

GEOENVIRONMENTAL PHASE II INVESTIGATION
PARCEL 004 – JIMMY & DEBBIE KNIGHT
301 MAIN STREET
WALNUT COVE, STOKES COUNTY, NORTH CAROLINA
STATE PROJECT: R-5768
WBS ELEMENT: 44670.1.1
APRIL 30, 2019

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5/7/2019



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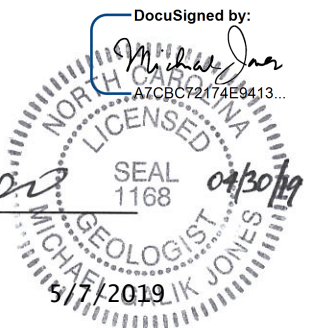


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Acronyms

BLS	Below Land Surface
BTEX	Benzene, Toluene, Ethylbenzene, & Xylenes
CADD	.....	Computer Aided Design and Drafting
COC	.....	Chain of Custody
CSA	.....	Comprehensive Site Assessment
DEQ	.....	Department of Environmental Quality
DRO	.....	Diesel Range Organics
DWM	.....	Division of Waste Management
EM	.....	Electromagnetic (as with EM-61)
EPA	.....	Environmental Protection Agency
GRO	.....	Gasoline Range Organics
GCLs	.....	Gross Contaminant Levels
GPR	.....	Ground Penetrating Radar
HASP	.....	Health & Safety Plan
MSCC	.....	Maximum Soil Contaminant Concentration
MTBE	.....	Methyl Tertiary Butyl Ether
µg/L	.....	Micrograms per Liter
mg/kg	.....	Milligram per kilogram
NPDES	.....	National Pollutions Discharge Elimination System
NCAC	.....	North Carolina Administrative Code
NCDOT	.....	North Carolina Department of Transportation
OSHA	.....	Occupational Safety and Health Administration
OVA	.....	Organic Vapor Analyzer
PPM	.....	Parts Per Million
PID	.....	Photo-ionization Detector
PSA	.....	Preliminary Site Assessment
PVC	.....	Poly-vinyl Chloride
RFP	.....	Request for Proposal
ROW	.....	Right of Way
SVOCs	.....	Semi-Volatile Organic Compounds
TW	.....	Temporary Well
TPH	.....	Total Petroleum Hydrocarbons
UVF	.....	Ultraviolet Fluorescence (UVF) QED Analyzer
UST	.....	Underground Storage Tank
US EPA	.....	United States Environmental Protection Agency
VOCs	.....	Volatile Organic Compounds

**GEOENVIRONMENTAL PHASE II INVESTIGATION
PARCEL 004 – JIMMY & DEBBIE KNIGHT
301 MAIN STREET
WALNUT COVE, STOKES COUNTY, NORTH CAROLINA**

EXECUTIVE SUMMARY OF RESULTS

Pyramid Environmental & Engineering P.C. (Pyramid) has prepared this GeoEnvironmental Phase II Investigation (Phase II) report documenting background information, field activities, assessment activities, findings, conclusions, and recommendations for Parcel 004, owned by Jimmy & Debbie Knight. The property currently contains a vacant building surrounded by asphalt grass, and dirt surfaces at 301 Main Street, Walnut Cove, NC. This Phase II was conducted on behalf of the North Carolina Department of Transportation (NCDOT) in accordance with Pyramid's February 22, 2019, technical proposal. This Phase II is a part of State Project R-5768.

The purpose of this assessment was to determine the presence or absence of underground storage tanks (USTs) and impacted soils between the existing edge of pavement and the proposed Right-Of-Way (ROW) and/or easements, whichever distance was greater. The Phase II was conducted with particular attention to the areas to be cut as indicated by slope stake lines and cross-sections or to be excavated for the installation of drainage features.

The following statements summarize the results of the Phase II:

- **Site History:** Pyramid interviewed DEQ personnel, interviewed property owners, and reviewed aerial photographs to assess past uses of the property. Pyramid reviewed aerial photographs from 1993 – 2018 obtained from Google Earth. Historical information reviewed as part of the Phase II indicated that the property appears to have remained in the same condition with its current building since at least 1993. The 1993 and 2018 aerial photographs are included in **Appendix A**.

On March 29, 2019, Pyramid emailed the Stokes County parcel address to Ms. Linda Estikowski at the NC Department of Environmental Quality (NC DEQ), with a request to investigate any environmental incidents associated with the parcel. Ms. Estikowski responded to the email and indicated that there were not any environmental incidents associated with the property.

Discussions with the NCDOT Project Manager Craig Haden indicated that a portion of the site may have been used as a waste disposal/dumping area in the past. As part of this Phase II, Pyramid was directed to investigate possible buried debris during the geophysical investigation. Additionally, during an interview he property

owner indicated that concrete and asphalt debris had been disposed of at the property in the past.

Pyramid Staff Professional Tim Leatherman performed a site investigation at the property. Mr. Leatherman did not observe any significant environmental risks on the property at the time of the investigation. No vent pipes were observed that could indicate the presence of USTs.

- **Geophysical Survey:** The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of twelve EM anomalies were identified. The majority of the EM metal detection anomalies were directly attributed to visible cultural features at the ground surface. The EM61 metal detection survey located zones of metallic debris either at the ground surface or buried in the shallow subsurface. This was confirmed using GPR and the in-phase component of the EM31, which is sensitive to metal on or just below the surface.

The EM61 and subsequent GPR surveys identified a no confidence anomaly in the west portion of the site that was approximately 8 feet long by 6 feet wide. The orientation of the GPR reflectors and the location of the anomaly suggest that this may potentially be a metallic drum or metallic object of similar size.

The EM61 and GPR also identified a suspected septic tank off the northwest corner of the building. The suspected septic tank was approximately 10 feet long by 6 feet wide. There was a sewer pipe entering the ground above the suspected septic tank.

Collectively, the UST geophysical data recorded evidence of a suspected septic tank and a no confidence anomaly within the survey area at Parcel 4. No evidence of any additional unknown USTs was observed.

The EM31 ground conductivity survey identified a high conductivity zone just north of the building on the property. This high conductivity zone may be indicative of other waste buried at the site. The buried waste investigation also identified multiple zones of either surficial or shallow buried metallic debris across the site.

- **Limited Soil Assessment:** A total of nine soil borings were performed across the property. Soil samples were screened in the field using a Photo-Ionization Detector (PID) and select soil samples were analyzed for Diesel Range Organics (DRO) and Gasoline Range Organics (GRO) using a QED Analyzer. The DEQ action level for TPH-GRO is 50 milligrams per kilogram (mg/kg) and the action level for TPH-DRO is 100 mg/kg. Soil samples were screened with a PID and select soil samples were analyzed for DRO and GRO using a QED Analyzer.

None of the soil samples analyzed exhibited DRO or GRO concentrations above DEQ action levels.

- **Limited Groundwater Assessment:** The water table was not encountered in the upper 10 feet of the soil column that was sampled during this Phase II. Review of the NCDOT engineering plans for this parcel indicate that groundwater will not be encountered during construction activities. Therefore, it was not necessary to collect a groundwater sample.
- **Contaminated Soil Volumes:** None of the soil samples analyzed exhibited DRO or GRO concentrations above DEQ action levels.

It should be noted that, if additional impacted soil is encountered during road construction outside of the area analyzed by this investigation, the impacted soil should be managed according to NC DEQ Division of Waste Management (DWM) guidelines and disposed of at a permitted facility.

- **Buried Waste and Metallic Debris:** Pyramid identified scattered surface metal debris and possible very shallow buried metallic debris across the site, as well as a zone of possible buried non-metallic waste. The NCDOT should be aware that they will encounter the metallic debris during construction, and may encounter non-metallic waste. Precautions and/or additional planning may be necessary to properly dispose of this debris/waste. There is no indication that the zone of possible buried non-metallic waste is environmentally hazardous.

1.0 INTRODUCTION

Pyramid Environmental & Engineering P.C. (Pyramid) has prepared this GeoEnvironmental Phase II Investigation (Phase II) report documenting background information, field activities, assessment activities, findings, conclusions, and recommendations for Parcel 004, owned by Jimmy & Debbie Knight. The property currently contains a vacant building surrounded by asphalt grass, and dirt surfaces at 301 Main Street, Walnut Cove, NC. This Phase II was conducted on behalf of the North Carolina Department of Transportation (NCDOT) in accordance with Pyramid's February 22, 2019, technical proposal. This Phase II is a part of State Project R-5768.

The purpose of this assessment was to determine the presence or absence of underground storage tanks (USTs), possible buried waste/debris, and impacted soils across the entire property due to its designation as a total take. The Phase II was conducted with particular attention to the areas to be cut as indicated by slope stake lines and cross-sections or to be excavated for the installation of drainage features. The location of the subject site is shown on **Figure 1**.

1.1 Background Information

Based on the NCDOT's February 22, 2019, *Request for Technical and Cost Proposal (RFP)*, the Phase II was conducted across all accessible portions of the property due to its designation as a total take, with emphasis on the areas to be cut as indicated by slope stake lines and cross-sections or to be excavated for the installation of drainage features and/or other utilities, in accordance with the CADD files provided to Pyramid by the NCDOT. The Phase II included the following:

- Research the properties for past uses and possible releases.
- Conduct a preliminary geophysical site assessment and limited soil assessment across the entire parcel with emphasis on the areas to be cut as indicated by slope stake lines and cross-sections or to be excavated for the installation of drainage features and/or other utilities.
- Include in the geophysical investigation both a survey for possible USTs and a survey to investigate for buried waste/debris.
- If groundwater is likely to be encountered by subsequent excavation required by construction, then Pyramid will attempt to obtain a groundwater sample from the parcel.

1.2 Project Information

Prior to field activities, a Health and Safety Plan was prepared. Prior to drilling activities, the public underground utilities were located and marked by the North Carolina One-Call Service. Pyramid's geophysical staff provided additional private utility locating services to mark the on-site private, buried utilities.

2.0 SITE HISTORY

The NCDOT GeoEnvironmental Planning Report for Parcel 004 in the RFP documents provided to Pyramid on February 18, 2019, provided the following background information related to the site:

“This facility currently is unoccupied and appears abandoned. The site is listed in the reviewed public records in the historical auto database, for records as an automotive supply and parts facility listed to, Grindstaff Joe, between 1992 to 1999. The site inspection of September 28, 2017, showed that the property contains a single structure that has been abandoned and is in a state of disuse. The remainder of the property is covered in grass or gravel, with a single tree adjacent to the building. The vegetation is sparse and stressed, but no visible signs of areas of affected growth is present. No ASTs or surface signs of USTs are present.”

Pyramid interviewed DEQ personnel, interviewed property owners, and reviewed aerial photographs to assess past uses of the property. Pyramid reviewed aerial photographs from 1993 – 2018 obtained from Google Earth. Historical information reviewed as part of the Phase II indicated that the property appears to have remained in the same condition with its current building since at least 1993. The 1993 and 2018 aerial photographs are included in **Appendix A**.

On March 29, 2019, Pyramid emailed the Stokes County parcel address to Ms. Linda Estikowski at the NC Department of Environmental Quality (NC DEQ), with a request to investigate any environmental incidents associated with the parcel. Ms. Estikowski responded to the email and indicated that there were not any environmental incidents associated with the property.

Discussions with the NCDOT Project Manager Craig Haden indicated that a portion of the site may have been used as a waste disposal/dumping area in the past. As part of this Phase II, Pyramid was directed to investigate possible buried debris during the geophysical investigation. Additionally, during an interview the property owner indicated that concrete and asphalt debris had been disposed of at the property in the past.

Pyramid Staff Professional Tim Leatherman performed a site investigation at the property. Mr. Leatherman did not observe any significant environmental risks on the property at the time of the investigation. No vent pipes were observed that could indicate the presence of USTs.

3.0 GEOPHYSICAL INVESTIGATION

Pyramid’s classifications of USTs for the purposes of this Phase II report are based directly on the geophysical UST ratings provided to us 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.

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of twelve EM anomalies were identified. The majority of the EM metal detection anomalies were directly attributed to visible cultural features at the ground surface. The EM61 metal detection survey located zones of metallic debris either at the ground surface or buried in the shallow subsurface. This was confirmed using GPR and the in-phase component of the EM31, which is sensitive to metal on or just below the surface.

The EM61 and subsequent GPR surveys identified a no confidence anomaly in the west portion of the site that was approximately 8 feet long by 6 feet wide. The orientation of the GPR reflectors and the location of the anomaly suggest that this may potentially be a metallic drum or metallic object of similar size.

The EM61 and GPR also identified a suspected septic tank off the northwest corner of the building. The suspected septic tank was approximately 10 feet long by 6 feet wide. There was a sewer pipe entering the ground above the suspected septic tank.

Collectively, the UST geophysical data recorded evidence of a suspected septic tank and a no confidence anomaly within the survey area at Parcel 4. No evidence of any additional unknown USTs was observed.

The EM31 ground conductivity survey identified a high conductivity zone just north of the building on the property. This high conductivity zone may be indicative of other waste buried at the site. The buried waste investigation also identified multiple zones of either surficial or shallow buried metallic debris across the site.

The full details of the geophysical investigation are documented in Pyramid’s Geophysical Investigation Report, dated April 3, 2019, which is included as **Appendix B**.

4.0 SOIL SAMPLING ACTIVITIES & RESULTS

4.1 Soil Assessment Field Activities

On April 24, 2019, Pyramid mobilized to the site, drilled soil borings and collected the proposed soil samples for the Phase II. Nine (9) soil borings (4-1 through 4-9) were advanced on the subject property. The soil borings were completed using a truck-mounted Geoprobe drill rig. The selected locations were chosen to avoid public utilities along the adjacent roads and private utilities associated with the business while remaining in the proposed ROW and/or easement, or within other areas of concern such as proposed drainage features and areas designated for soil removal as indicated by the NCDOT engineering plans. The locations of the borings are shown on **Figure 2**.

Soil samples were continuously collected in four-foot long disposable sleeves from each boring for geologic description and visual examination for signs of contamination. Soil recovered from each sleeve was screened in the field using a Photo-Ionization Detector (PID) approximately every 2 feet, depending on the soil recovery. In general, the soil sample with the highest PID reading was selected from each boring for QED Ultra-Violet Fluorescence (UVF) laboratory analysis. If field screening detected multiple elevated readings, then additional soil samples from each boring were selectively chosen for UVF analysis. The soil boring logs with the soil descriptions, visual examination, and PID screening results are included in **Appendix C**. The PID field screening results are summarized in **Table 1**. To prevent cross-contamination, new disposable nitrile gloves were worn by the sampling technician during the sampling activities and were changed between samples. Petroleum odor was detected in boring 7B-4 from 2-10 feet below the ground surface during the field screening.

The soil samples selected for total petroleum hydrocarbon (TPH) analyses were analyzed utilizing the QED UVF HC-1 Analyzer system from RED Lab. The DEQ & NCDOT now accept this instrument as an analytical method to provide total petroleum hydrocarbon (TPH) results for soil analysis for Phase II projects. Pyramid preserved the samples for UVF analysis in methanol-filled containers provided by RED Lab. The samples were shipped to RED Lab for analysis following the soil collection. The soil samples selected for analysis using the QED Analyzer were analyzed for TPH as diesel range organics (DRO) and TPH as gasoline range organics (GRO).

4.2 Soil Sample Analytical Results

QED Results

The DEQ action level for TPH-GRO is 50 milligrams per kilogram (mg/kg) and the action level for TPH-DRO is 100 mg/kg. Soil samples were screened with an PID and select soil samples were analyzed for DRO and GRO using a QED Analyzer. None of the soil samples analyzed exhibited DRO or GRO concentrations above DEQ action levels. The soil sample QED results are summarized in **Table 2**. A copy of the QED analysis report is included in **Appendix D**.

4.3 Temporary Monitoring Well Installation

The water table was not encountered in the upper 10 feet of the soil column that was sampled during this Phase II. Review of the NCDOT engineering plans for this parcel indicate that groundwater will not be encountered during construction activities. Therefore, it was not necessary to collect a groundwater sample.

5.0 CONCLUSIONS AND RECOMMENDATIONS

As requested by the NCDOT, Pyramid has completed a Phase II at Parcel 004 (Jimmy & Debbie Knight) located at 301 Main St., Walnut Cove, NC. The following is a summary of the assessment activities and results.

5.1 Geophysical Investigation

The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of twelve EM anomalies were identified. The majority of the EM metal detection anomalies were directly attributed to visible cultural features at the ground surface. The EM61 metal detection survey located zones of metallic debris either at the ground surface or buried in the shallow subsurface. This was confirmed using GPR and the in-phase component of the EM31, which is sensitive to metal on or just below the surface.

The EM61 and subsequent GPR surveys identified a no confidence anomaly in the west portion of the site that was approximately 8 feet long by 6 feet wide. The orientation of the GPR reflectors and the location of the anomaly suggest that this may potentially be a metallic drum or metallic object of similar size.

The EM61 and GPR also identified a suspected septic tank off the northwest corner of the building. The suspected septic tank was approximately 10 feet long by 6 feet wide. There was a sewer pipe entering the ground above the suspected septic tank.

Collectively, the UST geophysical data recorded evidence of a suspected septic tank and a no confidence anomaly within the survey area at Parcel 4. No evidence of any additional unknown USTs was observed.

The EM31 ground conductivity survey identified a high conductivity zone just north of the building on the property. This high conductivity zone may be indicative of other waste buried at the site. The buried waste investigation also identified multiple zones of either surficial or shallow buried metallic debris across the site.

5.2 Limited Soil Assessment

The DEQ action level for TPH-GRO is 50 milligrams per kilogram (mg/kg) and the action level for TPH-DRO is 100 mg/kg. Soil samples were screened with an PID and select soil samples were analyzed for DRO and GRO using a QED Analyzer. None of the soil samples analyzed exhibited DRO or GRO concentrations above DEQ action levels.

5.3 Limited Groundwater Assessment

The water table was not encountered in the upper 10 feet of the soil column that was sampled during this Phase II. Review of the NCDOT engineering plans for this parcel

indicate that groundwater will not be encountered during construction activities. Therefore, it was not necessary to collect a groundwater sample.

5.4 Recommendations

Petroleum-Impacted Soils

No evidence of petroleum-impacted soils (DRO/GRO > DEQ Action Levels) was observed during this investigation. Therefore, no recommendations for the treatment, handling, or disposal of such materials are warranted.

It should be noted that, if deeper soils are deemed unsuitable or if impacted soil is encountered during road construction outside of the area analyzed by this investigation, the impacted soil should be managed according to NC DEQ Division of Waste Management (DWM) guidelines and disposed of at a permitted facility.

Buried Waste and Metallic Debris

Pyramid identified scattered surface metal debris and possible very shallow buried metallic debris across the site, as well as a zone of possible buried non-metallic waste. The NCDOT should be aware that they will encounter the metallic debris during construction, and may encounter non-metallic waste. Precautions and/or additional planning may be necessary to properly dispose of this debris/waste. There is no indication that the zone of possible buried non-metallic waste is environmentally hazardous.

6.0 LIMITATIONS

The results of this preliminary investigation are limited to the boring locations completed during this limited assessment and presented in this report. The laboratory results only reflect the current conditions at the locations sampled on the date this Phase II was performed.

7.0 CLOSURE

This report was prepared for, and is available solely for use by, the NCDOT and their designees. The contents thereof may not be used or relied upon by any other person without the express written consent and authorization of Pyramid Environmental & Engineering, P.C. (Pyramid). The observations, conclusions, and recommendations documented in this report are based on site conditions and information reviewed at the time of Pyramid's investigation. Pyramid appreciates the opportunity to provide this environmental service.

FIGURES

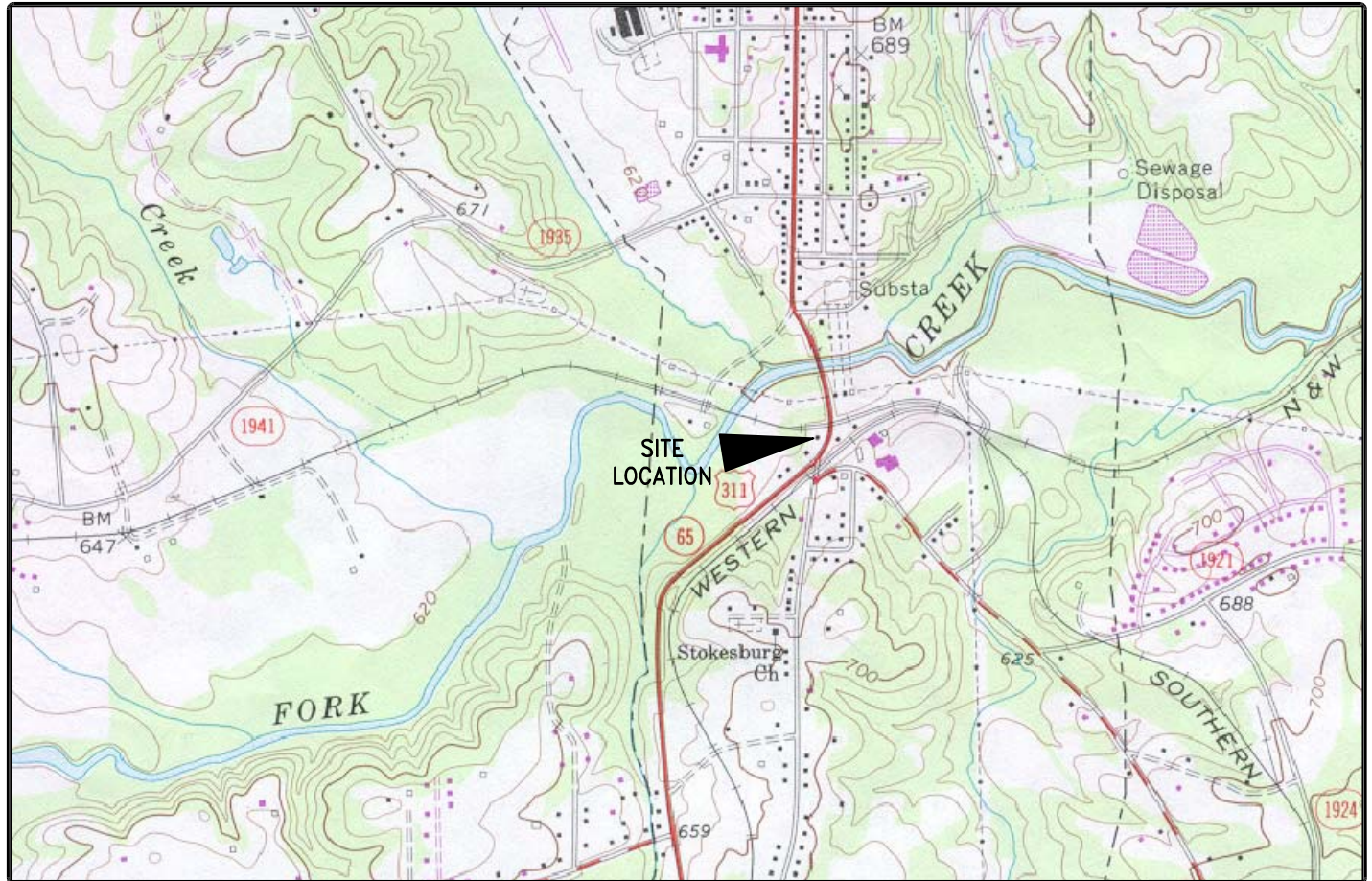
USGS TOPOGRAPHIC MAP

SITE:

301 S. MAIN STREET

LOCATION:

WALNUT COVE, NORTH CAROLINA



USGS IDENTIFICATION

SCALES

USGS 7.5
MINUTE MAP

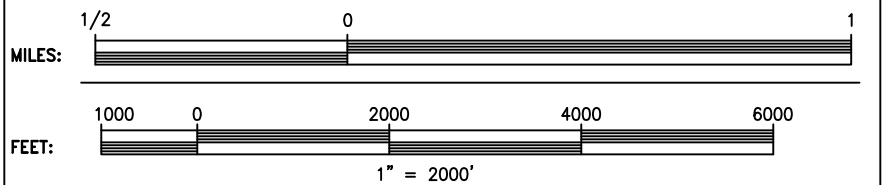
WALNUT COVE, N.C.

ORIGINAL DATE:

1971

PHOTOREVISION
DATE:

1986



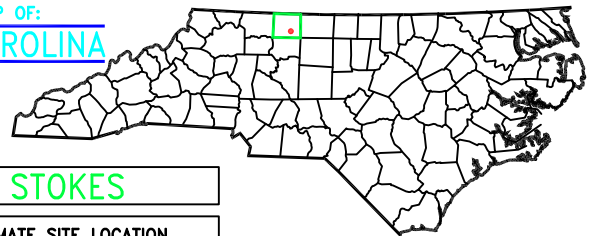
	PRIMARY HIGHWAY, HARD SURFACE
	SECONDARY HIGHWAY, HARD SURFACE
	LIGHT-DUTY ROAD HARD OR IMPROVED SURFACE
	UNIMPROVED ROAD
	STATE ROAD
	U.S. ROUTE
	INTERSTATE ROUTE

NOTES: ► TOPOGRAPHICAL CONTOUR INTERVAL = 20 FEET
► PHOTOREVISIONS DENOTED IN PURPLE

MAGNETIC
NORTH

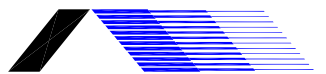


COUNTY MAP OF:
NORTH CAROLINA



COUNTY: STOKES

APPROXIMATE SITE LOCATION



PYRAMID
ENVIRONMENTAL & ENGINEERING, P.C.

CLIENT: NCDOT PROJECT R-5768

PROPERTY NAME: 301 S. MAIN ST., PARCEL 4

CITY: WALNUT COVE

STATE: NORTH CAROLINA

TITLE: TOPOGRAPHIC MAP

SCALE:
1" = 2000'

DATE:
4/4/19

DRAWING NAME:
USGSTOPO

DRAWN BY: KAM

CHECK BY: EC

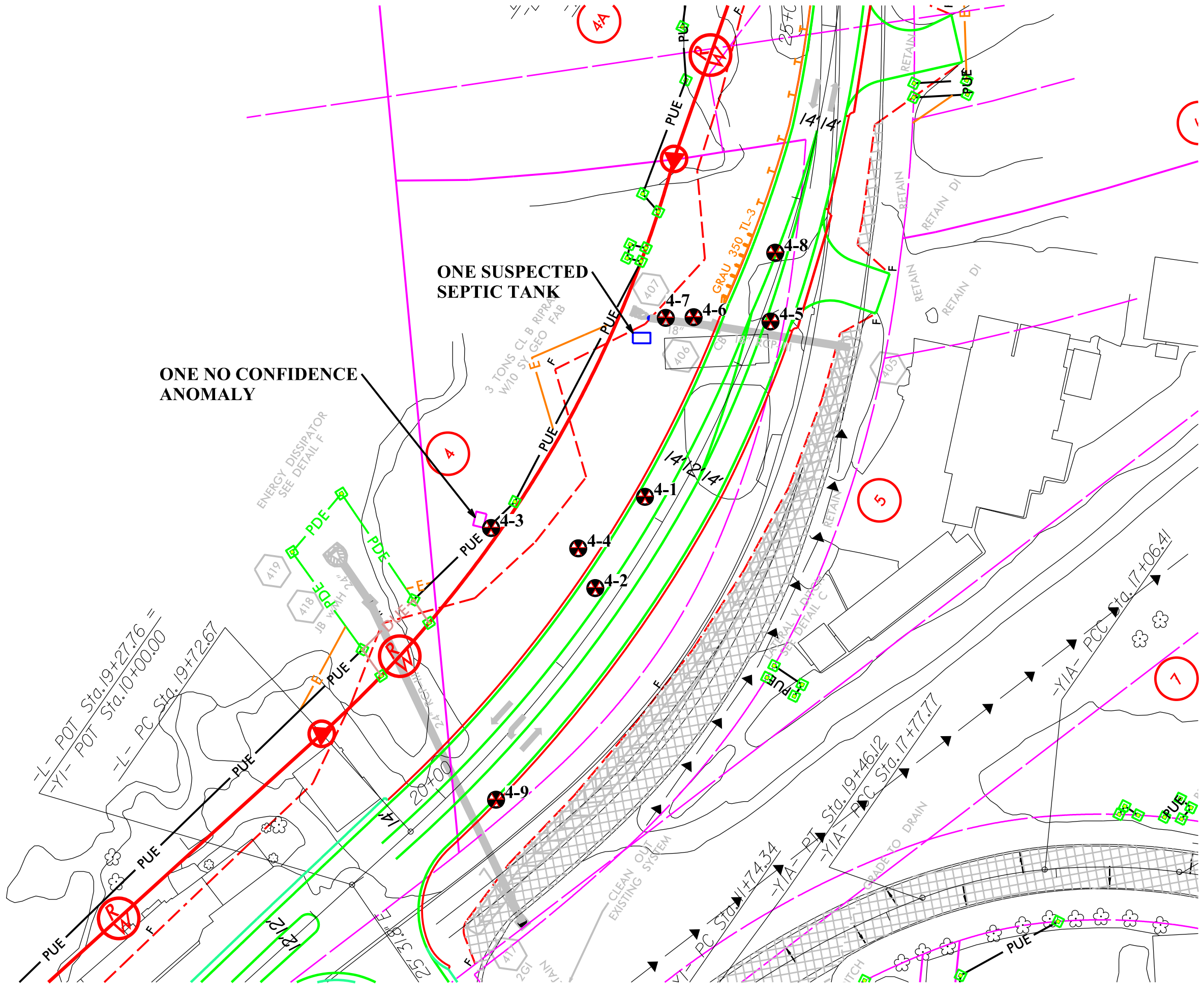
JOB NO.: 2019-074
TYPE: PSA

FIGURE NUMBER:
1

NOTES

TOPOGRAPHIC MAP USED IN THIS GRAPHIC IS MAPPED, EDITED, AND PUBLISHED BY THE UNITED STATES GEOLOGIC SURVEY, DEPARTMENT OF THE INTERIOR, RESTON VIRGINIA.

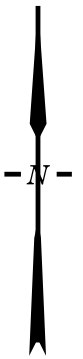
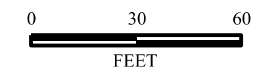
THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS.



LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PROPOSED PERMANENT UTILITY EASEMENT
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- SUSPECTED SEPTIC TANK
- NO CONFIDENCE ANOMALY
- 4-1 SOIL SAMPLING LOCATION*

*ANALYTICAL DATA PRESENTED IN TABLE 2 OF PHASE II REPORT



TITLE	SOIL BORING LOCATIONS		
PROJECT	PARCEL 4 WALNUT COVE, NORTH CAROLINA NCDOT PROJECT R-5768		
	503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 PYRAMID GEOPHYSICS 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology		
DATE: 04-24-2019	REVISION NO. 0		
PYRAMID PROJECT NO. 2019-074	FIGURE NO. 2		

TABLES

TABLE 1
Summary of Soil Field Screening Results
 NCDOT Project R-5768
 Parcel 004 - Stokes County PSAs
 Jimmy & Debbie Knight - 301 S. Main Street
 Walnut Cove, Stokes County, North Carolina

SOIL BORING 4/24/2019	SAMPLE ID	DEPTH (feet bgs)	PID READINGS (PPM)
4-1	4-1-0-2	0 to 2	1.3
	4-1-2-4	2 to 4	3.0
	4-1-4-5	4 to 5	4.9
4-2	4-2-0-2	0 to 2	2.7
	4-2-2-4	2 to 4	1.5
	4-2-4-6	4 to 6	4.4
	4-2-6-8	6 to 8	4.9
	4-2-8-10	8 to 10	2.5
4-3	4-3-0-2	0 to 2	1.4
	4-3-2-4	2 to 4	1.2
	4-3-4-5.5	4 to 5.5	1.0
4-4	4-4-0-2	0 to 2	1.6
	4-4-2-4	2 to 4	1.7
	4-4-4-6	4 to 6	0.6
	4-4-6-8	6 to 8	1.6
	4-4-8-10	8 to 10	1.1
4-5	4-5-0-2	0 to 2	1.2
	4-5-2-4	2 to 4	1.5
	4-5-4-6	4 to 6	1.0
	4-5-6-8	6 to 8	1.1
	4-5-8-10	8 to 10	1.2
4-6	4-6-0-2	0 to 2	No Recovery
	4-6-2-4	2 to 4	2.6
	4-6-4-6	4 to 6	1.8
	4-6-6-7	6 to 7	2.3
4-7	4-7-0-2	0 to 2	2.5
	4-7-2-4	2 to 4	0.6
	4-7-4-6	4 to 6	2.6
	4-7-6-8	6 to 8	1.2
	4-7-8-10	8 to 10	2.4
4-8	4-8-0-2	0 to 2	1.7
	4-8-2-4	2 to 4	2.1
	4-8-4-6	4 to 6	1.8
	4-8-6-7	6 to 7	1.5
4-9	4-9-0-1	0 to 1	1.9
	4-9-1-2	1 to 2	1.4

bgs= below ground surface

PID= photo-ionization detector

PPM= parts-per-million

☐ = sampled for lab analysis &/or QROS-QED analysis

OVA= Organic Vapor Analyzer

TABLE 2
Summary of Soil Sample QED Analytical Results for GRO/DRO
NCDOT State Project R-5768
Parcel 004 Jimmy & Debbie Knight - 301 S. Main Street
Walnut Cove, Stokes County, North Carolina

SAMPLE ID	DATE	DEPTH (feet)	PID (ppm)	QROS - QED Analysis		
				GRO (mg/kg) (C5-C10)	DRO (mg/kg) (C10-C35)	TPH (mg/kg) (C5-C35)
4-1-5	4/24/2019	4-5	39.0	<0.63	4.9	4.9
4-2-0-2	4/24/2019	0-2	0.3	<0.78	9.5	9.5
4-2-6-8	4/24/2019	6-8	1.2	<1.2	3.1	3.1
4-3-0-2	4/24/2019	0-2	0.7	<0.63	6.6	6.6
4-4-2-4	4/24/2019	2-4	55.7	<0.65	<0.65	<0.65
4-5-2-4	4/24/2019	2-4	1.2	<0.63	2.1	2.1
4-6-2-4	4/24/2019	2-4	0.6	<0.62	45.8	45.8
4-7-4-6	4/24/2019	4-6	0.6	<0.65	<0.65	<0.65
4-8-2-4	4/24/2019	2-4	0.9	<0.68	<0.68	<0.68
4-9-0-1	4/24/2019	0-1	1.1	<0.7	5.5	5.5
NC Initial Action Level - UST Section for 5035/5030-GRO; 3550-DRO				50	100	NA

PID= photo-ionization detector
PPM= parts-per-million

GRO= Gasoline Range Organics
DRO= Diesel Range Organics
mg/kg= milligrams-per-kilogram

TPH= Total Petroleum Hydrocarbons (GRO + DRO)

NA= Not Applicable

* Bold values indicate concentrations above initial action levels

APPENDIX A



Parcel 4

1993 Aerial

S Main St

N Main St

311

65



Parcel 4

2018 Aerial



APPENDIX B



PYRAMID GEOPHYSICAL SERVICES
(PROJECT 2019-074)


GEOPHYSICAL SURVEY


METALLIC UST INVESTIGATION: PARCEL 4 NCDOT PROJECT R-5768 (44670.1.1)

301 MAIN STREET, WALNUT COVE, NC

APRIL 24, 2019

Report prepared for: Craig Haden
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GEOPHYSICAL INVESTIGATION REPORT
Parcel 4 – 301 Main Street
Walnut Cove, Stokes County, North Carolina

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 Engineering Plans

Appendices

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LIST OF ACRONYMS

CADD	Computer Assisted Drafting and Design
DF	Dual Frequency
EM.....	Electromagnetic
GPR.....	Ground Penetrating Radar
GPS	Global Positioning System
NCDOT.....	North Carolina Department of Transportation
ROW	Right-of-Way
UST	Underground Storage Tank

EXECUTIVE SUMMARY

Project Description: Pyramid Environmental conducted a geophysical investigation for the North Carolina Department of Transportation (NCDOT) at Parcel 4, located at 301 Main Street, in Walnut Cove, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-5768). 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 April 2-4, 2019, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

Geophysical Results: The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. A total of twelve EM anomalies were identified. The majority of the EM metal detection anomalies were directly attributed to visible cultural features at the ground surface. The EM61 metal detection survey located zones of metallic debris either at the ground surface or buried in the shallow subsurface. This was confirmed using GPR and the in-phase component of the EM31, which is sensitive to metal on or just below the surface.

The EM61 and subsequent GPR surveys identified a no confidence anomaly in the west portion of the site that was approximately 8 feet long by 6 feet wide. The orientation of the GPR reflectors and the location of the anomaly suggest that this may potentially be a metallic drum or metallic object of similar size.

The EM61 and GPR also identified a suspected septic tank off the northwest corner of the building. The suspected septic tank was approximately 10 feet long by 6 feet wide. A sewer pipe was observed entering the ground above the suspected septic tank.

Collectively, the UST geophysical data recorded evidence of a suspected septic tank and a no confidence anomaly within the survey area at Parcel 4. No evidence of any additional unknown USTs was observed.

The EM31 ground conductivity survey identified a high conductivity zone just north of the building on the property. This high conductivity zone may be indicative of other waste buried at the site. The buried waste investigation also identified multiple zones of either surficial or shallow buried metallic debris across the site.

INTRODUCTION

Pyramid Environmental conducted a geophysical investigation for the North Carolina Department of Transportation (NCDOT) at Parcel 4, located at 301 Main Street, in Walnut Cove, NC. The survey was part of an NCDOT Right-of-Way (ROW) investigation (NCDOT Project R-5768). This property was understood to be a total take, and the survey was designed to include all accessible portions of the property. Conducted from April 2-4, 2019, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area. This property was also suspected of being a waste dumping site in the past and a secondary geophysical survey was conducted to investigate for buried waste on the site.

The site included a vacant building, surrounded by asphalt/gravel and grass/dirt surfaces. Discussions with the property owner indicated that the site had been used to store waste from a nearby concrete plant. There were large mounds of concrete and asphalt debris with visible metallic debris at or just below the surface. An aerial photograph showing the UST geophysical survey area boundaries and ground-level photographs are shown in **Figure 1** and the buried waste geophysical survey boundaries are shown in **Figure 2**. It should be noted that the limits of the buried waste survey area differ slightly from the UST geophysical survey area because the instrument used for the buried waste survey allows for slightly greater access in rough terrain than the UST geophysical instruments (methodology discussed below).

FIELD METHODOLOGY

The UST geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. Pyramid collected the EM metal detection 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 April 4, 2019, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Data were collected both in reconnaissance fashion as well as along formal transect lines across EM features. The GPR data were viewed in real-time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 6 feet, based on dielectric constants calculated by the DF unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the DF unit for post-processing and figure generation.

Pyramid also utilized electromagnetic and ground penetrating radar geophysical methods to investigate the potential buried waste at the subject property. Specifically, Pyramid utilized a Geonics EM31-MK1 (EM 31) ground conductivity meter which measures apparent ground conductivity (quadrature phase) and metal detection (in-phase) conditions down to a maximum depth of 18 feet below surface. The EM31 instrument was coupled to a Geode External GPS/GLONASS receiver to record the position of the EM data to sub-meter accuracy during the survey.

The EM31 method determines electrical properties of the earth materials by inducing electromagnetic currents in the ground and measuring the secondary magnetic field produced by these currents. An alternating current is generated in the transmitter coil located at one end of the instrument. The secondary magnetic field, which is produced by currents through the earth, induces a corresponding alternating current in the receiver coil located at the opposite end of the instrument.

After compensating for the primary field, which can be computed from the relative positions and orientations of both coils, the magnitude and relative phase of the secondary field are measured. These measurements are then converted to components of in-phase and 90 degrees out-of-phase (quadrature) with the transmitted field. The out-of-phase or quadrature component, using certain simple assumptions, is converted to a measure of apparent ground conductivity in millisiemens per meter (mS/m). The in-phase component responds to highly conductive areas (above 100 mS/m) or to areas containing metallic objects and debris and the values are expressed in terms of relative units or parts per thousand. Therefore, the in-phase data can be used to identify areas that may contain buried metallic material across areas recording lower conductivity values.

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 UST GEOPHYSICAL SURVEY RESULTS

Discussion of EM Results – UST Geophysical Survey

A contour plot of the EM61 results obtained across the survey area at the property is presented in **Figure 3**. Each EM anomaly is numbered for reference in the figure. The following table presents the list of EM anomalies and the cause of the metallic response, if known:

LIST OF METALLIC ANOMALIES IDENTIFIED BY EM SURVEY

Metallic Anomaly #	Cause of Anomaly	Investigated with GPR
1	No Confidence Anomaly	☑
2	Buried Metallic Debris	☑
3	Suspected Septic Tank	☑
4	Metal Sheet	
5	Guard Rail/Signs	
6	Drop Inlet	
7	Utility/Surface Debris	
8	Mailbox	
9	Utility	
10	Utility	
11	Buried Metallic Debris	☑

The majority of the EM anomalies identified using the EM61 were directly attributed to visible cultural features at the ground surface, including a metal sheet, a guard rail, signs, a drop inlet, surface debris, and utilities. The EM61 survey identified a number of medium to low amplitude features suspected to be associated with metallic debris at or just below the surface. These areas of suspected metallic debris are highlighted by the red dashed line in **Figure 3**. EM Anomalies 1-3 and 11 were all medium-sized, high-amplitude anomalies and were investigated with GPR to identify any potential USTs.

Discussion of GPR Results

Figure 4 presents the locations of the formal GPR transects performed at the property associated with the UST geophysical survey, as well as select transect images. All of the transect images can be found in **Appendix A**. A total of 8 formal GPR transects were

performed at the site. GPR Transects 1-2 and 5-6 were performed across EM Anomalies 11 and 2, respectively. These transects recorded isolated, high-amplitude hyperbolic reflectors and/or increases in signal penetration consistent with buried metallic debris.

GPR Transects 3 and 4 were performed across EM Anomaly 1. These transects both showed discreet high-amplitude lateral reflectors that are indicative of an isolated buried metal structure. The lack of a hyperbolic reflector would suggest that this feature is not a UST. As per the geophysical UST ratings provided by the NCDOT, this feature has been classified as a not confidence anomaly. The sloping lateral reflector in Transect 3 may indicate that this object is slightly tipped to one side, suggesting that this feature may potentially be a drum or other similarly sized metallic object. This anomaly measures approximately 8 feet long by 6 feet wide.

GPR Transects 7 and 8 were performed across EM Anomaly 3. These transects also both recorded discreet high-amplitude lateral reflectors. Given that this feature is located where a sewer pipe enters the ground, this has been classified as a suspected septic tank. GPR Transect 7, unlike the previously discussed Transect 3, was collected on a decline. The sloping lateral reflector seen in Transect 7 would indicate that this object is lying flat. The locations and dimensions of the no confidence anomaly and the suspected septic tank are presented in **Figure 5**, along with ground-level photographs.

Collectively, the UST survey geophysical data recorded evidence of a suspected septic tank and a no confidence anomaly within the survey area at Parcel 4. No evidence of other unknown metallic USTs was observed. **Figure 6** provides an overlay of the geophysical metal detection results, the suspected septic tank, and the no confidence anomaly onto the NCDOT MicroStation engineering plans for reference.

DISCUSSION OF BURIED WASTE GEOPHYSICAL SURVEY RESULTS

Discussion of EM Results – Buried Waste Investigation

A contour plot of the EM31 conductivity results obtained across the survey area at the property is presented in **Figure 7**. As discussed in the introduction, this site was previously used to store concrete and asphalt waste, which is visible at the ground surface. The subsurface conductivity results seen in **Figure 7** show an area of high conductivity in the northeast portion of the property, just north of the vacant building. GPR transects collected across the high conductivity feature (**Figure 7**) did not record any clear stratification in the subsurface that would suggest a buried waste deposit. However, the EM31 instrument averages the conductivity of the upper ~17 feet of soil. Therefore, this anomaly may be associated with buried waste or another conductivity high that is below the imaging depth of the GPR instrument.

In addition to the conductivity results, the EM31 records an in-phase component that is responsive to shallow buried metal. **Figure 8** provides a contour map of the in-phase results overlain on an aerial photograph of the property. The negative (green) responses are a typical indicator of either surface metallic debris or very shallow buried metal. These locations directly correlate to the interpreted zones of buried metal observed in the EM61 metal detection survey, providing a secondary method that verifies the locations of metallic debris at or near the ground surface across the property.

Figure 9 presents the final interpreted locations of interpreted metallic debris (either at the ground surface or buried just beneath the ground surface) overlain onto the NCDOT MicroStation engineering plans for reference.

SUMMARY & CONCLUSIONS

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 4 in Walnut Cove, North Carolina, provides the following summary and conclusions:

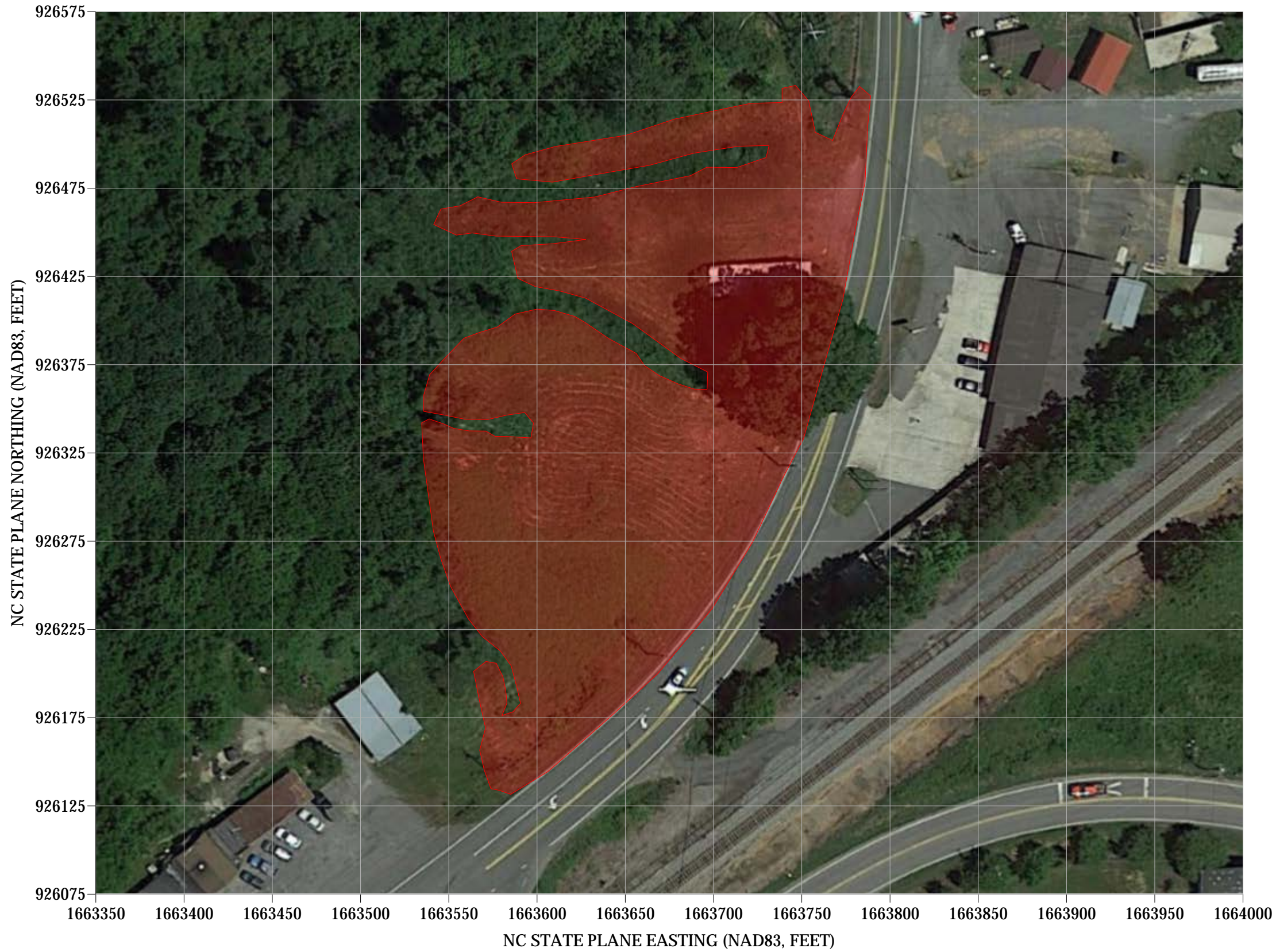
- The EM61 and GPR surveys provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- The majority of the EM metal detection anomalies were directly attributed to visible cultural features at the ground surface.
- The EM61 metal detection survey located zones of metallic debris either at the ground surface or buried in the shallow subsurface. This was confirmed using GPR and the in-phase component of the EM31, which is sensitive to metal on or just below the surface.
- The EM61 and subsequent GPR surveys identified a no confidence anomaly in the west portion of the site that was approximately 8 feet long by 6 feet wide. The orientation of the GPR reflectors and the location of the anomaly suggest that this may potentially be a metallic drum or metallic object of similar size.
- The EM61 and GPR also identified a suspected septic tank off of the northwest corner of the building. The suspected septic tank was approximately 10 feet long by 6 feet wide. A sewer pipe was observed entering the ground above the suspected septic tank.
- Collectively, the UST geophysical data recorded evidence of a suspected septic tank and a no confidence anomaly within the survey area at Parcel 4. No evidence of any additional unknown USTs was observed.
- The EM31 ground conductivity survey identified a high conductivity zone just north of the building on the property.
- This high conductivity zone may be indicative of other waste buried at the site.
- The buried waste investigation also identified multiple zones of either surficial or shallow buried metallic debris across the site.

LIMITATIONS

Geophysical surveys have been performed and this report was prepared for the NCDOT in accordance with generally accepted guidelines for EM and GPR surveys. It is generally recognized that the results of the EM and GPR surveys are non-unique and may not represent actual subsurface conditions. The EM 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.

The EM31 and GPR results obtained for this project may delineate the approximate perimeters of buried waste at the suspected disposal area. However, some of the buried waste may not be detected by the geophysical investigation. Furthermore, some EM31 apparent conductivity anomalies may be in response to changes in soil character and not due to buried waste.

APPROXIMATE BOUNDARIES OF UST GEOPHYSICAL SURVEY AREA




View of Survey Area
(Facing Approximately West)



View of Survey Area
(Facing Approximately North)



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			<p>PYRAMID PROJECT #:</p> <p>2019-074</p>	<p>FIGURE 1</p>

APPROXIMATE BOUNDARIES OF BURIED WASTE GEOPHYSICAL SURVEY AREA




View of Survey Area
(Facing Approximately West)

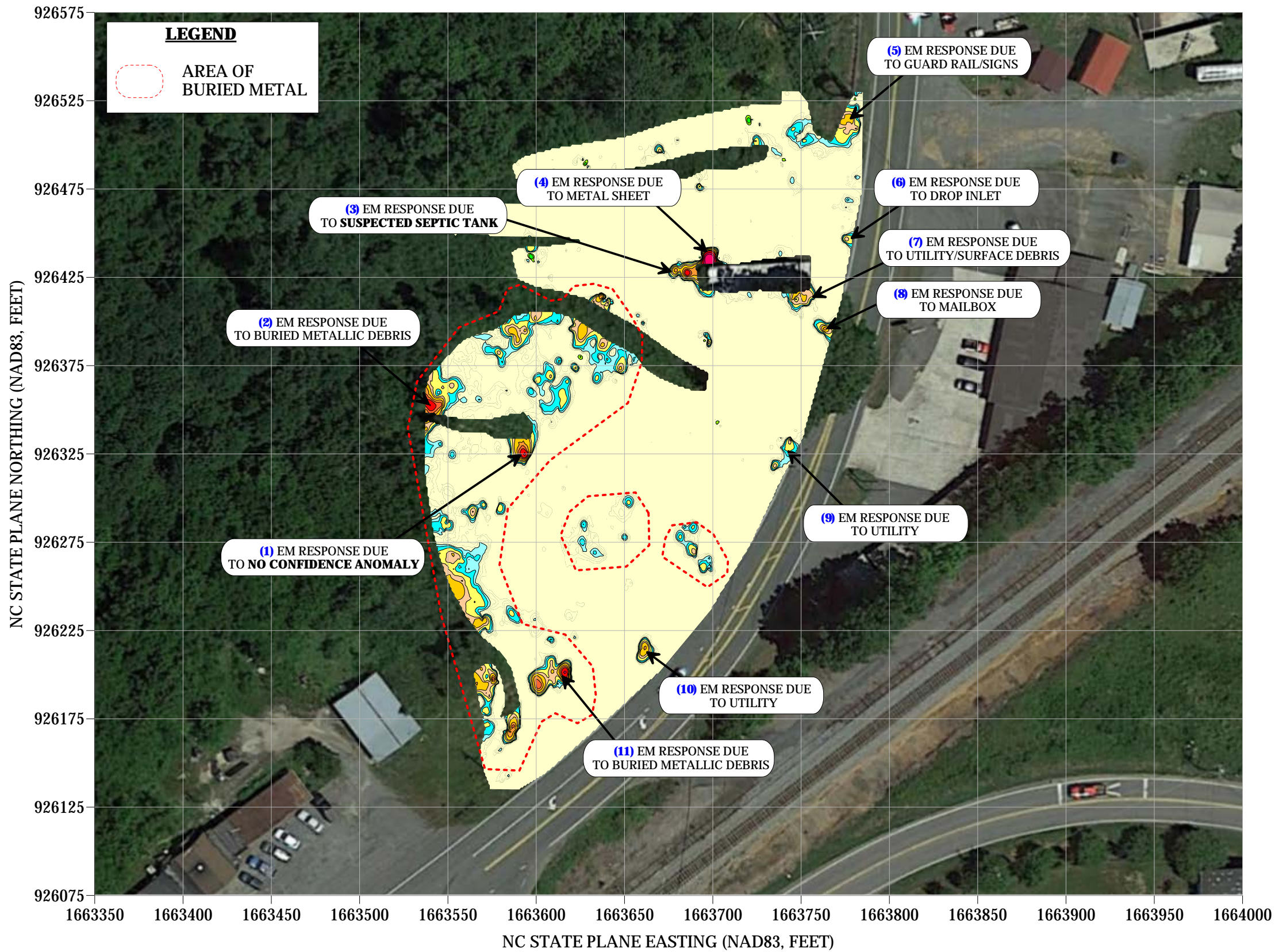


View of Survey Area
(Facing Approximately North)



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			PYRAMID PROJECT #:	2019-074	FIGURE 2	

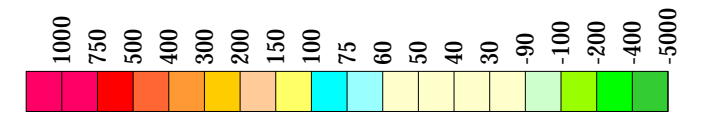
EM61 METAL DETECTION RESULTS



EVIDENCE OF ONE SUSPECTED SEPTIC TANK AND ONE NO CONFIDENCE ANOMALY OBSERVED. NO EVIDENCE OF ADDITIONAL 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 EM61 data were collected on April 2-3, using a Geonics EM61 instrument. Verification GPR data were collected using a GSSI UtilityScan DF instrument with a dual frequency 300/800 MHz antenna on April 4, 2019.

EM61 Metal Detection Response (millivolts)



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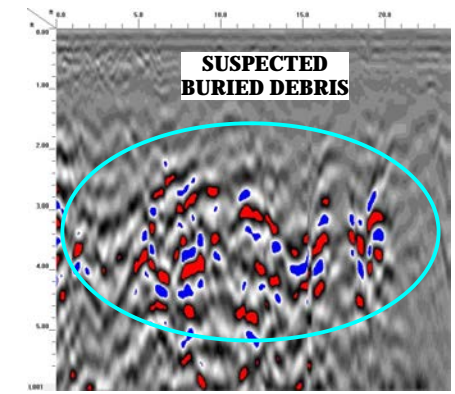
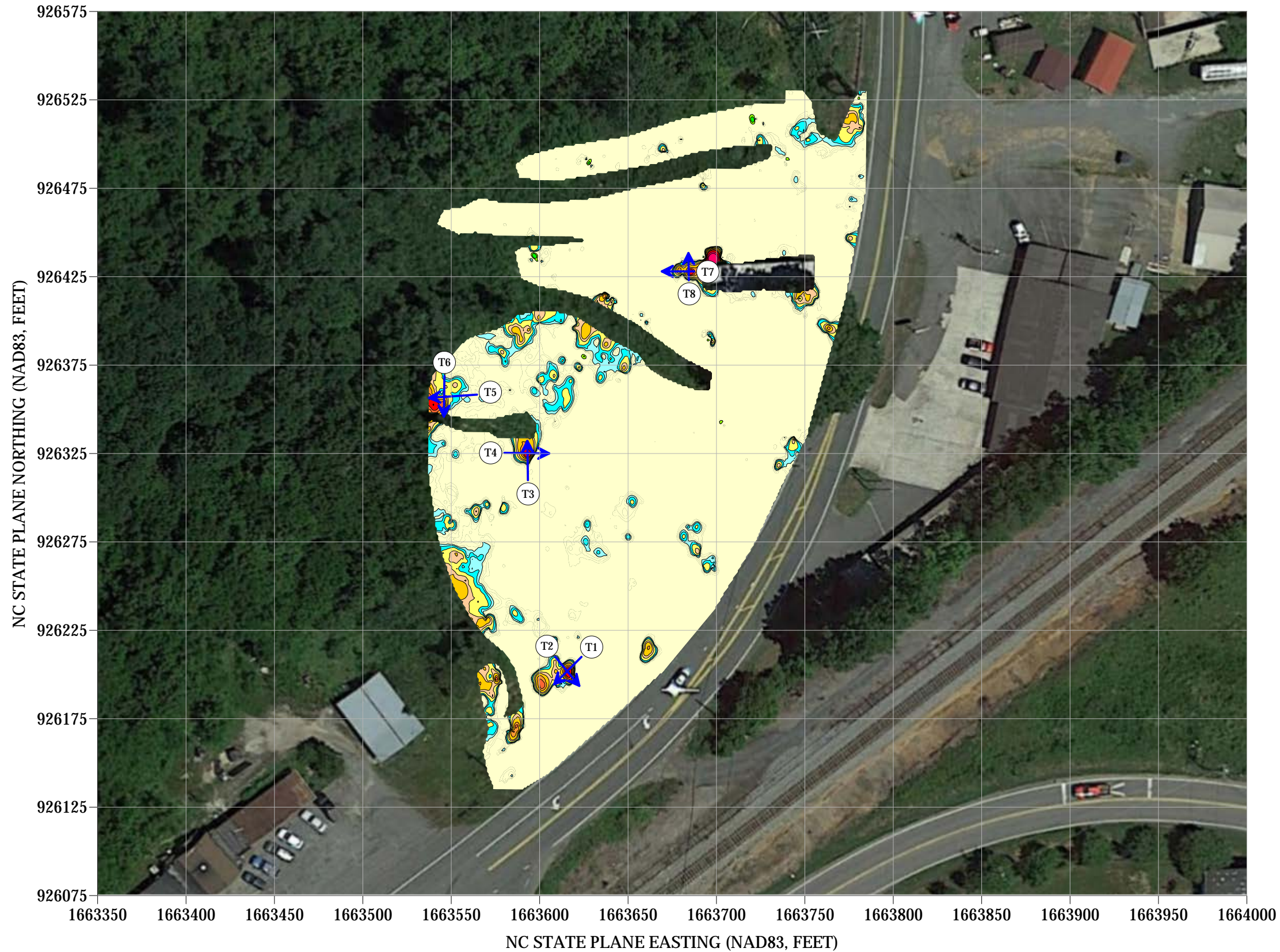
PROJECT
PARCEL 4
WALNUT COVE, NORTH CAROLINA
NCDOT PROJECT R-5768

TITLE
**PARCEL 4 - EM61 METAL DETECTION
CONTOUR MAP**

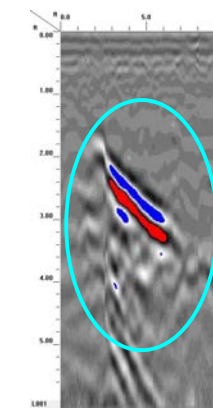
DATE
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PYRAMID PROJECT #:
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FIGURE 3

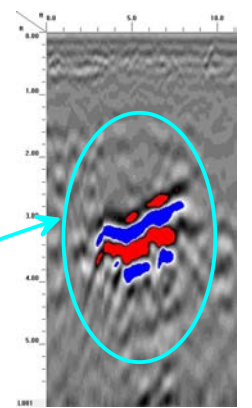
GPR TRANSECT LOCATIONS



GPR TRANSECT 1 (T1)

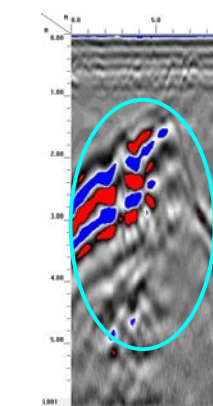


GPR TRANSECT 3 (T3)

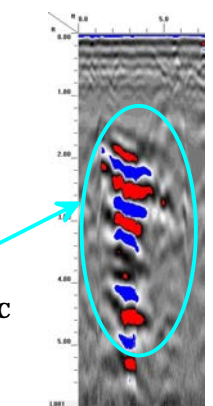


GPR TRANSECT 4 (T4)

NO CONFIDENCE ANOMALY



GPR TRANSECT 7 (T7)



GPR TRANSECT 8 (T8)

SUSPECTED SEPTIC TANK



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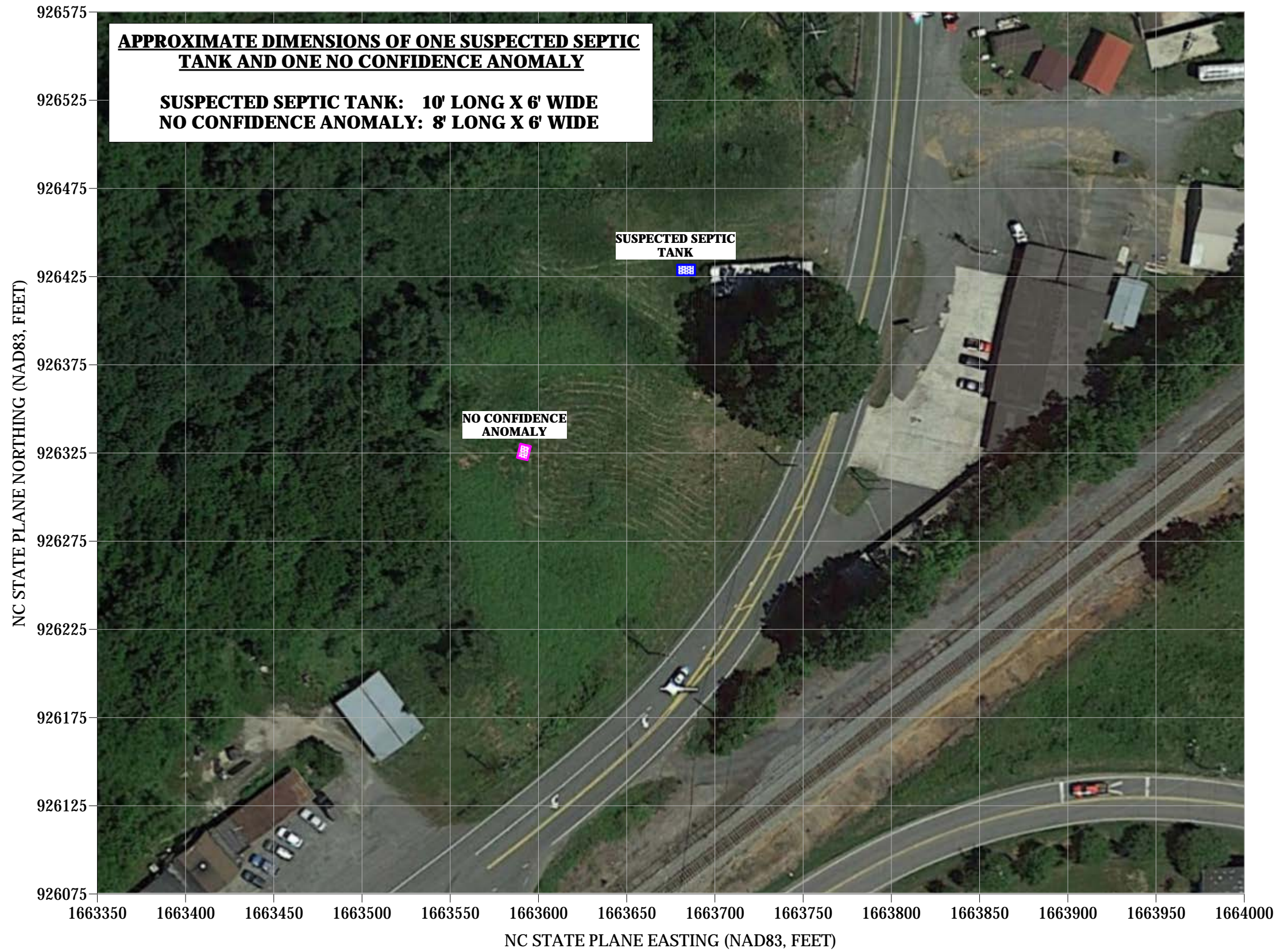
PROJECT
PARCEL 4
WALNUT COVE, NORTH CAROLINA
NCDOT PROJECT U-5768

TITLE
**PARCEL 4 - GPR TRANSECT LOCATIONS
AND SELECT IMAGES**

DATE
4/4/2019
PYRAMID PROJECT #:
2019-074

CLIENT
NCDOT
FIGURE 4

LOCATIONS AND SIZES OF ONE SUSPECTED SEPTIC TANK AND ONE NO CONFIDENCE ANOMALY



View of Suspected Septic Tank
(Facing Approximately East)



View of No Confidence Anomaly
(Facing Approximately West)



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PROJECT
PARCEL 4
WALNUT COVE, NORTH CAROLINA
NCDOT PROJECT R-5768

TITLE
**PARCEL 4 - LOCATIONS AND SIZES OF ONE
SUSPECTED SEPTIC TANK AND ONE
NO CONFIDENCE ANOMALY**

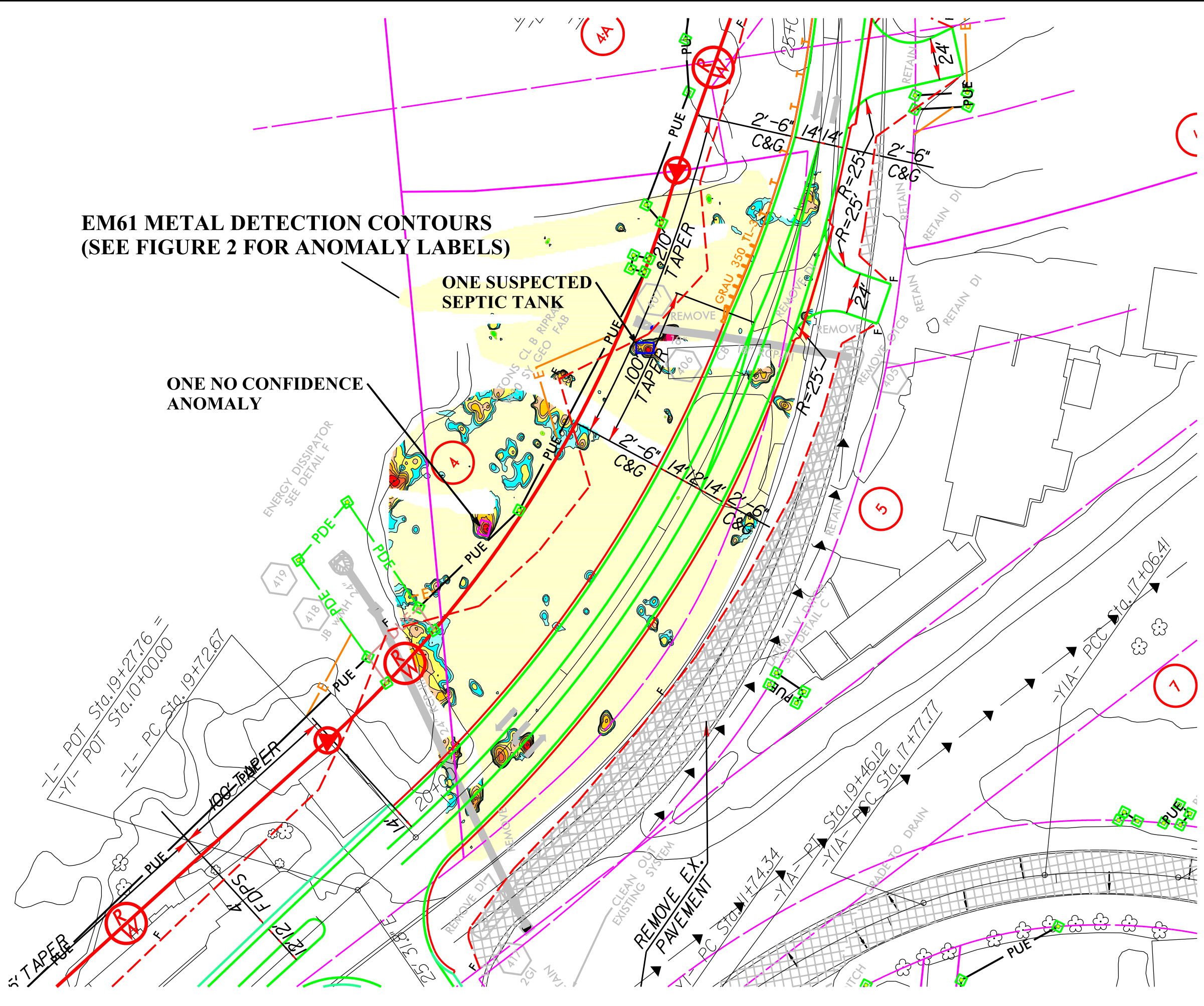
DATE
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PROJECT #:
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FIGURE 5

**EM61 METAL DETECTION CONTOURS
(SEE FIGURE 2 FOR ANOMALY LABELS)**

ONE SUSPECTED SEPTIC TANK

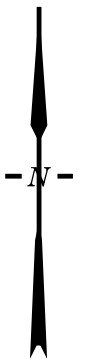
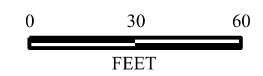
ONE NO CONFIDENCE ANOMALY



LEGEND

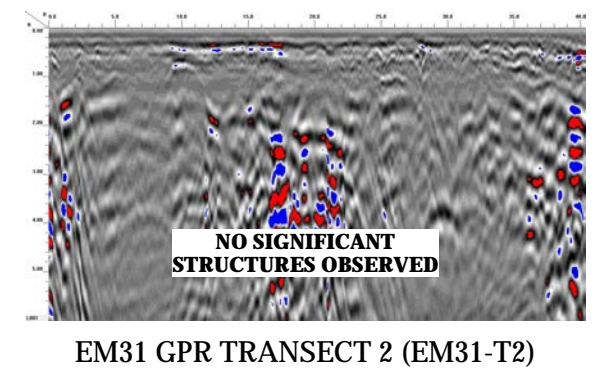
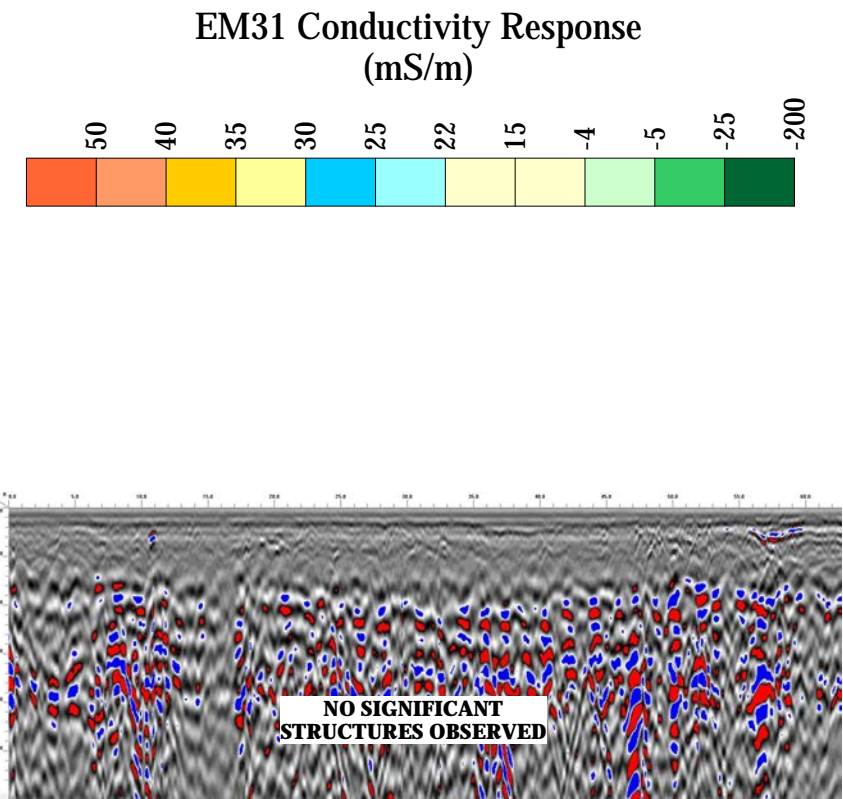
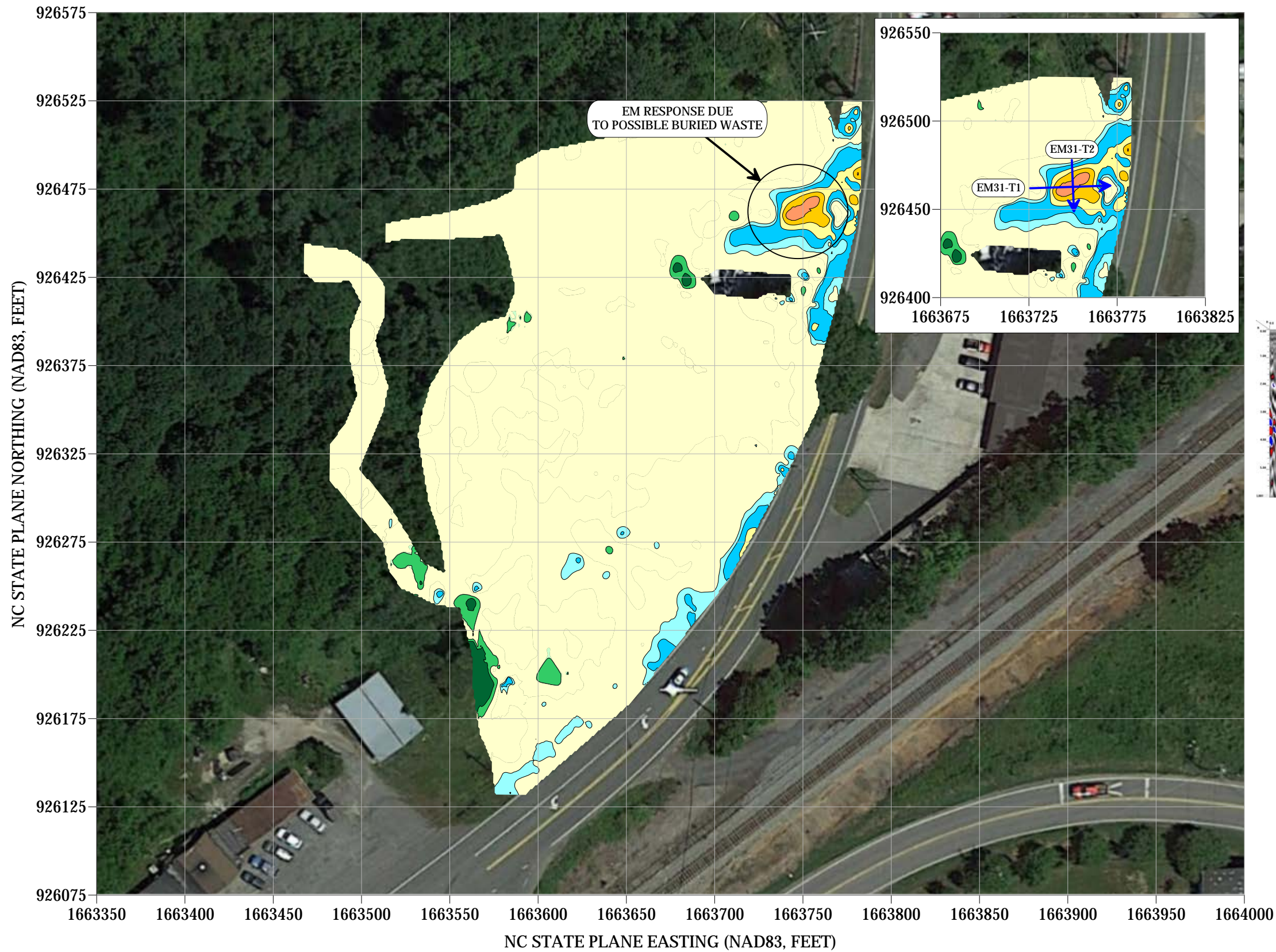
- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PROPOSED PERMANENT UTILITY EASEMENT
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- [Blue Box] SUSPECTED SEPTIC TANK
- [Magenta Box] NO CONFIDENCE ANOMALY

MILLIVOLTS (mV)



TITLE	OVERLAY OF METAL DETECTION RESULTS, SUSPECTED SEPTIC & NO CONFIDENCE ANOMALY ON NCDOT ENGINEERING PLANS	
PROJECT	PARCEL 4 WALNUT COVE, NORTH CAROLINA NCDOT PROJECT R-5768	
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DATE: 04-03-2019	REVISION NO. 0	
PYRAMID PROJECT NO. 2019-074	FIGURE NO. 6	

EM31 GROUND CONDUCTIVITY RESULTS AND RADAR IMAGES



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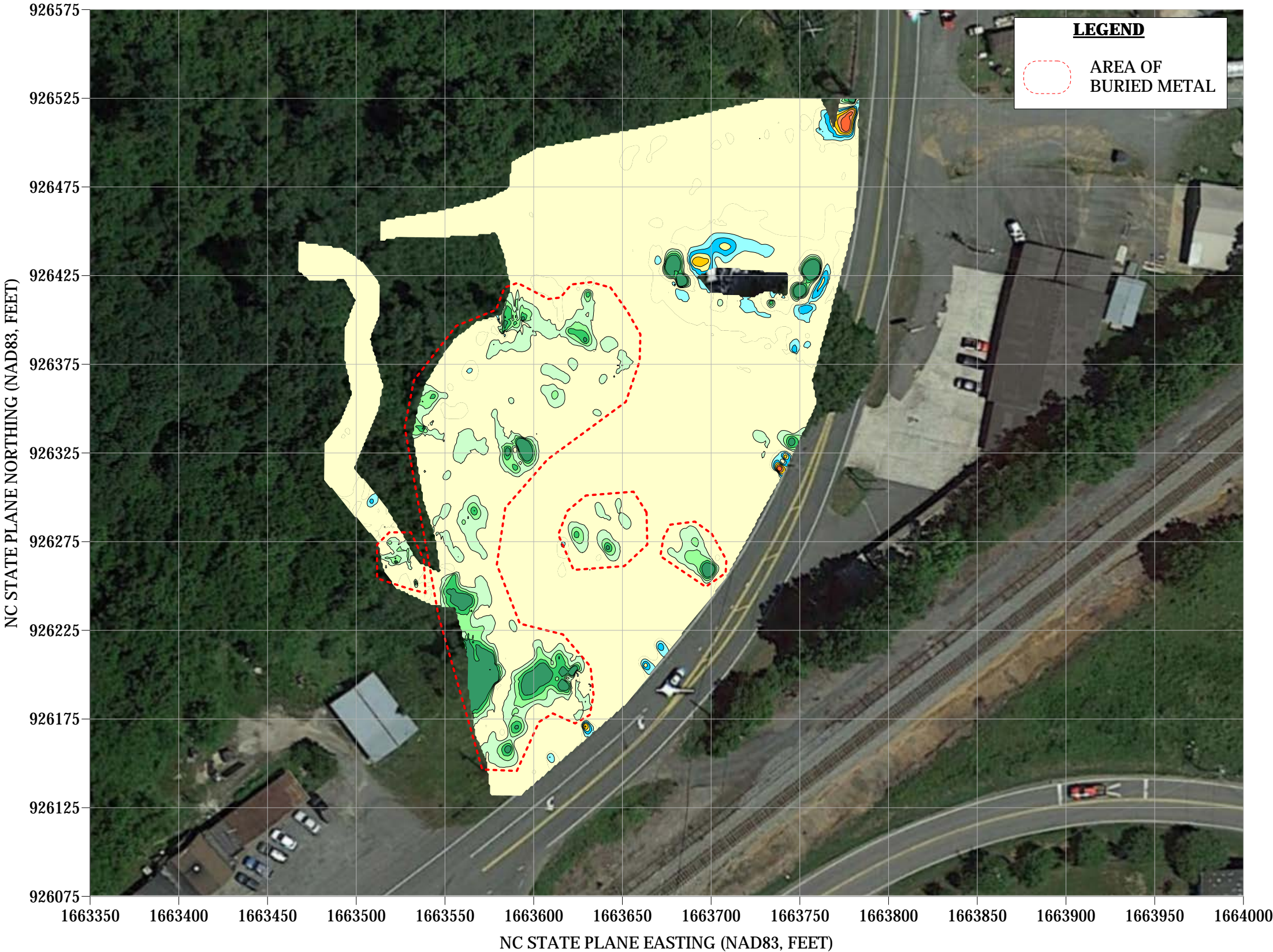
PROJECT
PARCEL 4
WALNUT COVE, NORTH CAROLINA
NCDOT PROJECT R-5768

TITLE
**PARCEL 4 - EM31 GROUND CONDUCTIVITY
CONTOUR MAP AND RADAR IMAGES**

DATE
4/4/2019
PYRAMID PROJECT #:
2019-074

CLIENT
NCDOT
FIGURE 7

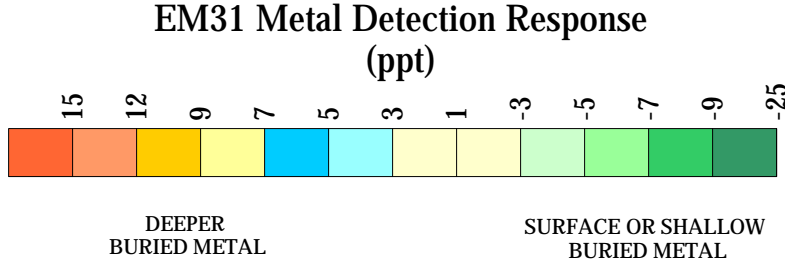
EM31 IN-PHASE METAL DETECTION RESULTS



LEGEND
 (Red dashed line) AREA OF BURIED METAL

NO EVIDENCE OF METALLIC USTs WAS OBSERVED.

The contour plot shows the in-phase results of the EM31 instrument in parts per thousand (ppt). The green contour intervals are indicative of metal on or just below the ground surface.



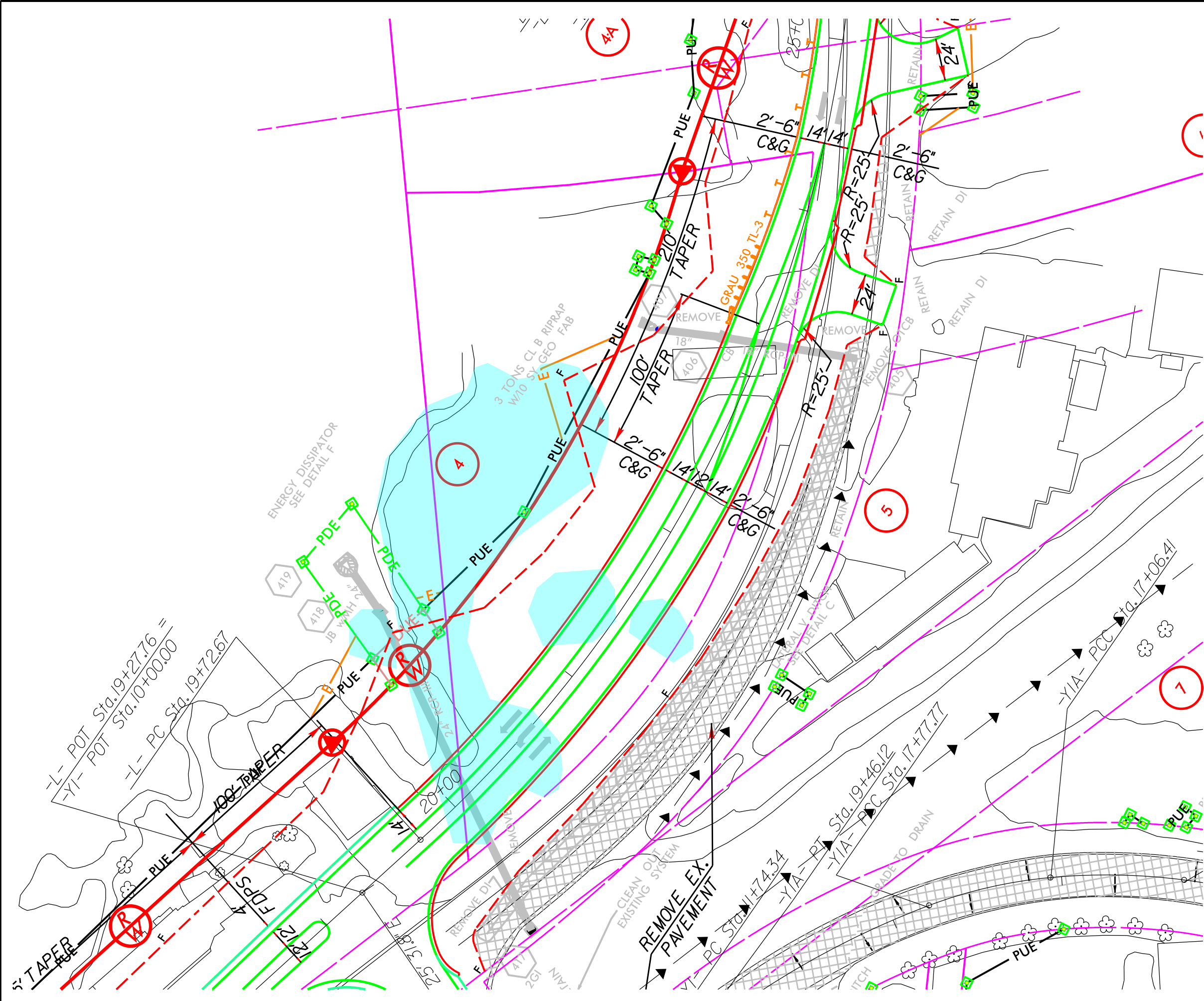
503 INDUSTRIAL AVENUE
 GREENSBORO, NC 27406
 (336) 335-3174 (p) (336) 691-0648 (f)
 License # C1251 Eng. / License # C257 Geology

PROJECT
PARCEL 4
 WALNUT COVE, NORTH CAROLINA
 NCDOT PROJECT R-5768

TITLE
PARCEL 4 - EM31 IN-PHASE METAL DETECTION CONTOUR MAP

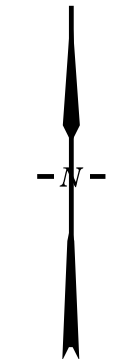
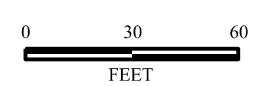
DATE
 4/4/2019
 PYRAMID PROJECT #:
 2019-074

CLIENT
 NCDOT
FIGURE 8



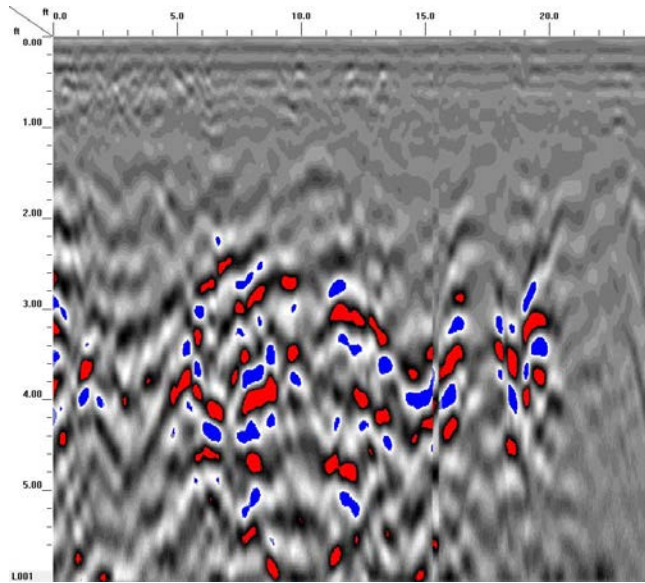
LEGEND

- EXISTING ROW
- EXISTING PROPERTY BOUNDARY
- PROPOSED ROW LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PUE
- PROPOSED SS CUT LINE
- PROPOSED SS FILL LINE
- AREA OF METALLIC DEBRIS

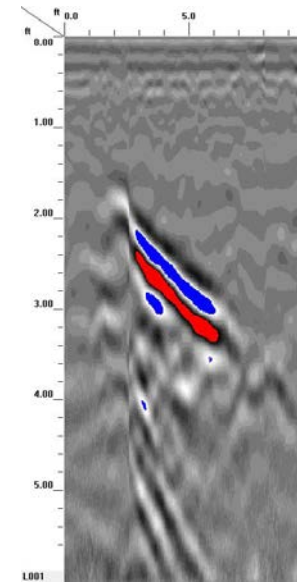


TITLE	OVERLAY OF SURFACE/SHALLOW METALLIC DEBRIS ON NCDOT ENGINEERING PLANS	
PROJECT	PARCEL 4 WALNUT COVE, NORTH CAROLINA NCDOT PROJECT R-5768	
	503 INDUSTRIAL AVENUE GREENSBORO, NC 27406 336.335.3174 (p) 336.691.0648 (f) License # C1251 Eng. / #C257 Geology	
DATE: 04-03-2019	REVISION NO. 0	
PYRAMID PROJECT NO. 2019-074	FIGURE NO. 9	

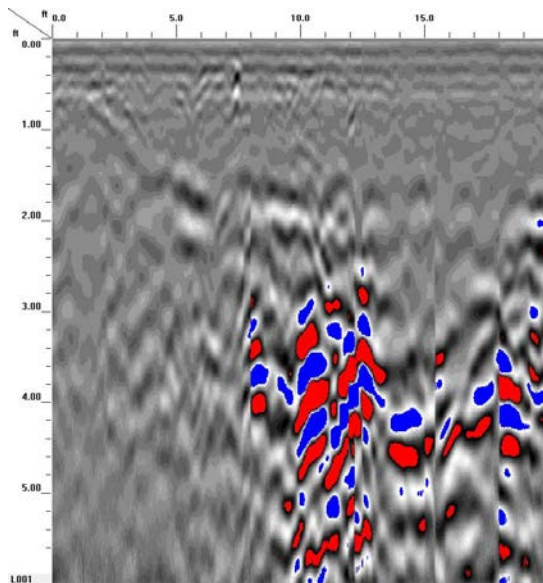
Appendix A – GPR Transect Images



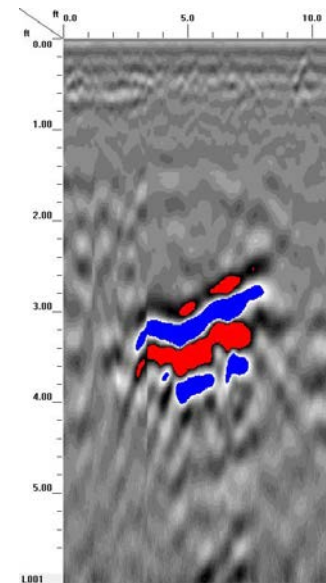
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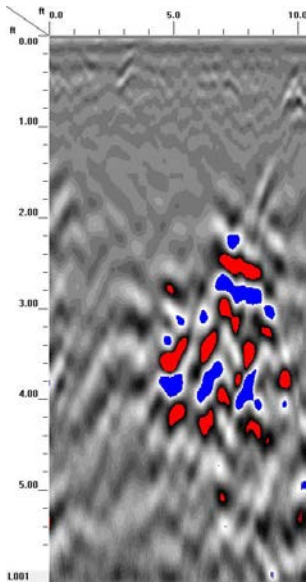
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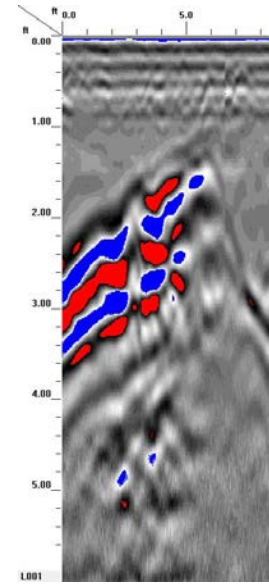
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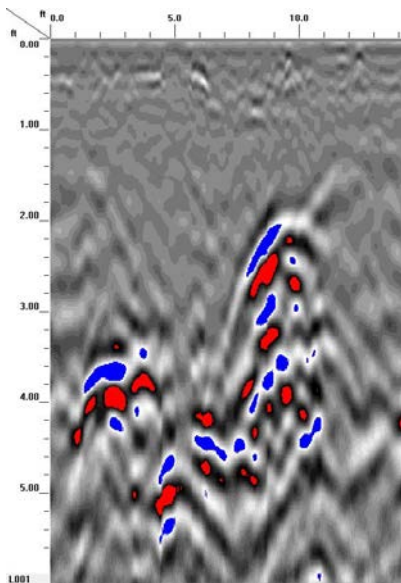
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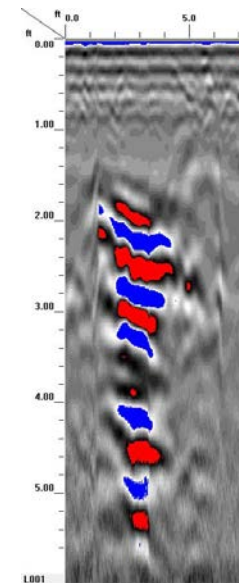
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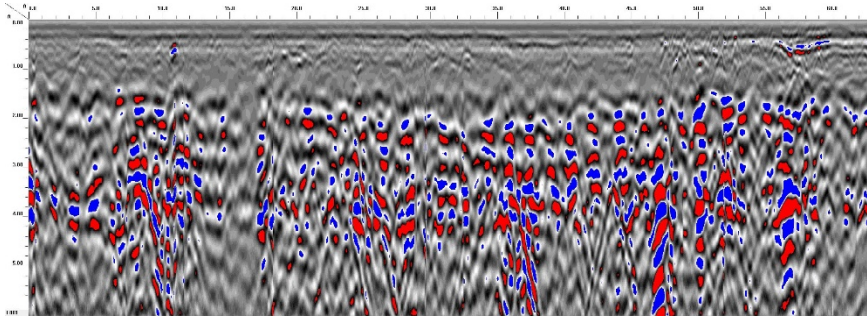
Transect 7



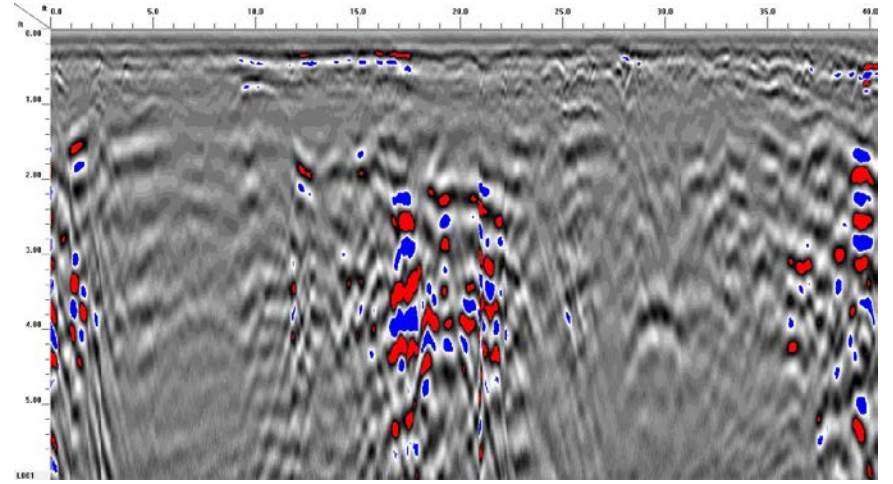
Transect 6



Transect 8



EM31 GPR Transect 1



EM31 GPR Transect 2

APPENDIX C

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-5768, Parcel 004, Walnut Cove, NC (2019-074)	BORING/WELL NO:	4-1
SITE LOCATION:	Stokes County, NC	BORING/WELL LOCATION:	Parcel 004, Center portion
START DATE:	04/24/19	COMPLETED:	04/24/19
GEOLOGIST:	T. Leatherman	DRILLER:	Draper Aden
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	5 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
----------------	---	--

	Surface - Asphalt	Core Sample Depths
0-2	Brown, sandy-silty-clay (CL), moist, no odor	PID= 1.3 PPM
2-4	Brown, sandy-silty-clay (CL), moist, no odor	PID= 3.0 PPM
4-5	Brown, sandy-silty-clay (CL), moist, no odor	PID= 4.9 PPM
	Decaying wood in the bottom of spoon	
	Geoprobe refusal at 5 feet.	

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) ____ DEPTH (ft) ____ DIAMETER (in) ____ MATERIAL ____.
 SCREEN LENGTH (ft) ____ DEPTH (ft) ____ DIAMETER (in) ____ MATERIAL ____.
 DEPTH TO TOP OF SAND ____ BAGS OF SAND ____.
 DEPTH TO TOP SEAL ____ BENTONITE USED ____ BAGS OF CEMENT USED 0.

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-5768, Parcel 004, Walnut Cove, NC (2019-074)	BORING/WELL NO:	4-2
SITE LOCATION:	Stokes County, NC	BORING/WELL LOCATION:	Parcel 004, South portion
START DATE:	04/24/19	COMPLETED:	04/24/19
GEOLOGIST:	T. Leatherman	DRILLER:	Draper Aden
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	10 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
----------------	---	--

		Core Sample Depths
	Surface - grass & dirt	
0-2	Brown, silty-sandy-clay (CL), moist, no odor	PID= 2.7 PPM
2-4	Brown, silty-sandy-clay (CL), moist, no odor	PID= 1.5 PPM
4-6	Brown, silty-sandy-clay (CL), moist, no odor	PID= 4.4 PPM
6-8	Brown, sandy-clayey-silt (ML), very moist, no odor	PID= 4.9 PPM
8-10	Brownish gray, clayey-sandy-silt (ML), moist to very moist, no odor	PID= 2.5 PPM
	No water in boring.	

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) _____ DEPTH (ft) _____ DIAMETER (in) _____ MATERIAL _____
 SCREEN LENGTH (ft) _____ DEPTH (ft) _____ DIAMETER (in) _____ MATERIAL _____
 DEPTH TO TOP OF SAND _____ BAGS OF SAND _____
 DEPTH TO TOP SEAL _____ BENTONITE USED _____ BAGS OF CEMENT USED 0

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-5768, Parcel 004, Walnut Cove, NC (2019-074)	BORING/WELL NO:	4-3
SITE LOCATION:	Stokes County, NC	BORING/WELL LOCATION:	Parcel 004, West portion
START DATE:	04/24/19	COMPLETED:	04/24/19
GEOLOGIST:	T. Leatherman	DRILLER:	Draper Aden
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	5.5 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
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	Grass - Asphalt	Core Sample Depths
0-2	Brown, sandy-clayey-silt (ML), moist, no odor	PID= 1.4 PPM
2-4	Brown, sandy-clayey-silt (ML), moist, no odor	PID= 1.2 PPM
4-5.5	Dark brown to black, sandy-clayey-silt (ML), very moist, no odor	PID= 1.0 PPM
	Geoprobe refusal at 5.5 feet.	

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) ___ DEPTH (ft) _____ DIAMETER (in) ___ MATERIAL _____.
 SCREEN LENGTH (ft) ___ DEPTH (ft) _____ DIAMETER (in) ___ MATERIAL _____.
 DEPTH TO TOP OF SAND _____ BAGS OF SAND _____.
 DEPTH TO TOP SEAL _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-5768, Parcel 004, Walnut Cove, NC (2019-074)	BORING/WELL NO:	4-4
SITE LOCATION:	Stokes County, NC	BORING/WELL LOCATION:	Parcel 004, Center portion
START DATE:	04/24/19	COMPLETED:	04/24/19
GEOLOGIST:	T. Leatherman	DRILLER:	Draper Aden
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	10 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
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	Surface - grass & dirt	Core Sample Depths
0-2	Brown, sandy-clayey-silt (ML), moist, no odor	PID= 1.6 PPM
2-4	Brown, sandy-clayey-silt (ML), moist, no odor	PID= 1.7 PPM
4-6	Brown, sandy-clayey-silt (ML), moist, no odor	PID= 0.6 PPM
6-8	Brown, sandy-clayey-silt (ML), moist to very moist, no odor	PID= 1.6 PPM
8-10	Brown to light gray, sandy-clayey-silt (ML), very moist, no odor	PID= 1.1 PPM

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) ___ DEPTH (ft) _____ DIAMETER (in) ___ MATERIAL _____.
 SCREEN LENGTH (ft) ___ DEPTH (ft) _____ DIAMETER (in) ___ MATERIAL _____.
 DEPTH TO TOP OF SAND _____ BAGS OF SAND _____.
 DEPTH TO TOP SEAL _____ BENTONITE USED _____ BAGS OF CEMENT USED 0_.

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-5768, Parcel 004, Walnut Cove, NC (2019-074)	BORING/WELL NO:	4-5
SITE LOCATION:	Stokes County, NC	BORING/WELL LOCATION:	Parcel 004, North portion
START DATE:	04/24/19	COMPLETED:	04/24/19
GEOLOGIST:	T. Leatherman	DRILLER:	Draper Aden
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	10 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
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	Surface - grass & dirt	Core Sample Depths
0-2	Dark brown, clayey-silty-sand (SC), moist, no odor	PID= 1.2 PPM
2-4	Brown to tan, sandy-clayey-silt (ML), moist, no odor	PID= 1.5 PPM
4-6	Brown to tan, sandy-clayey-silt (ML), moist, no odor	PID= 1.0 PPM
6-8	Tan, saprolite, sandy-silty-clay (CL), moist, no odor	PID= 1.1 PPM
8-10	Tan, saprolite, sandy-silty-clay (CL), moist, no odor	PID= 1.2 PPM

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) ___ DEPTH (ft) _____ DIAMETER (in) ___ MATERIAL _____.
 SCREEN LENGTH (ft) ___ DEPTH (ft) _____ DIAMETER (in) ___ MATERIAL _____.
 DEPTH TO TOP OF SAND _____ BAGS OF SAND _____.
 DEPTH TO TOP SEAL _____ BENTONITE USED _____ BAGS OF CEMENT USED 0_.

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-5768, Parcel 004, Walnut Cove, NC (2019-074)	BORING/WELL NO:	4-6
SITE LOCATION:	Stokes County, NC	BORING/WELL LOCATION:	Parcel 004, North portion
START DATE:	04/24/19	COMPLETED:	04/24/19
GEOLOGIST:	T. Leatherman	DRILLER:	Draper Aden
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	7 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
----------------	---	--

	Grass & Gravel	Core Sample Depths
0-2	No Recovery	No Recovery
2-4	Dark brown to black, natural organic rich soil, sandy-silt (SM), moist, no odor	PID= 2.6 PPM
4-6	Brown, sandy-clayey-silt (ML), moist to very moist, no odor	PID= 1.8 PPM
6-7	Brown, sandy-silty-clay (CL), firm, moist, no odor	PID= 2.3 PPM
	Geoprobe refusal at 7 feet.	

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) _____ DEPTH (ft) _____ DIAMETER (in) _____ MATERIAL _____.

SCREEN LENGTH (ft) _____ DEPTH (ft) _____ DIAMETER (in) _____ MATERIAL _____.

DEPTH TO TOP OF SAND _____ BAGS OF SAND _____.

DEPTH TO TOP SEAL _____ BENTONITE USED _____ BAGS OF CEMENT USED 0.

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-5768, Parcel 004, Walnut Cove, NC (2019-074)	BORING/WELL NO:	4-8
SITE LOCATION:	Stokes County, NC	BORING/WELL LOCATION:	Parcel 004, North portion
START DATE:	04/24/19	COMPLETED:	04/24/19
GEOLOGIST:	T. Leatherman	DRILLER:	Draper Aden
DRILL METHOD:	Geoprobe	SAMPLE METHOD:	Macro-core
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	7 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
----------------	---	--

	Grass & Gravel	Core Sample Depths
0-2	Brown, sandy-silty-clay (CL), firm, moist, no odor	PID= 1.7 PPM
2-4	Brown, sandy-silty-clay (CL), firm, moist, no odor	PID= 2.1 PPM
4-6	Brown, sandy-silty-clay (CL), firm, moist, no odor	PID= 1.8 PPM
6-7	Brown, clayey-silty-sand (SC), moist, no odor	PID= 1.5 PPM
	Geoprobe refusal at 7 feet.	

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) ____ DEPTH (ft) ____ DIAMETER (in) ____ MATERIAL _____.
 SCREEN LENGTH (ft) ____ DEPTH (ft) ____ DIAMETER (in) ____ MATERIAL _____.
 DEPTH TO TOP OF SAND _____. BAGS OF SAND _____.
 DEPTH TO TOP SEAL _____. BENTONITE USED _____. BAGS OF CEMENT USED 0_.

Pyramid Environmental & Engineering, P.C.

FIELD DRILLING RECORD

PROJECT NAME: PROJECT NUMBER:	NC DOT R-5768, Parcel 004, Walnut Cove, NC (2019-074)	BORING/WELL NO:	4-9
SITE LOCATION:	Stokes County, NC	BORING/WELL LOCATION:	Parcel 004, South portion
START DATE:	04/24/19	COMPLETED:	04/24/19
GEOLOGIST:	T. Leatherman	DRILLER:	Draper Aden
DRILL METHOD:	Hand-Auger	SAMPLE METHOD:	Hand-Auger Bucket
BORING DIA:	2-inch	CASING DIA:	N/A
TOTAL DEPTH:	2 feet	CASING DEPTH:	N/A

DEPTH (ft.)	VISUAL MANUAL SOIL CLASSIFICATION COLOR, TEXTURE, STRUCTURE, CONSISTENCY, ODOR, ETC.	OVA RESULTS PERCENT RECOVERY BLOW COUNTS
-------------	---	--

	Surface - grass and dirt	Core Sample Depths
0-1	Brown, sandy-clayey-silt (ML), moist, no odor	PID= 1.9 PPM
1-2	Dark brown, sandy-clay-silt loam with some rock fragments (SM), moist, no odor	PID= 1.4 PPM
	Hand-auger refusal at 2 feet.	

MONITORING WELL INFORMATION (IF APPLICABLE)

RISER LENGTH (ft) ____ DEPTH (ft) ____ DIAMETER (in) ____ MATERIAL ____.
 SCREEN LENGTH (ft) ____ DEPTH (ft) ____ DIAMETER (in) ____ MATERIAL ____.
 DEPTH TO TOP OF SAND ____ BAGS OF SAND ____.
 DEPTH TO TOP SEAL ____ BENTONITE USED ____ BAGS OF CEMENT USED 0.

APPENDIX D



Hydrocarbon Analysis Results

Client: PYRAMID ENVIRONMENTAL
Address: 503 INDUSTRIAL AVENUE
 GREENSBORO, NC 27406

Samples taken Wednesday, April 24, 2019
Samples extracted Wednesday, April 24, 2019
Samples analysed Friday, April 26, 2019

Contact: TIM LEATHERMAN

Operator CAROLINE STEVENS

Project: NCDOT STOKES PARCEL 4 / 2019-074

F03640

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	4-1-5	25.4	<0.63	<0.63	4.9	4.9	4.4	<0.2	<0.025	0	69.5	30.5	Deg Fuel 73.7%,(FCM)
s	4-2-0-2	31.1	<0.78	<0.78	9.5	9.5	4.3	<0.25	<0.031	0	62.9	37.1	V.Deg.PHC 97.1%,(FCM)
s	4-2-6-8	48.5	<1.2	<1.2	3.1	3.1	1.6	<0.39	<0.048	0	76.9	23.1	Road Tar 73.7%,(FCM)
s	4-3-0-2	25.4	<0.63	<0.63	6.6	6.6	3.3	0.38	<0.025	0	67.5	32.5	Deg.PHC 78.4%,(FCM)
s	4-4-2-4	25.8	<0.65	<0.65	<0.65	<0.65	<0.13	<0.21	<0.026	0	44.2	55.8	PHC not detected
s	4-5-2-4	25.2	<0.63	<0.63	2.1	2.1	0.63	<0.2	<0.025	0	63.8	36.2	V.Deg.PHC 83.5%,(FCM)
s	4-6-2-4	24.8	<0.62	<0.62	45.8	45.8	29.5	1	<0.025	0	75	25	Deg Fuel 74.4%,(FCM)
s	4-7-4-6	25.8	<0.65	<0.65	<0.65	<0.65	<0.13	<0.21	<0.026	0	100	0	Residual HC
s	4-8-2-4	27.4	<0.68	<0.68	<0.68	<0.68	<0.14	<0.22	<0.027	0	0	0	PHC not detected,(BO)
s	4-9-0-1	28.1	<0.7	<0.7	5.5	5.5	2.2	<0.22	<0.028	0	62.4	37.6	Deg.PHC 85.1%,(FCM)

Initial Calibrator QC check **OK**

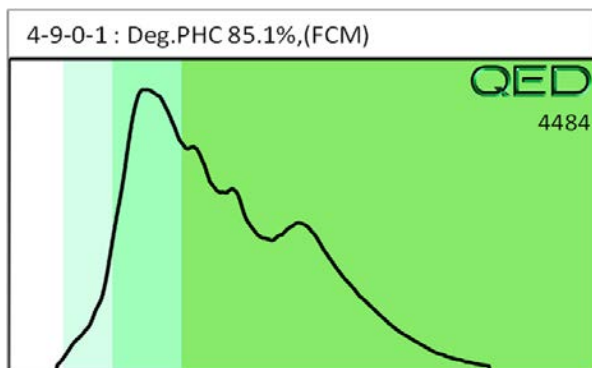
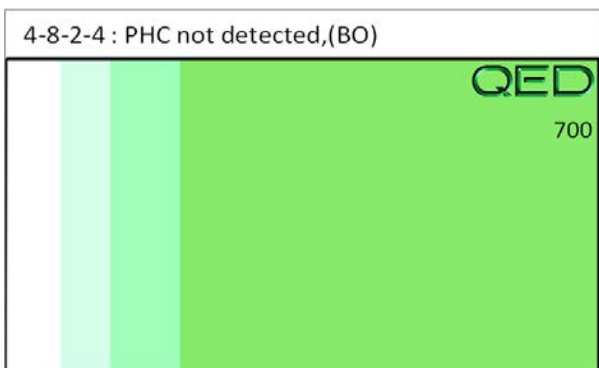
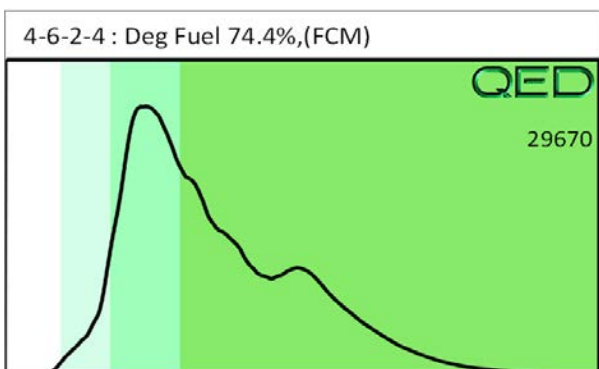
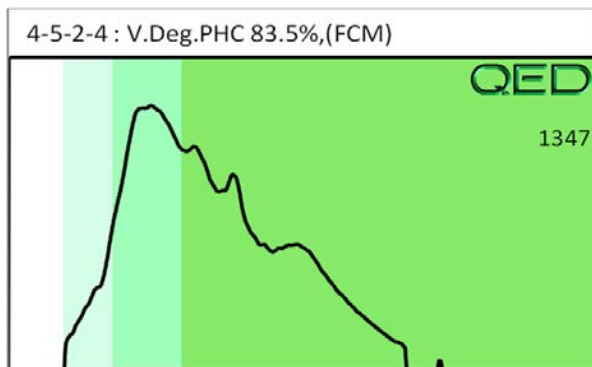
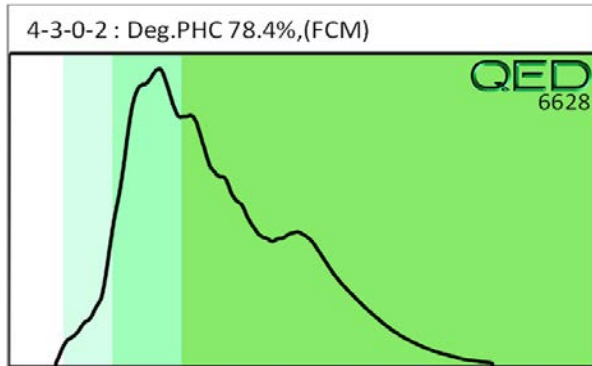
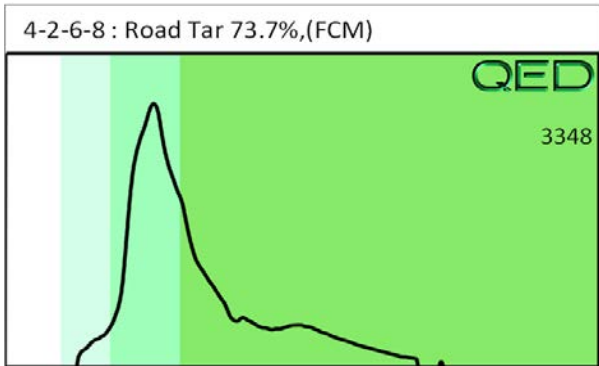
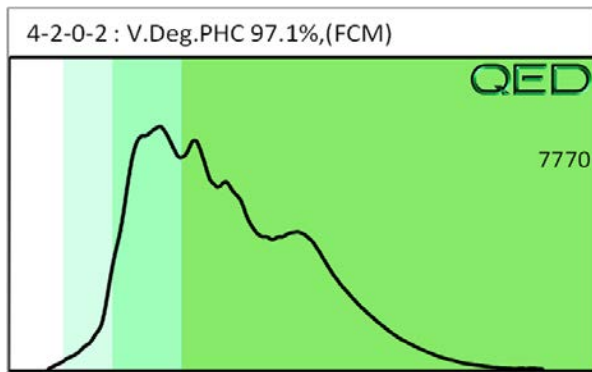
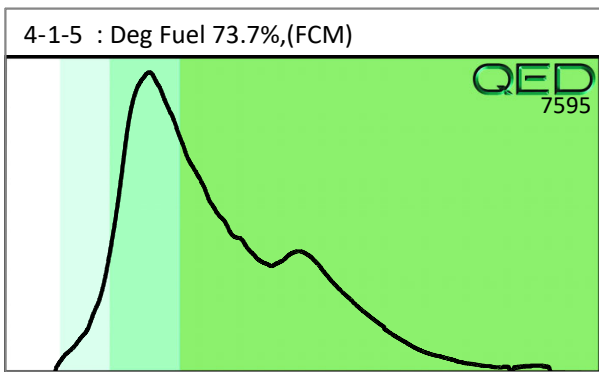
Final FCM QC Check **OK**

102.3 %

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



APPENDIX E
