Phase II Environmental Site Assessment
Roadway Improvement Project

Route 1 Widening Project
C&J Automotive
17541 Jefferson Davis Highway
Dumfries, Virginia 22026
Prince William County

Contract ID: 44115
VDOT Project: 001-212-249
VDOT UPC: 90339 Act: 689
VDOT Task Number: E-FR024.08

Prepared for
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February 2019

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Reviewed by: **Christopher J. Lalli, Vice President**

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Acronyms

AST	Above Ground Storage Tank
BGS	Below Ground Surface
C	Celsius
COC	Chain of Custody
CL	Center Line
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency – United States
FT	Feet
LT	Left
mg/kg	Milligrams per Kilogram
MW	Monitoring Well
PG	Professional Geologist
PID	Photoionization Detector
PPM	Parts Per Million
REC	Recognized Environmental Condition
RL	Reporting Limit
Rt	Route
RT	Right
R/W	Right-of-Way
STA	Station
TPH-DRO	Total Petroleum Hydrocarbons - Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbons – Gasoline Range Organics
UST	Underground Storage Tank
VDOT	Virginia Department of Transportation
VOC	Volatile Organic Compounds
VSWMR	Virginia Solid Waste Management Regulations
3e	EEE Consulting, Inc.

1.0 INTRODUCTION AND BACKGROUND

The Virginia Department of Transportation (VDOT) is administering proposed improvements and realignment of 2.3-miles of Route 1 (Fraley Boulevard) between the intersection with Quantico Gateway Drive and the intersection with Drumfires Road (State Route 234) in Dumfries, Prince William County, Virginia. The general project location and topographic setting are shown on **Figures 1** and **2**, respectively. An aerial photograph of the project area is also presented as **Figure 3**.

The roadway and drainage improvements will occur in existing roadway right-of-way (R/W), proposed R/W, permanent easements (slope & drainage), temporary construction easements (i.e. erosion & sediment control measures) and proposed limited access lines. A Phase I Environmental Site Assessment (ESA) was prepared by EEE Consulting, Inc (**3e**) for the study area in August 2018, which identified Recognized Environmental Conditions (REC) throughout the corridor, including the subject property as follows:

- **C&J Automotive** (Parcels 091 and 092) located at 17541 Jefferson Davis Highway, Dumfries, VA 22026 (VDOT Plan Sheet Nos. 15, 15C, & 16). This property is an active auto dealership and vehicle repair shop with petroleum storage in 55-gallon drums and various small containers; and a 250-gallon used oil AST. The property also had a petroleum release to the environment, which was tracked by the DEQ under Pollution Complaint (PC) No. 2003-3054. Under a FOIA request, no documents were available for review to determine location or extent of the reported petroleum release.

According to Plan Sheet Nos. 15, 15C, & 16 (see **Figure 4**), these Parcels are potential full takes to accommodate the installation of several Drainage Structures, associated pipe connections, and a Stormwater Management Basin (BMP #8).

The RECs identified at Parcels 091 and 092 have the potential to pose adverse impacts to subsurface media that will likely be disturbed during the installation of the noted drainage improvements. The constituents of concern are petroleum-based, which are based on the RECs identified above, and detailed in the Phase I ESA Corridor Study Report (**3e**, August 2018). Based on this information, the VDOT – NOVA District Hazardous Materials Manager requested the collection of representative samples to confirm the presence/absence of petroleum impacts to soil and groundwater in and proximate to the proposed acquisition and associated disturbance areas. On December 13th, 2018, **3e** mobilized to the site following public and private utility markings to install borings for the collection of representative soil and groundwater samples for laboratory analysis.

Subsurface boring advancements, sampling methods, corresponding analytical results, and conclusions/recommendations pertaining to the proposed construction activities at each site are summarized in the following sections of this report.

2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS

Prior to implementing the direct push boring installations, the approximate locations of subsurface public utilities were identified and marked by Miss Utility of Virginia. A utility locate request form was also completed with VDOT to identify utilities owned and operated by VDOT. Copies of the Miss Utility and VDOT Tickets are included in **Appendix A**. In addition to public utility identification, private subsurface utilities were also identified and marked in each investigative area prior to commencing drilling activities.

3.0 SOIL AND GROUNDWATER SAMPLING METHODS

3.1. Soil Sampling Methods

On December 13th, 2018, a direct push drill rig was utilized to advance six (6) soil borings with one (1) boring converted to a temporary groundwater monitoring well (MW) at the following locations:

- B1 – Installed proximate to STA No. 337+80; 65-ft RT of CL to a depth of 15-ft BGS as proposed.
- B2 – Installed proximate to STA No. 338+30; 120-ft RT of CL to a depth of 13-ft BGS upon refusal on consolidated material.
- B3 – Installed proximate to STA No. 338+15; 150-ft RT of CL to a depth of 15-ft BGS as proposed.
- B4 – Installed proximate to STA No. 339+15; 55-ft RT of CL to a depth of 20-ft BGS upon refusal on consolidated material with subsequent conversion to a temporary MW.
- B5 – Installed proximate to STA No. 338+00; 195-ft RT of CL to a depth of 13-ft BGS as proposed.
- B6 – Installed proximate to STA No. 339+45; 50-ft RT of CL to a depth of 18-ft BGS upon refusal on consolidated material.

The roadway improvements proposed to date, RECs, and boring locations are depicted on **Figure 4**.

Each soil boring was advanced using a Geoprobe® direct push rig. The direct-push rig utilizes a hollow-stem spoon that produced a continuous soil core in five (5)-ft intervals along the vertical depth of each boring. Each boring was advanced to predetermined depths or refusal at depths that ranged from 13-ft to 20-ft BGS. Subsurface conditions (i.e. wet soils) indicative of groundwater were only observed in B4. The detailed boring logs are presented in **Appendix B**.

Composite soil samples were collected to assess soil that will likely be disturbed during construction. The representative composite soil samples were obtained from the borings by collecting aliquots from the following depth intervals:

- B1, B2, B3 & B5: 5-10-ft and 10-15-ft BGS.
- B4 & B6: 10-15-ft and 15-20-ft BGS.

Each composite soil sample was placed into two (2) pre-cleaned 4-ounce glass jars. The sample jars were appropriately labeled and placed on ice in a cooler to maintain an appropriate temperature ($\leq$ 4°C) while in transit to the certified environmental laboratory. Chain of Custody (COC) documentation was completed for all samples submitted for laboratory analysis.

All composite soil samples obtained from the six (6) direct push borings were submitted for laboratory analysis of Total Petroleum Hydrocarbons Gasoline Range Organics (TPH-GRO) and Total Petroleum Hydrocarbons Diesel Range Organics (TPH-DRO). The COC documentation and laboratory analytical data are provided in **Appendix C**. A detailed discussion of the composite soil sample analytical results is presented in **Section 5.0** of this report.

3.2. Groundwater Sampling Methods

A temporary monitoring well was constructed in B4 to collect a representative groundwater sample to confirm the presence/absence of petroleum impact to the shallow groundwater table. This temporary well was constructed with 1-inch diameter, PVC well screen (slotted at 0.01-ft intervals) and solid 1-inch diameter casing. Screen and casing intervals for the temporary monitoring well is documented on the boring log (see **Appendix B)**. A PVC cap was fitted over the well to prevent intrusion of foreign material. Clean sand was then placed in the remaining annular space of the borehole to form a filter pack around the well screen.

On December 13th, 2018, an oil/water interface probe was utilized to determine the depth-to-groundwater and confirm the presence or absence of separate-phase petroleum in the temporary monitoring well. The static groundwater level in the temporary well was measured at a depth of 8.1-ft BGS (see **Appendix B**). Separate-phase petroleum or petroleum odors were not detected in the temporary monitoring well.

A representative groundwater sample was collected from the temporary monitoring well, which was prepared for transport to the laboratory in accordance the following procedures: 1) the sample was collected using disposable nylon string and a one-half-inch diameter, disposable polyethylene bailer; 2) the sample was placed into containers provided by the laboratory with the appropriate preservative; 3) placed on ice in a cooler to maintain appropriate temperature while in transport to the environmental laboratory and; 4) Chain of Custody documentation completed.

The groundwater sample was submitted for analysis of TPH-GRO and TPH-DRO by EPA Method 8015C and Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) by EPA Method 8021. The analytical data for the representative groundwater sample is provided in **Appendix C**. A discussion of the groundwater analytical results is provided in **Section 6.0** of this report.

After completion of the gauging/sampling activities, the temporary monitoring well was abandoned by removing the PVC screen and casing from the ground surface and filling the resulting void with bentonite chips.

4.0 PID SCREENING RESULTS

Photoionization Detector (PID) results for the screened direct push soil cores are presented below in **Table 1**. Measurement units are in parts per million (ppm).

Table 1 - PID Soil Screening Data: Route 1 – C&J Automotive

	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)
Depth (ft BGS)	0-5	5-10	10-15	15-20
B1	0.0	0.0	0.0	NA
B2	0.0	0.0	0.0	NA
B3	0.0	0.0	0.0	NA
B4	0.0	0.0	0.0	0.0
B5	0.0	0.0	0.0	NA
B6	0.0	0.0	0.0	0.0

Notes:
ppm = Parts per Million
BGS – Below Ground Surface
Depth Unit – foot BGS
NA – Not Applicable (no soil recovery)

A review of **Table 1** indicates that measurable PID readings were not observed in the screened soil cores in B1 through B6. No visual or olfactory evidence of petroleum-impacted media was observed during boring and sampling activities.

5.0 SOIL SAMPLE ANALYTICAL RESULTS

The analytical results obtained from the soil samples are summarized in **Table 2** on the following page. All results are listed in units of milligrams-per-kilogram (mg/kg). A detailed laboratory analytical report is provided in **Appendix C**.

Table 2: Soil Sample Analytical Data
C&J Automotive
Route 1 Widening, Dumfries VA
Units = Milligrams per Kilogram (mg/kg)

Location	**B1 5-10**		**B1 10-15**		**B2 5-10**		**B2 10-15**	
Laboratory I.D.	18L0643-01		18L0643-02		18L0643-03		18L0643-04	
Depth Below Grade	5-10 feet		10-15 feet		5-10 feet		10-15 feet	
Sample Time	8:55		9:00		9:20		9:30	
	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*
TPH-DRO	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*10.0*
TPH-GRO	ND	*0.10*	ND	*0.10*	ND	*0.10*	ND	*0.10*
Location	**B3 5-10**		**B3 10-15**		**B4 10-15**		**B4 15-20**	
Laboratory I.D.	18L0643-05		18L0643-06		18L0643-07		18L0643-08	
Depth Below Grade	5-10 feet		10-15 feet		10-15 feet		15-20 feet	
Sample Time	9:55		10:05		10:30		10:35	
	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*
TPH-DRO	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*10.0*
TPH-GRO	ND	*0.10*	ND	*0.10*	ND	*0.10*	ND	*0.28*
Location	**B5 5-10**		**B5 10-15**		**B6 10-15**		**B6 15-20**	
Laboratory I.D.	18L0643-09		18L0643-10		18L0643-11		18L0643-12	
Depth Below Grade	5-10 feet		10-15 feet		10-15 feet		15-20 feet	
Sample Time	10:55		11:05		11:25		11:30	
	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*
TPH-DRO	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*10.0*
TPH-GRO	ND	*0.10*	ND	*0.10*	ND	*0.10*	ND	*0.10*

Notes:
Bold / Underlined text = Concentration reported above RL
RL = Reporting Limit
ND -Below Laboratory Reporting Limit

A review of **Table 2** indicates that residual-phase TPH-DRO and TPH-GRO concentrations were not detected above the laboratory reporting limits (RLs) in the soil samples collected at Parcels 091 and 092.

6.0 DISSOLVED PHASE ANALYTICAL RESULTS

The dissolved-phase analytical result obtained from the groundwater sample collected at B4 are summarized in **Table 3** below. All results are listed in milligrams per liter (mg/L). A detailed laboratory analytical report is provided in **Appendix C**.

Table 3: Groundwater Sample Analytical Data
Route 1 Widening: C&J Automotive
Units = Milligrams per Liter (mg/l)

Location	**B4**	
Laboratory I.D.	18L0643-13	
Sample Time	12:10	
	Result	*RL*
TPH-GRO	ND	*0.10*
TPH-DRO	ND	*0.556*
Benzene	ND	*0.001*
Toluene	ND	*0.001*
Ethylbenzene	ND	*0.001*
m+p-xylenes	ND	*0.004*
o-xylene	ND	*0.002*

Notes:
Bold / Underlined text = Concentration reported above RL
RL = Reporting Limit
ND -Below Laboratory Reporting Limit

A review of **Table 3** indicates that dissolved-phase petroleum constituents were not detected above the applicable laboratory RLs in the representative groundwater sample collected from B4.

7.0 CONCLUSIONS AND RECOMMENDATIONS

A total of 6 direct push borings, with one (1) converted to a temporary groundwater monitoring well, were installed to determine if the RECs identified at Parcels 091 and 092 resulted in adverse impacts to subsurface media in the proposed acquisition and/or disturbance limits.

The representative soil and groundwater samples collected as part of this investigation did not contain detectable residual-phase and dissolved-phase petroleum constituent concentrations, respectively. Therefore, special management provisions to the construction contract should not apply for soil and groundwater that will likely be disturbed at Parcels 091 and 092 in response to the installation of the drainage improvements proposed as of the date of this report.

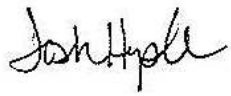
8.0 LIMITATIONS

It is impossible to know with certainty the entirety of a site is free of hazardous substances or conditions even with extensive subsurface testing. The conclusions of this investigation are based solely on the scope-of-work and on the sources of information reviewed during this investigation. This report was prepared for the exclusive use of VDOT, and their expressly-designated affiliates. **3e** accepts no responsibility for damages or claims resulting from past or future environmental degradation related to the subject property.

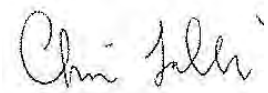
9.0 ACKNOWLEDGEMENT

3e appreciates the opportunity to provide environmental services to VDOT regarding the C&J Automotive - Route 1 roadway improvement project located in Dumfries, VA under the Professional Services HAZMAT Contract. If we may be of further assistance, or you have any questions or comments regarding the project, please contact our office at (540) 953-0170.

10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS



Joshua P. Hepler, PG
Project Environmental Scientist
Preparer



Chris Lalli
Vice President/Associate
Reviewer

Figures

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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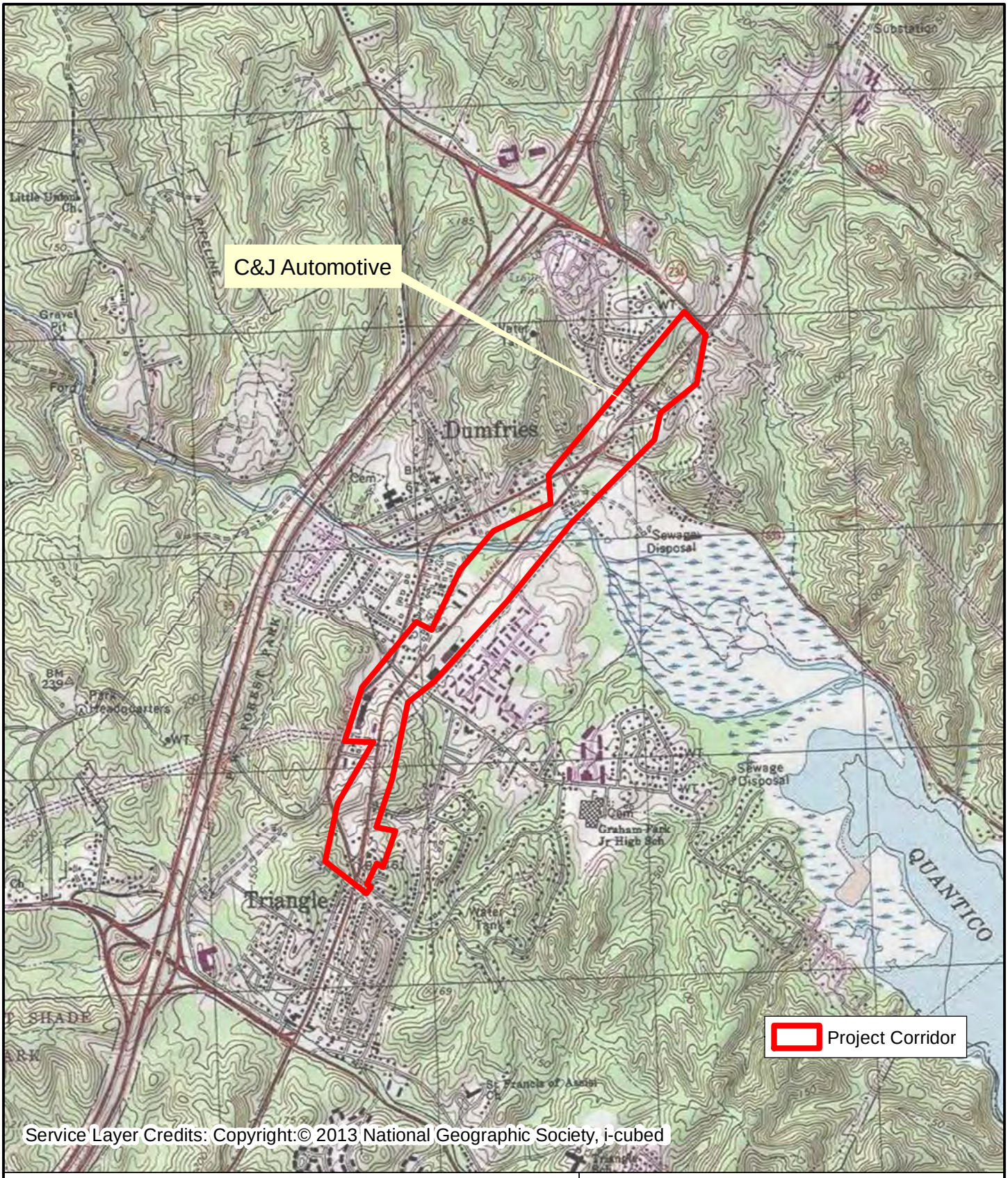
N

Prepared by Leah Potts, 01/24/2019
Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 1
PROJECT CORRIDOR AERIAL
C AND J AUTOMOTIVE

0 0.5 1
Miles

Dumfries, VA



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Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 2
PROJECT CORRIDOR TOPOGRAPHIC
C AND J AUTOMOTIVE

0 0.5 1
Miles

Dumfries, VA

1:24,000

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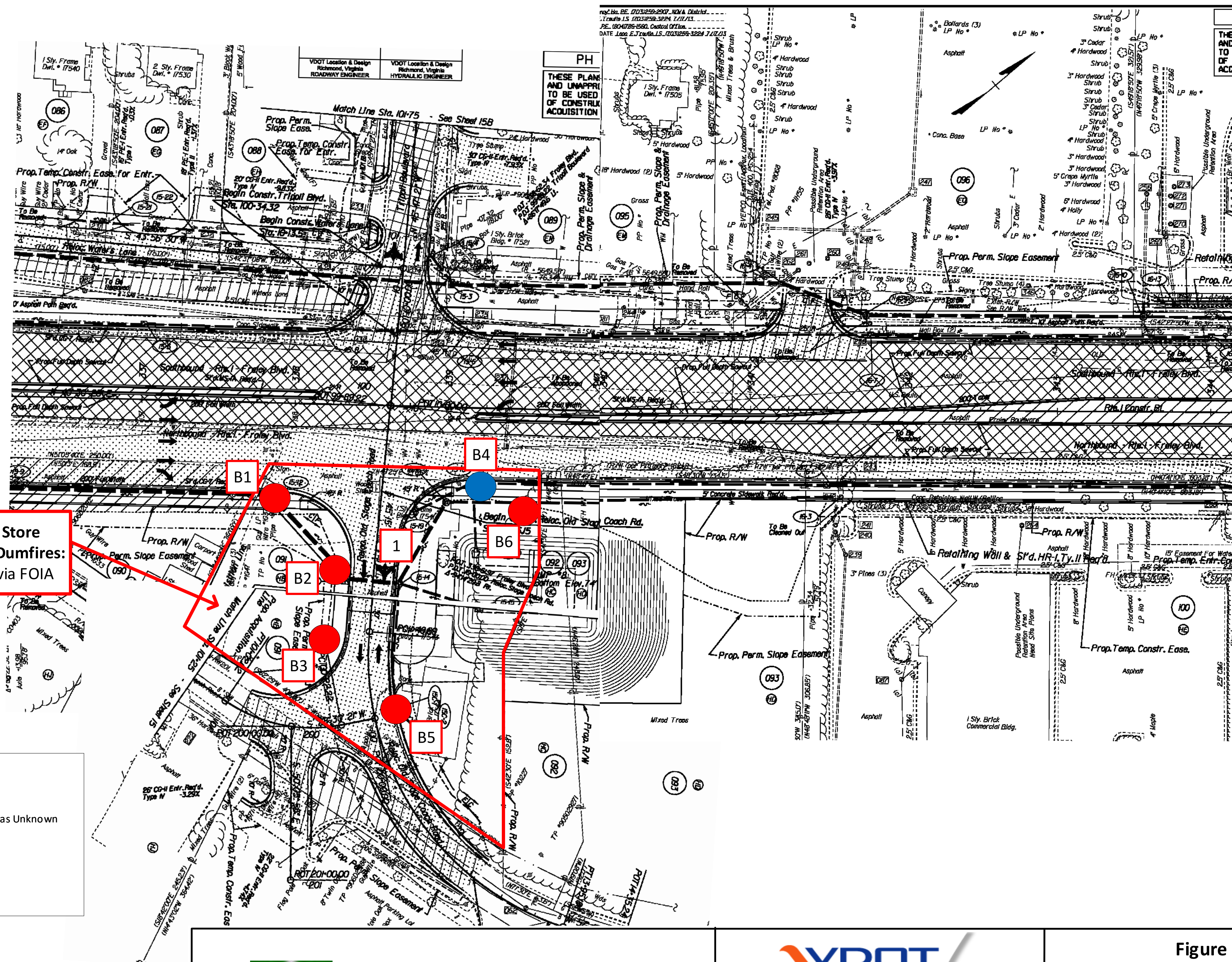
Sources: VGIN 2017
Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 3
AERIAL WITH PROPERTY BOUNDARIES
C AND J AUTOMOTIVE

0 100 200
Feet

Dumfries, VA



C&J Automotive/The Car Store
17539 Jefferson Davis Hwy, Dumfires:
PC 2003-3054 No Records via FOIA

LEGEND:

1	Petroleum Pollution Complaint – Affected Areas Unknown
(blue circle)	Temporary GW Monitoring Well
(red circle)	Soil Boring

Scale
0' 25' 50'

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VDOT
Virginia Department of Transportation

Route 1 Widening Project
Dumfries, Virginia

Figure 4

Plan Sheet Nos. 15, 15C, & 16 Depicting Identified RECs & Boring Locations at C&J Automotive.

E-FR024.08 January 2019

Appendix A: Miss Utility Ticket and VDOT Ticket

From: tickets@missutilityofvirginia.com
To: Josh Hepler
Subject: VUPS EMLCFM 2018/12/05 #01649 A833101323-02A RUSH RESP LREQ
Date: Wednesday, December 5, 2018 9:33:18 AM
Importance: High

EMLCFM 01649 VUPSa 12/05/18 09:33:14 A833101323-02A RESPONSE

Thank you for contacting VA811! This is an automatically generated response from the utilities who received your notice of excavation. If you have questions about the response, call the "field contact" for that utility. For your safety, please respect and protect the marks, excavate carefully around the marked utility lines and contact VA811 if you see clear evidence of unmarked utilities.

Remember, you can now reach VA811 by dialing 811.

Ticket : A833101323 Rev: 02A Taken: 12/05/18 07:10 AM

State: VA Cnty: PRINCE WILLIAM Place: DUMFRIES
Address : 17651 MAIN ST
Responses due by: 12/05/18 10:08 AM Expires: 12/19/18 07:00 AM

When the member Marking Code is blue, click for additional information that may be provided by the Operator/Locator.

Marking Code	Description	Response
CGV	COLUMBIA GAS (CGV930)	12/04/18 03:20 PM 10
	Marked	
	Field Contact: UTILIQUEST (703)754-2116	
	In the event of damage to a facility call: (800)543-8911	
CMC	COMCAST (CMC502)	12/03/18 02:42 PM 30
	No Conflict; utility is outside of stated work area.	
	Field Contact: CABLE PROTECTION SERVICES (804)562-3861	
	In the event of damage to a facility call: (800)441-6917 ext opt 1	
DOM	DOMINION ENERGY ELEC DIST (DOM400)	12/04/18 03:20 PM 10
	Marked	
	Field Contact: UTILIQUEST (703)754-2116	
	In the event of damage to a facility call: (888)667-3000	
PWS	PRINCE WILLIAM - WATER (PWS902)	11/29/18 09:16 AM 12
	Marked up to privately owned utility; contact private utility owner	
	for locate	
	Field Contact: BUTCH ROGERS (703)609-8097	
	In the event of damage to a facility call: (703)335-7982	
PWS	PRINCE WILLIAM - SEWER (PWS903)	11/29/18 09:16 AM 12
	Marked up to privately owned utility; contact private utility owner	
	for locate	
	Field Contact: BUTCH ROGERS (703)609-8097	
	In the event of damage to a facility call: (703)335-7982	
UNF	PEG BANDWIDTH (UNF937)	12/05/18 09:33 AM 30
	No Conflict; utility is outside of stated work area.	
	Field Contact: DAVID CADD (804)382-5823	
	In the event of damage to a facility call: (877)652-2321	
VZN	VERIZON (VZN703)	12/04/18 03:20 PM 10
	Marked	
	Field Contact: UTILIQUEST (703)754-2116	
	In the event of damage to a facility call: (888)483-1233	

LC1B

Locate Work Order Number:
N-04436

Project Location:
17541 Jefferson Davis Hwy, Dumfries, VA

Utility Location Results Form

Utility Location Results *(completed by utility location service provider)*

Photos attached ☑ Yes ☐ No

Was the location that was requested completed? ☐ Yes ☑ No

Detection cable and/or location tape available ☐ Yes ☑ No
Accurate As-Built Documents available ☐ Yes ☑ No

If no, please check all applicable boxes:

Accurate As-Built Documents:
Requested? ☐ Yes ☑ No Provided? ☐ Yes ☐ No
VDOT on-site assistance:
Requested? ☐ Yes ☑ No Provided? ☐ Yes ☐ No

Does the in-field survey area extend 3 feet beyond the border of the intended excavation area? (Required) ☐ Yes ☑ No

Utility Location Method(s) used:_____

Comments:

☐ Serco/Elite has provided utility markings within the scope of this request for all VDOT owned fiber optic communications cable, and all power cabling from the ITS Device to the ITS Cabinet that was accurately shown on drawings if provided by VDOT, or actual location contained detection cable or tape, and/or VDOT provided on-site assistance.

☐ Where no detection cable/tape and or accurate as-built documents, and/or VDOT assistance was not provided, we have provided approximate markings or no markings have occurred and the 3rd Party Requestor is advised that hand digging with extreme caution is advised. Photos have been attached.

☑ Please be advised that in no case will Serco/Elite be held liable or responsible for any power or communication cabling that falls outside our scope and could not be located due to the lack of accurate documentation, detection cable or tape, and/or VDOT assistance

☑ Arrived onsite to verify no VDOT ITS assets in the area.Team then verified junction boxes in area do not house VDOT fiber.

Certification:

The most appropriate equipment and technology to identify all VDOT underground utilities within the requested zone were used.

Utility Locator: (Print) Matt Robinson
(signature) _____
Company: Elite Contracting

Start time: 3:46 PM
End time: 3:48 PM
Date: 11-28-18

This information is valid for 15 days from signed date of marking. Any work performed after 15 days is not covered under this request and will need re-marked.

Appendix B: Boring Logs

Project Location:	**RT 1 Widening**
Site	**C&J**
Location	**STA 337+80.00; 65-ft Rt of CL**
Boring Location:	**B1**

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Date(s) Drilled:	**12/13/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**15'**	Screened Interval:	**N/A**
DTW Within Soil Boring:	**N/A**			Cased Interval:	**N/A**
Static GW Level:	**N/A**			Date GW Measured:	**N/A**

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.0			0.0-0.5' asphalt. 0.5-1' orange clay, moist. 1-5' grey/white sand, moist. No odors.
6 7 8 9 10	0.0		8:55	5-10' grey sand, slightly moist. No odors.
11 12 13 14 15	0.0		9:00	10-11' grey/orange clay, 11-14' grey/orange sand, 14-15' red clay. Dry. No odors. Boring terminated at 15-ft BGS.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site	**C&J**
Location	**STA 338+30.00; 120-ft Rt of CL**
Boring Location:	**B2**

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Date(s) Drilled:	**12/13/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**13'**	Screened Interval:	**N/A**
DTW Within Soil Boring:	**N/A**			Cased Interval:	**N/A**
Static GW Level:	**N/A**			Date GW Measured:	**N/A**

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.0			0-1' asphalt. 2-8' brown sandy clay. Dry. No odors.
6 7 8 9 10	0.0		9:20	8-11' grey sand. Moist. No odors.
11 12 13 14 15	0.0		9:30	11-13' red sand. Moist. No odors. Boring terminated at 15-ft BGS.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site	**C&J**
Location	**STA 338+15.00; 150-ft Rt of CL**
Boring Location:	**B3**

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Date(s) Drilled:	**12/13/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**13'**	Screened Interval:	**N/A**
DTW Within Soil Boring:	**N/A**			Cased Interval:	**N/A**
Static GW Level:	**N/A**			Date GW Measured:	**N/A**

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.0			0-1' asphalt. 1-2' coarse sandy clay, grey/orange. 2-4' grey clay. 4-5' grey sandy clay. Dry. No odors.
6 7 8 9 10	0.0		9:55	5-10' grey/orange sand. Slightly moist. No odors
11 12 13 14 15	0.0		10:05	11-13' grey/orange sand. Moist. No odors. Boring terminated at 15-ft BGS.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site	**C&J**
Location	**STA 339+15.00; 55-ft Rt of CL**
Boring Location:	**B4**

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Date(s) Drilled:	**12/13/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**20-ft**	Screened Interval:	**10-20-ft**
DTW Within Soil Boring:	**17-ft**			Cased Interval:	**0-10-ft**
Static GW Level:	**8.1-ft**			Date GW Measured:	**N/A**

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.0			0-0.5' topsoil. 0.5-5' sandy brown clay, moist. No odors.
6 7 8 9 10	0.0			5-14' orange white clay, very sandy, moist
11 12 13 14 15	0.0		10:30	14-15' orange white clay, moist
16 17 18 19 20	0.0		10:35	15-20' grey/orange sand. Moist from 16-17', Wet from 17-18', Moist from 18-19', dry from 19-20'. No odors. Boring refusal at 20-ft BGS.

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site	**C&J**
Location	**STA 338+00.00; 195-ft Rt of CL**
Boring Location:	**B5**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/13/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**13'**	Screened Interval:	**N/A**
DTW Within Soil Boring:	**N/A**			Cased Interval:	**N/A**
Static GW Level:	**N/A**			Date GW Measured:	**N/A**

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.0			0-1' topsoil. 1-3' tan/brown sand to sandy clay. 3-5' grey sand. Slightly moist. No odors.
6 7 8 9 10	0.0		10:55	5-9' grey sand, slightly moist. 9-10' clay, black/grey, dry.
11 12 13 14 15	0.0		11:05	10-12' clay, grey, low moisture. 12-13' grey sand, moist. No odors. Boring refusal at 13-ft BGS.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site	**C&J**
Location	**STA 339+45.00; 50-ft Rt of CL**
Boring Location:	**B6**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/13/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**18'**	Screened Interval:	**N/A**
DTW Within Soil Boring:	**N/A**			Cased Interval:	**N/A**
Static GW Level:	**N/A**			Date GW Measured:	**N/A**

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.0			0-0.5' topsoil and gravel. 0.5-3' orange sandy clay, moist. 3-5' grey sandy clay, moist. No odors.
6 7 8 9 10	0.0			5-8' grey sand, moist. 8-10' grey sand, low moisture. No odors.
11 12 13 14 15	0.0		11:25	10-13' grey sand, moist. 13-15' grey sand, hard, low moisture. No odors.
16 17 18 19 20	0.0		11:30	15--18' grey sand, clayey, low moisture. No odors. Boring refusal at 18'.

BGS - Below Ground Surface

Appendix C: Laboratory Reports and Sample Custody Documentation

1941 Reymet Road ● Richmond, Virginia 23237 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 18L0643

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg, VA 24060	Date Received:	December 14, 2018 14:00
		Date Issued:	December 21, 2018 10:36
		Project Number:	18-796.08
Submitted To:	Josh Hepler	Purchase Order:	18-796.08
Client Site I.D.:	C&J Automotive		

Enclosed are the results of analyses for samples received by the laboratory on 12/14/2018 14:00. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Ted Soyars

Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

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Supplier Diversity Strengthens the Commonwealth
by the Virginia Department of Minority Business Enterprise

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0643

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B1 5-10	18L0643-01	Soil	12/13/2018 08:55	12/14/2018 14:00
B1 10-15	18L0643-02	Soil	12/13/2018 09:00	12/14/2018 14:00
B2 5-10	18L0643-03	Soil	12/13/2018 09:20	12/14/2018 14:00
B2 10-15	18L0643-04	Soil	12/13/2018 09:30	12/14/2018 14:00
B3 5-10	18L0643-05	Soil	12/13/2018 09:55	12/14/2018 14:00
B3 10-15	18L0643-06	Soil	12/13/2018 10:05	12/14/2018 14:00
B4 10-15	18L0643-07	Soil	12/13/2018 10:30	12/14/2018 14:00
B4 15-20	18L0643-08	Soil	12/13/2018 10:35	12/14/2018 14:00
B5 5-10	18L0643-09	Soil	12/13/2018 10:55	12/14/2018 14:00
B5 10-15	18L0643-10	Soil	12/13/2018 11:05	12/14/2018 14:00
B6 10-15	18L0643-11	Soil	12/13/2018 11:25	12/14/2018 14:00
B6 15-20	18L0643-12	Soil	12/13/2018 11:30	12/14/2018 14:00
B4	18L0643-13	Ground Water	12/13/2018 12:10	12/14/2018 14:00

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B1 5-10 **Laboratory Sample ID:** 18L0643-01

Grab Date/Time: 12/13/2018 08:55

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	01	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 13:07	12/17/18 13:07	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*01*	*SW8015C*	*95.2 %*		*80-120*		*12/17/18 13:07*	*12/17/18 13:07*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	01	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 12:23	HLM
Surr: Pentacosane (Surr)	*01*	*SW8015C*	*93.4 %*		*40-160*		*12/19/18 14:00*	*12/20/18 12:23*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B1 10-15 **Laboratory Sample ID:** 18L0643-02

Grab Date/Time: 12/13/2018 09:00

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	02	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 13:29	12/17/18 13:29	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*02*	*SW8015C*	*96.3 %*		*80-120*		*12/17/18 13:29*	*12/17/18 13:29*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	02	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 12:50	HLM
Surr: Pentacosane (Surr)	*02*	*SW8015C*	*97.7 %*		*40-160*		*12/19/18 14:00*	*12/20/18 12:50*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B2 5-10 **Laboratory Sample ID:** 18L0643-03

Grab Date/Time: 12/13/2018 09:20

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	03	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 13:52	12/17/18 13:52	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*03*	*SW8015C*	*99.5 %*		*80-120*		*12/17/18 13:52*	*12/17/18 13:52*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	03	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 13:17	HLM
Surr: Pentacosane (Surr)	*03*	*SW8015C*	*96.1 %*		*40-160*		*12/19/18 14:00*	*12/20/18 13:17*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B2 10-15 **Laboratory Sample ID:** 18L0643-04

Grab Date/Time: 12/13/2018 09:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	04	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 18:48	12/17/18 18:48	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*04*	*SW8015C*	*101 %*		*80-120*		*12/17/18 18:48*	*12/17/18 18:48*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	04	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 13:43	HLM
Surr: Pentacosane (Surr)	*04*	*SW8015C*	*86.4 %*		*40-160*		*12/19/18 14:00*	*12/20/18 13:43*	*HLM*

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B3 5-10 **Laboratory Sample ID:** 18L0643-05

Grab Date/Time: 12/13/2018 09:55

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	05	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 19:10	12/17/18 19:10	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*05*	*SW8015C*	*98.8 %*		*80-120*		*12/17/18 19:10*	*12/17/18 19:10*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	05	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 14:10	HLM
Surr: Pentacosane (Surr)	*05*	*SW8015C*	*88.2 %*		*40-160*		*12/19/18 14:00*	*12/20/18 14:10*	*HLM*

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B3 10-15 **Laboratory Sample ID:** 18L0643-06

Grab Date/Time: 12/13/2018 10:05

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	06	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 19:33	12/17/18 19:33	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*06*	*SW8015C*	*99.8 %*		*80-120*		*12/17/18 19:33*	*12/17/18 19:33*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	06	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 14:37	HLM
Surr: Pentacosane (Surr)	*06*	*SW8015C*	*84.4 %*		*40-160*		*12/19/18 14:00*	*12/20/18 14:37*	*HLM*

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B4 10-15 **Laboratory Sample ID:** 18L0643-07

Grab Date/Time: 12/13/2018 10:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	07	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 19:55	12/17/18 19:55	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*07*	*SW8015C*	*98.3 %*		*80-120*		*12/17/18 19:55*	*12/17/18 19:55*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	07	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 15:03	HLM
Surr: Pentacosane (Surr)	*07*	*SW8015C*	*92.4 %*		*40-160*		*12/19/18 14:00*	*12/20/18 15:03*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B4 15-20 **Laboratory Sample ID:** 18L0643-08

Grab Date/Time: 12/13/2018 10:35

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	08RE1	SW8015C	<0.28 mg/kg		0.28	1	12/19/18 18:48	12/19/18 18:48	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*08RE1*	*SW8015C*	*106 %*		*80-120*		*12/19/18 18:48*	*12/19/18 18:48*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	08	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 15:30	HLM
Surr: Pentacosane (Surr)	*08*	*SW8015C*	*81.7 %*		*40-160*		*12/19/18 14:00*	*12/20/18 15:30*	*HLM*

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B5 5-10 **Laboratory Sample ID:** 18L0643-09

Grab Date/Time: 12/13/2018 10:55

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	09	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 20:40	12/17/18 20:40	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*09*	*SW8015C*	*95.5 %*		*80-120*		*12/17/18 20:40*	*12/17/18 20:40*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	09	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 15:56	HLM
Surr: Pentacosane (Surr)	*09*	*SW8015C*	*89.8 %*		*40-160*		*12/19/18 14:00*	*12/20/18 15:56*	*HLM*

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B5 10-15 **Laboratory Sample ID:** 18L0643-10

Grab Date/Time: 12/13/2018 11:05

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	10	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 21:02	12/17/18 21:02	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*10*	*SW8015C*	*96.0 %*		*80-120*		*12/17/18 21:02*	*12/17/18 21:02*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	10	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 16:23	HLM
Surr: Pentacosane (Surr)	*10*	*SW8015C*	*93.1 %*		*40-160*		*12/19/18 14:00*	*12/20/18 16:23*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B6 10-15 **Laboratory Sample ID:** 18L0643-11

Grab Date/Time: 12/13/2018 11:25

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	11	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 21:25	12/17/18 21:25	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*11*	*SW8015C*	*97.7 %*		*80-120*		*12/17/18 21:25*	*12/17/18 21:25*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	11	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 16:50	HLM
Surr: Pentacosane (Surr)	*11*	*SW8015C*	*85.3 %*		*40-160*		*12/19/18 14:00*	*12/20/18 16:50*	*HLM*

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B6 15-20 **Laboratory Sample ID:** 18L0643-12

Grab Date/Time: 12/13/2018 11:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	12	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 21:47	12/17/18 21:47	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*12*	*SW8015C*	*98.4 %*		*80-120*		*12/17/18 21:47*	*12/17/18 21:47*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	12	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 14:00	12/20/18 17:16	HLM
Surr: Pentacosane (Surr)	*12*	*SW8015C*	*85.1 %*		*40-160*		*12/19/18 14:00*	*12/20/18 17:16*	*HLM*

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Laboratory Order ID: 18L0643

Analytical Results

Sample I.D. B4 **Laboratory Sample ID:** 18L0643-13

Grab Date/Time: 12/13/2018 12:10

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GC									
Benzene	13	SW8021B	<1.00 ug/L		1.00	1	12/18/18 13:22	12/18/18 13:22	DFH
Toluene	13	SW8021B	<1.00 ug/L		1.00	1	12/18/18 13:22	12/18/18 13:22	DFH
Ethylbenzene	13	SW8021B	<1.00 ug/L		1.00	1	12/18/18 13:22	12/18/18 13:22	DFH
m+p-Xylenes	13	SW8021B	<4.00 ug/L		4.00	1	12/18/18 13:22	12/18/18 13:22	DFH
o-Xylene	13	SW8021B	<2.00 ug/L		2.00	1	12/18/18 13:22	12/18/18 13:22	DFH
Xylenes, Total	13	SW8021B	<6.00 ug/L		6.00	1	12/18/18 13:22	12/18/18 13:22	DFH
Surr: 2,5-Dibromotoluene (Surr PID)	*13*	*SW8021B*	*83.9 %*		*80-120*		*12/18/18 13:22*	*12/18/18 13:22*	*DFH*
Surr: 2,5-Dibromotoluene (Surr FID)	*13*	*SW8021B*	*100 %*		*80-120*		*12/18/18 13:22*	*12/18/18 13:22*	*DFH*
Volatile Hydrocarbons by GC									
TPH-Volatiles (GRO)	13	SW8015C	<0.10 mg/L		0.10	1	12/18/18 13:22	12/18/18 13:22	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	*13*	*SW8015C*	*100 %*		*80-120*		*12/18/18 13:22*	*12/18/18 13:22*	*DFH*
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	13	SW8015C	<0.556 mg/L		0.556	1	12/20/18 09:50	12/20/18 18:17	HLM
Surr: Pentacosane (Surr)	*13*	*SW8015C*	*100 %*		*65-125*		*12/20/18 09:50*	*12/20/18 18:17*	*HLM*

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3510C**		
18L0643-13	900 mL / 1.00 mL	SW8015C	BBL0601	SBL0596	AK80055

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3550C**		
18L0643-01	50.4 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-02	50.1 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-03	52.6 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-04	50.6 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-05	50.5 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-06	51.0 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-07	50.3 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-08	50.4 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-09	50.6 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-10	50.1 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-11	50.7 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056
18L0643-12	50.2 g / 1.00 mL	SW8015C	BBL0586	SBL0572	AK80056

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Hydrocarbons by GC		**Preparation Method:**	**SW5030B**		
18L0643-01	5.00 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-02	5.01 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-03	5.01 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-04	5.00 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-05	5.03 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-06	5.01 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-07	5.03 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-08	5.01 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-09	5.01 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-10	5.01 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0643-11	5.04 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
18L0643-12	5.04 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
Volatile Hydrocarbons by GC		**Preparation Method:**	**SW5030B**		
18L0643-13	5.00 mL / 5.00 mL	SW8015C	BBL0513	SBL0494	AK80015
18L0643-13	5.00 mL / 5.00 mL	SW8021B	BBL0513	SBL0494	AK80015
Volatile Hydrocarbons by GC		**Preparation Method:**	**SW5030B**		
18L0643-08RE1	1.77 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042

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Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Volatile Organic Compounds by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0513 - SW5030B										
Blank (BBL0513-BLK1)				Prepared & Analyzed: 12/18/2018						
Benzene	<1.00 ug/L	1.00	ug/L							
Toluene	<1.00 ug/L	1.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
m+p-Xylenes	<4.00 ug/L	4.00	ug/L							
o-Xylene	<2.00 ug/L	2.00	ug/L							
Xylenes, Total	<6.00 ug/L	6.00	ug/L							
Surr: 2,5-Dibromotoluene (Surr PID)	86.0		ug/L	100		86.0	80-120			
LCS (BBL0513-BS1)				Prepared & Analyzed: 12/18/2018						
Benzene	93.8 ug/L	1.00	ug/L	100	ug/L	93.8	70-130			
Toluene	97.1 ug/L	1.00	ug/L	100	ug/L	97.1	70-130			
Ethylbenzene	95.5 ug/L	1.00	ug/L	100	ug/L	95.5	70-130			
m+p-Xylenes	200 ug/L	4.00	ug/L	200	ug/L	99.9	70-130			
o-Xylene	104 ug/L	2.00	ug/L	100	ug/L	104	70-130			
Surr: 2,5-Dibromotoluene (Surr PID)	90.6		ug/L	100	ug/L	90.6	80-120			
Matrix Spike (BBL0513-MS1)	**Source: 18L0643-13**			Prepared & Analyzed: 12/18/2018						
Benzene	90.8 ug/L	1.00	ug/L	100	<1.00 ug/L	90.8	70-130			
Toluene	93.7 ug/L	1.00	ug/L	100	<1.00 ug/L	93.7	70-130			
Ethylbenzene	92.0 ug/L	1.00	ug/L	100	<1.00 ug/L	92.0	70-130			
m+p-Xylenes	191 ug/L	4.00	ug/L	200	<4.00 ug/L	95.3	70-130			
o-Xylene	99.7 ug/L	2.00	ug/L	100	<2.00 ug/L	99.7	70-130			
Surr: 2,5-Dibromotoluene (Surr PID)	85.7		ug/L	100	ug/L	85.7	80-120			
Matrix Spike Dup (BBL0513-MSD1)	**Source: 18L0643-13**			Prepared & Analyzed: 12/18/2018						
Benzene	89.6 ug/L	1.00	ug/L	100	<1.00 ug/L	89.6	70-130	1.31	20	
Toluene	92.4 ug/L	1.00	ug/L	100	<1.00 ug/L	92.4	70-130	1.38	20	
Ethylbenzene	90.8 ug/L	1.00	ug/L	100	<1.00 ug/L	90.8	70-130	1.31	20	
m+p-Xylenes	189 ug/L	4.00	ug/L	200	<4.00 ug/L	94.6	70-130	0.695	20	
o-Xylene	99.0 ug/L	2.00	ug/L	100	<2.00 ug/L	99.0	70-130	0.765	20	
Surr: 2,5-Dibromotoluene (Surr PID)	86.0		ug/L	100	ug/L	86.0	80-120			

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Volatile Organic Compounds by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual

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Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Volatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0475 - SW5030B										
Blank (BBL0475-BLK1)				Prepared & Analyzed: 12/17/2018						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
LCS (BBL0475-BS1)				Prepared & Analyzed: 12/17/2018						
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Volatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0475 - SW5030B										
LCS (BBL0475-BS1)				Prepared & Analyzed: 12/17/2018						
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Matrix Spike (BBL0475-MS1)		**Source: 18L0643-02**		Prepared & Analyzed: 12/17/2018						
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			

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Final Report

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Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Volatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0475 - SW5030B										
Matrix Spike (BBL0475-MS1)		**Source: 18L0643-02**		Prepared & Analyzed: 12/17/2018						
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Matrix Spike Dup (BBL0475-MSD1)		**Source: 18L0643-02**		Prepared & Analyzed: 12/17/2018						
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Volatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0475 - SW5030B										
Matrix Spike Dup (BBL0475-MSD1)		**Source: 18L0643-02**		Prepared & Analyzed: 12/17/2018						
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Batch BBL0513 - SW5030B										
Blank (BBL0513-BLK1)				Prepared & Analyzed: 12/18/2018						
TPH-Volatiles (GRO)	<0.10 mg/L	0.10	mg/L							
Surr: 2,5-Dibromotoluene (Surr FID)	107		ug/L	100		107	80-120			
LCS (BBL0513-BS1)				Prepared & Analyzed: 12/18/2018						
TPH-Volatiles (GRO)	1.01 mg/L	0.10	mg/L	1.00	mg/L	101	70-130			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Matrix Spike (BBL0513-MS1)		**Source: 18L0643-13**		Prepared & Analyzed: 12/18/2018						
TPH-Volatiles (GRO)	1.00 mg/L	0.10	mg/L	1.00	<0.10 mg/L	100	70-130			
Surr: 2,5-Dibromotoluene (Surr FID)	98.7		ug/L	100	ug/L	98.7	80-120			
Matrix Spike Dup (BBL0513-MSD1)		**Source: 18L0643-13**		Prepared & Analyzed: 12/18/2018						
TPH-Volatiles (GRO)	1.00 mg/L	0.10	mg/L	1.00	<0.10 mg/L	99.5	70-130	0.969	20	
Surr: 2,5-Dibromotoluene (Surr FID)	100		ug/L	100	ug/L	100	80-120			

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Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0586 - SW3550C										
Blank (BBL0586-BLK1)				Prepared: 12/19/2018 Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
Surr: Pentacosane (Surr)	4.49		mg/kg	5.03		89.2	40-160			
LCS (BBL0586-BS1)				Prepared: 12/19/2018 Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0586 - SW3550C										
LCS (BBL0586-BS1)				Prepared: 12/19/2018 Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
TPH-Semi-Volatiles (DRO)	77.8 mg/kg	10.0	mg/kg	99.8	mg/kg	77.9	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Surr: Pentacosane (Surr)	4.46		mg/kg	5.03	mg/kg	88.6	40-160			
Matrix Spike (BBL0586-MS1)		**Source: 18L0724-02**		Prepared: 12/19/2018 Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0586 - SW3550C										
Matrix Spike (BBL0586-MS1)		**Source: 18L0724-02**		Prepared: 12/19/2018 Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
TPH-Semi-Volatiles (DRO)	67.3 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	67.4	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Surr: Pentacosane (Surr)	4.23		mg/kg	5.03	mg/kg	84.2	40-160			
Matrix Spike Dup (BBL0586-MSD1)		**Source: 18L0724-02**		Prepared: 12/19/2018 Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
TPH-Semi-Volatiles (DRO)	59.5 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	60.1	40-160	12.2	20	
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			

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Final Report

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Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0586 - SW3550C										
Matrix Spike Dup (BBL0586-MSD1)		**Source: 18L0724-02**		Prepared: 12/19/2018 Analyzed: 12/20/2018						
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Surr: Pentacosane (Surr)	3.74		mg/kg	4.99	mg/kg	75.0	40-160			
Batch BBL0601 - SW3510C										
Blank (BBL0601-BLK1)				Prepared & Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
Surr: Pentacosane (Surr)	0.249		mg/L	0.252		98.8	65-125			
LCS (BBL0601-BS1)				Prepared & Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	3.3 mg/L	0.500	mg/L	5.00	mg/L	65.4	65-110			
Surr: Pentacosane (Surr)	0.208		mg/L	0.252	mg/L	82.5	65-125			
Matrix Spike (BBL0601-MS1)		**Source: 18L0662-02**		Prepared & Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	4.7 mg/L	0.556	mg/L	5.56	<0.556 mg/L	85.0	40-110			
Surr: Pentacosane (Surr)	0.300		mg/L	0.280	mg/L	107	65-125			
Matrix Spike Dup (BBL0601-MSD1)		**Source: 18L0662-02**		Prepared & Analyzed: 12/20/2018						
TPH-Semi-Volatiles (DRO)	4.3 mg/L	0.521	mg/L	5.21	<0.521 mg/L	82.0	40-110	10.1	20	
Surr: Pentacosane (Surr)	0.275		mg/L	0.262	mg/L	105	65-125			

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Certified Analyses included in this Report

Analyte	Certifications
SW8015C in Non-Potable Water	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
TPH-Volatiles (GRO)	VELAP,NC,WVDEP
SW8015C in Solids	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
TPH-Volatiles (GRO)	VELAP,NC,WVDEP
SW8021B in Non-Potable Water	
Benzene	VELAP,WVDEP
Toluene	VELAP,WVDEP
Ethylbenzene	VELAP,WVDEP
m+p-Xylenes	VELAP,WVDEP
o-Xylene	VELAP,WVDEP
Xylenes, Total	VELAP,WVDEP

Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019

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Summary of Data Qualifiers

RPD	Relative Percent Difference
Qual	Qualifers
-RE	Denotes sample was re-analyzed
D.F.	Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.
TIC	Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library . A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
PCBs, Total	Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.

AIR WATER & SOIL LABORATORIES, INC.

1941 REYMET ROAD
RICHMOND, VIRGINIA 23237
(804) 358-8295 PHONE
(804)358-8297 FAX

Chain of Custody
Form #: F1331
Rev. 3.0
Effective: Aug 24, 2017

CHAIN OF CUSTODY

PAGE 1 OF ~~1~~ 2 JPH

COMPANY NAME: EEE Consulting Inc	INVOICE TO: SAME	PROJECT NAME/Quote #: Rt. 1 Widning
CONTACT: Josh Hepler	INVOICE CONTACT:	SITE NAME: C&J Automotive
ADDRESS: 201 church St Blacksburg	INVOICE ADDRESS:	PROJECT NUMBER: 18-796.08
PHONE #: 540 230 3685	INVOICE PHONE #:	P.O. #: 18-796.08
FAX #: 540 953 0171 EMAIL: jhepler@eee-consulting.com		Pretreatment Program: NA
Is sample for compliance reporting? YES NO NA	Is sample from a chlorinated supply? YES NO NA	PWS I.D. #: NA
SAMPLER NAME (PRINT): Josh Hepler	SAMPLER SIGNATURE:	Turn Around Time: Circle: 10 5 Days or __ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	TPH - DRO	TPH - GRO	BTEX						COMMENTS
1) B1 5-10	X			NA	NA	12/13	8:55	NA	S	2	X	X	*						
2) B1 10-15	X						9:00						*						
3) B2 5-10	X						9:20						*						
4) B2 10-15	X						9:30						*						
5) B3 5-10	X						9:55						*						
6) B3 10-15 ~~m~~	X						10:05						*						
7) B4 ~~5~~ 10-15	X						10:30						*						
8) B4 ~~10~~ 15-20	X						10:35						*						
9) B5 5-10	X						10:55						*						
10) B5 10-15	X						11:05						*						4.9°C

JPH

Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol

* BTEX only if GRO is detected

PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
Carl Ellis III	12/13/18	[signature]	12/14/18 2:00
[signature]	12/14/18 2:00	[signature]	12/14/18 1400
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

QC Data Package
Level III ☐
Level IV ☐

LAB USE ONLY
Custody Seals used and intact? (Y/N) Y
COOLER TEMP °C
Received on ice? (Y/N) Y

EEE-Blacksburg **18L0643**
RT 1 Widning
Recd: 12/14/2018 Due: 01/02/2019

v130325002

F1331 AWS COC_v171001.xls

AIR WATER & SOIL LABORATORIES, INC.

1941 REYMET ROAD
RICHMOND, VIRGINIA 23237
(804) 358-8295 PHONE
(804)358-8297 FAX

Chain of Custody
Form #: F1331
Rev. 3.0
Effective: Aug 24, 2017

CHAIN OF CUSTODY

COMPANY NAME: EEE Consulting	INVOICE TO: same	PROJECT NAME/Quote #: Rt. 1 Widning
CONTACT: Josh Hepler	INVOICE CONTACT:	SITE NAME: C & J Automotive
ADDRESS: 201 Church St Blacksburg	INVOICE ADDRESS:	PROJECT NUMBER: 18-796.08
PHONE #: 540 953 0170	INVOICE PHONE #:	P.O. #: 18-796.08
FAX #: 540 953 0171 EMAIL: jhepler@eee-consulting.com		Pretreatment Program: NA
Is sample for compliance reporting? YES NO NA	Is sample from a chlorinated supply? YES NO NA	PWS I.D. #: NA
SAMPLER NAME (PRINT): Josh Hepler	SAMPLER SIGNATURE:	Turn Around Time: Circle: 10 5 Days or __ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	TPH - DRO	TPH - GRO	BTEX						COMMENTS
1) B6 10-15	X			~~X~~ NA	NA	12/13	11:25	NA	S	2	X	X	*						
2) B6 15-20	X			↓	↓	↓	11:30	↓	S	2	X	X	*						
3) B4	X			↓	↓	↓	12:10	↓	GW	6	X	X	X						
4)																			
5)																			
6)																			
7)																			
8)																			
9)																			
10)																			

ANALYSIS / (PRESERVATIVE)

Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol

* BTEX only if GRO is detected in soil.

PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
Cornell Elder III	12/13/18	[illegible]	12/14/18 2:50
[illegible]	12/14/18 2:50	[illegible]	12/14/18 1400
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

QC Data Package
Level III ☐
Level IV ☐

LAB USE ONLY
Custody Seals used and intact? (Y/N): _____
COOLER TEMP °C
Received on ice? (Y/N) _____ 4.9°C

EEE-Blacksburg **18L0643**
RT 1 Widning
Recd: 12/14/2018 Due: 01/02/2019

v130325002
_v171001.xls

AIR WATER SOIL LABORATORIES, INC.

Sample Preservation Log

Order ID 18L 06043

Date Performed: 12-14-18

Analyst Performing Check: SE

Sample ID	Container ID	Metals			Cyanide			Sulfide			Ammonia			TKN			Phos, Tot			NO3+NO2			DRO			Pesticide (8081/608/508)			SVOC (525.2/8270/625)			CrVI * **		Pest/PCB (508) / SVOC(525)					
		pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	Res.Cl as Received		Res.Cl P/A (If adjust.)	Res.Cl as Received		Res.Cl P/A (If adjust.)	pH as Received	Adjusted final pH	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)
		< 2	Other		> 12	Other		> 9	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		Present	Absent		Present	Absent				< 2	Other			Other	
13	A																						✓																

NaOH ID: _____ HNO_3 ID: _____ CrVI preserved date/time: _____ Analyst Initials: _____

** pH must be adjusted between 9.3 - 9.7*

H_2SO_4 ID: _____ $Na_2S_2O_3$ ID: _____ Buffer Sol'n ID: _____

HCL ID: _____ Na_2SO_3 ID: _____ 1N NaOH ID: _____ 5N NaOH: _____

**W.Va only certifies DISS CrVI and not T CrVI as an approved analyte under 40CFR136 for waste water.

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/21/2018 10:36
Submitted To:	Josh Hepler	Project Number:	18-796.08
Client Site I.D.:	C&J Automotive	Purchase Order:	18-796.08

Sample Conditions Checklist

Samples Received at:	**4.90°C**
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	Yes
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	Yes
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	No
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

No Trip Blank received, Zach Kiracofe notified at drop off. MMR 12/18/18 11:47

Phase II Environmental Site Assessment
Roadway Improvement Project

Route 1 Widening Project
Caliber Collision/Marine Structure
17870/17880 Fraley Boulevard
Dumfries, Virginia 22026
Prince William County

Contract ID: 44115
VDOT Project: 001-212-249
VDOT UPC: 90339 Act: 689
VDOT Task Number: E-FR024.03

Prepared for
Mr. Brutus Cooper
Regional VDOT HAZMAT Manager
Virginia Department of Transportation
NOVA District Office
4975 Alliance Drive
Fairfax, VA 22030

Prepared by
EEE Consulting, Inc.
201 Church Street
Blacksburg, Virginia 24060

January 2019

Prepared by: **Joshua P. Hepler, PG, Project Scientist**

Reviewed by: **Christopher J. Lalli, Vice President**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

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Acronyms

AST	Above Ground Storage Tank
BGS	Below Ground Surface
C	Celsius
COC	Chain of Custody
CL	Center Line
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency – United States
FT	Feet
LT	Left
mg/kg	Milligrams per Kilogram
MW	Monitoring Well
PG	Professional Geologist
PID	Photoionization Detector
PPM	Parts Per Million
REC	Recognized Environmental Condition
RL	Reporting Limit
Rt	Route
RT	Right
R/W	Right-of-Way
STA	Station
TPH-DRO	Total Petroleum Hydrocarbons - Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbons – Gasoline Range Organics
UST	Underground Storage Tank
VDOT	Virginia Department of Transportation
VOC	Volatile Organic Compounds
VSWMR	Virginia Solid Waste Management Regulations
3e	EEE Consulting, Inc.

1.0 INTRODUCTION AND BACKGROUND

The Virginia Department of Transportation (VDOT) is administering proposed improvements and realignment of 2.3-miles of Route 1 (Fraley Boulevard) between the intersection with Quantico Gateway Drive and the intersection with Drumfires Road (State Route 234) in Dumfries, Prince William County, Virginia. The general project location and topographic setting are shown on **Figures 1** and **2**, respectively. An aerial photograph of the project area is also presented as **Figure 3**.

The roadway and drainage improvements will occur in existing roadway right-of-way (R/W), proposed R/W, permanent easements (slope & drainage), temporary construction easements (i.e. erosion & sediment control measures) and proposed limited access lines. A Phase I Environmental Site Assessment (ESA) was prepared by EEE Consulting, Inc (**3e**) for the Study Area in August 2018, which identified Recognized Environmental Conditions (REC) throughout the corridor, including the subject property as follows:

- **Caliber Collision/Marine Structure** (Parcel 045) is located at 17884 Fraley Boulevard, and the adjacent vacant property (Parcel 049) for the proposed installation of a storm water management basis (i.e. BMP 4) is located at 17870 Fraley Boulevard, Dumfries, VA 22026 (VDOT Plan Sheet Nos. 9 and 10).
    - The Caliber Collision/Marine Structure property is an active vehicle body repair shop with a documented, petroleum release from a former diesel fuel UST that was tracked by the DEQ under PC No. 1998-3531.
    - Parcel 049 to the northeast is adjacent and topographically downgradient of Parcel 045 and was formerly a residential modular home park.

A review of FOIA files for PC No. 1998-3531 identified residual-phase petroleum impact to soil upon removal of the diesel fuel UST. Approximately 2,500-gallons of petroleum impacted groundwater were also removed from the UST excavation basin. Subsequently, six (6) monitoring wells were installed at Parcel 045 documenting dissolved-phase petroleum impact to groundwater on-site. These documented subsurface impacts have the potential to pose adverse impacts to subsurface media that may be disturbed in and proximate to this petroleum release site.

According to the Plan Sheet Nos. 9 and 10, Parcel 045 has a permanent slope easement and R/W acquisition along the southeastern portion of the property that borders the existing alignment of Route 1. The proposed R/W includes entrance and drainage improvements that will likely involve the disturbance of subsurface media. A review of Plan Sheet Nos. 9 and 10 indicates that portions of Parcel 049 will also be acquired to accommodate the installation of BMP 4 and drainage structures 10-7, 10-9, 10-10, 10-11, and associated pipe connections (see **Figure 4**).

The RECs identified at Parcel 045 have the potential to pose adverse impacts to subsurface media that will likely be disturbed during the installation of BMP 4 and the associated drainage structures.

The constituents of concern are petroleum-based, which are based on the RECs identified above and detailed in the Phase I ESA Corridor Study Report (**3e**, August 2018). Based on this information, the VDOT – NOVA District Hazardous Materials Manager requested the collection of representative samples to confirm the presence/absence of petroleum impacts to soil and groundwater, if encountered, in and proximate to the proposed R/W acquisition and disturbance areas. On December 7th, 2018, **3e** completed a Phase II ESA at Parcel 045 and Parcel 049 to confirm the presence/absence of impacts to subsurface media that will likely be disturbed in response to the proposed drainage improvements.

Subsurface boring advancements, sampling methods, corresponding analytical results, and conclusions/recommendations pertaining to the proposed construction activities at each site are summarized in the following sections of this report.

2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS

Prior to implementing the direct push boring installations, the approximate locations of subsurface public utilities were identified and marked by Miss Utility of Virginia. A utility locate request form was also completed with VDOT to identify utilities owned and operated by VDOT. Copies of the Miss Utility and VDOT Tickets are included in **Appendix A**. In addition to public utility identification, private subsurface utilities were also identified and marked in each investigative area prior to commencing drilling activities.

3.0 SOIL AND GROUNDWATER SAMPLING METHODS

3.1. Soil Sampling Methods

On December 7th, 2018, a direct push drill rig was utilized to advance four (4) soil borings with three (3) converted to temporary groundwater monitoring wells at the following locations:

<u>Parcel 045</u>

- B1 – Installed proximate to STA No. 301+45.00; 70-ft LT of CL to a depth of 15-ft BGS as proposed with subsequent conversion to a temporary groundwater monitoring well (MW).

<u>Parcel 049</u>

- B2 – Installed proximate to STA No. 303+20.00; 105-ft LT of CL to a depth of 10-ft BGS upon refusal.

- B3 – Installed proximate to STA No. 303+40.00; 160-ft LT of CL to a depth of 13-ft BGS upon refusal on consolidate material with subsequent conversion to a temporary groundwater MW.
- B4 – Installed proximate to STA No. 303+55.00; 215-ft LT of CL to a depth of 15-ft BGS as proposed with subsequent conversion to a temporary groundwater MW.

The roadway improvements proposed to date, RECs, and boring/temporary well locations are depicted on **Figure 4**.

Each soil boring was advanced using a Geoprobe® direct push rig. The direct-push rig utilizes a hollow-stem spoon that produced a continuous soil core in five (5)-ft intervals along the vertical depth of each boring. Each boring was advanced to predetermined depths or refusal at depths that ranged from 10- to 15-ft BGS. Subsurface conditions (i.e. wet soils) indicative of groundwater were observed in B1, B3, and B4. The detailed boring logs are presented in **Appendix B**.

Composite soil samples were collected to assess soil that will likely be disturbed during construction. The representative composite soil samples were obtained from the borings by collecting aliquots from the following depth intervals:

- B1 and B4: 5-10-ft and 10-15-ft BGS.
- B2: 0-5-ft and 5-10-ft BGS.
- B3: 5-10-ft and 10-13.5-ft BGS.

Each soil sample was placed into two (2) pre-cleaned 4-ounce glass jars. The sample jars were appropriately labeled and placed on ice in a cooler to maintain an appropriate temperature ($\leq$ 4°C) while in transit to the certified environmental laboratory. Chain of Custody (COC) documentation was completed for all samples submitted for laboratory analysis.

All composite soil samples obtained from the 4 direct push borings were submitted for laboratory analysis of TPH-DRO by EPA Method 8015C. The COC documentation and laboratory analytical data are provided in **Appendix C**. A detailed discussion of the composite soil sample analytical results is presented in **Section 5.0** of this report.

3.2. Groundwater Sampling Methods

Temporary monitoring wells were constructed in B1, B3 and B4 to collect representative groundwater samples to confirm the presence/absence of petroleum impact to the shallow groundwater table. Each temporary well was constructed with 1-inch diameter, PVC well screen (slotted at 0.01-ft intervals) and solid 1-inch diameter casing. Screen and casing intervals for the temporary monitoring wells are documented on the boring logs (see **Appendix B)**. PVC caps were

fitted over each well to prevent intrusion of foreign material. Clean sand was then placed in the remaining annular space of the borehole to form a filter pack around the well screen.

On December 7th, 2018, an oil/water interface probe was utilized to determine the depth-to-groundwater and confirm the presence or absence of separate-phase petroleum in the temporary monitoring well. The static groundwater levels in the temporary wells were measured as follows:

- B1: 4.1-ft BGS
- B3: 2.1-ft BGS
- B4: 3.4-ft BGS

Separate-phase petroleum or petroleum odors were not detected in the temporary monitoring wells.

Representative groundwater samples were collected from the temporary monitoring wells, which were prepared for transport to the laboratory in accordance the following procedures: 1) the samples were collected using disposable nylon string and a one-half-inch diameter, disposable polyethylene bailers; 2) the samples were placed into containers provided by the laboratory with the appropriate preservative; 3) placed on ice in a cooler to maintain appropriate temperature while in transport to the environmental laboratory and; 4) Chain of Custody documentation completed.

The groundwater samples were submitted for analysis of TPH-DRO by EPA Method 8015C. The analytical data for the representative groundwater samples is provided in **Appendix C**. A discussion of the groundwater analytical results is provided in **Section 6.0** of this report.

After completion of the gauging/sampling activities, the temporary monitoring wells were abandoned by removing the PVC screen and casing from the ground surface and filling the resulting voids to grade with bentonite chips.

4.0 PID SCREENING RESULTS

Photoionization Detector (PID) results for the screened direct push soil cores are presented on the following page in **Table 1**. Measurement units are in parts per million (ppm).

Table 1 - PID Soil Screening Data: Route 1 Caliber Collision/Marine Structure

	PID (ppm)	PID (ppm)	PID (ppm)
Depth (ft BGS)	0-5	5-10	10-15
B1	0.0	0.0	0.0
B2	0.0	0.0	NA
B3	0.0	0.0	0.0
B4	0.0	0.0	0.0

Notes:
ppm = Parts per Million
BGS – Below Ground Surface
Depth Unit – foot BGS
NA – Not Applicable

A review of **Table 1** indicates that measurable PID readings were noted detected in the screened soil cores. Visual or olfactory evidence of petroleum-impacted media were also not observed during boring and sampling activities.

5.0 SOIL SAMPLE ANALYTICAL RESULTS

The analytical results obtained from the soil samples are summarized below in **Table 2**. All results are listed in units of milligrams-per-kilogram (mg/kg). A detailed laboratory analytical report is provided in **Appendix C**.

Table 2: Soil Sample Analytical Data
Caliber Collision Marine Structure
Route 1 Widening, Dumfries VA
Units = Milligrams per Kilogram (mg/kg)

Location	**B1 5-10**		**B1 10-15**		**B2 0-5**		**B2 5-10**	
Laboratory I.D.	18L0367-01		18L0367-02		18L0367-03		18L0367-04	
Depth Below Grade	5-10 feet		10-15 feet		0-5 feet		5-10 feet	
Sample Time	10:10		10:15		10:20		10:30	
	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*
TPH-DRO	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*10.0*
Location	**B3 5-10**		**B3 10-13.5**		**B4 5-10**		**B4 10-15'**	
Laboratory I.D.	18L0367-05		18L0367-06		18L0367-07		18L0367-08	
Depth Below Grade	5-10 feet		5-13.5 feet		5-10 feet		10-15 feet	
Sample Time	10:40		10:45		11:05		11:15	
	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*
TPH-DRO	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*10.0*

Notes:
Bold / Underlined text = Concentration reported above RL
RL = Reporting Limit
ND -Below Laboratory Reporting Limit

A review of **Table 2** indicates that residual-phase TPH-DRO concentrations were not detected above the laboratory reporting limit (RL) in the representative soil samples collected at Parcels 045 and 049.

6.0 DISSOLVED PHASE ANALYTICAL RESULTS

The dissolved-phase analytical results obtained from the groundwater samples collected at B1, B3 and B4 are summarized below in **Table 3**. All results are listed in milligrams per liter (mg/L). A detailed laboratory analytical report is provided in **Appendix C**.

Table 3: Groundwater Sample Analytical Data
Route 1 Widening: Caliber Collision Marine Structure
Units = Milligrams per Liter (mg/l)

Location	**B1**		**B3**		**B4**	
Laboratory I.D.	18L0367-09		18L0367-10		18L0367-11	
Sample Time	10:20		10:47		11:20	
	Result	*RL*	Result	*RL*	Result	*RL*
TPH-DRO	ND	*0.658*	ND	*0.833*	ND	*0.833*

Notes:
Bold / Underlined text = Concentration reported above RL
RL = Reporting Limit
ND -Below Laboratory Reporting Limit

A review of **Table 3** indicates that dissolved-phase petroleum constituents were not detected above the laboratory RL in the representative groundwater samples collected from Parcels 045 and 049.

7.0 CONCLUSIONS AND RECOMMENDATIONS

A total of four (4) direct push borings with three (3) converted to temporary groundwater monitoring well were installed to collect representative samples to determine if the RECs identified at Parcel 045 resulted in adverse impacts to subsurface media that will likely be disturbed in response to the proposed drainage improvements at Parcel 045 and Parcel 049.

The representative soil and groundwater samples collected as part of this investigation did not contain detectable residual-phase and dissolved-phase petroleum constituent concentrations, respectively. Therefore, special management provisions to the construction contract should not apply for soil and groundwater that will likely be disturbed at Parcels 045 and 049 in response to the installation of BMP 4 and the associated drainage structures proposed as of the date of this report.

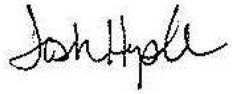
8.0 LIMITATIONS

It is impossible to know with certainty the entirety of a site is free of hazardous substances or conditions even with extensive subsurface testing. The conclusions of this investigation are based solely on the scope-of-work and on the sources of information reviewed during this investigation. This report was prepared for the exclusive use of VDOT, and their expressly-designated affiliates. **3e** accepts no responsibility for damages or claims resulting from past or future environmental degradation related to the subject property.

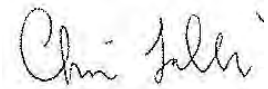
9.0 ACKNOWLEDGEMENT

3e appreciates the opportunity to provide environmental services to VDOT regarding the Caliber Collision Property - Route 1 roadway improvement project located in Dumfries, VA under the Professional Services HAZMAT Contract. If we may be of further assistance, or you have any questions or comments regarding the project, please contact our office at (540) 953-0170.

10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS



Joshua P. Hepler, PG
Project Environmental Scientist
Preparer



Chris Lalli
Vice President/Associate
Reviewer

Figures

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Environmental, Engineering and Educational Solutions

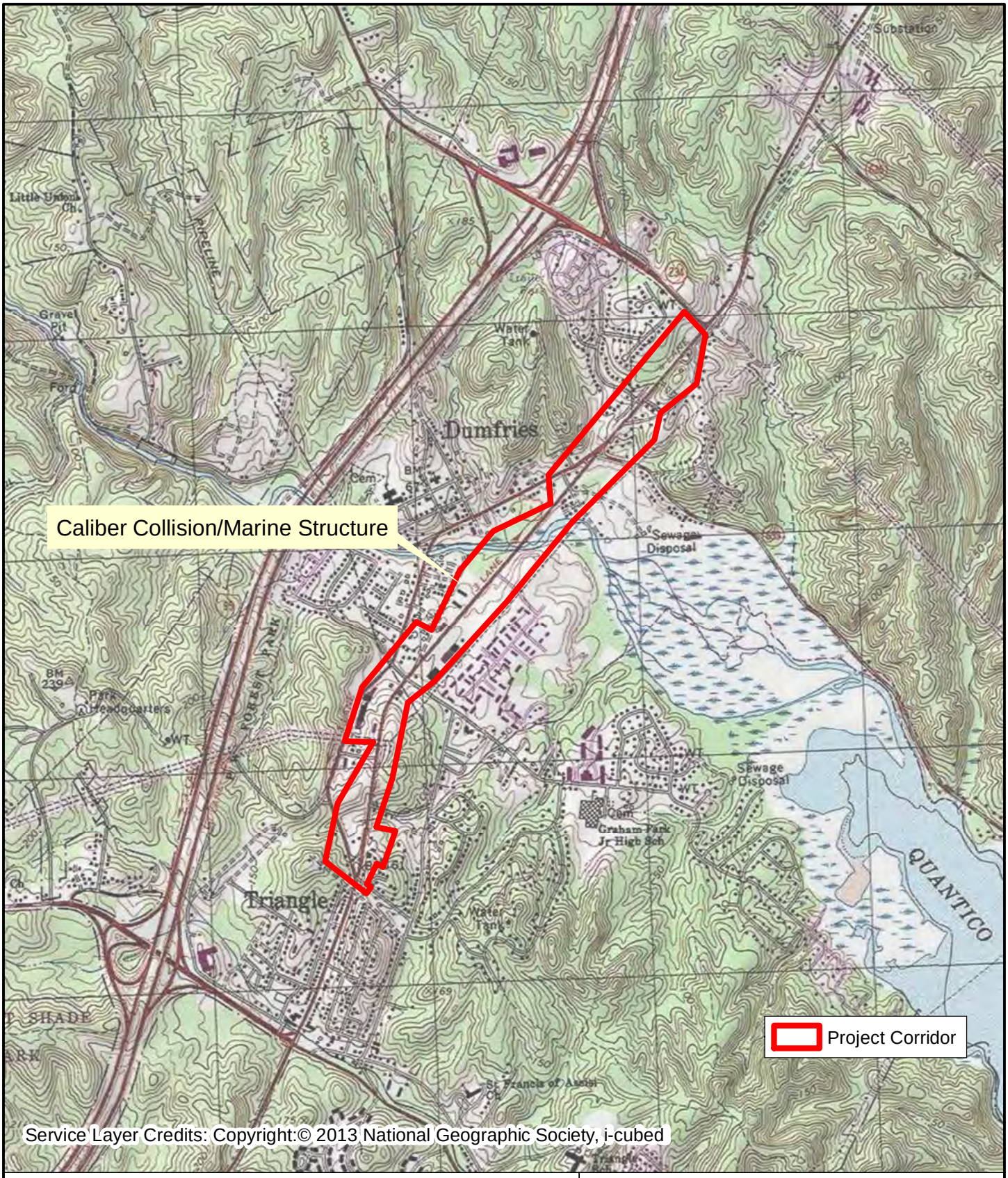
N

Prepared by Leah Potts, 01/24/2019
Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 1
PROJECT CORRIDOR AERIAL
CALIBER COLLISION/MARINE STRUCTURE

0 0.5 1
Miles

Dumfries, VA



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N

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Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 2
PROJECT CORRIDOR TOPOGRAPHIC
CALIBER COLLISION/MARINE STRUCTURE

0 0.5 1
Miles

Dumfries, VA

1:24,000

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

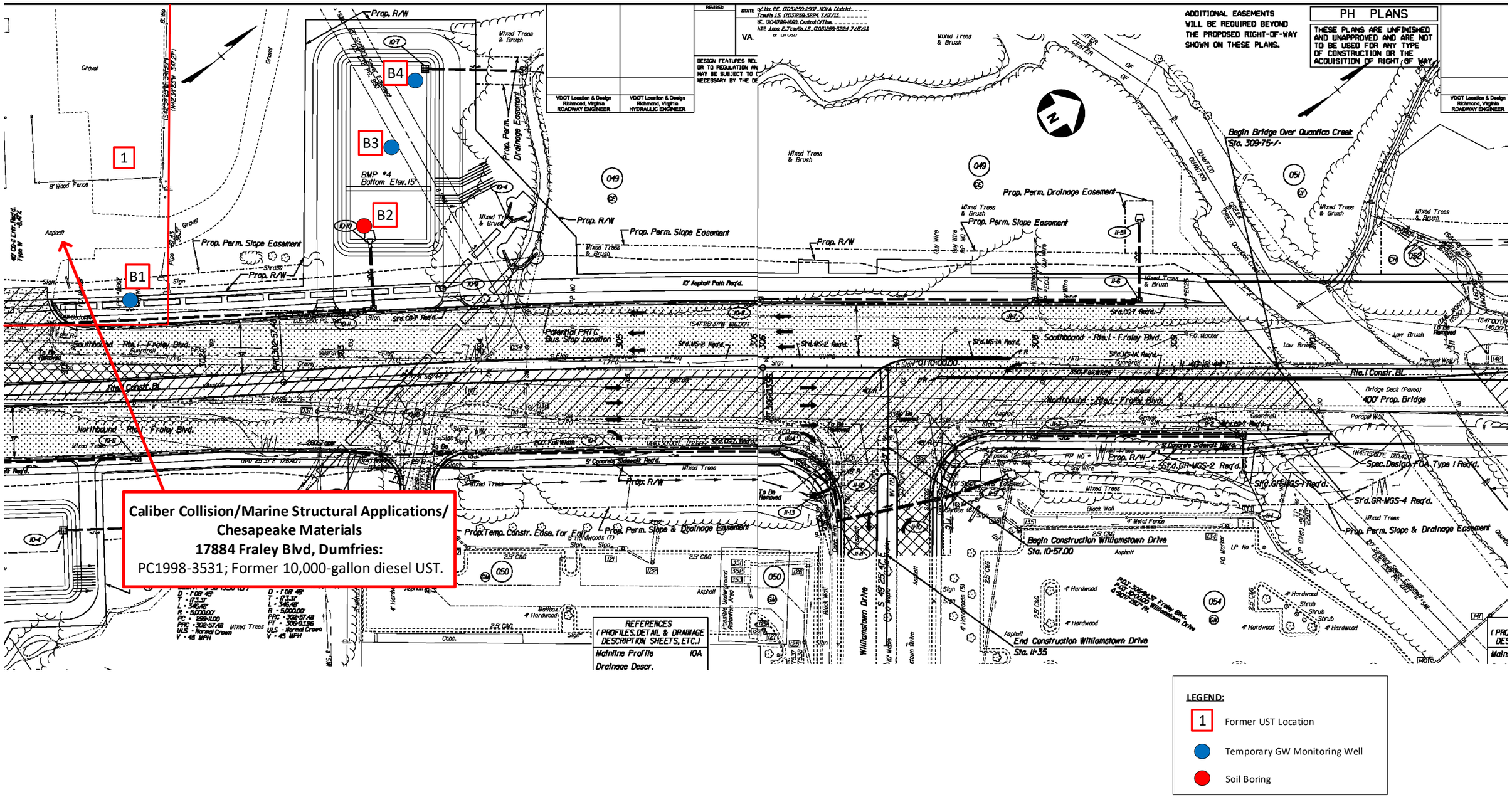
N

Prepared by Leah Potts, 01/24/2019
Sources: VGIN 2017
Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 3
AERIAL WITH PROPERTY BOUNDARIES
CALIBER COLLISION/MARINE STRUCTURE

0 200 400
Feet

Dumfries, VA



LEGEND:

- 1 Former UST Location
- Temporary GW Monitoring Well
- Soil Boring

Scale
0' 25' 50'

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VDOT Virginia Department of Transportation

Route 1 Widening Project
Dumfries, Virginia

FIGURE 4

Plan Sheet Nos. 10 and 11 Depicting Identified RECs & Boring and Temporary MW Locations at Caliber Collision/Marine Structural Applications/Chesapeake Materials.

E-FR024.03 January 2019

Appendix A: Miss Utility Ticket and VDOT Ticket

From: tickets@missutilityofvirginia.com
To: Josh Hepler
Subject: VUPS EMLCFM 2018/12/04 #01836 A833101259-01A RUSH RESP LREQ
Date: Tuesday, December 4, 2018 9:41:03 AM
Importance: High

EMLCFM 01836 VUPSa 12/04/18 09:40:59 A833101259-01A RESPONSE

Thank you for contacting VA811! This is an automatically generated response from the utilities who received your notice of excavation. If you have questions about the response, call the "field contact" for that utility. For your safety, please respect and protect the marks, excavate carefully around the marked utility lines and contact VA811 if you see clear evidence of unmarked utilities.

Remember, you can now reach VA811 by dialing 811.

Ticket : A833101259 Rev: 01A Taken: 12/03/18 11:49 AM

State: VA Cnty: PRINCE WILLIAM Place: DUMFRIES
Subdivision: CALIBER COLLISION
Address : 17880 FRALEY BLVD
Responses due by: 12/03/18 02:50 PM Expires: 12/19/18 07:00 AM

When the member Marking Code is blue, click for additional information that may be provided by the Operator/Locator.

Marking Code	Description	Response
CGV	COLUMBIA GAS (CGV930) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (800)543-8911	11/29/18 11:55 AM 30
CMC	COMCAST (CMC502) No Conflict; utility is outside of stated work area. Field Contact: CABLE PROTECTION SERVICES (804)562-3861 In the event of damage to a facility call: (800)441-6917 ext opt 1	12/03/18 02:37 PM 30
DOM	DOMINION ENERGY ELEC DIST (DOM400) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)667-3000	11/29/18 11:55 AM 30
PWS	PRINCE WILLIAM - WATER (PWS902) Marked up to privately owned utility; contact private utility owner for locate Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	11/29/18 10:30 AM 12
PWS	PRINCE WILLIAM - SEWER (PWS903) Marked up to privately owned utility; contact private utility owner for locate Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	11/29/18 10:30 AM 12
VZN	VERIZON (VZN703) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)483-1233	12/04/18 09:40 AM 30

LC1B

Locate Work Order Number:
N-04431

Project Location:
17880/17870 Fraley Blvd

Utility Location Results Form

Utility Location Results *(completed by utility location service provider)*

Photos attached ☑ Yes ☐ No

Was the location that was requested completed? ☐ Yes ☑ No

Detection cable and/or location tape available ☐ Yes ☑ No
Accurate As-Built Documents available ☐ Yes ☑ No

If no, please check all applicable boxes:

Accurate As-Built Documents:
Requested? ☐ Yes ☑ No Provided? ☐ Yes ☐ No
VDOT on-site assistance:
Requested? ☐ Yes ☑ No Provided? ☐ Yes ☐ No

Does the in-field survey area extend 3 feet beyond the border of the intended excavation area? (Required) ☐ Yes ☑ No

Utility Location Method(s) used:_____

Comments:

☐ Serco/Elite has provided utility markings within the scope of this request for all VDOT owned fiber optic communications cable, and all power cabling from the ITS Device to the ITS Cabinet that was accurately shown on drawings if provided by VDOT, or actual location contained detection cable or tape, and/or VDOT provided on-site assistance.

☐ Where no detection cable/tape and or accurate as-built documents, and/or VDOT assistance was not provided, we have provided approximate markings or no markings have occurred and the 3rd Party Requestor is advised that hand digging with extreme caution is advised. Photos have been attached.

☑ Please be advised that in no case will Serco/Elite be held liable or responsible for any power or communication cabling that falls outside our scope and could not be located due to the lack of accurate documentation, detection cable or tape, and/or VDOT assistance

☑ Arrived onsite to verify no VDOT ITS assets in the area.Team then verified junction boxes in area do not house VDOT fiber.

Certification:

The most appropriate equipment and technology to identify all VDOT underground utilities within the requested zone were used.

Utility Locator: (Print) Matt Robinson
(signature) _____
Company: Elite Contracting

Start time: 3:08 PM
End time: 3:10 PM
Date: 11-28-18

This information is valid for 15 days from signed date of marking. Any work performed after 15 days is not covered under this request and will need re-marked.

Appendix B: Boring Logs

Project Location:	**RT 1 Widening**
Site:	**Caliber Collision**
Location:	**STA 301+45.00; 70-ft LT of CL**
Boring Location:	**B1**

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Date(s) Drilled:	**12/7/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**15-ft**	Screened Interval:	**5-15-ft**
DTW Within Soil Boring:	**9-ft**			Cased Interval:	**0-5-ft**
Static GW Level:	**4.1-ft**	Date GW Measured:	**12/7/18**		

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5				0-1' Topsoil, moist. 1-5' gravelly sandy clay, brown, moist. No odors. 30% recovery.
6 7 8 9 10			10:10	5-7' brown gravelly sandy clay, moist. 7-10' grey silt stone, wet. No odors. 30% recovery.
11 12 13 14 15			10:15	10-15' grey sand, wet. No odors. 25% recovery. Boring terminated at 15-ft BGS.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site:	**Caliber Collision**
Location:	**STA 303+20.00; 105-ft LT of CL**
Boring Location:	**B2**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/7/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	**NA**
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**10'**	Screened Interval:	
DTW Within Soil Boring:	**N/A**			Cased Interval:	
Static GW Level:	**N/A**	Date GW Measured:	**N/A**		

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5			10:20	0-1' topsoil to quartzy gravel, dry. 1-3' sand, white and orange, gravel throughout. 3-4' sandy clay, brown, dry. 4-5' white sand, dry. No odors. 50% recovery.
6 7 8 9 10			10:30	5-6' quartz/sand/gravel. 6-8' gravelly clay. 8-10' siltstone. Refusal at 10-ft BGS
11 12 13 14 15				
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site:	**Caliber Collision**
Location:	**STA 303+40.00; 160-ft LT of CL**
Boring Location:	**B3**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/7/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**13.5-ft**	Screened Interval:	**5-13.5-ft**
DTW Within Soil Boring:	**7-ft**			Cased Interval:	**0-5-ft**
Static GW Level:	**2.1-ft**	Date GW Measured:	**12/7/18**		

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5				0-3' clay, brown. 3-5' sandy clay, brown to gray. Moist. No odors. 40% recovery.
6 7 8 9 10			10:40	5-10' gravel, wet. No odors. 20% recovery.
11 12 13 14 15			10:45	10-11' sand, tan. 11-13.5' silt stone, grey. Slightly moist. No odor. 40% recovery. Refusal at 13.5-ft BGS.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site:	**Caliber Collision**
Location:	**STA 303+55.00; 215-ft LT of CL**
Boring Location:	**B4**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/7/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**15-ft**	Screened Interval:	**5-15-ft**
DTW Within Soil Boring:	**4-ft**			Cased Interval:	**0-5-ft**
Static GW Level:	**3.4-ft**	Date GW Measured:	**12/7/18**		

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5				0-1' topsoil. 1-2' sandy clay, orange and grey, moist, no odor. 2-5' sandy clay, orange and grey, wet, slight odor. 50% recovery.
6 7 8 9 10			11:05	5-10' grey sand. Wet/saturated. Slight odor. 50% recovery.
11 12 13 14 15			11:15	10-15' grey/tan gravel, saturated. No odors. 40% recovery. Boring terminated at 15-ft BGS.
16 17 18 19 20				

BGS - Below Ground Surface

Appendix C: Laboratory Reports and Sample Custody Documentation

1941 Reymet Road ● Richmond, Virginia 23237 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 18L0367

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg, VA 24060	Date Received:	December 7, 2018 15:15
		Date Issued:	December 20, 2018 13:51
		Project Number:	18-796.03
Submitted To:	Josh Hepler	Purchase Order:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates		

Enclosed are the results of analyses for samples received by the laboratory on 12/07/2018 15:15. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Ted Soyars

Ted Soyars
Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.

Accredited in Accordance with nelac
Commonwealth of Virginia, DCLS
Accreditation # 460021

NWBOC EDWOSB Certified

Certified SWaM Small, Women and Minority-Owned
Supplier Diversity Strengthens the Commonwealth
by the Virginia Department of Minority Business Enterprise

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0367

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B1 5-10'	18L0367-01	Soil	12/07/2018 10:10	12/07/2018 15:15
B1 10-15'	18L0367-02	Soil	12/07/2018 10:15	12/07/2018 15:15
B2 0-5'	18L0367-03	Soil	12/07/2018 10:20	12/07/2018 15:15
B2 5-10'	18L0367-04	Soil	12/07/2018 10:30	12/07/2018 15:15
B3 5-10'	18L0367-05	Soil	12/07/2018 10:40	12/07/2018 15:15
B3 10-13.5'	18L0367-06	Soil	12/07/2018 10:45	12/07/2018 15:15
B4 5-10'	18L0367-07	Soil	12/07/2018 11:05	12/07/2018 15:15
B4 10-15'	18L0367-08	Soil	12/07/2018 11:15	12/07/2018 15:15
B1	18L0367-09	Ground Water	12/07/2018 10:20	12/07/2018 15:15
B3	18L0367-10	Ground Water	12/07/2018 10:47	12/07/2018 15:15
B4	18L0367-11	Ground Water	12/07/2018 11:20	12/07/2018 15:15

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B1 5-10' **Laboratory Sample ID:** 18L0367-01

Grab Date/Time: 12/07/2018 10:10

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	01	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 14:40	12/18/18 21:49	HLM
Surr: Pentacosane (Surr)	*01*	*SW8015C*	*101 %*		*40-160*		*12/17/18 14:40*	*12/18/18 21:49*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B1 10-15' **Laboratory Sample ID:** 18L0367-02

Grab Date/Time: 12/07/2018 10:15

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	02	SW8015C	<10.0 mg/kg		10.0	1	12/18/18 15:00	12/19/18 14:39	HLM
Surr: Pentacosane (Surr)	*02*	*SW8015C*	*104 %*		*40-160*		*12/18/18 15:00*	*12/19/18 14:39*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B2 0-5' **Laboratory Sample ID:** 18L0367-03

Grab Date/Time: 12/07/2018 10:20

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	03	SW8015C	<10.0 mg/kg		10.0	1	12/18/18 15:00	12/19/18 15:05	HLM
Surr: Pentacosane (Surr)	*03*	*SW8015C*	*130 %*		*40-160*		*12/18/18 15:00*	*12/19/18 15:05*	*HLM*

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B2 5-10' **Laboratory Sample ID:** 18L0367-04

Grab Date/Time: 12/07/2018 10:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	04	SW8015C	<10.0 mg/kg		10.0	1	12/18/18 15:00	12/19/18 15:32	HLM
Surr: Pentacosane (Surr)	*04*	*SW8015C*	*100 %*		*40-160*		*12/18/18 15:00*	*12/19/18 15:32*	*HLM*

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B3 5-10' **Laboratory Sample ID:** 18L0367-05

Grab Date/Time: 12/07/2018 10:40

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	05	SW8015C	<10.0 mg/kg		10.0	1	12/18/18 15:00	12/19/18 15:59	HLM
Surr: Pentacosane (Surr)	*05*	*SW8015C*	*111 %*		*40-160*		*12/18/18 15:00*	*12/19/18 15:59*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B3 10-13.5' **Laboratory Sample ID:** 18L0367-06

Grab Date/Time: 12/07/2018 10:45

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	06	SW8015C	<10.0 mg/kg		10.0	1	12/18/18 15:00	12/19/18 16:25	HLM
Surr: Pentacosane (Surr)	*06*	*SW8015C*	*100 %*		*40-160*		*12/18/18 15:00*	*12/19/18 16:25*	*HLM*

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Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B4 5-10' **Laboratory Sample ID:** 18L0367-07

Grab Date/Time: 12/07/2018 11:05

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	07	SW8015C	<10.0 mg/kg		10.0	1	12/18/18 15:00	12/19/18 16:52	HLM
Surr: Pentacosane (Surr)	*07*	*SW8015C*	*107 %*		*40-160*		*12/18/18 15:00*	*12/19/18 16:52*	*HLM*

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B4 10-15' **Laboratory Sample ID:** 18L0367-08

Grab Date/Time: 12/07/2018 11:15

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	08	SW8015C	<10.0 mg/kg		10.0	1	12/18/18 15:00	12/19/18 17:18	HLM
Surr: Pentacosane (Surr)	*08*	*SW8015C*	*104 %*		*40-160*		*12/18/18 15:00*	*12/19/18 17:18*	*HLM*

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B1 **Laboratory Sample ID:** 18L0367-09

Grab Date/Time: 12/07/2018 10:20

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	09	SW8015C	<0.658 mg/L		0.658	1	12/14/18 10:50	12/17/18 17:48	HLM
Surr: Pentacosane (Surr)	*09*	*SW8015C*	*80.5 %*		*65-125*		*12/14/18 10:50*	*12/17/18 17:48*	*HLM*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B3 **Laboratory Sample ID:** 18L0367-10

Grab Date/Time: 12/07/2018 10:47

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	10	SW8015C	<0.833 mg/L		0.833	1	12/14/18 10:50	12/17/18 18:14	HLM
Surr: Pentacosane (Surr)	*10*	*SW8015C*	*86.6 %*		*65-125*		*12/14/18 10:50*	*12/17/18 18:14*	*HLM*

AIR WATER & SOIL LABORATORIES, INC.

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Laboratory Order ID: 18L0367

Analytical Results

Sample I.D. B4 **Laboratory Sample ID:** 18L0367-11

Grab Date/Time: 12/07/2018 11:20

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	11	SW8015C	<0.833 mg/L		0.833	1	12/14/18 10:50	12/17/18 18:40	HLM
Surr: Pentacosane (Surr)	*11*	*SW8015C*	*89.3 %*		*65-125*		*12/14/18 10:50*	*12/17/18 18:40*	*HLM*

Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3510C**		
18L0367-09	380 mL / 0.500 mL	SW8015C	BBL0432	SBL0464	AK80055
18L0367-10	600 mL / 1.00 mL	SW8015C	BBL0432	SBL0464	AK80055
18L0367-11	600 mL / 1.00 mL	SW8015C	BBL0432	SBL0464	AK80055

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3550C**		
18L0367-01	50.2 g / 1.00 mL	SW8015C	BBL0499	SBL0487	AK80055
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3550C**		
18L0367-02	51.0 g / 1.00 mL	SW8015C	BBL0544	SBL0559	AK80056
18L0367-03	50.6 g / 1.00 mL	SW8015C	BBL0544	SBL0559	AK80056
18L0367-04	50.9 g / 1.00 mL	SW8015C	BBL0544	SBL0559	AK80056
18L0367-05	50.6 g / 1.00 mL	SW8015C	BBL0544	SBL0559	AK80056
18L0367-06	51.9 g / 1.00 mL	SW8015C	BBL0544	SBL0559	AK80056
18L0367-07	51.2 g / 1.00 mL	SW8015C	BBL0544	SBL0559	AK80056
18L0367-08	50.8 g / 1.00 mL	SW8015C	BBL0544	SBL0559	AK80056

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0432 - SW3510C										
Blank (BBL0432-BLK1)				Prepared: 12/14/2018 Analyzed: 12/17/2018						
TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
Surr: Pentacosane (Surr)	0.235		mg/L	0.252		93.4	65-125			
Surr: Pentacosane (Surr)	0.235		mg/L	0.252		93.4	65-125			
Surr: Pentacosane (Surr)	0.235		mg/L	0.252		93.4	65-125			
LCS (BBL0432-BS1)				Prepared: 12/14/2018 Analyzed: 12/17/2018						
TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.500	mg/L	5.00 mg/L		98.5	65-110			
TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.500	mg/L	5.00 mg/L		98.5	65-110			
TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.500	mg/L	5.00 mg/L		98.5	65-110			
Surr: Pentacosane (Surr)	0.261		mg/L	0.252 mg/L		103	65-125			
Surr: Pentacosane (Surr)	0.261		mg/L	0.252 mg/L		103	65-125			
Surr: Pentacosane (Surr)	0.261		mg/L	0.252 mg/L		103	65-125			
Matrix Spike (BBL0432-MS1)		**Source: 18L0402-01**		Prepared: 12/14/2018 Analyzed: 12/17/2018						
TPH-Semi-Volatiles (DRO)	4.1 mg/L	0.510	mg/L	5.10	1.3 mg/L	54.8	40-110			
TPH-Semi-Volatiles (DRO)	4.1 mg/L	0.510	mg/L	5.10	1.3 mg/L	54.8	40-110			
TPH-Semi-Volatiles (DRO)	4.1 mg/L	0.510	mg/L	5.10	1.3 mg/L	54.8	40-110			
Surr: Pentacosane (Surr)	0.307		mg/L	0.257 mg/L		119	65-125			
Surr: Pentacosane (Surr)	0.307		mg/L	0.257 mg/L		119	65-125			
Surr: Pentacosane (Surr)	0.307		mg/L	0.257 mg/L		119	65-125			
Matrix Spike Dup (BBL0432-MSD1)		**Source: 18L0402-01**		Prepared: 12/14/2018 Analyzed: 12/17/2018						
TPH-Semi-Volatiles (DRO)	4.1 mg/L	0.521	mg/L	5.21	1.3 mg/L	54.2	40-110	0.691	20	
TPH-Semi-Volatiles (DRO)	4.1 mg/L	0.521	mg/L	5.21	1.3 mg/L	54.2	40-110	0.691	20	
TPH-Semi-Volatiles (DRO)	4.1 mg/L	0.521	mg/L	5.21	1.3 mg/L	54.2	40-110	0.691	20	
Surr: Pentacosane (Surr)	0.311		mg/L	0.262 mg/L		119	65-125			
Surr: Pentacosane (Surr)	0.311		mg/L	0.262 mg/L		119	65-125			
Surr: Pentacosane (Surr)	0.311		mg/L	0.262 mg/L		119	65-125			

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0499 - SW3550C										
Blank (BBL0499-BLK1)				Prepared: 12/17/2018 Analyzed: 12/18/2018						
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
Surr: Pentacosane (Surr)	6.50		mg/kg	4.97		131	40-160			
LCS (BBL0499-BS1)				Prepared: 12/17/2018 Analyzed: 12/18/2018						
TPH-Semi-Volatiles (DRO)	71.9 mg/kg	10.0	mg/kg	99.2	mg/kg	72.4	40-160			
Surr: Pentacosane (Surr)	6.05		mg/kg	5.00	mg/kg	121	40-160			
Matrix Spike (BBL0499-MS1)		**Source: 18L0345-01**		Prepared: 12/17/2018 Analyzed: 12/18/2018						
TPH-Semi-Volatiles (DRO)	63.5 mg/kg	10.0	mg/kg	99.8	<10.0 mg/kg	63.6	40-160			
Surr: Pentacosane (Surr)	4.56		mg/kg	5.03	mg/kg	90.7	40-160			
Matrix Spike Dup (BBL0499-MSD1)		**Source: 18L0345-01**		Prepared: 12/17/2018 Analyzed: 12/18/2018						
TPH-Semi-Volatiles (DRO)	61.7 mg/kg	10.0	mg/kg	99.4	<10.0 mg/kg	62.1	40-160	2.80	20	
Surr: Pentacosane (Surr)	4.39		mg/kg	5.01	mg/kg	87.6	40-160			
Batch BBL0544 - SW3550C										
Blank (BBL0544-BLK1)				Prepared: 12/18/2018 Analyzed: 12/19/2018						
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
Surr: Pentacosane (Surr)	4.86		mg/kg	4.86		100	40-160			
Surr: Pentacosane (Surr)	4.86		mg/kg	4.86		100	40-160			
Surr: Pentacosane (Surr)	4.86		mg/kg	4.86		100	40-160			
Surr: Pentacosane (Surr)	4.86		mg/kg	4.86		100	40-160			
Surr: Pentacosane (Surr)	4.86		mg/kg	4.86		100	40-160			
Surr: Pentacosane (Surr)	4.86		mg/kg	4.86		100	40-160			

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0544 - SW3550C										
Blank (BBL0544-BLK1)				Prepared: 12/18/2018 Analyzed: 12/19/2018						
Surr: Pentacosane (Surr)	4.86		mg/kg	4.86		100	40-160			
LCS (BBL0544-BS1)				Prepared: 12/18/2018 Analyzed: 12/19/2018						
TPH-Semi-Volatiles (DRO)	85.8 mg/kg	10.0	mg/kg	99.0	mg/kg	86.6	40-160			
TPH-Semi-Volatiles (DRO)	85.8 mg/kg	10.0	mg/kg	99.0	mg/kg	86.6	40-160			
TPH-Semi-Volatiles (DRO)	85.8 mg/kg	10.0	mg/kg	99.0	mg/kg	86.6	40-160			
TPH-Semi-Volatiles (DRO)	85.8 mg/kg	10.0	mg/kg	99.0	mg/kg	86.6	40-160			
TPH-Semi-Volatiles (DRO)	85.8 mg/kg	10.0	mg/kg	99.0	mg/kg	86.6	40-160			
TPH-Semi-Volatiles (DRO)	85.8 mg/kg	10.0	mg/kg	99.0	mg/kg	86.6	40-160			
TPH-Semi-Volatiles (DRO)	85.8 mg/kg	10.0	mg/kg	99.0	mg/kg	86.6	40-160			
Surr: Pentacosane (Surr)	5.31		mg/kg	4.99	mg/kg	106	40-160			
Surr: Pentacosane (Surr)	5.31		mg/kg	4.99	mg/kg	106	40-160			
Surr: Pentacosane (Surr)	5.31		mg/kg	4.99	mg/kg	106	40-160			
Surr: Pentacosane (Surr)	5.31		mg/kg	4.99	mg/kg	106	40-160			
Surr: Pentacosane (Surr)	5.31		mg/kg	4.99	mg/kg	106	40-160			
Surr: Pentacosane (Surr)	5.31		mg/kg	4.99	mg/kg	106	40-160			
Surr: Pentacosane (Surr)	5.31		mg/kg	4.99	mg/kg	106	40-160			
Matrix Spike (BBL0544-MS1)		**Source: 18L0372-09**		Prepared: 12/18/2018 Analyzed: 12/19/2018						
TPH-Semi-Volatiles (DRO)	267 mg/kg	99.0	mg/kg	99.0	160 mg/kg	108	40-160			
TPH-Semi-Volatiles (DRO)	267 mg/kg	99.0	mg/kg	99.0	160 mg/kg	108	40-160			
TPH-Semi-Volatiles (DRO)	267 mg/kg	99.0	mg/kg	99.0	160 mg/kg	108	40-160			
TPH-Semi-Volatiles (DRO)	267 mg/kg	99.0	mg/kg	99.0	160 mg/kg	108	40-160			
TPH-Semi-Volatiles (DRO)	267 mg/kg	99.0	mg/kg	99.0	160 mg/kg	108	40-160			
TPH-Semi-Volatiles (DRO)	267 mg/kg	99.0	mg/kg	99.0	160 mg/kg	108	40-160			
TPH-Semi-Volatiles (DRO)	267 mg/kg	99.0	mg/kg	99.0	160 mg/kg	108	40-160			
Surr: Pentacosane (Surr)	5.49		mg/kg	4.99	mg/kg	110	40-160			
Surr: Pentacosane (Surr)	5.49		mg/kg	4.99	mg/kg	110	40-160			
Surr: Pentacosane (Surr)	5.49		mg/kg	4.99	mg/kg	110	40-160			
Surr: Pentacosane (Surr)	5.49		mg/kg	4.99	mg/kg	110	40-160			
Surr: Pentacosane (Surr)	5.49		mg/kg	4.99	mg/kg	110	40-160			

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0544 - SW3550C										
Matrix Spike (BBL0544-MS1)		**Source: 18L0372-09**		Prepared: 12/18/2018 Analyzed: 12/19/2018						
Surr: Pentacosane (Surr)	5.49		mg/kg	4.99	mg/kg	110	40-160			
Surr: Pentacosane (Surr)	5.49		mg/kg	4.99	mg/kg	110	40-160			
Matrix Spike Dup (BBL0544-MSD1)		**Source: 18L0372-09**		Prepared: 12/18/2018 Analyzed: 12/19/2018						
TPH-Semi-Volatiles (DRO)	155 mg/kg	97.8	mg/kg	97.8	160 mg/kg	-5.40	40-160	53.2	20	M, P
TPH-Semi-Volatiles (DRO)	155 mg/kg	97.8	mg/kg	97.8	160 mg/kg	-5.40	40-160	53.2	20	M, P
TPH-Semi-Volatiles (DRO)	155 mg/kg	97.8	mg/kg	97.8	160 mg/kg	-5.40	40-160	53.2	20	M, P
TPH-Semi-Volatiles (DRO)	155 mg/kg	97.8	mg/kg	97.8	160 mg/kg	-5.40	40-160	53.2	20	M, P
TPH-Semi-Volatiles (DRO)	155 mg/kg	97.8	mg/kg	97.8	160 mg/kg	-5.40	40-160	53.2	20	M, P
TPH-Semi-Volatiles (DRO)	155 mg/kg	97.8	mg/kg	97.8	160 mg/kg	-5.40	40-160	53.2	20	M, P
TPH-Semi-Volatiles (DRO)	155 mg/kg	97.8	mg/kg	97.8	160 mg/kg	-5.40	40-160	53.2	20	M, P
Surr: Pentacosane (Surr)	4.66		mg/kg	4.93	mg/kg	94.6	40-160			
Surr: Pentacosane (Surr)	4.66		mg/kg	4.93	mg/kg	94.6	40-160			
Surr: Pentacosane (Surr)	4.66		mg/kg	4.93	mg/kg	94.6	40-160			
Surr: Pentacosane (Surr)	4.66		mg/kg	4.93	mg/kg	94.6	40-160			
Surr: Pentacosane (Surr)	4.66		mg/kg	4.93	mg/kg	94.6	40-160			
Surr: Pentacosane (Surr)	4.66		mg/kg	4.93	mg/kg	94.6	40-160			
Surr: Pentacosane (Surr)	4.66		mg/kg	4.93	mg/kg	94.6	40-160			

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Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Certified Analyses included in this Report

Analyte	Certifications
SW8015C in Non-Potable Water	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
SW8015C in Solids	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP

Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019

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Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Summary of Data Qualifiers

M	Matrix spike recovery is outside established acceptance limits
P	Duplicate analysis does not meet the acceptance criteria for precision
RPD	Relative Percent Difference
Qual	Qualifers
-RE	Denotes sample was re-analyzed
D.F.	Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.
TIC	Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library . A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
PCBs, Total	Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.

AIR WATER & SOIL LABORATORIES, INC.

1941 REYMET ROAD
RICHMOND, VIRGINIA 23237
(804) 358-8295 PHONE
(804)358-8297 FAX

Chain of Custody
Form #: F1331
Rev. 3.0
Effective: Aug 24, 2017

CHAIN OF CUSTODY

PAGE _____ OF _____

COMPANY NAME: EEE Consulting, Inc.	INVOICE TO: Same	PROJECT NAME/Quote #:
CONTACT: Josh Heepler	INVOICE CONTACT:	SITE NAME: Caliber Collision / Marine Structure Applications
ADDRESS: 201 Church Street Blacksburg, VA	INVOICE ADDRESS:	PROJECT NUMBER: 18-796.03
PHONE #: 540-230-3685	INVOICE PHONE #:	P.O. #: 18-796.03
FAX #: / EMAIL: jheepler@eee-consulting.com		Pretreatment Program:
Is sample for compliance reporting? YES (NO)	Is sample from a chlorinated supply? YES (NO)	PWS I.D. #:
SAMPLER NAME (PRINT): Carroll Ellis III	SAMPLER SIGNATURE: Carroll Ellis III	Turn Around Time: Circle: (10) 5 Days or __ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

	CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE): TPH-DRO							COMMENTS (Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol; PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min))
1)	B1 5-10'						12/7/18	10:10	–	S	1								
2)	B1 10-15'							10:15	–		1								
3)	B2 0-5'							10:20	–		1								
4)	B2 5-10'							10:30	–		1								
5)	B3 5-10'							10:40	–		1								
6)	B3 10-13.5'							10:45	–		1								
7)	B4 5-10'							11:05	–		1								
8)	B4 10-15'							11:15	–		1								
9)	B1							10:20	–	GW	1								
10)	B3							10:47	–		1								0.2°C
11)	B4							11:20	–		1								

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
Carroll Ellis III	12/7/18 ~~12:40~~	[signature]	7 DEC 2018 15:15
RELINQUISHED:	DATE / TIME 3:15	RECEIVED:	DATE / TIME

QC Data Package: Level III ☐ Level IV ☐

LAB USE ONLY: Custody Seals used and intact? (Y/N) (Y) _____ COOLER TEMP °C: Received on ice? (Y/N) (Y) _____

EEE-Blacksburg 18L0367
Caliber Collision Marine Structure
Recd: 12/07/2018 Due: 12/21/2018

v130325002

F1331 AWS COC_v171001.xls

AIR WATER & SOIL

Sample Preservation Log

Sample Preservation Log
Form #: F1301
Rev # 9.0
Effective: Nov 13, 2018

Order ID 18L0367

Date Performed: 11 DEC 2018

Analyst Performing Check: TM

Sample ID	Container ID	Metals pH as Received < 2	Metals pH as Received Other	Metals Final pH (If adjust.)	Cyanide pH as Received > 12	Cyanide pH as Received Other	Cyanide Final pH (If adjust.)	Sulfide pH as Received > 9	Sulfide pH as Received Other	Sulfide Final pH (If adjust.)	Ammonia pH as Received < 2	Ammonia pH as Received Other	Ammonia Final pH (If adjust.)	TKN pH as Received < 2	TKN pH as Received Other	TKN Final pH (If adjust.)	Phos, Tot pH as Received < 2	Phos, Tot pH as Received Other	Phos, Tot Final pH (If adjust.)	NO3+NO2 pH as Received < 2	NO3+NO2 pH as Received Other	NO3+NO2 Final pH (If adjust.)	DRO pH as Received < 2	DRO pH as Received Other	DRO Final pH (If adjust.)	Pesticide (8081/608/508) Res.Cl as Received Present	Pesticide Res.Cl as Received Absent	Pesticide Res.Cl P/A (If adjust.)	SVOC (525.2/8270/625) Res.Cl as Received Present	SVOC Res.Cl as Received Absent	SVOC Res.Cl P/A (If adjust.)	CrVI * ** pH as Received	CrVI * ** Adjusted final pH	Pest/PCB (508) / SVOC(525) pH as Received < 2	Pest/PCB (508) / SVOC(525) pH as Received Other	Pest/PCB (508) / SVOC(525) Final pH (If adjust.)	pH as Received	pH as Received Other	Final pH (If adjust.)
09	A																																						
10	A																																						
11	A																																						

NaOH ID: _____ HNO_3 ID: _____

H_2SO_4 ID: _____ $Na_2S_2O_3$ ID: _____

HCL ID: _____ Na_2SO_3 ID: _____

CrVI preserved date/time: _____ Analyst Initials: _____

** pH must be adjusted between 9.3 - 9.7*

Buffer Sol'n ID: _____

1N NaOH ID: _____ 5N NaOH: _____

**W.Va only certifies DISS CrVI and not T CrVI as an approved analyte under 40CFR136 for waste water.

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 13:51
Submitted To:	Josh Hepler	Project Number:	18-796.03
Client Site I.D.:	Caliber Collision/Marina Structure Applicates	Purchase Order:	18-796.03

Sample Conditions Checklist

Samples Received at:	**0.20°C**
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	Yes
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	No
Are all volatile organic and TOX containers free of headspace?	NA
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	NA
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

Phase II Environmental Site Assessment
Roadway Improvement Project

Route 1 Widening Project
Cropper Auto Care
17660/17662 Main Street
Dumfries, Virginia 22026
Prince William County

Contract ID: 44115
VDOT Project: 001-212-249
VDOT UPC: 90339 Act: 689
VDOT Task Number: E-FR024.06

Prepared for
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February 2019

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3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

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Acronyms

AST	Above Ground Storage Tank
BGS	Below Ground Surface
C	Celsius
COC	Chain of Custody
CL	Center Line
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency – United States
FT	Feet
LT	Left
mg/kg	Milligrams per Kilogram
MW	Monitoring Well
PG	Professional Geologist
PID	Photoionization Detector
PPM	Parts Per Million
REC	Recognized Environmental Condition
RL	Reporting Limit
Rt	Route
RT	Right
R/W	Right-of-Way
STA	Station
TPH-DRO	Total Petroleum Hydrocarbons - Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbons – Gasoline Range Organics
UST	Underground Storage Tank
VDOT	Virginia Department of Transportation
VOC	Volatile Organic Compounds
VSWMR	Virginia Solid Waste Management Regulations
3e	EEE Consulting, Inc.

1.0 INTRODUCTION AND BACKGROUND

The Virginia Department of Transportation (VDOT) is administering proposed improvements and realignment of 2.3-miles of Route 1 (Fraley Boulevard) between the intersection with Quantico Gateway Drive and the intersection with Drumfires Road (State Route 234) in Dumfries, Prince William County, Virginia. The general project location and topographic setting are shown on **Figures 1** and **2**, respectively. An aerial photograph of the project area is also presented as **Figure 3.**

The roadway and drainage improvements will occur in existing roadway right-of-way (R/W), proposed R/W, permanent easements (slope & drainage), temporary construction easements (i.e. erosion & sediment control measures) and proposed limited access lines. A Phase I Environmental Site Assessment (ESA) was prepared by EEE Consulting, Inc (**3e**) for the Study Area in August 2018, which identified Recognized Environmental Conditions (REC) throughout the corridor, including the subject property as follows:

- **Cropper Auto Care** (Parcel 080) is located at 17662 Main Street, Dumfries, VA 22026 (VDOT Plan Sheet No 14B), which is currently a vehicle repair shop, body shop, and dismantled vehicle storage lot. A single-story residential rental unit with no observed petroleum/hazardous material storage is also located on the western portion of the property. Two (2) used oil Aboveground Storage Tanks (AST); one heating oil AST; and multiple 55-gallon drums of antifreeze and petroleum are also stored on-site with evident surface staining. FOIA documents also indicate complaints of apparent illicit dumping of petroleum and antifreeze on-site.

According to Plan Sheet No. 14B, the property is a potential full take because of the proposed R/W and permanent slope easement limits that intersect two (2), one-story buildings on-site. Improvements proposed to date at Parcel 080 include Drainage Structure Nos. 14B-2, 14B-8 and associated 18-inch diameter connection pipes, sidewalk, and roadway realignment improvements. (See **Figure 4**). Other notable disturbance activities include a proposed cut from approximately STA 105+65.00 to 106+35.00; 50-100-ft Right (Rt) of Main Street CL to approximately 8-ft below existing grade (see Plan Sheet No. 14D).

The RECs identified at Parcel 080 have the potential to pose adverse impacts to subsurface media that will likely be disturbed during the installation of the noted drainage and roadway improvements. The constituents of concern are petroleum and solvent-based as related to the RECs identified above and detailed in the Phase I ESA Corridor Study Report (**3e**, August 2018). Based on this information, the VDOT – NOVA District Hazardous Materials Manager requested the collection of representative samples to confirm the presence/absence of impacts to soil and groundwater in and proximate to the proposed acquisition and disturbance areas. On December 6th, 2018, **3e** completed a Phase II ESA at Parcel 080 to confirm the presence/absence of impacts

to subsurface media that will likely be disturbed in response to the proposed roadway and drainage improvements.

Subsurface boring advancements, sampling methods, corresponding analytical results, and conclusions/recommendations pertaining to the proposed construction activities at each site are summarized in the following sections of this report.

2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS

Prior to implementing the direct push boring installations, the approximate locations of subsurface public utilities were identified and marked by Miss Utility of Virginia. A utility locate request form was also completed with VDOT to identify utilities owned and operated by VDOT. Copies of the Miss Utility and VDOT Ticket are included in **Appendix A**. In addition to public utility identification, private subsurface utilities were also identified and marked in each investigative area prior to commencing drilling activities.

3.0 SOIL AND GROUNDWATER SAMPLING METHODS

3.1. Soil Sampling Methods

On December 6th, 2018, a direct push drill rig was utilized to advance four (4) soil borings with two (2) converted to temporary groundwater monitoring wells (MW). Additionally, due to access restrictions, one boring (i.e. B5) was installed utilizing a hand auger, which was also converted to a temporary groundwater MW. Two surface composite soil samples were also collected in areas with observed surface staining. The boring and sample locations are as follows:

- B1 – Installed proximate to STA No. 107+15.00; 40-ft RT of Main Street CL to a depth of 15-ft BGS as proposed.
- B2 – Installed proximate to STA No. 106+30.00; 25-ft RT of Main Street CL to a depth of 15-ft BGS as proposed.
- B3 – Installed proximate to STA No. 105+70.00; 5-ft RT of Main Street CL to a depth of 15-ft BGS as proposed with subsequent conversion to a temporary groundwater MW.
- B4 – Installed proximate to STA No. 106+00.00; 100-ft RT of Main Street CL to a depth of 15-ft BGS as proposed with subsequent conversion to a temporary groundwater MW.
- B5 – Installed proximate to STA No. 105+50.00; 50-ft RT of Main Street CL to a depth 5-ft BGS upon refusal on consolidated material with subsequent conversion to a temporary groundwater MW.
- B6 Composite Surface Sample – Collected proximate to STA No. 105+40.00; 65-ft RT of Main Street CL.
- B7 Composite Surface Sample – Collected proximate to STA No. 105+30.00; 85-ft RT of Main Street CL.

The roadway improvements proposed to date, RECs, and boring and sample locations are depicted on **Figure 4**.

Soil borings, B1 through B4 were advanced using a Geoprobe® direct push rig. The direct-push rig utilizes a hollow-stem spoon that produced a continuous soil core in five (5)-ft intervals along the vertical depth of each boring. Each boring installed with the drill rig were advanced to predetermined depths at a depth 15-ft BGS. The boring installed with the hand auger (i.e. B5) was advanced to 5-ft BGS upon refusal. Borings B3, B4 and B5 were installed for installations of temporary groundwater monitoring wells at 15-ft-, 15-ft and 5-ft BGS, respectively. Subsurface conditions (i.e. wet soils) indicative of groundwater were observed in B2, B3, B4 and B5. The detailed boring logs are presented in **Appendix B**.

Composite soil samples were collected in the proposed project limits to characterize subsurface conditions prior to roadway R/W acquisition, and assess soil that will likely be disturbed during construction. The representative composite soil samples were obtained from the borings by collecting aliquots from the following depth intervals:

- B1, B2, B3 and B4: 0-5-ft and 5-10-ft BGS.
- B5: 0-5-ft BGS.

Two (2) composite samples of surficial soil were also collected; one (1) proximate to the active 275-gallon heating oil AST and the other proximate to the two (2), 275-gallon used oil ASTs. The composite samples were obtained by collecting six (6) aliquots of soil from an approximate 10-ft x 10-ft area surrounding each AST area, which were placed in a pre-cleaned stainless-steel bowl. The contents of the mixing bowl were then carefully mixed and composited into the sample containers.

Each composite soil sample was placed into two (2) pre-cleaned 4-ounce glass jars. The sample jars were appropriately labeled and placed on ice in a cooler to maintain an appropriate temperature ($\leq$ 4°C) while in transit to the certified environmental laboratory. Chain of Custody (COC) documentation was completed for all samples submitted for laboratory analysis.

The composite soil samples were submitted for laboratory analysis of TPH-DRO and TPH-ORO. The composite samples collected to characterize surface soil proximate to the home heating and used oil ASTs were also submitted for laboratory analysis of the total RCRA 8 Metals and Ethylene Glycol. The COC documentation and laboratory analytical data are provided in **Appendix C**. A detailed discussion of the composite soil sample analytical results is presented in **Section 5.0** of this report.

3.2. Groundwater Sampling Methods

Temporary monitoring wells were constructed in B3, B4, and B5 to collect representative groundwater samples to confirm the presence/absence of impact to the shallow groundwater table. Each temporary well was constructed with 1-inch diameter, PVC well screen (slotted at 0.01-ft intervals) and solid 1-inch diameter casing. Screen and casing intervals for the temporary monitoring wells are documented on the boring log for each boring (see **Appendix B)**. PVC caps were fitted over each well to prevent intrusion of foreign material. Clean sand was then placed in the remaining annular space of the borehole to form a filter pack around the well screen.

On December 12th, 2018, an oil/water interface probe was utilized to determine the depth-to-groundwater and confirm the presence or absence of separate-phase petroleum in the temporary monitoring wells. The static groundwater levels in the temporary well were measured as follows:

- B3 at 9.5-ft BGS
- B4 at 9.5-ft BGS
- B5 at 2.5-ft BGS

Separate-phase petroleum or petroleum odors were not detected in the temporary monitoring wells.

To account for Volatile Organic Compound (VOC) analysis, a representative groundwater sample was collected from B3, B4 and B5 using a low flow capable bladder pump in general accordance with both EPA's Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedure (EPA/540/S-95/504) and ASTM D6771-02: *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations.* Water quality parameters (pH, temperature, and specific conductance) were stable (i.e., readings are within 10% of the previous measurement) prior to collecting each sample. The groundwater samples were prepared for transport to the laboratory in accordance the following procedures: 1): placed into containers provided by the laboratory with the appropriate preservative, 2): placed on ice in a cooler to maintain appropriate temperature while in transport to the environmental laboratory, 3): the Chain of Custody (COC) was completed and kept with the sample sets.

The groundwater samples were submitted for analysis of VOCs by EPA Method 8260 and; TPH-DRO and TPH-ORO by EPA Method 8015C. The analytical data for representative groundwater sample is provided in **Appendix C**. A discussion of the groundwater analytical result is provided in **Section 6.0** of this report.

After completion of the gauging/sampling activities, each temporary monitoring well was abandoned by removing the PVC screen and casing from the ground surface and filling the resulting void with bentonite chips.

4.0 PID SCREENING RESULTS

Photoionization Detector (PID) results for the screened direct push soil cores and surficial composite soil sample are presented on the following page in **Table 1**. Measurement units are in parts per million (ppm).

Table 1 - PID Soil Screening Data: Route 1 Cropper Auto Care

	PID (ppm)	PID (ppm)	PID (ppm)
Depth (ft BGS)	0-5	5-10	10-15
B1	0.4	0.4	0.4
B2	0.0	0.1	0.1
B3	0.3	0.1	0.0
B4	0.0	0.0	0.0
B5	0.0	NA	NA
B6	5.3	NA	NA
B7	6.7	NA	NA

ppm = Parts per Million
BGS – Below Ground Surface
Depth Unit – foot BGS

A review of **Table 1** indicates that the PID readings in the screened soil cores and surface composite soil sample were less than (<) 6.7-parts-per-million (ppm). Please note that the soil samples submitted for laboratory analysis from B5 0-5-ft, B6 Comp, and B7 Comp contained laboratory detectable TPH-DRO and/or TPH-ORO concentrations. The concentration detections in B5 did not register elevated PID readings or contain odors that were noticeable to olfactory senses, which is consistent for low concentration detections in the semi-volatile, hydrocarbon chain ranges (i.e. hydrocarbon chains from C10 – C38).

5.0 COMPOSITE SOIL SAMPLE ANALYTICAL RESULTS

The analytical results obtained from the composite soil samples are summarized in **Table 2** on the following page. All results are listed in units of milligrams-per-kilogram (mg/kg). A detailed laboratory analytical report is provided in **Appendix C**.

Table 2: Soil Sample Analytical Data
Cropper Auto Care
Route 1 Widening, Dumfries VA
Units = Milligrams per Kilogram (mg/kg)

Location	**B1 5-10**		**B1 10-15**		**B2 5-10**		**B2 10-15**		**B3 5-10**	
Laboratory I.D.	18L0319-01		18L0319-02		18L0319-03		18L0319-04		18L0319-05	
Depth Below Grade	5-10 feet		10-15 feet		5-10 feet		10-15 feet		5-10 feet	
Sample Time	10:55		11:05		11:50		12:00		11:30	
	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*
TPH-DRO	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*48.2*
TPH-ORO	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*10.0*	ND	*10.0*

Location	**B3 10-15**		**B4 5-10**		**B4 10-15**		**B5 0-5**	
Laboratory I.D.	18L0319-06		18L0319-07		18L0319-08		18L0319-09	
Depth Below Grade	10-15 feet		5-10 feet		10-15 feet		0-5 feet	
Sample Time	11:40		12:10		12:20		12:35	
	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*
TPH-DRO	ND	*10.0*	ND	*10.0*	ND	*10.0*	**17.1**	*10.0*
TPH-ORO	ND	*10.0*	ND	*10.0*	ND	*10.0*	**58.2**	*10.0*

Location	**B6 Comp**		**B7 Comp**	
Laboratory I.D.	18L0319-10		18L0319--11	
Depth Below Grade	Composite		Compsite	
Sample Time	13:00-13:10		13:15-13:25	
	Result	*RL*	Result	*RL*
TPH-DRO	**44.7**	*10.0*	**358**	*10.0*
TPH-ORO	**194**	*10.0*	ND	*10.0*
Silver	ND	*46.4*	ND	*47.3*
Arsenic	ND	*92.9*	ND	*94.5*
Barium	**50.6**	*46.4*	**92.6**	*47.3*
Cadmium	ND	*18.6*	ND	*18.9*
Chromium	ND	*46.4*	ND	*47.3*
Mercurcy	**0.017**	*0.008*	**0.011**	*0.008*
Lead	**84.4**	*46.4*	**242**	*47.3*
Selenium	ND	*232*	ND	*236*
Ethylene Glycol	ND	*13.5*	ND	*21.1*

Notes:

Bold / Underlined text = Concentration reported above RL

RL = Reporting Limit

ND -Below Laboratory Reporting Limit

A review of **Table 2** indicates the following:

- The residual-phase TPH-DRO and/or TPH-ORO concentrations detected in the samples collected from B6 Comp and B7 Comp **exceed** the Virginia Department of Environmental Quality (DEQ) TPH reporting limit of 100-mg/Kg for a petroleum release to the environment. The detected concentrations also **exceed** the Virginia Solid Waste Management Regulation (VSWMR) TPH limit of 50-mg/kg for fill material (***9VAC20-81-660D.2.d***).

- The residual-phase TPH-ORO concentrations detected in the samples collected from B5 at 0-5-ft BGS **exceed** the VSWMR TPH limit of 50-mg/kg for fill material.
- The total lead concentration detected in B7 Comp **exceeds** the EPA Toxicity Limit of 5.0-mg/L (***40 CRF 261.24***) for a characteristic hazardous waste by applying the Rule of 20.
- The total lead concentrations detected in B6 Comp and B7 Comp **exceed** the applicable USGS mean background concentrations established for the Eastern United States and Prince William County, VA.
- The total lead concentrations detected in B6 Comp and B7 Comp **exceed** the upper threshold average of 50-mg/kg for the natural occurrence of lead in soil as established by the EPA in the ***Review of the National Ambient Air Quality Standards (NAAQS) for Lead; Exposure Analysis Methodology and Validation (EPA, June 1989).***
- The total mercury and barium concentrations detected in B6 Comp and B7 Comp **are below** the applicable United States Geological Survey (USGS) mean background concentrations established for the Eastern United States and/or Prince William County, VA.

6.0 DISSOLVED PHASE ANALYTICAL RESULTS

The dissolved-phase analytical results obtained from the groundwater sample collected at B3, B4 and B5 are summarized in **Table 3** below. All results are listed in milligrams per liter (mg/L). A detailed laboratory analytical report is provided in **Appendix C**.

Table 3: Groundwater Sample Analytical Data
Route 1 Widening: Cropper Auto Care
Units = Milligrams per Liter (mg/l)

Location	B3		B4		B5		Trip Blank	
Laboratory I.D.	18L0642-01		18L0642-03		18L0642-02		18L0342-04	
Sample Time	12:00		10:30		11:15		16:05	
	Result	*RL*	Result	*RL*	Result	*RL*	Result	*RL*
Acetone	**0.0106**	*0.010*	**0.0117**	*0.010*	ND	*0.010*	ND	*0.010*
Tetrachloroethylene (PCE)	**0.0013**	*0.001*	**0.0014**	*0.001*	ND	*0.001*	ND	*0.001*
TPH-DRO	ND	*0.568*	ND	*0.581*	ND	*0.575*	NA	*NA*
TPH-GRO	ND	*1.1*	ND	*1.2*	ND	*1.2*	NA	*NA*

Notes:
Bold / Underlined text = Concentration reported above RL
RL = Reporting Limit
ND -Below Laboratory Reporting Limit

A review of **Table 3** indicates the following:

- The samples collected from B3 and B4 contain tetrachloroethylene (PCE) constituent concentrations above the laboratory RL. Please note that both concentrations are **below** the EPA Region 3 Regional Screening Level (RSL) for protection of groundwater, which is a Maximum Contaminate Level (MCL) of 0.005 mg/L.

- Acetone was detected above the laboratory RL in B3 and B4; however, it was not detected in B5 or the laboratory provided Trip Blank. Please note that EPA Region 3 does not maintain groundwater protection RSLs for acetone.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Representative soil and groundwater samples were collected under this investigation to determine if the RECs identified at Parcel 080 resulted in adverse impacts to media that will likely be disturbed in response to the proposed roadway and drainage improvements. The results of this investigation indicate the following:

Soil

- The residual-phase TPH-DRO and TPH-ORO concentrations detected in the B6 Comp and B7 Comp soil samples **exceed** both the TPH release reporting limit for petroleum impact to soil and VSWMR TPH limit for fill material. Both samples were collected in areas of surficial soil staining proximate to two petroleum ASTs that are staged on the northeastern side of the active repair/maintenance shop (see **Figure 4**).
- The residual-phase TPH-ORO concentration detected in B5 at 0-5-ft BGS exceeds the VSWMR TPH limit for fill material. The subject boring was advanced proximate to the surface staining and petroleum ASTs referenced in the previous bullet.
- The total lead concentrations detected in B6 Comp and B7 Comp **exceed** published background concentrations, which indicates that they are likely associated with an anthropogenic source (i.e. REC – visual surface staining).
- The Rule of 20 was applied to the detected total RCRA 8 metal concentrations to approximate the results of the Toxicity Characteristic Leaching Procedure (TCLP) extraction process, which dilutes the concentrations in the extraction fluid by a factor of 20. The total lead concentration detected in B7 Comp **exceeds** the Environmental Protection Agency (EPA) Toxicity Limit of 5.0-mg/L for lead by application of the Rule of 20. Therefore, it is possible that soil in and proximate to this location on-site contains leachable lead at concentrations that would be characteristic of a hazardous waste.
- The total barium and mercury concentrations detected in B6 Comp and B7 Comp are within the ranges of published background concentrations. Thus, they are not likely associated with the REC (i.e. visual surface staining) documented in this area of Parcel 080.

Groundwater

- The samples collected from B3 and B4 contained detectable PCE concentrations above the laboratory RL. However; both detection concentrations are **below** the EPA Region 3 MCL of 0.005 mg/L for protection of groundwater as a potable drinking water source. B3 was installed proximate to the CL of the proposed Main Street relocation at STA 105+70 and B4 was installed proximate to STA No. 106+00.00; 100-ft RT of Main Street CL. Groundwater in both temporary wells were measured at approximately 9.5-ft BGS
- Low acetone concentrations were also detected in B3 & B4.

Parcel 080 will likely be acquired as R/W to facilitate the installation of the realignment of Main Street and associated drainage improvements proposed as of the date of this report. **Prior to R/W acquisition, it is recommended that the current property owner report a documented petroleum release to the environment to the DEQ-NRO.** This recommendation is based on the detection of TPH concentrations in B6 Comp and B7 Comp that exceed 100-mg/kg.

The estimated volumes of petroleum impacted soil that will likely be excavated in the response to select roadway and drainage improvements at Parcel 080, and the corresponding soil management options that apply are detailed in the following **Section 7.1**.

In the absence of additional data collection, the detectable PCE concentrations in two wells with approximately 100-ft of lateral separation indicates that groundwater entering an open excavation at Parcel 080 would require Special Management Provisions. Options applicable to the characterization and management of impacted groundwater that may require dewatering from an open excavation are detailed in **Section 7.2**.

7.1. Petroleum and Lead Impacted Soil Volume Estimates

A review of Plan Sheet Nos. 14B and 14D and the data collected under this investigation indicates that select roadway and drainage improvements will require excavation in portions of Parcel 080 that are impacted by residual-phase petroleum and total lead concentrations as follows:

- A portion of the 15-inch diameter pipe that connects Drainage Structure Nos. 14B-2 to 14B-4 from approximately STA Nos. 105+35 to 105+65, 30-ft RT of CL. Please note that drainage descriptions and associated invert elevations were not available for specific structures as of the date of this report. However, preliminary information provided via e-mail by a VDOT Hydraulics/Drainage Engineer indicates that the subject drainage improvements referenced above will likely require excavation to depths that range from approximately 5.0-ft to 5.5-ft BGS.
- Cutting activities for a portion of the relocation of Main Street North from approximately STA Nos. 105+65 to 106+35, 50-100-ft RT of CL. This portion of the proposed cut is estimated to trend to depths of approximately 8-ft BGS in a footprint of 25-ft wide x 50-ft in length.
- The estimated excavation footprints in areas of Parcel 080 that have confirmed impacts to soil are depicted on **Figure 4**.

Based on this information, **Table 4** on the following page presents the estimated volume of impacted soil that will likely require Special Management Provisions to the construction contract.

Table 4: Cropper Auto Care
Petroleum/Lead-Impacted Soil Volume Estimates
Select Drainage Improvements & Pipe Connections

Boring ID	Impacted Soil Depths	Drainage Structure ID or Description	Impacted Excavation Footprint	Excavation Dimensions	Volume Estimate**	Volume Estimate**	Volume Estimate**
Unit	BGS		STA No.	LxWxH	Cubic Feet (ft^3)	Cubic Yards (yd^3)	Tons*
B5	0-5-ft	18-inch Diameter Pipe connecting 14B-2 to 14B-4	STA No. 105+35.00 to STA No. 105+65-ft; 30-ft RT of Main Street CL	30-ft x 3-ft x 5.5-ft	495	18	27
B6 Comp	0-1-ft BGS	Cut Associated w/Relocation of Main Street North	STA 105+15.00 to 105+60.00; 50-ft to 100-ft RT of Main Street CL	60-ft x 25-ft x 8-ft***	12,000	444	667

Notes:
***Tons calculated with conversion of 1yd^3 = 1.5 tons**
****Soil volume estimates are approximate and based on preliminary information available as of the date of this report.**
*****Full depth of cut estimated for management; however, representative data was collected from 0-1-ft BGS.**

A full-sized copy of **Table 4** is also included as **Appendix D**.

7.2. Petroleum and Lead Impacted Soil Management Options

The TPH and/or lead concentrations detected in B5 and B6 Comp indicates that soil proximate to the ASTs and surface staining northeast of the on-site repair shop meets the VSWMR definition of a non-hazardous, solid waste. VDOT has the option to place the impacted soil back into the excavation from which it came and/or excavations containing similar contaminants at Parcel 080. However, the cut proposed in this portion of the site has a large excavation component and options for reuse of the impacted soil on-site in accordance with the applicable requirements of the VSWMR may be limited. Based on this information, **Table 5** below provides rates to transport and dispose of the petroleum-impacted soil at the Prince William County landfill.

Table 5 - Cost Estimates for Transport and Disposal of Petroleum/Lead-Impacted Soil

Proposed Construction Area	Corresponding Samples Exhibiting Petroleum Impact (BGS)	Estimated Volume of Soil Requiring Special Handling (Cubic Yards)	Estimated Volume of Soil Requiring Special Handling (Tons)*	Estimated Cost for Staging, Transport, and Disposal**
18-in Pipe connecting 14B-2 to 14B-4	B5 0-5-ft BGS	18	27	$1,393
Cutting Grade	B6 Comp 0-1-ft BGS	444	667	$33,501

*Tons were calculated by assuming conversion factor for unexcavated soil of 1 yd^3 = 1.5 tons.
**Costs estimated with the following line items from the VDOT Statewide Hazardous Materials Services Contract.

1. The TPH concentrations detected in the samples collected from B5 and B6 Comp were below 500-mg/kg. In accordance with the applicable disposal requirement of the VSWMR (***9VAC 20-81-660D.2.c***), the petroleum-impacted soil can be disposed of at a permitted Subtitle D Landfill.
2. Recovery & Landfill Disposal of Petroleum Impacted Soil (minimum total tonnage of 8 tons) - $45/ton.
3. Preparation & Transportation of Regulated Non-Hazardous Waste - $6.18/per loaded mile; 9 miles one-way trip to the Prince William County Landfill; 20 tons per truckload (B5 = 2 trips; B6 Comp = 34 trips).
4. Soil staging on and covered by polyethylene plastic sheeting, staging area bermed to prevent run-on/runoff – 5% of the total cost for soil transportation and disposal.

Please note that the total lead concentration in B6 Comp exceeds 100-mg/kg. Therefore, the landfill or other selected disposal facility may require TCLP analytical data for lead as part of the Waste Profile processes for facility acceptance of this waste stream. If TCLP analytical data is deemed necessary, then one composite sample should be collected per 100-yd^3 of soil (i.e. 5 composite samples total). Under this scenario it may also be beneficial to analyze the composite samples for TPH-DRO & TPH-ORO because ex-situ samples of the soil stockpiles would be representative of the excavated material for disposal (i.e. not discrete samples), which may contain TPH concentrations that meet the VSWMR limits for fill material (i.e. TPH concentrations < 50-mg/kg).

7.1. Impacted Water Disposal Cost Estimate

The detectable PCE concentrations in two temporary wells that were installed on-site indicate that any water entering an open excavation will require additional characterization and/or management as follows:

- Pumped into a suitable, temporary storage container(s) with one representative collected per 10,000-gallons of water. The representative sample should be analyzed for VOC constituents via EPA Method 8260 to confirm the presence/absence of detectable PCE concentrations. In the absence of confirmed/detectable PCE concentrations, the resulting water can be managed as a non-impacted waste stream.
- The management options that apply to impacted water that is dewatered from an open excavation include the following:
    1. Discharged to the sanitary sewer system under a pre-treatment agreement with the Prince William County Public Service Authority.
    2. Treated on-site and discharged to a surface water in accordance with the terms and discharge limitations of a Virginia Discharge Elimination System Permit (VPDES).
    3. Transported and disposed at certified treatment facility.

The estimated volume of impacted groundwater that may enter the open excavations is calculated below by reducing and incorporating site-specific data, and published literature values into an open trench dewatering equation (i.e. The Dupuit Equation).

Steady state flow to an open excavation that trends below the groundwater table of an unconfined aquifer can be estimated via the Dupuit Equation. The subject equation is as follows:

$$Q = K\frac{(h_2^2 - h_1^2)}{2L}$$

Where:

Q = discharge per unit thickness (ft^2/day)
K= hydraulic conductivity of the aquifer (ft/day)
h_2, h_1 = steady-state heads measured along the flow path (ft)
L = distance between steady-state head measurements (ft)

It is estimated that groundwater may flow into the excavations associated with the 18-inch diameter pipe connecting 14B-2 to 14B-4 because measurable groundwater was detected in proximate wells that ranged from 2.5-9.5-ft BGS . The total length of the open excavation for this connection pipe at Parcel 080 that is estimated to trend to wetted depths is estimated at 100-linear feet (LF). The total linear footage of the trench (i.e. 100-ft) is multiplied by a factor of two because groundwater would flow in from both sidewalls of the excavation. However, flow from the bottom of the excavation is not predicted because it is assumed that no upward gradient is present in an unconfined aquifer system.

Aquifer testing was not employed as part of this investigation to calculate a site-specific hydraulic conductivity for Parcel 080. Additionally, top of casing elevations were not established for the temporary monitoring wells installed in borings B3, B4 and B5, which are necessary to calculate the change in hydraulic head over a horizontal distance between two monitoring points. Therefore, the following literature values and/or assumptions were made to estimate Q via the Dupuit Equation:

- K = 0.283 feet/day. K is estimated at 10^{-5} centimeters/second, which is a literature value (***Applied Hydrogeology – Fetter, 2nd Edition, 1998***) that is based on the "sandy clay" observed proximate to the depths to groundwater measured in borings B3, B4 and B5 (see **Boring Logs – Appendix B**).
- h_2, h_1 = 4.0-ft and 9.0-ft as measured in borings B3 and B4, respectively. Please note these hydraulic heads were calculated by subtracting the groundwater depths measured from the top of the casings from the respective well terminus depths of 15-ft BGS.
- L – 100-ft. This is the distance between temporary wells B3 and B4.

A steady state flow (i.e. Q) of 0.09198 ft^2/day is calculated for the unconfined aquifer in the project area by utilizing the K literature value of 0.283 feet/day. The wetted depth of the excavation, length of the excavation, and steady state flow is utilized to calculate the volume of water that will require dewatering on a daily basis under steady state conditions. For example, a 200-ft long

excavation with a wetted depth of 1-ft would yield a daily flow of 36.79-ft^3/day or approximately 275.20-gallons-per-day (gpd) as follows:

$$Q = (0.09198\text{-ft/day} \times 1\text{-ft}) \times (200\text{-ft} \times 2)$$
$$Q = 36.79\text{-ft}^3\text{/day}$$

Or

$$Q = 36.79\text{-ft}^3\text{/day} \times 7.48\text{-gallons/ft}^3$$
$$Q = 275.20\text{-gpd}$$

Based on this equation, the steady state Q to the open trenches is calculated at 275.20-gpd. It should be noted that the rate of inflow for the initial 24-48 hours of dewatering will be 2 to 5 times greater than the steady state Q because a greater hydraulic gradient will exist until steady state conditions are reached. Based on this information, an open excavation with these dimensions that is open for 4 days (i.e. 96-hours) could produce dewatering volumes that range from approximately 1,660-3,300-gallons. The spreadsheet that was utilized for this example calculation is presented as **Appendix E**.

Table 6 below outlines the disposal cost for approximately 3,300-gallons of dewater at a certified treatment facility in Richmond, VA.

TABLE 6: Costs for Dewatering, Transport, and Disposal of Impacted Groundwater

Proposed Drainage Structures	Corresponding GW Samples Exhibiting Impact	Estimated Volume of Dewater for Disposal (Gallon/Day)*	Estimated Volume of Dewater for Disposal (Gallons/Day)**	Estimated Cost for Removal, Transport, and Disposal***
100 LF of 18-inch diameter pipe between 14B-2 &14B-4	Temporary Wells Set @ B3 and B4	275	3,300	$7,656.00
Totals	**NA**	**275**	**3,300**	**$7,656.00**

*Gallons were calculated by utilizing conversion factor of 1-ft^3 of water = 7.48-gallons

**A 5x mulitplier was calculated to account for initial dewatering phase.

***Costs estimated with following line item from the VDOT Statewide Hazardous Materials Services Contract:

1. Bulk Recvoery & Disposal of Petroleum Contaminated Liquids - Vaccum Truck - $2.32/Gallon. (400-Gallon Minimum per Contract).

A review of **Table 6** indicates a cost of **$7,656.00** for the dewatering, management, and disposal of approximately 3,300-gallons of impacted groundwater. It should also be noted that the presented calculations assume isotropic conditions across the project area and different soil and/or fill material types will likely result in varying hydraulic conductivities that will influence the rate of groundwater flow into an open excavation. Therefore, greater volumes of water may be encountered in excavations that trend into more porous subsurface media such as gravel or fill materials.

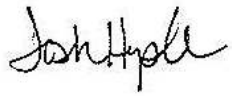
8.0 LIMITATIONS

It is impossible to know with certainty the entirety of a site is free of hazardous substances or conditions even with extensive subsurface testing. The conclusions of this investigation are based solely on the scope-of-work and on the sources of information reviewed during this investigation. This report was prepared for the exclusive use of VDOT, and their expressly-designated affiliates. **3e** accepts no responsibility for damages or claims resulting from past or future environmental degradation related to the subject property.

9.0 ACKNOWLEDGEMENT

3e appreciates the opportunity to provide environmental services to VDOT regarding the Cropper Auto Care property - Route 1 roadway improvement project located in Dumfries, VA under the Professional Services HAZMAT Contract. If we may be of further assistance, or you have any questions or comments regarding the project, please contact our office at (540) 953-0170.

10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS



Joshua P. Hepler, PG
Project Environmental Scientist
Preparer

Chris Lalli
Vice President/Associate
Reviewer

Figures

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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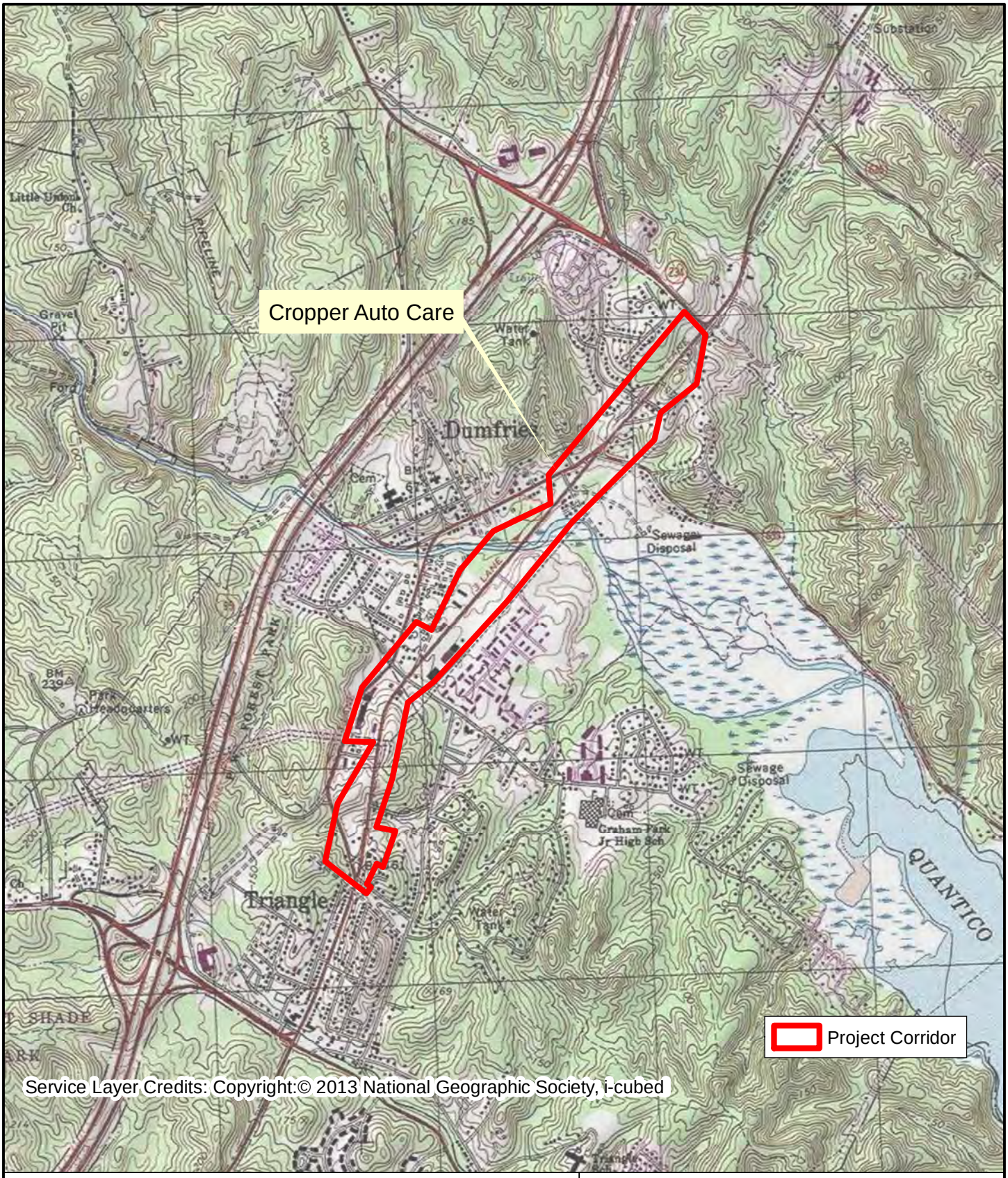
N

Prepared by Leah Potts, 01/24/2019
Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 1
PROJECT CORRIDOR AERIAL
CROPPER AUTO CARE

0 0.5 1
Miles

Dumfries, VA



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Prepared by Leah Potts, 01/24/2019
Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 2
PROJECT CORRIDOR TOPOGRAPHIC
CROPPER AUTO CARE

0 0.5 1
Miles

Dumfries, VA

1:24,000

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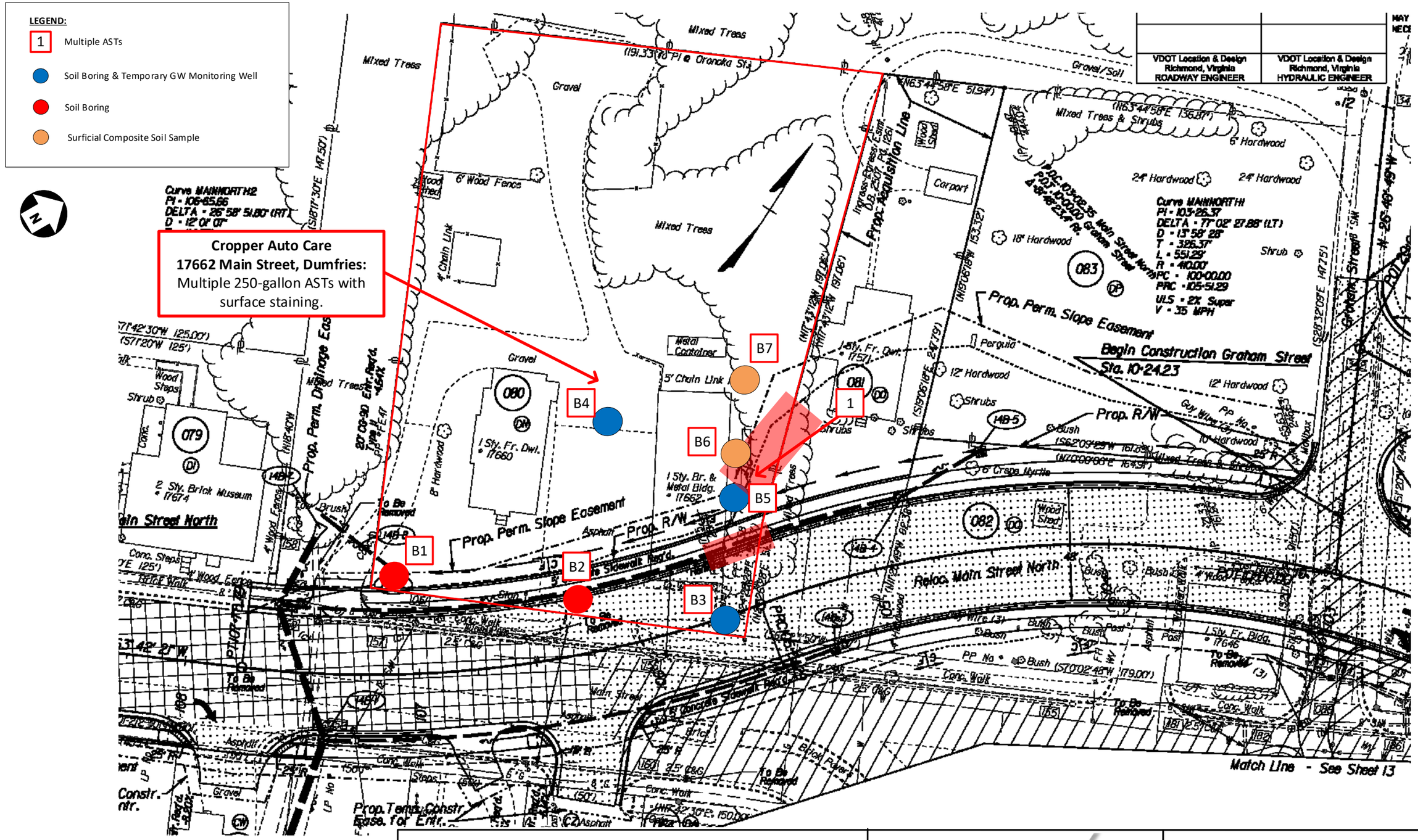
Prepared by Leah Potts, 01/24/2019
Sources: VGIN 2017
Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

FIGURE 3
AERIAL WITH PROPERTY BOUNDARIES
CROPPER AUTO CARE

0 100 200
Feet

Dumfries, VA



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VDOT Virginia Department of Transportation

Route 1 Widening Project
Dumfries, Virginia

FIGURE 4

Plan Sheet 14B Depicting Identified RECs and Boring Locations at Cropper Auto Care.

E-FR024.06

January 2019

Appendix A: Miss Utility Ticket

From: tickets@missutilityofvirginia.com
To: Josh Hepler
Subject: VUPS EMLCFM 2018/12/05 #02112 A833101313-03A RUSH RESP LREQ
Date: Wednesday, December 5, 2018 10:17:11 AM
Importance: High

EMLCFM 02112 VUPSa 12/05/18 10:17:07 A833101313-03A RESPONSE

Thank you for contacting VA811! This is an automatically generated response from the utilities who received your notice of excavation. If you have questions about the response, call the "field contact" for that utility. For your safety, please respect and protect the marks, excavate carefully around the marked utility lines and contact VA811 if you see clear evidence of unmarked utilities.

Remember, you can now reach VA811 by dialing 811.

Ticket : A833101313 Rev: 03A Taken: 12/05/18 07:03 AM

State: VA Cnty: PRINCE WILLIAM Place: DUMFRIES
Address : 17662 MAIN ST
Responses due by: 12/05/18 10:08 AM Expires: 12/19/18 07:00 AM

When the member Marking Code is blue, click for additional information that may be provided by the Operator/Locator.

Marking Code	Description	Response
CGV	COLUMBIA GAS (CGV930)	12/04/18 01:15 PM 10
	Marked	
	Field Contact: UTILIQUEST (703)754-2116	
	In the event of damage to a facility call: (800)543-8911	
DOM	DOMINION ENERGY ELEC DIST (DOM400)	11/29/18 01:10 PM 30
	No Conflict; utility is outside of stated work area.	
	Field Contact: UTILIQUEST (703)754-2116	
	In the event of damage to a facility call: (888)667-3000	
PWS	PRINCE WILLIAM - WATER (PWS902)	11/29/18 09:51 AM 12
	Marked up to privately owned utility; contact private utility owner	
	for locate	
	Field Contact: BUTCH ROGERS (703)609-8097	
	In the event of damage to a facility call: (703)335-7982	
PWS	PRINCE WILLIAM - SEWER (PWS903)	11/29/18 09:51 AM 12
	Marked up to privately owned utility; contact private utility owner	
	for locate	
	Field Contact: BUTCH ROGERS (703)609-8097	
	In the event of damage to a facility call: (703)335-7982	
SIG	SUMMITTIG (SIG800)	12/04/18 03:01 PM 30
	No Conflict; utility is outside of stated work area.	
	Field Contact: RALPH WORLEY (804)921-9126	
	In the event of damage to a facility call: (855)776-6515	
UNF	PEG BANDWIDTH (UNF937)	12/05/18 10:17 AM 10
	Marked	
	Field Contact: DAVID CADD (804)382-5823	
	In the event of damage to a facility call: (877)652-2321	
VZN	VERIZON (VZN703)	12/04/18 03:27 PM 30
	No Conflict; utility is outside of stated work area.	
	Field Contact: UTILIQUEST (703)754-2116	
	In the event of damage to a facility call: (888)483-1233	

LC1B

Locate Work Order Number:
N-04431

Project Location:
17880/17870 Fraley Blvd

Utility Location Results Form

Utility Location Results *(completed by utility location service provider)*

Photos attached ☑ Yes ☐ No

Was the location that was requested completed? ☐ Yes ☑ No

Detection cable and/or location tape available ☐ Yes ☑ No
Accurate As-Built Documents available ☐ Yes ☑ No

If no, please check all applicable boxes:

Accurate As-Built Documents:
Requested? ☐ Yes ☑ No Provided? ☐ Yes ☐ No
VDOT on-site assistance:
Requested? ☐ Yes ☑ No Provided? ☐ Yes ☐ No

Does the in-field survey area extend 3 feet beyond the border of the intended excavation area? (Required) ☐ Yes ☑ No

Utility Location Method(s) used:_____

Comments:

☐ Serco/Elite has provided utility markings within the scope of this request for all VDOT owned fiber optic communications cable, and all power cabling from the ITS Device to the ITS Cabinet that was accurately shown on drawings if provided by VDOT, or actual location contained detection cable or tape, and/or VDOT provided on-site assistance.

☐ Where no detection cable/tape and or accurate as-built documents, and/or VDOT assistance was not provided, we have provided approximate markings or no markings have occurred and the 3rd Party Requestor is advised that hand digging with extreme caution is advised. Photos have been attached.

☑ Please be advised that in no case will Serco/Elite be held liable or responsible for any power or communication cabling that falls outside our scope and could not be located due to the lack of accurate documentation, detection cable or tape, and/or VDOT assistance

☑ Arrived onsite to verify no VDOT ITS assets in the area.Team then verified junction boxes in area do not house VDOT fiber.

Certification:

The most appropriate equipment and technology to identify all VDOT underground utilities within the requested zone were used.

Utility Locator: (Print) Matt Robinson
(signature) _____
Company: Elite Contracting

Start time: 3:08 PM
End time: 3:10 PM
Date: 11-28-18

This information is valid for 15 days from signed date of marking. Any work performed after 15 days is not covered under this request and will need re-marked.

Appendix B: Boring Logs

Project Location:	**RT 1 Widening**
Site:	**Cropper Auto Care**
Location:	**STA No. 107+15.00; 40-ft RT of Main St CL**
Boring Location:	**B1**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/6/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**15'**	Screened Interval:	
DTW Within Soil Boring:	**N/A**			Cased Interval:	
Static GW Level:	**N/A**	Date GW Measured:	**N/A**		

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.4			0-0.5' topsoil. 0.5-2' orange low moisture clay w/ clasts (quartz). 2-3' dark brown, very moist, sandy clay. 3-5' brown clay, fine sandy, moist. No odors.
6 7 8 9 10	0.4		10:55	50% recovery. 5-6' Gray sandy clay followed by gravel. 6-8' Brown sandy clay, moist. 8-10' brown clay, slightly moist. No odors.
11 12 13 14 15	0.4		11:05	65% recovery. 11-14' brown/gray sandy clay, moist. 14-15' brown coarse sandy clay with gray siltstone, dry. No odors.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site:	**Cropper Auto Care**
Location:	**STA No. 106+30.00; 25-ft RT of Main St CL**
Boring Location:	**B2**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/6/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**15'**	Screened Interval:	**N/A**
DTW Within Soil Boring:	**N/A**			Cased Interval:	**N/A**
Static GW Level:	**N/A**			Date GW Measured:	**N/A**

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.0			0-0.5' asphalt. 0.5-4' brown/grey sandy clay. 4-5' grey clay. Dry. No odors. 100% recoverey
6 7 8 9 10	0.1		11:50	5-6' grey clay, moist. 6-7' sandy clay, wet. 7-9' orange clay, sandy, moist. 9-10' more clay, moist, orange/grey. No odors.
11 12 13 14 15	0.1		12:00	10-12' clay, tan/grey, moist. 12-13' gravelly sand, low moisture. 13-15' sand and siltstone, dry. No odors.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site:	**Cropper Auto Care**
Location:	**STA No. 105+70.00; 5-ft RT of Main St CL**
Boring Location:	**B3**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/6/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**15'**	Screened Interval:	**5-15'**
DTW Within Soil Boring:	**11'**			Cased Interval:	**0-5'**
Static GW Level:	**9.5'**	Date GW Measured:	**December 12, 2018**		

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.3			0-0.5 topsoil. 0.5-2 grey clay, moist. 2-4 orange grey clay sandy, moist. 4-5' grey clay, low moisture. No odors.
6 7 8 9 10	0.1		11:30	5-6' grey, fine sandy clay, moist. 6-7' orange coarse sandy clay, moist. 7-8' orange /grey sand, moist. 8-9' grey/orange sandy clay, slightly moist. 9-10' grey clay, slightly moist. No odors. 80% recovery.
11 12 13 14 15	0.0		11:40	10-11' Wet sandy clay, brown. 11-13' Clay, tan/grey. 13-14' Sandy clay, grey. 14-15' Sand/gravel/pebbles, dry. No odors. 60% recovery.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site:	**Cropper Auto Care**
Location:	**STA No. 106+00.00; 100-ft RT of Main St CL**
Boring Location:	**B4**

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Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/6/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Geo Probe**	Total Depth Drilled:	**15'**	Screened Interval:	**5-15'**
DTW Within Soil Boring:	**6'**			Cased Interval:	**0-5'**
Static GW Level:	**9.5'**	Date GW Measured:	**December 12, 2018**		

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.0			0-1' concrete. 1-5' sandy clay, orange/grey, moist. No odors.
6 7 8 9 10	0.0		12:10	5-9' brown/grey coarse sandy clay, wet. 9-10' finer grain, grey sandy clay, moist. No odors.
11 12 13 14 15	0.0		12:20	10-12' sand, grey/orange, wet. 12-13' orange clay, sandy, moist. 13-14' grey clay, moist. 14-15' sandy clay, moist grey. No odors.
16 17 18 19 20				

BGS - Below Ground Surface

Project Location:	**RT 1 Widening**
Site:	**Cropper Auto Care**
Location:	**STA No. 105+50.00; 50-ft RT of Main St CL**
Boring Location:	**B4**

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

Date(s) Drilled:	**12/6/18**	Logged By:	**Josh Hepler/Carroll Ellis**	Well Information:	
Drill Rig Type:	**Hand Auger**	Total Depth Drilled:	**5'**	Screened Interval:	**0-5'**
DTW Within Soil Boring:	**2.5'**			Cased Interval:	**NA**
Static GW Level:	**4.5'**			Date GW Measured:	**December 12, 2018**

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1				
2				
3	0.0		12:35	0-5' sandy clay, brown trending to orange, moist trending to wet. Boring terminated upon consolidated material.
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Appendix C: Laboratory Reports and Sample Custody Documentation

1941 Reymet Road ● Richmond, Virginia 23237 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 18L0319

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg, VA 24060	Date Received:	December 7, 2018 15:15
		Date Issued:	December 20, 2018 15:02
		Project Number:	18-796.06
Submitted To:	Josh Hepler	Purchase Order:	18-796.06
Client Site I.D.:	Cropper Auto Care		

Enclosed are the results of analyses for samples received by the laboratory on 12/07/2018 15:15. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Ted Soyars

Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.

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Commonwealth of Virginia, DCLS
Accreditation # 460021

NWBOC EDWOSB Certified

Certified SWaM Small, Women and Minority-Owned
Supplier Diversity Strengthens the Commonwealth
by the Virginia Department of Minority Business Enterprise

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0319

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B1 5-10	18L0319-01	Soil	12/06/2018 10:55	12/07/2018 15:15
B1 10-15	18L0319-02	Soil	12/06/2018 11:05	12/07/2018 15:15
B2 5-10	18L0319-03	Soil	12/06/2018 11:50	12/07/2018 15:15
B2 10-15	18L0319-04	Soil	12/06/2018 12:00	12/07/2018 15:15
B3 5-10	18L0319-05	Soil	12/06/2018 11:30	12/07/2018 15:15
B3 10-15	18L0319-06	Soil	12/06/2018 11:40	12/07/2018 15:15
B4 5-10	18L0319-07	Soil	12/06/2018 12:10	12/07/2018 15:15
B4 10-15	18L0319-08	Soil	12/06/2018 12:20	12/07/2018 15:15
B5 0-5	18L0319-09	Soil	12/06/2018 12:35	12/07/2018 15:15
B6 Comp	18L0319-10	Soil	12/06/2018 13:00 to 12/06/2018 13:10	12/07/2018 15:15
B7 Comp	18L0319-11	Soil	12/06/2018 13:15 to 12/06/2018 13:25	12/07/2018 15:15

Analysis for Ethylene Glycol was subcontracted to (insert laboratory). The subcontracted results are attached at the end of this Certificate of Analysis.

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B1 5-10 **Laboratory Sample ID:** 18L0319-01

Grab Date/Time: 12/06/2018 10:55

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	01	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 14:53	HLM
Surr: Pentacosane (Surr)	*01*	*SW8015C*	*93.8 %*		*40-160*		*12/17/18 09:20*	*12/18/18 14:53*	*HLM*
TPH-Semi-Volatiles (ORO)	01	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 13:46	HLM

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Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B1 10-15 **Laboratory Sample ID:** 18L0319-02

Grab Date/Time: 12/06/2018 11:05

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	02	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 15:20	HLM
Surr: Pentacosane (Surr)	*02*	*SW8015C*	*98.3 %*		*40-160*		*12/17/18 09:20*	*12/18/18 15:20*	*HLM*
TPH-Semi-Volatiles (ORO)	02	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 14:11	HLM

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Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B2 5-10 **Laboratory Sample ID:** 18L0319-03

Grab Date/Time: 12/06/2018 11:50

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	03	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 15:47	HLM
Surr: Pentacosane (Surr)	*03*	*SW8015C*	*94.9 %*		*40-160*		*12/17/18 09:20*	*12/18/18 15:47*	*HLM*
TPH-Semi-Volatiles (ORO)	03	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 14:36	HLM

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Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B2 10-15 **Laboratory Sample ID:** 18L0319-04

Grab Date/Time: 12/06/2018 12:00

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	04	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 15:30	12/14/18 14:55	HLM
Surr: Pentacosane (Surr)	*04*	*SW8015C*	*111 %*		*40-160*		*12/13/18 15:30*	*12/14/18 14:55*	*HLM*
TPH-Semi-Volatiles (ORO)	04	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 15:01	HLM

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Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B3 5-10 **Laboratory Sample ID:** 18L0319-05

Grab Date/Time: 12/06/2018 11:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	05	SW8015C	<48.2 mg/kg		48.2	1	12/17/18 09:20	12/18/18 16:13	HLM
Surr: Pentacosane (Surr)	*05*	*SW8015C*	*102 %*		*40-160*		*12/17/18 09:20*	*12/18/18 16:13*	*HLM*
TPH-Semi-Volatiles (ORO)	05	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 15:25	HLM

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Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B3 10-15 **Laboratory Sample ID:** 18L0319-06

Grab Date/Time: 12/06/2018 11:40

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	06	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 16:40	HLM
Surr: Pentacosane (Surr)	*06*	*SW8015C*	*99.2 %*		*40-160*		*12/17/18 09:20*	*12/18/18 16:40*	*HLM*
TPH-Semi-Volatiles (ORO)	06	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 15:50	HLM

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Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B4 5-10 **Laboratory Sample ID:** 18L0319-07

Grab Date/Time: 12/06/2018 12:10

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	07	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 17:06	HLM
Surr: Pentacosane (Surr)	*07*	*SW8015C*	*103 %*		*40-160*		*12/17/18 09:20*	*12/18/18 17:06*	*HLM*
TPH-Semi-Volatiles (ORO)	07	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 16:15	HLM

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Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B4 10-15 **Laboratory Sample ID:** 18L0319-08

Grab Date/Time: 12/06/2018 12:20

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	08	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 17:33	HLM
Surr: Pentacosane (Surr)	*08*	*SW8015C*	*94.1 %*		*40-160*		*12/17/18 09:20*	*12/18/18 17:33*	*HLM*
TPH-Semi-Volatiles (ORO)	08	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 16:39	HLM

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Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B5 0-5 **Laboratory Sample ID:** 18L0319-09

Grab Date/Time: 12/06/2018 12:35

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	09	SW8015C	**17.1 mg/kg**		10.0	1	12/17/18 09:20	12/18/18 18:00	HLM
Surr: Pentacosane (Surr)	*09*	*SW8015C*	*88.1 %*		*40-160*		*12/17/18 09:20*	*12/18/18 18:00*	*HLM*
TPH-Semi-Volatiles (ORO)	09	SW8015C	**58.2 mg/kg**		10.0	1	12/13/18 16:22	12/14/18 17:53	HLM

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Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B6 Comp **Laboratory Sample ID:** 18L0319-10

Grab Date/Time: 12/06/2018 13:10

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Metals (Total) by EPA 6000/7000 Series Methods									
Silver	10	SW6010C	<46.4 mg/kg		46.4	100	12/11/18 11:30	12/13/18 11:53	SNL
Arsenic	10	SW6010C	<92.9 mg/kg		92.9	100	12/11/18 11:30	12/13/18 11:53	SNL
Barium	10	SW6010C	**50.6 mg/kg**		46.4	100	12/11/18 11:30	12/13/18 11:53	SNL
Cadmium	10	SW6010C	<18.6 mg/kg		18.6	100	12/11/18 11:30	12/13/18 11:53	SNL
Chromium	10	SW6010C	<46.4 mg/kg		46.4	100	12/11/18 11:30	12/13/18 11:53	SNL
Mercury	10	SW7471B	**0.017 mg/kg**		0.008	1	12/11/18 13:22	12/11/18 15:39	MWL
Lead	10	SW6010C	**84.4 mg/kg**		46.4	100	12/11/18 11:30	12/13/18 11:53	SNL
Selenium	10	SW6010C	<232 mg/kg		232	100	12/11/18 11:30	12/13/18 11:53	SNL
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	10	SW8015C	**44.7 mg/kg**		10.0	1	12/17/18 09:20	12/18/18 18:26	HLM
Surr: Pentacosane (Surr)	*10*	*SW8015C*	*59.6 %*		*40-160*		*12/17/18 09:20*	*12/18/18 18:26*	*HLM*
TPH-Semi-Volatiles (ORO)	10	SW8015C	**194 mg/kg**		10.0	1	12/13/18 16:22	12/14/18 18:18	HLM

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Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Laboratory Order ID: 18L0319

Analytical Results

Sample I.D. B7 Comp **Laboratory Sample ID:** 18L0319-11

Grab Date/Time: 12/06/2018 13:25

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Metals (Total) by EPA 6000/7000 Series Methods									
Silver	11	SW6010C	<47.3 mg/kg		47.3	100	12/11/18 11:30	12/13/18 12:00	SNL
Arsenic	11	SW6010C	<94.5 mg/kg		94.5	100	12/11/18 11:30	12/13/18 12:00	SNL
Barium	11	SW6010C	**92.6 mg/kg**		47.3	100	12/11/18 11:30	12/13/18 12:00	SNL
Cadmium	11	SW6010C	<18.9 mg/kg		18.9	100	12/11/18 11:30	12/13/18 12:00	SNL
Chromium	11	SW6010C	<47.3 mg/kg		47.3	100	12/11/18 11:30	12/13/18 12:00	SNL
Mercury	11	SW7471B	**0.011 mg/kg**		0.008	1	12/19/18 10:16	12/20/18 10:56	AOC
Lead	11	SW6010C	**242 mg/kg**		47.3	100	12/11/18 11:30	12/13/18 12:00	SNL
Selenium	11	SW6010C	<236 mg/kg		236	100	12/11/18 11:30	12/13/18 12:00	SNL
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	11	SW8015C	**358 mg/kg**		10.0	1	12/17/18 09:20	12/18/18 18:52	HLM
Surr: Pentacosane (Surr)	*11*	*SW8015C*	*69.5 %*		*40-160*		*12/17/18 09:20*	*12/18/18 18:52*	*HLM*
TPH-Semi-Volatiles (ORO)	11	SW8015C	<10.0 mg/kg		10.0	1	12/13/18 16:22	12/14/18 18:43	HLM

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Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Analytical Summary

	Preparation Method:
18L0319-10	SW8015C
18L0319-11	SW8015C

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Metals (Total) by EPA 6000/7000 Series Methods		**Preparation Method:**	**SW3050B**		
18L0319-10	1.08 g / 50.0 mL	SW6010C	BBL0259	SBL0354	AL80067
18L0319-11	1.06 g / 50.0 mL	SW6010C	BBL0259	SBL0354	AL80067

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3550C**		
18L0319-04	50.5 g / 1.00 mL	SW8015C	BBL0402	SBL0404	AK80055
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3550C**		
18L0319-01	50.7 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-02	50.2 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-03	50.8 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-04	52.3 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-05	50.9 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-06	51.1 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-07	50.3 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-08	50.7 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-09	50.5 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-10	50.5 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
18L0319-11	50.1 g / 1.00 mL	SW8015C	BBL0403	SBL0421	AH80136
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3550C**		
18L0319-01	50.3 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0319-02	50.4 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0319-03	50.8 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0319-05	51.9 g / 5.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0319-06	50.7 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0319-07	50.7 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0319-08	51.2 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0319-09	50.5 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056

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Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
18L0319-10	52.8 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0319-11	50.4 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Metals (Total) by EPA 6000/7000 Series Methods		**Preparation Method:**	**SW7471A**		
18L0319-10	0.532 g / 20.0 mL	SW7471B	BBL0268	SBL0268	AL80055

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Metals (Total) by EPA 6000/7000 Series Methods		**Preparation Method:**	**SW7471B**		
18L0319-11	0.500 g / 20.0 mL	SW7471B	BBL0551	SBL0568	AL80098

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Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0259 - SW3050B										
Blank (BBL0259-BLK1)				Prepared: 12/11/2018 Analyzed: 12/13/2018						
Chromium	<0.500 mg/kg	0.500	mg/kg							
Cadmium	<0.200 mg/kg	0.200	mg/kg							
Cadmium	<0.200 mg/kg	0.200	mg/kg							
Barium	<0.500 mg/kg	0.500	mg/kg							
Silver	<0.500 mg/kg	0.500	mg/kg							
Arsenic	<1.00 mg/kg	1.00	mg/kg							
Arsenic	<1.00 mg/kg	1.00	mg/kg							
Selenium	<2.50 mg/kg	2.50	mg/kg							
Chromium	<0.500 mg/kg	0.500	mg/kg							
Silver	<0.500 mg/kg	0.500	mg/kg							
Selenium	<2.50 mg/kg	2.50	mg/kg							
Lead	<0.500 mg/kg	0.500	mg/kg							
Lead	<0.500 mg/kg	0.500	mg/kg							
Barium	<0.500 mg/kg	0.500	mg/kg							
LCS (BBL0259-BS1)				Prepared: 12/11/2018 Analyzed: 12/13/2018						
Arsenic	92.7 mg/kg	1.00	mg/kg	93.0	mg/kg	99.7	80-120			
Cadmium	93.4 mg/kg	0.200	mg/kg	93.0	mg/kg	100	80-120			
Selenium	89.3 mg/kg	2.50	mg/kg	93.0	mg/kg	96.0	80-120			
Selenium	89.3 mg/kg	2.50	mg/kg	93.0	mg/kg	96.0	80-120			
Barium	97.4 mg/kg	0.500	mg/kg	93.0	mg/kg	105	80-120			
Arsenic	92.7 mg/kg	1.00	mg/kg	93.0	mg/kg	99.7	80-120			
Cadmium	93.4 mg/kg	0.200	mg/kg	93.0	mg/kg	100	80-120			
Barium	97.4 mg/kg	0.500	mg/kg	93.0	mg/kg	105	80-120			
Silver	4.86 mg/kg	0.500	mg/kg	4.65	mg/kg	104	80-120			
Chromium	94.9 mg/kg	0.500	mg/kg	93.0	mg/kg	102	80-120			
Chromium	94.9 mg/kg	0.500	mg/kg	93.0	mg/kg	102	80-120			
Lead	96.1 mg/kg	0.500	mg/kg	93.0	mg/kg	103	80-120			
Lead	96.1 mg/kg	0.500	mg/kg	93.0	mg/kg	103	80-120			
Silver	4.86 mg/kg	0.500	mg/kg	4.65	mg/kg	104	80-120			

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0259 - SW3050B										
LCS Dup (BBL0259-BSD1)				Prepared: 12/11/2018 Analyzed: 12/13/2018						
Cadmium	93.3 mg/kg	0.200	mg/kg	97.9	mg/kg	95.2	80-120	0.158	20	
Cadmium	93.3 mg/kg	0.200	mg/kg	97.9	mg/kg	95.2	80-120	0.158	20	
Chromium	94.4 mg/kg	0.500	mg/kg	97.9	mg/kg	96.4	80-120	0.515	20	
Chromium	94.4 mg/kg	0.500	mg/kg	97.9	mg/kg	96.4	80-120	0.515	20	
Lead	95.5 mg/kg	0.500	mg/kg	97.9	mg/kg	97.5	80-120	0.698	20	
Barium	96.9 mg/kg	0.500	mg/kg	97.9	mg/kg	98.9	80-120	0.535	20	
Silver	4.86 mg/kg	0.500	mg/kg	4.90	mg/kg	99.2	80-120	0.0287	20	
Selenium	89.4 mg/kg	2.50	mg/kg	97.9	mg/kg	91.3	80-120	0.0666	20	
Lead	95.5 mg/kg	0.500	mg/kg	97.9	mg/kg	97.5	80-120	0.698	20	
Silver	4.86 mg/kg	0.500	mg/kg	4.90	mg/kg	99.2	80-120	0.0287	20	
Arsenic	92.8 mg/kg	1.00	mg/kg	97.9	mg/kg	94.7	80-120	0.0585	20	
Arsenic	92.8 mg/kg	1.00	mg/kg	97.9	mg/kg	94.7	80-120	0.0585	20	
Barium	96.9 mg/kg	0.500	mg/kg	97.9	mg/kg	98.9	80-120	0.535	20	
Selenium	89.4 mg/kg	2.50	mg/kg	97.9	mg/kg	91.3	80-120	0.0666	20	
Matrix Spike (BBL0259-MS1)		**Source: 18L0319-10**		Prepared: 12/11/2018 Analyzed: 12/13/2018						
Silver	<47.7 mg/kg	47.7	mg/kg	4.77	<47.7 mg/kg		75-125			M2
Silver	<47.7 mg/kg	47.7	mg/kg	4.77	<47.7 mg/kg		75-125			M2
Lead	198 mg/kg	47.7	mg/kg	95.3	84.4 mg/kg	119	75-125			
Cadmium	106 mg/kg	19.1	mg/kg	95.3	<19.1 mg/kg	111	75-125			
Arsenic	110 mg/kg	95.3	mg/kg	95.3	<95.3 mg/kg	115	75-125			
Barium	334 mg/kg	47.7	mg/kg	95.3	50.6 mg/kg	297	75-125			M2
Barium	334 mg/kg	47.7	mg/kg	95.3	50.6 mg/kg	297	75-125			M2
Arsenic	110 mg/kg	95.3	mg/kg	95.3	<95.3 mg/kg	115	75-125			
Cadmium	106 mg/kg	19.1	mg/kg	95.3	<19.1 mg/kg	111	75-125			
Chromium	112 mg/kg	47.7	mg/kg	95.3	<47.7 mg/kg	117	75-125			
Chromium	112 mg/kg	47.7	mg/kg	95.3	<47.7 mg/kg	117	75-125			
Lead	198 mg/kg	47.7	mg/kg	95.3	84.4 mg/kg	119	75-125			
Selenium	<238 mg/kg	238	mg/kg	95.3	<238 mg/kg		75-125			M2
Selenium	<238 mg/kg	238	mg/kg	95.3	<238 mg/kg		75-125			M2

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0259 - SW3050B										
Matrix Spike Dup (BBL0259-MSD1)		**Source: 18L0319-10**		Prepared: 12/11/2018 Analyzed: 12/13/2018						
Lead	166 mg/kg	46.2	mg/kg	92.3	84.4 mg/kg	88.0	75-125	17.7	20	
Selenium	<231 mg/kg	231	mg/kg	92.3	<231 mg/kg		75-125		20	M2
Selenium	<231 mg/kg	231	mg/kg	92.3	<231 mg/kg		75-125		20	M2
Lead	166 mg/kg	46.2	mg/kg	92.3	84.4 mg/kg	88.0	75-125	17.7	20	
Chromium	104 mg/kg	46.2	mg/kg	92.3	<46.2 mg/kg	113	75-125	7.25	20	
Chromium	104 mg/kg	46.2	mg/kg	92.3	<46.2 mg/kg	113	75-125	7.25	20	
Cadmium	97.3 mg/kg	18.5	mg/kg	92.3	<18.5 mg/kg	105	75-125	8.43	20	
Cadmium	97.3 mg/kg	18.5	mg/kg	92.3	<18.5 mg/kg	105	75-125	8.43	20	
Barium	149 mg/kg	46.2	mg/kg	92.3	50.6 mg/kg	107	75-125	76.3	20	P
Arsenic	98.9 mg/kg	92.3	mg/kg	92.3	<92.3 mg/kg	107	75-125	10.7	20	
Arsenic	98.9 mg/kg	92.3	mg/kg	92.3	<92.3 mg/kg	107	75-125	10.7	20	
Silver	<46.2 mg/kg	46.2	mg/kg	4.62	<46.2 mg/kg		75-125		20	M2
Silver	<46.2 mg/kg	46.2	mg/kg	4.62	<46.2 mg/kg		75-125		20	M2
Barium	149 mg/kg	46.2	mg/kg	92.3	50.6 mg/kg	107	75-125	76.3	20	P
Batch BBL0268 - SW7471A										
Blank (BBL0268-BLK1)				Prepared & Analyzed: 12/11/2018						
Mercury	<0.008 mg/kg	0.008	mg/kg							
LCS (BBL0268-BS1)				Prepared & Analyzed: 12/11/2018						
Mercury	0.099 mg/kg	0.008	mg/kg	0.0956	mg/kg	104	80-120			
LCS Dup (BBL0268-BSD1)				Prepared & Analyzed: 12/11/2018						
Mercury	0.086 mg/kg	0.008	mg/kg	0.0843	mg/kg	102	80-120	13.6	20	
Matrix Spike (BBL0268-MS1)		**Source: 18L0124-01**		Prepared & Analyzed: 12/11/2018						
Mercury	0.153 mg/kg	0.008	mg/kg	0.0917	0.060 mg/kg	101	80-120			

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Metals (Total) by EPA 6000/7000 Series Methods - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0268 - SW7471A										
Matrix Spike Dup (BBL0268-MSD1)		**Source: 18L0124-01**		Prepared & Analyzed: 12/11/2018						
Mercury	0.142 mg/kg	0.008	mg/kg	0.0873	0.060 mg/kg	94.1	80-120	7.38	20	
Batch BBL0551 - SW7471B										
Blank (BBL0551-BLK1)				Prepared: 12/19/2018 Analyzed: 12/20/2018						
Mercury	<0.008 mg/kg	0.008	mg/kg							
LCS (BBL0551-BS1)				Prepared: 12/19/2018 Analyzed: 12/20/2018						
Mercury	0.101 mg/kg	0.008	mg/kg	0.0977	mg/kg	104	80-120			
LCS Dup (BBL0551-BSD1)				Prepared: 12/19/2018 Analyzed: 12/20/2018						
Mercury	0.100 mg/kg	0.008	mg/kg	0.0978	mg/kg	103	80-120	0.762	20	
Matrix Spike (BBL0551-MS1)		**Source: 18L0495-01**		Prepared: 12/19/2018 Analyzed: 12/20/2018						
Mercury	1.12 mg/kg	0.008	mg/kg	0.0962	1.05 mg/kg	66.0	80-120			M
Matrix Spike Dup (BBL0551-MSD1)		**Source: 18L0495-01**		Prepared: 12/19/2018 Analyzed: 12/20/2018						
Mercury	1.15 mg/kg	0.008	mg/kg	0.0965	1.05 mg/kg	104	80-120	3.23	20	

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0402 - SW3550C										
Blank (BBL0402-BLK1)				Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
Surr: Pentacosane (Surr)	5.28		mg/kg	4.95		107	40-160			
LCS (BBL0402-BS1)				Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (DRO)	99.0 mg/kg	10.0	mg/kg	99.0	mg/kg	100	40-160			
Surr: Pentacosane (Surr)	5.19		mg/kg	4.99	mg/kg	104	40-160			
Matrix Spike (BBL0402-MS1)		**Source: 18L0476-01**		Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (DRO)	92.3 mg/kg	10.0	mg/kg	96.3	<10.0 mg/kg	95.8	40-160			
Surr: Pentacosane (Surr)	6.08		mg/kg	4.86	mg/kg	125	40-160			
Matrix Spike Dup (BBL0402-MSD1)		**Source: 18L0476-01**		Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (DRO)	91.0 mg/kg	10.0	mg/kg	96.7	<10.0 mg/kg	94.1	40-160	1.35	20	
Surr: Pentacosane (Surr)	5.82		mg/kg	4.87	mg/kg	119	40-160			
Batch BBL0403 - SW3550C										
Blank (BBL0403-BLK1)				Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0403 - SW3550C										
LCS (BBL0403-BS1)				Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
TPH-Semi-Volatiles (ORO)	70.5 mg/kg	10.0	mg/kg	98.0	mg/kg	71.9	40-160			
Matrix Spike (BBL0403-MS1)		**Source: 18L0319-08**		Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
TPH-Semi-Volatiles (ORO)	60.5 mg/kg	10.0	mg/kg	98.8	<10.0 mg/kg	61.2	40-160			
Matrix Spike Dup (BBL0403-MSD1)		**Source: 18L0319-08**		Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0403 - SW3550C										
Matrix Spike Dup (BBL0403-MSD1)		**Source: 18L0319-08**		Prepared: 12/13/2018 Analyzed: 12/14/2018						
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
TPH-Semi-Volatiles (ORO)	62.0 mg/kg	10.0	mg/kg	99.0	<10.0 mg/kg	62.6	40-160	2.43	20	
Batch BBL0469 - SW3550C										
Blank (BBL0469-BLK1)				Prepared: 12/17/2018 Analyzed: 12/18/2018						
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0469 - SW3550C										
LCS (BBL0469-BS1)				Prepared: 12/17/2018 Analyzed: 12/18/2018						
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Matrix Spike (BBL0469-MS1)		**Source: 18L0319-07**		Prepared: 12/17/2018 Analyzed: 12/18/2018						
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0469 - SW3550C										
Matrix Spike (BBL0469-MS1)		**Source: 18L0319-07**		Prepared: 12/17/2018 Analyzed: 12/18/2018						
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160			
Matrix Spike Dup (BBL0469-MSD1)		**Source: 18L0319-07**		Prepared: 12/17/2018 Analyzed: 12/19/2018						
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20	
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0469 - SW3550C										
Matrix Spike Dup (BBL0469-MSD1)		**Source: 18L0319-07**		Prepared: 12/17/2018 Analyzed: 12/19/2018						
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Certified Analyses included in this Report

Analyte	Certifications
SW6010C in Solids	
Arsenic	VELAP
Barium	VELAP,WVDEP
Cadmium	VELAP,WVDEP
Chromium	VELAP
Lead	VELAP,WVDEP
Selenium	VELAP,WVDEP
Silver	VELAP,WVDEP
SW7471B in Solids	
Mercury	VELAP,WVDEP
SW8015C in Solids	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
TPH-Semi-Volatiles (ORO)	VELAP

Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Summary of Data Qualifiers

M	Matrix spike recovery is outside established acceptance limits
M2	Sample was diluted due to matrix interference.
P	Duplicate analysis does not meet the acceptance criteria for precision
RPD	Relative Percent Difference
Qual	Qualifers
-RE	Denotes sample was re-analyzed
D.F.	Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.
TIC	Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library . A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
PCBs, Total	Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.

AIR WATER & SOIL LABORATORIES, INC.

1941 REYMET ROAD
RICHMOND, VIRGINIA 23237
(804) 358-8295 PHONE
(804)358-8297 FAX

Chain of Custody
Form #: F1331
Rev. 3.0
Effective: Aug 24, 2017

CHAIN OF CUSTODY

PAGE 1 OF 1

COMPANY NAME: EEE Consulting	INVOICE TO: same	PROJECT NAME/Quote #: Rt 1 Widening
CONTACT: Josh Hepler	INVOICE CONTACT:	SITE NAME: Cropper Auto Care
ADDRESS: 201 Church St Blacksburg	INVOICE ADDRESS:	PROJECT NUMBER: 18-796.06
PHONE #: 540 230 3685	INVOICE PHONE #:	P.O. #: 18-796.06
FAX #: / EMAIL: jhepler@eee-consulting		Pretreatment Program: NA
Is sample for compliance reporting? YES NO NA	Is sample from a chlorinated supply? YES NO NA	PWS I.D. #: NA
SAMPLER NAME (PRINT): Josh Hepler	SAMPLER SIGNATURE:	Turn Around Time: Circle: 10 5 Days or __ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	TPH - ORO	TPH - DRO	Total RCRA 8 metals	Ethylene Glycol					COMMENTS
1) B1 5-10	X					12/6	10:55	NA	S	2	X	X							
2) B1 10-15							11:05												
3) B2 5-10							11:50												
4) B2 10-15							12:00												
5) B3 5-10							11:30												
6) B3 10-15							11:40												
7) B4 5-10							12:10												
8) B4 10-15							12:20												
9) B5 Comp		X		12/6	1:00					4			X	X					
10) B6 Comp		X		12/6	1:15					4			X	X					

Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol

PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
	12/7 / 12:21		
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
	12/7/18 3:13		7 DEC 2018 15:15
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

QC Data Package
Level III ☐
Level IV ☐

LAB USE ONLY
Custody Seals used and intact? (Y/N): _____
COOLER TEMP: 5.7 °C
Received on ice? (Y/N) _____

EEE-Blacksburg 18L0319
Cropper Auto Care
Recd: 12/07/2018 Due: 12/21/2018

v130325002

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

Sample Conditions Checklist

Samples Received at:	**5.70°C**
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	No
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	Yes
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	No
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 15:02
Submitted To:	Josh Hepler	Project Number:	18-796.06
Client Site I.D.:	Cropper Auto Care	Purchase Order:	18-796.06

As per Josh Hepler the CoC is to be revised by update or adding the following samples:

No sample for B5 Comp was received.

B5 0-5: 12/6/18 12:35pm; DRO & ORO.

B6 Comp: 12/6 1:00pm; DRO, ORO, RCRA 8, & Ethylene Glycol.

B7 Comp: 12/6 1:15pm; DRO, ORO, RCRA 8, & Ethylene Glycol.

As per Josh Hepler all composite samples are over a ten minute period. BAR 12/11/18 0839

Analytics Corporation
10329 Stony Run Lane
Ashland, VA 23005
Phone: (804) 365-3000
Fax: (804) 365-3002

December 14, 2018

KATRINA COOKE
AIR WATER _SOIL
1941 REYMET ROAD
Richmond, VA 23237

Account ID:	45819840 45819840
Purchase Order:	2115
Client ID:	18L0319
Work Order:	1045312

Dear KATRINA COOKE

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, December 12, 2018. The signature below certifies that the results are based on the referenced methods and applicable certifications or accreditations are noted for each parameter reported (see key at end of report).

Unless otherwise specified all analyses of solid materials are based on dry weight.

Reported results relate only to the items tested, as received by the laboratory.

On-site analysis (analysis ASAP) is recommended for the following tests: pH, temperature, dissolved oxygen, residual chlorine and sulfite. When performed off-site, these tests do not meet NELAC standards.

Abbreviations:ug/L = micrograms per Liter, mg/L = milligrams per Liter, ug/g = micrograms per gram, mg/kg = milligrams per kilogram ug/wp = micrograms per wipe, ug/ml = micrograms per millimeter, uS/cm = microsiemens per centimeter at 25 degrees Celcius ppb = parts per billion, DF = Dilution Factor.

If you have any questions concerning this report, please feel free to call Client Services at 1-800-888-8061.

Sincerely,

Dawn A. Casto

Dawn Casto
Technical Director (or designee)

Enclosures

CERTIFICATE OF ANALYSIS

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Analytics Corporation
10329 Stony Run Lane
Ashland, VA 23005
Phone: (804) 365-3000
Fax: (908) 365-3002

ANALYTICAL RESULTS

Workorder: 1045312 18L0319

Lab ID:	**1045312001**	Date Received:	12/12/2018 10:42	Matrix	Soil/Solids/Sediment
Sample ID:	**18L0319-10 B-6 COMP**	Date Collected:	12/06/2018 13:10	Sample Type:	COMP

Parameters	Results	Units	LOQ	DF	Prepared	By	Analyzed	By	Qual	Certifications
Analytical Method: SW-846 3550 sec 7.2										
Percent Moisture	26.1	%		1	NA	NA	12/13/2018 08:52	JRM		
Analytical Method: SW-846 8015C					Preparation Method: SW-846 3550M					
Ethylene Glycol	<13.5	mg/Kg	13.5	1	12/13/2018 17:39	JPM2	12/13/2018 17:39	JPM2		V

CERTIFICATE OF ANALYSIS

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Analytics Corporation
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Ashland, VA 23005
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Fax: (908) 365-3002

ANALYTICAL RESULTS

Workorder: 1045312 18L0319

Lab ID:	**1045312002**	Date Received:	12/12/2018 10:42	Matrix	Soil/Solids/Sediment
Sample ID:	**18L0319-11 B-7 COMP**	Date Collected:	12/06/2018 13:25	Sample Type:	COMP

Parameters	Results	Units	LOQ	DF	Prepared	By	Analyzed	By	Qual	Certifications
Analytical Method: SW-846 3550 sec 7.2										
Percent Moisture	52.8	%		1	NA	NA	12/13/2018 08:52	JRM		
Analytical Method: SW-846 8015C					Preparation Method: SW-846 3550M					
Ethylene Glycol	<21.1	mg/Kg	21.1	1	12/13/2018 17:59	JPM2	12/13/2018 17:59	JPM2		V

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Analytics Corporation
10329 Stony Run Lane
Ashland, VA 23005
Phone: (804) 365-3000
Fax: (908) 365-3002

ANALYTICAL RESULTS

Workorder: 1045312 18L0319

Qualifiers

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Certification Index:

V = Virginia (NELAC) - 1 VAC 30-46 H 1, Laboratory ID: 460160, Certificate #: 10076

CERTIFICATE OF ANALYSIS

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AIR WATER & SOIL LABORATORIES, INC.

Analytics Laboratories
10329 Stony Run Lane
Ashland VA 23005

CHAIN OF CUSTODY

COMPANY NAME: AWS Labs, Inc.	INVOICE TO: AWS Labs, Inc.	PROJECT NAME/Quote #: 18L0319
CONTACT: Katrina Cooke	INVOICE CONTACT:	SITE NAME:
ADDRESS: 1941 Reymet Road, Richmond, VA 23237	INVOICE ADDRESS: 1941 Reymet Rd., Richmond, VA 23237	PROJECT NUMBER: 18L0319
PHONE #: (804) 358-8295	INVOICE PHONE #: (804) 358-8295	P.O. #: 2115
FAX #:	EMAIL: support@awslabs.com	Pretreatment Program:
Is sample for compliance reporting? YES NO	Is sample from a chlorinated supply? YES NO	PWS I.D. #:
SAMPLER NAME (PRINT):	SAMPLER SIGNATURE:	**Turn Around Time:**

Matrix Codes: WW=Water Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

COMMENTS

Due: 12/19/18

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE) Ethylene Glycol								COMMENTS
1) 18L0319-10 B-6 Comp		X		12/06/18	1300	12/06/18	1310		S	1	X								
2) 18L0319-11 B-7 Comp		X		12/06/18	1315	12/06/18	1325		S	1	X								
3)																			
4)																			
5)																			
6)																			
7)																			
8)																			
9)																			
10)																			

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
[signature]	12/12/18 10:13	Samson	12/12/18 10:13
RELINQUISHED: Samson	DATE / TIME 12-12-18 1042	RECEIVED: Amy Larson	DATE / TIME 12/12/18 1042
RELINQUISHED:	DATE / TIME	RECEIVED: Amy Larson	DATE / TIME

QC Data Package
- Level I ☐
- Level II ☐
- Level III ☐
- Level IV ☐

LAB USE ONLY **COOLER TEMP** 2.6 °C

Analytics.xls

ANALYTICS

Sample Container Receipt Form

Version 6-24-2011

Work Order: 1045312

Customer Name: AIR WATER & SOIL 45819840 4581984

CLIENT SAMPLE ID	LAB CONTAINER ID	TYPE OF CONTAINER	QTY	Temp(C)	pH	Chlorine on Arrival (ppm)	Condition Code	Preservative
18L0319-10 B-6 CO	1045312001-A	4 OZ G	1	2.6		NA	OK	NONE
18L0319-11 B-7 CO	1045312002-A	4 OZ G	1	2.6		NA	OK	NONE

Notes

Sample Custodian Signature		Date:	12/12/18

SHERRY MCLAREN

Condition Code Definations	
OK	Received in good condition

1941 Reymet Road ● Richmond, Virginia 23237 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Laboratory Order ID 18L0642

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg, VA 24060	Date Received:	December 14, 2018 14:00
		Date Issued:	December 20, 2018 16:23
		Project Number:	18-796
Submitted To:	Josh Hepler	Purchase Order:	
Client Site I.D.:	Cropper Auto Care		

Enclosed are the results of analyses for samples received by the laboratory on 12/14/2018 14:00. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Ted Soyars

Laboratory Manager

End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

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Accredited in accordance with nelac
Commonwealth of Virginia, DCLS
Accreditation # 460021

NWBOC EDWOSB Certified

Certified SWaM Small, Women and Minority-Owned
Supplier Diversity Strengthens the Commonwealth
by the Virginia Department of Minority Business Enterprise

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0642

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-3	18L0642-01	Ground Water	12/12/2018 12:00	12/14/2018 14:00
B-5	18L0642-02	Ground Water	12/12/2018 11:15	12/14/2018 14:00
B-4	18L0642-03	Ground Water	12/12/2018 10:30	12/14/2018 14:00
Trip Blank	18L0642-04	Ground Water	11/27/2018 16:05	12/14/2018 14:00

AIR WATER & SOIL LABORATORIES, INC.

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-3 **Laboratory Sample ID:** 18L0642-01

Grab Date/Time: 12/12/2018 12:00

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
1,1,1,2-Tetrachloroethane	01	SW8260B	<0.40 ug/L		0.40	1	12/17/18 13:33	12/17/18 13:33	KCS
1,1,1-Trichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,1,2,2-Tetrachloroethane	01	SW8260B	<0.40 ug/L		0.40	1	12/17/18 13:33	12/17/18 13:33	KCS
1,1,2-Trichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,1-Dichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,1-Dichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,1-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2,3-Trichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2,3-Trichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2,4-Trichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2,4-Trimethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2-Dibromo-3-chloropropane (DBCP)	01	SW8260B	<4.00 ug/L		4.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2-Dibromoethane (EDB)	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2-Dichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,2-Dichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,3,5-Trimethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,3-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,3-Dichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
1,4-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
2,2-Dichloropropane	01	SW8260B	<2.00 ug/L		2.00	1	12/17/18 13:33	12/17/18 13:33	KCS
2-Butanone (MEK)	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:33	12/17/18 13:33	KCS
2-Chlorotoluene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
2-Hexanone (MBK)	01	SW8260B	<5.00 ug/L		5.00	1	12/17/18 13:33	12/17/18 13:33	KCS
4-Chlorotoluene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS

AIR WATER & SOIL LABORATORIES, INC.

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-3 **Laboratory Sample ID:** 18L0642-01

Grab Date/Time: 12/12/2018 12:00

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
4-Isopropyltoluene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
4-Methyl-2-pentanone (MIBK)	01	SW8260B	<5.00 ug/L		5.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Acetone	01	SW8260B	**10.6 ug/L**		10.0	1	12/17/18 13:33	12/17/18 13:33	KCS
Benzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Bromobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Bromochloromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Bromodichloromethane	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 13:33	12/17/18 13:33	KCS
Bromoform	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Bromomethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Carbon disulfide	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:33	12/17/18 13:33	KCS
Carbon tetrachloride	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Chlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Chloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Chloroform	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 13:33	12/17/18 13:33	KCS
Chloromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
cis-1,2-Dichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
cis-1,3-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Dibromochloromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Dibromomethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Dichlorodifluoromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Di-isopropyl ether (DIPE)	01	SW8260B	<5.00 ug/L		5.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Ethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Hexachlorobutadiene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Iodomethane	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:33	12/17/18 13:33	KCS
Isopropylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS

AIR WATER & SOIL LABORATORIES, INC.

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-3 **Laboratory Sample ID:** 18L0642-01

Grab Date/Time: 12/12/2018 12:00

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
m+p-Xylenes	01	SW8260B	<2.00 ug/L		2.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Methylene chloride	01	SW8260B	<4.00 ug/L		4.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Methyl-t-butyl ether (MTBE)	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Naphthalene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
n-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
n-Propylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
o-Xylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
sec-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Styrene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
tert-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Tetrachloroethylene (PCE)	01	SW8260B	**1.30 ug/L**		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Toluene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
trans-1,2-Dichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
trans-1,3-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Trichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Trichlorofluoromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Vinyl acetate	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:33	12/17/18 13:33	KCS
Vinyl chloride	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 13:33	12/17/18 13:33	KCS
Xylenes, Total	01	SW8260B	<3.00 ug/L		3.00	1	12/17/18 13:33	12/17/18 13:33	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	*01*	*SW8260B*	*105 %*		*70-120*		*12/17/18 13:33*	*12/17/18 13:33*	*KCS*
Surr: 4-Bromofluorobenzene (Surr)	*01*	*SW8260B*	*101 %*		*75-120*		*12/17/18 13:33*	*12/17/18 13:33*	*KCS*
Surr: Dibromofluoromethane (Surr)	*01*	*SW8260B*	*109 %*		*70-130*		*12/17/18 13:33*	*12/17/18 13:33*	*KCS*
Surr: Toluene-d8 (Surr)	*01*	*SW8260B*	*104 %*		*70-130*		*12/17/18 13:33*	*12/17/18 13:33*	*KCS*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-3 **Laboratory Sample ID:** 18L0642-01

Grab Date/Time: 12/12/2018 12:00

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	01	SW8015C	<0.568 mg/L		0.568	1	12/19/18 13:55	12/20/18 03:58	HLM
Surr: Pentacosane (Surr)	*01*	*SW8015C*	*118 %*		*65-125*		*12/19/18 13:55*	*12/20/18 03:58*	*HLM*
TPH-Semi-Volatiles (ORO)	01	SW8015C	<1.1 mg/L		1.1	1	12/19/18 09:30	12/19/18 12:52	HLM

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Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-5 **Laboratory Sample ID:** 18L0642-02

Grab Date/Time: 12/12/2018 11:15

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
1,1,1,2-Tetrachloroethane	02	SW8260B	<0.40 ug/L		0.40	1	12/17/18 13:57	12/17/18 13:57	KCS
1,1,1-Trichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,1,2,2-Tetrachloroethane	02	SW8260B	<0.40 ug/L		0.40	1	12/17/18 13:57	12/17/18 13:57	KCS
1,1,2-Trichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,1-Dichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,1-Dichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,1-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2,3-Trichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2,3-Trichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2,4-Trichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2,4-Trimethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2-Dibromo-3-chloropropane (DBCP)	02	SW8260B	<4.00 ug/L		4.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2-Dibromoethane (EDB)	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2-Dichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2-Dichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,2-Dichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,3,5-Trimethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,3-Dichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,3-Dichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
1,4-Dichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
2,2-Dichloropropane	02	SW8260B	<2.00 ug/L		2.00	1	12/17/18 13:57	12/17/18 13:57	KCS
2-Butanone (MEK)	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:57	12/17/18 13:57	KCS
2-Chlorotoluene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
2-Hexanone (MBK)	02	SW8260B	<5.00 ug/L		5.00	1	12/17/18 13:57	12/17/18 13:57	KCS
4-Chlorotoluene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-5 **Laboratory Sample ID:** 18L0642-02

Grab Date/Time: 12/12/2018 11:15

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
4-Isopropyltoluene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
4-Methyl-2-pentanone (MIBK)	02	SW8260B	<5.00 ug/L		5.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Acetone	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:57	12/17/18 13:57	KCS
Benzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Bromobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Bromochloromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Bromodichloromethane	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 13:57	12/17/18 13:57	KCS
Bromoform	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Bromomethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Carbon disulfide	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:57	12/17/18 13:57	KCS
Carbon tetrachloride	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Chlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Chloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Chloroform	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 13:57	12/17/18 13:57	KCS
Chloromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
cis-1,2-Dichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
cis-1,3-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Dibromochloromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Dibromomethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Dichlorodifluoromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Di-isopropyl ether (DIPE)	02	SW8260B	<5.00 ug/L		5.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Ethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Hexachlorobutadiene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Iodomethane	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:57	12/17/18 13:57	KCS
Isopropylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS

AIR WATER & SOIL LABORATORIES, INC.

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-5 **Laboratory Sample ID:** 18L0642-02

Grab Date/Time: 12/12/2018 11:15

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
m+p-Xylenes	02	SW8260B	<2.00 ug/L		2.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Methylene chloride	02	SW8260B	<4.00 ug/L		4.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Methyl-t-butyl ether (MTBE)	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Naphthalene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
n-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
n-Propylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
o-Xylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
sec-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Styrene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
tert-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Tetrachloroethylene (PCE)	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Toluene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
trans-1,2-Dichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
trans-1,3-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Trichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Trichlorofluoromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Vinyl acetate	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 13:57	12/17/18 13:57	KCS
Vinyl chloride	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 13:57	12/17/18 13:57	KCS
Xylenes, Total	02	SW8260B	<3.00 ug/L		3.00	1	12/17/18 13:57	12/17/18 13:57	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	*02*	*SW8260B*	*104 %*		*70-120*		*12/17/18 13:57*	*12/17/18 13:57*	*KCS*
Surr: 4-Bromofluorobenzene (Surr)	*02*	*SW8260B*	*99.9 %*		*75-120*		*12/17/18 13:57*	*12/17/18 13:57*	*KCS*
Surr: Dibromofluoromethane (Surr)	*02*	*SW8260B*	*108 %*		*70-130*		*12/17/18 13:57*	*12/17/18 13:57*	*KCS*
Surr: Toluene-d8 (Surr)	*02*	*SW8260B*	*95.1 %*		*70-130*		*12/17/18 13:57*	*12/17/18 13:57*	*KCS*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-5 **Laboratory Sample ID:** 18L0642-02

Grab Date/Time: 12/12/2018 11:15

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	02	SW8015C	<0.575 mg/L		0.575	1	12/19/18 13:55	12/20/18 04:24	HLM
Surr: Pentacosane (Surr)	*02*	*SW8015C*	*96.4 %*		*65-125*		*12/19/18 13:55*	*12/20/18 04:24*	*HLM*
TPH-Semi-Volatiles (ORO)	02	SW8015C	<1.2 mg/L		1.2	1	12/19/18 09:30	12/19/18 13:17	HLM

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-4 **Laboratory Sample ID:** 18L0642-03

Grab Date/Time: 12/12/2018 10:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
1,1,1,2-Tetrachloroethane	03	SW8260B	<0.40 ug/L		0.40	1	12/17/18 14:21	12/17/18 14:21	KCS
1,1,1-Trichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,1,2,2-Tetrachloroethane	03	SW8260B	<0.40 ug/L		0.40	1	12/17/18 14:21	12/17/18 14:21	KCS
1,1,2-Trichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,1-Dichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,1-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,1-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2,3-Trichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2,3-Trichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2,4-Trichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2,4-Trimethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2-Dibromo-3-chloropropane (DBCP)	03	SW8260B	<4.00 ug/L		4.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2-Dibromoethane (EDB)	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2-Dichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2-Dichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,2-Dichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,3,5-Trimethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,3-Dichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,3-Dichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
1,4-Dichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
2,2-Dichloropropane	03	SW8260B	<2.00 ug/L		2.00	1	12/17/18 14:21	12/17/18 14:21	KCS
2-Butanone (MEK)	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 14:21	12/17/18 14:21	KCS
2-Chlorotoluene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
2-Hexanone (MBK)	03	SW8260B	<5.00 ug/L		5.00	1	12/17/18 14:21	12/17/18 14:21	KCS
4-Chlorotoluene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-4 **Laboratory Sample ID:** 18L0642-03

Grab Date/Time: 12/12/2018 10:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
4-Isopropyltoluene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
4-Methyl-2-pentanone (MIBK)	03	SW8260B	<5.00 ug/L		5.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Acetone	03	SW8260B	**11.7 ug/L**		10.0	1	12/17/18 14:21	12/17/18 14:21	KCS
Benzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Bromobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Bromochloromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Bromodichloromethane	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 14:21	12/17/18 14:21	KCS
Bromoform	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Bromomethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Carbon disulfide	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 14:21	12/17/18 14:21	KCS
Carbon tetrachloride	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Chlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Chloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Chloroform	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 14:21	12/17/18 14:21	KCS
Chloromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
cis-1,2-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
cis-1,3-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Dibromochloromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Dibromomethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Dichlorodifluoromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Di-isopropyl ether (DIPE)	03	SW8260B	<5.00 ug/L		5.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Ethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Hexachlorobutadiene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Iodomethane	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 14:21	12/17/18 14:21	KCS
Isopropylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS

AIR WATER & SOIL LABORATORIES, INC.

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-4 **Laboratory Sample ID:** 18L0642-03

Grab Date/Time: 12/12/2018 10:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
m+p-Xylenes	03	SW8260B	<2.00 ug/L		2.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Methylene chloride	03	SW8260B	<4.00 ug/L		4.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Methyl-t-butyl ether (MTBE)	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Naphthalene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
n-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
n-Propylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
o-Xylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
sec-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Styrene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
tert-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Tetrachloroethylene (PCE)	03	SW8260B	**1.40 ug/L**		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Toluene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
trans-1,2-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
trans-1,3-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Trichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Trichlorofluoromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Vinyl acetate	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 14:21	12/17/18 14:21	KCS
Vinyl chloride	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 14:21	12/17/18 14:21	KCS
Xylenes, Total	03	SW8260B	<3.00 ug/L		3.00	1	12/17/18 14:21	12/17/18 14:21	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	*03*	*SW8260B*	*107 %*		*70-120*		*12/17/18 14:21*	*12/17/18 14:21*	*KCS*
Surr: 4-Bromofluorobenzene (Surr)	*03*	*SW8260B*	*101 %*		*75-120*		*12/17/18 14:21*	*12/17/18 14:21*	*KCS*
Surr: Dibromofluoromethane (Surr)	*03*	*SW8260B*	*108 %*		*70-130*		*12/17/18 14:21*	*12/17/18 14:21*	*KCS*
Surr: Toluene-d8 (Surr)	*03*	*SW8260B*	*102 %*		*70-130*		*12/17/18 14:21*	*12/17/18 14:21*	*KCS*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. B-4 **Laboratory Sample ID:** 18L0642-03

Grab Date/Time: 12/12/2018 10:30

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Semivolatile Hydrocarbons by GC									
TPH-Semi-Volatiles (DRO)	03	SW8015C	<0.581 mg/L		0.581	1	12/19/18 13:55	12/20/18 04:49	HLM
Surr: Pentacosane (Surr)	*03*	*SW8015C*	*96.9 %*		*65-125*		*12/19/18 13:55*	*12/20/18 04:49*	*HLM*
TPH-Semi-Volatiles (ORO)	03	SW8015C	<1.2 mg/L		1.2	1	12/19/18 09:30	12/19/18 13:42	HLM

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. Trip Blank **Laboratory Sample ID:** 18L0642-04

Grab Date/Time: 11/27/2018 16:05

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
1,1,1,2-Tetrachloroethane	04	SW8260B	<0.40 ug/L		0.40	1	12/17/18 11:35	12/17/18 11:35	KCS
1,1,1-Trichloroethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,1,2,2-Tetrachloroethane	04	SW8260B	<0.40 ug/L		0.40	1	12/17/18 11:35	12/17/18 11:35	KCS
1,1,2-Trichloroethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,1-Dichloroethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,1-Dichloroethylene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,1-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2,3-Trichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2,3-Trichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2,4-Trichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2,4-Trimethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2-Dibromo-3-chloropropane (DBCP)	04	SW8260B	<4.00 ug/L		4.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2-Dibromoethane (EDB)	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2-Dichloroethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,2-Dichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,3,5-Trimethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,3-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,3-Dichloropropane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
1,4-Dichlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
2,2-Dichloropropane	04	SW8260B	<2.00 ug/L		2.00	1	12/17/18 11:35	12/17/18 11:35	KCS
2-Butanone (MEK)	04	SW8260B	<10.0 ug/L		10.0	1	12/17/18 11:35	12/17/18 11:35	KCS
2-Chlorotoluene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
2-Hexanone (MBK)	04	SW8260B	<5.00 ug/L		5.00	1	12/17/18 11:35	12/17/18 11:35	KCS
4-Chlorotoluene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS

AIR WATER & SOIL LABORATORIES, INC.

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. Trip Blank **Laboratory Sample ID:** 18L0642-04

Grab Date/Time: 11/27/2018 16:05

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
4-Isopropyltoluene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
4-Methyl-2-pentanone (MIBK)	04	SW8260B	<5.00 ug/L		5.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Acetone	04	SW8260B	<10.0 ug/L		10.0	1	12/17/18 11:35	12/17/18 11:35	KCS
Benzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Bromobenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Bromochloromethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Bromodichloromethane	04	SW8260B	<0.50 ug/L		0.50	1	12/17/18 11:35	12/17/18 11:35	KCS
Bromoform	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Bromomethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Carbon disulfide	04	SW8260B	<10.0 ug/L		10.0	1	12/17/18 11:35	12/17/18 11:35	KCS
Carbon tetrachloride	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Chlorobenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Chloroethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Chloroform	04	SW8260B	<0.50 ug/L		0.50	1	12/17/18 11:35	12/17/18 11:35	KCS
Chloromethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
cis-1,2-Dichloroethylene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
cis-1,3-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Dibromochloromethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Dibromomethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Dichlorodifluoromethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Di-isopropyl ether (DIPE)	04	SW8260B	<5.00 ug/L		5.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Ethylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Hexachlorobutadiene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Iodomethane	04	SW8260B	<10.0 ug/L		10.0	1	12/17/18 11:35	12/17/18 11:35	KCS
Isopropylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS

AIR WATER & SOIL LABORATORIES, INC.

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Results

Sample I.D. Trip Blank **Laboratory Sample ID:** 18L0642-04

Grab Date/Time: 11/27/2018 16:05

Field Residual Cl: **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
Volatile Organic Compounds by GCMS									
m+p-Xylenes	04	SW8260B	<2.00 ug/L		2.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Methylene chloride	04	SW8260B	<4.00 ug/L		4.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Methyl-t-butyl ether (MTBE)	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Naphthalene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
n-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
n-Propylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
o-Xylene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
sec-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Styrene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
tert-Butylbenzene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Tetrachloroethylene (PCE)	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Toluene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
trans-1,2-Dichloroethylene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
trans-1,3-Dichloropropene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Trichloroethylene	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Trichlorofluoromethane	04	SW8260B	<1.00 ug/L		1.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Vinyl acetate	04	SW8260B	<10.0 ug/L		10.0	1	12/17/18 11:35	12/17/18 11:35	KCS
Vinyl chloride	04	SW8260B	<0.50 ug/L		0.50	1	12/17/18 11:35	12/17/18 11:35	KCS
Xylenes, Total	04	SW8260B	<3.00 ug/L		3.00	1	12/17/18 11:35	12/17/18 11:35	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	*04*	*SW8260B*	*100 %*		*70-120*		*12/17/18 11:35*	*12/17/18 11:35*	*KCS*
Surr: 4-Bromofluorobenzene (Surr)	*04*	*SW8260B*	*100 %*		*75-120*		*12/17/18 11:35*	*12/17/18 11:35*	*KCS*
Surr: Dibromofluoromethane (Surr)	*04*	*SW8260B*	*108 %*		*70-130*		*12/17/18 11:35*	*12/17/18 11:35*	*KCS*
Surr: Toluene-d8 (Surr)	*04*	*SW8260B*	*104 %*		*70-130*		*12/17/18 11:35*	*12/17/18 11:35*	*KCS*

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Laboratory Order ID: 18L0642

Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3510C**		
18L0642-01	870 mL / 1.00 mL	SW8015C	BBL0541	SBL0545	AH80136
18L0642-02	860 mL / 1.00 mL	SW8015C	BBL0541	SBL0545	AH80136
18L0642-03	860 mL / 1.00 mL	SW8015C	BBL0541	SBL0545	AH80136
Semivolatile Hydrocarbons by GC		**Preparation Method:**	**SW3510C**		
18L0642-01	880 mL / 1.00 mL	SW8015C	BBL0585	SBL0564	AK80055
18L0642-02	870 mL / 1.00 mL	SW8015C	BBL0585	SBL0564	AK80055
18L0642-03	860 mL / 1.00 mL	SW8015C	BBL0585	SBL0564	AK80055

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
Volatile Organic Compounds by GCMS		**Preparation Method:**	**SW5030B**		
18L0642-01	5.00 mL / 5.00 mL	SW8260B	BBL0489	SBL0448	AL80011
18L0642-02	5.00 mL / 5.00 mL	SW8260B	BBL0489	SBL0448	AL80011
18L0642-03	5.00 mL / 5.00 mL	SW8260B	BBL0489	SBL0448	AL80011
18L0642-04	5.00 mL / 5.00 mL	SW8260B	BBL0489	SBL0448	AL80011

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
1,1,1,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,1,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,1,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,1,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,1-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,1-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,1-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,1-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,2,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,2,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,2,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,2,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,2-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,2-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,2-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,2-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloropropene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloropropene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloropropene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloropropene	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
1,2,3-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichloropropane	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichloropropane	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichloropropane	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichloropropane	<1.00 ug/L	1.00	ug/L							
1,2,4-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							
1,2-Dibromo-3-chloropropane (DBCP)	<4.00 ug/L	4.00	ug/L							
1,2-Dibromo-3-chloropropane (DBCP)	<4.00 ug/L	4.00	ug/L							
1,2-Dibromo-3-chloropropane (DBCP)	<4.00 ug/L	4.00	ug/L							
1,2-Dibromo-3-chloropropane (DBCP)	<4.00 ug/L	4.00	ug/L							
1,2-Dibromoethane (EDB)	<1.00 ug/L	1.00	ug/L							
1,2-Dibromoethane (EDB)	<1.00 ug/L	1.00	ug/L							
1,2-Dibromoethane (EDB)	<1.00 ug/L	1.00	ug/L							
1,2-Dibromoethane (EDB)	<1.00 ug/L	1.00	ug/L							
1,2-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,2-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,2-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,2-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,2-Dichloropropane	<1.00 ug/L	1.00	ug/L							
1,2-Dichloropropane	<1.00 ug/L	1.00	ug/L							

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
1,2-Dichloropropane	<1.00 ug/L	1.00	ug/L							
1,2-Dichloropropane	<1.00 ug/L	1.00	ug/L							
1,3,5-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							
1,3,5-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							
1,3,5-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							
1,3,5-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							
1,3-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,3-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,3-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,3-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,3-Dichloropropane	<1.00 ug/L	1.00	ug/L							
1,3-Dichloropropane	<1.00 ug/L	1.00	ug/L							
1,3-Dichloropropane	<1.00 ug/L	1.00	ug/L							
1,3-Dichloropropane	<1.00 ug/L	1.00	ug/L							
1,4-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,4-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,4-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,4-Dichlorobenzene	<1.00 ug/L	1.00	ug/L							
2,2-Dichloropropane	<2.00 ug/L	2.00	ug/L							
2,2-Dichloropropane	<2.00 ug/L	2.00	ug/L							
2,2-Dichloropropane	<2.00 ug/L	2.00	ug/L							
2,2-Dichloropropane	<2.00 ug/L	2.00	ug/L							
2-Butanone (MEK)	<10.0 ug/L	10.0	ug/L							
2-Butanone (MEK)	<10.0 ug/L	10.0	ug/L							
2-Butanone (MEK)	<10.0 ug/L	10.0	ug/L							
2-Butanone (MEK)	<10.0 ug/L	10.0	ug/L							
2-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
2-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
2-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
2-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
2-Hexanone (MBK)	<5.00 ug/L	5.00	ug/L							

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
2-Hexanone (MBK)	<5.00 ug/L	5.00	ug/L							
2-Hexanone (MBK)	<5.00 ug/L	5.00	ug/L							
2-Hexanone (MBK)	<5.00 ug/L	5.00	ug/L							
4-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
4-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
4-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
4-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
4-Isopropyltoluene	<1.00 ug/L	1.00	ug/L							
4-Isopropyltoluene	<1.00 ug/L	1.00	ug/L							
4-Isopropyltoluene	<1.00 ug/L	1.00	ug/L							
4-Isopropyltoluene	<1.00 ug/L	1.00	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.00 ug/L	5.00	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.00 ug/L	5.00	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.00 ug/L	5.00	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.00 ug/L	5.00	ug/L							
Acetone	<10.0 ug/L	10.0	ug/L							
Acetone	<10.0 ug/L	10.0	ug/L							
Acetone	<10.0 ug/L	10.0	ug/L							
Acetone	<10.0 ug/L	10.0	ug/L							
Benzene	<1.00 ug/L	1.00	ug/L							
Benzene	<1.00 ug/L	1.00	ug/L							
Benzene	<1.00 ug/L	1.00	ug/L							
Benzene	<1.00 ug/L	1.00	ug/L							
Bromobenzene	<1.00 ug/L	1.00	ug/L							
Bromobenzene	<1.00 ug/L	1.00	ug/L							
Bromobenzene	<1.00 ug/L	1.00	ug/L							
Bromobenzene	<1.00 ug/L	1.00	ug/L							
Bromochloromethane	<1.00 ug/L	1.00	ug/L							
Bromochloromethane	<1.00 ug/L	1.00	ug/L							
Bromochloromethane	<1.00 ug/L	1.00	ug/L							
Bromochloromethane	<1.00 ug/L	1.00	ug/L							

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
Bromodichloromethane	<0.50 ug/L	0.50	ug/L							
Bromodichloromethane	<0.50 ug/L	0.50	ug/L							
Bromodichloromethane	<0.50 ug/L	0.50	ug/L							
Bromodichloromethane	<0.50 ug/L	0.50	ug/L							
Bromoform	<1.00 ug/L	1.00	ug/L							
Bromoform	<1.00 ug/L	1.00	ug/L							
Bromoform	<1.00 ug/L	1.00	ug/L							
Bromoform	<1.00 ug/L	1.00	ug/L							
Bromomethane	<1.00 ug/L	1.00	ug/L							
Bromomethane	<1.00 ug/L	1.00	ug/L							
Bromomethane	<1.00 ug/L	1.00	ug/L							
Bromomethane	<1.00 ug/L	1.00	ug/L							
Carbon disulfide	<10.0 ug/L	10.0	ug/L							
Carbon disulfide	<10.0 ug/L	10.0	ug/L							
Carbon disulfide	<10.0 ug/L	10.0	ug/L							
Carbon disulfide	<10.0 ug/L	10.0	ug/L							
Carbon tetrachloride	<1.00 ug/L	1.00	ug/L							
Carbon tetrachloride	<1.00 ug/L	1.00	ug/L							
Carbon tetrachloride	<1.00 ug/L	1.00	ug/L							
Carbon tetrachloride	<1.00 ug/L	1.00	ug/L							
Chlorobenzene	<1.00 ug/L	1.00	ug/L							
Chlorobenzene	<1.00 ug/L	1.00	ug/L							
Chlorobenzene	<1.00 ug/L	1.00	ug/L							
Chlorobenzene	<1.00 ug/L	1.00	ug/L							
Chloroethane	<1.00 ug/L	1.00	ug/L							
Chloroethane	<1.00 ug/L	1.00	ug/L							
Chloroethane	<1.00 ug/L	1.00	ug/L							
Chloroethane	<1.00 ug/L	1.00	ug/L							
Chloroform	<0.50 ug/L	0.50	ug/L							
Chloroform	<0.50 ug/L	0.50	ug/L							
Chloroform	<0.50 ug/L	0.50	ug/L							

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
Chloroform	<0.50 ug/L	0.50	ug/L							
Chloromethane	<1.00 ug/L	1.00	ug/L							
Chloromethane	<1.00 ug/L	1.00	ug/L							
Chloromethane	<1.00 ug/L	1.00	ug/L							
Chloromethane	<1.00 ug/L	1.00	ug/L							
cis-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
cis-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
cis-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
cis-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
cis-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
cis-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
cis-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
cis-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
Dibromochloromethane	<1.00 ug/L	1.00	ug/L							
Dibromochloromethane	<1.00 ug/L	1.00	ug/L							
Dibromochloromethane	<1.00 ug/L	1.00	ug/L							
Dibromochloromethane	<1.00 ug/L	1.00	ug/L							
Dibromomethane	<1.00 ug/L	1.00	ug/L							
Dibromomethane	<1.00 ug/L	1.00	ug/L							
Dibromomethane	<1.00 ug/L	1.00	ug/L							
Dibromomethane	<1.00 ug/L	1.00	ug/L							
Dichlorodifluoromethane	<1.00 ug/L	1.00	ug/L							
Dichlorodifluoromethane	<1.00 ug/L	1.00	ug/L							
Dichlorodifluoromethane	<1.00 ug/L	1.00	ug/L							
Dichlorodifluoromethane	<1.00 ug/L	1.00	ug/L							
Di-isopropyl ether (DIPE)	<5.00 ug/L	5.00	ug/L							
Di-isopropyl ether (DIPE)	<5.00 ug/L	5.00	ug/L							
Di-isopropyl ether (DIPE)	<5.00 ug/L	5.00	ug/L							
Di-isopropyl ether (DIPE)	<5.00 ug/L	5.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
Hexachlorobutadiene	<1.00 ug/L	1.00	ug/L							
Hexachlorobutadiene	<1.00 ug/L	1.00	ug/L							
Hexachlorobutadiene	<1.00 ug/L	1.00	ug/L							
Hexachlorobutadiene	<1.00 ug/L	1.00	ug/L							
Iodomethane	<10.0 ug/L	10.0	ug/L							
Iodomethane	<10.0 ug/L	10.0	ug/L							
Iodomethane	<10.0 ug/L	10.0	ug/L							
Iodomethane	<10.0 ug/L	10.0	ug/L							
Isopropylbenzene	<1.00 ug/L	1.00	ug/L							
Isopropylbenzene	<1.00 ug/L	1.00	ug/L							
Isopropylbenzene	<1.00 ug/L	1.00	ug/L							
Isopropylbenzene	<1.00 ug/L	1.00	ug/L							
m+p-Xylenes	<2.00 ug/L	2.00	ug/L							
m+p-Xylenes	<2.00 ug/L	2.00	ug/L							
m+p-Xylenes	<2.00 ug/L	2.00	ug/L							
m+p-Xylenes	<2.00 ug/L	2.00	ug/L							
Methylene chloride	<4.00 ug/L	4.00	ug/L							
Methylene chloride	<4.00 ug/L	4.00	ug/L							
Methylene chloride	<4.00 ug/L	4.00	ug/L							
Methylene chloride	<4.00 ug/L	4.00	ug/L							
Methyl-t-butyl ether (MTBE)	<1.00 ug/L	1.00	ug/L							
Methyl-t-butyl ether (MTBE)	<1.00 ug/L	1.00	ug/L							
Methyl-t-butyl ether (MTBE)	<1.00 ug/L	1.00	ug/L							
Methyl-t-butyl ether (MTBE)	<1.00 ug/L	1.00	ug/L							
Naphthalene	<1.00 ug/L	1.00	ug/L							
Naphthalene	<1.00 ug/L	1.00	ug/L							
Naphthalene	<1.00 ug/L	1.00	ug/L							
Naphthalene	<1.00 ug/L	1.00	ug/L							
n-Butylbenzene	<1.00 ug/L	1.00	ug/L							

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
n-Butylbenzene	<1.00 ug/L	1.00	ug/L							
n-Butylbenzene	<1.00 ug/L	1.00	ug/L							
n-Butylbenzene	<1.00 ug/L	1.00	ug/L							
n-Propylbenzene	<1.00 ug/L	1.00	ug/L							
n-Propylbenzene	<1.00 ug/L	1.00	ug/L							
n-Propylbenzene	<1.00 ug/L	1.00	ug/L							
n-Propylbenzene	<1.00 ug/L	1.00	ug/L							
o-Xylene	<1.00 ug/L	1.00	ug/L							
o-Xylene	<1.00 ug/L	1.00	ug/L							
o-Xylene	<1.00 ug/L	1.00	ug/L							
o-Xylene	<1.00 ug/L	1.00	ug/L							
sec-Butylbenzene	<1.00 ug/L	1.00	ug/L							
sec-Butylbenzene	<1.00 ug/L	1.00	ug/L							
sec-Butylbenzene	<1.00 ug/L	1.00	ug/L							
sec-Butylbenzene	<1.00 ug/L	1.00	ug/L							
Styrene	<1.00 ug/L	1.00	ug/L							
Styrene	<1.00 ug/L	1.00	ug/L							
Styrene	<1.00 ug/L	1.00	ug/L							
Styrene	<1.00 ug/L	1.00	ug/L							
tert-Butylbenzene	<1.00 ug/L	1.00	ug/L							
tert-Butylbenzene	<1.00 ug/L	1.00	ug/L							
tert-Butylbenzene	<1.00 ug/L	1.00	ug/L							
tert-Butylbenzene	<1.00 ug/L	1.00	ug/L							
Tetrachloroethylene (PCE)	<1.00 ug/L	1.00	ug/L							
Tetrachloroethylene (PCE)	<1.00 ug/L	1.00	ug/L							
Tetrachloroethylene (PCE)	<1.00 ug/L	1.00	ug/L							
Tetrachloroethylene (PCE)	<1.00 ug/L	1.00	ug/L							
Toluene	<1.00 ug/L	1.00	ug/L							
Toluene	<1.00 ug/L	1.00	ug/L							
Toluene	<1.00 ug/L	1.00	ug/L							
Toluene	<1.00 ug/L	1.00	ug/L							

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
trans-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
trans-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
trans-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
trans-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
trans-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
trans-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
trans-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
trans-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
Trichloroethylene	<1.00 ug/L	1.00	ug/L							
Trichloroethylene	<1.00 ug/L	1.00	ug/L							
Trichloroethylene	<1.00 ug/L	1.00	ug/L							
Trichloroethylene	<1.00 ug/L	1.00	ug/L							
Trichlorofluoromethane	<1.00 ug/L	1.00	ug/L							
Trichlorofluoromethane	<1.00 ug/L	1.00	ug/L							
Trichlorofluoromethane	<1.00 ug/L	1.00	ug/L							
Trichlorofluoromethane	<1.00 ug/L	1.00	ug/L							
Vinyl acetate	<10.0 ug/L	10.0	ug/L							
Vinyl acetate	<10.0 ug/L	10.0	ug/L							
Vinyl acetate	<10.0 ug/L	10.0	ug/L							
Vinyl acetate	<10.0 ug/L	10.0	ug/L							
Vinyl chloride	<0.50 ug/L	0.50	ug/L							
Vinyl chloride	<0.50 ug/L	0.50	ug/L							
Vinyl chloride	<0.50 ug/L	0.50	ug/L							
Vinyl chloride	<0.50 ug/L	0.50	ug/L							
Xylenes, Total	<3.00 ug/L	3.00	ug/L							
Xylenes, Total	<3.00 ug/L	3.00	ug/L							
Xylenes, Total	<3.00 ug/L	3.00	ug/L							
Xylenes, Total	<3.00 ug/L	3.00	ug/L							
Surr: 1,2-Dichloroethane-d4 (Surr)	51.6		ug/L	50.0		103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.6		ug/L	50.0		103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.6		ug/L	50.0		103	70-120			

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Final Report

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Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Blank (BBL0489-BLK1)				Prepared & Analyzed: 12/17/2018						
Surr: 1,2-Dichloroethane-d4 (Surr)	51.6		ug/L	50.0		103	70-120			
Surr: 4-Bromofluorobenzene (Surr)	51.2		ug/L	50.0		102	75-120			
Surr: 4-Bromofluorobenzene (Surr)	51.2		ug/L	50.0		102	75-120			
Surr: 4-Bromofluorobenzene (Surr)	51.2		ug/L	50.0		102	75-120			
Surr: 4-Bromofluorobenzene (Surr)	51.2		ug/L	50.0		102	75-120			
Surr: Dibromofluoromethane (Surr)	53.5		ug/L	50.0		107	70-130			
Surr: Dibromofluoromethane (Surr)	53.5		ug/L	50.0		107	70-130			
Surr: Dibromofluoromethane (Surr)	53.5		ug/L	50.0		107	70-130			
Surr: Dibromofluoromethane (Surr)	53.5		ug/L	50.0		107	70-130			
Surr: Toluene-d8 (Surr)	50.8		ug/L	50.0		102	70-130			
Surr: Toluene-d8 (Surr)	50.8		ug/L	50.0		102	70-130			
Surr: Toluene-d8 (Surr)	50.8		ug/L	50.0		102	70-130			
Surr: Toluene-d8 (Surr)	50.8		ug/L	50.0		102	70-130			
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
1,1,1,2-Tetrachloroethane	51.8 ug/L	0.4	ug/L	50.0	ug/L	104	80-130			
1,1,1,2-Tetrachloroethane	51.8 ug/L	0.4	ug/L	50.0	ug/L	104	80-130			
1,1,1,2-Tetrachloroethane	51.8 ug/L	0.4	ug/L	50.0	ug/L	104	80-130			
1,1,1,2-Tetrachloroethane	51.8 ug/L	0.4	ug/L	50.0	ug/L	104	80-130			
1,1,1-Trichloroethane	55.3 ug/L	1	ug/L	50.0	ug/L	111	65-130			
1,1,1-Trichloroethane	55.3 ug/L	1	ug/L	50.0	ug/L	111	65-130			
1,1,1-Trichloroethane	55.3 ug/L	1	ug/L	50.0	ug/L	111	65-130			
1,1,1-Trichloroethane	55.3 ug/L	1	ug/L	50.0	ug/L	111	65-130			
1,1,2,2-Tetrachloroethane	53.8 ug/L	0.4	ug/L	50.0	ug/L	108	65-130			
1,1,2,2-Tetrachloroethane	53.8 ug/L	0.4	ug/L	50.0	ug/L	108	65-130			
1,1,2,2-Tetrachloroethane	53.8 ug/L	0.4	ug/L	50.0	ug/L	108	65-130			
1,1,2,2-Tetrachloroethane	53.8 ug/L	0.4	ug/L	50.0	ug/L	108	65-130			
1,1,2-Trichloroethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,1,2-Trichloroethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,1,2-Trichloroethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,1,2-Trichloroethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
1,1-Dichloroethane	62.8 ug/L	1	ug/L	50.0	ug/L	126	70-135			
1,1-Dichloroethane	62.8 ug/L	1	ug/L	50.0	ug/L	126	70-135			
1,1-Dichloroethane	62.8 ug/L	1	ug/L	50.0	ug/L	126	70-135			
1,1-Dichloroethane	62.8 ug/L	1	ug/L	50.0	ug/L	126	70-135			
1,1-Dichloroethylene	59.6 ug/L	1	ug/L	50.0	ug/L	119	70-130			
1,1-Dichloroethylene	59.6 ug/L	1	ug/L	50.0	ug/L	119	70-130			
1,1-Dichloroethylene	59.6 ug/L	1	ug/L	50.0	ug/L	119	70-130			
1,1-Dichloroethylene	59.6 ug/L	1	ug/L	50.0	ug/L	119	70-130			
1,1-Dichloropropene	57.9 ug/L	1	ug/L	50.0	ug/L	116	75-135			
1,1-Dichloropropene	57.9 ug/L	1	ug/L	50.0	ug/L	116	75-135			
1,1-Dichloropropene	57.9 ug/L	1	ug/L	50.0	ug/L	116	75-135			
1,1-Dichloropropene	57.9 ug/L	1	ug/L	50.0	ug/L	116	75-135			
1,2,3-Trichlorobenzene	48.5 ug/L	1	ug/L	50.0	ug/L	97.1	55-140			
1,2,3-Trichlorobenzene	48.5 ug/L	1	ug/L	50.0	ug/L	97.1	55-140			
1,2,3-Trichlorobenzene	48.5 ug/L	1	ug/L	50.0	ug/L	97.1	55-140			
1,2,3-Trichlorobenzene	48.5 ug/L	1	ug/L	50.0	ug/L	97.1	55-140			
1,2,3-Trichloropropane	52.6 ug/L	1	ug/L	50.0	ug/L	105	75-125			
1,2,3-Trichloropropane	52.6 ug/L	1	ug/L	50.0	ug/L	105	75-125			
1,2,3-Trichloropropane	52.6 ug/L	1	ug/L	50.0	ug/L	105	75-125			
1,2,3-Trichloropropane	52.6 ug/L	1	ug/L	50.0	ug/L	105	75-125			
1,2,4-Trichlorobenzene	49.3 ug/L	1	ug/L	50.0	ug/L	98.5	65-135			
1,2,4-Trichlorobenzene	49.3 ug/L	1	ug/L	50.0	ug/L	98.5	65-135			
1,2,4-Trichlorobenzene	49.3 ug/L	1	ug/L	50.0	ug/L	98.5	65-135			
1,2,4-Trichlorobenzene	49.3 ug/L	1	ug/L	50.0	ug/L	98.5	65-135			
1,2,4-Trimethylbenzene	54.4 ug/L	1	ug/L	50.0	ug/L	109	75-130			
1,2,4-Trimethylbenzene	54.4 ug/L	1	ug/L	50.0	ug/L	109	75-130			
1,2,4-Trimethylbenzene	54.4 ug/L	1	ug/L	50.0	ug/L	109	75-130			
1,2,4-Trimethylbenzene	54.4 ug/L	1	ug/L	50.0	ug/L	109	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	45.1 ug/L	4	ug/L	50.0	ug/L	90.2	50-130			
1,2-Dibromo-3-chloropropane (DBCP)	45.1 ug/L	4	ug/L	50.0	ug/L	90.2	50-130			
1,2-Dibromo-3-chloropropane (DBCP)	45.1 ug/L	4	ug/L	50.0	ug/L	90.2	50-130			

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
1,2-Dibromo-3-chloropropane (DBCP)	45.1 ug/L	4	ug/L	50.0	ug/L	90.2	50-130			
1,2-Dibromoethane (EDB)	54.0 ug/L	1	ug/L	50.0	ug/L	108	80-120			
1,2-Dibromoethane (EDB)	54.0 ug/L	1	ug/L	50.0	ug/L	108	80-120			
1,2-Dibromoethane (EDB)	54.0 ug/L	1	ug/L	50.0	ug/L	108	80-120			
1,2-Dibromoethane (EDB)	54.0 ug/L	1	ug/L	50.0	ug/L	108	80-120			
1,2-Dichlorobenzene	50.8 ug/L	1	ug/L	50.0	ug/L	102	70-120			
1,2-Dichlorobenzene	50.8 ug/L	1	ug/L	50.0	ug/L	102	70-120			
1,2-Dichlorobenzene	50.8 ug/L	1	ug/L	50.0	ug/L	102	70-120			
1,2-Dichlorobenzene	50.8 ug/L	1	ug/L	50.0	ug/L	102	70-120			
1,2-Dichloroethane	54.6 ug/L	1	ug/L	50.0	ug/L	109	70-130			
1,2-Dichloroethane	54.6 ug/L	1	ug/L	50.0	ug/L	109	70-130			
1,2-Dichloroethane	54.6 ug/L	1	ug/L	50.0	ug/L	109	70-130			
1,2-Dichloroethane	54.6 ug/L	1	ug/L	50.0	ug/L	109	70-130			
1,2-Dichloropropane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,2-Dichloropropane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,2-Dichloropropane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,2-Dichloropropane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,3,5-Trimethylbenzene	55.2 ug/L	1	ug/L	50.0	ug/L	110	75-125			
1,3,5-Trimethylbenzene	55.2 ug/L	1	ug/L	50.0	ug/L	110	75-125			
1,3,5-Trimethylbenzene	55.2 ug/L	1	ug/L	50.0	ug/L	110	75-125			
1,3,5-Trimethylbenzene	55.2 ug/L	1	ug/L	50.0	ug/L	110	75-125			
1,3-Dichlorobenzene	53.1 ug/L	1	ug/L	50.0	ug/L	106	75-125			
1,3-Dichlorobenzene	53.1 ug/L	1	ug/L	50.0	ug/L	106	75-125			
1,3-Dichlorobenzene	53.1 ug/L	1	ug/L	50.0	ug/L	106	75-125			
1,3-Dichlorobenzene	53.1 ug/L	1	ug/L	50.0	ug/L	106	75-125			
1,3-Dichloropropane	56.0 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,3-Dichloropropane	56.0 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,3-Dichloropropane	56.0 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,3-Dichloropropane	56.0 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,4-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0	ug/L	100	75-125			
1,4-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0	ug/L	100	75-125			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
1,4-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0	ug/L	100	75-125			
1,4-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0	ug/L	100	75-125			
2,2-Dichloropropane	60.7 ug/L	2	ug/L	50.0	ug/L	121	70-135			
2,2-Dichloropropane	60.7 ug/L	2	ug/L	50.0	ug/L	121	70-135			
2,2-Dichloropropane	60.7 ug/L	2	ug/L	50.0	ug/L	121	70-135			
2,2-Dichloropropane	60.7 ug/L	2	ug/L	50.0	ug/L	121	70-135			
2-Butanone (MEK)	68.1 ug/L	10	ug/L	50.0	ug/L	136	30-150			
2-Butanone (MEK)	68.1 ug/L	10	ug/L	50.0	ug/L	136	30-150			
2-Butanone (MEK)	68.1 ug/L	10	ug/L	50.0	ug/L	136	30-150			
2-Butanone (MEK)	68.1 ug/L	10	ug/L	50.0	ug/L	136	30-150			
2-Chlorotoluene	53.2 ug/L	1	ug/L	50.0	ug/L	106	75-125			
2-Chlorotoluene	53.2 ug/L	1	ug/L	50.0	ug/L	106	75-125			
2-Chlorotoluene	53.2 ug/L	1	ug/L	50.0	ug/L	106	75-125			
2-Chlorotoluene	53.2 ug/L	1	ug/L	50.0	ug/L	106	75-125			
2-Hexanone (MBK)	61.2 ug/L	5	ug/L	50.0	ug/L	122	55-130			
2-Hexanone (MBK)	61.2 ug/L	5	ug/L	50.0	ug/L	122	55-130			
2-Hexanone (MBK)	61.2 ug/L	5	ug/L	50.0	ug/L	122	55-130			
2-Hexanone (MBK)	61.2 ug/L	5	ug/L	50.0	ug/L	122	55-130			
4-Chlorotoluene	50.0 ug/L	1	ug/L	50.0	ug/L	99.9	75-130			
4-Chlorotoluene	50.0 ug/L	1	ug/L	50.0	ug/L	99.9	75-130			
4-Chlorotoluene	50.0 ug/L	1	ug/L	50.0	ug/L	99.9	75-130			
4-Chlorotoluene	50.0 ug/L	1	ug/L	50.0	ug/L	99.9	75-130			
4-Isopropyltoluene	52.3 ug/L	1	ug/L	50.0	ug/L	105	75-130			
4-Isopropyltoluene	52.3 ug/L	1	ug/L	50.0	ug/L	105	75-130			
4-Isopropyltoluene	52.3 ug/L	1	ug/L	50.0	ug/L	105	75-130			
4-Isopropyltoluene	52.3 ug/L	1	ug/L	50.0	ug/L	105	75-130			
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	ug/L	119	60-135			
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	ug/L	119	60-135			
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	ug/L	119	60-135			
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	ug/L	119	60-135			
Acetone	69.4 ug/L	10	ug/L	50.0	ug/L	139	40-140			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
Acetone	69.4 ug/L	10	ug/L	50.0	ug/L	139	40-140			
Acetone	69.4 ug/L	10	ug/L	50.0	ug/L	139	40-140			
Acetone	69.4 ug/L	10	ug/L	50.0	ug/L	139	40-140			
Benzene	57.5 ug/L	1	ug/L	50.0	ug/L	115	80-120			
Benzene	57.5 ug/L	1	ug/L	50.0	ug/L	115	80-120			
Benzene	57.5 ug/L	1	ug/L	50.0	ug/L	115	80-120			
Benzene	57.5 ug/L	1	ug/L	50.0	ug/L	115	80-120			
Bromobenzene	52.2 ug/L	1	ug/L	50.0	ug/L	104	75-125			
Bromobenzene	52.2 ug/L	1	ug/L	50.0	ug/L	104	75-125			
Bromobenzene	52.2 ug/L	1	ug/L	50.0	ug/L	104	75-125			
Bromobenzene	52.2 ug/L	1	ug/L	50.0	ug/L	104	75-125			
Bromochloromethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	65-130			
Bromochloromethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	65-130			
Bromochloromethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	65-130			
Bromochloromethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	65-130			
Bromodichloromethane	57.7 ug/L	0.5	ug/L	50.0	ug/L	115	75-120			
Bromodichloromethane	57.7 ug/L	0.5	ug/L	50.0	ug/L	115	75-120			
Bromodichloromethane	57.7 ug/L	0.5	ug/L	50.0	ug/L	115	75-120			
Bromodichloromethane	57.7 ug/L	0.5	ug/L	50.0	ug/L	115	75-120			
Bromoform	49.9 ug/L	1	ug/L	50.0	ug/L	99.7	70-130			
Bromoform	49.9 ug/L	1	ug/L	50.0	ug/L	99.7	70-130			
Bromoform	49.9 ug/L	1	ug/L	50.0	ug/L	99.7	70-130			
Bromoform	49.9 ug/L	1	ug/L	50.0	ug/L	99.7	70-130			
Bromomethane	48.9 ug/L	1	ug/L	50.0	ug/L	97.8	30-145			
Bromomethane	48.9 ug/L	1	ug/L	50.0	ug/L	97.8	30-145			
Bromomethane	48.9 ug/L	1	ug/L	50.0	ug/L	97.8	30-145			
Bromomethane	48.9 ug/L	1	ug/L	50.0	ug/L	97.8	30-145			
Carbon disulfide	54.5 ug/L	10	ug/L	50.0	ug/L	109	35-160			
Carbon disulfide	54.5 ug/L	10	ug/L	50.0	ug/L	109	35-160			
Carbon disulfide	54.5 ug/L	10	ug/L	50.0	ug/L	109	35-160			
Carbon disulfide	54.5 ug/L	10	ug/L	50.0	ug/L	109	35-160			

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
Carbon tetrachloride	53.9 ug/L	1	ug/L	50.0	ug/L	108	65-140			
Carbon tetrachloride	53.9 ug/L	1	ug/L	50.0	ug/L	108	65-140			
Carbon tetrachloride	53.9 ug/L	1	ug/L	50.0	ug/L	108	65-140			
Carbon tetrachloride	53.9 ug/L	1	ug/L	50.0	ug/L	108	65-140			
Chlorobenzene	52.8 ug/L	1	ug/L	50.0	ug/L	106	80-120			
Chlorobenzene	52.8 ug/L	1	ug/L	50.0	ug/L	106	80-120			
Chlorobenzene	52.8 ug/L	1	ug/L	50.0	ug/L	106	80-120			
Chlorobenzene	52.8 ug/L	1	ug/L	50.0	ug/L	106	80-120			
Chloroethane	56.4 ug/L	1	ug/L	50.0	ug/L	113	60-135			
Chloroethane	56.4 ug/L	1	ug/L	50.0	ug/L	113	60-135			
Chloroethane	56.4 ug/L	1	ug/L	50.0	ug/L	113	60-135			
Chloroethane	56.4 ug/L	1	ug/L	50.0	ug/L	113	60-135			
Chloroform	57.8 ug/L	0.5	ug/L	50.0	ug/L	116	65-135			
Chloroform	57.8 ug/L	0.5	ug/L	50.0	ug/L	116	65-135			
Chloroform	57.8 ug/L	0.5	ug/L	50.0	ug/L	116	65-135			
Chloroform	57.8 ug/L	0.5	ug/L	50.0	ug/L	116	65-135			
Chloromethane	56.6 ug/L	1	ug/L	50.0	ug/L	113	40-125			
Chloromethane	56.6 ug/L	1	ug/L	50.0	ug/L	113	40-125			
Chloromethane	56.6 ug/L	1	ug/L	50.0	ug/L	113	40-125			
Chloromethane	56.6 ug/L	1	ug/L	50.0	ug/L	113	40-125			
cis-1,2-Dichloroethylene	59.1 ug/L	1	ug/L	50.0	ug/L	118	70-125			
cis-1,2-Dichloroethylene	59.1 ug/L	1	ug/L	50.0	ug/L	118	70-125			
cis-1,2-Dichloroethylene	59.1 ug/L	1	ug/L	50.0	ug/L	118	70-125			
cis-1,2-Dichloroethylene	59.1 ug/L	1	ug/L	50.0	ug/L	118	70-125			
cis-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	70-130			
cis-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	70-130			
cis-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	70-130			
cis-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	70-130			
Dibromochloromethane	54.9 ug/L	1	ug/L	50.0	ug/L	110	60-135			
Dibromochloromethane	54.9 ug/L	1	ug/L	50.0	ug/L	110	60-135			
Dibromochloromethane	54.9 ug/L	1	ug/L	50.0	ug/L	110	60-135			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
Dibromochloromethane	54.9 ug/L	1	ug/L	50.0	ug/L	110	60-135			
Dibromomethane	53.5 ug/L	1	ug/L	50.0	ug/L	107	75-125			
Dibromomethane	53.5 ug/L	1	ug/L	50.0	ug/L	107	75-125			
Dibromomethane	53.5 ug/L	1	ug/L	50.0	ug/L	107	75-125			
Dibromomethane	53.5 ug/L	1	ug/L	50.0	ug/L	107	75-125			
Dichlorodifluoromethane	50.2 ug/L	1	ug/L	50.0	ug/L	100	30-155			
Dichlorodifluoromethane	50.2 ug/L	1	ug/L	50.0	ug/L	100	30-155			
Dichlorodifluoromethane	50.2 ug/L	1	ug/L	50.0	ug/L	100	30-155			
Dichlorodifluoromethane	50.2 ug/L	1	ug/L	50.0	ug/L	100	30-155			
Ethylbenzene	54.2 ug/L	1	ug/L	50.0	ug/L	108	75-125			
Ethylbenzene	54.2 ug/L	1	ug/L	50.0	ug/L	108	75-125			
Ethylbenzene	54.2 ug/L	1	ug/L	50.0	ug/L	108	75-125			
Ethylbenzene	54.2 ug/L	1	ug/L	50.0	ug/L	108	75-125			
Hexachlorobutadiene	48.6 ug/L	1	ug/L	50.0	ug/L	97.3	50-140			
Hexachlorobutadiene	48.6 ug/L	1	ug/L	50.0	ug/L	97.3	50-140			
Hexachlorobutadiene	48.6 ug/L	1	ug/L	50.0	ug/L	97.3	50-140			
Hexachlorobutadiene	48.6 ug/L	1	ug/L	50.0	ug/L	97.3	50-140			
Isopropylbenzene	58.3 ug/L	1	ug/L	50.0	ug/L	117	75-125			
Isopropylbenzene	58.3 ug/L	1	ug/L	50.0	ug/L	117	75-125			
Isopropylbenzene	58.3 ug/L	1	ug/L	50.0	ug/L	117	75-125			
Isopropylbenzene	58.3 ug/L	1	ug/L	50.0	ug/L	117	75-125			
m+p-Xylenes	112 ug/L	2	ug/L	100	ug/L	112	75-130			
m+p-Xylenes	112 ug/L	2	ug/L	100	ug/L	112	75-130			
m+p-Xylenes	112 ug/L	2	ug/L	100	ug/L	112	75-130			
m+p-Xylenes	112 ug/L	2	ug/L	100	ug/L	112	75-130			
Methylene chloride	60.4 ug/L	4	ug/L	50.0	ug/L	121	55-140			
Methylene chloride	60.4 ug/L	4	ug/L	50.0	ug/L	121	55-140			
Methylene chloride	60.4 ug/L	4	ug/L	50.0	ug/L	121	55-140			
Methylene chloride	60.4 ug/L	4	ug/L	50.0	ug/L	121	55-140			
Methyl-t-butyl ether (MTBE)	58.5 ug/L	1	ug/L	50.0	ug/L	117	65-125			
Methyl-t-butyl ether (MTBE)	58.5 ug/L	1	ug/L	50.0	ug/L	117	65-125			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
Methyl-t-butyl ether (MTBE)	58.5 ug/L	1	ug/L	50.0	ug/L	117	65-125			
Methyl-t-butyl ether (MTBE)	58.5 ug/L	1	ug/L	50.0	ug/L	117	65-125			
Naphthalene	50.1 ug/L	1	ug/L	50.0	ug/L	100	55-140			
Naphthalene	50.1 ug/L	1	ug/L	50.0	ug/L	100	55-140			
Naphthalene	50.1 ug/L	1	ug/L	50.0	ug/L	100	55-140			
Naphthalene	50.1 ug/L	1	ug/L	50.0	ug/L	100	55-140			
n-Butylbenzene	55.9 ug/L	1	ug/L	50.0	ug/L	112	70-135			
n-Butylbenzene	55.9 ug/L	1	ug/L	50.0	ug/L	112	70-135			
n-Butylbenzene	55.9 ug/L	1	ug/L	50.0	ug/L	112	70-135			
n-Butylbenzene	55.9 ug/L	1	ug/L	50.0	ug/L	112	70-135			
n-Propylbenzene	51.4 ug/L	1	ug/L	50.0	ug/L	103	70-130			
n-Propylbenzene	51.4 ug/L	1	ug/L	50.0	ug/L	103	70-130			
n-Propylbenzene	51.4 ug/L	1	ug/L	50.0	ug/L	103	70-130			
n-Propylbenzene	51.4 ug/L	1	ug/L	50.0	ug/L	103	70-130			
o-Xylene	54.8 ug/L	1	ug/L	50.0	ug/L	110	80-120			
o-Xylene	54.8 ug/L	1	ug/L	50.0	ug/L	110	80-120			
o-Xylene	54.8 ug/L	1	ug/L	50.0	ug/L	110	80-120			
o-Xylene	54.8 ug/L	1	ug/L	50.0	ug/L	110	80-120			
sec-Butylbenzene	55.4 ug/L	1	ug/L	50.0	ug/L	111	70-125			
sec-Butylbenzene	55.4 ug/L	1	ug/L	50.0	ug/L	111	70-125			
sec-Butylbenzene	55.4 ug/L	1	ug/L	50.0	ug/L	111	70-125			
sec-Butylbenzene	55.4 ug/L	1	ug/L	50.0	ug/L	111	70-125			
Styrene	55.8 ug/L	1	ug/L	50.0	ug/L	112	65-135			
Styrene	55.8 ug/L	1	ug/L	50.0	ug/L	112	65-135			
Styrene	55.8 ug/L	1	ug/L	50.0	ug/L	112	65-135			
Styrene	55.8 ug/L	1	ug/L	50.0	ug/L	112	65-135			
tert-Butylbenzene	53.7 ug/L	1	ug/L	50.0	ug/L	107	70-130			
tert-Butylbenzene	53.7 ug/L	1	ug/L	50.0	ug/L	107	70-130			
tert-Butylbenzene	53.7 ug/L	1	ug/L	50.0	ug/L	107	70-130			
tert-Butylbenzene	53.7 ug/L	1	ug/L	50.0	ug/L	107	70-130			
Tetrachloroethylene (PCE)	75.3 ug/L	1	ug/L	50.0	ug/L	151	45-150			L

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
Tetrachloroethylene (PCE)	75.3 ug/L	1	ug/L	50.0	ug/L	151	45-150			L
Tetrachloroethylene (PCE)	75.3 ug/L	1	ug/L	50.0	ug/L	151	45-150			L
Tetrachloroethylene (PCE)	75.3 ug/L	1	ug/L	50.0	ug/L	151	45-150			L
Toluene	55.8 ug/L	1	ug/L	50.0	ug/L	112	75-120			
Toluene	55.8 ug/L	1	ug/L	50.0	ug/L	112	75-120			
Toluene	55.8 ug/L	1	ug/L	50.0	ug/L	112	75-120			
Toluene	55.8 ug/L	1	ug/L	50.0	ug/L	112	75-120			
trans-1,2-Dichloroethylene	58.2 ug/L	1	ug/L	50.0	ug/L	116	60-140			
trans-1,2-Dichloroethylene	58.2 ug/L	1	ug/L	50.0	ug/L	116	60-140			
trans-1,2-Dichloroethylene	58.2 ug/L	1	ug/L	50.0	ug/L	116	60-140			
trans-1,2-Dichloroethylene	58.2 ug/L	1	ug/L	50.0	ug/L	116	60-140			
trans-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	55-140			
trans-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	55-140			
trans-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	55-140			
trans-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	55-140			
Trichloroethylene	54.7 ug/L	1	ug/L	50.0	ug/L	109	70-125			
Trichloroethylene	54.7 ug/L	1	ug/L	50.0	ug/L	109	70-125			
Trichloroethylene	54.7 ug/L	1	ug/L	50.0	ug/L	109	70-125			
Trichloroethylene	54.7 ug/L	1	ug/L	50.0	ug/L	109	70-125			
Trichlorofluoromethane	51.5 ug/L	1	ug/L	50.0	ug/L	103	60-145			
Trichlorofluoromethane	51.5 ug/L	1	ug/L	50.0	ug/L	103	60-145			
Trichlorofluoromethane	51.5 ug/L	1	ug/L	50.0	ug/L	103	60-145			
Trichlorofluoromethane	51.5 ug/L	1	ug/L	50.0	ug/L	103	60-145			
Vinyl chloride	33.5 ug/L	0.5	ug/L	50.0	ug/L	67.0	50-145			
Vinyl chloride	33.5 ug/L	0.5	ug/L	50.0	ug/L	67.0	50-145			
Vinyl chloride	33.5 ug/L	0.5	ug/L	50.0	ug/L	67.0	50-145			
Vinyl chloride	33.5 ug/L	0.5	ug/L	50.0	ug/L	67.0	50-145			
Surr: 1,2-Dichloroethane-d4 (Surr)	50.0		ug/L	50.0	ug/L	100	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	50.0		ug/L	50.0	ug/L	100	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	50.0		ug/L	50.0	ug/L	100	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	50.0		ug/L	50.0	ug/L	100	70-120			

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
LCS (BBL0489-BS1)				Prepared & Analyzed: 12/17/2018						
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: Dibromofluoromethane (Surr)	51.5		ug/L	50.0	ug/L	103	70-130			
Surr: Dibromofluoromethane (Surr)	51.5		ug/L	50.0	ug/L	103	70-130			
Surr: Dibromofluoromethane (Surr)	51.5		ug/L	50.0	ug/L	103	70-130			
Surr: Dibromofluoromethane (Surr)	51.5		ug/L	50.0	ug/L	103	70-130			
Surr: Toluene-d8 (Surr)	49.7		ug/L	50.0	ug/L	99.4	70-130			
Surr: Toluene-d8 (Surr)	49.7		ug/L	50.0	ug/L	99.4	70-130			
Surr: Toluene-d8 (Surr)	49.7		ug/L	50.0	ug/L	99.4	70-130			
Surr: Toluene-d8 (Surr)	49.7		ug/L	50.0	ug/L	99.4	70-130			
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
1,1,1,2-Tetrachloroethane	49.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	99.3	80-130			
1,1,1,2-Tetrachloroethane	49.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	99.3	80-130			
1,1,1,2-Tetrachloroethane	49.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	99.3	80-130			
1,1,1,2-Tetrachloroethane	49.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	99.3	80-130			
1,1,1-Trichloroethane	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	65-130			
1,1,1-Trichloroethane	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	65-130			
1,1,1-Trichloroethane	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	65-130			
1,1,1-Trichloroethane	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	65-130			
1,1,2,2-Tetrachloroethane	53.7 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130			
1,1,2,2-Tetrachloroethane	53.7 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130			
1,1,2,2-Tetrachloroethane	53.7 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130			
1,1,2,2-Tetrachloroethane	53.7 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130			
1,1,2-Trichloroethane	56.0 ug/L	1	ug/L	50.0	<1 ug/L	112	75-125			
1,1,2-Trichloroethane	56.0 ug/L	1	ug/L	50.0	<1 ug/L	112	75-125			
1,1,2-Trichloroethane	56.0 ug/L	1	ug/L	50.0	<1 ug/L	112	75-125			
1,1,2-Trichloroethane	56.0 ug/L	1	ug/L	50.0	<1 ug/L	112	75-125			
1,1-Dichloroethane	62.7 ug/L	1	ug/L	50.0	<1 ug/L	125	70-135			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
1,1-Dichloroethane	62.7 ug/L	1	ug/L	50.0	<1 ug/L	125	70-135			
1,1-Dichloroethane	62.7 ug/L	1	ug/L	50.0	<1 ug/L	125	70-135			
1,1-Dichloroethane	62.7 ug/L	1	ug/L	50.0	<1 ug/L	125	70-135			
1,1-Dichloroethylene	57.9 ug/L	1	ug/L	50.0	<1 ug/L	116	70-130			
1,1-Dichloroethylene	57.9 ug/L	1	ug/L	50.0	<1 ug/L	116	70-130			
1,1-Dichloroethylene	57.9 ug/L	1	ug/L	50.0	<1 ug/L	116	70-130			
1,1-Dichloroethylene	57.9 ug/L	1	ug/L	50.0	<1 ug/L	116	70-130			
1,1-Dichloropropene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	75-135			
1,1-Dichloropropene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	75-135			
1,1-Dichloropropene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	75-135			
1,1-Dichloropropene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	75-135			
1,2,3-Trichlorobenzene	46.6 ug/L	1	ug/L	50.0	<1 ug/L	93.3	55-140			
1,2,3-Trichlorobenzene	46.6 ug/L	1	ug/L	50.0	<1 ug/L	93.3	55-140			
1,2,3-Trichlorobenzene	46.6 ug/L	1	ug/L	50.0	<1 ug/L	93.3	55-140			
1,2,3-Trichlorobenzene	46.6 ug/L	1	ug/L	50.0	<1 ug/L	93.3	55-140			
1,2,3-Trichloropropane	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
1,2,3-Trichloropropane	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
1,2,3-Trichloropropane	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
1,2,3-Trichloropropane	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
1,2,4-Trichlorobenzene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.3	65-135			
1,2,4-Trichlorobenzene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.3	65-135			
1,2,4-Trichlorobenzene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.3	65-135			
1,2,4-Trichlorobenzene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.3	65-135			
1,2,4-Trimethylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	75-130			
1,2,4-Trimethylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	75-130			
1,2,4-Trimethylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	75-130			
1,2,4-Trimethylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	48.0 ug/L	4	ug/L	50.0	<4 ug/L	95.9	50-130			
1,2-Dibromo-3-chloropropane (DBCP)	48.0 ug/L	4	ug/L	50.0	<4 ug/L	95.9	50-130			
1,2-Dibromo-3-chloropropane (DBCP)	48.0 ug/L	4	ug/L	50.0	<4 ug/L	95.9	50-130			
1,2-Dibromo-3-chloropropane (DBCP)	48.0 ug/L	4	ug/L	50.0	<4 ug/L	95.9	50-130			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
1,2-Dibromoethane (EDB)	52.3 ug/L	1	ug/L	50.0	<1 ug/L	105	80-120			
1,2-Dibromoethane (EDB)	52.3 ug/L	1	ug/L	50.0	<1 ug/L	105	80-120			
1,2-Dibromoethane (EDB)	52.3 ug/L	1	ug/L	50.0	<1 ug/L	105	80-120			
1,2-Dibromoethane (EDB)	52.3 ug/L	1	ug/L	50.0	<1 ug/L	105	80-120			
1,2-Dichlorobenzene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.6	70-120			
1,2-Dichlorobenzene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.6	70-120			
1,2-Dichlorobenzene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.6	70-120			
1,2-Dichlorobenzene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.6	70-120			
1,2-Dichloroethane	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	70-130			
1,2-Dichloroethane	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	70-130			
1,2-Dichloroethane	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	70-130			
1,2-Dichloroethane	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	70-130			
1,2-Dichloropropane	56.5 ug/L	1	ug/L	50.0	<1 ug/L	113	75-125			
1,2-Dichloropropane	56.5 ug/L	1	ug/L	50.0	<1 ug/L	113	75-125			
1,2-Dichloropropane	56.5 ug/L	1	ug/L	50.0	<1 ug/L	113	75-125			
1,2-Dichloropropane	56.5 ug/L	1	ug/L	50.0	<1 ug/L	113	75-125			
1,3,5-Trimethylbenzene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125			
1,3,5-Trimethylbenzene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125			
1,3,5-Trimethylbenzene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125			
1,3,5-Trimethylbenzene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125			
1,3-Dichlorobenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125			
1,3-Dichlorobenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125			
1,3-Dichlorobenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125			
1,3-Dichlorobenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125			
1,3-Dichloropropane	55.5 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125			
1,3-Dichloropropane	55.5 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125			
1,3-Dichloropropane	55.5 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125			
1,3-Dichloropropane	55.5 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125			
1,4-Dichlorobenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	75-125			
1,4-Dichlorobenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	75-125			
1,4-Dichlorobenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	75-125			

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
1,4-Dichlorobenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	75-125			
2,2-Dichloropropane	55.7 ug/L	2	ug/L	50.0	<2 ug/L	111	70-135			
2,2-Dichloropropane	55.7 ug/L	2	ug/L	50.0	<2 ug/L	111	70-135			
2,2-Dichloropropane	55.7 ug/L	2	ug/L	50.0	<2 ug/L	111	70-135			
2,2-Dichloropropane	55.7 ug/L	2	ug/L	50.0	<2 ug/L	111	70-135			
2-Butanone (MEK)	58.1 ug/L	10	ug/L	50.0	<10 ug/L	116	30-150			
2-Butanone (MEK)	58.1 ug/L	10	ug/L	50.0	<10 ug/L	116	30-150			
2-Butanone (MEK)	58.1 ug/L	10	ug/L	50.0	<10 ug/L	116	30-150			
2-Butanone (MEK)	58.1 ug/L	10	ug/L	50.0	<10 ug/L	116	30-150			
2-Chlorotoluene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	75-125			
2-Chlorotoluene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	75-125			
2-Chlorotoluene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	75-125			
2-Chlorotoluene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	75-125			
2-Hexanone (MBK)	55.2 ug/L	5	ug/L	50.0	<5 ug/L	110	55-130			
2-Hexanone (MBK)	55.2 ug/L	5	ug/L	50.0	<5 ug/L	110	55-130			
2-Hexanone (MBK)	55.2 ug/L	5	ug/L	50.0	<5 ug/L	110	55-130			
2-Hexanone (MBK)	55.2 ug/L	5	ug/L	50.0	<5 ug/L	110	55-130			
4-Chlorotoluene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.1	75-130			
4-Chlorotoluene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.1	75-130			
4-Chlorotoluene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.1	75-130			
4-Chlorotoluene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.1	75-130			
4-Isopropyltoluene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130			
4-Isopropyltoluene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130			
4-Isopropyltoluene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130			
4-Isopropyltoluene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130			
4-Methyl-2-pentanone (MIBK)	56.4 ug/L	5	ug/L	50.0	<5 ug/L	113	60-135			
4-Methyl-2-pentanone (MIBK)	56.4 ug/L	5	ug/L	50.0	<5 ug/L	113	60-135			
4-Methyl-2-pentanone (MIBK)	56.4 ug/L	5	ug/L	50.0	<5 ug/L	113	60-135			
4-Methyl-2-pentanone (MIBK)	56.4 ug/L	5	ug/L	50.0	<5 ug/L	113	60-135			
Acetone	79.2 ug/L	10	ug/L	50.0	10.6 ug/L	137	40-140			
Acetone	79.2 ug/L	10	ug/L	50.0	10.6 ug/L	137	40-140			

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Acetone	79.2 ug/L	10	ug/L	50.0	10.6 ug/L	137	40-140			
Acetone	79.2 ug/L	10	ug/L	50.0	10.6 ug/L	137	40-140			
Benzene	55.3 ug/L	1	ug/L	50.0	<1 ug/L	111	80-120			
Benzene	55.3 ug/L	1	ug/L	50.0	<1 ug/L	111	80-120			
Benzene	55.3 ug/L	1	ug/L	50.0	<1 ug/L	111	80-120			
Benzene	55.3 ug/L	1	ug/L	50.0	<1 ug/L	111	80-120			
Bromobenzene	49.4 ug/L	1	ug/L	50.0	<1 ug/L	98.8	75-125			
Bromobenzene	49.4 ug/L	1	ug/L	50.0	<1 ug/L	98.8	75-125			
Bromobenzene	49.4 ug/L	1	ug/L	50.0	<1 ug/L	98.8	75-125			
Bromobenzene	49.4 ug/L	1	ug/L	50.0	<1 ug/L	98.8	75-125			
Bromochloromethane	57.7 ug/L	1	ug/L	50.0	<1 ug/L	115	65-130			
Bromochloromethane	57.7 ug/L	1	ug/L	50.0	<1 ug/L	115	65-130			
Bromochloromethane	57.7 ug/L	1	ug/L	50.0	<1 ug/L	115	65-130			
Bromochloromethane	57.7 ug/L	1	ug/L	50.0	<1 ug/L	115	65-130			
Bromodichloromethane	57.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	114	75-120			
Bromodichloromethane	57.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	114	75-120			
Bromodichloromethane	57.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	114	75-120			
Bromodichloromethane	57.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	114	75-120			
Bromoform	48.6 ug/L	1	ug/L	50.0	<1 ug/L	97.2	70-130			
Bromoform	48.6 ug/L	1	ug/L	50.0	<1 ug/L	97.2	70-130			
Bromoform	48.6 ug/L	1	ug/L	50.0	<1 ug/L	97.2	70-130			
Bromoform	48.6 ug/L	1	ug/L	50.0	<1 ug/L	97.2	70-130			
Bromomethane	41.0 ug/L	1	ug/L	50.0	<1 ug/L	81.9	30-145			
Bromomethane	41.0 ug/L	1	ug/L	50.0	<1 ug/L	81.9	30-145			
Bromomethane	41.0 ug/L	1	ug/L	50.0	<1 ug/L	81.9	30-145			
Bromomethane	41.0 ug/L	1	ug/L	50.0	<1 ug/L	81.9	30-145			
Carbon disulfide	40.3 ug/L	10	ug/L	50.0	<10 ug/L	80.6	35-160			
Carbon disulfide	40.3 ug/L	10	ug/L	50.0	<10 ug/L	80.6	35-160			
Carbon disulfide	40.3 ug/L	10	ug/L	50.0	<10 ug/L	80.6	35-160			
Carbon disulfide	40.3 ug/L	10	ug/L	50.0	<10 ug/L	80.6	35-160			
Carbon tetrachloride	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-140			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Carbon tetrachloride	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-140			
Carbon tetrachloride	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-140			
Carbon tetrachloride	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-140			
Chlorobenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.3	80-120			
Chlorobenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.3	80-120			
Chlorobenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.3	80-120			
Chlorobenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.3	80-120			
Chloroethane	56.8 ug/L	1	ug/L	50.0	<1 ug/L	114	60-135			
Chloroethane	56.8 ug/L	1	ug/L	50.0	<1 ug/L	114	60-135			
Chloroethane	56.8 ug/L	1	ug/L	50.0	<1 ug/L	114	60-135			
Chloroethane	56.8 ug/L	1	ug/L	50.0	<1 ug/L	114	60-135			
Chloroform	57.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	115	65-135			
Chloroform	57.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	115	65-135			
Chloroform	57.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	115	65-135			
Chloroform	57.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	115	65-135			
Chloromethane	54.6 ug/L	1	ug/L	50.0	<1 ug/L	109	40-125			
Chloromethane	54.6 ug/L	1	ug/L	50.0	<1 ug/L	109	40-125			
Chloromethane	54.6 ug/L	1	ug/L	50.0	<1 ug/L	109	40-125			
Chloromethane	54.6 ug/L	1	ug/L	50.0	<1 ug/L	109	40-125			
cis-1,2-Dichloroethylene	58.8 ug/L	1	ug/L	50.0	<1 ug/L	118	70-125			
cis-1,2-Dichloroethylene	58.8 ug/L	1	ug/L	50.0	<1 ug/L	118	70-125			
cis-1,2-Dichloroethylene	58.8 ug/L	1	ug/L	50.0	<1 ug/L	118	70-125			
cis-1,2-Dichloroethylene	58.8 ug/L	1	ug/L	50.0	<1 ug/L	118	70-125			
cis-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	70-130			
cis-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	70-130			
cis-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	70-130			
cis-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	70-130			
Dibromochloromethane	54.1 ug/L	1	ug/L	50.0	<1 ug/L	108	60-135			
Dibromochloromethane	54.1 ug/L	1	ug/L	50.0	<1 ug/L	108	60-135			
Dibromochloromethane	54.1 ug/L	1	ug/L	50.0	<1 ug/L	108	60-135			
Dibromochloromethane	54.1 ug/L	1	ug/L	50.0	<1 ug/L	108	60-135			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Dibromomethane	53.6 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125			
Dibromomethane	53.6 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125			
Dibromomethane	53.6 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125			
Dibromomethane	53.6 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125			
Dichlorodifluoromethane	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.3	30-155			
Dichlorodifluoromethane	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.3	30-155			
Dichlorodifluoromethane	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.3	30-155			
Dichlorodifluoromethane	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.3	30-155			
Ethylbenzene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	75-125			
Ethylbenzene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	75-125			
Ethylbenzene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	75-125			
Ethylbenzene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	75-125			
Hexachlorobutadiene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.5	50-140			
Hexachlorobutadiene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.5	50-140			
Hexachlorobutadiene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.5	50-140			
Hexachlorobutadiene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.5	50-140			
Isopropylbenzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
Isopropylbenzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
Isopropylbenzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
Isopropylbenzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
m+p-Xylenes	103 ug/L	2	ug/L	100	<2 ug/L	103	75-130			
m+p-Xylenes	103 ug/L	2	ug/L	100	<2 ug/L	103	75-130			
m+p-Xylenes	103 ug/L	2	ug/L	100	<2 ug/L	103	75-130			
m+p-Xylenes	103 ug/L	2	ug/L	100	<2 ug/L	103	75-130			
Methylene chloride	51.5 ug/L	4	ug/L	50.0	<4 ug/L	103	55-140			
Methylene chloride	51.5 ug/L	4	ug/L	50.0	<4 ug/L	103	55-140			
Methylene chloride	51.5 ug/L	4	ug/L	50.0	<4 ug/L	103	55-140			
Methylene chloride	51.5 ug/L	4	ug/L	50.0	<4 ug/L	103	55-140			
Methyl-t-butyl ether (MTBE)	61.3 ug/L	1	ug/L	50.0	<1 ug/L	123	65-125			
Methyl-t-butyl ether (MTBE)	61.3 ug/L	1	ug/L	50.0	<1 ug/L	123	65-125			
Methyl-t-butyl ether (MTBE)	61.3 ug/L	1	ug/L	50.0	<1 ug/L	123	65-125			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Methyl-t-butyl ether (MTBE)	61.3 ug/L	1	ug/L	50.0	<1 ug/L	123	65-125			
Naphthalene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140			
Naphthalene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140			
Naphthalene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140			
Naphthalene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140			
n-Butylbenzene	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	70-135			
n-Butylbenzene	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	70-135			
n-Butylbenzene	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	70-135			
n-Butylbenzene	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	70-135			
n-Propylbenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	70-130			
n-Propylbenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	70-130			
n-Propylbenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	70-130			
n-Propylbenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	70-130			
o-Xylene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	80-120			
o-Xylene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	80-120			
o-Xylene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	80-120			
o-Xylene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	80-120			
sec-Butylbenzene	52.9 ug/L	1	ug/L	50.0	<1 ug/L	106	70-125			
sec-Butylbenzene	52.9 ug/L	1	ug/L	50.0	<1 ug/L	106	70-125			
sec-Butylbenzene	52.9 ug/L	1	ug/L	50.0	<1 ug/L	106	70-125			
sec-Butylbenzene	52.9 ug/L	1	ug/L	50.0	<1 ug/L	106	70-125			
Styrene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	65-135			
Styrene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	65-135			
Styrene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	65-135			
Styrene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	65-135			
tert-Butylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	70-130			
tert-Butylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	70-130			
tert-Butylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	70-130			
tert-Butylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	70-130			
Tetrachloroethylene (PCE)	69.7 ug/L	1	ug/L	50.0	1.30 ug/L	137	45-150			
Tetrachloroethylene (PCE)	69.7 ug/L	1	ug/L	50.0	1.30 ug/L	137	45-150			

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Certificate of Analysis

Final Report

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Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Tetrachloroethylene (PCE)	69.7 ug/L	1	ug/L	50.0	1.30 ug/L	137	45-150			
Tetrachloroethylene (PCE)	69.7 ug/L	1	ug/L	50.0	1.30 ug/L	137	45-150			
Toluene	53.7 ug/L	1	ug/L	50.0	<1 ug/L	107	75-120			
Toluene	53.7 ug/L	1	ug/L	50.0	<1 ug/L	107	75-120			
Toluene	53.7 ug/L	1	ug/L	50.0	<1 ug/L	107	75-120			
Toluene	53.7 ug/L	1	ug/L	50.0	<1 ug/L	107	75-120			
trans-1,2-Dichloroethylene	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	60-140			
trans-1,2-Dichloroethylene	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	60-140			
trans-1,2-Dichloroethylene	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	60-140			
trans-1,2-Dichloroethylene	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	60-140			
trans-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	55-140			
trans-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	55-140			
trans-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	55-140			
trans-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	55-140			
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125			
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125			
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125			
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125			
Trichlorofluoromethane	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	60-145			
Trichlorofluoromethane	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	60-145			
Trichlorofluoromethane	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	60-145			
Trichlorofluoromethane	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	60-145			
Vinyl chloride	29.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	58.2	50-145			
Vinyl chloride	29.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	58.2	50-145			
Vinyl chloride	29.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	58.2	50-145			
Vinyl chloride	29.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	58.2	50-145			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.5		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.5		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.5		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.5		ug/L	50.0	ug/L	103	70-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike (BBL0489-MS1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: Dibromofluoromethane (Surr)	54.1		ug/L	50.0	ug/L	108	70-130			
Surr: Dibromofluoromethane (Surr)	54.1		ug/L	50.0	ug/L	108	70-130			
Surr: Dibromofluoromethane (Surr)	54.1		ug/L	50.0	ug/L	108	70-130			
Surr: Dibromofluoromethane (Surr)	54.1		ug/L	50.0	ug/L	108	70-130			
Surr: Toluene-d8 (Surr)	51.0		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	51.0		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	51.0		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	51.0		ug/L	50.0	ug/L	102	70-130			
Matrix Spike Dup (BBL0489-MSD1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
1,1,1,2-Tetrachloroethane	48.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	97.3	80-130	2.06	30	
1,1,1,2-Tetrachloroethane	48.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	97.3	80-130	2.06	30	
1,1,1,2-Tetrachloroethane	48.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	97.3	80-130	2.06	30	
1,1,1,2-Tetrachloroethane	48.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	97.3	80-130	2.06	30	
1,1,1-Trichloroethane	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	65-130	6.45	30	
1,1,1-Trichloroethane	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	65-130	6.45	30	
1,1,1-Trichloroethane	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	65-130	6.45	30	
1,1,1-Trichloroethane	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	65-130	6.45	30	
1,1,2,2-Tetrachloroethane	53.4 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130	0.691	30	
1,1,2,2-Tetrachloroethane	53.4 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130	0.691	30	
1,1,2,2-Tetrachloroethane	53.4 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130	0.691	30	
1,1,2,2-Tetrachloroethane	53.4 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130	0.691	30	
1,1,2-Trichloroethane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125	0.591	30	
1,1,2-Trichloroethane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125	0.591	30	
1,1,2-Trichloroethane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125	0.591	30	
1,1,2-Trichloroethane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125	0.591	30	
1,1-Dichloroethane	60.4 ug/L	1	ug/L	50.0	<1 ug/L	121	70-135	3.66	30	
1,1-Dichloroethane	60.4 ug/L	1	ug/L	50.0	<1 ug/L	121	70-135	3.66	30	

1941 Reymet Road ● Richmond, Virginia 23230 ● Tel: (804)-358-8295 Fax: (804)-358-8297

Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)	**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018							
1,1-Dichloroethane	60.4 ug/L	1	ug/L	50.0	<1 ug/L	121	70-135	3.66	30	
1,1-Dichloroethane	60.4 ug/L	1	ug/L	50.0	<1 ug/L	121	70-135	3.66	30	
1,1-Dichloroethylene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-130	5.43	30	
1,1-Dichloroethylene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-130	5.43	30	
1,1-Dichloroethylene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-130	5.43	30	
1,1-Dichloroethylene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-130	5.43	30	
1,1-Dichloropropene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-135	2.61	30	
1,1-Dichloropropene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-135	2.61	30	
1,1-Dichloropropene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-135	2.61	30	
1,1-Dichloropropene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-135	2.61	30	
1,2,3-Trichlorobenzene	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.9	55-140	2.61	30	
1,2,3-Trichlorobenzene	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.9	55-140	2.61	30	
1,2,3-Trichlorobenzene	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.9	55-140	2.61	30	
1,2,3-Trichlorobenzene	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.9	55-140	2.61	30	
1,2,3-Trichloropropane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.759	30	
1,2,3-Trichloropropane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.759	30	
1,2,3-Trichloropropane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.759	30	
1,2,3-Trichloropropane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.759	30	
1,2,4-Trichlorobenzene	43.3 ug/L	1	ug/L	50.0	<1 ug/L	86.6	65-135	4.23	30	
1,2,4-Trichlorobenzene	43.3 ug/L	1	ug/L	50.0	<1 ug/L	86.6	65-135	4.23	30	
1,2,4-Trichlorobenzene	43.3 ug/L	1	ug/L	50.0	<1 ug/L	86.6	65-135	4.23	30	
1,2,4-Trichlorobenzene	43.3 ug/L	1	ug/L	50.0	<1 ug/L	86.6	65-135	4.23	30	
1,2,4-Trimethylbenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130	3.27	30	
1,2,4-Trimethylbenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130	3.27	30	
1,2,4-Trimethylbenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130	3.27	30	
1,2,4-Trimethylbenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130	3.27	30	
1,2-Dibromo-3-chloropropane (DBCP)	47.4 ug/L	4	ug/L	50.0	<4 ug/L	94.8	50-130	1.20	30	
1,2-Dibromo-3-chloropropane (DBCP)	47.4 ug/L	4	ug/L	50.0	<4 ug/L	94.8	50-130	1.20	30	
1,2-Dibromo-3-chloropropane (DBCP)	47.4 ug/L	4	ug/L	50.0	<4 ug/L	94.8	50-130	1.20	30	
1,2-Dibromo-3-chloropropane (DBCP)	47.4 ug/L	4	ug/L	50.0	<4 ug/L	94.8	50-130	1.20	30	
1,2-Dibromoethane (EDB)	52.1 ug/L	1	ug/L	50.0	<1 ug/L	104	80-120	0.403	30	

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)	**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018							
1,2-Dibromoethane (EDB)	52.1 ug/L	1	ug/L	50.0	<1 ug/L	104	80-120	0.403	30	
1,2-Dibromoethane (EDB)	52.1 ug/L	1	ug/L	50.0	<1 ug/L	104	80-120	0.403	30	
1,2-Dibromoethane (EDB)	52.1 ug/L	1	ug/L	50.0	<1 ug/L	104	80-120	0.403	30	
1,2-Dichlorobenzene	47.2 ug/L	1	ug/L	50.0	<1 ug/L	94.5	70-120	3.27	30	
1,2-Dichlorobenzene	47.2 ug/L	1	ug/L	50.0	<1 ug/L	94.5	70-120	3.27	30	
1,2-Dichlorobenzene	47.2 ug/L	1	ug/L	50.0	<1 ug/L	94.5	70-120	3.27	30	
1,2-Dichlorobenzene	47.2 ug/L	1	ug/L	50.0	<1 ug/L	94.5	70-120	3.27	30	
1,2-Dichloroethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	5.09	30	
1,2-Dichloroethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	5.09	30	
1,2-Dichloroethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	5.09	30	
1,2-Dichloroethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	5.09	30	
1,2-Dichloropropane	53.2 ug/L	1	ug/L	50.0	<1 ug/L	106	75-125	6.15	30	
1,2-Dichloropropane	53.2 ug/L	1	ug/L	50.0	<1 ug/L	106	75-125	6.15	30	
1,2-Dichloropropane	53.2 ug/L	1	ug/L	50.0	<1 ug/L	106	75-125	6.15	30	
1,2-Dichloropropane	53.2 ug/L	1	ug/L	50.0	<1 ug/L	106	75-125	6.15	30	
1,3,5-Trimethylbenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125	3.33	30	
1,3,5-Trimethylbenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125	3.33	30	
1,3,5-Trimethylbenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125	3.33	30	
1,3,5-Trimethylbenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125	3.33	30	
1,3-Dichlorobenzene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.0	75-125	4.44	30	
1,3-Dichlorobenzene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.0	75-125	4.44	30	
1,3-Dichlorobenzene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.0	75-125	4.44	30	
1,3-Dichlorobenzene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.0	75-125	4.44	30	
1,3-Dichloropropane	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	75-125	1.87	30	
1,3-Dichloropropane	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	75-125	1.87	30	
1,3-Dichloropropane	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	75-125	1.87	30	
1,3-Dichloropropane	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	75-125	1.87	30	
1,4-Dichlorobenzene	46.4 ug/L	1	ug/L	50.0	<1 ug/L	92.8	75-125	2.91	30	
1,4-Dichlorobenzene	46.4 ug/L	1	ug/L	50.0	<1 ug/L	92.8	75-125	2.91	30	
1,4-Dichlorobenzene	46.4 ug/L	1	ug/L	50.0	<1 ug/L	92.8	75-125	2.91	30	
1,4-Dichlorobenzene	46.4 ug/L	1	ug/L	50.0	<1 ug/L	92.8	75-125	2.91	30	

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)	**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018							
2,2-Dichloropropane	53.0 ug/L	2	ug/L	50.0	<2 ug/L	106	70-135	4.87	30	
2,2-Dichloropropane	53.0 ug/L	2	ug/L	50.0	<2 ug/L	106	70-135	4.87	30	
2,2-Dichloropropane	53.0 ug/L	2	ug/L	50.0	<2 ug/L	106	70-135	4.87	30	
2,2-Dichloropropane	53.0 ug/L	2	ug/L	50.0	<2 ug/L	106	70-135	4.87	30	
2-Butanone (MEK)	60.5 ug/L	10	ug/L	50.0	<10 ug/L	121	30-150	4.07	30	
2-Butanone (MEK)	60.5 ug/L	10	ug/L	50.0	<10 ug/L	121	30-150	4.07	30	
2-Butanone (MEK)	60.5 ug/L	10	ug/L	50.0	<10 ug/L	121	30-150	4.07	30	
2-Butanone (MEK)	60.5 ug/L	10	ug/L	50.0	<10 ug/L	121	30-150	4.07	30	
2-Chlorotoluene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.7	75-125	4.54	30	
2-Chlorotoluene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.7	75-125	4.54	30	
2-Chlorotoluene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.7	75-125	4.54	30	
2-Chlorotoluene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.7	75-125	4.54	30	
2-Hexanone (MBK)	59.9 ug/L	5	ug/L	50.0	<5 ug/L	120	55-130	8.31	30	
2-Hexanone (MBK)	59.9 ug/L	5	ug/L	50.0	<5 ug/L	120	55-130	8.31	30	
2-Hexanone (MBK)	59.9 ug/L	5	ug/L	50.0	<5 ug/L	120	55-130	8.31	30	
2-Hexanone (MBK)	59.9 ug/L	5	ug/L	50.0	<5 ug/L	120	55-130	8.31	30	
4-Chlorotoluene	45.8 ug/L	1	ug/L	50.0	<1 ug/L	91.7	75-130	4.64	30	
4-Chlorotoluene	45.8 ug/L	1	ug/L	50.0	<1 ug/L	91.7	75-130	4.64	30	
4-Chlorotoluene	45.8 ug/L	1	ug/L	50.0	<1 ug/L	91.7	75-130	4.64	30	
4-Chlorotoluene	45.8 ug/L	1	ug/L	50.0	<1 ug/L	91.7	75-130	4.64	30	
4-Isopropyltoluene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	75-130	3.63	30	
4-Isopropyltoluene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	75-130	3.63	30	
4-Isopropyltoluene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	75-130	3.63	30	
4-Isopropyltoluene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	75-130	3.63	30	
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	<5 ug/L	119	60-135	5.34	30	
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	<5 ug/L	119	60-135	5.34	30	
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	<5 ug/L	119	60-135	5.34	30	
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	<5 ug/L	119	60-135	5.34	30	
Acetone	80.4 ug/L	10	ug/L	50.0	10.6 ug/L	140	40-140	1.47	30	
Acetone	80.4 ug/L	10	ug/L	50.0	10.6 ug/L	140	40-140	1.47	30	
Acetone	80.4 ug/L	10	ug/L	50.0	10.6 ug/L	140	40-140	1.47	30	

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)	**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018							
Acetone	80.4 ug/L	10	ug/L	50.0	10.6 ug/L	140	40-140	1.47	30	
Benzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	80-120	2.75	30	
Benzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	80-120	2.75	30	
Benzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	80-120	2.75	30	
Benzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	80-120	2.75	30	
Bromobenzene	47.7 ug/L	1	ug/L	50.0	<1 ug/L	95.4	75-125	3.52	30	
Bromobenzene	47.7 ug/L	1	ug/L	50.0	<1 ug/L	95.4	75-125	3.52	30	
Bromobenzene	47.7 ug/L	1	ug/L	50.0	<1 ug/L	95.4	75-125	3.52	30	
Bromobenzene	47.7 ug/L	1	ug/L	50.0	<1 ug/L	95.4	75-125	3.52	30	
Bromochloromethane	56.2 ug/L	1	ug/L	50.0	<1 ug/L	112	65-130	2.67	30	
Bromochloromethane	56.2 ug/L	1	ug/L	50.0	<1 ug/L	112	65-130	2.67	30	
Bromochloromethane	56.2 ug/L	1	ug/L	50.0	<1 ug/L	112	65-130	2.67	30	
Bromochloromethane	56.2 ug/L	1	ug/L	50.0	<1 ug/L	112	65-130	2.67	30	
Bromodichloromethane	55.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	112	75-120	2.48	30	
Bromodichloromethane	55.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	112	75-120	2.48	30	
Bromodichloromethane	55.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	112	75-120	2.48	30	
Bromodichloromethane	55.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	112	75-120	2.48	30	
Bromoform	49.2 ug/L	1	ug/L	50.0	<1 ug/L	98.3	70-130	1.17	30	
Bromoform	49.2 ug/L	1	ug/L	50.0	<1 ug/L	98.3	70-130	1.17	30	
Bromoform	49.2 ug/L	1	ug/L	50.0	<1 ug/L	98.3	70-130	1.17	30	
Bromoform	49.2 ug/L	1	ug/L	50.0	<1 ug/L	98.3	70-130	1.17	30	
Bromomethane	38.6 ug/L	1	ug/L	50.0	<1 ug/L	77.3	30-145	5.83	30	
Bromomethane	38.6 ug/L	1	ug/L	50.0	<1 ug/L	77.3	30-145	5.83	30	
Bromomethane	38.6 ug/L	1	ug/L	50.0	<1 ug/L	77.3	30-145	5.83	30	
Bromomethane	38.6 ug/L	1	ug/L	50.0	<1 ug/L	77.3	30-145	5.83	30	
Carbon disulfide	44.5 ug/L	10	ug/L	50.0	<10 ug/L	88.9	35-160	9.89	30	
Carbon disulfide	44.5 ug/L	10	ug/L	50.0	<10 ug/L	88.9	35-160	9.89	30	
Carbon disulfide	44.5 ug/L	10	ug/L	50.0	<10 ug/L	88.9	35-160	9.89	30	
Carbon disulfide	44.5 ug/L	10	ug/L	50.0	<10 ug/L	88.9	35-160	9.89	30	
Carbon tetrachloride	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	65-140	4.54	30	
Carbon tetrachloride	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	65-140	4.54	30	

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Certificate of Analysis

Final Report

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Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)	**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018							
Carbon tetrachloride	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	65-140	4.54	30	
Carbon tetrachloride	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	65-140	4.54	30	
Chlorobenzene	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	80-120	2.55	30	
Chlorobenzene	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	80-120	2.55	30	
Chlorobenzene	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	80-120	2.55	30	
Chlorobenzene	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	80-120	2.55	30	
Chloroethane	52.4 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	8.04	30	
Chloroethane	52.4 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	8.04	30	
Chloroethane	52.4 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	8.04	30	
Chloroethane	52.4 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	8.04	30	
Chloroform	55.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	111	65-135	3.57	30	
Chloroform	55.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	111	65-135	3.57	30	
Chloroform	55.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	111	65-135	3.57	30	
Chloroform	55.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	111	65-135	3.57	30	
Chloromethane	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	40-125	5.14	30	
Chloromethane	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	40-125	5.14	30	
Chloromethane	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	40-125	5.14	30	
Chloromethane	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	40-125	5.14	30	
cis-1,2-Dichloroethylene	56.1 ug/L	1	ug/L	50.0	<1 ug/L	112	70-125	4.60	30	
cis-1,2-Dichloroethylene	56.1 ug/L	1	ug/L	50.0	<1 ug/L	112	70-125	4.60	30	
cis-1,2-Dichloroethylene	56.1 ug/L	1	ug/L	50.0	<1 ug/L	112	70-125	4.60	30	
cis-1,2-Dichloroethylene	56.1 ug/L	1	ug/L	50.0	<1 ug/L	112	70-125	4.60	30	
cis-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-130	3.57	30	
cis-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-130	3.57	30	
cis-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-130	3.57	30	
cis-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-130	3.57	30	
Dibromochloromethane	52.7 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	2.68	30	
Dibromochloromethane	52.7 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	2.68	30	
Dibromochloromethane	52.7 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	2.68	30	
Dibromochloromethane	52.7 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	2.68	30	
Dibromomethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.428	30	

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)	**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018							
Dibromomethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.428	30	
Dibromomethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.428	30	
Dibromomethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.428	30	
Dichlorodifluoromethane	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.7	30-155	7.02	30	
Dichlorodifluoromethane	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.7	30-155	7.02	30	
Dichlorodifluoromethane	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.7	30-155	7.02	30	
Dichlorodifluoromethane	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.7	30-155	7.02	30	
Ethylbenzene	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.4	75-125	3.39	30	
Ethylbenzene	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.4	75-125	3.39	30	
Ethylbenzene	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.4	75-125	3.39	30	
Ethylbenzene	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.4	75-125	3.39	30	
Hexachlorobutadiene	43.6 ug/L	1	ug/L	50.0	<1 ug/L	87.3	50-140	3.60	30	
Hexachlorobutadiene	43.6 ug/L	1	ug/L	50.0	<1 ug/L	87.3	50-140	3.60	30	
Hexachlorobutadiene	43.6 ug/L	1	ug/L	50.0	<1 ug/L	87.3	50-140	3.60	30	
Hexachlorobutadiene	43.6 ug/L	1	ug/L	50.0	<1 ug/L	87.3	50-140	3.60	30	
Isopropylbenzene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125	3.40	30	
Isopropylbenzene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125	3.40	30	
Isopropylbenzene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125	3.40	30	
Isopropylbenzene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125	3.40	30	
m+p-Xylenes	99.2 ug/L	2	ug/L	100	<2 ug/L	99.2	75-130	3.53	30	
m+p-Xylenes	99.2 ug/L	2	ug/L	100	<2 ug/L	99.2	75-130	3.53	30	
m+p-Xylenes	99.2 ug/L	2	ug/L	100	<2 ug/L	99.2	75-130	3.53	30	
m+p-Xylenes	99.2 ug/L	2	ug/L	100	<2 ug/L	99.2	75-130	3.53	30	
Methylene chloride	57.4 ug/L	4	ug/L	50.0	<4 ug/L	115	55-140	10.9	30	
Methylene chloride	57.4 ug/L	4	ug/L	50.0	<4 ug/L	115	55-140	10.9	30	
Methylene chloride	57.4 ug/L	4	ug/L	50.0	<4 ug/L	115	55-140	10.9	30	
Methylene chloride	57.4 ug/L	4	ug/L	50.0	<4 ug/L	115	55-140	10.9	30	
Methyl-t-butyl ether (MTBE)	59.2 ug/L	1	ug/L	50.0	<1 ug/L	118	65-125	3.48	30	
Methyl-t-butyl ether (MTBE)	59.2 ug/L	1	ug/L	50.0	<1 ug/L	118	65-125	3.48	30	
Methyl-t-butyl ether (MTBE)	59.2 ug/L	1	ug/L	50.0	<1 ug/L	118	65-125	3.48	30	
Methyl-t-butyl ether (MTBE)	59.2 ug/L	1	ug/L	50.0	<1 ug/L	118	65-125	3.48	30	

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Certificate of Analysis

Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Naphthalene	50.5 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	0.159	30	
Naphthalene	50.5 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	0.159	30	
Naphthalene	50.5 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	0.159	30	
Naphthalene	50.5 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	0.159	30	
n-Butylbenzene	50.0 ug/L	1	ug/L	50.0	<1 ug/L	100	70-135	4.34	30	
n-Butylbenzene	50.0 ug/L	1	ug/L	50.0	<1 ug/L	100	70-135	4.34	30	
n-Butylbenzene	50.0 ug/L	1	ug/L	50.0	<1 ug/L	100	70-135	4.34	30	
n-Butylbenzene	50.0 ug/L	1	ug/L	50.0	<1 ug/L	100	70-135	4.34	30	
n-Propylbenzene	46.3 ug/L	1	ug/L	50.0	<1 ug/L	92.6	70-130	3.31	30	
n-Propylbenzene	46.3 ug/L	1	ug/L	50.0	<1 ug/L	92.6	70-130	3.31	30	
n-Propylbenzene	46.3 ug/L	1	ug/L	50.0	<1 ug/L	92.6	70-130	3.31	30	
n-Propylbenzene	46.3 ug/L	1	ug/L	50.0	<1 ug/L	92.6	70-130	3.31	30	
o-Xylene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	80-120	2.69	30	
o-Xylene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	80-120	2.69	30	
o-Xylene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	80-120	2.69	30	
o-Xylene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	80-120	2.69	30	
sec-Butylbenzene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-125	4.47	30	
sec-Butylbenzene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-125	4.47	30	
sec-Butylbenzene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-125	4.47	30	
sec-Butylbenzene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-125	4.47	30	
Styrene	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-135	2.42	30	
Styrene	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-135	2.42	30	
Styrene	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-135	2.42	30	
Styrene	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-135	2.42	30	
tert-Butylbenzene	49.5 ug/L	1	ug/L	50.0	<1 ug/L	99.1	70-130	3.30	30	
tert-Butylbenzene	49.5 ug/L	1	ug/L	50.0	<1 ug/L	99.1	70-130	3.30	30	
tert-Butylbenzene	49.5 ug/L	1	ug/L	50.0	<1 ug/L	99.1	70-130	3.30	30	
tert-Butylbenzene	49.5 ug/L	1	ug/L	50.0	<1 ug/L	99.1	70-130	3.30	30	
Tetrachloroethylene (PCE)	68.1 ug/L	1	ug/L	50.0	1.30 ug/L	134	45-150	2.32	30	
Tetrachloroethylene (PCE)	68.1 ug/L	1	ug/L	50.0	1.30 ug/L	134	45-150	2.32	30	
Tetrachloroethylene (PCE)	68.1 ug/L	1	ug/L	50.0	1.30 ug/L	134	45-150	2.32	30	

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Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Tetrachloroethylene (PCE)	68.1 ug/L	1	ug/L	50.0	1.30 ug/L	134	45-150	2.32	30	
Toluene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-120	3.35	30	
Toluene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-120	3.35	30	
Toluene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-120	3.35	30	
Toluene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-120	3.35	30	
trans-1,2-Dichloroethylene	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	60-140	3.78	30	
trans-1,2-Dichloroethylene	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	60-140	3.78	30	
trans-1,2-Dichloroethylene	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	60-140	3.78	30	
trans-1,2-Dichloroethylene	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	60-140	3.78	30	
trans-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	3.57	30	
trans-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	3.57	30	
trans-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	3.57	30	
trans-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	3.57	30	
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125	0.0196	30	
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125	0.0196	30	
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125	0.0196	30	
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125	0.0196	30	
Trichlorofluoromethane	44.4 ug/L	1	ug/L	50.0	<1 ug/L	88.9	60-145	7.18	30	
Trichlorofluoromethane	44.4 ug/L	1	ug/L	50.0	<1 ug/L	88.9	60-145	7.18	30	
Trichlorofluoromethane	44.4 ug/L	1	ug/L	50.0	<1 ug/L	88.9	60-145	7.18	30	
Trichlorofluoromethane	44.4 ug/L	1	ug/L	50.0	<1 ug/L	88.9	60-145	7.18	30	
Vinyl chloride	26.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	53.0	50-145	9.25	30	
Vinyl chloride	26.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	53.0	50-145	9.25	30	
Vinyl chloride	26.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	53.0	50-145	9.25	30	
Vinyl chloride	26.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	53.0	50-145	9.25	30	
Surr: 1,2-Dichloroethane-d4 (Surr)	51.3		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.3		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.3		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.3		ug/L	50.0	ug/L	103	70-120			
Surr: 4-Bromofluorobenzene (Surr)	53.0		ug/L	50.0	ug/L	106	75-120			
Surr: 4-Bromofluorobenzene (Surr)	53.0		ug/L	50.0	ug/L	106	75-120			

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Volatile Organic Compounds by GCMS - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0489 - SW5030B										
Matrix Spike Dup (BBL0489-MSD1)		**Source: 18L0642-01**		Prepared & Analyzed: 12/17/2018						
Surr: 4-Bromofluorobenzene (Surr)	53.0		ug/L	50.0	ug/L	106	75-120			
Surr: 4-Bromofluorobenzene (Surr)	53.0		ug/L	50.0	ug/L	106	75-120			
Surr: Dibromofluoromethane (Surr)	53.2		ug/L	50.0	ug/L	106	70-130			
Surr: Dibromofluoromethane (Surr)	53.2		ug/L	50.0	ug/L	106	70-130			
Surr: Dibromofluoromethane (Surr)	53.2		ug/L	50.0	ug/L	106	70-130			
Surr: Dibromofluoromethane (Surr)	53.2		ug/L	50.0	ug/L	106	70-130			
Surr: Toluene-d8 (Surr)	50.9		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	50.9		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	50.9		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	50.9		ug/L	50.0	ug/L	102	70-130			

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Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Semivolatile Hydrocarbons by GC - Quality Control

Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BBL0541 - SW3510C										
Blank (BBL0541-BLK1)				Prepared: 12/18/2018 Analyzed: 12/19/2018						
TPH-Semi-Volatiles (ORO)	<1.0 mg/L	1.0	mg/L							
TPH-Semi-Volatiles (ORO)	<1.0 mg/L	1.0	mg/L							
TPH-Semi-Volatiles (ORO)	<1.0 mg/L	1.0	mg/L							
LCS (BBL0541-BS1)				Prepared: 12/18/2018 Analyzed: 12/19/2018						
TPH-Semi-Volatiles (ORO)	2.1 mg/L	1.0	mg/L	5.00	mg/L	41.2	40-160			
TPH-Semi-Volatiles (ORO)	2.1 mg/L	1.0	mg/L	5.00	mg/L	41.2	40-160			
TPH-Semi-Volatiles (ORO)	2.1 mg/L	1.0	mg/L	5.00	mg/L	41.2	40-160			
Batch BBL0585 - SW3510C										
Blank (BBL0585-BLK2)				Prepared & Analyzed: 12/19/2018						
TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
Surr: Pentacosane (Surr)	0.231		mg/L	0.252		91.7	65-125			
Surr: Pentacosane (Surr)	0.231		mg/L	0.252		91.7	65-125			
Surr: Pentacosane (Surr)	0.231		mg/L	0.252		91.7	65-125			
LCS (BBL0585-BS2)				Prepared & Analyzed: 12/19/2018						
TPH-Semi-Volatiles (DRO)	5.1 mg/L	0.500	mg/L	5.00	mg/L	101	65-110			
TPH-Semi-Volatiles (DRO)	5.1 mg/L	0.500	mg/L	5.00	mg/L	101	65-110			
TPH-Semi-Volatiles (DRO)	5.1 mg/L	0.500	mg/L	5.00	mg/L	101	65-110			
Surr: Pentacosane (Surr)	0.299		mg/L	0.252	mg/L	119	65-125			
Surr: Pentacosane (Surr)	0.299		mg/L	0.252	mg/L	119	65-125			
Surr: Pentacosane (Surr)	0.299		mg/L	0.252	mg/L	119	65-125			

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Certified Analyses included in this Report

Analyte	Certifications
SW8015C in Non-Potable Water	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
TPH-Semi-Volatiles (ORO)	VELAP
SW8260B in Non-Potable Water	
1,1,1,2-Tetrachloroethane	NC,VELAP,WVDEP
1,1,1-Trichloroethane	NC,VELAP,WVDEP
1,1,2,2-Tetrachloroethane	NC,VELAP,WVDEP
1,1,2-Trichloroethane	NC,VELAP,WVDEP
1,1-Dichloroethane	NC,VELAP,WVDEP
1,1-Dichloroethylene	NC,VELAP,WVDEP
1,1-Dichloropropene	NC,VELAP,WVDEP
1,2,3-Trichlorobenzene	NC,VELAP,WVDEP
1,2,3-Trichloropropane	NC,VELAP,WVDEP
1,2,4-Trichlorobenzene	NC,VELAP,WVDEP
1,2,4-Trimethylbenzene	NC,VELAP,WVDEP
1,2-Dibromo-3-chloropropane (DBCP)	NC,VELAP,WVDEP
1,2-Dibromoethane (EDB)	NC,VELAP,WVDEP
1,2-Dichlorobenzene	NC,VELAP,WVDEP
1,2-Dichloroethane	NC,VELAP,WVDEP
1,2-Dichloropropane	NC,VELAP,WVDEP
1,3,5-Trimethylbenzene	NC,WVDEP
1,3-Dichlorobenzene	NC,VELAP,WVDEP
1,3-Dichloropropane	NC,VELAP,WVDEP
1,4-Dichlorobenzene	NC,VELAP,WVDEP
2,2-Dichloropropane	NC,VELAP,WVDEP
2-Butanone (MEK)	NC,VELAP,WVDEP
2-Chlorotoluene	NC,VELAP,WVDEP
2-Hexanone (MBK)	NC,VELAP,WVDEP
4-Chlorotoluene	NC,VELAP,WVDEP
4-Isopropyltoluene	NC,VELAP,WVDEP
4-Methyl-2-pentanone (MIBK)	NC,VELAP,WVDEP
Acetone	NC,VELAP,WVDEP
Benzene	NC,VELAP,WVDEP
Bromobenzene	NC,VELAP,WVDEP
Bromochloromethane	NC,VELAP,WVDEP
Bromodichloromethane	NC,VELAP,WVDEP
Bromoform	NC,VELAP,WVDEP

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Certificate of Analysis

Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:23
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Certified Analyses included in this Report

Analyte	Certifications
Bromomethane	NC,VELAP,WVDEP
Carbon disulfide	NC,VELAP,WVDEP
Carbon tetrachloride	NC,VELAP,WVDEP
Chlorobenzene	NC,VELAP,WVDEP
Chloroethane	NC,VELAP,WVDEP
Chloroform	NC,VELAP,WVDEP
Chloromethane	NC,VELAP,WVDEP
cis-1,2-Dichloroethylene	NC,VELAP,WVDEP
cis-1,3-Dichloropropene	NC,VELAP,WVDEP
Dibromochloromethane	NC,VELAP,WVDEP
Dibromomethane	NC,VELAP,WVDEP
Dichlorodifluoromethane	NC,VELAP,WVDEP
Di-isopropyl ether (DIPE)	NC,VELAP,WVDEP
Ethylbenzene	NC,VELAP,WVDEP
Hexachlorobutadiene	NC,VELAP,WVDEP
Iodomethane	NC,VELAP,WVDEP
Isopropylbenzene	NC,VELAP,WVDEP
m+p-Xylenes	NC,VELAP,WVDEP
Methylene chloride	NC,VELAP,WVDEP
Methyl-t-butyl ether (MTBE)	NC,VELAP,WVDEP
Naphthalene	NC,VELAP,WVDEP
n-Butylbenzene	NC,VELAP,WVDEP
n-Propylbenzene	NC,VELAP,WVDEP
o-Xylene	NC,VELAP,WVDEP
sec-Butylbenzene	NC,VELAP,WVDEP
Styrene	NC,VELAP,WVDEP
tert-Butylbenzene	NC,VELAP,WVDEP
Tetrachloroethylene (PCE)	NC,VELAP,WVDEP
Toluene	NC,VELAP,WVDEP
trans-1,2-Dichloroethylene	NC,VELAP,WVDEP
trans-1,3-Dichloropropene	NC,VELAP,WVDEP
Trichloroethylene	NC,VELAP,WVDEP
Trichlorofluoromethane	NC,VELAP,WVDEP
Vinyl acetate	NC,VELAP,WVDEP
Vinyl chloride	NC,VELAP,WVDEP
Xylenes, Total	NC,VELAP,WVDEP

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Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019

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Summary of Data Qualifiers

L	LCS recovery is outside of established acceptance limits
RPD	Relative Percent Difference
Qual	Qualifers
-RE	Denotes sample was re-analyzed
D.F.	Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.
TIC	Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library . A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
PCBs, Total	Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.

AIR WATER & SOIL LABORATORIES, INC.

1941 REYMET ROAD
RICHMOND, VIRGINIA 23237
(804) 358-8295 PHONE
(804)358-8297 FAX

Chain of Custody
Form #: F1331
Rev. 3.0
Effective: Aug 24, 2017

CHAIN OF CUSTODY

PAGE 1 OF 1

COMPANY NAME: EEE Consulting	INVOICE TO: Josh Hepler	PROJECT NAME/Quote #: Cropper Auto Care
CONTACT: Josh Hepler	INVOICE CONTACT: same	SITE NAME: Cropper Auto Care
ADDRESS: 8525 Bell Creek Rd	INVOICE ADDRESS: same	PROJECT NUMBER: 18-796
PHONE #: 804-442-3330	INVOICE PHONE #: same	P.O. #:
FAX #: EMAIL: jhepler@eee-consulting.com		Pretreatment Program:
Is sample for compliance reporting? YES (NO)	Is sample from a chlorinated supply? YES (NO)	PWS I.D. #:
SAMPLER NAME (PRINT): Zach Krouse	SAMPLER SIGNATURE: [signature]	Turn Around Time: Circle: (10) 5 Days or __ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other_____

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	VOCs	TPH-DRO	TPH-GRO						COMMENTS
1) B-3	X					12-12	12:00		GW	5	X	X	X						
2) B-5	X					12-12	11:15		GW	5	X	X	X						
3) B-4	X					12-12	10:30		GW	5	X	X	X						
4)																			
5)																			
6)																			
7)																			
8)																			
9)																			
10)																			2.1°C

Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol

PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME
[signature]	12/13/18	[signature]	12/14/18 2:00
[signature]	12/14/18 2:00	[signature]	12/14/18 1400
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

QC Data Package
Level III ☐
Level IV ☐

LAB USE ONLY
Custody Seals used and intact? (Y/N): _____
COOLER TEMP °C
Received on ice? (Y/N) _____

EEE-Blacksburg **18L0642**
Cropper Auto Care
Recd: 12/14/2018 Due: 01/02/2019

v130325002

_v171001.xls

AIR WATER SOIL

Order ID 18L0642

Sample Preservation Log

Date Performed: 14 DEC 2018

Analyst Performing Check: TL

Sample ID	Container ID	Metals			Cyanide			Sulfide			Ammonia			TKN			Phos, Tot			NO3+NO2			DRO			Pesticide (8081/608/508)			SVOC (525.2/8270/625)			CrVI * **		Pest/PCB (508) / SVOC(525)					
		pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)	Res.Cl as Received		Res.Cl P/A (If adjust.)	Res.Cl as Received		Res.Cl P/A (If adjust.)	pH as Received	Adjusted final pH	pH as Received		Final pH (If adjust.)	pH as Received		Final pH (If adjust.)
		< 2	Other		> 12	Other		> 9	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		< 2	Other		Present	Absent		Present	Absent				< 2	Other			Other	
01	A																						/																
01	B																						/																
02	A																						/																
02	B																						/																
03	A																						/																
03	B																						/																

NaOH ID: _____ HNO_3 ID: _____

H_2SO_4 ID: _____ $Na_2S_2O_3$ ID: _____

HCL ID: _____ Na_2SO_3 ID: _____

CrVI preserved date/time: _____ Analyst Initials: _____

pH must be adjusted between 9.3 - 9.7

Buffer Sol'n ID: _____

1N NaOH ID: _____ 5N NaOH: _____

**W.Va only certifies DISS CrVI and not T CrVI as an approved analyte under 40CFR136 for waste water.

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Certificate of Analysis

Final Report

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Client Site I.D.:	Cropper Auto Care	Purchase Order:	

Sample Conditions Checklist

Samples Received at:	**2.10°C**
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	No
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	Yes
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	Yes
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

Received Trip Blank (27 Nov 2018/16.05) added to work order, Zach Kiracofe notified at drop off. THM 14 Dec 2018/16.44

As per Josh Hepler: Samples should be analyzed for DRO, ORO and VOC; not the GRO as listed on the COC. THM 17 Dec 2018/9.15

Appendix D: Table 4 - Petroleum/Lead Impacted Soil Volume Estimate

Table 4: Cropper Auto Care
Petroleum/Lead-Impacted Soil Volume Estimates
Select Drainage Improvements & Pipe Connections

Boring ID	Impacted Soil Depths	Drainage Structure ID or Description	Impacted Excavation Footprint	Excavation Dimensions	Volume Estimate**	Volume Estimate**	Volume Estimate**
Unit	BGS		STA No.	LxWxH	Cubic Feet (ft^3)	Cubic Yards (yd^3)	Tons*
B5	0-5-ft	18-in Pipe connecting 14B-2 to 14B-4	STA No. 105+35.00 to STA No. 105+65-ft; 30-ft to 35-ft RT of Main Street CL	25-ft x 3-ft x 6.5-ft	488	18	27
B6	0-1-ft BGS	Cutting Grade	STA 105+15.00 to 105+60.00; 50-ft to 100-ft RT of Main Street CL Rt of Main Street CL	50-ft x 25-ft x 8-ft	10,000	370	556

Notes:

***Tons calculated with conversion of $1yd^3$ = 1.5 tons**

****Soil volume estimates are approximate and based on preliminary information available as of the date of this report.**

Appendix E Dupuit Spreadsheet

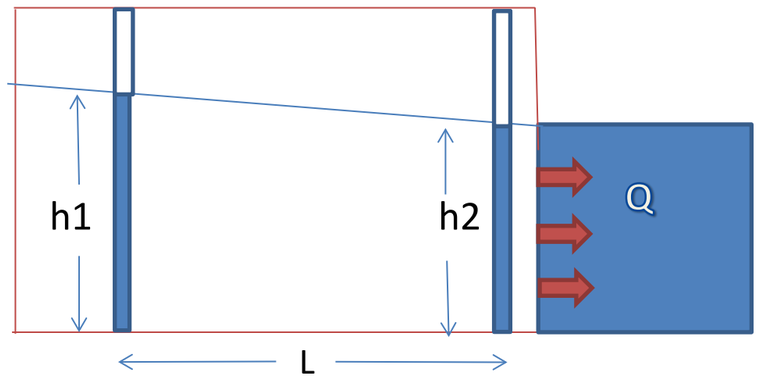
Dupuit Equation for Steady-State Flow to a Trench in an Unconfined Aquifer

Parameter	Q	K	h2	h1	L
Units	ft2/day	ft/day	ft	ft	ft
	0.091975	0.283	9	4	100

wet depth of trench	1	ft
Length of trench	200	ft

Daily Q of trench	36.79	ft3/day
Daily Q of trench	275.1892	gpd

Initial Q Range	550.3784	gpd	for first 24-48 hours
to	1375.946	gpd	



Dupuit Equation - Steady State:

$$Q = K\frac{(h_2^2 - h_1^2)}{2L}$$

where:

Q = discharge per unit thickness (ft^2/d)
K = hydraulic conductivity of aquifer (ft/d)
h_2, h_1 = steady-state heads measured along flow path (ft)
L = distance between steady-state head measurements (ft)

Assumptions[2]:

i. The aquifer is unconfined.
ii. The aquifer has an infinite areal extent.
iii. The trench is of infinite length (into the page).
iv. The aquifer is homogeneous, isotropic and of uniform thickness over the area influenced by the trench.
v. Prior to trench dewatering, the water table is horizontal over the area influenced by the trench.
vi. The trench penetrates the entire saturated thickness of the aquifer.
vii. The flow to the trench is at steady-state.
viii. The velocity of flow is proportional to the tangent of the hydraulic gradient instead of the sine as it is in reality.[1]
ix. The flow is horizontal and uniform everywhere in a vertical section through the trench (cross-sectional flow).[1]