

# Phase II ESA Former Double Oaks School

1205 and 1209 Eureka Street, 1326 Prince  
Hall Avenue, and 1326 Woodward Avenue  
Charlotte, North Carolina



H&H Job No. CLT-628  
December 6, 2018



SMARTER ENVIRONMENTAL SOLUTIONS

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**Phase II ESA  
Former Double Oaks School  
1205 and 1209 Eureka Street, 1326 Prince Hall Avenue, and 1326 Woodward Avenue  
Charlotte, North Carolina  
H&H Job No. CLT-628**

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**Phase II ESA**  
**Former Double Oaks School**  
**1205 and 1209 Eureka Street, 1326 Prince Hall Avenue, and 1326 Woodward Avenue**  
**Charlotte, North Carolina**  
**H&H Job No. CLT-628**

**1.0 Introduction and Background**

In accordance with our task order with the City of Charlotte, this report presents the methods and results of Phase II Environmental Site Assessment (ESA) activities performed by Hart & Hickman, PC (H&H) on the former Double Oaks School property. The property is located at 1205 and 1209 Eureka Street, 1326 Prince Hall Avenue, and 1326 Woodward Avenue in Charlotte, Mecklenburg County, North Carolina (Site). The purpose of this Phase II ESA was to assess potential contamination in groundwater, soil vapor, and surface water associated with a former off-site dry-cleaning facility.

The Site consists of one parcel of land that is approximately 10.78 acres. The Site is developed with seven adjoining educational buildings that total approximately 63,859 square feet (sq. ft.). The subject Site has been utilized for educational purposes from the 1950s until 2010 and as a daycare from 2012 until 2016. Since this time, the Site has remained primarily vacant.

H&H recently completed Phase I ESA activities at the Site and identified the following recognized environmental condition (REC):

- According to a 2018 *Groundwater Monitoring Report* prepared for the former Blue Band 1-Hour Cleaners (2216 Statesville Avenue), a dry-cleaning facility operated approximately 750 feet northeast of the Site from at least 1964 until 1981. Chlorinated solvent impacts associated with historical dry-cleaning operations were identified in groundwater in March 2003. During the most recent groundwater sampling event conducted in October 2017, vinyl chloride (0.00018 mg/L) was detected in monitoring well MW-4 located approximately 20 feet east of the Site at a concentration exceeding the North Carolina 2L Groundwater Standard (2L Standard) of 0.00003 mg/L.

Tetrachloroethene (PCE), trichloroethene (TCE), and/or vinyl chloride were also detected above the 2L Standards in pore water samples collected adjacent to the west side of the stream and immediately east of the Site boundary. According to a PCE isoconcentration map included in the 2018 *Groundwater Monitoring Report*, PCE is estimated to be present in groundwater above the 2L Standard in the eastern portion of the subject Site.

PCE (up to 0.0088 mg/L) was detected above the NC 2B Surface Water Standard (2B Standard) of 0.0033 mg/L in surface water samples collected from a stream less than 50 feet east of the Site. This stream flows in a northwesterly direction (towards the Site) and crosses the northernmost portion of the subject Site. Based on the estimated extent of chlorinated solvent impacts in groundwater and the presence of PCE at concentrations exceeding the applicable surface water standard in samples collected upgradient of the Site, H&H considers the solvent release at the former Blue Band 1-Hour Cleaners facility and associated groundwater and surface water impacts to be a REC for the Site. There is also the potential for soil vapor impacts on the Site from this plume.

H&H understands that future plans may include redevelopment of the Site for residential housing and an education center. Therefore, H&H conducted Phase II ESA activities at the Site to further evaluate the potential for the above-mentioned REC to impact the potential redevelopment project. A Site Location Map is included as Figure 1, and a Sample Location Map is provided as Figure 2. The methods and results of the Phase II ESA activities conducted are summarized in the following sections.

## **2.0 Phase II ESA Sampling Activities**

The Phase II ESA activities were performed on November 9 and 12, 2018 in general accordance with DEQ – IHSB *Guidelines for Assessment and Cleanup* dated October 2015, and most recent version of the U.S. Environmental Protection Agency (EPA) Region 4 Science and Ecosystem Support (SESD) *Field Branches Quality System and Technical Procedures* guidance. Specifically, H&H conducted soil gas and surface water sampling activities at the Site in accordance with the approved scope of work. Additionally, H&H attempted to collect shallow groundwater samples at the Site. However, hard saprolite or partially weathered rock was encountered prior to penetrating the groundwater table resulting in DPT refusal. As such, no groundwater samples were collected at this time.

As required by Mecklenburg County, H&H obtained a Subsurface Investigation Permit (SIP No. 70002563) from the Mecklenburg County Land Use and Environmental Services Agency (LUESA) prior to installing temporary monitoring wells at the Site. H&H will close out the SIP with the County. Soil boring logs are included as Appendix A.

### **2.1 Utility Clearance/Geophysical Survey**

Prior to conducting Phase II ESA sampling activities, H&H contacted North Carolina 811, the public utility locating service, to mark subsurface utilities at the Site. H&H also contracted a private utility locator, Probe Utility Locating, LLC (Probe), to screen the proposed boring locations for subgrade utilities using ground-penetrating radar (GPR) and electromagnetic methods prior to the sampling event.

### **2.2 Groundwater Sampling Activities**

#### Shallow Temporary Monitoring Wells

On November 9, 2018, H&H contracted Mid-South Environmental, Inc. (Mid-South) to install two (2) shallow temporary monitoring wells using hand auger and direct push technology (DPT) drilling methods. Two (2) temporary monitoring wells were to be installed in soil borings

advanced in the east-northeastern and east-southeastern portions of the Site to assess potential chlorinated solvent impacts associated with a release at the upgradient former Blue Band 1-Hour Cleaners dry-cleaning facility (2216 Statesville Avenue).

Prior to soil boring advancement, boring locations were cleared to 5 ft below ground surface (bgs) using a hand auger. Hand auger cuttings and continuous soil samples were screened for staining, odors, and organic vapors using a photoionization detector (PID). Lithological descriptions and PID screening results are provided in boring logs in Appendix A.

During advancement of soil borings, H&H encountered DPT refusal at depths up to 22 ft bgs, and the water table was not encountered. H&H attempted a total of five borings to reach the water table without success. As such, no temporary monitoring wells were installed, and no groundwater samples were collected.

### **2.3 Soil Gas Sampling Activities**

To evaluate the potential for vapor intrusion associated with potential future development, H&H directed Mid-South to install two (2) temporary subsurface soil gas monitoring points (SG-1 and SG-2). The soil gas sample points (SG-1 and SG-2) were installed in soil borings advanced in the east-northeastern and east-southeastern portions of the Site to assess potential vapor impacts associated with the release at the upgradient former Blue Band 1-Hour Cleaners dry-cleaning facility (2216 Statesville Avenue).

The soil gas points were sampled in general accordance with DEQ Division of Waste Management (DWM) Vapor Intrusion Guidance dated March 2018 and as described below.

During advancement of the borehole, soil recovered from the DPT sampler was described for lithologic purposes, and screened for the presence of odors, staining, and for organic vapors utilizing a PID. Soil gas monitoring points SG-1 and SG-2 were installed using DPT and hand auger methods to depths of approximately 7 ft bgs and 22 ft bgs, respectively, due to encountering DPT refusal at deeper depths.

Each soil gas monitoring point was constructed with a six-inch long screen point fitted with Teflon® tubing that extended to the surface. Once the screen point was set at the desired depth, sand was installed in the boring around the screen point to approximately six-inches above the top of the screen. Following installation of the sand, hydrated bentonite was installed from the top of the sand to approximately six-inches bgs. Following installation, H&H purged approximately three volumes of soil gas from the screen point and Teflon® tubing.

Prior to sampling, a leak check was conducted at each soil gas monitoring point by constructing a shroud around the monitoring point and flooding the air within the shroud with helium gas. Using a syringe, a sample was collected from the gas in the shroud into a Tedlar® bag and analyzed using a helium gas detector. Soil gas from the monitoring point was purged and sampled outside of the shroud into a separate Tedlar® bag and analyzed using the helium gas detector to ensure that helium concentrations were less than 10% of the concentration measured within the shroud.

Following successful field leak checks, the soil gas samples were collected into one-liter stainless steel Summa canisters for laboratory analysis by connecting the Teflon® sample tubing to an airflow regulator using a brass nut and ferrule assembly to create an air tight seal. The Summa canisters were allowed to fill slowly using an airflow regulator over a period of approximately five minutes at each location. During collection of the samples, H&H collected measurements of ambient temperature at the beginning, middle, and end of the sampling day. Precipitation, if any, was noted. Following sample collection, the Summa canisters were shipped to SGS Accutest, Inc. (SGS) for analysis of VOCs by EPA Method TO-15. The soil gas point horizontal locations were estimated using field-measurement techniques. Field measurements associated with the soil gas points are summarized on forms in Appendix B.



## **2.4 Surface Water Sampling Activities**

To evaluate the potential for surface water impacts at the Site, H&H collected two (2) surface water samples (Creek-1 and Creek-2). One (1) surface water sample (Creek-1) was collected from the north-central portion of the Site where the creek enters the subject Site property to assess potential surface water impacts associated with the release at the upgradient former Blue Band 1-Hour Cleaners dry-cleaning facility (2216 Statesville Avenue). One (1) surface water sample (Creek-2) was collected from the north-central portion of the Site and approximately 300 ft downstream of surface water sample Creek-1 to assess the extent of potential surface water impacts associated with the release at the upgradient former Blue Band 1-Hour Cleaners dry-cleaning facility (2216 Statesville Avenue).

The surface water samples were collected by utilizing a decontaminated surface water sampler to collect surface water from the creek at each designated surface water sample location. The surface water sample was poured into laboratory-supplied glassware, labeled, and stored on ice in laboratory-supplied coolers. Following sample collection, surface water samples were delivered under chain-of-custody protocol to Prism Analytical, Inc. (Prism) for analysis of VOCs by EPA Method 8260.

## **2.5 Boring Abandonment and Investigation Derived Waste**

Upon completion of the sampling activities, H&H directed drillers to abandon the soil borings and soil gas points by filling the soil borings with a hydrated bentonite/grout slurry, and patching the surfaces to match the surrounding area. Based on field screening, H&H did not identify evidence of significant soil impacts, and soil cuttings were spread on-Site.

## **2.6 QA/QC Process**

H&H utilized standard quality assurance/quality control (QA/QC) processes during the Phase II ESA activities. Non-dedicated sampling equipment, including DPT tooling, the water level meter, and the hand auger, were decontaminated using Liquinox<sup>®</sup> detergent and deionized water

prior to and between each sampling location. H&H and the drilling contractors wore nitrile gloves while handling samples. Surface water samples were collected in laboratory-provided containers and placed on ice immediately after collection. A completed chain-of-custody record accompanied the samples and included the sample designation, date and time collected, matrix, sample container information, and requested analyses.

### 3.0 Analytical Laboratory Results

The results of analysis of the soil gas samples are summarized in Table 1 and the results of analysis of the surface water samples are summarized in Table 2. Field sampling documents are provided in Appendix B and laboratory analytical data reports, and chain-of-custody records are included as Appendix C.

#### 3.1 Soil Gas Results

Laboratory analytical results for the soil gas samples were compared to the DEQ DWM Residential and non-Residential Soil Gas Screening Levels (SGSLs) dated February 2018. These screening levels are conservative and are based upon a lifetime incremental cancer risk (LICR) of  $1 \times 10^{-5}$  for potential carcinogenic effects and/or a Hazard Index (HI) of 0.2 for potential non-carcinogenic effects. Vapor intrusion mitigation is not usually considered unless the LICR exceeds the DEQ acceptable risk of  $1 \times 10^{-4}$  for potential carcinogenic effects and a HI of 1 for potential non-carcinogenic effects. The results were compared to both the Residential and non-Residential SGSLs.

Laboratory analytical results indicate the presence of multiple VOCs in soil gas. 1,3-butadiene ( $90.0 \mu\text{g}/\text{m}^3$ ) was detected in soil gas above the appropriate Residential SGSL of  $14 \mu\text{g}/\text{m}^3$  in soil gas sample SG-2, located in the east-southeastern portion of the Site. This concentration is below the appropriate Non-Residential (industrial/commercial) SGSL of  $180 \mu\text{g}/\text{m}^3$ . No additional VOCs were detected at concentrations which exceed Residential or Non-Residential SGSLs in soil gas samples SG-1 or SG-2.

#### 3.2 Soil Gas Sample Risk Calculations

To further evaluate the detected compounds in the soil gas samples, H&H input the concentrations of the compounds into the DEQ Risk Calculator (February 2018 Version) to calculate cumulative potential carcinogenic and non-carcinogenic risks based on future intended use of the Site. Risk calculator results are documented in Appendix D. A summary of the

calculated LICRs and HIs for the SG-1 and SG-2 samples is provided below:

Sample ID	Residential <sup>(1)</sup>		Risk Exceeded?	Non-Residential Worker <sup>(2)</sup>		Risk Exceeded?
	Calculated LICR	Calculated HI		Calculated LICR	Calculated HI	
SG-1	3.1E-06	1.8E-01	No	2.3E-07	1.4E-02	No
SG-2	3.0E-05	1.4E+00	Yes	2.3E-06	1.1E-01	No

Notes:

1) Results based on the DEQ Risk Calculator for Residential Use Scenario of the Soil Gas to Indoor Air Exposure Pathway (February 2018)

2) Results based on the DEQ Risk Calculator for Non-Residential Worker Use Scenario of the Soil Gas to Indoor Air Exposure Pathway (February 2018)

As indicated above, the calculated LICRs did not exceed the DEQ acceptable risk of  $1 \times 10^{-4}$  and the calculated HIs were less than 1 for Residential and Non-Residential workers in the SG-1 sample. However, the calculated LICRs exceeded the DEQ acceptable HI of 1 for Residential use in the SG-2 sample collected in the east-southeastern portion of the Site. The calculated LICRs did not exceed the DEQ acceptable risk of  $1 \times 10^{-4}$  and the calculated HIs were less than 1 for Non-Residential workers in the SG-2 sample.

### 3.3 Surface Water Results

Laboratory analytical results were compared to the NC DEQ 2B Surface Water Standards dated September 2017. Tetrachloroethylene (PCE) was detected in surface water samples Creek-1 (5.4  $\mu\text{g/L}$ ) and Creek-2 (3.4  $\mu\text{g/L}$ ). These detections exceed the 2B Standard for PCE (3.3  $\mu\text{g/L}$ ). Low levels of trichloroethylene (TCE) were detected in surface water samples Creek-1 (2.1  $\mu\text{g/L}$ ) and Creek-2 (1  $\mu\text{g/L}$ ) at concentrations below 2B Standards. No additional VOCs were detected in either surface water sample.

### 3.4 Surface Water Sample Risk Calculations

To further evaluate the detected compounds in the surface water samples, H&H input the concentrations of the compounds into the DEQ Risk Calculator (February 2018 Version) to calculate cumulative potential carcinogenic and non-carcinogenic risks based on proposed residential development at the Site. Copies of the calculations are provided in Appendix D. A

summary of the calculated LICRs and HIs for the Creek-1 and Creek-2 samples is provided below:

Sample ID	Calculated LICR	Calculated HI	Risk Exceeded?
Creek-1	5.4E-07	1.0E-01	No
Creek-2	2.7E-07	5.4E-02	No

Note: Results based on the DEQ Risk Calculator for Surface Water Combined Pathways (February 2018)

As indicated above, the calculated LICRs did not exceed the DEQ acceptable risk of  $1 \times 10^{-4}$  and the calculated HIs were less than 1 in both surface water samples.

## 4.0 Summary and Conclusions

H&H has completed Phase II ESA activities on the former Double Oaks School property located at 1205 and 1209 Eureka Street, 1326 Prince Hall Avenue, and 1326 Woodward Avenue in Charlotte, Mecklenburg County, North Carolina. The purpose of this Phase II ESA was to assess potential contamination in surface water, groundwater, and soil vapor associated with an off-site dry-cleaner prior to redevelopment of the Site for residential housing and an education center. A summary of the results of the Phase II ESA is provided below.

### Groundwater

- H&H attempted to install two shallow temporary groundwater monitoring wells in the east-northeast and east-southeast portions of the Site. However, H&H encountered DPT refusal prior to penetrating the water table. As such, no temporary monitoring wells were installed and no groundwater samples were collected. Prior data suggest the presence of groundwater impacts in the far eastern portion of the Site.

### Soil Gas

- The results of the soil gas assessment indicate that 1,3-butadiene ( $90 \mu\text{g}/\text{m}^3$ ) was detected in soil gas above the Residential SGSL of  $14 \mu\text{g}/\text{m}^3$  in soil gas sample SG-2, located in the east-southeastern portion of the Site. Risk calculations indicate that the soil gas concentration in this area exceeds the DEQ acceptable risk for residential use.
- No VOCs were detected at concentrations which exceed Residential SGSLs in soil gas sample SG-1, located in the east-northeastern portion of the Site. The cumulative potential carcinogenic and non-carcinogenic risks in the SG-1 sample are acceptable for residential occupants based on the DEQ risk calculator results.

## Surface Water

- PCE was detected in surface water samples Creek-1 and Creek-2 located in the northern portion of the Site at concentrations that exceed the 2B Surface Water Standards. No additional VOCs were detected at concentrations exceeding 2B Standards in either surface water sample location.
- The cumulative potential carcinogenic and non-carcinogenic risks in the Creek-1 and Creek-2 samples appear to be acceptable based on the DEQ risk calculator results.

## Recommendations

Due to the site impacts, future property owners or developers should conduct their own due diligence and may desire the environmental liability protections afforded by a NC DEQ Brownfields Agreement. Whether or not a Brownfields Agreement is sought, H&H recommends that additional soil gas sampling be conducted from the southeastern portion of the subject Site, and near proposed future buildings. Should soil vapor impacts be observed at concentrations exceeding the DEQ acceptable risk for residential use, vapor intrusion mitigation may be needed for the proposed buildings in the southeastern portion of the Site.

**Table 1**  
**Summary of Soil Gas Analytical Data**  
**1205 Eureka Street**  
**Charlotte, North Carolina**  
**H&H Job No. CLT-628**

Sample ID	SG-1	SG-2	Screening Criteria	
			Residential Soil Gas Screening Level <sup>1</sup>	Non-Residential Soil Gas Screening Level <sup>2</sup>
Sample Date	11/9/2018	11/9/2018		
Screen Depth (ft bgs)	6.5-7	21.5-22		
Units	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>
<b><u>VOCs (TO-15)</u></b>				
Acetone	87.7	73.2	220,000	2,700,000
1,3-Butadiene	8.4	<b>90.0</b>	14	180
Benzene	2.8	9.9 J	120	1,600
Carbon disulfide	2.1 J	ND	4,900	61,000
Dichlorodifluoromethane	2.1 J	ND	700	8,800
Ethanol	19.0	ND	NE	NE
Ethylbenzene	4.3	14 J	370	4,900
Ethyl Acetate	33	ND	490	6,100
4-Ethyltoluene	2.7 J	ND	NE	NE
Heptane	2.1 J	11 J	2,800	35,000
Hexane	4.9	38.8	4,900	61,000
2-Hexanone	12	18	210	2,600
Isopropyl Alcohol	6.6	ND	NE	NE
Methyl ethyl ketone	24	21	35,000	440,000
Methyl Isobutyl Ketone	8.2	11 J	21,000	260,000
Propylene	68.9	1,420	21,000	260,000
1,2,4-Trimethylbenzene	9.8	ND	420	5,300
1,3,5-Trimethylbenzene	1.9 J	ND	420	5,300
Tertiary Butyl Alcohol	29	ND	NE	NE
Tetrachloroethylene	12	7.5	280	3,500
Tetrahydrofuran	2.3 J	ND	14,000	180,000
Toluene	14	31	35,000	440,000
m,p-Xylene	19	69.1	700	8,800
o-Xylene	7.4	24	700	8,800
Xylenes (total)	26	93.4	700	8,800

Notes:

1) North Carolina Department of Environmental Quality (DEQ) Division of Waste Management (DWM) Residential Soil Gas Screening Levels (SGSLs), February 2018

2) North Carolina DEQ DWM Non-Residential SGSLs, February 2018

EPA Method number follows parameter in parenthesis

**Bold** concentration exceeds North Carolina DEQ DWM Residential SGSLs

**Bold and Underlined** concentration exceeds North Carolina DEQ DWM Residential and Non-Residential SGSLs

ft bgs = feet below ground surface; ND = not detected; NE = not established

µg/m<sup>3</sup> = micrograms per cubic meter

Only those compounds detected in at least one sample shown above

J = result is less than the laboratory reporting limit but greater than or equal to the method detection limit.

The concentration is a lab calculated approximate value



**Table 2**  
**Summary of Surface Water Analytical Data**  
**1205 Eureka Street**  
**Charlotte, North Carolina**  
**H&H Job No. CLT-628**

Sample ID	CREEK-1	CREEK-2	Screening Criteria
Sample Date	11/12/2018	11/12/2018	<b>NCAC 02B Surface Water Standard (1)</b>
Units	µg/L	µg/L	µg/L
<b><u>VOCs (8260B)</u></b>			
Tetrachloroethylene	<b><u>5.4</u></b>	<b><u>3.4</u></b>	3.3
Trichloroethylene	2.1	1.0	30

Notes:

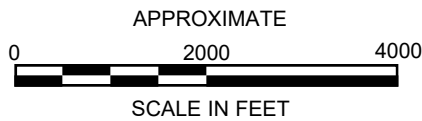
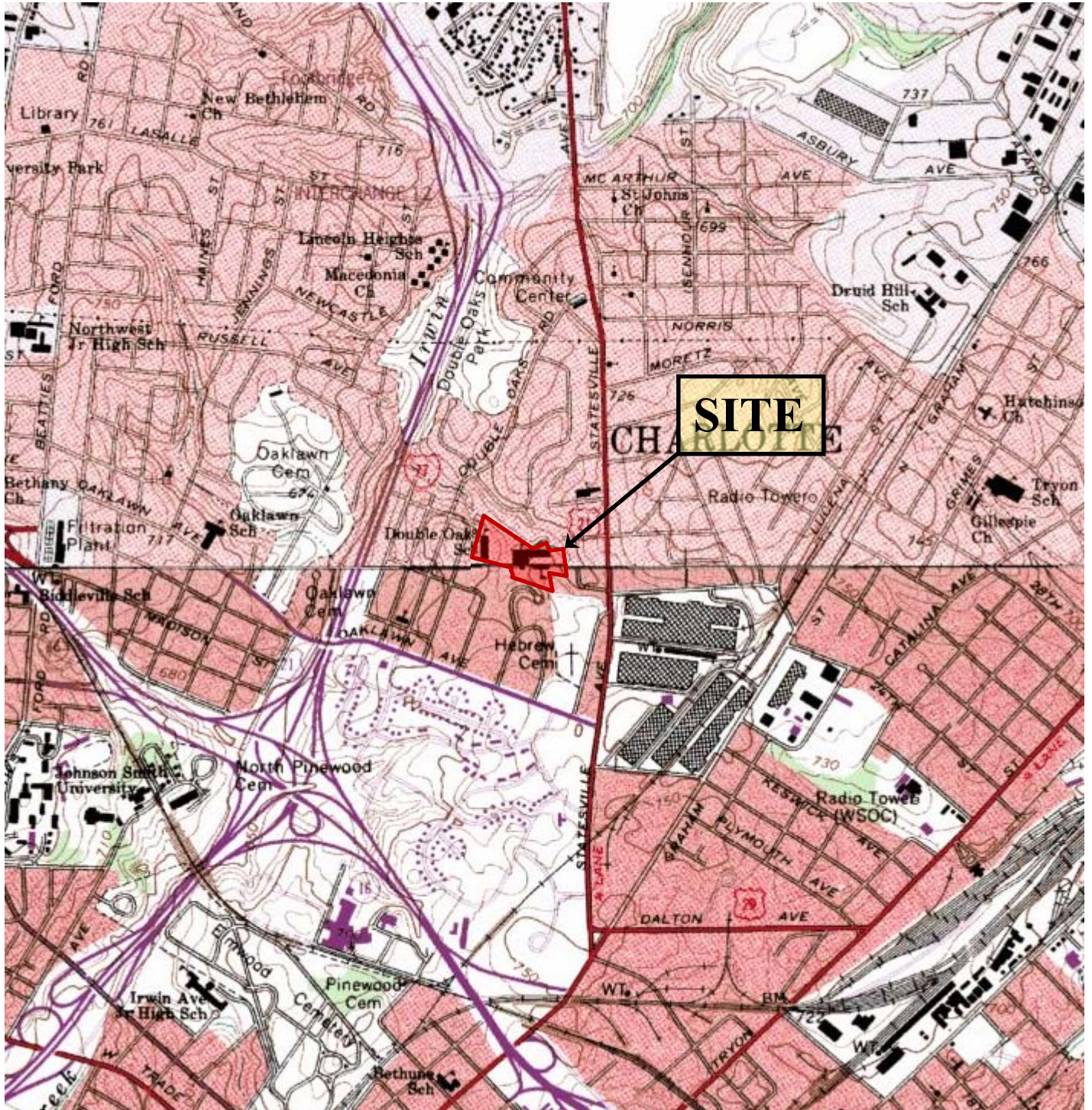
1) North Carolina Department of Environmental Quality (DEQ) Division of Water Resources (DWR) 02B Standards, Septer EPA Method number follows parameter in parenthesis

VOCs = volatile organic compounds

Only those compounds detected in at least one sample shown above

**Bold and Underlined** concentration exceeds DEQ 02B Standard

µg/L = micrograms per liter



U.S.G.S. QUADRANGLE MAP  
**DERITA, NORTH CAROLINA 1996**

QUADRANGLE  
 7.5 MINUTE SERIES (TOPOGRAPHIC)

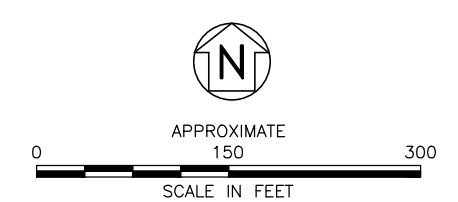
TITLE	<b>SITE LOCATION MAP</b>	
PROJECT	FORMER DOUBLE OAKS SCHOOL 1205-1209 EUREKA STREET, 1326 PRINCE HALL AVENUE, AND 1326 WOODWARD AVENUE CHARLOTTE, NORTH CAROLINA	
	 <b>SMARTER ENVIRONMENTAL SOLUTIONS</b>	2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007 (p) 704-586-0373 (f)
DATE:	11-28-18	REVISION NO: 0
JOB NO:	CLT-628	FIGURE: 1

SAMPLE ID	DATE	TETRACHLOROETHYLENE (mg/L)	TRICHLOROETHENE (mg/L)	VINYL CHLORIDE (mg/L)
MW-4	10/11/17	<0.00050	<0.0010	<b>0.00018 J</b>
H-2-B	5/14/13	<b>0.0074</b>	<b>0.014</b>	<0.0005
H-3-B	5/14/13	<b>0.006</b>	<b>0.012</b>	<0.0005
H-4-B	5/14/13	<b>0.0022</b>	<b>0.0053</b>	<b>0.0010</b>
SW-2	5/14/13	<b>0.0088</b>	0.017	<0.0005
SW-3	5/14/13	<b>0.008</b>	0.015	<0.0005
SW-4	5/14/13	<b>0.0068</b>	0.012	<0.0005
CREEK-1	11/9/18	<b>0.0054</b>	0.0021	<0.0005
CREEK-2	11/9/18	<b>0.0034</b>	0.001	<0.0005

NOTE: BOLD VALUES EXCEEDED THE NC 2L GROUNDWATER STANDARD OR THE NC 2B SURFACE WATER STANDARD



- LEGEND**
- SITE PROPERTY BOUNDARY
  - - - UNNAMED TRIBUTARY OF IRWIN CREEK
  - GROUNDWATER MONITORING WELL
  - GROUNDWATER SAMPLE LOCATION (2013)
  - SURFACE WATER SAMPLE LOCATION (2013)
  - SURFACE WATER SAMPLE LOCATION (2018)
  - TEMPORARY SOIL GAS SAMPLE LOCATION
  - ESTIMATED EXTENT OF PCE IN GROUNDWATER > NC 2L STANDARD BASED ON 2018 GROUNDWATER MONITORING REPORT (ATC)



TITLE	
<b>SAMPLE LOCATION MAP</b>	
PROJECT	<b>FORMER DOUBLE OAKS SCHOOL</b> 1205-1209 EUREKA STREET, 1326 PRINCE HALL AVENUE AND 1326 WOODWARD AVENUE CHARLOTTE, NORTH CAROLINA
<small>2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f) License # C-1269 / #C-245 Geology</small>	
DATE: 12-4-18	REVISION NO. 0
JOB NO. CLT-628	FIGURE NO. 2

S:\AAA-Master Projects\City of Charlotte - CLT\CLT-600\CLT-628 Double Oaks Site Map.dwg, FIG 2, 12/4/2018 12:05:43 PM, erichardson

## **Appendix A**

### **Boring Logs**



Client: City of Charlotte  
 Project: CLT-628  
 Address: 1205 Eureka Street, Charlotte, NC

**BORING LOG**  
 Boring No. SG-1  
 Page: 1 of 1

Drilling Start Date: 11/9/2018  
 Drilling End Date: 11/9/2018  
 Drilling Company: Mid South Environmental  
 Drilling Method: Direct Push  
 Drilling Equipment: Geoprobe 54DT  
 Driller: Don Warren  
 Logged By: Robert Sorgel

Boring Depth (ft): 7.0  
 Boring Diameter (in): 2.00  
 Sampling Method(s):  
 DTW During Drilling (ft):  
 DTW After Drilling (ft):  
 Ground Surface Elev. (ft):  
 Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0								(0') Elastic SILT (MH); trace fine sand, mostly silt, little clay, soft, dry, pale reddish-brown	0.9		0
								(4') Elastic SILT with sand (MH); few fine-medium sand, mostly silt, little clay, stiff, dry, pale yellowish-brown	0.7		
5								(5') Elastic SILT with sand (MH); few fine-medium sand, mostly silt, little clay, very stiff, dry, very pale yellowish-gray	0.6		5
								(7') Boring terminated			
10											10
15											15
20											20

NOTES: Hole precleared to 5.0' on 11/9/2018 by Mid South Environmental using hand auger. DPT refusal encountered at 7' bgs.



Client: City of Charlotte  
 Project: CLT-628  
 Address: 1205 Eureka Street, Charlotte, NC

**BORING LOG**  
 Boring No. SG-2  
 Page: 1 of 2

Drilling Start Date: 11/9/2018  
 Drilling End Date: 11/9/2018  
 Drilling Company: Mid South Environmental  
 Drilling Method: Direct Push  
 Drilling Equipment: Geoprobe 54DT  
 Driller: Don Warren  
 Logged By: Robert Sorgel

Boring Depth (ft): 22.0  
 Boring Diameter (in): 2.00  
 Sampling Method(s):  
 DTW During Drilling (ft):  
 DTW After Drilling (ft):  
 Ground Surface Elev. (ft):  
 Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
0								(0') SILT with sand (ML); little fine-medium sand, mostly silt, few clay, soft, dry, light reddish-brown	2.5		0
								(4') Silty SAND (SM); mostly fine-medium grained sand, some silt, trace clay, loose, dry, light reddish-brown	1.2		5
								(7') SILT with sand (ML); little fine sand, mostly silt, few clay, soft, dry, pale yellowish-brown	1.3		10
								(10') SILT (ML); little fine sand, mostly silt, few clay, stiff, dry, pale yellowish-brown	1.4		15
								(15') Elastic SILT (MH); few fine sand, mostly silt, some clay, very stiff, dry, pale brown	1.8		20
								(17') Elastic SILT (MH); trace fine sand, mostly silt, few clay, very stiff, dry, pale brown			

NOTES: Hole precleared to 5.0' on 11/9/2018 by Mid South Environmental using hand auger. DPT refusal encountered at 22' bgs.



Client: City of Charlotte  
 Project: CLT-628  
 Address: 1205 Eureka Street, Charlotte, NC

**BORING LOG**  
 Boring No. SG-2  
 Page: 2 of 2

Drilling Start Date: 11/9/2018	Boring Depth (ft): 22.0
Drilling End Date: 11/9/2018	Boring Diameter (in): 2.00
Drilling Company: Mid South Environmental	Sampling Method(s):
Drilling Method: Direct Push	DTW During Drilling (ft):
Drilling Equipment: Geoprobe 54DT	DTW After Drilling (ft):
Driller: Don Warren	Ground Surface Elev. (ft):
Logged By: Robert Sorgel	Location (X,Y):

DEPTH (ft)	LITHOLOGY	WATER LEVEL	BORING COMPLETION	COLLECT				SOIL/ROCK VISUAL DESCRIPTION	MEASURE		DEPTH (ft)
				Sample Type	Time	Blow Counts	Recovery (ft)		PID (ppm)	Lab Sample	
20								(17') Elastic SILT (MH); trace fine sand, mostly silt, few clay, very stiff, dry, pale brown	1.6		20
								(22') Boring terminated			
25											25
30											30
35											35
40											40

NOTES: Hole precleared to 5.0' on 11/9/2018 by Mid South Environmental using hand auger. DPT refusal encountered at 22' bgs.

**Appendix B**  
**Field Documents**



**Hart & Hickman, PC**  
**Field Equipment Calibration Form**

**SITE INFORMATION**

Job Name.: \_\_\_\_\_ Job Number: \_\_\_\_\_

Location: \_\_\_\_\_

**EQUIPMENT**

Notes: If multiple instruments are used, list each! Mark parameters N/A if not measured!

Manufacturer, Model & Serial #: \_\_\_\_\_

Manufacturer, Model & Serial #: \_\_\_\_\_

Manufacturer, Model & Serial #: \_\_\_\_\_

**CALIBRATION RESULTS**

**pH**

pH 4 Buffer = \_\_\_\_\_ pH 7 Buffer = \_\_\_\_\_ pH 10 Buffer = \_\_\_\_\_

**ORP/REDOX (mV)**

Solution Concentration (mV) = \_\_\_\_\_ Instrument Reading = \_\_\_\_\_

**CONDUCTIVITY (uS)**

1,000 uS Solution = \_\_\_\_\_ 1,294 uS Solution = \_\_\_\_\_

1,413 uS Solution = \_\_\_\_\_ 2,016 uS Solution = \_\_\_\_\_

**TURBIDITY (NTU)**

0.02 NTU = \_\_\_\_\_ 10 NTU = \_\_\_\_\_ 100 NTU = \_\_\_\_\_ 1,000 NTU = \_\_\_\_\_

**DISSOLVED OXYGEN (mg/L)**

Temperature (Celsius) = \_\_\_\_\_ 100% Saturation In Air (mg/L) = \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Performed by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_



CALIBRATION LOG  
MGD-2002

Instrument: MGD-2002

Serial Number: 41944

ES 1264

Calibrated materials required

Zero Gas Cylinder: 0.0 ppm

Span Gas Cylinder: 99.999% VOL HELIUM  
LOT: KBI-HELIUM-1  
EXP: 10/10/20222

Battery Check 100%

**Gas Calibration Check Performed at Room Temperature**

**PID**

Calibration Gas (ppm)	MGD Reading	Tolerance	Comments
Zero Gas = 0.0	0.0	<1.5 ppm	
HELIUM = 99.999%	99.20%	+/-10%	

Signature: RQA

Date: 11/07/2018

EASTERN SOLUTIONS, LLC  
(803) 746-5180  
PACKING LIST  
*Helium Detector*

ES #: 1264

Date: 11/7/18

---

Standard Items	Prepared	QC Check
Helium Detector	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Manual	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Moisture Filters (2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Needle Probe	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ground Probe	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
AC Charger	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Shoulder Strap	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Calibration Log	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Calibration Sticker	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

---

Prepared By:

*FJD*

QC Check:

*ACS*

Date:

*11.8.18*

# Sub-Slab / Soil Gas Vapor QA/QC Field Form

Project No.: \_\_\_\_\_

ID Numbers Sample / Canister / Regulator	Canister / Regulator Shut-in Test Passed	Vapor Monitoring Point Construction					Helium Leak Test						
		Type		Ground Surface		Depth of Screen	Date & Time	Ambient Temp.	Purge Method	Purge Vol	Helium Conc. Shroud	Helium Conc. Purge	Leak Test Passed
		Yes / No	SS, SG	perm., temp.	concrete, wood, asphalt, grass, soil, gravel etc.	thickness inches (if appl.)	ft bgs	mm/dd/yy 24-hour clock	°F	syringe, peristaltic, etc.	Liters	%	% or ppm (indicate units below)
S: C: R:													
S: C: R:													
S: C: R:													
S: C: R:													

S= sample; C/R = canister/regulator; SS = sub-slab; SG = soil gas; perm = permanent; temp = temporary

Sampler(s): \_\_\_\_\_  
 Weather: \_\_\_\_\_  
 Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### General Field Sketch of Sample Locations

Sample locations provided on Figure 2

**Note: Leak Test Requirements**  
 Per NC DEQ DWM Vapor Intrusion  
 Guidance, leak test passes if helium  
 concentration in purge air is less than  
 10% of helium concentration in shroud.



**SURFACE WATER SAMPLING RECORD**

Job No: \_\_\_\_\_

Well ID: \_\_\_\_\_

Well Location: \_\_\_\_\_

Date: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Top of Casing Elevation (ft msl): \_\_\_\_\_ Casing Material: \_\_\_\_\_ Volume of Water Per Well Volume: \_\_\_\_\_

Total Well Depth (ft): \_\_\_\_\_ Depth to Water (ft): \_\_\_\_\_ Well Diameter: \_\_\_\_\_

Sampling Personnel: \_\_\_\_\_, \_\_\_\_\_ Screen Interval (ft bgs): \_\_\_\_\_ - \_\_\_\_\_

Type of Pump: \_\_\_\_\_ Tubing Material: \_\_\_\_\_ Pump/Tubing set at: \_\_\_\_\_ ft.

Weather Conditions: \_\_\_\_\_ NOTES: \_\_\_\_\_

**GROUNDWATER SAMPLING PARAMETERS**

<u>Time</u>	<u>Water Level</u>	<u>Volume Pumped</u>	<u>Pumping Rate</u>	<u>DO (mg/l)</u>	<u>Temp. (°C)</u>	<u>S. Cond. (µS/cm)</u>	<u>pH (SU)</u>	<u>ORP (mV)</u>	<u>Turbidity (NTU)</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

Other Sample Parameters: \_\_\_\_\_

Sampled at: \_\_\_\_\_ Parameters taken with: \_\_\_\_\_

Sample Delivered to: \_\_\_\_\_ by \_\_\_\_\_ at \_\_\_\_\_

Field Filtration:  Yes  No If yes, which sample parameters were field filtered: \_\_\_\_\_

Sample Parameter Containers (Types, Number of Containers, Preservatives): \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

**SURFACE WATER SAMPLING RECORD**

Job No: \_\_\_\_\_

Well ID: \_\_\_\_\_

Well Location: \_\_\_\_\_

Facility Name: \_\_\_\_\_

Date: \_\_\_\_\_

Top of Casing Elevation (ft msl): \_\_\_\_\_ Casing Material: \_\_\_\_\_ Volume of Water Per Well Volume: \_\_\_\_\_

Total Well Depth (ft): \_\_\_\_\_ Depth to Water (ft): \_\_\_\_\_ Well Diameter: \_\_\_\_\_

Sampling Personnel: \_\_\_\_\_, \_\_\_\_\_ Screen Interval (ft bgs): \_\_\_\_\_ - \_\_\_\_\_

Type of Pump: \_\_\_\_\_ Tubing Material: \_\_\_\_\_ Pump/Tubing set at: \_\_\_\_\_ ft.

Weather Conditions: \_\_\_\_\_ NOTES: \_\_\_\_\_

**GROUNDWATER SAMPLING PARAMETERS**

<u>Time</u>	<u>Water Level</u>	<u>Volume Pumped</u>	<u>Pumping Rate</u>	<u>DO (mg/l)</u>	<u>Temp. (°C)</u>	<u>S. Cond. (µS/cm)</u>	<u>pH (SU)</u>	<u>ORP (mV)</u>	<u>Turbidity (NTU)</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

Other Sample Parameters: \_\_\_\_\_

Sampled at: \_\_\_\_\_ Parameters taken with: \_\_\_\_\_

Sample Delivered to: \_\_\_\_\_ by \_\_\_\_\_ at \_\_\_\_\_

Field Filtration:  Yes  No If yes, which sample parameters were field filtered: \_\_\_\_\_

Sample Parameter Containers (Types, Number of Containers, Preservatives): \_\_\_\_\_

## **Appendix C**

### **Laboratory Analytical Reports**

The results set forth herein are provided by SGS North America Inc.

*e-Hardcopy 2.0*  
*Automated Report*

## Technical Report for

### Hart & Hickman

CLT-628, 1205 Eureka Street, Charlotte, NC

CLT-628

SGS Job Number: JC78069

Sampling Date: 11/09/18

### Report to:

Hart & Hickman, PC  
2923 South Tryon Street Suite 100  
Charlotte, NC 28203  
rsorgel@harthickman.com

ATTN: Robert Sorgel

Total number of pages in report: 42



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

A handwritten signature in black ink, appearing to read "Brian McGuire".

**Brian McGuire**  
General Manager

Client Service contact: Kelly Ramos 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

This report shall not be reproduced, except in its entirety, without the written approval of SGS.  
Test results relate only to samples analyzed.



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1

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## Sample Summary

Hart & Hickman

Job No: JC78069

CLT-628, 1205 Eureka Street, Charlotte, NC  
Project No: CLT-628

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
JC78069-1	11/09/18	12:34 RS	11/14/18	AIR	Soil Vapor Comp.	SG-1
JC78069-2	11/09/18	12:20 RS	11/14/18	AIR	Soil Vapor Comp.	SG-2

## Summary of Hits

**Job Number:** JC78069  
**Account:** Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC  
**Collected:** 11/09/18

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC78069-1	SG-1					
Acetone		36.9	0.80	0.45	ppbv	TO-15
1,3-Butadiene		3.8	0.80	0.18	ppbv	TO-15
Benzene		0.88	0.80	0.048	ppbv	TO-15
Carbon disulfide		0.68 J	0.80	0.094	ppbv	TO-15
Dichlorodifluoromethane		0.42 J	0.80	0.066	ppbv	TO-15
Ethanol		10.1	2.0	0.87	ppbv	TO-15
Ethylbenzene		0.98	0.80	0.060	ppbv	TO-15
Ethyl Acetate		9.2	0.80	0.15	ppbv	TO-15
4-Ethyltoluene		0.54 J	0.80	0.12	ppbv	TO-15
Heptane		0.52 J	0.80	0.070	ppbv	TO-15
Hexane		1.4	0.80	0.042	ppbv	TO-15
2-Hexanone		3.0	0.80	0.15	ppbv	TO-15
Isopropyl Alcohol		2.7	0.80	0.26	ppbv	TO-15
Methyl ethyl ketone		8.0	0.80	0.17	ppbv	TO-15
Methyl Isobutyl Ketone		2.0	0.80	0.14	ppbv	TO-15
Propylene		40.1	2.0	0.064	ppbv	TO-15
1,2,4-Trimethylbenzene		2.0	0.80	0.13	ppbv	TO-15
1,3,5-Trimethylbenzene		0.39 J	0.80	0.13	ppbv	TO-15
Tertiary Butyl Alcohol		9.5	0.80	0.055	ppbv	TO-15
Tetrachloroethylene		1.7	0.16	0.12	ppbv	TO-15
Tetrahydrofuran		0.77 J	0.80	0.20	ppbv	TO-15
Toluene		3.6	0.80	0.058	ppbv	TO-15
m,p-Xylene		4.3	0.80	0.14	ppbv	TO-15
o-Xylene		1.7	0.80	0.068	ppbv	TO-15
Xylenes (total)		5.9	0.80	0.068	ppbv	TO-15
Acetone		87.7	1.9	1.1	ug/m3	TO-15
1,3-Butadiene		8.4	1.8	0.40	ug/m3	TO-15
Benzene		2.8	2.6	0.15	ug/m3	TO-15
Carbon disulfide		2.1 J	2.5	0.29	ug/m3	TO-15
Dichlorodifluoromethane		2.1 J	4.0	0.33	ug/m3	TO-15
Ethanol		19.0	3.8	1.6	ug/m3	TO-15
Ethylbenzene		4.3	3.5	0.26	ug/m3	TO-15
Ethyl Acetate		33	2.9	0.54	ug/m3	TO-15
4-Ethyltoluene		2.7 J	3.9	0.59	ug/m3	TO-15
Heptane		2.1 J	3.3	0.29	ug/m3	TO-15
Hexane		4.9	2.8	0.15	ug/m3	TO-15
2-Hexanone		12	3.3	0.61	ug/m3	TO-15
Isopropyl Alcohol		6.6	2.0	0.64	ug/m3	TO-15
Methyl ethyl ketone		24	2.4	0.50	ug/m3	TO-15
Methyl Isobutyl Ketone		8.2	3.3	0.57	ug/m3	TO-15
Propylene		68.9	3.4	0.11	ug/m3	TO-15
1,2,4-Trimethylbenzene		9.8	3.9	0.64	ug/m3	TO-15
1,3,5-Trimethylbenzene		1.9 J	3.9	0.64	ug/m3	TO-15

## Summary of Hits

**Job Number:** JC78069  
**Account:** Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC  
**Collected:** 11/09/18

Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
		Tertiary Butyl Alcohol	29	2.4	0.17	ug/m3 TO-15
		Tetrachloroethylene	12	1.1	0.81	ug/m3 TO-15
		Tetrahydrofuran	2.3 J	2.4	0.59	ug/m3 TO-15
		Toluene	14	3.0	0.22	ug/m3 TO-15
		m,p-Xylene	19	3.5	0.61	ug/m3 TO-15
		o-Xylene	7.4	3.5	0.30	ug/m3 TO-15
		Xylenes (total)	26	3.5	0.30	ug/m3 TO-15
<b>JC78069-2</b>	<b>SG-2</b>					
		Acetone	30.8	4.0	2.2	ppbv TO-15
		1,3-Butadiene	40.7	4.0	0.92	ppbv TO-15
		Benzene	3.1 J	4.0	0.24	ppbv TO-15
		Ethylbenzene	3.3 J	4.0	0.30	ppbv TO-15
		Heptane	2.8 J	4.0	0.35	ppbv TO-15
		Hexane	11.0	4.0	0.21	ppbv TO-15
		2-Hexanone	4.4	4.0	0.73	ppbv TO-15
		Methyl ethyl ketone	7.2	4.0	0.84	ppbv TO-15
		Methyl Isobutyl Ketone	2.7 J	4.0	0.72	ppbv TO-15
		Propylene	828	20	0.64	ppbv TO-15
		Tetrachloroethylene	1.1	0.80	0.62	ppbv TO-15
		Toluene	8.2	4.0	0.29	ppbv TO-15
		m,p-Xylene	15.9	4.0	0.68	ppbv TO-15
		o-Xylene	5.6	4.0	0.34	ppbv TO-15
		Xylenes (total)	21.5	4.0	0.34	ppbv TO-15
		Acetone	73.2	9.5	5.2	ug/m3 TO-15
		1,3-Butadiene	90.0	8.8	2.0	ug/m3 TO-15
		Benzene	9.9 J	13	0.77	ug/m3 TO-15
		Ethylbenzene	14 J	17	1.3	ug/m3 TO-15
		Heptane	11 J	16	1.4	ug/m3 TO-15
		Hexane	38.8	14	0.74	ug/m3 TO-15
		2-Hexanone	18	16	3.0	ug/m3 TO-15
		Methyl ethyl ketone	21	12	2.5	ug/m3 TO-15
		Methyl Isobutyl Ketone	11 J	16	3.0	ug/m3 TO-15
		Propylene	1420	34	1.1	ug/m3 TO-15
		Tetrachloroethylene	7.5	5.4	4.2	ug/m3 TO-15
		Toluene	31	15	1.1	ug/m3 TO-15
		m,p-Xylene	69.1	17	3.0	ug/m3 TO-15
		o-Xylene	24	17	1.5	ug/m3 TO-15
		Xylenes (total)	93.4	17	1.5	ug/m3 TO-15

Sample Results

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Report of Analysis

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# Report of Analysis

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3

<b>Client Sample ID:</b> SG-1		<b>Date Sampled:</b> 11/09/18
<b>Lab Sample ID:</b> JC78069-1		<b>Date Received:</b> 11/14/18
<b>Matrix:</b> AIR - Soil Vapor Comp. Summa ID: A617		<b>Percent Solids:</b> n/a
<b>Method:</b> TO-15		
<b>Project:</b> CLT-628, 1205 Eureka Street, Charlotte, NC		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6W09223.D	1	11/20/18 19:55	PC	n/a	n/a	V6W357
Run #2							

Run #	Initial Volume
Run #1	100 ml
Run #2	

## VOA TO15 List

CAS No.	MW	Compound	Result	RL	MDL	Units	Q	Result	RL	MDL	Units
67-64-1	58.08	Acetone	36.9	0.80	0.45	ppbv		87.7	1.9	1.1	ug/m3
106-99-0	54.09	1,3-Butadiene	3.8	0.80	0.18	ppbv		8.4	1.8	0.40	ug/m3
71-43-2	78.11	Benzene	0.88	0.80	0.048	ppbv		2.8	2.6	0.15	ug/m3
75-27-4	163.8	Bromodichloromethane	ND	0.80	0.11	ppbv		ND	5.4	0.74	ug/m3
75-25-2	252.8	Bromoform	ND	0.80	0.15	ppbv		ND	8.3	1.6	ug/m3
74-83-9	94.94	Bromomethane	ND	0.80	0.088	ppbv		ND	3.1	0.34	ug/m3
593-60-2	106.9	Bromoethene	ND	0.80	0.088	ppbv		ND	3.5	0.38	ug/m3
100-44-7	126	Benzyl Chloride <sup>a</sup>	ND	0.80	0.23	ppbv		ND	4.1	1.2	ug/m3
75-15-0	76.14	Carbon disulfide	0.68	0.80	0.094	ppbv	J	2.1	2.5	0.29	ug/m3
108-90-7	112.6	Chlorobenzene	ND	0.80	0.10	ppbv		ND	3.7	0.46	ug/m3
75-00-3	64.52	Chloroethane	ND	0.80	0.19	ppbv		ND	2.1	0.50	ug/m3
67-66-3	119.4	Chloroform	ND	0.80	0.080	ppbv		ND	3.9	0.39	ug/m3
74-87-3	50.49	Chloromethane	ND	0.80	0.061	ppbv		ND	1.7	0.13	ug/m3
107-05-1	76.53	3-Chloropropene	ND	0.80	0.16	ppbv		ND	2.5	0.50	ug/m3
95-49-8	126.6	2-Chlorotoluene	ND	0.80	0.10	ppbv		ND	4.1	0.52	ug/m3
56-23-5	153.8	Carbon tetrachloride	ND	0.80	0.094	ppbv		ND	5.0	0.59	ug/m3
110-82-7	84.16	Cyclohexane	ND	0.80	0.088	ppbv		ND	2.8	0.30	ug/m3
75-34-3	98.96	1,1-Dichloroethane	ND	0.80	0.046	ppbv		ND	3.2	0.19	ug/m3
75-35-4	96.94	1,1-Dichloroethylene	ND	0.80	0.067	ppbv		ND	3.2	0.27	ug/m3
106-93-4	187.9	1,2-Dibromoethane	ND	0.80	0.071	ppbv		ND	6.1	0.55	ug/m3
107-06-2	98.96	1,2-Dichloroethane	ND	0.80	0.083	ppbv		ND	3.2	0.34	ug/m3
78-87-5	113	1,2-Dichloropropane	ND	0.80	0.077	ppbv		ND	3.7	0.36	ug/m3
123-91-1	88.12	1,4-Dioxane	ND	0.80	0.21	ppbv		ND	2.9	0.76	ug/m3
75-71-8	120.9	Dichlorodifluoromethane	0.42	0.80	0.066	ppbv	J	2.1	4.0	0.33	ug/m3
124-48-1	208.3	Dibromochloromethane	ND	0.80	0.13	ppbv		ND	6.8	1.1	ug/m3
156-60-5	96.94	trans-1,2-Dichloroethylene	ND	0.80	0.029	ppbv		ND	3.2	0.11	ug/m3
156-59-2	96.94	cis-1,2-Dichloroethylene	ND	0.80	0.047	ppbv		ND	3.2	0.19	ug/m3
10061-01-5	111	cis-1,3-Dichloropropene	ND	0.80	0.078	ppbv		ND	3.6	0.35	ug/m3
541-73-1	147	m-Dichlorobenzene	ND	0.80	0.076	ppbv		ND	4.8	0.46	ug/m3
95-50-1	147	o-Dichlorobenzene	ND	0.80	0.087	ppbv		ND	4.8	0.52	ug/m3
106-46-7	147	p-Dichlorobenzene	ND	0.80	0.070	ppbv		ND	4.8	0.42	ug/m3
10061-02-6	111	trans-1,3-Dichloropropene	ND	0.80	0.078	ppbv		ND	3.6	0.35	ug/m3

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

# Report of Analysis

<b>Client Sample ID:</b> SG-1		
<b>Lab Sample ID:</b> JC78069-1		
<b>Matrix:</b> AIR - Soil Vapor Comp. Summa ID: A617	<b>Date Sampled:</b> 11/09/18	
<b>Method:</b> TO-15	<b>Date Received:</b> 11/14/18	
<b>Project:</b> CLT-628, 1205 Eureka Street, Charlotte, NC	<b>Percent Solids:</b> n/a	

## VOA TO15 List

CAS No.	MW	Compound	Result	RL	MDL	Units	Q	Result	RL	MDL	Units
64-17-5	46.07	Ethanol	10.1	2.0	0.87	ppbv		19.0	3.8	1.6	ug/m3
100-41-4	106.2	Ethylbenzene	0.98	0.80	0.060	ppbv		4.3	3.5	0.26	ug/m3
141-78-6	88	Ethyl Acetate	9.2	0.80	0.15	ppbv		33	2.9	0.54	ug/m3
622-96-8	120.2	4-Ethyltoluene	0.54	0.80	0.12	ppbv	J	2.7	3.9	0.59	ug/m3
76-13-1	187.4	Freon 113	ND	0.80	0.068	ppbv		ND	6.1	0.52	ug/m3
76-14-2	170.9	Freon 114	ND	0.80	0.076	ppbv		ND	5.6	0.53	ug/m3
142-82-5	100.2	Heptane	0.52	0.80	0.070	ppbv	J	2.1	3.3	0.29	ug/m3
87-68-3	260.8	Hexachlorobutadiene	ND	0.80	0.18	ppbv		ND	8.5	1.9	ug/m3
110-54-3	86.17	Hexane	1.4	0.80	0.042	ppbv		4.9	2.8	0.15	ug/m3
591-78-6	100	2-Hexanone	3.0	0.80	0.15	ppbv		12	3.3	0.61	ug/m3
67-63-0	60.1	Isopropyl Alcohol	2.7	0.80	0.26	ppbv		6.6	2.0	0.64	ug/m3
75-09-2	84.94	Methylene chloride	ND	0.80	0.058	ppbv		ND	2.8	0.20	ug/m3
78-93-3	72.11	Methyl ethyl ketone	8.0	0.80	0.17	ppbv		24	2.4	0.50	ug/m3
108-10-1	100.2	Methyl Isobutyl Ketone	2.0	0.80	0.14	ppbv		8.2	3.3	0.57	ug/m3
1634-04-4	88.15	Methyl Tert Butyl Ether	ND	0.80	0.077	ppbv		ND	2.9	0.28	ug/m3
80-62-6	100.12	Methylmethacrylate	ND	0.80	0.13	ppbv		ND	3.3	0.53	ug/m3
115-07-1	42	Propylene	40.1	2.0	0.064	ppbv		68.9	3.4	0.11	ug/m3
100-42-5	104.1	Styrene	ND	0.80	0.076	ppbv		ND	3.4	0.32	ug/m3
71-55-6	133.4	1,1,1-Trichloroethane	ND	0.80	0.13	ppbv		ND	4.4	0.71	ug/m3
79-34-5	167.9	1,1,2,2-Tetrachloroethane	ND	0.80	0.11	ppbv		ND	5.5	0.76	ug/m3
79-00-5	133.4	1,1,2-Trichloroethane	ND	0.80	0.12	ppbv		ND	4.4	0.65	ug/m3
120-82-1	181.5	1,2,4-Trichlorobenzene	ND	0.80	0.35	ppbv		ND	5.9	2.6	ug/m3
95-63-6	120.2	1,2,4-Trimethylbenzene	2.0	0.80	0.13	ppbv		9.8	3.9	0.64	ug/m3
108-67-8	120.2	1,3,5-Trimethylbenzene	0.39	0.80	0.13	ppbv	J	1.9	3.9	0.64	ug/m3
540-84-1	114.2	2,2,4-Trimethylpentane	ND	0.80	0.087	ppbv		ND	3.7	0.41	ug/m3
75-65-0	74.12	Tertiary Butyl Alcohol	9.5	0.80	0.055	ppbv		29	2.4	0.17	ug/m3
127-18-4	165.8	Tetrachloroethylene	1.7	0.16	0.12	ppbv		12	1.1	0.81	ug/m3
109-99-9	72.11	Tetrahydrofuran	0.77	0.80	0.20	ppbv	J	2.3	2.4	0.59	ug/m3
108-88-3	92.14	Toluene	3.6	0.80	0.058	ppbv		14	3.0	0.22	ug/m3
79-01-6	131.4	Trichloroethylene	ND	0.16	0.076	ppbv		ND	0.86	0.41	ug/m3
75-69-4	137.4	Trichlorofluoromethane	ND	0.80	0.11	ppbv		ND	4.5	0.62	ug/m3
75-01-4	62.5	Vinyl chloride	ND	0.80	0.089	ppbv		ND	2.0	0.23	ug/m3
108-05-4	86	Vinyl Acetate	ND	0.80	0.14	ppbv		ND	2.8	0.49	ug/m3
	106.2	m,p-Xylene	4.3	0.80	0.14	ppbv		19	3.5	0.61	ug/m3
95-47-6	106.2	o-Xylene	1.7	0.80	0.068	ppbv		7.4	3.5	0.30	ug/m3
1330-20-7	106.2	Xylenes (total)	5.9	0.80	0.068	ppbv		26	3.5	0.30	ug/m3

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	102%		65-128%

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> SG-1		<b>Date Sampled:</b> 11/09/18
<b>Lab Sample ID:</b> JC78069-1		<b>Date Received:</b> 11/14/18
<b>Matrix:</b> AIR - Soil Vapor Comp. Summa ID: A617		<b>Percent Solids:</b> n/a
<b>Method:</b> TO-15		
<b>Project:</b> CLT-628, 1205 Eureka Street, Charlotte, NC		

**VOA TO15 List**

CAS No.	MW	Compound	Result	RL	MDL	Units	Q	Result	RL	MDL	Units
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(a) Associated CCV outside of control limits high, sample was ND.

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ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> SG-2		
<b>Lab Sample ID:</b> JC78069-2		<b>Date Sampled:</b> 11/09/18
<b>Matrix:</b> AIR - Soil Vapor Comp. Summa ID: M198		<b>Date Received:</b> 11/14/18
<b>Method:</b> TO-15		<b>Percent Solids:</b> n/a
<b>Project:</b> CLT-628, 1205 Eureka Street, Charlotte, NC		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	6W09224.D	1	11/20/18 20:43	PC	n/a	n/a	V6W357
Run #2	6W09240.D	1	11/21/18 14:37	PC	n/a	n/a	V6W358

Run #	Initial Volume
Run #1	20.0 ml
Run #2	10.0 ml

## VOA TO15 List

CAS No.	MW	Compound	Result	RL	MDL	Units	Q	Result	RL	MDL	Units
67-64-1	58.08	Acetone	30.8	4.0	2.2	ppbv		73.2	9.5	5.2	ug/m3
106-99-0	54.09	1,3-Butadiene	40.7	4.0	0.92	ppbv		90.0	8.8	2.0	ug/m3
71-43-2	78.11	Benzene	3.1	4.0	0.24	ppbv	J	9.9	13	0.77	ug/m3
75-27-4	163.8	Bromodichloromethane	ND	4.0	0.54	ppbv		ND	27	3.6	ug/m3
75-25-2	252.8	Bromoform	ND	4.0	0.75	ppbv		ND	41	7.8	ug/m3
74-83-9	94.94	Bromomethane	ND	4.0	0.44	ppbv		ND	16	1.7	ug/m3
593-60-2	106.9	Bromoethene	ND	4.0	0.44	ppbv		ND	17	1.9	ug/m3
100-44-7	126	Benzyl Chloride <sup>a</sup>	ND	4.0	1.1	ppbv		ND	21	5.7	ug/m3
75-15-0	76.14	Carbon disulfide	ND	4.0	0.47	ppbv		ND	12	1.5	ug/m3
108-90-7	112.6	Chlorobenzene	ND	4.0	0.52	ppbv		ND	18	2.4	ug/m3
75-00-3	64.52	Chloroethane	ND	4.0	0.97	ppbv		ND	11	2.6	ug/m3
67-66-3	119.4	Chloroform	ND	4.0	0.40	ppbv		ND	20	2.0	ug/m3
74-87-3	50.49	Chloromethane	ND	4.0	0.31	ppbv		ND	8.3	0.64	ug/m3
107-05-1	76.53	3-Chloropropene	ND	4.0	0.79	ppbv		ND	13	2.5	ug/m3
95-49-8	126.6	2-Chlorotoluene	ND	4.0	0.50	ppbv		ND	21	2.6	ug/m3
56-23-5	153.8	Carbon tetrachloride	ND	4.0	0.47	ppbv		ND	25	3.0	ug/m3
110-82-7	84.16	Cyclohexane	ND	4.0	0.44	ppbv		ND	14	1.5	ug/m3
75-34-3	98.96	1,1-Dichloroethane	ND	4.0	0.23	ppbv		ND	16	0.93	ug/m3
75-35-4	96.94	1,1-Dichloroethylene	ND	4.0	0.33	ppbv		ND	16	1.3	ug/m3
106-93-4	187.9	1,2-Dibromoethane	ND	4.0	0.36	ppbv		ND	31	2.8	ug/m3
107-06-2	98.96	1,2-Dichloroethane	ND	4.0	0.42	ppbv		ND	16	1.7	ug/m3
78-87-5	113	1,2-Dichloropropane	ND	4.0	0.38	ppbv		ND	18	1.8	ug/m3
123-91-1	88.12	1,4-Dioxane	ND	4.0	1.0	ppbv		ND	14	3.6	ug/m3
75-71-8	120.9	Dichlorodifluoromethane	ND	4.0	0.33	ppbv		ND	20	1.6	ug/m3
124-48-1	208.3	Dibromochloromethane	ND	4.0	0.67	ppbv		ND	34	5.7	ug/m3
156-60-5	96.94	trans-1,2-Dichloroethylene	ND	4.0	0.15	ppbv		ND	16	0.59	ug/m3
156-59-2	96.94	cis-1,2-Dichloroethylene	ND	4.0	0.23	ppbv		ND	16	0.91	ug/m3
10061-01-5	111	cis-1,3-Dichloropropene	ND	4.0	0.39	ppbv		ND	18	1.8	ug/m3
541-73-1	147	m-Dichlorobenzene	ND	4.0	0.38	ppbv		ND	24	2.3	ug/m3
95-50-1	147	o-Dichlorobenzene	ND	4.0	0.44	ppbv		ND	24	2.6	ug/m3
106-46-7	147	p-Dichlorobenzene	ND	4.0	0.35	ppbv		ND	24	2.1	ug/m3
10061-02-6	111	trans-1,3-Dichloropropene	ND	4.0	0.39	ppbv		ND	18	1.8	ug/m3

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

# Report of Analysis

<b>Client Sample ID:</b> SG-2		
<b>Lab Sample ID:</b> JC78069-2		
<b>Matrix:</b> AIR - Soil Vapor Comp. Summa ID: M198	<b>Date Sampled:</b> 11/09/18	
<b>Method:</b> TO-15	<b>Date Received:</b> 11/14/18	
<b>Project:</b> CLT-628, 1205 Eureka Street, Charlotte, NC	<b>Percent Solids:</b> n/a	

## VOA TO15 List

CAS No.	MW	Compound	Result	RL	MDL	Units	Q	Result	RL	MDL	Units
64-17-5	46.07	Ethanol	ND	10	4.4	ppbv		ND	19	8.3	ug/m3
100-41-4	106.2	Ethylbenzene	3.3	4.0	0.30	ppbv	J	14	17	1.3	ug/m3
141-78-6	88	Ethyl Acetate	ND	4.0	0.75	ppbv		ND	14	2.7	ug/m3
622-96-8	120.2	4-Ethyltoluene	ND	4.0	0.59	ppbv		ND	20	2.9	ug/m3
76-13-1	187.4	Freon 113	ND	4.0	0.34	ppbv		ND	31	2.6	ug/m3
76-14-2	170.9	Freon 114	ND	4.0	0.38	ppbv		ND	28	2.7	ug/m3
142-82-5	100.2	Heptane	2.8	4.0	0.35	ppbv	J	11	16	1.4	ug/m3
87-68-3	260.8	Hexachlorobutadiene	ND	4.0	0.91	ppbv		ND	43	9.7	ug/m3
110-54-3	86.17	Hexane	11.0	4.0	0.21	ppbv		38.8	14	0.74	ug/m3
591-78-6	100	2-Hexanone	4.4	4.0	0.73	ppbv		18	16	3.0	ug/m3
67-63-0	60.1	Isopropyl Alcohol	ND	4.0	1.3	ppbv		ND	9.8	3.2	ug/m3
75-09-2	84.94	Methylene chloride	ND	4.0	0.29	ppbv		ND	14	1.0	ug/m3
78-93-3	72.11	Methyl ethyl ketone	7.2	4.0	0.84	ppbv		21	12	2.5	ug/m3
108-10-1	100.2	Methyl Isobutyl Ketone	2.7	4.0	0.72	ppbv	J	11	16	3.0	ug/m3
1634-04-4	88.15	Methyl Tert Butyl Ether	ND	4.0	0.38	ppbv		ND	14	1.4	ug/m3
80-62-6	100.12	Methylmethacrylate	ND	4.0	0.65	ppbv		ND	16	2.7	ug/m3
115-07-1	42	Propylene	828 <sup>b</sup>	20	0.64	ppbv		1420 <sup>b</sup>	34	1.1	ug/m3
100-42-5	104.1	Styrene	ND	4.0	0.38	ppbv		ND	17	1.6	ug/m3
71-55-6	133.4	1,1,1-Trichloroethane	ND	4.0	0.66	ppbv		ND	22	3.6	ug/m3
79-34-5	167.9	1,1,2,2-Tetrachloroethane	ND	4.0	0.54	ppbv		ND	27	3.7	ug/m3
79-00-5	133.4	1,1,2-Trichloroethane	ND	4.0	0.61	ppbv		ND	22	3.3	ug/m3
120-82-1	181.5	1,2,4-Trichlorobenzene	ND	4.0	1.8	ppbv		ND	30	13	ug/m3
95-63-6	120.2	1,2,4-Trimethylbenzene	ND	4.0	0.66	ppbv		ND	20	3.2	ug/m3
108-67-8	120.2	1,3,5-Trimethylbenzene	ND	4.0	0.67	ppbv		ND	20	3.3	ug/m3
540-84-1	114.2	2,2,4-Trimethylpentane	ND	4.0	0.44	ppbv		ND	19	2.1	ug/m3
75-65-0	74.12	Tertiary Butyl Alcohol	ND	4.0	0.28	ppbv		ND	12	0.85	ug/m3
127-18-4	165.8	Tetrachloroethylene	1.1	0.80	0.62	ppbv		7.5	5.4	4.2	ug/m3
109-99-9	72.11	Tetrahydrofuran	ND	4.0	1.0	ppbv		ND	12	2.9	ug/m3
108-88-3	92.14	Toluene	8.2	4.0	0.29	ppbv		31	15	1.1	ug/m3
79-01-6	131.4	Trichloroethylene	ND	0.80	0.38	ppbv		ND	4.3	2.0	ug/m3
75-69-4	137.4	Trichlorofluoromethane	ND	4.0	0.56	ppbv		ND	22	3.1	ug/m3
75-01-4	62.5	Vinyl chloride	ND	4.0	0.45	ppbv		ND	10	1.2	ug/m3
108-05-4	86	Vinyl Acetate	ND	4.0	0.68	ppbv		ND	14	2.4	ug/m3
	106.2	m,p-Xylene	15.9	4.0	0.68	ppbv		69.1	17	3.0	ug/m3
95-47-6	106.2	o-Xylene	5.6	4.0	0.34	ppbv		24	17	1.5	ug/m3
1330-20-7	106.2	Xylenes (total)	21.5	4.0	0.34	ppbv		93.4	17	1.5	ug/m3

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	104%	96%	65-128%

ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> SG-2		
<b>Lab Sample ID:</b> JC78069-2		<b>Date Sampled:</b> 11/09/18
<b>Matrix:</b> AIR - Soil Vapor Comp. Summa ID: M198		<b>Date Received:</b> 11/14/18
<b>Method:</b> TO-15		<b>Percent Solids:</b> n/a
<b>Project:</b> CLT-628, 1205 Eureka Street, Charlotte, NC		

### VOA TO15 List

CAS No.	MW	Compound	Result	RL	MDL	Units	Q	Result	RL	MDL	Units
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- (a) Associated CCV outside of control limits high, sample was ND.
- (b) Result is from Run# 2

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ND = Not detected      MDL = Method Detection Limit      J = Indicates an estimated value  
 RL = Reporting Limit      B = Indicates analyte found in associated method blank  
 E = Indicates value exceeds calibration range      N = Indicates presumptive evidence of a compound

Misc. Forms

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Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody
- Summa Canister and Flow Controller Log



AIR

# AIR CHAIN OF CUSTODY

SGS North America Inc. - Dayton  
2235 Route 130, Dayton, NJ 08810  
TEL: 732-329-0200 FAX: 732-329-3499  
www.sgs.com/ehsusa

FED-EX Tracking # 46236 0657 6044  
Bottle Order Contract # L3-102918-55  
SGS Quote #  
SGS Job # JC78069

Client / Reporting Information				Project Information				Weather Parameters				Requested Analysis						
Company Name: <b>HART &amp; HICKMAN, P.C.</b>				Project Name: <b>DOUBLE OATS</b>				Temperature (Fahrenheit)				Requested Analysis						
Address: <b>2933 S-TRYON ST. STE 100</b>				Street: <b>1205 EUREKA STREET</b>				Start: <b>48</b>		Maximum: <b>48</b>								
City: <b>CHARLOTTE NC 28203</b>				City: <b>CHARLOTTE NC</b>				Stop: <b>48</b>		Minimum: <b>48</b>								
Project Contact: <b>MATT BRAMBLETT</b> E-mail: <b>mbramblett@hartsman.com</b>				Project #: <b>CLT-628</b>				Atmospheric Pressure (Inches of Hg)										
Phone #: <b>(704) 586-0007</b>				Client Purchase Order #				Start: <b>30.06</b>		Maximum: <b>30.06</b>								
Sampler(s) Name(s): <b>ROBERT SORTEL</b>								Stop: <b>30.06</b>		Minimum: <b>30.06</b>		Requested Analysis						
								Other weather comment:										
Lab Sample #	Field ID / Point of Collection	Air Type			Start Sampling Information					Stop Sampling Information								
		Indoor (I) Soil Vap (SV) Ambient (A)	Canister Serial #	Canister Size 6L or 1L	Flow Controller Serial #	Date	Time (24hr clock)	Canister Pressure ("Hg)	Interior Temp (F)	Sampler Init.	Date			Time (24hr clock)	Canister Pressure ("Hg)	Interior Temp (F)	Sampler Init.	
1	SG-1	SV	A617	1L	FL02	11/9/18	1227	-28	48	RS	11/9/18			1234	-5	48	RS	*
2	SG-2	SV	M198	1L	MC268	11/9/18	1210	-29	48	RS	11/9/18			1220	-5	48	RS	*
Turnaround Time (Business days)				Data Deliverable Information				Comments / Remarks										
<input checked="" type="checkbox"/> Standard - 15 Days <input type="checkbox"/> 10 Day <input type="checkbox"/> 5 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 1 Day <input type="checkbox"/> Other				Approved By: _____ Date: _____				All NJDEP TO-15 is mandatory Full T1 Comm A Comm B Reduced T2 Full T1 Other: DKQP reporting				PLEASE COPY RSORTEL@HARTSMAN.COM ON RESULTS (SUMM)						
Sample Custody must be documented below each time samples change possession, including courier delivery.																		
Relinquished by: <b>[Signature]</b>	Date Time: <b>11/16/18 17:00</b>	Received By: <b>ROBERT SORTEL</b>	Relinquished By: <b>[Signature]</b>	Date Time: <b>11/9/18 14:00</b>	Received By: <b>[Signature]</b>	Relinquished by: <b>[Signature]</b>	Date Time: <b>11/9/18 11:00</b>	Received By: <b>[Signature]</b>	Relinquished By: <b>[Signature]</b>	Date Time: <b>11/9/18 14:00</b>	Received By: <b>[Signature]</b>	Relinquished by: <b>[Signature]</b>	Date Time: <b>11/9/18 11:00</b>	Received By: <b>[Signature]</b>	Relinquished By: <b>[Signature]</b>	Date Time: <b>11/9/18 11:00</b>	Received By: <b>[Signature]</b>	
Custody Seal #																		

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4

INITIAL SIGNATURE **[Signature]**



## SGS Sample Receipt Summary

Job Number: JC78069

Client: HART & HICKMAN, PC

Project: CLT-628, 1205 EUREKA STREET, CHARLOTTE

Date / Time Received: 11/14/2018 11:00:00 AM

Delivery Method: \_\_\_\_\_

Airbill #'s: \_\_\_\_\_

**Cooler Temps (Raw Measured) °C:**

**Cooler Temps (Corrected) °C:**

**Cooler Security**

- |  |   |
|--|---|
| 1. Custody Seals Present: <input checked="" type="checkbox"/> <u>Y</u> <input type="checkbox"/> <u>N</u> | 3. COC Present: <input checked="" type="checkbox"/> <u>Y</u> <input type="checkbox"/> <u>N</u>        |
| 2. Custody Seals Intact: <input checked="" type="checkbox"/> <u>Y</u> <input type="checkbox"/> <u>N</u>  | 4. Smpl Dates/Time OK: <input checked="" type="checkbox"/> <u>Y</u> <input type="checkbox"/> <u>N</u> |

**Cooler Temperature**

- |  |     |
|--|-----|
| 1. Temp criteria achieved: <input type="checkbox"/> <u>Y</u> <input type="checkbox"/> <u>N</u> |     |
| 2. Cooler temp verification: _____   | N/A |
| 3. Cooler media: _____   | N/A |
| 4. No. Coolers: _____  | N/A |

**Quality Control Preservation**

- |                                 |                                     |                                     |                                     |                          |
|---------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| 2. Trip Blank listed on COC:    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> |
| 3. Samples preserved properly:  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |
| 4. VOCs headspace free:         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

**Sample Integrity - Documentation**

- |  |                                     |                          |  |
|--|-------------------------------------|--------------------------|--|
| 1. Sample labels present on bottles:   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |  |
| 2. Container labeling complete:        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |  |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |  |

**Sample Integrity - Condition**

- |                                  |                                     |                          |  |
|----------------------------------|-------------------------------------|--------------------------|--|
| 1. Sample recvd within HT:       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |  |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |  |
| 3. Condition of sample:          | Intact                              |                          |  |

**Sample Integrity - Instructions**

- |  |                                     |                                     |                                     |
|--|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear:            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 2. Bottles received for unspecified tests: | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                     |
| 3. Sufficient volume recvd for analysis:   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 4. Compositing instructions clear:         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear:           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Test Strip Lot #s:	pH 1-12: _____	216017	pH 12+: _____	208717	Other: (Specify) _____
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Comments

SM089-03  
Rev. Date 12/7/17

**JC78069: Chain of Custody**

Page 2 of 2

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# Summa Canister and Flow Controller Log

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC  
**Received:** 11/14/18

SUMMA CANISTERS													
Shipping						Receiving							
Summa ID	Vac L	Date " Hg	Date Out	By	SCC Batch	SCC FileID	Sample Number	Date In	By	Vac " Hg	Pres psig	Final psig	Dil Fact
A617	1	29.4	11/01/18	JT	CP10038	6W08796.D	JC78069-1	11/19/18	JT	5.5			1
M198	1	29.4	11/01/18	JT	CP10038	6W08796.D	JC78069-2	11/19/18	JT	6.5			1

FLOW CONTROLLERS / OTHER										
Shipping					Receiving					
Flow Crtl ID	Date Out	By	cc/ min	Time hrs.	Date In	By	cc/ min	Flow RPD	Equipment Type	
FC092	11/01/18	JT	150	.083	11/20/18	JT	168	11.3	Flow Controller	
MC268	11/01/18	JT	150	.083	11/20/18	JT	166	10.1	Flow Controller	

**SGS Bottle Order(s):**  
 LS-102918-55

**Prep Date**      **Room Temp(F)**      **Bar Pres "Hg**  
 11/01/18          70                                      29.92

4.2  
4

## MS Volatiles

5

### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Instrument Performance Checks (BFB)
- Surrogate Recovery Summaries



## Method Blank Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W357-MB	6W09217.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Compound	Result	RL	MDL	Units	Q	Result	RL	Units
67-64-1	Acetone	ND	0.20	0.11	ppbv		ND	0.48	ug/m3
106-99-0	1,3-Butadiene	ND	0.20	0.046	ppbv		ND	0.44	ug/m3
71-43-2	Benzene	ND	0.20	0.012	ppbv		ND	0.64	ug/m3
75-27-4	Bromodichloromethane	ND	0.20	0.027	ppbv		ND	1.3	ug/m3
75-25-2	Bromoform	ND	0.20	0.037	ppbv		ND	2.1	ug/m3
74-83-9	Bromomethane	ND	0.20	0.022	ppbv		ND	0.78	ug/m3
593-60-2	Bromoethene	ND	0.20	0.022	ppbv		ND	0.87	ug/m3
100-44-7	Benzyl Chloride	ND	0.20	0.057	ppbv		ND	1.0	ug/m3
75-15-0	Carbon disulfide	ND	0.20	0.024	ppbv		ND	0.62	ug/m3
108-90-7	Chlorobenzene	ND	0.20	0.026	ppbv		ND	0.92	ug/m3
75-00-3	Chloroethane	ND	0.20	0.048	ppbv		ND	0.53	ug/m3
67-66-3	Chloroform	ND	0.20	0.020	ppbv		ND	0.98	ug/m3
74-87-3	Chloromethane	ND	0.20	0.015	ppbv		ND	0.41	ug/m3
107-05-1	3-Chloropropene	ND	0.20	0.040	ppbv		ND	0.63	ug/m3
95-49-8	2-Chlorotoluene	ND	0.20	0.025	ppbv		ND	1.0	ug/m3
56-23-5	Carbon tetrachloride	ND	0.20	0.024	ppbv		ND	1.3	ug/m3
110-82-7	Cyclohexane	ND	0.20	0.022	ppbv		ND	0.69	ug/m3
75-34-3	1,1-Dichloroethane	ND	0.20	0.012	ppbv		ND	0.81	ug/m3
75-35-4	1,1-Dichloroethylene	ND	0.20	0.017	ppbv		ND	0.79	ug/m3
106-93-4	1,2-Dibromoethane	ND	0.20	0.018	ppbv		ND	1.5	ug/m3
107-06-2	1,2-Dichloroethane	ND	0.20	0.021	ppbv		ND	0.81	ug/m3
78-87-5	1,2-Dichloropropane	ND	0.20	0.019	ppbv		ND	0.92	ug/m3
123-91-1	1,4-Dioxane	ND	0.20	0.052	ppbv		ND	0.72	ug/m3
75-71-8	Dichlorodifluoromethane	ND	0.20	0.017	ppbv		ND	0.99	ug/m3
124-48-1	Dibromochloromethane	ND	0.20	0.033	ppbv		ND	1.7	ug/m3
156-60-5	trans-1,2-Dichloroethylene	ND	0.20	0.0073	ppbv		ND	0.79	ug/m3
156-59-2	cis-1,2-Dichloroethylene	ND	0.20	0.012	ppbv		ND	0.79	ug/m3
10061-01-5	cis-1,3-Dichloropropene	ND	0.20	0.020	ppbv		ND	0.91	ug/m3
541-73-1	m-Dichlorobenzene	ND	0.20	0.019	ppbv		ND	1.2	ug/m3
95-50-1	o-Dichlorobenzene	ND	0.20	0.022	ppbv		ND	1.2	ug/m3
106-46-7	p-Dichlorobenzene	ND	0.20	0.018	ppbv		ND	1.2	ug/m3
10061-02-6	trans-1,3-Dichloropropene	ND	0.20	0.020	ppbv		ND	0.91	ug/m3
64-17-5	Ethanol	ND	0.50	0.22	ppbv		ND	0.94	ug/m3
100-41-4	Ethylbenzene	ND	0.20	0.015	ppbv		ND	0.87	ug/m3
141-78-6	Ethyl Acetate	ND	0.20	0.038	ppbv		ND	0.72	ug/m3
622-96-8	4-Ethyltoluene	ND	0.20	0.030	ppbv		ND	0.98	ug/m3

5.1.1  
5

## Method Blank Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W357-MB	6W09217.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Compound	Result	RL	MDL	Units	Q	Result	RL	Units
76-13-1	Freon 113	ND	0.20	0.017	ppbv		ND	1.5	ug/m3
76-14-2	Freon 114	ND	0.20	0.019	ppbv		ND	1.4	ug/m3
142-82-5	Heptane	ND	0.20	0.018	ppbv		ND	0.82	ug/m3
87-68-3	Hexachlorobutadiene	ND	0.20	0.046	ppbv		ND	2.1	ug/m3
110-54-3	Hexane	ND	0.20	0.011	ppbv		ND	0.70	ug/m3
591-78-6	2-Hexanone	ND	0.20	0.036	ppbv		ND	0.82	ug/m3
67-63-0	Isopropyl Alcohol	ND	0.20	0.065	ppbv		ND	0.49	ug/m3
75-09-2	Methylene chloride	ND	0.20	0.015	ppbv		ND	0.69	ug/m3
78-93-3	Methyl ethyl ketone	ND	0.20	0.042	ppbv		ND	0.59	ug/m3
108-10-1	Methyl Isobutyl Ketone	ND	0.20	0.036	ppbv		ND	0.82	ug/m3
1634-04-4	Methyl Tert Butyl Ether	ND	0.20	0.019	ppbv		ND	0.72	ug/m3
80-62-6	Methylmethacrylate	ND	0.20	0.033	ppbv		ND	0.82	ug/m3
115-07-1	Propylene	ND	0.50	0.016	ppbv		ND	0.86	ug/m3
100-42-5	Styrene	ND	0.20	0.019	ppbv		ND	0.85	ug/m3
71-55-6	1,1,1-Trichloroethane	ND	0.20	0.033	ppbv		ND	1.1	ug/m3
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.20	0.027	ppbv		ND	1.4	ug/m3
79-00-5	1,1,2-Trichloroethane	ND	0.20	0.030	ppbv		ND	1.1	ug/m3
120-82-1	1,2,4-Trichlorobenzene	ND	0.20	0.089	ppbv		ND	1.5	ug/m3
95-63-6	1,2,4-Trimethylbenzene	ND	0.20	0.033	ppbv		ND	0.98	ug/m3
108-67-8	1,3,5-Trimethylbenzene	ND	0.20	0.034	ppbv		ND	0.98	ug/m3
540-84-1	2,2,4-Trimethylpentane	ND	0.20	0.022	ppbv		ND	0.93	ug/m3
75-65-0	Tertiary Butyl Alcohol	ND	0.20	0.014	ppbv		ND	0.61	ug/m3
127-18-4	Tetrachloroethylene	ND	0.040	0.031	ppbv		ND	0.27	ug/m3
109-99-9	Tetrahydrofuran	ND	0.20	0.050	ppbv		ND	0.59	ug/m3
108-88-3	Toluene	ND	0.20	0.014	ppbv		ND	0.75	ug/m3
79-01-6	Trichloroethylene	ND	0.040	0.019	ppbv		ND	0.21	ug/m3
75-69-4	Trichlorofluoromethane	ND	0.20	0.028	ppbv		ND	1.1	ug/m3
75-01-4	Vinyl chloride	ND	0.20	0.022	ppbv		ND	0.51	ug/m3
108-05-4	Vinyl Acetate	ND	0.20	0.034	ppbv		ND	0.70	ug/m3
	m,p-Xylene	ND	0.20	0.034	ppbv		ND	0.87	ug/m3
95-47-6	o-Xylene	ND	0.20	0.017	ppbv		ND	0.87	ug/m3
1330-20-7	Xylenes (total)	ND	0.20	0.017	ppbv		ND	0.87	ug/m3

5.1.1  
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## Method Blank Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W357-MB	6W09217.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Surrogate Recoveries	Limits
460-00-4	4-Bromofluorobenzene	93% 65-128%

# Method Blank Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W358-MB	6W09239.D	1	11/21/18	PC	n/a	n/a	V6W358

The QC reported here applies to the following samples:

Method: TO-15

JC78069-2

CAS No.	Compound	Result	RL	MDL	Units	Q	Result	RL	Units
115-07-1	Propylene	ND	0.50	0.016	ppbv		ND	0.86	ug/m3

CAS No.	Surrogate Recoveries	Limits
460-00-4	4-Bromofluorobenzene	93% 65-128%

# Method Blank Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-MB	6W08795.D	1	10/24/18	PC	n/a	n/a	V6W337

The QC reported here applies to the following samples:

Method: TO-15

V6W337-SCC

CAS No.	Compound	Result	RL	MDL	Units	Q	Result	RL	Units
67-64-1	Acetone	ND	0.20	0.11	ppbv		ND	0.48	ug/m3
106-99-0	1,3-Butadiene	ND	0.20	0.046	ppbv		ND	0.44	ug/m3
71-43-2	Benzene	ND	0.20	0.012	ppbv		ND	0.64	ug/m3
75-27-4	Bromodichloromethane	ND	0.20	0.027	ppbv		ND	1.3	ug/m3
75-25-2	Bromoform	ND	0.20	0.037	ppbv		ND	2.1	ug/m3
74-83-9	Bromomethane	ND	0.20	0.022	ppbv		ND	0.78	ug/m3
593-60-2	Bromoethene	ND	0.20	0.022	ppbv		ND	0.87	ug/m3
100-44-7	Benzyl Chloride	ND	0.20	0.057	ppbv		ND	1.0	ug/m3
75-15-0	Carbon disulfide	ND	0.20	0.024	ppbv		ND	0.62	ug/m3
108-90-7	Chlorobenzene	ND	0.20	0.026	ppbv		ND	0.92	ug/m3
75-00-3	Chloroethane	ND	0.20	0.048	ppbv		ND	0.53	ug/m3
67-66-3	Chloroform	ND	0.20	0.020	ppbv		ND	0.98	ug/m3
74-87-3	Chloromethane	ND	0.20	0.015	ppbv		ND	0.41	ug/m3
107-05-1	3-Chloropropene	ND	0.20	0.040	ppbv		ND	0.63	ug/m3
95-49-8	2-Chlorotoluene	ND	0.20	0.025	ppbv		ND	1.0	ug/m3
56-23-5	Carbon tetrachloride	ND	0.20	0.024	ppbv		ND	1.3	ug/m3
110-82-7	Cyclohexane	ND	0.20	0.022	ppbv		ND	0.69	ug/m3
75-34-3	1,1-Dichloroethane	ND	0.20	0.012	ppbv		ND	0.81	ug/m3
75-35-4	1,1-Dichloroethylene	ND	0.20	0.017	ppbv		ND	0.79	ug/m3
106-93-4	1,2-Dibromoethane	ND	0.20	0.018	ppbv		ND	1.5	ug/m3
107-06-2	1,2-Dichloroethane	ND	0.20	0.021	ppbv		ND	0.81	ug/m3
78-87-5	1,2-Dichloropropane	ND	0.20	0.019	ppbv		ND	0.92	ug/m3
123-91-1	1,4-Dioxane	ND	0.20	0.052	ppbv		ND	0.72	ug/m3
75-71-8	Dichlorodifluoromethane	ND	0.20	0.017	ppbv		ND	0.99	ug/m3
124-48-1	Dibromochloromethane	ND	0.20	0.033	ppbv		ND	1.7	ug/m3
156-60-5	trans-1,2-Dichloroethylene	ND	0.20	0.0073	ppbv		ND	0.79	ug/m3
156-59-2	cis-1,2-Dichloroethylene	ND	0.20	0.012	ppbv		ND	0.79	ug/m3
10061-01-5	cis-1,3-Dichloropropene	ND	0.20	0.020	ppbv		ND	0.91	ug/m3
541-73-1	m-Dichlorobenzene	ND	0.20	0.019	ppbv		ND	1.2	ug/m3
95-50-1	o-Dichlorobenzene	ND	0.20	0.022	ppbv		ND	1.2	ug/m3
106-46-7	p-Dichlorobenzene	ND	0.20	0.018	ppbv		ND	1.2	ug/m3
10061-02-6	trans-1,3-Dichloropropene	ND	0.20	0.020	ppbv		ND	0.91	ug/m3
64-17-5	Ethanol	ND	0.50	0.22	ppbv		ND	0.94	ug/m3
100-41-4	Ethylbenzene	ND	0.20	0.015	ppbv		ND	0.87	ug/m3
141-78-6	Ethyl Acetate	ND	0.20	0.038	ppbv		ND	0.72	ug/m3
622-96-8	4-Ethyltoluene	ND	0.20	0.030	ppbv		ND	0.98	ug/m3

5.1.3  
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## Method Blank Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-MB	6W08795.D	1	10/24/18	PC	n/a	n/a	V6W337

The QC reported here applies to the following samples:

Method: TO-15

V6W337-SCC

CAS No.	Compound	Result	RL	MDL	Units	Q	Result	RL	Units
76-13-1	Freon 113	ND	0.20	0.017	ppbv		ND	1.5	ug/m3
76-14-2	Freon 114	ND	0.20	0.019	ppbv		ND	1.4	ug/m3
142-82-5	Heptane	ND	0.20	0.018	ppbv		ND	0.82	ug/m3
87-68-3	Hexachlorobutadiene	ND	0.20	0.046	ppbv		ND	2.1	ug/m3
110-54-3	Hexane	ND	0.20	0.011	ppbv		ND	0.70	ug/m3
591-78-6	2-Hexanone	ND	0.20	0.036	ppbv		ND	0.82	ug/m3
67-63-0	Isopropyl Alcohol	ND	0.20	0.065	ppbv		ND	0.49	ug/m3
75-09-2	Methylene chloride	ND	0.20	0.015	ppbv		ND	0.69	ug/m3
78-93-3	Methyl ethyl ketone	ND	0.20	0.042	ppbv		ND	0.59	ug/m3
108-10-1	Methyl Isobutyl Ketone	ND	0.20	0.036	ppbv		ND	0.82	ug/m3
1634-04-4	Methyl Tert Butyl Ether	ND	0.20	0.019	ppbv		ND	0.72	ug/m3
80-62-6	Methylmethacrylate	ND	0.20	0.033	ppbv		ND	0.82	ug/m3
115-07-1	Propylene	ND	0.50	0.016	ppbv		ND	0.86	ug/m3
100-42-5	Styrene	ND	0.20	0.019	ppbv		ND	0.85	ug/m3
71-55-6	1,1,1-Trichloroethane	ND	0.20	0.033	ppbv		ND	1.1	ug/m3
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.20	0.027	ppbv		ND	1.4	ug/m3
79-00-5	1,1,2-Trichloroethane	ND	0.20	0.030	ppbv		ND	1.1	ug/m3
120-82-1	1,2,4-Trichlorobenzene	ND	0.20	0.089	ppbv		ND	1.5	ug/m3
95-63-6	1,2,4-Trimethylbenzene	ND	0.20	0.033	ppbv		ND	0.98	ug/m3
108-67-8	1,3,5-Trimethylbenzene	ND	0.20	0.034	ppbv		ND	0.98	ug/m3
540-84-1	2,2,4-Trimethylpentane	ND	0.20	0.022	ppbv		ND	0.93	ug/m3
75-65-0	Tertiary Butyl Alcohol	ND	0.20	0.014	ppbv		ND	0.61	ug/m3
127-18-4	Tetrachloroethylene	ND	0.040	0.031	ppbv		ND	0.27	ug/m3
109-99-9	Tetrahydrofuran	ND	0.20	0.050	ppbv		ND	0.59	ug/m3
108-88-3	Toluene	ND	0.20	0.014	ppbv		ND	0.75	ug/m3
79-01-6	Trichloroethylene	ND	0.040	0.019	ppbv		ND	0.21	ug/m3
75-69-4	Trichlorofluoromethane	ND	0.20	0.028	ppbv		ND	1.1	ug/m3
75-01-4	Vinyl chloride	ND	0.20	0.022	ppbv		ND	0.51	ug/m3
108-05-4	Vinyl Acetate	ND	0.20	0.034	ppbv		ND	0.70	ug/m3
	m,p-Xylene	ND	0.20	0.034	ppbv		ND	0.87	ug/m3
95-47-6	o-Xylene	ND	0.20	0.017	ppbv		ND	0.87	ug/m3
1330-20-7	Xylenes (total)	ND	0.20	0.017	ppbv		ND	0.87	ug/m3

# Method Blank Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-MB	6W08795.D	1	10/24/18	PC	n/a	n/a	V6W337

The QC reported here applies to the following samples:

Method: TO-15

V6W337-SCC

CAS No.	Surrogate Recoveries	Limits
460-00-4	4-Bromofluorobenzene	95% 65-128%

5.1.3  
5

# Blank Spike/Blank Spike Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W357-BS	6W09214.D	1	11/20/18	PC	n/a	n/a	V6W357
V6W357-BSD	6W09215.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Compound	Spike ppbv	BSP ppbv	BSP %	BSD ppbv	BSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	10	9.9	99	9.6	96	3	70-130/30
106-99-0	1,3-Butadiene	10	9.0	90	8.8	88	2	70-130/30
71-43-2	Benzene	10	10.5	105	10.4	104	1	70-130/30
75-27-4	Bromodichloromethane	10	9.6	96	9.4	94	2	70-130/30
75-25-2	Bromoform	10	12.4	124	12.6	126	2	70-130/30
74-83-9	Bromomethane	10	9.1	91	8.9	89	2	70-130/30
593-60-2	Bromoethene	10	9.7	97	9.5	95	2	70-130/30
100-44-7	Benzyl Chloride	10	14.9	149* a	14.7	147* a	1	70-130/30
75-15-0	Carbon disulfide	10	10.7	107	10.6	106	1	70-130/30
108-90-7	Chlorobenzene	10	10.1	101	10.2	102	1	70-130/30
75-00-3	Chloroethane	10	9.2	92	9.0	90	2	70-130/30
67-66-3	Chloroform	10	9.1	91	9.0	90	1	70-130/30
74-87-3	Chloromethane	10	8.6	86	8.5	85	1	70-130/30
107-05-1	3-Chloropropene	10	11.4	114	11.2	112	2	70-130/30
95-49-8	2-Chlorotoluene	10	10.6	106	10.8	108	2	70-130/30
56-23-5	Carbon tetrachloride	10	9.2	92	9.1	91	1	70-130/30
110-82-7	Cyclohexane	10	10.9	109	10.7	107	2	70-130/30
75-34-3	1,1-Dichloroethane	10	9.9	99	9.8	98	1	70-130/30
75-35-4	1,1-Dichloroethylene	10	9.5	95	9.4	94	1	70-130/30
106-93-4	1,2-Dibromoethane	10	10.3	103	10.1	101	2	70-130/30
107-06-2	1,2-Dichloroethane	10	8.2	82	8.0	80	2	70-130/30
78-87-5	1,2-Dichloropropane	10	10.8	108	10.5	105	3	70-130/30
123-91-1	1,4-Dioxane	10	10.9	109	10.7	107	2	70-130/30
75-71-8	Dichlorodifluoromethane	10	8.4	84	8.2	82	2	70-130/30
124-48-1	Dibromochloromethane	10	10.6	106	10.4	104	2	70-130/30
156-60-5	trans-1,2-Dichloroethylene	10	10.1	101	10	100	1	70-130/30
156-59-2	cis-1,2-Dichloroethylene	10	10	100	9.8	98	2	70-130/30
10061-01-5	cis-1,3-Dichloropropene	10	10.8	108	10.5	105	3	70-130/30
541-73-1	m-Dichlorobenzene	10	11.0	110	11.1	111	1	70-130/30
95-50-1	o-Dichlorobenzene	10	10.9	109	11.0	110	1	70-130/30
106-46-7	p-Dichlorobenzene	10	11.2	112	11.4	114	2	70-130/30
10061-02-6	trans-1,3-Dichloropropene	10	10.7	107	10.4	104	3	70-130/30
64-17-5	Ethanol	10	8.1	81	7.9	79	2	70-130/30
100-41-4	Ethylbenzene	10	10.2	102	10.4	104	2	70-130/30
141-78-6	Ethyl Acetate	10	12.0	120	11.8	118	2	70-130/30
622-96-8	4-Ethyltoluene	10	10.4	104	10.6	106	2	70-130/30

\* = Outside of Control Limits.

5.2.1  
5



# Blank Spike/Blank Spike Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W357-BS	6W09214.D	1	11/20/18	PC	n/a	n/a	V6W357
V6W357-BSD	6W09215.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Compound	Spike ppbv	BSP ppbv	BSP %	BSD ppbv	BSD %	RPD	Limits Rec/RPD
76-13-1	Freon 113	10	9.6	96	9.5	95	1	70-130/30
76-14-2	Freon 114	10	8.3	83	8.2	82	1	70-130/30
142-82-5	Heptane	10	10.8	108	10.6	106	2	70-130/30
87-68-3	Hexachlorobutadiene	10	10.1	101	10.3	103	2	70-130/30
110-54-3	Hexane	10	11.0	110	10.8	108	2	70-130/30
591-78-6	2-Hexanone	10	11.9	119	11.5	115	3	70-130/30
67-63-0	Isopropyl Alcohol	10	9.2	92	9.0	90	2	70-130/30
75-09-2	Methylene chloride	10	9.6	96	9.4	94	2	70-130/30
78-93-3	Methyl ethyl ketone	10	12.2	122	12.0	120	2	70-130/30
108-10-1	Methyl Isobutyl Ketone	10	11.5	115	11.3	113	2	70-130/30
1634-04-4	Methyl Tert Butyl Ether	10	9.9	99	9.8	98	1	70-130/30
80-62-6	Methylmethacrylate	10	11.6	116	11.1	111	4	70-130/30
115-07-1	Propylene	10	10.5	105	10.2	102	3	70-130/30
100-42-5	Styrene	10	11.3	113	11.5	115	2	70-130/30
71-55-6	1,1,1-Trichloroethane	10	8.9	89	8.8	88	1	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	10	11.1	111	11.3	113	2	70-130/30
79-00-5	1,1,2-Trichloroethane	10	10.4	104	10.2	102	2	70-130/30
120-82-1	1,2,4-Trichlorobenzene	10	11.4	114	11.5	115	1	70-130/30
95-63-6	1,2,4-Trimethylbenzene	10	10.1	101	10.3	103	2	70-130/30
108-67-8	1,3,5-Trimethylbenzene	10	9.9	99	10.2	102	3	70-130/30
540-84-1	2,2,4-Trimethylpentane	10	10.7	107	10.5	105	2	70-130/30
75-65-0	Tertiary Butyl Alcohol	10	10.5	105	10.4	104	1	70-130/30
127-18-4	Tetrachloroethylene	10	9.4	94	9.3	93	1	70-130/30
109-99-9	Tetrahydrofuran	10	11.8	118	11.6	116	2	70-130/30
108-88-3	Toluene	10	10.1	101	9.9	99	2	70-130/30
79-01-6	Trichloroethylene	10	9.7	97	9.5	95	2	70-130/30
75-69-4	Trichlorofluoromethane	10	7.8	78	7.6	76	3	70-130/30
75-01-4	Vinyl chloride	10	9.0	90	8.8	88	2	70-130/30
108-05-4	Vinyl Acetate	10	11.1	111	10.8	108	3	70-130/30
	m,p-Xylene	20	19.5	98	19.8	99	2	70-130/30
95-47-6	o-Xylene	10	9.9	99	10.0	100	1	70-130/30
1330-20-7	Xylenes (total)	30	29.4	98	29.8	99	1	70-130/30

\* = Outside of Control Limits.

5.2.1  
5

# Blank Spike/Blank Spike Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W357-BS	6W09214.D	1	11/20/18	PC	n/a	n/a	V6W357
V6W357-BSD	6W09215.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
460-00-4	4-Bromofluorobenzene	101%	100%	65-128%

(a) High percent recoveries and no associated positive reported in the QC batch.

\* = Outside of Control Limits.

# Blank Spike/Blank Spike Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W358-BS	6W09236.D	1	11/21/18	PC	n/a	n/a	V6W358
V6W358-BSD	6W09237.D	1	11/21/18	PC	n/a	n/a	V6W358

The QC reported here applies to the following samples:

Method: TO-15

JC78069-2

CAS No.	Compound	Spike ppbv	BSP ppbv	BSP %	BSD ppbv	BSD %	RPD	Limits Rec/RPD
115-07-1	Propylene	10	10.0	100	9.6	96	4	70-130/30

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
460-00-4	4-Bromofluorobenzene	102%	102%	65-128%

\* = Outside of Control Limits.

# Blank Spike/Blank Spike Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-BS	6W08792.D	1	10/24/18	PC	n/a	n/a	V6W337
V6W337-BSD	6W08793.D	1	10/24/18	PC	n/a	n/a	V6W337

The QC reported here applies to the following samples:

Method: TO-15

V6W337-SCC

CAS No.	Compound	Spike ppbv	BSP ppbv	BSP %	BSD ppbv	BSD %	RPD	Limits Rec/RPD
67-64-1	Acetone	10	9.4	94	9.6	96	2	70-130/30
106-99-0	1,3-Butadiene	10	10.0	100	10.2	102	2	70-130/30
71-43-2	Benzene	10	9.6	96	9.8	98	2	70-130/30
75-27-4	Bromodichloromethane	10	10.0	100	10.1	101	1	70-130/30
75-25-2	Bromoform	10	11.2	112	11.6	116	4	70-130/30
74-83-9	Bromomethane	10	9.5	95	9.6	96	1	70-130/30
593-60-2	Bromoethene	10	9.7	97	9.8	98	1	70-130/30
100-44-7	Benzyl Chloride	10	12.6	126	12.9	129	2	70-130/30
75-15-0	Carbon disulfide	10	9.6	96	9.7	97	1	70-130/30
108-90-7	Chlorobenzene	10	9.3	93	9.4	94	1	70-130/30
75-00-3	Chloroethane	10	10.1	101	10.2	102	1	70-130/30
67-66-3	Chloroform	10	9.3	93	9.4	94	1	70-130/30
74-87-3	Chloromethane	10	9.8	98	9.9	99	1	70-130/30
107-05-1	3-Chloropropene	10	10.3	103	10.5	105	2	70-130/30
95-49-8	2-Chlorotoluene	10	9.7	97	10	100	3	70-130/30
56-23-5	Carbon tetrachloride	10	10	100	10.2	102	2	70-130/30
110-82-7	Cyclohexane	10	9.8	98	10.0	100	2	70-130/30
75-34-3	1,1-Dichloroethane	10	9.5	95	9.6	96	1	70-130/30
75-35-4	1,1-Dichloroethylene	10	9.7	97	9.8	98	1	70-130/30
106-93-4	1,2-Dibromoethane	10	10.1	101	10.1	101	0	70-130/30
107-06-2	1,2-Dichloroethane	10	9.7	97	9.8	98	1	70-130/30
78-87-5	1,2-Dichloropropane	10	9.9	99	10	100	1	70-130/30
123-91-1	1,4-Dioxane	10	10.4	104	10.6	106	2	70-130/30
75-71-8	Dichlorodifluoromethane	10	9.5	95	9.7	97	2	70-130/30
124-48-1	Dibromochloromethane	10	10.6	106	10.7	107	1	70-130/30
156-60-5	trans-1,2-Dichloroethylene	10	9.9	99	10.0	100	1	70-130/30
156-59-2	cis-1,2-Dichloroethylene	10	9.9	99	10.0	100	1	70-130/30
10061-01-5	cis-1,3-Dichloropropene	10	10.4	104	10.5	105	1	70-130/30
541-73-1	m-Dichlorobenzene	10	9.9	99	10.4	104	5	70-130/30
95-50-1	o-Dichlorobenzene	10	9.6	96	9.8	98	2	70-130/30
106-46-7	p-Dichlorobenzene	10	10.0	100	10.6	106	6	70-130/30
10061-02-6	trans-1,3-Dichloropropene	10	10.8	108	11.0	110	2	70-130/30
64-17-5	Ethanol	10	9.7	97	9.9	99	2	70-130/30
100-41-4	Ethylbenzene	10	9.5	95	9.7	97	2	70-130/30
141-78-6	Ethyl Acetate	10	10.6	106	10.8	108	2	70-130/30
622-96-8	4-Ethyltoluene	10	9.8	98	10	100	2	70-130/30

\* = Outside of Control Limits.

5.2.3  
5

# Blank Spike/Blank Spike Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-BS	6W08792.D	1	10/24/18	PC	n/a	n/a	V6W337
V6W337-BSD	6W08793.D	1	10/24/18	PC	n/a	n/a	V6W337

The QC reported here applies to the following samples:

Method: TO-15

V6W337-SCC

CAS No.	Compound	Spike ppbv	BSP ppbv	BSP %	BSD ppbv	BSD %	RPD	Limits Rec/RPD
76-13-1	Freon 113	10	9.5	95	9.6	96	1	70-130/30
76-14-2	Freon 114	10	9.4	94	9.5	95	1	70-130/30
142-82-5	Heptane	10	10.1	101	10.2	102	1	70-130/30
87-68-3	Hexachlorobutadiene	10	7.4	74	7.5	75	1	70-130/30
110-54-3	Hexane	10	10.0	100	10.1	101	1	70-130/30
591-78-6	2-Hexanone	10	11.0	110	11.2	112	2	70-130/30
67-63-0	Isopropyl Alcohol	10	9.8	98	9.9	99	1	70-130/30
75-09-2	Methylene chloride	10	8.8	88	8.9	89	1	70-130/30
78-93-3	Methyl ethyl ketone	10	11.2	112	11.2	112	0	70-130/30
108-10-1	Methyl Isobutyl Ketone	10	10.5	105	10.6	106	1	70-130/30
1634-04-4	Methyl Tert Butyl Ether	10	9.8	98	10	100	2	70-130/30
80-62-6	Methylmethacrylate	10	10.6	106	10.7	107	1	70-130/30
115-07-1	Propylene	10	9.8	98	10	100	2	70-130/30
100-42-5	Styrene	10	10.4	104	10.7	107	3	70-130/30
71-55-6	1,1,1-Trichloroethane	10	9.6	96	9.7	97	1	70-130/30
79-34-5	1,1,2,2-Tetrachloroethane	10	9.6	96	9.8	98	2	70-130/30
79-00-5	1,1,2-Trichloroethane	10	9.9	99	10.0	100	1	70-130/30
120-82-1	1,2,4-Trichlorobenzene	10	9.1	91	9.0	90	1	70-130/30
95-63-6	1,2,4-Trimethylbenzene	10	9.9	99	10.0	100	1	70-130/30
108-67-8	1,3,5-Trimethylbenzene	10	9.5	95	9.6	96	1	70-130/30
540-84-1	2,2,4-Trimethylpentane	10	9.9	99	10	100	1	70-130/30
75-65-0	Tertiary Butyl Alcohol	10	10.5	105	10.6	106	1	70-130/30
127-18-4	Tetrachloroethylene	10	9.1	91	9.2	92	1	70-130/30
109-99-9	Tetrahydrofuran	10	10.6	106	10.9	109	3	70-130/30
108-88-3	Toluene	10	9.6	96	9.7	97	1	70-130/30
79-01-6	Trichloroethylene	10	9.7	97	9.7	97	0	70-130/30
75-69-4	Trichlorofluoromethane	10	9.3	93	9.5	95	2	70-130/30
75-01-4	Vinyl chloride	10	9.9	99	10	100	1	70-130/30
108-05-4	Vinyl Acetate	10	10.5	105	10.7	107	2	70-130/30
	m,p-Xylene	20	18.9	95	19.2	96	2	70-130/30
95-47-6	o-Xylene	10	9.6	96	9.7	97	1	70-130/30
1330-20-7	Xylenes (total)	30	28.5	95	28.9	96	1	70-130/30

\* = Outside of Control Limits.

5.2.3  
5

# Blank Spike/Blank Spike Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-BS	6W08792.D	1	10/24/18	PC	n/a	n/a	V6W337
V6W337-BSD	6W08793.D	1	10/24/18	PC	n/a	n/a	V6W337

The QC reported here applies to the following samples:

Method: TO-15

V6W337-SCC

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
460-00-4	4-Bromofluorobenzene	101%	103%	65-128%

\* = Outside of Control Limits.

# Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC78069-2DUP	6W09225.D	1	11/20/18	PC	n/a	n/a	V6W357
JC78069-2	6W09224.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Compound	JC78069-2 ppbv	DUP Q	DUP ppbv	Q	RPD	Limits
67-64-1	Acetone	30.8		29.1		6	25
106-99-0	1,3-Butadiene	40.7		39.6		3	25
71-43-2	Benzene	3.1	J	2.9	J	7	25
75-27-4	Bromodichloromethane	ND		ND		nc	25
75-25-2	Bromoform	ND		ND		nc	25
74-83-9	Bromomethane	ND		ND		nc	25
593-60-2	Bromoethene	ND		ND		nc	25
100-44-7	Benzyl Chloride	ND		ND		nc	25
75-15-0	Carbon disulfide	ND		ND		nc	25
108-90-7	Chlorobenzene	ND		ND		nc	25
75-00-3	Chloroethane	ND		ND		nc	25
67-66-3	Chloroform	ND		ND		nc	25
74-87-3	Chloromethane	ND		ND		nc	25
107-05-1	3-Chloropropene	ND		ND		nc	25
95-49-8	2-Chlorotoluene	ND		ND		nc	25
56-23-5	Carbon tetrachloride	ND		ND		nc	25
110-82-7	Cyclohexane	ND		ND		nc	25
75-34-3	1,1-Dichloroethane	ND		ND		nc	25
75-35-4	1,1-Dichloroethylene	ND		ND		nc	25
106-93-4	1,2-Dibromoethane	ND		ND		nc	25
107-06-2	1,2-Dichloroethane	ND		ND		nc	25
78-87-5	1,2-Dichloropropane	ND		ND		nc	25
123-91-1	1,4-Dioxane	ND		ND		nc	25
75-71-8	Dichlorodifluoromethane	ND		ND		nc	25
124-48-1	Dibromochloromethane	ND		ND		nc	25
156-60-5	trans-1,2-Dichloroethylene	ND		ND		nc	25
156-59-2	cis-1,2-Dichloroethylene	ND		ND		nc	25
10061-01-5	cis-1,3-Dichloropropene	ND		ND		nc	25
541-73-1	m-Dichlorobenzene	ND		ND		nc	25
95-50-1	o-Dichlorobenzene	ND		ND		nc	25
106-46-7	p-Dichlorobenzene	ND		ND		nc	25
10061-02-6	trans-1,3-Dichloropropene	ND		ND		nc	25
64-17-5	Ethanol	ND		ND		nc	25
100-41-4	Ethylbenzene	3.3	J	2.9	J	13	25
141-78-6	Ethyl Acetate	ND		ND		nc	25
622-96-8	4-Ethyltoluene	ND		ND		nc	25

\* = Outside of Control Limits.

5.3.1  
5

# Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC78069-2DUP	6W09225.D	1	11/20/18	PC	n/a	n/a	V6W357
JC78069-2	6W09224.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Compound	JC78069-2 ppbv	DUP Q	ppbv	Q	RPD	Limits
76-13-1	Freon 113	ND		ND		nc	25
76-14-2	Freon 114	ND		ND		nc	25
142-82-5	Heptane	2.8	J	2.6	J	7	25
87-68-3	Hexachlorobutadiene	ND		ND		nc	25
110-54-3	Hexane	11.0		10.4		6	25
591-78-6	2-Hexanone	4.4		3.9	J	12	25
67-63-0	Isopropyl Alcohol	ND		ND		nc	25
75-09-2	Methylene chloride	ND		ND		nc	25
78-93-3	Methyl ethyl ketone	7.2		6.6		9	25
108-10-1	Methyl Isobutyl Ketone	2.7	J	ND		200* a	25
1634-04-4	Methyl Tert Butyl Ether	ND		ND		nc	25
80-62-6	Methylmethacrylate	ND		ND		nc	25
115-07-1	Propylene	1150	E	1090	E	5	25
100-42-5	Styrene	ND		ND		nc	25
71-55-6	1,1,1-Trichloroethane	ND		ND		nc	25
79-34-5	1,1,2,2-Tetrachloroethane	ND		ND		nc	25
79-00-5	1,1,2-Trichloroethane	ND		ND		nc	25
120-82-1	1,2,4-Trichlorobenzene	ND		ND		nc	25
95-63-6	1,2,4-Trimethylbenzene	ND		ND		nc	25
108-67-8	1,3,5-Trimethylbenzene	ND		ND		nc	25
540-84-1	2,2,4-Trimethylpentane	ND		ND		nc	25
75-65-0	Tertiary Butyl Alcohol	ND		ND		nc	25
127-18-4	Tetrachloroethylene	1.1		1.1		0	25
109-99-9	Tetrahydrofuran	ND		ND		nc	25
108-88-3	Toluene	8.2		7.4		10	25
79-01-6	Trichloroethylene	ND		ND		nc	25
75-69-4	Trichlorofluoromethane	ND		ND		nc	25
75-01-4	Vinyl chloride	ND		ND		nc	25
108-05-4	Vinyl Acetate	ND		ND		nc	25
	m,p-Xylene	15.9		13.8		14	25
95-47-6	o-Xylene	5.6		5.0		11	25
1330-20-7	Xylenes (total)	21.5		18.8		13	25

\* = Outside of Control Limits.

5.3.1  
5



## Duplicate Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC78069-2DUP	6W09225.D	1	11/20/18	PC	n/a	n/a	V6W357
JC78069-2	6W09224.D	1	11/20/18	PC	n/a	n/a	V6W357

The QC reported here applies to the following samples:

Method: TO-15

JC78069-1, JC78069-2

CAS No.	Surrogate Recoveries	DUP	JC78069-2	Limits
460-00-4	4-Bromofluorobenzene	96%	104%	65-128%

(a) High RPD due to low concentration of hit

\* = Outside of Control Limits.

# Summa Cleaning Certification

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-SCC	6W08796.D	1	10/24/18	PC	n/a	n/a	V6W337

The QC reported here (Summa A533) applies to the following samples: Method: TO-15

Batch CP10038 cleaned 10/18/18: JC78069-1(A617), JC78069-2(M198)

CAS No.	Compound	Result	RL	MDL	Units	Q	Result	RL	Units
67-64-1	Acetone	ND	0.20	0.11	ppbv		ND	0.48	ug/m3
106-99-0	1,3-Butadiene	ND	0.20	0.046	ppbv		ND	0.44	ug/m3
71-43-2	Benzene	ND	0.20	0.012	ppbv		ND	0.64	ug/m3
75-27-4	Bromodichloromethane	ND	0.20	0.027	ppbv		ND	1.3	ug/m3
75-25-2	Bromoform	ND	0.20	0.037	ppbv		ND	2.1	ug/m3
74-83-9	Bromomethane	ND	0.20	0.022	ppbv		ND	0.78	ug/m3
593-60-2	Bromoethene	ND	0.20	0.022	ppbv		ND	0.87	ug/m3
100-44-7	Benzyl Chloride	ND	0.20	0.057	ppbv		ND	1.0	ug/m3
75-15-0	Carbon disulfide	ND	0.20	0.024	ppbv		ND	0.62	ug/m3
108-90-7	Chlorobenzene	ND	0.20	0.026	ppbv		ND	0.92	ug/m3
75-00-3	Chloroethane	ND	0.20	0.048	ppbv		ND	0.53	ug/m3
67-66-3	Chloroform	ND	0.20	0.020	ppbv		ND	0.98	ug/m3
74-87-3	Chloromethane	ND	0.20	0.015	ppbv		ND	0.41	ug/m3
107-05-1	3-Chloropropene	ND	0.20	0.040	ppbv		ND	0.63	ug/m3
95-49-8	2-Chlorotoluene	ND	0.20	0.025	ppbv		ND	1.0	ug/m3
56-23-5	Carbon tetrachloride	ND	0.20	0.024	ppbv		ND	1.3	ug/m3
110-82-7	Cyclohexane	ND	0.20	0.022	ppbv		ND	0.69	ug/m3
75-34-3	1,1-Dichloroethane	ND	0.20	0.012	ppbv		ND	0.81	ug/m3
75-35-4	1,1-Dichloroethylene	ND	0.20	0.017	ppbv		ND	0.79	ug/m3
106-93-4	1,2-Dibromoethane	ND	0.20	0.018	ppbv		ND	1.5	ug/m3
107-06-2	1,2-Dichloroethane	ND	0.20	0.021	ppbv		ND	0.81	ug/m3
78-87-5	1,2-Dichloropropane	ND	0.20	0.019	ppbv		ND	0.92	ug/m3
123-91-1	1,4-Dioxane	ND	0.20	0.052	ppbv		ND	0.72	ug/m3
75-71-8	Dichlorodifluoromethane	ND	0.20	0.017	ppbv		ND	0.99	ug/m3
124-48-1	Dibromochloromethane	ND	0.20	0.033	ppbv		ND	1.7	ug/m3
156-60-5	trans-1,2-Dichloroethylene	ND	0.20	0.0073	ppbv		ND	0.79	ug/m3
156-59-2	cis-1,2-Dichloroethylene	ND	0.20	0.012	ppbv		ND	0.79	ug/m3
10061-01-5	cis-1,3-Dichloropropene	ND	0.20	0.020	ppbv		ND	0.91	ug/m3
541-73-1	m-Dichlorobenzene	ND	0.20	0.019	ppbv		ND	1.2	ug/m3
95-50-1	o-Dichlorobenzene	ND	0.20	0.022	ppbv		ND	1.2	ug/m3
106-46-7	p-Dichlorobenzene	ND	0.20	0.018	ppbv		ND	1.2	ug/m3
10061-02-6	trans-1,3-Dichloropropene	ND	0.20	0.020	ppbv		ND	0.91	ug/m3
64-17-5	Ethanol	ND	0.50	0.22	ppbv		ND	0.94	ug/m3
100-41-4	Ethylbenzene	ND	0.20	0.015	ppbv		ND	0.87	ug/m3
141-78-6	Ethyl Acetate	ND	0.20	0.038	ppbv		ND	0.72	ug/m3
622-96-8	4-Ethyltoluene	ND	0.20	0.030	ppbv		ND	0.98	ug/m3

5.4.1  
5

# Summa Cleaning Certification

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-SCC	6W08796.D	1	10/24/18	PC	n/a	n/a	V6W337

**The QC reported here (Summa A533) applies to the following samples:** Method: TO-15

Batch CP10038 cleaned 10/18/18: JC78069-1(A617), JC78069-2(M198)

CAS No.	Compound	Result	RL	MDL	Units	Q	Result	RL	Units
76-13-1	Freon 113	ND	0.20	0.017	ppbv		ND	1.5	ug/m3
76-14-2	Freon 114	ND	0.20	0.019	ppbv		ND	1.4	ug/m3
142-82-5	Heptane	ND	0.20	0.018	ppbv		ND	0.82	ug/m3
87-68-3	Hexachlorobutadiene	ND	0.20	0.046	ppbv		ND	2.1	ug/m3
110-54-3	Hexane	ND	0.20	0.011	ppbv		ND	0.70	ug/m3
591-78-6	2-Hexanone	ND	0.20	0.036	ppbv		ND	0.82	ug/m3
67-63-0	Isopropyl Alcohol	ND	0.20	0.065	ppbv		ND	0.49	ug/m3
75-09-2	Methylene chloride	ND	0.20	0.015	ppbv		ND	0.69	ug/m3
78-93-3	Methyl ethyl ketone	ND	0.20	0.042	ppbv		ND	0.59	ug/m3
108-10-1	Methyl Isobutyl Ketone	ND	0.20	0.036	ppbv		ND	0.82	ug/m3
1634-04-4	Methyl Tert Butyl Ether	ND	0.20	0.019	ppbv		ND	0.72	ug/m3
80-62-6	Methylmethacrylate	ND	0.20	0.033	ppbv		ND	0.82	ug/m3
115-07-1	Propylene	ND	0.50	0.016	ppbv		ND	0.86	ug/m3
100-42-5	Styrene	ND	0.20	0.019	ppbv		ND	0.85	ug/m3
71-55-6	1,1,1-Trichloroethane	ND	0.20	0.033	ppbv		ND	1.1	ug/m3
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.20	0.027	ppbv		ND	1.4	ug/m3
79-00-5	1,1,2-Trichloroethane	ND	0.20	0.030	ppbv		ND	1.1	ug/m3
120-82-1	1,2,4-Trichlorobenzene	ND	0.20	0.089	ppbv		ND	1.5	ug/m3
95-63-6	1,2,4-Trimethylbenzene	ND	0.20	0.033	ppbv		ND	0.98	ug/m3
108-67-8	1,3,5-Trimethylbenzene	ND	0.20	0.034	ppbv		ND	0.98	ug/m3
540-84-1	2,2,4-Trimethylpentane	ND	0.20	0.022	ppbv		ND	0.93	ug/m3
75-65-0	Tertiary Butyl Alcohol	ND	0.20	0.014	ppbv		ND	0.61	ug/m3
127-18-4	Tetrachloroethylene	ND	0.040	0.031	ppbv		ND	0.27	ug/m3
109-99-9	Tetrahydrofuran	ND	0.20	0.050	ppbv		ND	0.59	ug/m3
108-88-3	Toluene	ND	0.20	0.014	ppbv		ND	0.75	ug/m3
79-01-6	Trichloroethylene	ND	0.040	0.019	ppbv		ND	0.21	ug/m3
75-69-4	Trichlorofluoromethane	ND	0.20	0.028	ppbv		ND	1.1	ug/m3
75-01-4	Vinyl chloride	ND	0.20	0.022	ppbv		ND	0.51	ug/m3
108-05-4	Vinyl Acetate	ND	0.20	0.034	ppbv		ND	0.70	ug/m3
	m,p-Xylene	ND	0.20	0.034	ppbv		ND	0.87	ug/m3
95-47-6	o-Xylene	ND	0.20	0.017	ppbv		ND	0.87	ug/m3
1330-20-7	Xylenes (total)	ND	0.20	0.017	ppbv		ND	0.87	ug/m3

5.4.1  
5

# Summa Cleaning Certification

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V6W337-SCC	6W08796.D	1	10/24/18	PC	n/a	n/a	V6W337

The QC reported here (Summa A533) applies to the following samples: Method: TO-15

Batch CP10038 cleaned 10/18/18: JC78069-1(A617), JC78069-2(M198)

CAS No.	Surrogate Recoveries	Limits
460-00-4	4-Bromofluorobenzene	91% 65-128%

5.4.1  
5

# Instrument Performance Check (BFB)

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

<b>Sample:</b> V6W335-BFB	<b>Injection Date:</b> 10/22/18
<b>Lab File ID:</b> 6W08748.D	<b>Injection Time:</b> 12:00
<b>Instrument ID:</b> GCMS6W	

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	8.0 - 40.0% of mass 95	34776	17.6	Pass
75	30.0 - 66.0% of mass 95	93560	47.5	Pass
95	Base peak, 100% relative abundance	197120	100.0	Pass
96	5.0 - 9.0% of mass 95	13073	6.63	Pass
173	Less than 2.0% of mass 174	1546	0.78 (0.81) <sup>a</sup>	Pass
174	50.0 - 120.0% of mass 95	190869	96.8	Pass
175	4.0 - 9.0% of mass 174	13968	7.09 (7.32) <sup>a</sup>	Pass
176	93.0 - 101.0% of mass 174	187051	94.9 (98.0) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	12105	6.14 (6.47) <sup>b</sup>	Pass

(a) Value is % of mass 174

(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V6W335-IC335	6W08749.D	10/22/18	12:49	00:49	Initial cal 0.04
V6W335-IC335	6W08750.D	10/22/18	13:48	01:48	Initial cal 0.1
V6W335-IC335	6W08751.D	10/22/18	14:40	02:40	Initial cal 0.2
V6W335-IC335	6W08752.D	10/22/18	15:33	03:33	Initial cal 0.5
V6W335-IC335	6W08753.D	10/22/18	16:23	04:23	Initial cal 5
V6W335-ICC335	6W08754.D	10/22/18	17:14	05:14	Initial cal 10
V6W335-IC335	6W08755.D	10/22/18	18:07	06:07	Initial cal 20
V6W335-IC335	6W08756.D	10/22/18	19:04	07:04	Initial cal 40
V6W335-ICV335	6W08758.D	10/22/18	20:45	08:45	Initial cal verification 10

5.5.1  
5

# Instrument Performance Check (BFB)

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

<b>Sample:</b> V6W337-BFB	<b>Injection Date:</b> 10/24/18
<b>Lab File ID:</b> 6W08790.D	<b>Injection Time:</b> 13:26
<b>Instrument ID:</b> GCMS6W	

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	8.0 - 40.0% of mass 95	33085	17.4	Pass
75	30.0 - 66.0% of mass 95	88811	46.7	Pass
95	Base peak, 100% relative abundance	190144	100.0	Pass
96	5.0 - 9.0% of mass 95	12734	6.70	Pass
173	Less than 2.0% of mass 174	1507	0.79 (0.83) <sup>a</sup>	Pass
174	50.0 - 120.0% of mass 95	181696	95.6	Pass
175	4.0 - 9.0% of mass 174	13255	6.97 (7.30) <sup>a</sup>	Pass
176	93.0 - 101.0% of mass 174	175957	92.5 (96.8) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	11525	6.06 (6.55) <sup>b</sup>	Pass

(a) Value is % of mass 174

(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V6W337-CC335	6W08791.D	10/24/18	14:17	00:51	Continuing cal 10
V6W337-BS	6W08792.D	10/24/18	15:07	01:41	Blank Spike
V6W337-BSD	6W08793.D	10/24/18	15:58	02:32	Blank Spike Duplicate
V6W337-MB	6W08795.D	10/24/18	17:54	04:28	Method Blank
V6W337-SCC	6W08796.D	10/24/18	18:50	05:24	Summa Cleaning Certification
ZZZZZZ	6W08797.D	10/24/18	19:42	06:16	(unrelated sample)
ZZZZZZ	6W08798.D	10/24/18	20:33	07:07	(unrelated sample)
ZZZZZZ	6W08799.D	10/24/18	21:24	07:58	(unrelated sample)
ZZZZZZ	6W08800.D	10/24/18	22:15	08:49	(unrelated sample)
ZZZZZZ	6W08801.D	10/24/18	23:08	09:42	(unrelated sample)
ZZZZZZ	6W08802.D	10/25/18	00:01	10:35	(unrelated sample)
JC75871-6	6W08803.D	10/25/18	00:51	11:25	(used for QC only; not part of job JC78069)
JC75871-6DUP	6W08804.D	10/25/18	01:42	12:16	Duplicate
ZZZZZZ	6W08805.D	10/25/18	02:32	13:06	(unrelated sample)
ZZZZZZ	6W08806.D	10/25/18	03:24	13:58	(unrelated sample)
ZZZZZZ	6W08807.D	10/25/18	04:17	14:51	(unrelated sample)

5.5.2  
5

# Instrument Performance Check (BFB)

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

<b>Sample:</b> V6W357-BFB	<b>Injection Date:</b> 11/20/18
<b>Lab File ID:</b> 6W09212.D	<b>Injection Time:</b> 09:18
<b>Instrument ID:</b> GCMS6W	

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	8.0 - 40.0% of mass 95	21611	14.4	Pass
75	30.0 - 66.0% of mass 95	62288	41.6	Pass
95	Base peak, 100% relative abundance	149909	100.0	Pass
96	5.0 - 9.0% of mass 95	10112	6.75	Pass
173	Less than 2.0% of mass 174	1188	0.79 (0.84) <sup>a</sup>	Pass
174	50.0 - 120.0% of mass 95	141445	94.4	Pass
175	4.0 - 9.0% of mass 174	10493	7.00 (7.42) <sup>a</sup>	Pass
176	93.0 - 101.0% of mass 174	137248	91.6 (97.0) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	9114	6.08 (6.64) <sup>b</sup>	Pass

(a) Value is % of mass 174

(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V6W357-CC335	6W09213.D	11/20/18	10:06	00:48	Continuing cal 10
V6W357-BS	6W09214.D	11/20/18	10:59	01:41	Blank Spike
V6W357-BSD	6W09215.D	11/20/18	11:46	02:28	Blank Spike Duplicate
V6W357-MB	6W09217.D	11/20/18	14:30	05:12	Method Blank
ZZZZZZ	6W09218.D	11/20/18	15:29	06:11	(unrelated sample)
ZZZZZZ	6W09219.D	11/20/18	16:19	07:01	(unrelated sample)
ZZZZZZ	6W09220.D	11/20/18	17:08	07:50	(unrelated sample)
ZZZZZZ	6W09221.D	11/20/18	18:05	08:47	(unrelated sample)
ZZZZZZ	6W09222.D	11/20/18	19:07	09:49	(unrelated sample)
JC78069-1	6W09223.D	11/20/18	19:55	10:37	SG-1
JC78069-2	6W09224.D	11/20/18	20:43	11:25	SG-2
JC78069-2DUP	6W09225.D	11/20/18	21:31	12:13	Duplicate
V6W357-SCC	6W09227.D	11/20/18	23:17	13:59	Summa Cleaning Certification
V6W357-SCC	6W09228.D	11/21/18	00:10	14:52	Summa Cleaning Certification

5.5.3  
5

# Instrument Performance Check (BFB)

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

<b>Sample:</b> V6W358-BFB	<b>Injection Date:</b> 11/21/18
<b>Lab File ID:</b> 6W09234.D	<b>Injection Time:</b> 08:38
<b>Instrument ID:</b> GCMS6W	

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance	Pass/Fail
50	8.0 - 40.0% of mass 95	20736	14.0	Pass
75	30.0 - 66.0% of mass 95	61280	41.3	Pass
95	Base peak, 100% relative abundance	148368	100.0	Pass
96	5.0 - 9.0% of mass 95	9715	6.55	Pass
173	Less than 2.0% of mass 174	1248	0.84 (0.85) <sup>a</sup>	Pass
174	50.0 - 120.0% of mass 95	146826	99.0	Pass
175	4.0 - 9.0% of mass 174	10805	7.28 (7.36) <sup>a</sup>	Pass
176	93.0 - 101.0% of mass 174	143666	96.8 (97.8) <sup>a</sup>	Pass
177	5.0 - 9.0% of mass 176	9404	6.34 (6.55) <sup>b</sup>	Pass

(a) Value is % of mass 174

(b) Value is % of mass 176

**This check applies to the following Samples, MS, MSD, Blanks, and Standards:**

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V6W358-CC335	6W09235.D	11/21/18	09:26	00:48	Continuing cal 10
V6W358-BS	6W09236.D	11/21/18	10:20	01:42	Blank Spike
V6W358-BSD	6W09237.D	11/21/18	11:07	02:29	Blank Spike Duplicate
V6W358-MB	6W09239.D	11/21/18	13:16	04:38	Method Blank
JC78069-2	6W09240.D	11/21/18	14:37	05:59	SG-2
ZZZZZ	6W09241.D	11/21/18	15:24	06:46	(unrelated sample)

5.5.4  
5



# Surrogate Recovery Summary

**Job Number:** JC78069  
**Account:** HAHNCC Hart & Hickman  
**Project:** CLT-628, 1205 Eureka Street, Charlotte, NC

<b>Method:</b> TO-15	<b>Matrix:</b> AIR
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Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1
JC78069-1	6W09223.D	102
JC78069-2	6W09224.D	104
JC78069-2	6W09240.D	96
JC78069-2DUP	6W09225.D	96
V6W337-SCC	6W08796.D	91
V6W357-BS	6W09214.D	101
V6W357-BSD	6W09215.D	100
V6W357-MB	6W09217.D	93
V6W358-BS	6W09236.D	102
V6W358-BSD	6W09237.D	102
V6W358-MB	6W09239.D	93
V6W337-BS	6W08792.D	101
V6W337-BSD	6W08793.D	103
V6W337-MB	6W08795.D	95

Surrogate Compounds	Recovery Limits
S1 = 4-Bromofluorobenzene	65-128%

5.6.1  
5



Full-Service Analytical & Environmental Solutions

NC Certification No. 402  
NC Drinking Water Cert No. 37735  
SC Certification No. 99012

# Case Narrative

11/19/2018

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

Project: CLT-628

Lab Submittal Date: 11/12/2018  
Prism Work Order: 8110203

This data package contains the analytical results for the project identified above and includes a Case Narrative, Sample Results and Chain of Custody. Unless otherwise noted, all samples were received in acceptable condition and processed according to the referenced methods.

Data qualifiers are flagged individually on each sample. A key reference for the data qualifiers appears at the end of this case narrative.

Please call if you have any questions relating to this analytical report.

Respectfully,

**PRISM LABORATORIES, INC.**

Angela D. Overcash  
VP Laboratory Services

Reviewed By Terri W. Cole For Angela D. Overcash  
Project Manager

### Data Qualifiers Key Reference:

- B Analyte is found in the associated blank at a concentration >1/2 RL.
- L2 LCSD recovery outside of the QC limits. LCS recovery within the limits. No further action taken.
- BRL Below Reporting Limit
- MDL Method Detection Limit
- RPD Relative Percent Difference
- \* Results reported to the reporting limit. All other results are reported to the MDL with values between MDL and reporting limit indicated with a J.

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449 Springbrook Road - P.O. Box 240543 - Charlotte, NC 28224-0543  
Phone: 704/529-6364 - Toll Free Number: 1-800/529-6364 - Fax: 704/525-0409

Client Sample ID	Lab Sample ID	Matrix	Date/Time Sampled	Date/Time Received
Creek-1	8110203-01	Water	11/12/18 6:15	11/12/18 13:35
Creek-2	8110203-02	Water	11/12/18 5:55	11/12/18 13:35

Samples were received in good condition at 3.2 degrees C unless otherwise noted.

Prism ID	Client ID	Parameter	Method	Result	Units
8110203-01	Creek-1	Tetrachloroethylene	*8260B	5.4	ug/L
8110203-01	Creek-1	Trichloroethylene	*8260B	2.1	ug/L
8110203-02	Creek-2	Tetrachloroethylene	*8260B	3.4	ug/L
8110203-02	Creek-2	Trichloroethylene	*8260B	1.0	ug/L

Hart & Hickman (Charlotte)  
 Attn: Matt Bramblett  
 2923 South Tryon St. Ste 100  
 Charlotte, NC 28203

Project: CLT-628  
  
 Sample Matrix: Water

Client Sample ID: Creek-1  
 Prism Sample ID: 8110203-01  
 Prism Work Order: 8110203  
 Time Collected: 11/12/18 06:15  
 Time Submitted: 11/12/18 13:35

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
<b>Volatile Organic Compounds by GC/MS</b>									
1,1,1,2-Tetrachloroethane	BRL	ug/L	0.50	0.11	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,1,1-Trichloroethane	BRL	ug/L	0.50	0.061	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,1,2,2-Tetrachloroethane	BRL	ug/L	0.50	0.036	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,1,2-Trichloroethane	BRL	ug/L	0.50	0.066	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,1-Dichloroethane	BRL	ug/L	0.50	0.083	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,1-Dichloroethylene	BRL	ug/L	0.50	0.083	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,1-Dichloropropylene	BRL	ug/L	0.50	0.051	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2,3-Trichlorobenzene	BRL	ug/L	2.0	0.40	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2,3-Trichloropropane	BRL	ug/L	1.0	0.14	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2,4-Trichlorobenzene	BRL	ug/L	1.0	0.13	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2,4-Trimethylbenzene	BRL	ug/L	0.50	0.054	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2-Dibromo-3-chloropropane	BRL	ug/L	2.0	0.17	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2-Dibromoethane	BRL	ug/L	0.50	0.051	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2-Dichlorobenzene	BRL	ug/L	0.50	0.076	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2-Dichloroethane	BRL	ug/L	0.50	0.066	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,2-Dichloropropane	BRL	ug/L	0.50	0.11	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,3,5-Trimethylbenzene	BRL	ug/L	0.50	0.076	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,3-Dichlorobenzene	BRL	ug/L	0.50	0.054	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,3-Dichloropropane	BRL	ug/L	0.50	0.043	1	*8260B	11/14/18 21:42	KDM	P8K0264
1,4-Dichlorobenzene	BRL	ug/L	0.50	0.050	1	*8260B	11/14/18 21:42	KDM	P8K0264
2,2-Dichloropropane	BRL	ug/L	2.0	0.11	1	*8260B	11/14/18 21:42	KDM	P8K0264
2-Chlorotoluene	BRL	ug/L	0.50	0.066	1	*8260B	11/14/18 21:42	KDM	P8K0264
4-Chlorotoluene	BRL	ug/L	0.50	0.050	1	*8260B	11/14/18 21:42	KDM	P8K0264
4-Isopropyltoluene	BRL	ug/L	0.50	0.089	1	*8260B	11/14/18 21:42	KDM	P8K0264
Acetone	BRL	ug/L	5.0	0.31	1	*8260B	11/14/18 21:42	KDM	P8K0264
Acrolein	BRL	ug/L	20	0.20	1	*8260B	11/14/18 21:42	KDM	P8K0264
Acrylonitrile	BRL	ug/L	20	0.20	1	*8260B	11/14/18 21:42	KDM	P8K0264
Benzene	BRL	ug/L	0.50	0.048	1	*8260B	11/14/18 21:42	KDM	P8K0264
Bromobenzene	BRL	ug/L	0.50	0.057	1	*8260B	11/14/18 21:42	KDM	P8K0264
Bromochloromethane	BRL	ug/L	0.50	0.14	1	*8260B	11/14/18 21:42	KDM	P8K0264
Bromodichloromethane	BRL	ug/L	0.50	0.062	1	*8260B	11/14/18 21:42	KDM	P8K0264
Bromoform	BRL	ug/L	1.0	0.040	1	*8260B	11/14/18 21:42	KDM	P8K0264
Bromomethane	BRL	ug/L	1.0	0.18	1	*8260B	11/14/18 21:42	KDM	P8K0264
Carbon disulfide	BRL	ug/L	5.0	0.075	1	*8260B	11/14/18 21:42	KDM	P8K0264
Carbon Tetrachloride	BRL	ug/L	0.50	0.11	1	*8260B	11/14/18 21:42	KDM	P8K0264
Chlorobenzene	BRL	ug/L	0.50	0.062	1	*8260B	11/14/18 21:42	KDM	P8K0264
Chloroethane	BRL	ug/L	0.50	0.22	1	*8260B	11/14/18 21:42	KDM	P8K0264
Chloroform	BRL	ug/L	0.50	0.076	1	*8260B	11/14/18 21:42	KDM	P8K0264
Chloromethane	BRL	ug/L	0.50	0.079	1	*8260B	11/14/18 21:42	KDM	P8K0264
cis-1,2-Dichloroethylene	BRL	ug/L	0.50	0.056	1	*8260B	11/14/18 21:42	KDM	P8K0264
cis-1,3-Dichloropropylene	BRL	ug/L	0.50	0.079	1	*8260B	11/14/18 21:42	KDM	P8K0264
Dibromochloromethane	BRL	ug/L	0.50	0.081	1	*8260B	11/14/18 21:42	KDM	P8K0264

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Hart & Hickman (Charlotte)  
 Attn: Matt Bramblett  
 2923 South Tryon St. Ste 100  
 Charlotte, NC 28203

Project: CLT-628  
  
 Sample Matrix: Water

Client Sample ID: Creek-1  
 Prism Sample ID: 8110203-01  
 Prism Work Order: 8110203  
 Time Collected: 11/12/18 06:15  
 Time Submitted: 11/12/18 13:35

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Dibromomethane	BRL	ug/L	0.50	0.065	1	*8260B	11/14/18 21:42	KDM	P8K0264
Dichlorodifluoromethane	BRL	ug/L	1.0	0.11	1	*8260B	11/14/18 21:42	KDM	P8K0264
Ethylbenzene	BRL	ug/L	0.50	0.061	1	*8260B	11/14/18 21:42	KDM	P8K0264
Hexachlorobutadiene	BRL	ug/L	2.0	0.16	1	*8260B	11/14/18 21:42	KDM	P8K0264
Isopropyl Ether	BRL	ug/L	0.50	0.050	1	*8260B	11/14/18 21:42	KDM	P8K0264
Isopropylbenzene (Cumene)	BRL	ug/L	0.50	0.054	1	*8260B	11/14/18 21:42	KDM	P8K0264
m,p-Xylenes	BRL	ug/L	1.0	0.12	1	*8260B	11/14/18 21:42	KDM	P8K0264
Methyl Butyl Ketone (2-Hexanone)	BRL	ug/L	5.0	0.065	1	*8260B	11/14/18 21:42	KDM	P8K0264
Methyl Ethyl Ketone (2-Butanone)	BRL	ug/L	5.0	0.24	1	*8260B	11/14/18 21:42	KDM	P8K0264
Methyl Isobutyl Ketone	BRL	ug/L	5.0	0.078	1	*8260B	11/14/18 21:42	KDM	P8K0264
Methylene Chloride	BRL	ug/L	1.0	0.083	1	*8260B	11/14/18 21:42	KDM	P8K0264
Methyl-tert-Butyl Ether	BRL	ug/L	0.50	0.042	1	*8260B	11/14/18 21:42	KDM	P8K0264
Naphthalene	BRL	ug/L	1.0	0.19	1	*8260B	11/14/18 21:42	KDM	P8K0264
n-Butylbenzene	BRL	ug/L	1.0	0.076	1	*8260B	11/14/18 21:42	KDM	P8K0264
n-Propylbenzene	BRL	ug/L	0.50	0.087	1	*8260B	11/14/18 21:42	KDM	P8K0264
o-Xylene	BRL	ug/L	0.50	0.044	1	*8260B	11/14/18 21:42	KDM	P8K0264
sec-Butylbenzene	BRL	ug/L	0.50	0.076	1	*8260B	11/14/18 21:42	KDM	P8K0264
Styrene	BRL	ug/L	0.50	0.047	1	*8260B	11/14/18 21:42	KDM	P8K0264
tert-Butylbenzene	BRL	ug/L	0.50	0.088	1	*8260B	11/14/18 21:42	KDM	P8K0264
<b>Tetrachloroethylene</b>	<b>5.4</b>	<b>ug/L</b>	<b>0.50</b>	<b>0.098</b>	<b>1</b>	<b>*8260B</b>	<b>11/14/18 21:42</b>	<b>KDM</b>	<b>P8K0264</b>
Toluene	BRL	ug/L	0.50	0.044	1	*8260B	11/14/18 21:42	KDM	P8K0264
trans-1,2-Dichloroethylene	BRL	ug/L	0.50	0.094	1	*8260B	11/14/18 21:42	KDM	P8K0264
trans-1,3-Dichloropropylene	BRL	ug/L	0.50	0.070	1	*8260B	11/14/18 21:42	KDM	P8K0264
<b>Trichloroethylene</b>	<b>2.1</b>	<b>ug/L</b>	<b>0.50</b>	<b>0.078</b>	<b>1</b>	<b>*8260B</b>	<b>11/14/18 21:42</b>	<b>KDM</b>	<b>P8K0264</b>
Trichlorofluoromethane	BRL	ug/L	0.50	0.062	1	*8260B	11/14/18 21:42	KDM	P8K0264
Vinyl acetate	BRL	ug/L	2.0	0.060	1	*8260B	11/14/18 21:42	KDM	P8K0264
Vinyl chloride	BRL	ug/L	0.50	0.097	1	*8260B	11/14/18 21:42	KDM	P8K0264
Xylenes, total	BRL	ug/L	1.5	0.15	1	*8260B	11/14/18 21:42	KDM	P8K0264

Surrogate	Recovery	Control Limits
4-Bromofluorobenzene	96 %	80-124
Dibromofluoromethane	96 %	75-129
Toluene-d8	93 %	77-123

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Hart & Hickman (Charlotte)  
 Attn: Matt Bramblett  
 2923 South Tryon St. Ste 100  
 Charlotte, NC 28203

Project: CLT-628  
  
 Sample Matrix: Water

Client Sample ID: Creek-2  
 Prism Sample ID: 8110203-02  
 Prism Work Order: 8110203  
 Time Collected: 11/12/18 05:55  
 Time Submitted: 11/12/18 13:35

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
<b>Volatile Organic Compounds by GC/MS</b>									
1,1,1,2-Tetrachloroethane	BRL	ug/L	0.50	0.11	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,1,1-Trichloroethane	BRL	ug/L	0.50	0.061	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,1,2,2-Tetrachloroethane	BRL	ug/L	0.50	0.036	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,1,2-Trichloroethane	BRL	ug/L	0.50	0.066	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,1-Dichloroethane	BRL	ug/L	0.50	0.083	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,1-Dichloroethylene	BRL	ug/L	0.50	0.083	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,1-Dichloropropylene	BRL	ug/L	0.50	0.051	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2,3-Trichlorobenzene	BRL	ug/L	2.0	0.40	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2,3-Trichloropropane	BRL	ug/L	1.0	0.14	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2,4-Trichlorobenzene	BRL	ug/L	1.0	0.13	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2,4-Trimethylbenzene	BRL	ug/L	0.50	0.054	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2-Dibromo-3-chloropropane	BRL	ug/L	2.0	0.17	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2-Dibromoethane	BRL	ug/L	0.50	0.051	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2-Dichlorobenzene	BRL	ug/L	0.50	0.076	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2-Dichloroethane	BRL	ug/L	0.50	0.066	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,2-Dichloropropane	BRL	ug/L	0.50	0.11	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,3,5-Trimethylbenzene	BRL	ug/L	0.50	0.076	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,3-Dichlorobenzene	BRL	ug/L	0.50	0.054	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,3-Dichloropropane	BRL	ug/L	0.50	0.043	1	*8260B	11/14/18 22:08	KDM	P8K0264
1,4-Dichlorobenzene	BRL	ug/L	0.50	0.050	1	*8260B	11/14/18 22:08	KDM	P8K0264
2,2-Dichloropropane	BRL	ug/L	2.0	0.11	1	*8260B	11/14/18 22:08	KDM	P8K0264
2-Chlorotoluene	BRL	ug/L	0.50	0.066	1	*8260B	11/14/18 22:08	KDM	P8K0264
4-Chlorotoluene	BRL	ug/L	0.50	0.050	1	*8260B	11/14/18 22:08	KDM	P8K0264
4-Isopropyltoluene	BRL	ug/L	0.50	0.089	1	*8260B	11/14/18 22:08	KDM	P8K0264
Acetone	BRL	ug/L	5.0	0.31	1	*8260B	11/14/18 22:08	KDM	P8K0264
Acrolein	BRL	ug/L	20	0.20	1	*8260B	11/14/18 22:08	KDM	P8K0264
Acrylonitrile	BRL	ug/L	20	0.20	1	*8260B	11/14/18 22:08	KDM	P8K0264
Benzene	BRL	ug/L	0.50	0.048	1	*8260B	11/14/18 22:08	KDM	P8K0264
Bromobenzene	BRL	ug/L	0.50	0.057	1	*8260B	11/14/18 22:08	KDM	P8K0264
Bromochloromethane	BRL	ug/L	0.50	0.14	1	*8260B	11/14/18 22:08	KDM	P8K0264
Bromodichloromethane	BRL	ug/L	0.50	0.062	1	*8260B	11/14/18 22:08	KDM	P8K0264
Bromoform	BRL	ug/L	1.0	0.040	1	*8260B	11/14/18 22:08	KDM	P8K0264
Bromomethane	BRL	ug/L	1.0	0.18	1	*8260B	11/14/18 22:08	KDM	P8K0264
Carbon disulfide	BRL	ug/L	5.0	0.075	1	*8260B	11/14/18 22:08	KDM	P8K0264
Carbon Tetrachloride	BRL	ug/L	0.50	0.11	1	*8260B	11/14/18 22:08	KDM	P8K0264
Chlorobenzene	BRL	ug/L	0.50	0.062	1	*8260B	11/14/18 22:08	KDM	P8K0264
Chloroethane	BRL	ug/L	0.50	0.22	1	*8260B	11/14/18 22:08	KDM	P8K0264
Chloroform	BRL	ug/L	0.50	0.076	1	*8260B	11/14/18 22:08	KDM	P8K0264
Chloromethane	BRL	ug/L	0.50	0.079	1	*8260B	11/14/18 22:08	KDM	P8K0264
cis-1,2-Dichloroethylene	BRL	ug/L	0.50	0.056	1	*8260B	11/14/18 22:08	KDM	P8K0264
cis-1,3-Dichloropropylene	BRL	ug/L	0.50	0.079	1	*8260B	11/14/18 22:08	KDM	P8K0264
Dibromochloromethane	BRL	ug/L	0.50	0.081	1	*8260B	11/14/18 22:08	KDM	P8K0264

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Hart & Hickman (Charlotte)  
 Attn: Matt Bramblett  
 2923 South Tryon St. Ste 100  
 Charlotte, NC 28203

Project: CLT-628

Sample Matrix: Water

Client Sample ID: Creek-2  
 Prism Sample ID: 8110203-02  
 Prism Work Order: 8110203  
 Time Collected: 11/12/18 05:55  
 Time Submitted: 11/12/18 13:35

Parameter	Result	Units	Report Limit	MDL	Dilution Factor	Method	Analysis Date/Time	Analyst	Batch ID
Dibromomethane	BRL	ug/L	0.50	0.065	1	*8260B	11/14/18 22:08	KDM	P8K0264
Dichlorodifluoromethane	BRL	ug/L	1.0	0.11	1	*8260B	11/14/18 22:08	KDM	P8K0264
Ethylbenzene	BRL	ug/L	0.50	0.061	1	*8260B	11/14/18 22:08	KDM	P8K0264
Hexachlorobutadiene	BRL	ug/L	2.0	0.16	1	*8260B	11/14/18 22:08	KDM	P8K0264
Isopropyl Ether	BRL	ug/L	0.50	0.050	1	*8260B	11/14/18 22:08	KDM	P8K0264
Isopropylbenzene (Cumene)	BRL	ug/L	0.50	0.054	1	*8260B	11/14/18 22:08	KDM	P8K0264
m,p-Xylenes	BRL	ug/L	1.0	0.12	1	*8260B	11/14/18 22:08	KDM	P8K0264
Methyl Butyl Ketone (2-Hexanone)	BRL	ug/L	5.0	0.065	1	*8260B	11/14/18 22:08	KDM	P8K0264
Methyl Ethyl Ketone (2-Butanone)	BRL	ug/L	5.0	0.24	1	*8260B	11/14/18 22:08	KDM	P8K0264
Methyl Isobutyl Ketone	BRL	ug/L	5.0	0.078	1	*8260B	11/14/18 22:08	KDM	P8K0264
Methylene Chloride	BRL	ug/L	1.0	0.083	1	*8260B	11/14/18 22:08	KDM	P8K0264
Methyl-tert-Butyl Ether	BRL	ug/L	0.50	0.042	1	*8260B	11/14/18 22:08	KDM	P8K0264
Naphthalene	BRL	ug/L	1.0	0.19	1	*8260B	11/14/18 22:08	KDM	P8K0264
n-Butylbenzene	BRL	ug/L	1.0	0.076	1	*8260B	11/14/18 22:08	KDM	P8K0264
n-Propylbenzene	BRL	ug/L	0.50	0.087	1	*8260B	11/14/18 22:08	KDM	P8K0264
o-Xylene	BRL	ug/L	0.50	0.044	1	*8260B	11/14/18 22:08	KDM	P8K0264
sec-Butylbenzene	BRL	ug/L	0.50	0.076	1	*8260B	11/14/18 22:08	KDM	P8K0264
Styrene	BRL	ug/L	0.50	0.047	1	*8260B	11/14/18 22:08	KDM	P8K0264
tert-Butylbenzene	BRL	ug/L	0.50	0.088	1	*8260B	11/14/18 22:08	KDM	P8K0264
<b>Tetrachloroethylene</b>	<b>3.4</b>	<b>ug/L</b>	<b>0.50</b>	<b>0.098</b>	<b>1</b>	<b>*8260B</b>	<b>11/14/18 22:08</b>	<b>KDM</b>	<b>P8K0264</b>
Toluene	BRL	ug/L	0.50	0.044	1	*8260B	11/14/18 22:08	KDM	P8K0264
trans-1,2-Dichloroethylene	BRL	ug/L	0.50	0.094	1	*8260B	11/14/18 22:08	KDM	P8K0264
trans-1,3-Dichloropropylene	BRL	ug/L	0.50	0.070	1	*8260B	11/14/18 22:08	KDM	P8K0264
<b>Trichloroethylene</b>	<b>1.0</b>	<b>ug/L</b>	<b>0.50</b>	<b>0.078</b>	<b>1</b>	<b>*8260B</b>	<b>11/14/18 22:08</b>	<b>KDM</b>	<b>P8K0264</b>
Trichlorofluoromethane	BRL	ug/L	0.50	0.062	1	*8260B	11/14/18 22:08	KDM	P8K0264
Vinyl acetate	BRL	ug/L	2.0	0.060	1	*8260B	11/14/18 22:08	KDM	P8K0264
Vinyl chloride	BRL	ug/L	0.50	0.097	1	*8260B	11/14/18 22:08	KDM	P8K0264
Xylenes, total	BRL	ug/L	1.5	0.15	1	*8260B	11/14/18 22:08	KDM	P8K0264

Surrogate	Recovery	Control Limits
4-Bromofluorobenzene	100 %	80-124
Dibromofluoromethane	95 %	75-129
Toluene-d8	93 %	77-123

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Hart & Hickman (Charlotte)  
Attn: Matt Bramblett  
2923 South Tryon St. Ste 100  
Charlotte, NC 28203

Project: CLT-628

Prism Work Order: 8110203  
Time Submitted: 11/12/2018 1:35:00PM

**Volatile Organic Compounds by GC/MS - Quality Control**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P8K0264 - 5030B</b>										
<b>Blank (P8K0264-BLK1)</b>										
Prepared & Analyzed: 11/14/18										
1,1,1,2-Tetrachloroethane	BRL	0.50	ug/L							
1,1,1-Trichloroethane	BRL	0.50	ug/L							
1,1,1,2-Tetrachloroethane	BRL	0.50	ug/L							
1,1,2-Trichloroethane	BRL	0.50	ug/L							
1,1-Dichloroethane	BRL	0.50	ug/L							
1,1-Dichloroethylene	BRL	0.50	ug/L							
1,1-Dichloropropylene	BRL	0.50	ug/L							
1,2,3-Trichlorobenzene	BRL	2.0	ug/L							
1,2,3-Trichloropropane	BRL	1.0	ug/L							
1,2,4-Trichlorobenzene	BRL	1.0	ug/L							
1,2,4-Trimethylbenzene	BRL	0.50	ug/L							
1,2-Dibromo-3-chloropropane	BRL	2.0	ug/L							
1,2-Dibromoethane	BRL	0.50	ug/L							
1,2-Dichlorobenzene	BRL	0.50	ug/L							
1,2-Dichloroethane	BRL	0.50	ug/L							
1,2-Dichloropropane	BRL	0.50	ug/L							
1,3,5-Trimethylbenzene	BRL	0.50	ug/L							
1,3-Dichlorobenzene	BRL	0.50	ug/L							
1,3-Dichloropropane	BRL	0.50	ug/L							
1,4-Dichlorobenzene	BRL	0.50	ug/L							
2,2-Dichloropropane	BRL	2.0	ug/L							
2-Chlorotoluene	BRL	0.50	ug/L							
4-Chlorotoluene	BRL	0.50	ug/L							
4-Isopropyltoluene	BRL	0.50	ug/L							
Acetone	BRL	5.0	ug/L							
Acrolein	BRL	20	ug/L							
Acrylonitrile	BRL	20	ug/L							
Benzene	BRL	0.50	ug/L							
Bromobenzene	BRL	0.50	ug/L							
Bromochloromethane	BRL	0.50	ug/L							
Bromodichloromethane	BRL	0.50	ug/L							
Bromoform	BRL	1.0	ug/L							
Bromomethane	BRL	1.0	ug/L							
Carbon disulfide	BRL	5.0	ug/L							
Carbon Tetrachloride	BRL	0.50	ug/L							
Chlorobenzene	BRL	0.50	ug/L							
Chloroethane	BRL	0.50	ug/L							
Chloroform	1.75	0.50	ug/L							B
Chloromethane	BRL	0.50	ug/L							
cis-1,2-Dichloroethylene	BRL	0.50	ug/L							
cis-1,3-Dichloropropylene	BRL	0.50	ug/L							
Dibromochloromethane	BRL	0.50	ug/L							
Dibromomethane	BRL	0.50	ug/L							
Dichlorodifluoromethane	BRL	1.0	ug/L							
Ethylbenzene	BRL	0.50	ug/L							
Hexachlorobutadiene	BRL	2.0	ug/L							

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Project: CLT-628

Prism Work Order: 8110203  
Time Submitted: 11/12/2018 1:35:00PM

**Volatile Organic Compounds by GC/MS - Quality Control**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P8K0264 - 5030B</b>										
<b>Blank (P8K0264-BLK1)</b>										
Prepared & Analyzed: 11/14/18										
Isopropyl Ether	BRL	0.50	ug/L							
Isopropylbenzene (Cumene)	BRL	0.50	ug/L							
m,p-Xylenes	BRL	1.0	ug/L							
Methyl Butyl Ketone (2-Hexanone)	BRL	5.0	ug/L							
Methyl Ethyl Ketone (2-Butanone)	BRL	5.0	ug/L							
Methyl Isobutyl Ketone	BRL	5.0	ug/L							
Methylene Chloride	BRL	1.0	ug/L							
Methyl-tert-Butyl Ether	BRL	0.50	ug/L							
Naphthalene	BRL	1.0	ug/L							
n-Butylbenzene	BRL	1.0	ug/L							
n-Propylbenzene	BRL	0.50	ug/L							
o-Xylene	BRL	0.50	ug/L							
sec-Butylbenzene	BRL	0.50	ug/L							
Styrene	BRL	0.50	ug/L							
tert-Butylbenzene	BRL	0.50	ug/L							
Tetrachloroethylene	BRL	0.50	ug/L							
Toluene	BRL	0.50	ug/L							
trans-1,2-Dichloroethylene	BRL	0.50	ug/L							
trans-1,3-Dichloropropylene	BRL	0.50	ug/L							
Trichloroethylene	BRL	0.50	ug/L							
Trichlorofluoromethane	BRL	0.50	ug/L							
Vinyl acetate	BRL	2.0	ug/L							
Vinyl chloride	BRL	0.50	ug/L							
Xylenes, total	BRL	1.5	ug/L							
Surrogate: 4-Bromofluorobenzene	49.3		ug/L	50.00		99	80-124			
Surrogate: Dibromofluoromethane	48.4		ug/L	50.00		97	75-129			
Surrogate: Toluene-d8	46.7		ug/L	50.00		93	77-123			

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**Volatile Organic Compounds by GC/MS - Quality Control**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P8K0264 - 5030B</b>										
<b>LCS (P8K0264-BS1)</b>										
Prepared & Analyzed: 11/14/18										
1,1,1,2-Tetrachloroethane	19.6	0.50	ug/L	20.00		98	79-134			
1,1,1-Trichloroethane	18.2	0.50	ug/L	20.00		91	75-136			
1,1,2,2-Tetrachloroethane	18.8	0.50	ug/L	20.00		94	62-127			
1,1,2-Trichloroethane	20.8	0.50	ug/L	20.00		104	70-140			
1,1-Dichloroethane	19.0	0.50	ug/L	20.00		95	78-130			
1,1-Dichloroethylene	18.1	0.50	ug/L	20.00		90	70-154			
1,1-Dichloropropylene	18.7	0.50	ug/L	20.00		94	71-136			
1,2,3-Trichlorobenzene	19.0	2.0	ug/L	20.00		95	58-144			
1,2,3-Trichloropropane	18.8	1.0	ug/L	20.00		94	71-127			
1,2,4-Trichlorobenzene	18.6	1.0	ug/L	20.00		93	66-139			
1,2,4-Trimethylbenzene	18.9	0.50	ug/L	20.00		94	75-133			
1,2-Dibromo-3-chloropropane	17.1	2.0	ug/L	20.00		86	63-134			
1,2-Dibromoethane	19.5	0.50	ug/L	20.00		98	77-135			
1,2-Dichlorobenzene	18.6	0.50	ug/L	20.00		93	78-128			
1,2-Dichloroethane	20.8	0.50	ug/L	20.00		104	68-131			
1,2-Dichloropropane	20.3	0.50	ug/L	20.00		101	77-130			
1,3,5-Trimethylbenzene	18.2	0.50	ug/L	20.00		91	75-131			
1,3-Dichlorobenzene	17.9	0.50	ug/L	20.00		90	77-125			
1,3-Dichloropropane	19.6	0.50	ug/L	20.00		98	76-132			
1,4-Dichlorobenzene	18.4	0.50	ug/L	20.00		92	75-126			
2,2-Dichloropropane	20.0	2.0	ug/L	20.00		100	29-149			
2-Chlorotoluene	17.8	0.50	ug/L	20.00		89	74-126			
4-Chlorotoluene	18.7	0.50	ug/L	20.00		94	78-129			
4-Isopropyltoluene	18.4	0.50	ug/L	20.00		92	69-132			
Acetone	42.4	5.0	ug/L	40.00		106	40-166			
Acrolein	39.4	20	ug/L	40.00		98	70-130			
Acrylonitrile	41.0	20	ug/L	40.00		102	81-127			
Benzene	20.2	0.50	ug/L	20.00		101	77-128			
Bromobenzene	18.3	0.50	ug/L	20.00		92	78-129			
Bromochloromethane	20.2	0.50	ug/L	20.00		101	78-135			
Bromodichloromethane	20.8	0.50	ug/L	20.00		104	76-138			
Bromoform	20.8	1.0	ug/L	20.00		104	71-135			
Bromomethane	16.7	1.0	ug/L	20.00		83	41-168			
Carbon disulfide	19.0	5.0	ug/L	20.00		95	59-135			
Carbon Tetrachloride	18.0	0.50	ug/L	20.00		90	72-142			
Chlorobenzene	18.9	0.50	ug/L	20.00		94	78-119			
Chloroethane	19.9	0.50	ug/L	20.00		99	57-142			
Chloroform	21.7	0.50	ug/L	20.00		108	77-130			
Chloromethane	20.3	0.50	ug/L	20.00		102	47-145			
cis-1,2-Dichloroethylene	19.8	0.50	ug/L	20.00		99	76-141			
cis-1,3-Dichloropropylene	20.5	0.50	ug/L	20.00		102	65-140			
Dibromochloromethane	17.6	0.50	ug/L	20.00		88	75-134			
Dibromomethane	20.8	0.50	ug/L	20.00		104	76-138			
Dichlorodifluoromethane	19.3	1.0	ug/L	20.00		96	28-163			
Ethylbenzene	19.1	0.50	ug/L	20.00		95	80-127			
Hexachlorobutadiene	16.4	2.0	ug/L	20.00		82	61-134			

B

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Hart & Hickman (Charlotte)  
 Attn: Matt Bramblett  
 2923 South Tryon St. Ste 100  
 Charlotte, NC 28203

Project: CLT-628

Prism Work Order: 8110203  
 Time Submitted: 11/12/2018 1:35:00PM

**Volatile Organic Compounds by GC/MS - Quality Control**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P8K0264 - 5030B</b>										
<b>LCS (P8K0264-BS1)</b>										
				Prepared & Analyzed: 11/14/18						
Isopropyl Ether	20.2	0.50	ug/L	20.00		101	60-154			
Isopropylbenzene (Cumene)	18.7	0.50	ug/L	20.00		94	70-130			
m,p-Xylenes	37.5	1.0	ug/L	40.00		94	77-133			
Methyl Butyl Ketone (2-Hexanone)	19.0	5.0	ug/L	20.00		95	64-137			
Methyl Ethyl Ketone (2-Butanone)	19.9	5.0	ug/L	20.00		99	71-134			
Methyl Isobutyl Ketone	21.3	5.0	ug/L	20.00		106	69-134			
Methylene Chloride	20.4	1.0	ug/L	20.00		102	73-131			
Methyl-tert-Butyl Ether	20.0	0.50	ug/L	20.00		100	68-135			
Naphthalene	18.7	1.0	ug/L	20.00		94	64-136			
n-Butylbenzene	19.0	1.0	ug/L	20.00		95	68-134			
n-Propylbenzene	18.8	0.50	ug/L	20.00		94	72-132			
o-Xylene	18.7	0.50	ug/L	20.00		94	78-128			
sec-Butylbenzene	18.5	0.50	ug/L	20.00		92	71-131			
Styrene	18.9	0.50	ug/L	20.00		95	78-129			
tert-Butylbenzene	18.1	0.50	ug/L	20.00		91	70-132			
Tetrachloroethylene	16.5	0.50	ug/L	20.00		82	80-129			
Toluene	20.3	0.50	ug/L	20.00		101	76-131			
trans-1,2-Dichloroethylene	20.1	0.50	ug/L	20.00		100	76-135			
trans-1,3-Dichloropropylene	22.6	0.50	ug/L	20.00		113	67-140			
Trichloroethylene	20.0	0.50	ug/L	20.00		100	77-133			
Trichlorofluoromethane	21.9	0.50	ug/L	20.00		109	62-148			
Vinyl acetate	22.6	2.0	ug/L	20.00		113	34-167			
Vinyl chloride	20.2	0.50	ug/L	20.00		101	57-141			
Xylenes, total	56.3	1.5	ug/L	60.00		94	77-133			
Surrogate: 4-Bromofluorobenzene	49.2		ug/L	50.00		98	80-124			
Surrogate: Dibromofluoromethane	47.9		ug/L	50.00		96	75-129			
Surrogate: Toluene-d8	46.3		ug/L	50.00		93	77-123			



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Project: CLT-628

Prism Work Order: 8110203  
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**Volatile Organic Compounds by GC/MS - Quality Control**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P8K0264 - 5030B</b>										
<b>LCS Dup (P8K0264-BSD1)</b>										
				Prepared & Analyzed: 11/14/18						
1,1,1,2-Tetrachloroethane	19.0	0.50	ug/L	20.00		95	79-134	3	20	
1,1,1-Trichloroethane	17.0	0.50	ug/L	20.00		85	75-136	7	20	
1,1,2,2-Tetrachloroethane	17.8	0.50	ug/L	20.00		89	62-127	5	20	
1,1,2-Trichloroethane	19.6	0.50	ug/L	20.00		98	70-140	6	20	
1,1-Dichloroethane	17.6	0.50	ug/L	20.00		88	78-130	8	20	
1,1-Dichloroethylene	17.3	0.50	ug/L	20.00		86	70-154	5	20	
1,1-Dichloropropylene	17.5	0.50	ug/L	20.00		88	71-136	7	20	
1,2,3-Trichlorobenzene	17.0	2.0	ug/L	20.00		85	58-144	11	20	
1,2,3-Trichloropropane	18.0	1.0	ug/L	20.00		90	71-127	4	20	
1,2,4-Trichlorobenzene	16.9	1.0	ug/L	20.00		85	66-139	10	20	
1,2,4-Trimethylbenzene	17.5	0.50	ug/L	20.00		87	75-133	8	20	
1,2-Dibromo-3-chloropropane	16.4	2.0	ug/L	20.00		82	63-134	5	20	
1,2-Dibromoethane	18.5	0.50	ug/L	20.00		92	77-135	6	20	
1,2-Dichlorobenzene	17.2	0.50	ug/L	20.00		86	78-128	8	20	
1,2-Dichloroethane	19.2	0.50	ug/L	20.00		96	68-131	8	20	
1,2-Dichloropropane	20.0	0.50	ug/L	20.00		100	77-130	2	20	
1,3,5-Trimethylbenzene	16.9	0.50	ug/L	20.00		85	75-131	7	20	
1,3-Dichlorobenzene	16.4	0.50	ug/L	20.00		82	77-125	9	20	
1,3-Dichloropropane	18.9	0.50	ug/L	20.00		94	76-132	4	20	
1,4-Dichlorobenzene	16.7	0.50	ug/L	20.00		83	75-126	10	20	
2,2-Dichloropropane	18.4	2.0	ug/L	20.00		92	29-149	8	20	
2-Chlorotoluene	16.5	0.50	ug/L	20.00		82	74-126	8	20	
4-Chlorotoluene	17.1	0.50	ug/L	20.00		85	78-129	9	20	
4-Isopropyltoluene	16.5	0.50	ug/L	20.00		83	69-132	11	20	
Acetone	39.4	5.0	ug/L	40.00		98	40-166	7	20	
Acrolein	37.3	20	ug/L	40.00		93	70-130	5	20	
Acrylonitrile	39.4	20	ug/L	40.00		98	81-127	4	20	
Benzene	19.1	0.50	ug/L	20.00		96	77-128	5	20	
Bromobenzene	17.1	0.50	ug/L	20.00		85	78-129	7	20	
Bromochloromethane	19.3	0.50	ug/L	20.00		96	78-135	5	20	
Bromodichloromethane	19.9	0.50	ug/L	20.00		99	76-138	5	20	
Bromoform	20.5	1.0	ug/L	20.00		103	71-135	1	20	
Bromomethane	15.7	1.0	ug/L	20.00		78	41-168	6	20	
Carbon disulfide	17.9	5.0	ug/L	20.00		90	59-135	6	20	
Carbon Tetrachloride	17.0	0.50	ug/L	20.00		85	72-142	6	20	
Chlorobenzene	17.9	0.50	ug/L	20.00		90	78-119	5	20	
Chloroethane	18.5	0.50	ug/L	20.00		92	57-142	7	20	
Chloroform	20.1	0.50	ug/L	20.00		100	77-130	8	20	B
Chloromethane	19.1	0.50	ug/L	20.00		96	47-145	6	20	
cis-1,2-Dichloroethylene	18.8	0.50	ug/L	20.00		94	76-141	5	20	
cis-1,3-Dichloropropylene	18.9	0.50	ug/L	20.00		95	65-140	8	20	
Dibromochloromethane	17.8	0.50	ug/L	20.00		89	75-134	0.8	20	
Dibromomethane	19.4	0.50	ug/L	20.00		97	76-138	7	20	
Dichlorodifluoromethane	18.1	1.0	ug/L	20.00		91	28-163	6	20	
Ethylbenzene	18.4	0.50	ug/L	20.00		92	80-127	4	20	
Hexachlorobutadiene	15.3	2.0	ug/L	20.00		76	61-134	7	20	

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Hart & Hickman (Charlotte)  
 Attn: Matt Bramblett  
 2923 South Tryon St. Ste 100  
 Charlotte, NC 28203

Project: CLT-628

Prism Work Order: 8110203  
 Time Submitted: 11/12/2018 1:35:00PM

**Volatile Organic Compounds by GC/MS - Quality Control**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch P8K0264 - 5030B</b>										
<b>LCS Dup (P8K0264-BSD1)</b>										
Prepared & Analyzed: 11/14/18										
Isopropyl Ether	19.0	0.50	ug/L	20.00		95	60-154	6	20	
Isopropylbenzene (Cumene)	16.8	0.50	ug/L	20.00		84	70-130	11	20	
m,p-Xylenes	36.1	1.0	ug/L	40.00		90	77-133	4	20	
Methyl Butyl Ketone (2-Hexanone)	18.6	5.0	ug/L	20.00		93	64-137	2	20	
Methyl Ethyl Ketone (2-Butanone)	19.2	5.0	ug/L	20.00		96	71-134	3	20	
Methyl Isobutyl Ketone	19.9	5.0	ug/L	20.00		99	69-134	7	20	
Methylene Chloride	18.8	1.0	ug/L	20.00		94	73-131	9	20	
Methyl-tert-Butyl Ether	19.3	0.50	ug/L	20.00		96	68-135	4	20	
Naphthalene	17.3	1.0	ug/L	20.00		86	64-136	8	20	
n-Butylbenzene	16.4	1.0	ug/L	20.00		82	68-134	14	20	
n-Propylbenzene	17.5	0.50	ug/L	20.00		88	72-132	7	20	
o-Xylene	18.1	0.50	ug/L	20.00		91	78-128	3	20	
sec-Butylbenzene	17.0	0.50	ug/L	20.00		85	71-131	8	20	
Styrene	18.3	0.50	ug/L	20.00		91	78-129	3	20	
tert-Butylbenzene	16.6	0.50	ug/L	20.00		83	70-132	9	20	
Tetrachloroethylene	15.3	0.50	ug/L	20.00		77	80-129	7	20	L2
Toluene	18.6	0.50	ug/L	20.00		93	76-131	8	20	
trans-1,2-Dichloroethylene	18.8	0.50	ug/L	20.00		94	76-135	7	20	
trans-1,3-Dichloropropylene	21.8	0.50	ug/L	20.00		109	67-140	4	20	
Trichloroethylene	18.8	0.50	ug/L	20.00		94	77-133	6	20	
Trichlorofluoromethane	21.1	0.50	ug/L	20.00		105	62-148	4	20	
Vinyl acetate	21.3	2.0	ug/L	20.00		107	34-167	6	20	
Vinyl chloride	18.6	0.50	ug/L	20.00		93	57-141	8	20	
Xylenes, total	54.2	1.5	ug/L	60.00		90	77-133	4	20	
Surrogate: 4-Bromofluorobenzene	47.6		ug/L	50.00		95	80-124			
Surrogate: Dibromofluoromethane	47.0		ug/L	50.00		94	75-129			
Surrogate: Toluene-d8	46.6		ug/L	50.00		93	77-123			

**Sample Extraction Data**

Prep Method: 5030B

Lab Number	Batch	Initial	Final	Date/Time
8110203-01	P8K0264	10 mL	10 mL	11/14/18 8:25
8110203-02	P8K0264	10 mL	10 mL	11/14/18 8:25



## **Appendix D**

### **Cumulative Risk Calculation Outputs**



## North Carolina Department of Environmental Quality Risk Calculator

<b>Version Date:</b>	February 2018
<b>Basis:</b>	November 2017 EPA RSL Table
<b>Site Name:</b>	Former Double Oaks School
<b>Site Address:</b>	1205 Eureka Street
<b>DEQ Section:</b>	
<b>Site ID:</b>	1205 Eureka Street
<b>Exposure Unit ID:</b>	SG-1
<b>Submittal Date:</b>	11/28/2018
<b>Prepared By:</b>	Robert Sorgel
<b>Reviewed By:</b>	Matt Bramblett

Table of Contents		TOC
Version Date: February 2018		
Basis: November 2017 EPA RSL Table		
Site ID: 1205 Eureka Street		
Exposure Unit ID: SG-1		
Form No.	Description	Check box if included
<b>DATA INPUT SHEETS</b>		
<b>Input Section 1 - Exposure Pathways &amp; Parameters</b>		
Input Form 1A	Complete Exposure Pathways	<input checked="" type="checkbox"/>
Input Form 1B	Exposure Factors and Target Risks	<input checked="" type="checkbox"/>
Input Form 1C	Contaminant Migration Parameters	<input type="checkbox"/>
Input Form 1D	Sample Statistics	<input type="checkbox"/>
<b>Input Section 2 - Exposure Point Concentrations</b>		
Input Form 2A	Surface Soil Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2B	Subsurface Soil Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2C	Groundwater Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2D	Surface Water Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2E	Soil Gas Exposure Point Concentration Table	<input checked="" type="checkbox"/>
Input Form 2F	Indoor Air Exposure Point Concentration Table	<input type="checkbox"/>
<b>DATA OUTPUT SHEETS</b>		
<b>Output Section 1 - Summary Output for All Calculators</b>		
Output Form 1A	Summary of Risk Assessment Output	<input checked="" type="checkbox"/>
<b>Output Section 2 - Primary Calculators</b>		
Output Form 2A	Resident Soil Combined Pathways	<input type="checkbox"/>
Output Form 2B	Resident Groundwater Combined Pathways	<input type="checkbox"/>
Output Form 2C	Non-Residential Worker Soil Combined Pathways	<input type="checkbox"/>
Output Form 2D	Non-Residential Worker Groundwater Combined Pathways	<input type="checkbox"/>
Output Form 2E	Construction Worker Soil Combined Pathways	<input type="checkbox"/>
Output Form 2F	User Defined Soil Combined Pathways	<input type="checkbox"/>
Output Form 2G	User Defined Surface Water Combined Pathways	<input type="checkbox"/>
<b>Output Section 3 - Vapor Intrusion Calculators</b>		
Output Form 3A	Resident Groundwater to Indoor Air	<input type="checkbox"/>
Output Form 3B	Resident Soil Gas to Indoor Air	<input checked="" type="checkbox"/>
Output Form 3C	Resident Indoor Air	<input type="checkbox"/>
Output Form 3D	Non-Residential Worker Groundwater to Indoor Air	<input type="checkbox"/>
Output Form 3E	Non-Residential Worker Soil Gas to Indoor Air	<input checked="" type="checkbox"/>
Output Form 3F	Non-Residential Worker Indoor Air	<input type="checkbox"/>
<b>Output Section 4 - Contaminant Migration to Point of Exposure (POE) Worksheets</b>		
Output Form 4A	Soil Source to Groundwater POE - Forward Mode	<input type="checkbox"/>
Output Form 4B	Groundwater Source to Groundwater POE - Forward Mode	<input type="checkbox"/>
Output Form 4C	Soil Source to Surface Water POE - Forward Mode	<input type="checkbox"/>
Output Form 4D	Groundwater Source to Surface Water POE - Forward Mode	<input type="checkbox"/>
Output Form 4E	Soil Source to Groundwater POE - Backward Mode	<input type="checkbox"/>
Output Form 4F	Groundwater Source to Groundwater POE - Backward Mode	<input type="checkbox"/>
Output Form 4G	Soil Source to Surface Water POE - Backward Mode	<input type="checkbox"/>
Output Form 4H	Groundwater Source to Surface Water POE - Backward Mode	<input type="checkbox"/>

Complete Exposure Pathways		Input Form 1A
<b>Version Date: February 2018</b>		
<b>Basis: November 2017 EPA RSL Table</b>		
<b>Site ID: 1205 Eureka Street</b>		
<b>Exposure Unit ID: SG-1</b>		
<i>Note: Risk output will only be calculated for complete exposure pathways.</i>		
Receptor	Pathway	Check box if pathway complete
<b>PRIMARY PATHWAYS</b>		
Resident	Soil Combined Pathways	<input type="checkbox"/>
	Groundwater Combined Pathways	<input type="checkbox"/>
Non-Residential Worker	Soil Combined Pathways	<input type="checkbox"/>
	Groundwater Combined Pathways	<input type="checkbox"/>
Construction Worker	Soil Combined Pathways	<input type="checkbox"/>
User Defined	Soil Combined Pathways	<input type="checkbox"/>
	Surface Water Combined Pathways	<input type="checkbox"/>
<b>VAPOR INTRUSION PATHWAYS</b>		
Resident	Groundwater to Indoor Air	<input type="checkbox"/>
	Soil Gas to Indoor Air	<input checked="" type="checkbox"/>
	Indoor Air	<input type="checkbox"/>
Non-Residential Worker	Groundwater to Indoor Air	<input type="checkbox"/>
	Soil Gas to Indoor Air	<input checked="" type="checkbox"/>
	Indoor Air	<input type="checkbox"/>
<b>CONTAMINANT MIGRATION PATHWAYS</b>		
Protection of Groundwater Use	Source Soil	<input type="checkbox"/>
	Source Groundwater	<input type="checkbox"/>
Protection of Surface Water	Source Soil	<input type="checkbox"/>
	Source Groundwater	<input type="checkbox"/>

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-1

Exposure Parameter	Default Value	Site Specific Value	Justification
General			
Target Cancer Risk (individual)	1.0E-06	1.0E-06	
Target Cancer Risk (cumulative)	1.0E-04	1.0E-04	
Target Hazard Index (individual)	2.0E-01	2.0E-01	
Target Hazard Index (cumulative)	1.0E+00	1.0E+00	
Residential Child			
Lifetime (LT) (years)	70	70	
Body Weight (BW) (kg)	15	15	
Exposure Duration (ED) (yr)	6	6	
Exposure Frequency (EF) (d/yr)	350	350	
Exposure Time (ET) (hr)	24	24	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	2373	2373	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.2	0.2	
Soil Ingestion Rate (IRS) (mg/day)	200	200	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	6365	6365	
Water Ingestion Rate (IRW) (L/d)	0.78	0.78	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	0.54	0.54	
Water Event Frequency (EV) (events/day)	1	1	
Residential Adult			
Lifetime (LT) (years)	70	70	
Body Weight (BW) (kg)	80	80	
Exposure Duration (ED) (yr)	20	20	
Exposure Frequency (EF) (d/yr)	350	350	
Exposure Time (ET) (hr)	24	24	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	6032	6032	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.07	0.07	
Soil Ingestion Rate (IRS) (mg/day)	100	100	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	19652	19652	
Water Ingestion Rate (IRW) (L/d)	2.5	2.5	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	0.71	0.71	
Water Event Frequency (EV) (events/day)	1	1	
Non-Residential Worker			
Lifetime (LT) (years)	70	70	
Body Weight (BW) (kg)	80	80	
Exposure Duration (ED) (yr)	25	25	
Exposure Frequency (EF) (d/yr)	250	250	
Exposure Time (ET) (hr)	8	8	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	3527	3527	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.12	0.12	
Soil Ingestion Rate (IR) (mg/day)	100	100	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	19652	19652	
Water Ingestion Rate (IRW) (L/d)	0.83	0.83	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	0.67	0.67	
Water Event Frequency (EV) (events/day)	1	1	
Construction Worker			
Lifetime (LT) (years)	70	70	
Body Weight (BW) (kg)	80	80	
Working Weeks (EW) (wk/yr)	50	50	
Exposure Duration (ED) (yr)	1	1	
Exposure Frequency (EF) (d/yr)	250	250	
Exposure Time (ET) (hr)	8	8	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	3527	3527	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.3	0.3	
Soil Ingestion Rate (IR) (mg/day)	330	330	

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-1

Exposure Parameter	Default Value		Site Specific Value	Justification
User Defined Child				
	Recreator	Trespasser		
Lifetime (LT) (years)	70	NA	70	
Averaging Time (AT) (days/yr)	365	NA	365	
Body Weight (BW) (kg)	15	NA	15	
Exposure Duration 0-2 (ED) (yr)	2	NA	2	
Exposure Duration 2-6 (ED) (yr)	4	NA	4	
Exposure Frequency (EF) (d/yr)	195	NA	195	
Exposure Time (ET) (hr)	2	NA	2	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	2373	NA	2373	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.2	NA	0.2	
Soil Ingestion Rate (IRS) (mg/day)	200	NA	200	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	6365	NA	6365	
Water Ingestion Rate (IRW) (L/hr)	0.12	NA	0.12	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	2	NA	2	
Water Event Frequency (EV) (events/day)	1	NA	1	
User Defined Adult				
	Recreator	Trespasser		
Lifetime (LT) (years)	70	70	70	
Body Weight (BW) (kg)	80	45	80	
Exposure Duration 6-16 (ED) (yr)	10	10	10	
Exposure Duration 16-26 (ED) (yr)	10	0	10	
Exposure Frequency (EF) (d/yr)	195	90	195	
Exposure Time (ET) (hr)	2	2	2	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	6032	6032	6032	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.07	0.2	0.07	
Soil Ingestion Rate (IRS) (mg/day)	100	200	100	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	19652	19652	19652	
Water Ingestion Rate (IRW) (L/hr)	0.071	0.071	0.071	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	2	2	2	
Water Event Frequency (EV) (events/day)	1	1	1	

Exposure Point Concentrations

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-1

Soil Gas Exposure Point Concentration Table

Note: Chemicals highlighted in orange are non-volatile chemicals. Since these chemicals do not pose a vapor intrusion risk, no risk values are calculated for these chemicals.

Exposure Point Concentration (ug/m <sup>3</sup> )	Justification for Exposure Point Concentration	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (Screening Level) (n/c)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
87.7		67-64-1	Acetone			ug/m <sup>3</sup>										
2.8		71-43-2	Benzene			ug/m <sup>3</sup>										
8.4		106-99-0	Butadiene, 1,3-			ug/m <sup>3</sup>										
2.1		75-15-0	Carbon Disulfide			ug/m <sup>3</sup>										
2.1		75-71-8	Dichlorodifluoromethane			ug/m <sup>3</sup>										
19		111-77-3	Ethanol, 2-(2-methoxyethoxy)-			ug/m <sup>3</sup>										
33		141-78-6	Ethyl Acetate			ug/m <sup>3</sup>										
4.3		100-41-4	Ethylbenzene			ug/m <sup>3</sup>										
2.3		109-99-9	~Tetrahydrofuran			ug/m <sup>3</sup>										
2.1		142-82-5	Heptane, N-			ug/m <sup>3</sup>										
4.9		110-54-3	Hexane, N-			ug/m <sup>3</sup>										
12		591-78-6	Hexanone, 2-			ug/m <sup>3</sup>										
24		78-93-3	Methyl Ethyl Ketone (2-Butanone)			ug/m <sup>3</sup>										
8.2		108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)			ug/m <sup>3</sup>										
68.9		115-07-1	Propylene			ug/m <sup>3</sup>										
12		127-18-4	Tetrachloroethylene			ug/m <sup>3</sup>										
14		108-88-3	Toluene			ug/m <sup>3</sup>										
9.8		95-63-6	Trimethylbenzene, 1,2,4-			ug/m <sup>3</sup>										
1.9		108-67-8	Trimethylbenzene, 1,3,5-			ug/m <sup>3</sup>										
19		106-42-3	Xylene, P-			ug/m <sup>3</sup>										
7.4		95-47-6	Xylene, o-			ug/m <sup>3</sup>										
26		1330-20-7	Xylenes			ug/m <sup>3</sup>										

<b>Summary of Risk Assessment Output</b>	<b>Output Form 1A</b>
--	-----------------------

**Version Date:** February 2018

**Basis:** November 2017 EPA RSL Table

**Site ID:** 1205 Eureka Street

**Exposure Unit ID:** SG-1

**PRIMARY CALCULATORS**

Receptor	Pathway	Carcinogenic Risk	Hazard Index	Risk exceeded?
Resident	Soil Combined Pathways	NC	NC	NC
	Groundwater Combined Pathways*	NC	NC	NC
Non-Residential Worker	Soil Combined Pathways	NC	NC	NC
	Groundwater Combined Pathways*	NC	NC	NC
Construction Worker	Soil Combined Pathways	NC	NC	NC
User Defined	Soil Combined Pathways	NC	NC	NC
	Surface Water Combined Pathways*	NC	NC	NC

**VAPOR INTRUSION CALCULATORS**

Receptor	Pathway	Carcinogenic Risk	Hazard Index	Risk exceeded?
Resident	Groundwater to Indoor Air	NC	NC	NC
	Soil Gas to Indoor Air	3.1E-06	1.8E-01	NO
	Indoor Air	NC	NC	NC
Non-Residential Worker	Groundwater to Indoor Air	NC	NC	NC
	Soil Gas to Indoor Air	2.3E-07	1.4E-02	NO
	Indoor Air	NC	NC	NC

**CONTAMINANT MIGRATION CALCULATORS**

Pathway	Source	Target POE Concentrations Exceeded?	
Protection of Groundwater Use	Source Soil	Exceedence of 2L at POE?	NC
	Source Groundwater	Exceedence of 2L at POE?	NC
Protection of Surface Water	Source Soil	Exceedence of 2B at POE?	NC
	Source Groundwater	Exceedence of 2B at POE?	NC

**Notes:**

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.
2. \* = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-1

Carcinogenic risk and hazard quotient cells highlighted in orange are associated with non-volatile chemicals. Since these chemicals do not pose a vapor intrusion risk, no risk values are calculated for these chemicals.

All concentrations are in ug/m<sup>3</sup>

CAS #	Chemical Name:	Soil Gas Concentration (ug/m <sup>3</sup> )	Calculated Indoor Air Concentration (ug/m <sup>3</sup> )	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
67-64-1	Acetone	87.7	2.631	-	6.5E+03		8.1E-05
71-43-2	Benzene	2.8	0.084	3.6E-01	6.3E+00	2.3E-07	2.7E-03
106-99-0	Butadiene, 1,3-	8.4	0.252	9.4E-02	4.2E-01	<b>2.7E-06</b>	1.2E-01
78-92-2	Butyl alcohol, sec-			-	6.3E+03		
75-15-0	Carbon Disulfide	2.1	0.063	-	1.5E+02		8.6E-05
75-71-8	Dichlorodifluoromethane	2.1	0.063	-	2.1E+01		6.0E-04
111-77-3	Ethanol, 2-(2-methoxyethoxy)-	19	0.57	-	-		
141-78-6	Ethyl Acetate	33	0.99	-	1.5E+01		1.4E-02
100-41-4	Ethylbenzene	4.3	0.129	1.1E+00	2.1E+02	1.1E-07	1.2E-04
109-99-9	~Tetrahydrofuran	2.3	0.069	-	4.2E+02		3.3E-05
142-82-5	Heptane, N-	2.1	0.063	-	8.3E+01		1.5E-04
110-54-3	Hexane, N-	4.9	0.147	-	1.5E+02		2.0E-04
591-78-6	Hexanone, 2-	12	0.36	-	6.3E+00		1.2E-02
78-93-3	Methyl Ethyl Ketone (2-Butanone)	24	0.72	-	1.0E+03		1.4E-04
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	8.2	0.246	-	6.3E+02		7.9E-05
115-07-1	Propylene	68.9	2.067	-	6.3E+02		6.6E-04
127-18-4	Tetrachloroethylene	12	0.36	1.1E+01	8.3E+00	3.3E-08	8.6E-03
108-88-3	Toluene	14	0.42	-	1.0E+03		8.1E-05
95-63-6	Trimethylbenzene, 1,2,4-	9.8	0.294	-	1.3E+01		4.7E-03
108-67-8	Trimethylbenzene, 1,3,5-	1.9	0.057	-	1.3E+01		9.1E-04
106-42-3	Xylene, P-	19	0.57	-	2.1E+01		5.5E-03
95-47-6	Xylene, o-	7.4	0.222	-	2.1E+01		2.1E-03
1330-20-7	Xylenes	26	0.78	-	2.1E+01		7.5E-03

Cumulative:	3.1E-06	1.8E-01
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Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-1

Carcinogenic risk and hazard quotient cells highlighted in orange are associated with non-volatile chemicals. Since these chemicals do not pose a vapor intrusion risk, no risk values are calculated for these chemicals.

All concentrations are in  $\mu\text{g}/\text{m}^3$

CAS #	Chemical Name:	Soil Gas Concentration ( $\mu\text{g}/\text{m}^3$ )	Calculated Indoor Air Concentration ( $\mu\text{g}/\text{m}^3$ )	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
67-64-1	Acetone	87.7	0.877	-	2.7E+04		6.5E-06
71-43-2	Benzene	2.8	0.028	1.6E+00	2.6E+01	1.8E-08	2.1E-04
106-99-0	Butadiene, 1,3-	8.4	0.084	4.1E-01	1.8E+00	2.1E-07	9.6E-03
78-92-2	Butyl alcohol, sec-			-	2.6E+04		
75-15-0	Carbon Disulfide	2.1	0.021	-	6.1E+02		6.8E-06
75-71-8	Dichlorodifluoromethane	2.1	0.021	-	8.8E+01		4.8E-05
111-77-3	Ethanol, 2-(2-methoxyethoxy)-	19	0.19	-	-		
141-78-6	Ethyl Acetate	33	0.33	-	6.1E+01		1.1E-03
100-41-4	Ethylbenzene	4.3	0.043	4.9E+00	8.8E+02	8.8E-09	9.8E-06
109-99-9	~Tetrahydrofuran	2.3	0.023	-	1.8E+03		2.6E-06
142-82-5	Heptane, N-	2.1	0.021	-	3.5E+02		1.2E-05
110-54-3	Hexane, N-	4.9	0.049	-	6.1E+02		1.6E-05
591-78-6	Hexanone, 2-	12	0.12	-	2.6E+01		9.1E-04
78-93-3	Methyl Ethyl Ketone (2-Butanone)	24	0.24	-	4.4E+03		1.1E-05
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	8.2	0.082	-	2.6E+03		6.2E-06
115-07-1	Propylene	68.9	0.689	-	2.6E+03		5.2E-05
127-18-4	Tetrachloroethylene	12	0.12	4.7E+01	3.5E+01	2.5E-09	6.8E-04
108-88-3	Toluene	14	0.14	-	4.4E+03		6.4E-06
95-63-6	Trimethylbenzene, 1,2,4-	9.8	0.098	-	5.3E+01		3.7E-04
108-67-8	Trimethylbenzene, 1,3,5-	1.9	0.019	-	5.3E+01		7.2E-05
106-42-3	Xylene, P-	19	0.19	-	8.8E+01		4.3E-04
95-47-6	Xylene, o-	7.4	0.074	-	8.8E+01		1.7E-04
1330-20-7	Xylenes	26	0.26	-	8.8E+01		5.9E-04

Cumulative:	2.3E-07	1.4E-02
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## North Carolina Department of Environmental Quality Risk Calculator

<b>Version Date:</b>	February 2018
<b>Basis:</b>	November 2017 EPA RSL Table
<b>Site Name:</b>	Former Double Oaks School
<b>Site Address:</b>	1205 Eureka Street
<b>DEQ Section:</b>	
<b>Site ID:</b>	1205 Eureka Street
<b>Exposure Unit ID:</b>	SG-2
<b>Submittal Date:</b>	11/28/2018
<b>Prepared By:</b>	Robert Sorgel
<b>Reviewed By:</b>	Matt Bramblett

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Input Form 1A	Complete Exposure Pathways	<input checked="" type="checkbox"/>
Input Form 1B	Exposure Factors and Target Risks	<input checked="" type="checkbox"/>
Input Form 1C	Contaminant Migration Parameters	<input type="checkbox"/>
Input Form 1D	Sample Statistics	<input type="checkbox"/>
<b>Input Section 2 - Exposure Point Concentrations</b>		
Input Form 2A	Surface Soil Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2B	Subsurface Soil Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2C	Groundwater Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2D	Surface Water Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2E	Soil Gas Exposure Point Concentration Table	<input checked="" type="checkbox"/>
Input Form 2F	Indoor Air Exposure Point Concentration Table	<input type="checkbox"/>
<b>DATA OUTPUT SHEETS</b>		
<b>Output Section 1 - Summary Output for All Calculators</b>		
Output Form 1A	Summary of Risk Assessment Output	<input checked="" type="checkbox"/>
<b>Output Section 2 - Primary Calculators</b>		
Output Form 2A	Resident Soil Combined Pathways	<input type="checkbox"/>
Output Form 2B	Resident Groundwater Combined Pathways	<input type="checkbox"/>
Output Form 2C	Non-Residential Worker Soil Combined Pathways	<input type="checkbox"/>
Output Form 2D	Non-Residential Worker Groundwater Combined Pathways	<input type="checkbox"/>
Output Form 2E	Construction Worker Soil Combined Pathways	<input type="checkbox"/>
Output Form 2F	User Defined Soil Combined Pathways	<input type="checkbox"/>
Output Form 2G	User Defined Surface Water Combined Pathways	<input type="checkbox"/>
<b>Output Section 3 - Vapor Intrusion Calculators</b>		
Output Form 3A	Resident Groundwater to Indoor Air	<input type="checkbox"/>
Output Form 3B	Resident Soil Gas to Indoor Air	<input checked="" type="checkbox"/>
Output Form 3C	Resident Indoor Air	<input type="checkbox"/>
Output Form 3D	Non-Residential Worker Groundwater to Indoor Air	<input type="checkbox"/>
Output Form 3E	Non-Residential Worker Soil Gas to Indoor Air	<input checked="" type="checkbox"/>
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<b>Output Section 4 - Contaminant Migration to Point of Exposure (POE) Worksheets</b>		
Output Form 4A	Soil Source to Groundwater POE - Forward Mode	<input type="checkbox"/>
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Output Form 4D	Groundwater Source to Surface Water POE - Forward Mode	<input type="checkbox"/>
Output Form 4E	Soil Source to Groundwater POE - Backward Mode	<input type="checkbox"/>
Output Form 4F	Groundwater Source to Groundwater POE - Backward Mode	<input type="checkbox"/>
Output Form 4G	Soil Source to Surface Water POE - Backward Mode	<input type="checkbox"/>
Output Form 4H	Groundwater Source to Surface Water POE - Backward Mode	<input type="checkbox"/>

Complete Exposure Pathways		Input Form 1A
<b>Version Date: February 2018</b>		
<b>Basis: November 2017 EPA RSL Table</b>		
<b>Site ID: 1205 Eureka Street</b>		
<b>Exposure Unit ID: SG-2</b>		
<i>Note: Risk output will only be calculated for complete exposure pathways.</i>		
Receptor	Pathway	Check box if pathway complete
<b>PRIMARY PATHWAYS</b>		
Resident	Soil Combined Pathways	<input type="checkbox"/>
	Groundwater Combined Pathways	<input type="checkbox"/>
Non-Residential Worker	Soil Combined Pathways	<input type="checkbox"/>
	Groundwater Combined Pathways	<input type="checkbox"/>
Construction Worker	Soil Combined Pathways	<input type="checkbox"/>
User Defined	Soil Combined Pathways	<input type="checkbox"/>
	Surface Water Combined Pathways	<input type="checkbox"/>
<b>VAPOR INTRUSION PATHWAYS</b>		
Resident	Groundwater to Indoor Air	<input type="checkbox"/>
	Soil Gas to Indoor Air	<input checked="" type="checkbox"/>
	Indoor Air	<input type="checkbox"/>
Non-Residential Worker	Groundwater to Indoor Air	<input type="checkbox"/>
	Soil Gas to Indoor Air	<input checked="" type="checkbox"/>
	Indoor Air	<input type="checkbox"/>
<b>CONTAMINANT MIGRATION PATHWAYS</b>		
Protection of Groundwater Use	Source Soil	<input type="checkbox"/>
	Source Groundwater	<input type="checkbox"/>
Protection of Surface Water	Source Soil	<input type="checkbox"/>
	Source Groundwater	<input type="checkbox"/>

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-2

Exposure Parameter	Default Value	Site Specific Value	Justification
General			
Target Cancer Risk (individual)	1.0E-06	1.0E-06	
Target Cancer Risk (cumulative)	1.0E-04	1.0E-04	
Target Hazard Index (individual)	2.0E-01	2.0E-01	
Target Hazard Index (cumulative)	1.0E+00	1.0E+00	
Residential Child			
Lifetime (LT) (years)	70	70	
Body Weight (BW) (kg)	15	15	
Exposure Duration (ED) (yr)	6	6	
Exposure Frequency (EF) (d/yr)	350	350	
Exposure Time (ET) (hr)	24	24	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	2373	2373	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.2	0.2	
Soil Ingestion Rate (IRS) (mg/day)	200	200	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	6365	6365	
Water Ingestion Rate (IRW) (L/d)	0.78	0.78	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	0.54	0.54	
Water Event Frequency (EV) (events/day)	1	1	
Residential Adult			
Lifetime (LT) (years)	70	70	
Body Weight (BW) (kg)	80	80	
Exposure Duration (ED) (yr)	20	20	
Exposure Frequency (EF) (d/yr)	350	350	
Exposure Time (ET) (hr)	24	24	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	6032	6032	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.07	0.07	
Soil Ingestion Rate (IRS) (mg/day)	100	100	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	19652	19652	
Water Ingestion Rate (IRW) (L/d)	2.5	2.5	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	0.71	0.71	
Water Event Frequency (EV) (events/day)	1	1	
Non-Residential Worker			
Lifetime (LT) (years)	70	70	
Body Weight (BW) (kg)	80	80	
Exposure Duration (ED) (yr)	25	25	
Exposure Frequency (EF) (d/yr)	250	250	
Exposure Time (ET) (hr)	8	8	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	3527	3527	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.12	0.12	
Soil Ingestion Rate (IR) (mg/day)	100	100	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	19652	19652	
Water Ingestion Rate (IRW) (L/d)	0.83	0.83	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	0.67	0.67	
Water Event Frequency (EV) (events/day)	1	1	
Construction Worker			
Lifetime (LT) (years)	70	70	
Body Weight (BW) (kg)	80	80	
Working Weeks (EW) (wk/yr)	50	50	
Exposure Duration (ED) (yr)	1	1	
Exposure Frequency (EF) (d/yr)	250	250	
Exposure Time (ET) (hr)	8	8	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	3527	3527	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.3	0.3	
Soil Ingestion Rate (IR) (mg/day)	330	330	

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-2

Exposure Parameter	Default Value		Site Specific Value	Justification
User Defined Child				
	Recreator	Trespasser		
Lifetime (LT) (years)	70	NA	70	
Averaging Time (AT) (days/yr)	365	NA	365	
Body Weight (BW) (kg)	15	NA	15	
Exposure Duration 0-2 (ED) (yr)	2	NA	2	
Exposure Duration 2-6 (ED) (yr)	4	NA	4	
Exposure Frequency (EF) (d/yr)	195	NA	195	
Exposure Time (ET) (hr)	2	NA	2	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	2373	NA	2373	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.2	NA	0.2	
Soil Ingestion Rate (IRS) (mg/day)	200	NA	200	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	6365	NA	6365	
Water Ingestion Rate (IRW) (L/hr)	0.12	NA	0.12	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	2	NA	2	
Water Event Frequency (EV) (events/day)	1	NA	1	
User Defined Adult				
	Recreator	Trespasser		
Lifetime (LT) (years)	70	70	70	
Body Weight (BW) (kg)	80	45	80	
Exposure Duration 6-16 (ED) (yr)	10	10	10	
Exposure Duration 16-26 (ED) (yr)	10	0	10	
Exposure Frequency (EF) (d/yr)	195	90	195	
Exposure Time (ET) (hr)	2	2	2	
Skin Surface Area - Soil Exposure (SA <sub>s</sub> ) (cm <sup>2</sup> )	6032	6032	6032	
Soil Adherence Factor (AF) (mg/cm <sup>2</sup> )	0.07	0.2	0.07	
Soil Ingestion Rate (IRS) (mg/day)	100	200	100	
Skin Surface Area - Water Exposure (SA <sub>w</sub> ) (cm <sup>2</sup> )	19652	19652	19652	
Water Ingestion Rate (IRW) (L/hr)	0.071	0.071	0.071	
Water Exposure Time (ET <sub>event</sub> ) (hr/event)	2	2	2	
Water Event Frequency (EV) (events/day)	1	1	1	

Exposure Point Concentrations

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-2

Soil Gas Exposure Point Concentration Table

Note: Chemicals highlighted in orange are non-volatile chemicals. Since these chemicals do not pose a vapor intrusion risk, no risk values are calculated for these chemicals.

Exposure Point Concentration (ug/m <sup>3</sup> )	Justification for Exposure Point Concentration	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (Screening Level) (n/c)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
73.2		67-64-1	Acetone			ug/m <sup>3</sup>										
9.9		71-43-2	Benzene			ug/m <sup>3</sup>										
90		106-99-0	Butadiene, 1,3-			ug/m <sup>3</sup>										
14		100-41-4	Ethylbenzene			ug/m <sup>3</sup>										
11		142-82-5	Heptane, N-			ug/m <sup>3</sup>										
38.8		110-54-3	Hexane, N-			ug/m <sup>3</sup>										
18		591-78-6	Hexanone, 2-			ug/m <sup>3</sup>										
21		78-93-3	Methyl Ethyl Ketone (2-Butanone)			ug/m <sup>3</sup>										
11		108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)			ug/m <sup>3</sup>										
1420		115-07-1	Propylene			ug/m <sup>3</sup>										
7.5		127-18-4	Tetrachloroethylene			ug/m <sup>3</sup>										
31		108-88-3	Toluene			ug/m <sup>3</sup>										
69.1		106-42-3	Xylene, P-			ug/m <sup>3</sup>										
24		95-47-6	Xylene, o-			ug/m <sup>3</sup>										
93.4		1330-20-7	Xylenes			ug/m <sup>3</sup>										

<b>Summary of Risk Assessment Output</b>	<b>Output Form 1A</b>
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**Version Date:** February 2018

**Basis:** November 2017 EPA RSL Table

**Site ID:** 1205 Eureka Street

**Exposure Unit ID:** SG-2

**PRIMARY CALCULATORS**

Receptor	Pathway	Carcinogenic Risk	Hazard Index	Risk exceeded?
Resident	Soil Combined Pathways	NC	NC	NC
	Groundwater Combined Pathways*	NC	NC	NC
Non-Residential Worker	Soil Combined Pathways	NC	NC	NC
	Groundwater Combined Pathways*	NC	NC	NC
Construction Worker	Soil Combined Pathways	NC	NC	NC
User Defined	Soil Combined Pathways	NC	NC	NC
	Surface Water Combined Pathways*	NC	NC	NC

**VAPOR INTRUSION CALCULATORS**

Receptor	Pathway	Carcinogenic Risk	Hazard Index	Risk exceeded?
Resident	Groundwater to Indoor Air	NC	NC	NC
	Soil Gas to Indoor Air	3.0E-05	1.4E+00	YES
	Indoor Air	NC	NC	NC
Non-Residential Worker	Groundwater to Indoor Air	NC	NC	NC
	Soil Gas to Indoor Air	2.3E-06	1.1E-01	NO
	Indoor Air	NC	NC	NC

**CONTAMINANT MIGRATION CALCULATORS**

Pathway	Source	Target POE Concentrations Exceeded?	
Protection of Groundwater Use	Source Soil	Exceedence of 2L at POE?	NC
	Source Groundwater	Exceedence of 2L at POE?	NC
Protection of Surface Water	Source Soil	Exceedence of 2B at POE?	NC
	Source Groundwater	Exceedence of 2B at POE?	NC

**Notes:**

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.
2. \* = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.



Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-2

Carcinogenic risk and hazard quotient cells highlighted in orange are associated with non-volatile chemicals. Since these chemicals do not pose a vapor intrusion risk, no risk values are calculated for these chemicals.

All concentrations are in ug/m<sup>3</sup>

CAS #	Chemical Name:	Soil Gas Concentration (ug/m <sup>3</sup> )	Calculated Indoor Air Concentration (ug/m <sup>3</sup> )	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
67-64-1	Acetone	73.2	2.196	-	6.5E+03		6.8E-05
71-43-2	Benzene	9.9	0.297	3.6E-01	6.3E+00	8.3E-07	9.5E-03
106-99-0	Butadiene, 1,3-	90	2.7	9.4E-02	4.2E-01	<b>2.9E-05</b>	<b>1.3E+00</b>
100-41-4	Ethylbenzene	14	0.42	1.1E+00	2.1E+02	3.7E-07	4.0E-04
142-82-5	Heptane, N-	11	0.33	-	8.3E+01		7.9E-04
110-54-3	Hexane, N-	38.8	1.164	-	1.5E+02		1.6E-03
591-78-6	Hexanone, 2-	18	0.54	-	6.3E+00		1.7E-02
78-93-3	Methyl Ethyl Ketone (2-Butanone)	21	0.63	-	1.0E+03		1.2E-04
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	11	0.33	-	6.3E+02		1.1E-04
115-07-1	Propylene	1420	42.6	-	6.3E+02		1.4E-02
127-18-4	Tetrachloroethylene	7.5	0.225	1.1E+01	8.3E+00	2.1E-08	5.4E-03
108-88-3	Toluene	31	0.93	-	1.0E+03		1.8E-04
106-42-3	Xylene, P-	69.1	2.073	-	2.1E+01		2.0E-02
95-47-6	Xylene, o-	24	0.72	-	2.1E+01		6.9E-03
1330-20-7	Xylenes	93.4	2.802	-	2.1E+01		2.7E-02

Cumulative:	3.0E-05	<b>1.4E+00</b>
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Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: SG-2

Carcinogenic risk and hazard quotient cells highlighted in orange are associated with non-volatile chemicals. Since these chemicals do not pose a vapor intrusion risk, no risk values are calculated for these chemicals.

All concentrations are in ug/m<sup>3</sup>

CAS #	Chemical Name:	Soil Gas Concentration (ug/m <sup>3</sup> )	Calculated Indoor Air Concentration (ug/m <sup>3</sup> )	Target Indoor Air Conc. for Carcinogens @ TCR = 1E-06	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 0.2	Calculated Carcinogenic Risk	Calculated Non-Carcinogenic Hazard Quotient
67-64-1	Acetone	73.2	0.732	-	2.7E+04		5.4E-06
71-43-2	Benzene	9.9	0.099	1.6E+00	2.6E+01	6.3E-08	7.5E-04
106-99-0	Butadiene, 1,3-	90	0.9	4.1E-01	1.8E+00	<b>2.2E-06</b>	1.0E-01
100-41-4	Ethylbenzene	14	0.14	4.9E+00	8.8E+02	2.9E-08	3.2E-05
142-82-5	Heptane, N-	11	0.11	-	3.5E+02		6.3E-05
110-54-3	Hexane, N-	38.8	0.388	-	6.1E+02		1.3E-04
591-78-6	Hexanone, 2-	18	0.18	-	2.6E+01		1.4E-03
78-93-3	Methyl Ethyl Ketone (2-Butanone)	21	0.21	-	4.4E+03		9.6E-06
108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	11	0.11	-	2.6E+03		8.4E-06
115-07-1	Propylene	1420	14.2	-	2.6E+03		1.1E-03
127-18-4	Tetrachloroethylene	7.5	0.075	4.7E+01	3.5E+01	1.6E-09	4.3E-04
108-88-3	Toluene	31	0.31	-	4.4E+03		1.4E-05
106-42-3	Xylene, P-	69.1	0.691	-	8.8E+01		1.6E-03
95-47-6	Xylene, o-	24	0.24	-	8.8E+01		5.5E-04
1330-20-7	Xylenes	93.4	0.934	-	8.8E+01		2.1E-03

Cumulative:	2.3E-06	1.1E-01
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## North Carolina Department of Environmental Quality Risk Calculator

<b>Version Date:</b>	February 2018
<b>Basis:</b>	November 2017 EPA RSL Table
<b>Site Name:</b>	Former Double Oaks School
<b>Site Address:</b>	1205 Eureka Street
<b>DEQ Section:</b>	
<b>Site ID:</b>	1205 Eureka Street
<b>Exposure Unit ID:</b>	CREEK-1
<b>Submittal Date:</b>	11/28/2018
<b>Prepared By:</b>	Robert Sorgel
<b>Reviewed By:</b>	Matt Bramblett

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<b>Input Section 1 - Exposure Pathways &amp; Parameters</b>		
Input Form 1A	Complete Exposure Pathways	<input checked="" type="checkbox"/>
Input Form 1B	Exposure Factors and Target Risks	<input checked="" type="checkbox"/>
Input Form 1C	Contaminant Migration Parameters	<input type="checkbox"/>
Input Form 1D	Sample Statistics	<input type="checkbox"/>
<b>Input Section 2 - Exposure Point Concentrations</b>		
Input Form 2A	Surface Soil Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2B	Subsurface Soil Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2C	Groundwater Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2D	Surface Water Exposure Point Concentration Table	<input checked="" type="checkbox"/>
Input Form 2E	Soil Gas Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2F	Indoor Air Exposure Point Concentration Table	<input type="checkbox"/>
<b>DATA OUTPUT SHEETS</b>		
<b>Output Section 1 - Summary Output for All Calculators</b>		
Output Form 1A	Summary of Risk Assessment Output	<input checked="" type="checkbox"/>
<b>Output Section 2 - Primary Calculators</b>		
Output Form 2A	Resident Soil Combined Pathways	<input type="checkbox"/>
Output Form 2B	Resident Groundwater Combined Pathways	<input type="checkbox"/>
Output Form 2C	Non-Residential Worker Soil Combined Pathways	<input type="checkbox"/>
Output Form 2D	Non-Residential Worker Groundwater Combined Pathways	<input type="checkbox"/>
Output Form 2E	Construction Worker Soil Combined Pathways	<input type="checkbox"/>
Output Form 2F	User Defined Soil Combined Pathways	<input type="checkbox"/>
Output Form 2G	User Defined Surface Water Combined Pathways	<input checked="" type="checkbox"/>
<b>Output Section 3 - Vapor Intrusion Calculators</b>		
Output Form 3A	Resident Groundwater to Indoor Air	<input type="checkbox"/>
Output Form 3B	Resident Soil Gas to Indoor Air	<input type="checkbox"/>
Output Form 3C	Resident Indoor Air	<input type="checkbox"/>
Output Form 3D	Non-Residential Worker Groundwater to Indoor Air	<input type="checkbox"/>
Output Form 3E	Non-Residential Worker Soil Gas to Indoor Air	<input type="checkbox"/>
Output Form 3F	Non-Residential Worker Indoor Air	<input type="checkbox"/>
<b>Output Section 4 - Contaminant Migration to Point of Exposure (POE) Worksheets</b>		
Output Form 4A	Soil Source to Groundwater POE - Forward Mode	<input type="checkbox"/>
Output Form 4B	Groundwater Source to Groundwater POE - Forward Mode	<input type="checkbox"/>
Output Form 4C	Soil Source to Surface Water POE - Forward Mode	<input type="checkbox"/>
Output Form 4D	Groundwater Source to Surface Water POE - Forward Mode	<input type="checkbox"/>
Output Form 4E	Soil Source to Groundwater POE - Backward Mode	<input type="checkbox"/>
Output Form 4F	Groundwater Source to Groundwater POE - Backward Mode	<input type="checkbox"/>
Output Form 4G	Soil Source to Surface Water POE - Backward Mode	<input type="checkbox"/>
Output Form 4H	Groundwater Source to Surface Water POE - Backward Mode	<input type="checkbox"/>

Complete Exposure Pathways		Input Form 1A
<b>Version Date: February 2018</b>		
<b>Basis: November 2017 EPA RSL Table</b>		
<b>Site ID: 1205 Eureka Street</b>		
<b>Exposure Unit ID: CREEK-1</b>		
<i>Note: Risk output will only be calculated for complete exposure pathways.</i>		
Receptor	Pathway	Check box if pathway complete
<b>PRIMARY PATHWAYS</b>		
Resident	Soil Combined Pathways	<input type="checkbox"/>
	Groundwater Combined Pathways	<input type="checkbox"/>
Non-Residential Worker	Soil Combined Pathways	<input type="checkbox"/>
	Groundwater Combined Pathways	<input type="checkbox"/>
Construction Worker	Soil Combined Pathways	<input type="checkbox"/>
User Defined	Soil Combined Pathways	<input type="checkbox"/>
	Surface Water Combined Pathways	<input checked="" type="checkbox"/>
<b>VAPOR INTRUSION PATHWAYS</b>		
Resident	Groundwater to Indoor Air	<input type="checkbox"/>
	Soil Gas to Indoor Air	<input type="checkbox"/>
	Indoor Air	<input type="checkbox"/>
Non-Residential Worker	Groundwater to Indoor Air	<input type="checkbox"/>
	Soil Gas to Indoor Air	<input type="checkbox"/>
	Indoor Air	<input type="checkbox"/>
<b>CONTAMINANT MIGRATION PATHWAYS</b>		
Protection of Groundwater Use	Source Soil	<input type="checkbox"/>
	Source Groundwater	<input type="checkbox"/>
Protection of Surface Water	Source Soil	<input type="checkbox"/>
	Source Groundwater	<input type="checkbox"/>

**Exposure Point Concentrations** Input Form 2D  
 Version Date: February 2018  
 Basis: November 2017 EPA RSL Table  
 Site ID: 1205 Eureka Street  
 Exposure Unit ID: CREEK-1

**Surface Water Exposure Point Concentration Table**

Exposure Point Concentration (ug/L)	Justification for Exposure Point Concentration	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (Screening Level) (n/c)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
5.4		127-18-4	Tetrachloroethylene			ug/L										
2.1		79-01-6	Trichloroethylene			ug/L										

<b>Summary of Risk Assessment Output</b>	<b>Output Form 1A</b>
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**Version Date:** February 2018

**Basis:** November 2017 EPA RSL Table

**Site ID:** 1205 Eureka Street

**Exposure Unit ID:** CREEK-1

**PRIMARY CALCULATORS**

Receptor	Pathway	Carcinogenic Risk	Hazard Index	Risk exceeded?
Resident	Soil Combined Pathways	NC	NC	NC
	Groundwater Combined Pathways*	NC	NC	NC
Non-Residential Worker	Soil Combined Pathways	NC	NC	NC
	Groundwater Combined Pathways*	NC	NC	NC
Construction Worker	Soil Combined Pathways	NC	NC	NC
User Defined	Soil Combined Pathways	NC	NC	NC
	Surface Water Combined Pathways*	5.4E-07	1.0E-01	NO

**VAPOR INTRUSION CALCULATORS**

Receptor	Pathway	Carcinogenic Risk	Hazard Index	Risk exceeded?
Resident	Groundwater to Indoor Air	NC	NC	NC
	Soil Gas to Indoor Air	NC	NC	NC
	Indoor Air	NC	NC	NC
Non-Residential Worker	Groundwater to Indoor Air	NC	NC	NC
	Soil Gas to Indoor Air	NC	NC	NC
	Indoor Air	NC	NC	NC

**CONTAMINANT MIGRATION CALCULATORS**

Pathway	Source	Target POE Concentrations Exceeded?	
Protection of Groundwater Use	Source Soil	Exceedence of 2L at POE?	NC
	Source Groundwater	Exceedence of 2L at POE?	NC
Protection of Surface Water	Source Soil	Exceedence of 2B at POE?	NC
	Source Groundwater	Exceedence of 2B at POE?	NC

**Notes:**

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.
2. \* = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: CREEK-1

Receptor Type:

CAS #	Chemical Name:	Ingestion Concentration (ug/L)	Dermal Concentration (ug/L)	Ingestion Carcinogenic Risk	Dermal Contact Carcinogenic Risk	Calculated Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Contact Hazard Quotient	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	5.4	5.4	1.1E-08	8.0E-08	9.1E-08	7.7E-03	2.5E-02	3.3E-02
79-01-6	Trichloroethylene	2.1	2.1	1.6E-07	2.8E-07	4.5E-07	3.6E-02	3.4E-02	7.0E-02

Cumulative: 5.4E-07

1.0E-01



## North Carolina Department of Environmental Quality Risk Calculator

<b>Version Date:</b>	February 2018
<b>Basis:</b>	November 2017 EPA RSL Table
<b>Site Name:</b>	Former Double Oaks School
<b>Site Address:</b>	1205 Eureka Street
<b>DEQ Section:</b>	
<b>Site ID:</b>	1205 Eureka Street
<b>Exposure Unit ID:</b>	CREEK-2
<b>Submittal Date:</b>	11/28/2018
<b>Prepared By:</b>	Robert Sorgel
<b>Reviewed By:</b>	Matt Bramblett

Table of Contents		TOC
Version Date: February 2018		
Basis: November 2017 EPA RSL Table		
Site ID: 1205 Eureka Street		
Exposure Unit ID: CREEK-2		
Form No.	Description	Check box if included
<b>DATA INPUT SHEETS</b>		
<b>Input Section 1 - Exposure Pathways &amp; Parameters</b>		
Input Form 1A	Complete Exposure Pathways	<input checked="" type="checkbox"/>
Input Form 1B	Exposure Factors and Target Risks	<input checked="" type="checkbox"/>
Input Form 1C	Contaminant Migration Parameters	<input type="checkbox"/>
Input Form 1D	Sample Statistics	<input type="checkbox"/>
<b>Input Section 2 - Exposure Point Concentrations</b>		
Input Form 2A	Surface Soil Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2B	Subsurface Soil Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2C	Groundwater Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2D	Surface Water Exposure Point Concentration Table	<input checked="" type="checkbox"/>
Input Form 2E	Soil Gas Exposure Point Concentration Table	<input type="checkbox"/>
Input Form 2F	Indoor Air Exposure Point Concentration Table	<input type="checkbox"/>
<b>DATA OUTPUT SHEETS</b>		
<b>Output Section 1 - Summary Output for All Calculators</b>		
Output Form 1A	Summary of Risk Assessment Output	<input checked="" type="checkbox"/>
<b>Output Section 2 - Primary Calculators</b>		
Output Form 2A	Resident Soil Combined Pathways	<input type="checkbox"/>
Output Form 2B	Resident Groundwater Combined Pathways	<input type="checkbox"/>
Output Form 2C	Non-Residential Worker Soil Combined Pathways	<input type="checkbox"/>
Output Form 2D	Non-Residential Worker Groundwater Combined Pathways	<input type="checkbox"/>
Output Form 2E	Construction Worker Soil Combined Pathways	<input type="checkbox"/>
Output Form 2F	User Defined Soil Combined Pathways	<input type="checkbox"/>
Output Form 2G	User Defined Surface Water Combined Pathways	<input checked="" type="checkbox"/>
<b>Output Section 3 - Vapor Intrusion Calculators</b>		
Output Form 3A	Resident Groundwater to Indoor Air	<input type="checkbox"/>
Output Form 3B	Resident Soil Gas to Indoor Air	<input type="checkbox"/>
Output Form 3C	Resident Indoor Air	<input type="checkbox"/>
Output Form 3D	Non-Residential Worker Groundwater to Indoor Air	<input type="checkbox"/>
Output Form 3E	Non-Residential Worker Soil Gas to Indoor Air	<input type="checkbox"/>
Output Form 3F	Non-Residential Worker Indoor Air	<input type="checkbox"/>
<b>Output Section 4 - Contaminant Migration to Point of Exposure (POE) Worksheets</b>		
Output Form 4A	Soil Source to Groundwater POE - Forward Mode	<input type="checkbox"/>
Output Form 4B	Groundwater Source to Groundwater POE - Forward Mode	<input type="checkbox"/>
Output Form 4C	Soil Source to Surface Water POE - Forward Mode	<input type="checkbox"/>
Output Form 4D	Groundwater Source to Surface Water POE - Forward Mode	<input type="checkbox"/>
Output Form 4E	Soil Source to Groundwater POE - Backward Mode	<input type="checkbox"/>
Output Form 4F	Groundwater Source to Groundwater POE - Backward Mode	<input type="checkbox"/>
Output Form 4G	Soil Source to Surface Water POE - Backward Mode	<input type="checkbox"/>
Output Form 4H	Groundwater Source to Surface Water POE - Backward Mode	<input type="checkbox"/>

Complete Exposure Pathways		Input Form 1A
<b>Version Date: February 2018</b>		
<b>Basis: November 2017 EPA RSL Table</b>		
<b>Site ID: 1205 Eureka Street</b>		
<b>Exposure Unit ID: CREEK-2</b>		
<i>Note: Risk output will only be calculated for complete exposure pathways.</i>		
Receptor	Pathway	Check box if pathway complete
<b>PRIMARY PATHWAYS</b>		
Resident	Soil Combined Pathways	<input type="checkbox"/>
	Groundwater Combined Pathways	<input type="checkbox"/>
Non-Residential Worker	Soil Combined Pathways	<input type="checkbox"/>
	Groundwater Combined Pathways	<input type="checkbox"/>
Construction Worker	Soil Combined Pathways	<input type="checkbox"/>
User Defined	Soil Combined Pathways	<input type="checkbox"/>
	Surface Water Combined Pathways	<input checked="" type="checkbox"/>
<b>VAPOR INTRUSION PATHWAYS</b>		
Resident	Groundwater to Indoor Air	<input type="checkbox"/>
	Soil Gas to Indoor Air	<input type="checkbox"/>
	Indoor Air	<input type="checkbox"/>
Non-Residential Worker	Groundwater to Indoor Air	<input type="checkbox"/>
	Soil Gas to Indoor Air	<input type="checkbox"/>
	Indoor Air	<input type="checkbox"/>
<b>CONTAMINANT MIGRATION PATHWAYS</b>		
Protection of Groundwater Use	Source Soil	<input type="checkbox"/>
	Source Groundwater	<input type="checkbox"/>
Protection of Surface Water	Source Soil	<input type="checkbox"/>
	Source Groundwater	<input type="checkbox"/>

**Exposure Point Concentrations** Input Form 2D  
 Version Date: February 2018  
 Basis: November 2017 EPA RSL Table  
 Site ID: 1205 Eureka Street  
 Exposure Unit ID: CREEK-2

**Surface Water Exposure Point Concentration Table**

Exposure Point Concentration (ug/L)	Justification for Exposure Point Concentration	CAS Number	Chemical	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Background Value	Screening Toxicity Value (Screening Level) (n/c)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
3.4		127-18-4	Tetrachloroethylene			ug/L										
1		79-01-6	Trichloroethylene			ug/L										

<b>Summary of Risk Assessment Output</b>	<b>Output Form 1A</b>
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**Version Date:** February 2018

**Basis:** November 2017 EPA RSL Table

**Site ID:** 1205 Eureka Street

**Exposure Unit ID:** CREEK-2

**PRIMARY CALCULATORS**

Receptor	Pathway	Carcinogenic Risk	Hazard Index	Risk exceeded?
Resident	Soil Combined Pathways	NC	NC	NC
	Groundwater Combined Pathways*	NC	NC	NC
Non-Residential Worker	Soil Combined Pathways	NC	NC	NC
	Groundwater Combined Pathways*	NC	NC	NC
Construction Worker	Soil Combined Pathways	NC	NC	NC
User Defined	Soil Combined Pathways	NC	NC	NC
	Surface Water Combined Pathways*	2.7E-07	5.4E-02	NO

**VAPOR INTRUSION CALCULATORS**

Receptor	Pathway	Carcinogenic Risk	Hazard Index	Risk exceeded?
Resident	Groundwater to Indoor Air	NC	NC	NC
	Soil Gas to Indoor Air	NC	NC	NC
	Indoor Air	NC	NC	NC
Non-Residential Worker	Groundwater to Indoor Air	NC	NC	NC
	Soil Gas to Indoor Air	NC	NC	NC
	Indoor Air	NC	NC	NC

**CONTAMINANT MIGRATION CALCULATORS**

Pathway	Source	Target POE Concentrations Exceeded?	
Protection of Groundwater Use	Source Soil	Exceedence of 2L at POE?	NC
	Source Groundwater	Exceedence of 2L at POE?	NC
Protection of Surface Water	Source Soil	Exceedence of 2B at POE?	NC
	Source Groundwater	Exceedence of 2B at POE?	NC

**Notes:**

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.
2. \* = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.

Version Date: February 2018

Basis: November 2017 EPA RSL Table

Site ID: 1205 Eureka Street

Exposure Unit ID: CREEK-2

Receptor Type:

CAS #	Chemical Name:	Ingestion Concentration (ug/L)	Dermal Concentration (ug/L)	Ingestion Carcinogenic Risk	Dermal Contact Carcinogenic Risk	Calculated Carcinogenic Risk	Ingestion Hazard Quotient	Dermal Contact Hazard Quotient	Calculated Non-Carcinogenic Hazard Quotient
127-18-4	Tetrachloroethylene	3.4	3.4	7.2E-09	5.0E-08	5.7E-08	4.8E-03	1.6E-02	2.1E-02
79-01-6	Trichloroethylene	1	1	7.8E-08	1.4E-07	2.1E-07	1.7E-02	1.6E-02	3.3E-02

Cumulative: 2.7E-07

5.4E-02