North Carolina Department of Transportation

Preliminary Site Assessment
State Project: U-5114
WBS Element: 42376.1.FR1
PIN: 01710109
Mecklenburg County

QAS II Inc. Property (Valvoline)
14114 Statesville Rd
Huntersville, NC 28078
October 7, 2014

AMEC Environment and Infrastructure, Inc.
AMEC Project: 153055114

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1.0 INTRODUCTION

In accordance with the North Carolina Department of Transportation (NCDOT) Request for Proposal, dated July 29, 2014, AMEC Environment and Infrastructure, Inc. (AMEC) has performed a Preliminary Site Assessment (PSA) for the QAS II Inc. Property (the Site) to be effected by the realignment of the intersection of US 21 (Statesville Road) and Gilead Road. The Site, which is located on 14114 Statesville Road, currently operates as a quick lube oil change facility called Valvoline Oil. It is identified as Valvoline Instant Oil Change within the NCDOT U-5114 design project. The property is located on the eastern side of Statesville Road approximately 400 feet south of Gilead Road, which is in Huntersville of Mecklenburg County, North Carolina. The investigation was conducted in accordance with AMEC's Technical and Cost proposal dated August 12, 2014 and revised August 21, 2014.

NCDOT contracted AMEC to perform the PSA within the proposed Right Of Way (ROW) of the site due to the potential presence of petroleum hydrocarbons at the site. The PSA was performed to determine if soils have been impacted as a result of present and past uses of the property within the proposed design project area, and if any buried underground storage tanks (USTs) still are present in the area of investigation.

The following report summarizes a geophysics survey, presents location and capacities of any USTs, and describes our subsurface field investigation at the site. The report includes the evaluation of field screening, as well as field analyses with regards to the presence or absence of soil contamination within the proposed NCDOT ROW in the western portion of the site. **Appendix A** includes a Photograph log for the site.

1.1 Site Location and History

The site is located at 14114 Statesville Road, Huntersville, Mecklenburg County, North Carolina and is located approximately 400 feet south of the current intersection of US 21 (Statesville Road) and Gilead Road in Mecklenburg County, North Carolina. The site currently operates as a Valvoline quick lube and oil change facility. The site does not appear in the UST Section Registry, however there is a ground water incident (GWI# 36866) associated with the formerly named facility (GBH Automotive), which was also an oil change facility. No ground water monitoring wells were observed on site.

1.2 Site Description

The Valvoline quick lube and oil change facility is a one story cinder block building with two open-topped vehicle oil changing pits. No ground water monitoring wells were observed on site. The geophysical surveyor, ESP Associates, P.A. identified a possible underground storage tank (UST) or tanks on the western edge of the property within the area of investigation. No other visible indications of USTs were noted in the field. The site is located in a commercial area of Huntersville in Mecklenburg County and the vicinity is primarily commercial. The adjacent property to the south is a Waffle House Restaurant with a grassy area and woods beyond. The adjacent property to the east-southeast is residential. The adjacent property located to the west across Statesville Road is a Hardees Restaurant. The adjacent properties to the north include a Rite-Aid drug store then a BP Gas Station and strip mall just beyond.

2.0 GEOLOGY

2.1 Regional Geology

The Valvoline Oil Property is located within the Metamorphic type rocks of the Charlotte and Milton Belt Physiographic Province of western North Carolina. The Metavolcanic rock is interbedded felsic to mafic tuffs and flowrock.

2.2 Site Geology

Site geology was observed through the drilling and sampling of 5 shallow direct push probe soil borings (SB) onsite. **Figure 2** presents the boring locations within the area of investigation selected by NCDOT. Borings did not exceed a total depth of ten feet below ground surface (BGS). Fill material consisting predominantly of red clayey silt to reddish-brown clayey silt was observed in each of the five borings. Boring logs are presented in **Appendix B**.

3.0 FIELD ACTIVITIES

3.1 Preliminary Activities

Prior to commencing field sampling activities at the site, several tasks were accomplished in preparation for the subsurface investigation. The Health and Safety Plan (HASP) was modified to include the site-specific health and safety information necessary for the field activities. North Carolina-1-Call was contacted on August 20, 2014 to report the proposed drilling activities and subsequently notify all affected utilities for the parcel. ESP Associates of Greensboro, North Carolina was selected for conduct of the geophysical surveys. Geologic Exploration Inc. of Statesville, North Carolina was retained by AMEC to perform the direct push sampling for soil borings. QROS was contacted for acquisition of a rented UVF Hydrocarbon Analyzer and Enviro Equipment, Inc. was contacted for rental of a Photoionization Detector (PID).

3.2 Site Reconnaissance

AMEC personnel performed a site reconnaissance on August 8, 2014. During the site reconnaissance, the area was visually examined for the presence of any UST or areas/obstructions that could potentially affect the subsurface investigation and the number of boring locations were discussed. AMEC personnel also used the site visit as an opportunity to contact the property manager and inform the store of upcoming field activities.

3.3 Geophysical Survey Results

The geophysical survey of the site occurred on the 20th and 21st of August 2014. The geophysical subcontractor, ESP Associates, P.A., performed electromagnetic followed by ground penetrating radar (GPR) surveys. From their survey data, ESP Associates identified one geophysical anomaly that they classified as a possible UST. The GPR data suggests that the possible UST is about 20 feet long, 2.5 feet in diameter and buried about 5 feet BGS. It is possible that this feature is two or more USTs laid end to end. The GPR data also identified a possible product line leading from the possible UST towards the building. The possible product line is buried approximately two feet BGS. ESP Associates, P.A. did not identify additional potential USTs, potential product lines and/or subsurface utilities at the site. Geophysical Report is presented in **Appendix C**.

3.4 Well Survey

A well survey was not performed as part of this PSA.

3.5 Soil Sampling

AMEC conducted drilling activities at the site on August 27th, 2014. AMEC's drilling subcontractor Geologic Exploration Inc. advanced five direct push soil borings within the proposed expanded NCDOT ROW. Soil boring locations were focused in the area of the identified geophysical anomaly and within the area of investigation. Boring locations were strategically placed on the northern and southern ends of the possible UST. Utilities which run parallel to the possible UST did not allow borings to be placed on the western side of the possible UST. The remaining three borings were placed parallel to Statesville Road on the eastern side of the possible UST and within the area of investigation. Figure 2 presents the Site Map with boring locations and identifications.

The purpose of soil sampling was to determine if a petroleum release had occurred in the vicinity of the possible UST or elsewhere within the area of investigation, and if so, to estimate the volume of impacted soil that might require special handling during construction activities. Soil sampling was performed utilizing direct push methods accompanied by field screening and onsite quantitative analyses. AMEC conducted field screening of the soil borings with a PID that was used to screen recovered soil at approximate one-foot intervals. Any interval of the soil boring exhibiting elevated PID readings was selected for onsite quantitative analysis of total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH) soil via ultraviolet fluorescence (UVF) utilizing a QROS-QED Hydrocarbon Analyzer. When no PID readings were measurable in a boring then one shallow and one deeper soil sample was retained from each boring for UVF onsite analysis. The analysis was performed onsite by Troy Holzschuh, a certified QED UVF technician with AMEC. The UVF results were generated concurrent with soil boring activities so that real-time decision making could be utilized for boring placement.

4.0 SOIL SAMPLING RESULTS

Based on PID field screening and onsite UVF hydrocarbon analysis from August 27, 2014 there is no evidence of a petroleum hydrocarbon release onsite, within the area of investigation.

Onsite Soil Screening and UVF Analysis

Elevated PID readings, above ten parts per million, were not detected in any of the five borings conducted at the site. The PID field screening results are summarized in **Table 1** and are provided on the boring logs in Appendix B.

Results from UVF onsite hydrocarbon analyses are presented in **Table 2**, with instrument generated tables in **Appendix D**. Several categories of analyses were measured onsite such as: gasoline range organics (GRO); diesel range organics (DRO); benzene, ethylbenzene, toluene, xylenes (BETX); total aromatics; and polycyclic aromatics (PAHs). **Figure 3** presents the GRO and DRO results at each boring.

Elevated GRO or DRO values, above the NCDENR Action Limit of 10 mg/kg, were not detected in any of the five soil borings drilled at the site. Low level TPH or PAH concentrations were measured in four of the ten soil samples with identified fingerprint matches of waste oil or degraded petroleum hydrocarbons. Maximum concentrations were observed in V-SB-2 at the 5 to 6 feet BGS sample with 4.09 mg/kg TPH-DRO and 1.26 mg/kg PAHs. This boring is east of the possible UST and north of the possible fuel line.

Onsite UVF hydrocarbon analysis results did not identify elevated total benzene, toluene, ethylbenzene and xylenes (BTEX). All of the total BTEX values detected were below quantitative limits. The hydrocarbon analysis results from the QED QROS Hydrocarbon Analyzer are provided in **Appendix D**.

5.0 CONCLUSIONS

Based on site observations and onsite UVF analysis, petroleum-impacted soil contamination was not identified above the NCDENR Action level of 10 mg/kg during the field activities.

The following bulleted summary is based upon AMEC's evaluation of field observations and onsite quantitative analyses of soil samples collected from the Site on August 27, 2014.

- The property operates as a quick lube and oil change facility and contains two operating oil changing pits.

- Geophysics data suggests that, in the area of investigation, one possible UST is about 20 feet long, 2.5 feet in diameter and buried about 5 feet BGS. It is possible that this feature is two or more USTs laid end to end.

- Geophysics data also identified a possible product line leading from the possible UST towards the building. The possible product line is buried approximately two feet bgs.

- Five soil borings were drilled with two soil samples collected from each boring. Since the PID did not indicate elevated readings the samples were collected at the 5 to 6 foot and the 9 to 10 foot intervals. Each sample was analyzed via UVF in the field utilizing a QROS QED Hydrocarbon Analyzer.

- All TPH values were below the NC Action level of 10 mg/kg.

6.0 RECOMMENDATIONS

Based on these PSA results, AMEC does not recommend further assessment or soil sampling in the area of investigation. Once design information is available, specifically the depth of construction for roadway improvements, the possible UST may need to be investigated and closed by removal.

TABLES

Table 1
PID Field Screening Results
Valvoline Site-Mecklenburg County
Huntersville, North Carolina

SAMPLE ID	Sample Date	Comments	Sample Depth (feet bgs)	Field Screening PID data (ppm)
V-SB-1	8/27/2014	South of Valvoline Sign	5 to 6	0
		South of Valvoline Sign	9 to 10	0
V-SB-2	8/27/2014	North of Possible Fuel Line	5 to 6	0
		North of Possible Fuel Line	9 to 10	0
V-SB-3	8/27/2014	East of Power Pole on the North End of Property	5 to 6	0
		East of Power Pole on the North End of Property	9 to 10	0
V-SB-4	8/27/2014	South of Possible UST	5 to 6	0
		South of Possible UST	9 to 10	0
V-SB-5	8/27/2014	North of Possible UST	5 to 6	0
		North of Possible UST	9 to 10	0

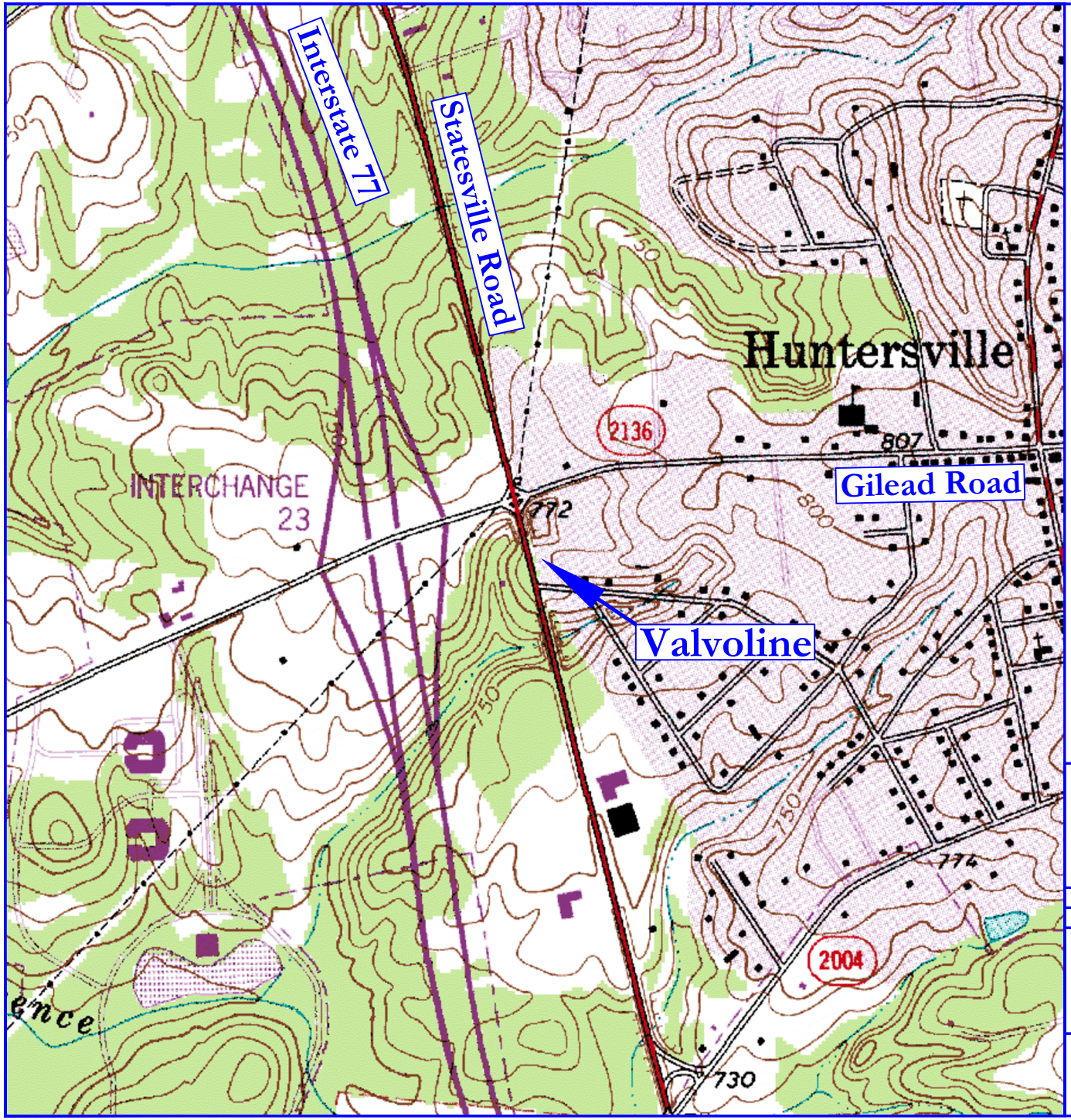
Notes: PPM = Parts Per Million

Table 2
UVF Onsite Hydrocarbon Analytical Soil Data, 8/27/14
Valvoline Site-Mecklenburg County
Huntersville, North Carolina

Sample ID Number	Sample Depth (ft bgs)	BTEX (mg/kg)	GRO (mg/kg)	DRO(mg/kg)	PAHs (mg/kg)
V-SB-1	5 to 6	<1.3	<1.3	<0.25	<0.03
V-SB-1	9 to 10	<1.0	<1.0	<0.21	<0.02
V-SB-2	5 to 6	<1.0	<1.0	4	1.26
V-SB-2	9 to 10	<1.1	<1.1	<0.21	<0.02
V-SB-3	5 to 6	<1.3	<1.3	<0.26	<0.03
V-SB-3	9 to 10	<1.1	<1.1	3.16	0.89
V-SB-4	5 to 6	<1.0	<1.0	1	0.12
V-SB-4	9 to 10	<1.2	<1.2	<0.23	<0.02
V-SB-5	5 to 6	<1.1	<1.1	1	0.89
V-SB-5	9 to 10	<1.1	<1.1	1.42	<0.02

NOTES:
(mg/kg) = Millograms per kilogram
GRO = Gasoline Organic Compounds
DRO = Diesel Organic Compounds
BTEX = Benzene, Toluene, Ethylbenzene and Xylenes
PAHs = Polycyclic Aromatic Hydrocarbon
ft bgs = feet below ground surface

FIGURES



0' 500' 1000' 1500'

1" = 1000'

7.5 Minute Quadrangle
North Carolina, 1983
Photorevised 1993

VICINITY MAP

QAS II Inc. Property (Valvoline Oil)
14114 Statesville Rd. Huntersville, NC

DRAWING NAME: P:\NCDOT\Huntersville\FIG1			DATE: 10/6/14	
SCALE: 1 INCH = 1,000 FEET	DR: TLH	CHK: HPC	REV:	

PREPARED FOR:
NC Department Of Transportation
Geotechnical Unit
WBS Element: 42376.1.FR
TIP# U-5114

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Figure:

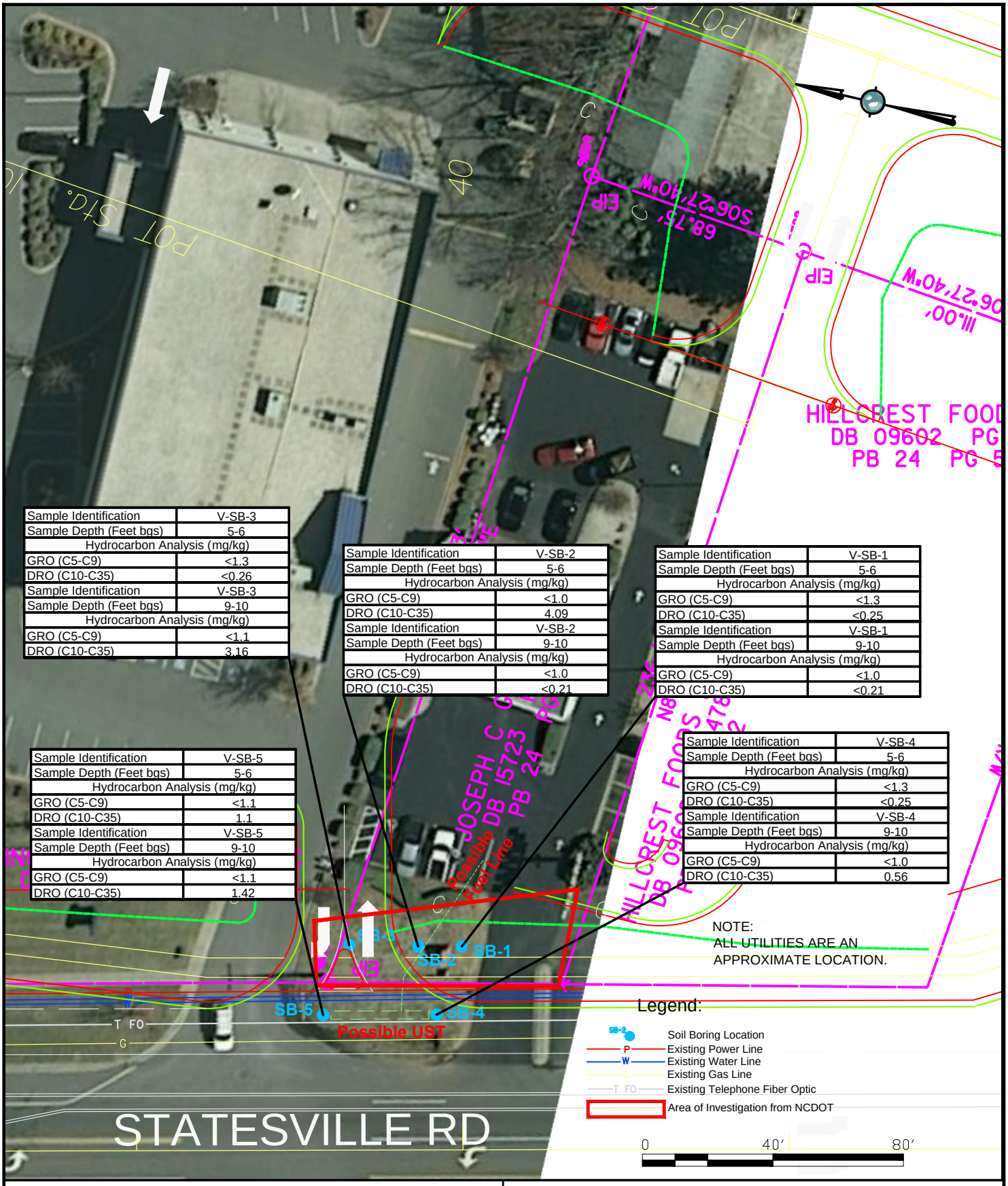
Figure 1

amec

SITE MAP WITH BORING LOCATIONS
QAS II Inc. (Valvoline Oil)
14114 Statesville Rd. Huntersville, NC 28078

PREPARED BY:	DATE:	CHECKED BY:	DATE:	JOB NUMBER:	FIGURE:
LDD/TLH	10/1/2014	HPC	10/1/2014	153055114.0003	2

Path: P:\6228 Environmental\jobs\2014\15305-XXXX NCDOT GeoEnvironmental\U-5114, Huntersville PSAs\MicroStation.Drawing\U5114 Figures.dwg [Valvoline Figure 2]
Date: October 21, 2014 - 4:01pm By: dewayne.dunn



Sample Identification	V-SB-3
Sample Depth (Feet bgs)	5-6
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.3
DRO (C10-C35)	<0.26
Sample Identification	V-SB-3
Sample Depth (Feet bgs)	9-10
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.1
DRO (C10-C35)	3.16

Sample Identification	V-SB-2
Sample Depth (Feet bgs)	5-6
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.0
DRO (C10-C35)	4.09
Sample Identification	V-SB-2
Sample Depth (Feet bgs)	9-10
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.0
DRO (C10-C35)	<0.21

Sample Identification	V-SB-1
Sample Depth (Feet bgs)	5-6
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.3
DRO (C10-C35)	<0.25
Sample Identification	V-SB-1
Sample Depth (Feet bgs)	9-10
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.0
DRO (C10-C35)	<0.21

Sample Identification	V-SB-5
Sample Depth (Feet bgs)	5-6
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.1
DRO (C10-C35)	1.1
Sample Identification	V-SB-5
Sample Depth (Feet bgs)	9-10
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.1
DRO (C10-C35)	1.42

Sample Identification	V-SB-4
Sample Depth (Feet bgs)	5-6
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.3
DRO (C10-C35)	<0.25
Sample Identification	V-SB-4
Sample Depth (Feet bgs)	9-10
Hydrocarbon Analysis (mg/kg)	
GRO (C5-C9)	<1.0
DRO (C10-C35)	0.56

amec

ONSITE UVF HYDROCARBON ANALYSIS (8/27/14)
QAS II Inc. (Valvoline Oil)
14114 Statesville Rd. Huntersville, NC 28078

PREPARED BY:	DATE:	CHECKED BY:	DATE:	JOB NUMBER:	FIGURE:
LDD/TLH	10/1/2014	HPC	10/1/2014	153055114.0003	3

Path: P:\6228 Environmental\jobs\2014\15305-XXXX NCDOT GeoEnvironmental\U-5114, Huntersville PSAs\MicroStation.Drawing\U5114 Figures.dwg [Valvoline Figure 3]
Date: October 21, 2014 - 4:01pm By: dewayne.dunn

APPENDIX A

PHOTOGRAPH LOG

Photo 1

Site prior to PSA activities .

Photo 2

Area of investigation.

Photo 3

Possible UST as marked by Geophysical Survey.

Photo 4

Geologic Exploration using a hand auger for the upper 5 feet prior to using the direct push drill rig.

APPENDIX B

BORING LOGS

AMEC of NC, Inc.
BORING LOG

Boring/Well No.: V-SB-1	**Site Name: Valvoline**
Date: 8-27-14	**Location: Huntersville, Mecklenburg Co., NC**
Job No.: 153055114	**Sample Method: Direct Push**
AMEC Rep: Shane Sisco	**Drilling Method: Direct Push**
Drilling Company: Geologic Exploration	**Driller Name/Cert #: Jacob Messick/B4252**
Remarks:	

Depth (ft BLS)	PID/OVA Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
0.5-10			Red, Clayey Silt
0.5-1	0		
1-2	0		
2-3	0		
3-4	0		
4-5	0		
5-6	0	V-SB-1(5-6)	
6-7	0		
7-8	0		
8-9	0		
9-10	0	V-SB-1(9-10)	

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:

AMEC Earth & Environmental, Inc.
BORING LOG

Boring/Well No.: V-SB-2	**Site Name: Valvoline**
Date: 8-27-14	**Location: Huntersville, Mecklenburg Co., NC**
Job No.: 153055114	**Sample Method: Direct Push**
AMEC Rep: Shane Sisco	**Drilling Method: Direct Push**
Drilling Company: Geologic Exploration	**Driller Name/Cert #: Jacob Messick/B4252**
Remarks:	

Depth (ft BLS)	PID/OVA Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
0.5-2.5			Redish Brown, Sandy Clayey Silt
0.5-1	0		
1-2	0		
2.5-3	0		
2.5-10			Red, Clayey Silt
2.5-3	0		
3-4	0		
4-5	0		
5-6	0	V-SB-2 (5-6)	
6-7	0		
7-8	0		
8-9	0		
9-10	0	V-SB-2 (9-10)	

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:

AMEC Earth & Environmental, Inc.

BORING LOG

Boring/Well No.: V-SB-3	**Site Name: Valvoline**
Date: 8-27-14	**Location: Huntersville, Mecklenburg Co., NC**
Job No.: 153055114	**Sample Method: Direct Push**
AMEC Rep: Shane Sisco	**Drilling Method: Direct Push**
Drilling Company: Geologic Exploration	**Driller Name/Cert #: Jacob Messick/B4252**
Remarks:	

Depth (ft BLS)	PID/OVA Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
0.5-5			Red, Clayey Silt
0.5-1	0		
1-2	0		
2-3	0		
3-4	0		
4-5	0		
5-10			Brownish Red, Clayey Silt
5-6	0	V-SB-3 (5-6)	
6-7	0		
7-8	0		
8-9	0		
9-10	0	V-SB-3 (9-10)	

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:

AMEC Earth & Environmental, Inc.
BORING LOG

Boring/Well No.: V-SB-4	**Site Name: Valvoline**
Date: 8-27-14	**Location: Huntersville, Mecklenburg Co., NC**
Job No.: 153055114	**Sample Method: Direct Push**
AMEC Rep: Shane Sisco	**Drilling Method: Direct Push**
Drilling Company: Geologic Exploration	**Driller Name/Cert #: Jacob Messick/B4252**
Remarks:	

Depth (ft BLS)	PID/OVA Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
0.5-5			Red, Clayey Silt
0.5-1	0		
1-2	0		
2-3	0		
3-4	0		
4-4.5	0		
4.5-6			Brownish Red, Clayey Silt
4.5-5	0		
5-6	0	V-SB-4 (5-6)	
6-10			Brown, Clayey Silt, Moist
6-7	0		
7-8	0		
8-9	0		
9-10	0	V-SB-4 (9-10)	

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:

AMEC Earth & Environmental, Inc.
BORING LOG

Boring/Well No.: V-SB-5	**Site Name: Valvoline**
Date: 8-27-14	**Location: Huntersville, Mecklenburg Co., NC**
Job No.: 153055114	**Sample Method: Direct Push**
AMEC Rep: Shane Sisco	**Drilling Method: Direct Push**
Drilling Company: Geologic Exploration	**Driller Name/Cert #: Jacob Messick/B4252**
Remarks:	

Depth (ft BLS)	PID/OVA Reading (ppm)	Lab Sample ID	Soil/Lithologic Description
0.5-1.5			Brown, Gravelly Clayey Silt
0.5-1	0		
1-1.5	0		
1.5-4.5			Red, Clayey Silt
1.5-2	0		
2-3	0		
3-4	0		
4-4.5	0		
4.5-10			Red, Clayey Silt
4.5-5	0		
5-6	0	V-SB-5 (5-6)	
6-7	0		
7-8	0		
8-9	0		
9-10	0	V-SB-5 (9-10)	

WELL CONSTRUCTION DETAILS (If Applicable)

Well Type/Diameter:	Outer Casing Interval:
Total Depth:	Outer Casing Diameter:
Screen Interval:	Bentonite Interval:
Sand Interval:	Slot Size:
Grout Interval:	Static Water Level:

APPENDIX C

GEOPHYSICAL REPORT

ESP Associates, P.A.

September 2, 2014

Ms. Helen Corley, LG, Project Manager
AMEC Earth and Environmental of North Carolina, Inc.
2801 Yorkmont Road, Suite 100
Charlotte, NC 28208

Subject: Report on Geophysical Services for QAS II Inc. (Valvoline Oil) Property
ESP Project No. CS34.302.000

State Project:	U-5114
WBS Element	42376.1.FR1
County:	Mecklenburg
Description:	Huntersville- Intersection of US 21 (Statesville Road) and Gilead Road, construct intersection improvements including bicycle and pedestrian accommodations

Dear Ms. Corley:

ESP Associates, P.A. (ESP) is pleased to present this report on the geophysical services we provided for the referenced project. We sent preliminary results to you and Mr. Troy Holzschuh via email on August 26, 2014. This work was performed in accordance with the NCDOT's Request for Proposal to AMEC dated July 29, 2014 and our cost proposal sent to the NCDOT on August 15, 2014. We received a verbal notice to proceed from Mr. Craig Haden on August 18, 2014.

1.0 GEOPHYSICAL DATA COLLECTION

On August 20 and 21, ESP performed geophysical studies within the planned right-of-way and/or easements at the Valvoline property. The work consisted of metal detection using a Geonics EM61 MK2 instrument connected to an Archer Field PC, followed by subsurface imaging of selected EM61 anomalies using a Sensors and Software Noggin 250 Ground-Penetrating Radar (GPR) instrument. Representative photographs of the geophysical study area are provided on Figure 1.

The EM61 data were collected over the accessible areas using a line spacing of approximately 2.5 feet. We used a sub-meter differential GPS instrument (Hemisphere XF101) connected to the Archer Field PC to provide approximate locations of the EM61 data in real time. We collected GPR data using a line

spacing of one to two feet in the vicinity of an EM61 anomaly in the drainage ditch on the west side of the property (Figure 1.C). The remaining EM61 anomalies on the property were attributed to surface objects and buried utilities.

2.0 DATA ANALYSIS AND PRESENTATION

The EM61 data were gridded and contoured to produce plan view contour maps of the early time gate response (Figure 2) and the differential response (Figure 3). The differential response is calculated by subtracting the response of the bottom coil from the response of the top coil of the EM61. Typically, the differential response diminishes the response from smaller, near-surface metallic objects, thus emphasizing the response from deeper and larger metallic objects. The approximate locations of observed site features, such as utilities and signs, were superimposed on the contour maps.

The GPR data were reviewed in the field and were processed later for further review and for display in this report (Figure 4).

3.0 DISCUSSION OF RESULTS

The EM61 early time gate contour plot shows the response from known site features in addition to inferred buried utilities, as noted (Figure 2). The EM61 differential contour plot indicates anomalies that correspond to known features, such as signs, manholes, drop inlets, poles, and guy wire anchors (Figure 3).

An EM61 anomaly not attributed to known site features was observed at the west side of the property in the vicinity of the ditch. The GPR data we collected over this anomaly suggested the presence of a possible buried underground storage tank (UST) or tanks (Figure 4). The location of the possible UST(s) was offset to the east from the EM61 anomaly. The GPR data suggest that the possible UST is about 20 feet long, about 2.5 feet in diameter, and is buried about 5 feet below the ground surface. It is possible that this feature is two or more USTs laid end to end. The outline of the possible UST was marked on the ground surface with pink marking paint. We also marked a buried pipe leading from the possible UST towards the building with a dashed line; this pipe could be a product line. The GPR data indicates this pipe is buried about two feet below the ground surface.

4.0 SUMMARY AND CONCLUSIONS

Our review of the geophysical data collected for this project indicates the presence of a possible UST(s) within the geophysical study areas. The possible UST(s) is about 20 feet long, about 2.5 feet in diameter, and is buried about 5 feet below the ground surface. These dimensions correspond to a tank volume of about 700 gallons or possibly two 350-gallon tanks.

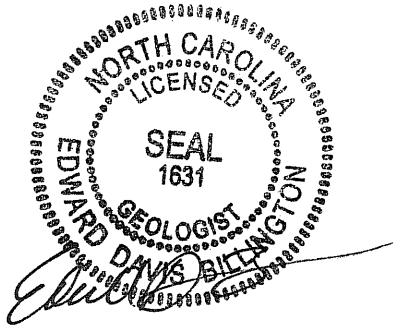
5.0 LIMITATIONS

These services have been provided for AMEC and the North Carolina Department of Transportation in accordance with generally accepted guidelines for performing geophysical surveys. It is recognized that the results of geophysical surveys are non-unique and subject to interpretation. Further, the locations of data and features included in this report are approximate and were collected using a sub-meter DGPS instrument. ESP makes no guarantee as to the accuracy of these locations.

Thank you for the opportunity to be of service to AMEC and the NCDOT Geotechnical Engineering Unit on this project. Please contact us if you have any questions or need further information.

Sincerely,

ESP ASSOCIATES, P.A.



Edward D. Billington, P.G.

EDB/PMW

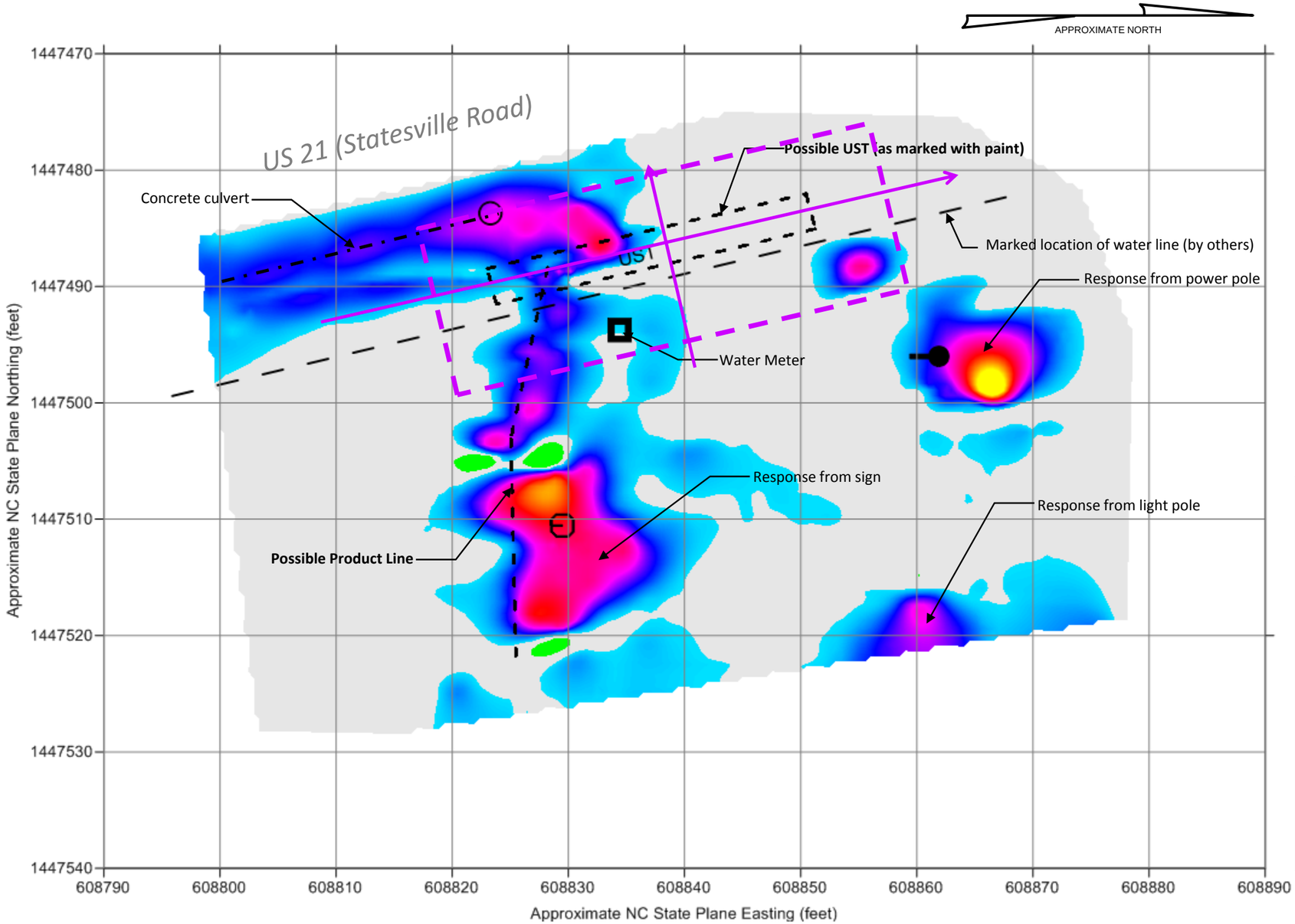
Attachments: Figures 1 – 4

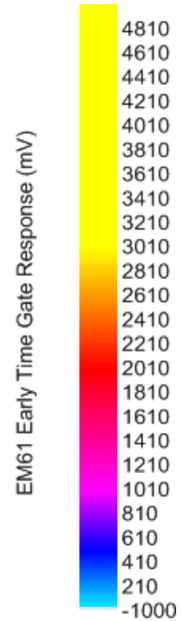
A. Photo of Valvoline site from north end of property, looking south.

B. Photo of Valvoline site from south end of property, looking north.

C. Photo of Possible UST marked on Valvoline site, looking north.

PROJECT NO. CS34.302.000	***FIGURE 1 – VALVOLINE PROPERTY PHOTOS OF SITE***	ESP Associates, P.A.
SCALE NTS		7204 W. Friendly Ave. Greensboro, NC 27410
DATE 8/25/14	***U-5114, INTERSECTION OF US21 AND GILEAD ROAD MECKLENBURG COUNTY, NORTH CAROLINA***	336.334.7724
BY EDB		www.espassociates.com





EXPLANATION

- Miscellaneous metal object (pipe, debris, etc.)
- Utility Box (water meter, electrical outlet, etc.)
- Drop Inlet or Catch Basin
- Manhole
- Power pole
- Guy wire anchor
- Light pole
- Sign
- EM61 Data Collection Areas
- GPR Data Collection Areas
- Individual GPR Lines and Direction
- UST — Approximate location of possible or probable UST

Note: Locations of data and features are approximate and were collected using a sub-meter DGPS instrument. ESP make no guarantees as to the accuracy of these locations. Coordinates on the axes of the maps are approximate and provided for general reference only.

PROJECT NO.	CS34.302.000
SCALE	AS SHOWN
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BY	EDB

FIGURE 2 – VALVOLINE PROPERTY
EM61 EARLY TIME GATE RESPONSE

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MECKLENBURG COUNTY, NORTH CAROLINA

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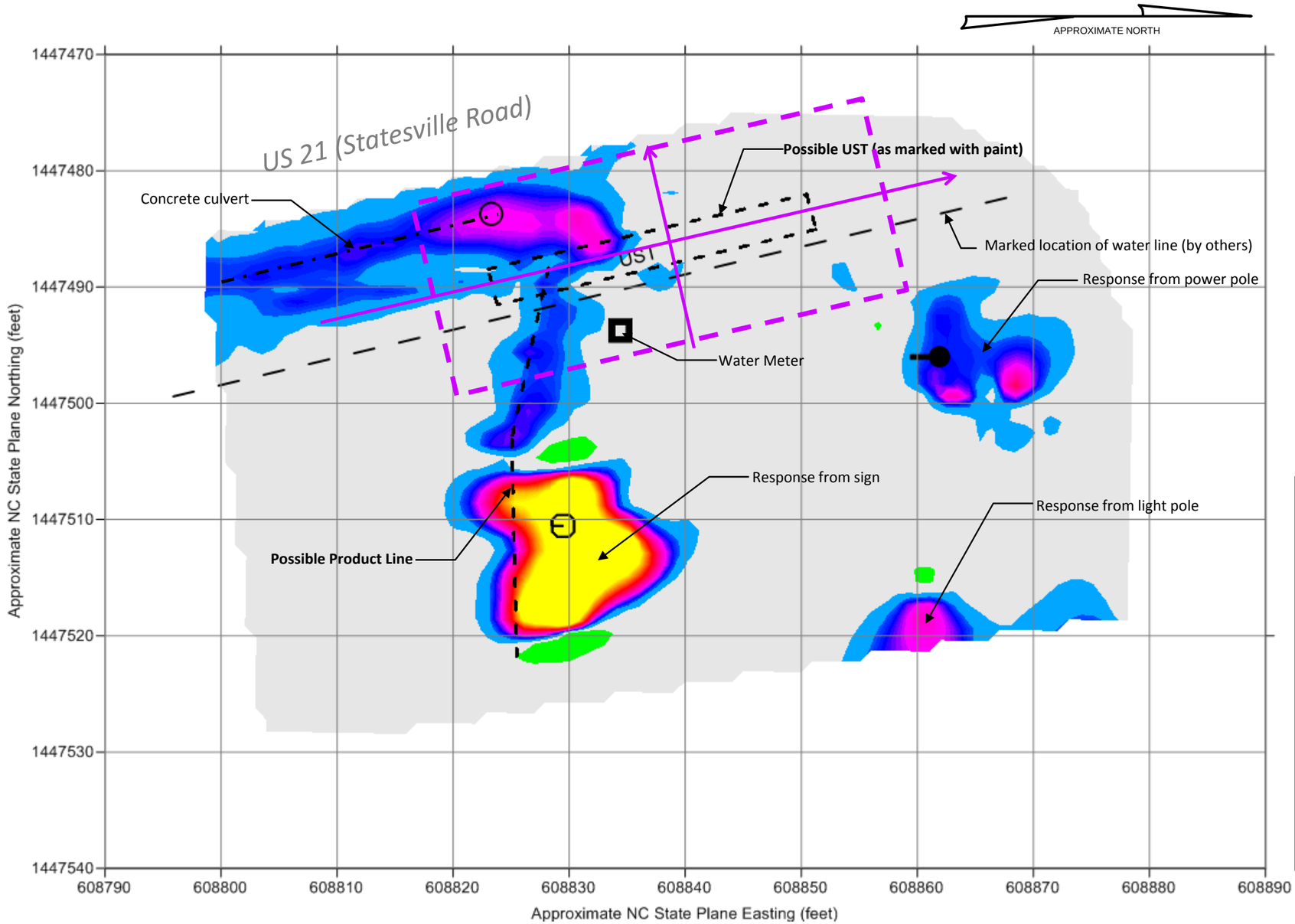
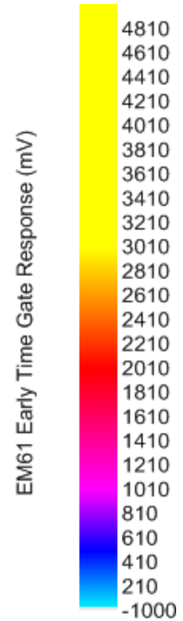
7204 W. Friendly Ave.
Greensboro, NC 27410
336.334.7724
www.espassociates.com





EXPLANATION

- Miscellaneous metal object (pipe, debris, etc.)
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- GPR Data Collection Areas
- Individual GPR Lines and Direction
- Approximate location of possible or probable UST

Note: Locations of data and features are approximate and were collected using a sub-meter DGPS instrument. ESP make no guarantees as to the accuracy of these locations. Coordinates on the axes of the maps are approximate and provided for general reference only.

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DATE	8/25/14
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FIGURE 3 – VALVOLINE PROPERTY
EM61 DIFFERENTIAL RESPONSE

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MECKLENBURG COUNTY, NORTH CAROLINA

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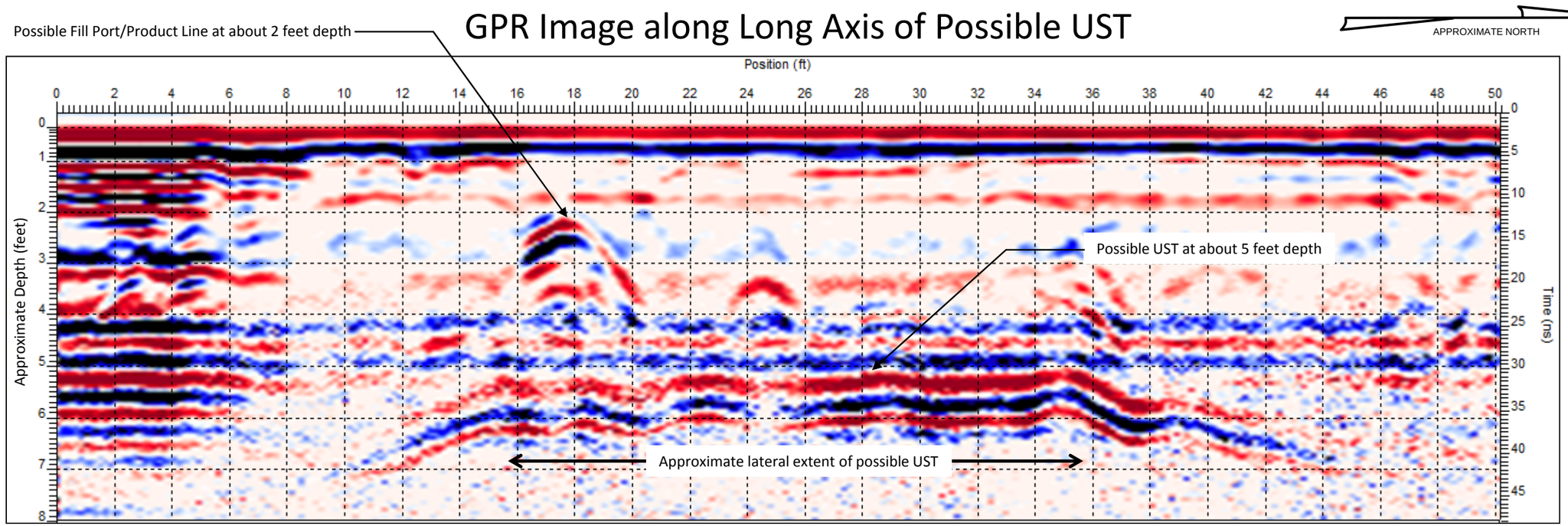
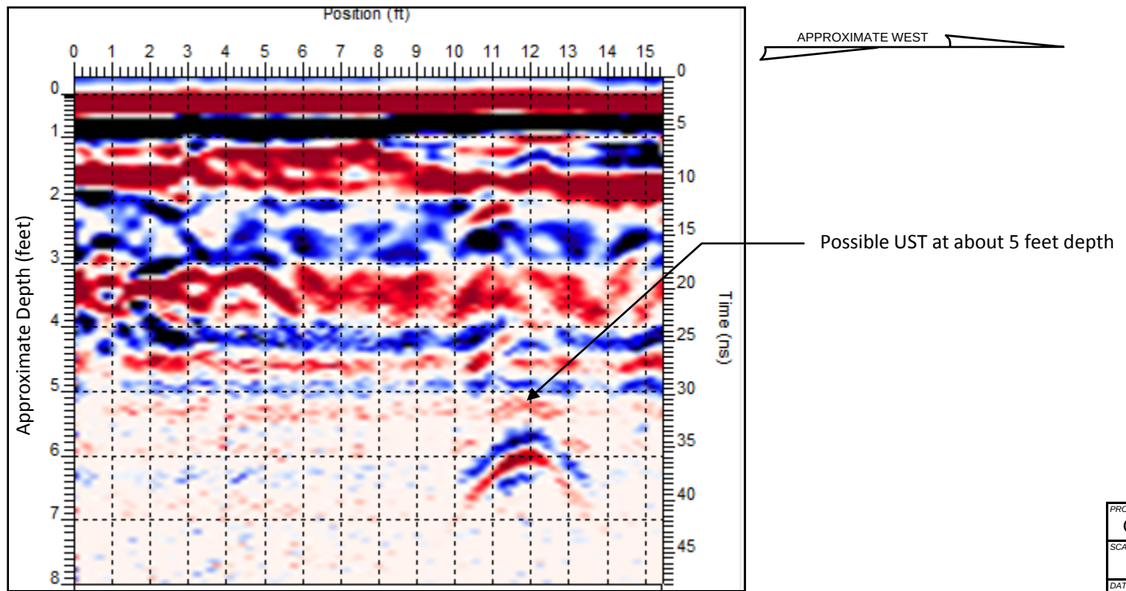
GPR Image along Long Axis of Possible UST



GPR Image along Short Axis of Possible UST



APPROXIMATE WEST

Possible UST at about 5 feet depth

PROJECT NO. CS34.302.000	***FIGURE 4 – VALVOLINE PROPERTY EXAMPLE GPR IMAGES***	ESP Associates, P.A.
SCALE AS SHOWN		7204 W. Friendly Ave. Greensboro, NC 27410
DATE 8/25/14	***U-5114, INTERSECTION OF US21 AND GILEAD ROAD MECKLENBURG COUNTY, NORTH CAROLINA***	336.334.7724
BY EDB		www.espassociates.com

APPENDIX D

HYDROCARBON ANALYSIS RESULTS

QED

QROS

Hydrocarbon Analysis Results

Client: NCDOT
Address: 14114 Statesville Rd
Huntersville, NC
Valvoline

Contact: Craig Haden

Project: U-5114

Samples taken Wednesday, August 27, 2014
Samples extracted Wednesday, August 27, 2014
Samples analysed Wednesday, August 27, 2014

Operator Troy L. Holzschuh

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	V-SB-1 (5-6)	25.0	<1.3	<1.3	<0.25	<1.3	<0.25	<0.03	<0.025	0	0	0	TPH not detected
s	V-SB-1 (9-10)	21.0	<1	<1	<0.21	<0.21	<0.21	<0.02	<0.021	0	76.7	23.3	PAH
s	V-SB-2 (5-6)	20.0	<1	<1	4.09	4.09	1.26	0.06	<0.02	90.7	9.3	0	Waste OilWaste Oil (FCM) 58.1%
s	V-SB-2 (9-10)	21.0	<1.1	<1.1	<0.21	<1.1	<0.21	<0.02	<0.021	0	0	0	Background Organics
s	V-SB-3 (5-6)	26.0	<1.3	<1.3	<0.26	<1.3	<0.26	<0.03	<0.026	0	0	0	TPH not detected
s	V-SB--3 (9-10)	22.0	<1.1	<1.1	3.16	3.16	2.27	0.89	<0.022	67.8	30.6	1.6	Coal Tar 92.1%
s	V-SB-4 (5-6)	21.0	<1	<1	0.56	0.56	0.55	0.12	<0.021	81.3	6.7	12	V.Deg.PHC 50%
s	V-SB-4 (9-10)	23.0	<1.2	<1.2	<0.23	<1.2	<0.23	<0.02	<0.023	0	100	0	Match not possible
s	V-SB-5 (5-6)	22.0	<1.1	<1.1	1.1	1.1	0.79	0.89	<0.022	71.1	18.8	10.1	V.Deg.PHC 59.2%
s	V-SB-5 (9-10)	22.0	<1.1	<1.1	1.42	1.42	<0.22	<0.02	<0.022	86.7	10.7	2.5	Deg.Fuel (FCM) 45.5%

Initial Calibrator QC check OK

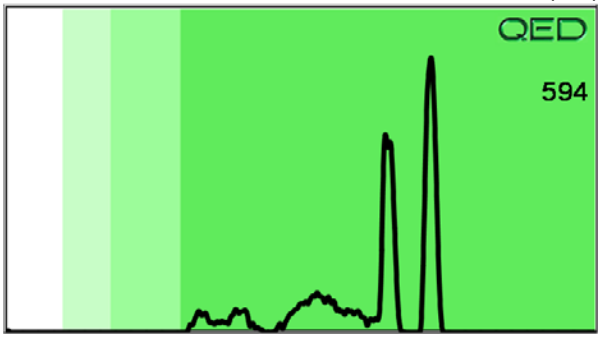
Final FCM QC Check OK 92.4%

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

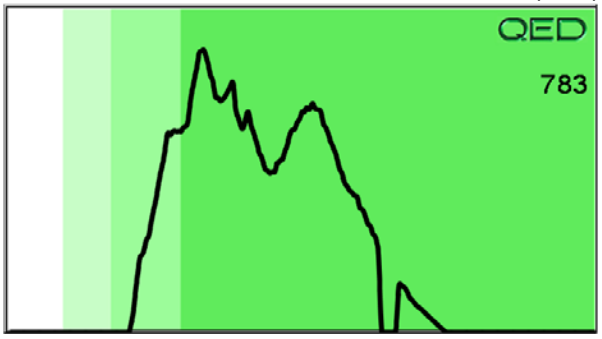
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

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

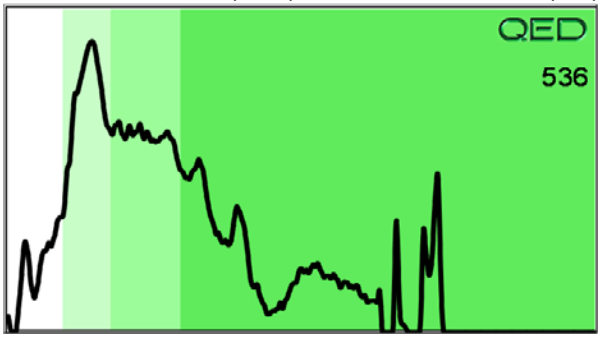
TPH not detected V-SB-1 (5-6)



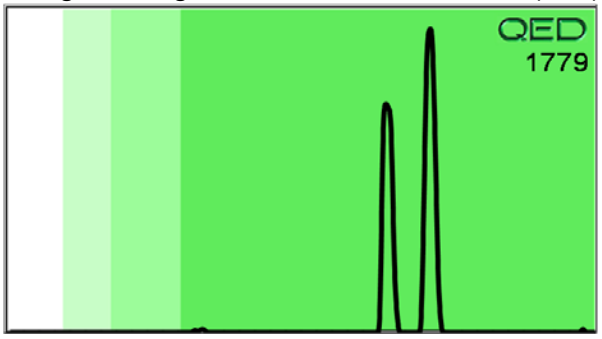
PAH V-SB-1 (9-10)



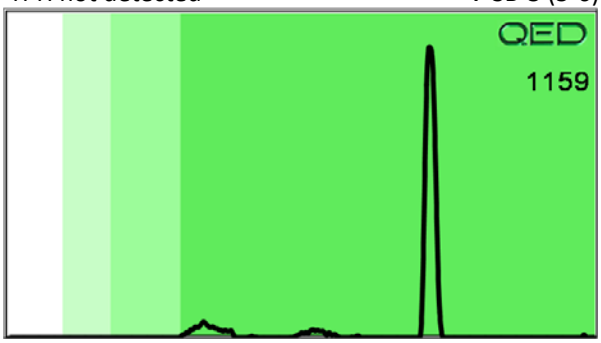
Waste OilWaste Oil (FCM) 58.1% V-SB-2 (5-6)



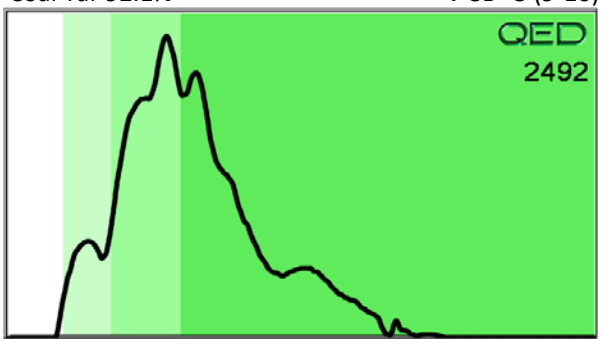
Background Organics V-SB-2 (9-10)



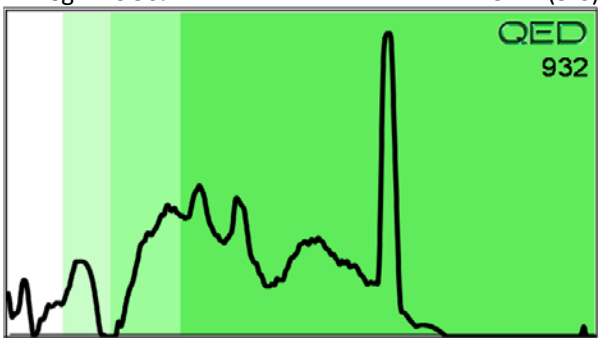
TPH not detected V-SB-3 (5-6)



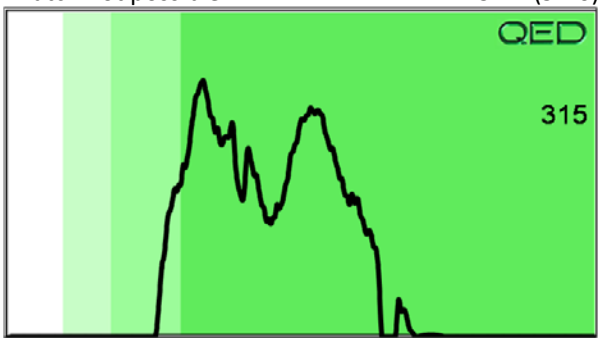
Coal Tar 92.1% V-SB--3 (9-10)



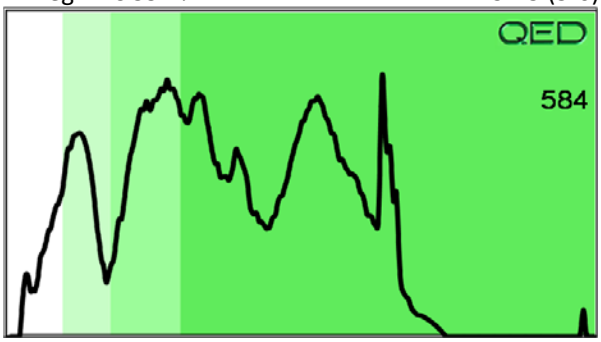
V.Deg.PHC 50% V-SB-4 (5-6)



Match not possible V-SB-4 (9-10)



V.Deg.PHC 59.2% V-SB-5 (5-6)



Deg.Fuel (FCM) 45.5% V-SB-5 (9-10)