TASMAN GEOSCIENCES
6899 Pecos St., Unit C
Denver, CO 80221
303-487-1228
www.tasman-geo.com

September 3, 2015

Mr. Steve Weathers
Principal Environmental Specialist
DCP Midstream, L.P.
370 17th St. #2500
Denver, CO 80202

RE: Supplemental Sub-Slab Vapor Sampling Results – August 13, 2015
DCP Midstream, L.P. – 301 Hickory St., Eaton CO 80615

Dear Mr. Weathers:

In accordance with the *Supplemental Indoor Air Quality Sampling Results Letter* dated July 31, 2015, (Supplemental Letter), Tasman Geosciences (Tasman), on behalf of DCP Midstream, L.P. (DCP) conducted sub-slab vapor sampling on August 13, 2015, in the interior of the basement of the private residence located at 301 Hickory St., Eaton, CO 80615. Per the recommendations of the Supplemental Letter, the sub-slab vapor samples were collected to evaluate sub-slab air below the residence. The residence is located adjacent to a DCP Pipeline located approximately 0.25 miles north of the intersection of County Road 39 and County Road 74 near the town of Eaton, CO (Site [Figure 1]).

Air Sampling Exercise:

This report provides the results of Tasman's sub-slab vapor sampling exercise at the residence, including: (i) BTEX [1] vapor sampling results; (ii) leak detection of sub-slab vapor sampling equipment using Helium shroud methods per EPA guidance, and; (iii) the presence of volatile organic compounds (VOC) in sub-slab vapor using a photoionization detector (PID). The sub-slab vapor sampling exercise was conducted on August 13, 2015, at the residence, specifically in the southeast corner of the basement. The sub slab vapor sampling points were installed in accordance with the procedures outlined in the Supplemental Letter, the sampling devices were properly calibrated and tested for leaks, and sample locations were positioned following appropriate available protocols. Subsequent to vapor sample collection the device was transported under chain of custody to a certified laboratory in Castle Rock, Colo., to be analyzed.

Results:

The results from this sampling event of the BTEX vapor sample laboratory analyses and PID readings for the sub-slab vapor are provided in the following table and the attached Table 1, and the laboratory analytical report for the BTEX samples are included in Attachment B.

[1] BTEX compounds are found in natural gas hydrocarbons, and are benzene, toluene, ethylbenzene, and xylene.

Sub-Slab Vapor Sample Results – August, 13 2015

Sample ID	Analytical results in micrograms/meters cubed (µg/m^3)	PID Organic Vapor Readings (ppm)
301 Hickory St. – Sub-slab	Benzene – 1.1 Toluene – 1.9 Ethylbenzene – 2.9 Xylenes, Total – 8.8	12.4
CDPHE-HWMMD Air Screening Concentrations; Residential Action Level (µg/m^3)	Benzene – 3.1 Toluene – 5,200 Ethylbenzene – 9.7 Xylenes (Mixture/Total) - 100	

ND= Analyte NOT DETECTED at or above the reporting limit

The BTEX vapor sample results are expressed in micrograms (µg) of the chemical in a cubic meter of air (m^3). The CDPHE long-term health standard for BTEX in a residential setting, *i.e.*, over a lifetime exposure to the relevant chemical, is referred to as the Residential Action Level. The results of the overall IAQ evaluation are summarized below and please refer to the July 31, 2015 Supplemental Letter for our complete evaluation:

- The concentrations of VOC, such as BTEX, generally decrease as they migrate from soil vapor to indoor air. The measured sub-slab vapor concentrations shown on Table 1, however, are lower than the indoor air concentrations measured indoors in June and July. This observed increase in concentrations from soil vapor to indoor air is the reverse of the concentration profile expected due to vapor intrusion, and suggests that the higher indoor air concentrations are more likely diffusing downwards into the sub-slab soils.
- According to EPA (2015), sub-slab vapor concentrations in residential homes are typically 33 times greater than indoor air concentrations caused by vapor intrusion[1.] Therefore, if the basement and main floor concentrations of benzene shown in Table 1 were due to vapor intrusion, we would expect sub-slab vapor benzene concentrations to be in the range of approximately 100 to 400 µg/m3 or greater, compared to the 1.1 µg/m3 concentration observed. While sub-slab vapor concentrations can vary over time and space, the measured value is approximately two to three orders of magnitude smaller than expected if vapor intrusion was the source of benzene in indoor air. The same general conclusion applies to the other BTEX compounds. It is also noted that the sub-slab vapor sample was collected in the southeast corner of the basement nearest to the known extent of the groundwater plume.
- As noted in the Supplemental Letter, soil vapor BTEX concentrations would be expected to have the predicted soil vapor ratios on Figure 2, if due to the observed concentrations in nearby groundwater. The measured sub-slab vapor BTEX ratios are very different from predicted soil vapor ratios, but similar to indoor air (June and July) and outdoor air (July) ratios. This indicates that sub-slab vapor BTEX

[1] Based on observed residential attenuation factors (indoor air concentration divided by sub-slab vapor concentration) of 0.03 or less in 95% of homes evaluated by EPA (2015).

concentrations are more likely due to downward diffusion of outdoor and indoor air than vapor intrusion.

Conclusions and Recommendations

The above lines of evidence, combined with the lines of evidence discussed in the July 31, 2015 Supplemental Letter, strongly suggest that vapor intrusion is not the source of BTEX measured in the indoor air samples that were collected previously. Therefore, further vapor intrusion investigation and/or vapor intrusion mitigation has not been deemed necessary.

Should you have any questions or comments about the results and/or recommendations provided herein, please do not hesitate to contact me at 720-633-5143 or bhumphrey@tasman-geo.com.

Sincerely,

Brian Humphrey
Environmental Scientist
Tasman Geosciences

Enclosures:

Table 1 – Vapor Sample Analytical Results Summary Table

Figure 1 – Site Location Map
Figure 2 – BTEX Ratio Plots

Attachment A –Sub-Slab Vapor Sample Analytical Results

cc:
File

TABLES

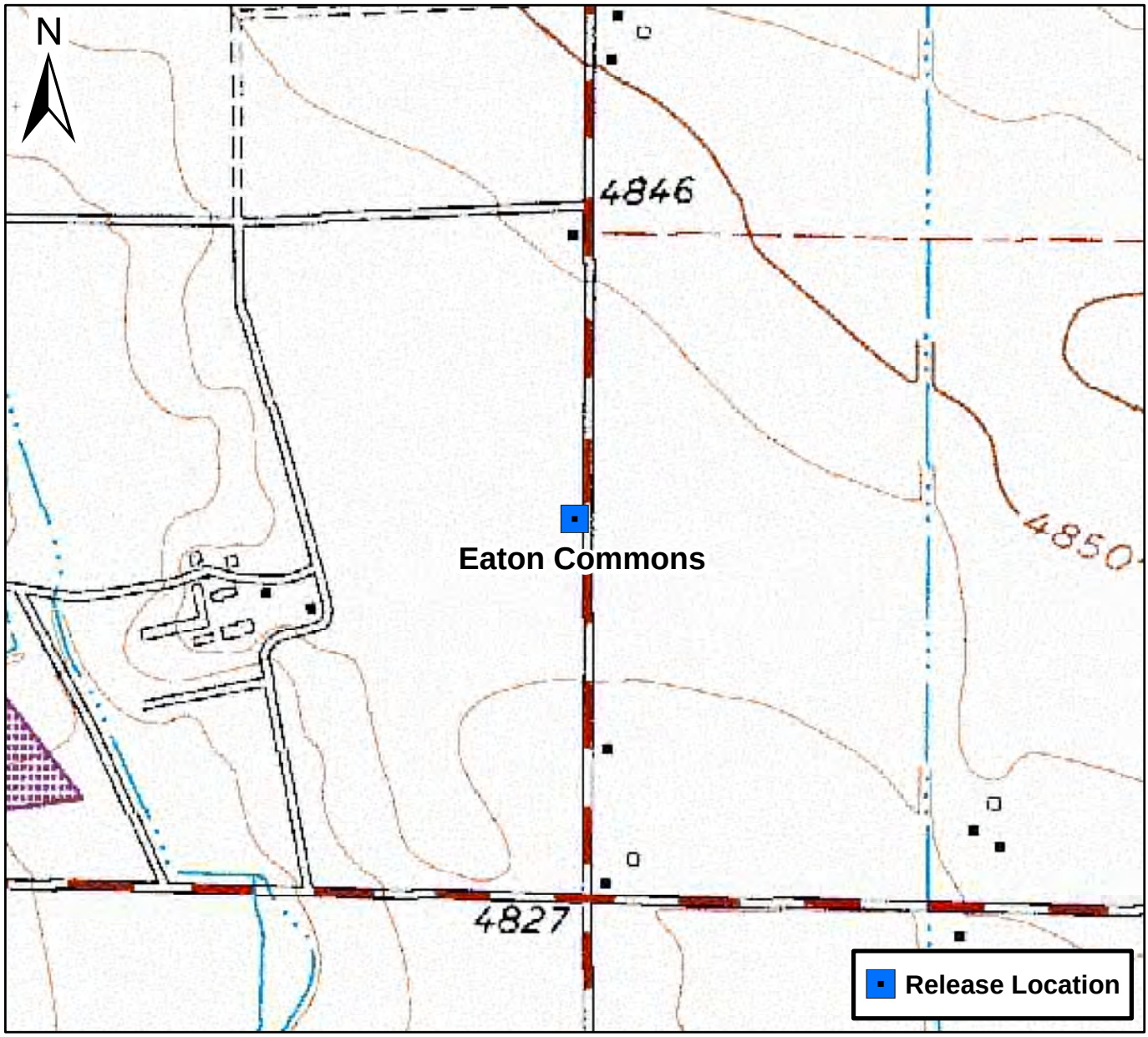
Table 1
Vapor Sample Analytical Results Summary Table
301 Hickory St., Eaton, CO

Compound	Indoor Air					Outdoor Air		Sub-Slab	CDPHE Indoor Air Residential Action Levels (March 2012)	EPA (2011) Residential Indoor Air Background Range (50th %)	EPA (2011) Residential Indoor Air Background Range (90th %)
	Basement		Main Floor		Garage						
	June 2015	July 2015	June 2015	July 2015	July 2015	June 2015	July 2015	August 2015			
Benzene	**8**	**3.5**	**11**	**4.1**	**120**	2	2.6	1.1	3.1	<RL - 4.7	5.2 - 15
Toluene	13	11	35	14	460	8.6	6	1.9	5200	4.8 - 24	25 - 77
Ethylbenzene	2.9	2.2	6.4	3.3	**140**	<0.43	1.6	2.9	9.7	1 - 3.7	4.8 - 13
Total Xylenes	12	12	33	16	**760**	<0.43	17	8.8	100		

Notes:

- All Concentrations in micrograms per meter cubed (µg/m3)
- Bold values exceed the CDPHE Residential Action Level
- EPA (2011) - Background Indoor Air Concentration of Volatile Organic Compounds in North American Residences (1990 - 2005): A Compilation of Statistics for Assessing Vapor Intrusion; US Environmental Protection Agency, OSWER, EPA 530-R-10-001

FIGURES



0 750 1,500 Feet

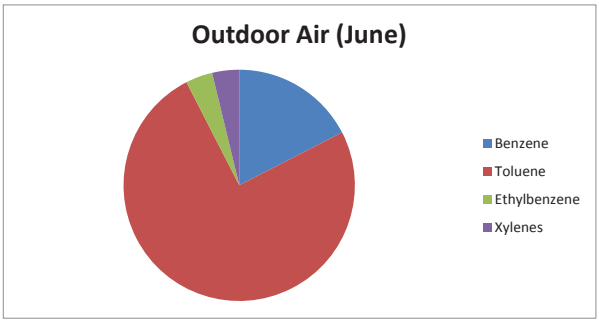
Figure 1

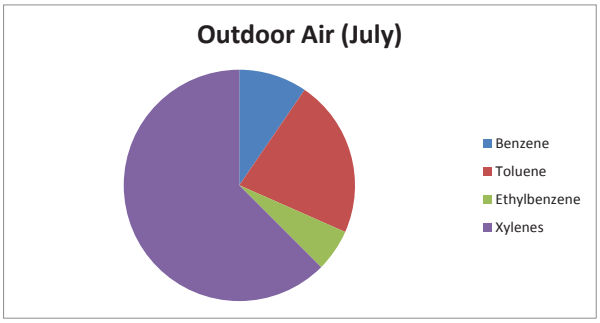
Site Location Map
Eaton Commons
NESE S31 T7N R65W
Weld County, Colorado

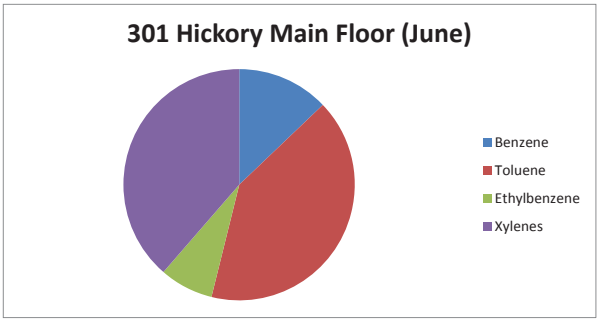
TASMAN GEOSCIENCES

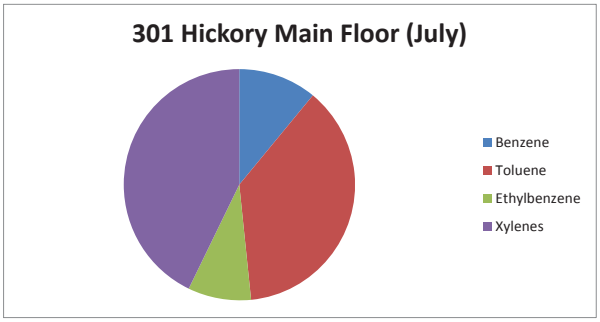
Drawn By: DBA
Date: 6/11/2015

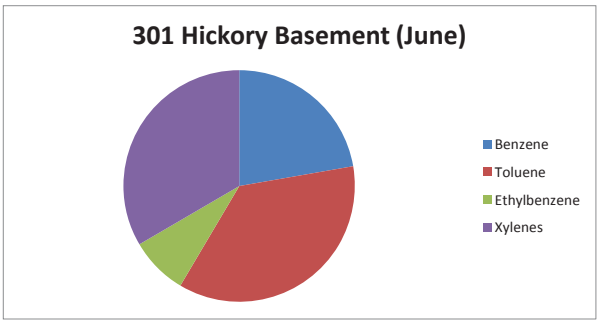
Figure 2 BETX Ratio Plots
301 Hickory St., Eaton, CO

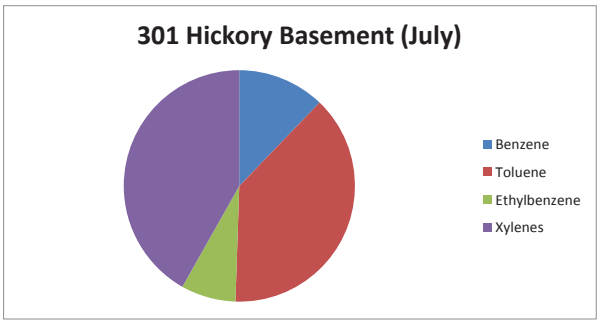


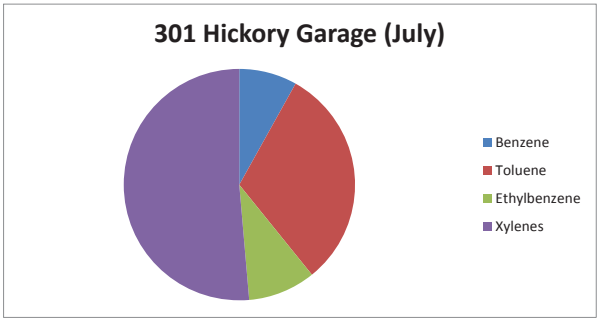


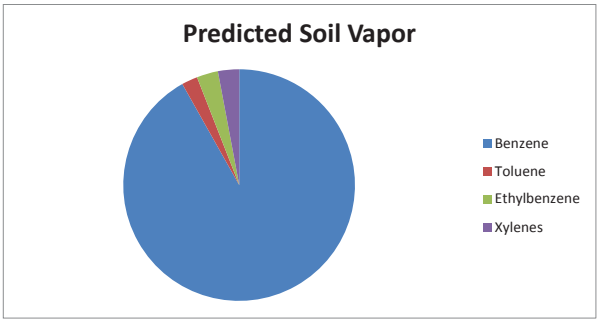


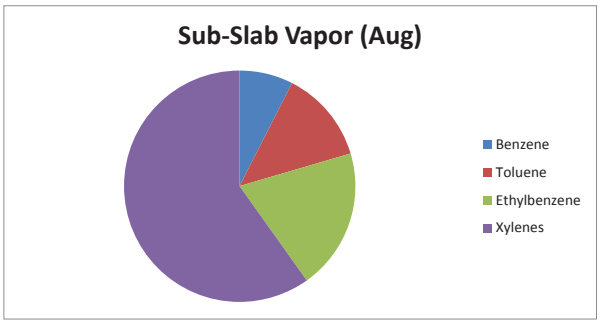












ATTACHMENT A – VAPOR SAMPLE ANALYTICAL RESULTS

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

August 20, 2015

Steve Weathers
DCP Midstream
370 17th Street #2500
Denver, CO 80202

RE: Eaton Commons

Enclosed are the results of analyses for samples received by Summit Scientific on 08/13/15 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Paul Shrewsbury
President

S2

Project:	
Project Number:	**Reported:**
Project Manager:	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received

Summit Scientific

1508706.

S2

741 Corporate Circle, Suite J ♦ Golden, Colorado 80401
303-277-9310 ♦ 303-374-5933

Page 1 of 1

Client: DCP Midstream
Address:
City/State/Zip:
Phone: Fax:
Sampler Name: Brian Humphrey

Project Manager: Steve Wentlers
E-Mail: SWwentlers@dcpmidstream.com
Project Name: Euton Commons
Project Number:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative: HCl	Preservative: HNO3	Preservative: None	Preservative: Other (Specify)	Matrix: Groundwater	Matrix: Soil	Matrix: Air-Canister #	Matrix: Other (Specify)	Analysis Requested: TO-15 BTEX	Special Instructions
1	940 E. 3rd - Subslab	8/13/15	1145-1213	1			X				2691		X	
2	301 Hickory St. - Subslab	↓	1327-1355	1			↓				2510		↓	
3	Duplicate - 081315	↓	—	1			↓				2675		↓	
4														
5														
6														
7														
8														
9														
10														

Relinquished by:	Date/Time:	Received by:	Date/Time:
	8-13-15/		8/13/15 1730
Relinquished by:	Date/Time:	Received by:	Date/Time:
	8/13/15 1820		
Relinquished by:	Date/Time:	Received by:	Date/Time:

Turn Around Time (Check)
Same Day ___ 72 hours ___
24 hours ___ Standard X
48 hours ___

Sample Integrity:
Temperature Upon Receipt: ____
Intact: Yes No

Notes:
Please cc: bhumphrey@tasman-geo.com

www.s2scientific.com

S2

Project:		
Project Number:		**Reported:**
Project Manager:		

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Environmental Chemistry Services, Inc.
2 Oakwood Park Plaza; 100
Castle Rock, CO 80104-1885
TEL: (303) 850-7606 FAX: (303) 850-7609
Website: www.ecs-corp.com

August 19, 2015

Paul Shrewsbury
Summit Scientific
741 Corporate Circle
Suite I
Golden, CO 80401
TEL: (303) 277-9310
FAX (303) 374-5933

RE: Eaton Commons Order No.: 1508019

Dear Paul Shrewsbury:

Environmental Chemistry Services, Inc. received 3 sample(s) on 8/14/2015 for the analyses presented in the following report.

There were no problems with the analytical events associated with this report, , unless noted in the Case Narrative.

Quality control data is within laboratory defined or method specified acceptance limits except if noted.

If you have any questions regarding these tests results, please feel free to call or email.

TEL: (303) 850-7606 ext:300
kris@ecs-corp.com

Sincerely,

Kris Mascarenas
Director of Client Services
2 Oakwood Park Plaza; 100
Castle Rock, CO 80104-1885

Environmental Chemistry Services, Inc.
2 Oakwood Park Plaza; 100
Castle Rock, CO 80104-1885
TEL: (303) 850-7606 FAX: (303) 850-7609
Website: www.ecs-corp.com

Case Narrative

WO#: **1508019**
Date: **8/19/2015**

CLIENT: Summit Scientific
Project: Eaton Commons

This report in its entirety consists of the documents listed below. All documents contain the Environmental Chemistry Services, Inc. Work Order Number assigned to this report.

1. Paginated Report including: A Cover Letter, Case Narrative, Analytical Results, and Applicable Quality Control Reports.

2. Copies of the Chain of Custody Document(s) supplied with this sample set.

3. Electronic Data Deliverables (EDD) if requested.

All samples were analyzed in accordance with "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition." The method used is the Compendium Method TO-15 for the Determination of Volatile Organic Compounds (VOCs) in air collected in specially prepared canisters and analyzed by Gas Chromatography/Mass Spectrometry (GC/MS).

REF:

Center for Environmental Research Information
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, OH 45268
January 1999

Any comments or problems with the analytical events associated with this report are noted below.

Environmental Chemistry Services, Inc.

Date: *19-Aug-15*

Client:	Summit Scientific	**Client Sample ID:**	301 Hickory St.-Sub Slab
Work Order:	1508019	**Canister ID:**	2510
Project:	Eaton Commons	**Collection Date:**	8/13/2015 1:55:00 PM
Lab ID:	1508019-02A	**Matrix:**	AIR

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
BTEX IN AIR		Method: **TO-15**				Analyst: **TSM**
Benzene	1.1	0.32		µg/m³	1	8/19/2015 12:16:00 AM
Toluene	1.9	0.38		µg/m³	1	8/19/2015 12:16:00 AM
Ethylbenzene	2.9	0.43		µg/m³	1	8/19/2015 12:16:00 AM
Xylenes, Total	8.8	0.43		µg/m³	1	8/19/2015 12:16:00 AM
Surr: Toluene-d8	88.6	30-170		%REC	1	8/19/2015 12:16:00 AM
Surr: 4-Bromofluorobenzene	95.8	30-170		%REC	1	8/19/2015 12:16:00 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required.
DF	Dilution Factor	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	N	Tentatively identified compounds
ND	Not Detected at the RL	O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits	R	Percent Difference outside accepted limits

Environmental Chemistry Services, Inc.
2 Oakwood Park Plaza; 100
Castle Rock, CO 80104-1885
TEL: (303) 850-7606 FAX: (303) 850-7609
Website: www.ecs-corp.com

QC SUMMARY REPORT

Work Order: **1508019**

19-Aug-15

Client: Summit Scientific
Project: Eaton Commons **BatchID:** **R2182**

Sample ID **MBLK**	SampType: **MBLK**	TestCode: **TO15B**	Units: **µg/m³**	Prep Date:	RunNo: **2182**
Client ID: **PBW**	Batch ID: **R2182**	TestNo: **TO-15**		Analysis Date: **8/18/2015**	SeqNo: **28462**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.32	0	0				0			
Toluene	ND	0.38	0	0				0			
Ethylbenzene	ND	0.43	0	0				0			
Xylenes, Total	ND	0.43	0	0				0			
Surr: Toluene-d8	12		10.00		122	30	170				
Surr: 4-Bromofluorobenzene	9.1		10.00		90.6	30	170				

Sample ID **LCS**	SampType: **LCS**	TestCode: **TO15B**	Units: **µg/m³**	Prep Date:	RunNo: **2182**
Client ID: **LCSW**	Batch ID: **R2182**	TestNo: **TO-15**		Analysis Date: **8/18/2015**	SeqNo: **28463**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	30	0.32	32	0	92.5	30	170	0			
Toluene	35	0.38	38	0	93.5	30	170	0			
Ethylbenzene	44	0.43	43	0	102	30	170	0			
Xylenes, Total	130	0.43	130	0	97.5	30	170	0			
Surr: Toluene-d8	9.8		10.00		97.7	30	170				
Surr: 4-Bromofluorobenzene	9.2		10.00		92.5	30	170				

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **TO15B**	Units: **µg/m³**	Prep Date:	RunNo: **2182**
Client ID: **LCSS02**	Batch ID: **R2182**	TestNo: **TO-15**		Analysis Date: **8/18/2015**	SeqNo: **28464**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	30	0.32	32	0	94.9	30	170	30	2.56	30	

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the RL	O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted reco

Environmental Chemistry Services, Inc.
2 Oakwood Park Plaza; 100
Castle Rock, CO 80104-1885
TEL: (303) 850-7606 FAX: (303) 850-7609
Website: www.ecs-corp.com

QC SUMMARY REPORT

Work Order: **1508019**

19-Aug-15

Client: Summit Scientific
Project: Eaton Commons **BatchID:** **R2182**

Sample ID **LCSD** SampType: **LCSD** TestCode: **TO15B** Units: **µg/m³** Prep Date: RunNo: **2182**
Client ID: **LCSS02** Batch ID: **R2182** TestNo: **TO-15** Analysis Date: **8/18/2015** SeqNo: **28464**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toluene	36	0.38	38	0	95.7	30	170	35	2.33	30	
Ethylbenzene	45	0.43	43	0	104	30	170	44	1.94	30	
Xylenes, Total	130	0.43	130	0	100	30	170	130	2.50	30	
Surr: Toluene-d8	10		10.00		101	30	170		0	30	
Surr: 4-Bromofluorobenzene	9.4		10.00		94.5	30	170		0	30	

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Dilution was required.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the RL	O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits	RL	Reporting Limit	S	Spike Recovery outside accepted reco

ECS
Environmental Chemistry Services
2 Oakwood Park Plaza, Suite 100
Castle Rock, Colorado 80104
Phone: 303.850.7606
Fax: 303.850.7609
www.ecs-corp.com

Chain of Custody Record (COC)

COC # 14521

PROJECT INFORMATION

Project Number:

Project Name: Eaton Commons

Report To: Summit Scientific

Telephone:

Fax / E-Mail:

ANALYSES REQUESTED

NUMBER OF CONTAINERS: 1 | 1 | 1

BTEX: X | ↓ | ↓

TURN-AROUND-TIME (TAT)

☑ Standard
☐ Rush
☐ Other

REMARKS

Sum

Work Order Number: *(for lab use only)* 1508019

SAMPLE NUMBER / IDENTIFICATION	SAMPLE Date	SAMPLE Time	Matrix*	Container & Size.**	CANISTER ID	REMARKS	LAB #
940 E. 3rd - SubSlab	8/13/15	1145-1213	AR	SU	2691	11.25	1
301 Hickory St. - SubSlab	↓	1327-1355	AR	SU	2510	11.26	2
Duplicate - 081315	↓	—	AR	SU	2675	10.54	3

Sampled By:

Shipment Method:

Airbill Number:

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
1a Relinquished By:		Nakita Horton	Summit Scientific	8/14/15	10:24
1b Received By:		ELISA MASCARENAS	ECS	8-14-15	10:24
2a Relinquished By:					
2b Received By:					
3a Relinquished By:					
3b Received By:					

THE ABOVE SIGNED HAS READ AND UNDERSTANDS THE CREDIT TERMS AND CREDIT POLICIES OF ECS, INC. AND AGREES TO THE TERMS AND CONDITIONS AS SET FORTH IN THIS AGREEMENT.

***Matrix Key:** AQ = Aqueous AR = Air SO = Soil WA = Waste OT = Other

Preservative: H = HCl N = Nitric SF = Sulfuric

****Container:** A = Amber B = Brass C = Clear Glass P = Plastic S = Soil Jar SU = Summa PF = PUF T = Tedlar TU = Tube OT = Other