-3 (0-2)	52.7	39.9	12.8	
COMMENTS/REQUESTS: Report to MDLs & "f" flags						TARGET GC/UVF ANALYTES:				
Relinquished by				Accepted by		Date/Time		RED Lab USE ONLY Ref. No 18 10-0000		
Adam Michalek				Fed Ex		10/13/22 1100				
Relinquished by				Accepted by		Date/Time				
				11/11 10/14/22		1050				