

**FOURTH QUARTER 2019  
SITE MONITORING DATA  
DUNCAN D20-12, 20-13**

COGCC SPILL TRACKING # 459804  
COGCC REMEDIATION # 12461

Prepared for:



2115 117th Avenue  
Greeley, CO 80631

Prepared by:



6855 West 119th Avenue  
Broomfield, Colorado 80020

**TABLE 1**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - DUNCAN D20-12, 20-13**

Monitoring Well ID	Date	Top of Casing Elevation (ft. AMSL)	Total Depth (ft. BTOC)	Depth to Water (ft.) <sup>(1)</sup>	Depth to LNAPL (ft.) <sup>(1)</sup>	LNAPL Thickness (ft.)	Groundwater Elevation* (ft. AMSL)
BH01	08/23/19	4772.46	21.77	5.32	ND	ND	4765.17
BH01	11/15/19	4772.46	21.68	5.73	ND	ND	4764.76
BH02	08/23/19	4773.47	17.30	5.47	ND	ND	4765.14
BH02	11/15/19	4773.47	17.23	5.89	ND	ND	4764.72
BH03	08/23/19	4770.68	14.10	5.83	ND	ND	4765.26
BH03	11/15/19	4770.68	13.92	6.27	ND	ND	4764.82
BH04	08/23/19	4773.76	20.74	5.62	ND	ND	4765.20
BH04	11/15/19	4773.76	19.76	6.02	ND	ND	4764.80
BH05	08/23/19	4772.36	20.15	5.56	ND	ND	4765.12
BH05	11/15/19	4772.36	19.69	5.93	ND	ND	4764.75
BH06	08/23/19	4772.64	16.63	5.53	ND	ND	4765.18
BH06	11/15/19	4772.64	16.59	5.90	ND	ND	4764.81

ft. = Feet

AMSL = Above mean sea level

BTOC = Below top of casing

LNAPL = Light non-aqueous phase liquid

ND = No LNAPL detected

1) Depth to water measurements were collected from top of casing and adjusted using survey data to reflect depth of water from ground surface.

\* Groundwater elevation was corrected for product thickness (when present) using the following calculation:

Groundwater elevation = (TOC Elevation - Measured Depth to Water)+(LNAPL Thickness in Well x LNAPL Relative Density)

LNAPL relative density was estimated to be approximately 0.75

**TABLE 2**  
**GROUNDWATER ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - DUNCAN D20-12, 20-13**

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
<b>COGCC Standard</b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>
GW01	12/10/18	<b>970</b>	3.2	560	<b>3,800</b>
BH01	08/23/19	<b>440</b>	<1.0	490	<b>1,400</b>
BH01	11/15/19	<b>840</b>	<1.0	420	<b>1,200</b>
BH02	08/23/19	<1.0	<1.0	<1.0	<2.0
BH02	11/15/19	<1.0	<1.0	<1.0	<2.0
BH03	08/23/19	<1.0	<1.0	<1.0	<2.0
BH03	11/15/19	<1.0	<1.0	<1.0	<2.0
BH04	08/23/19	<1.0	<1.0	<1.0	<2.0
BH04	11/15/19	<1.0	<1.0	<1.0	<2.0
BH05	08/23/19	<b>340</b>	<1.0	500	<b>1,700</b>
BH05	11/15/19	<b>530</b>	<1.0	490	<b>1,600</b>
BH06	08/23/19	<1.0	<1.0	<1.0	<2.0
BH06	11/15/19	<1.0	<1.0	<1.0	<2.0

**Notes:**

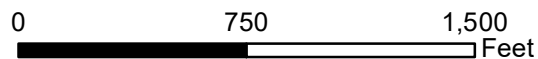
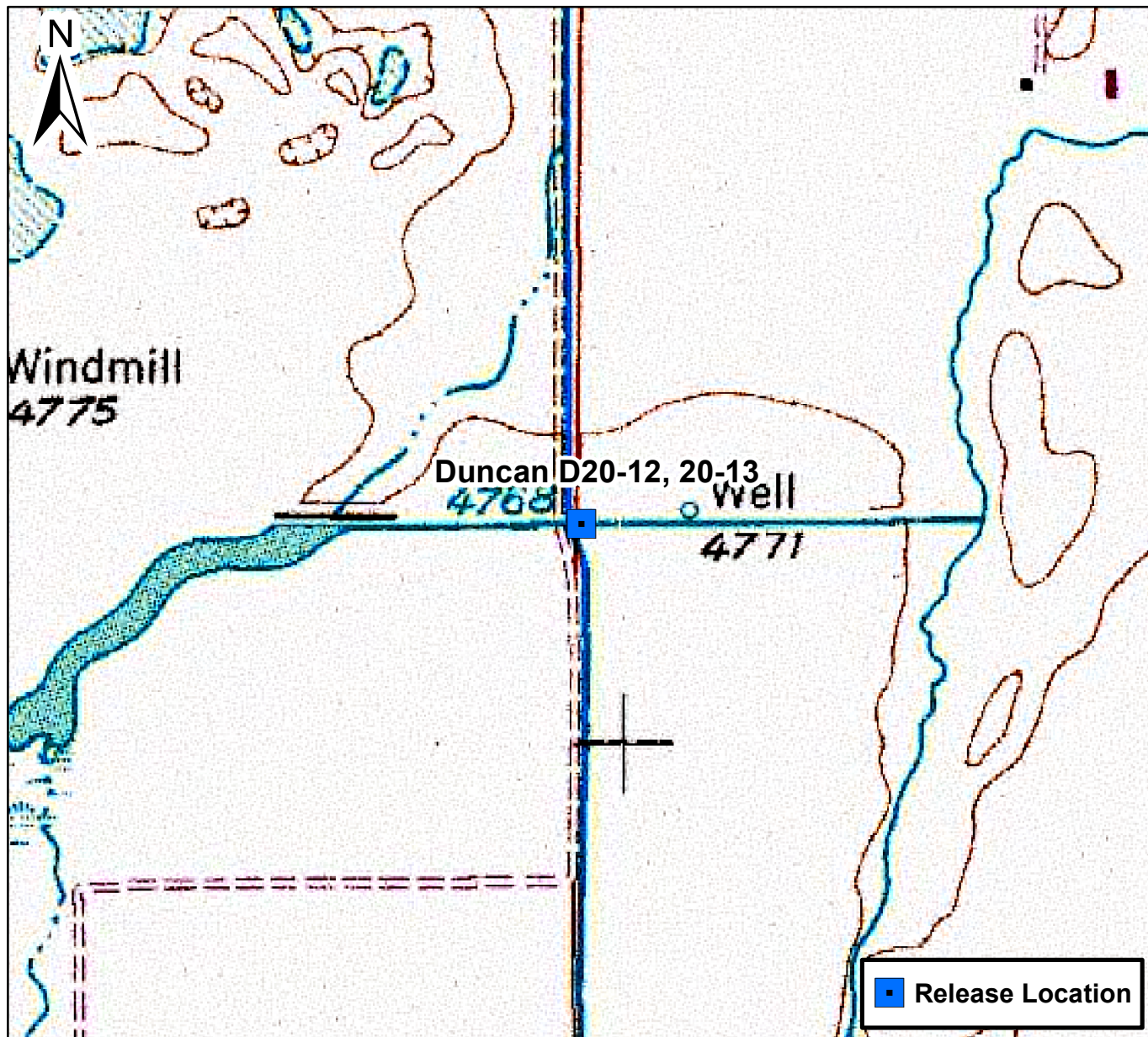
COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

< = Analytical result is less than the indicated laboratory reporting limit

Groundwater standards referenced from COGCC Table 910-1

**Highlighted results are equal to or exceed the COGCC Table 910-1 standard**




## Figure 1

Site Location Map  
Duncan D20-12, 20-13  
NWSW S20 T3N R64W  
Weld County, Colorado

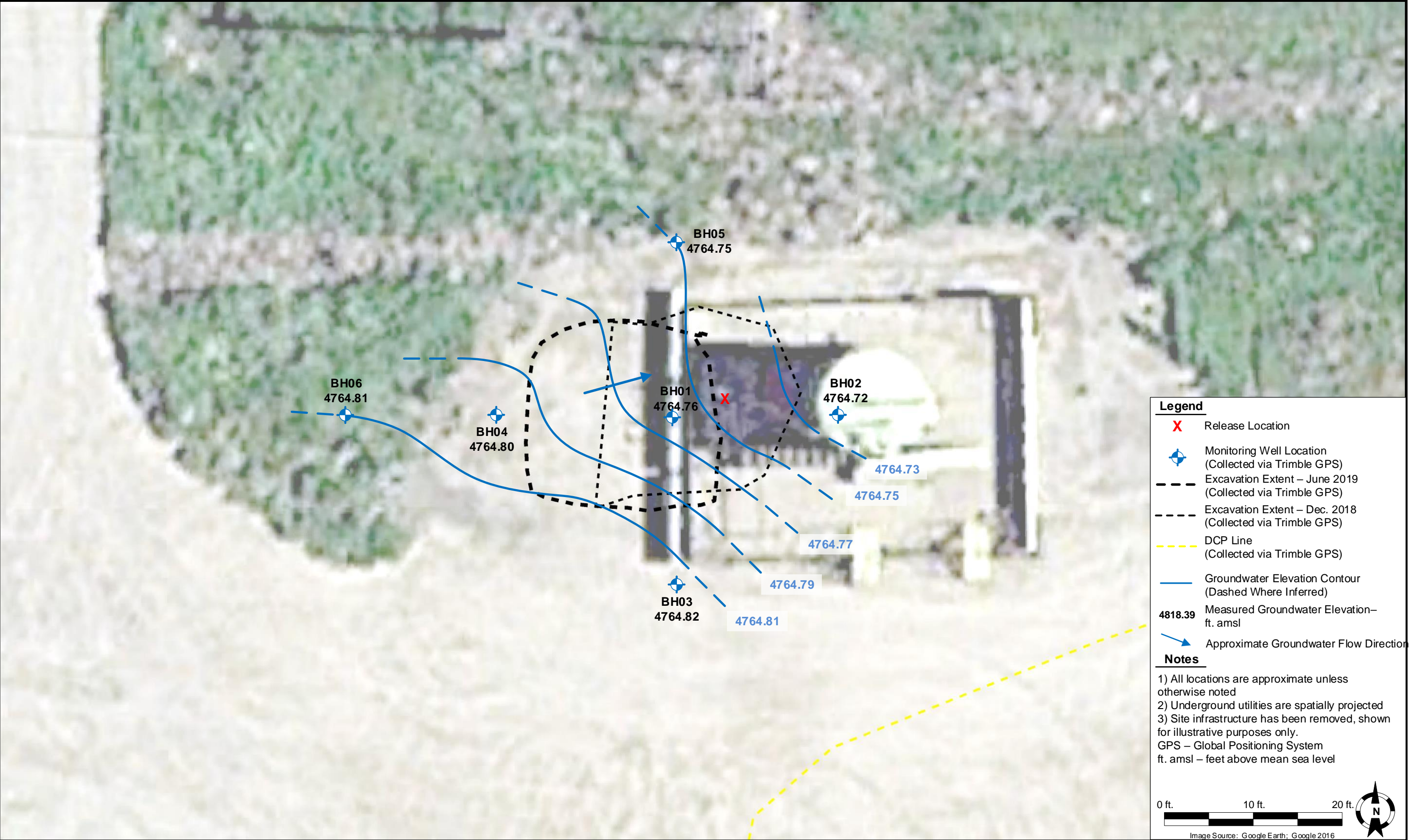






DATE: 9/10/2019	 <b>TASMAN</b> GEOSCIENCES	Tasman Geosciences, Inc. 6855 W. 119 <sup>th</sup> Avenue Broomfield, CO 80020	<b>Noble Energy, Inc. – DJ Basin</b> <b>Duncan D20-12, 20-13</b> NWSW, Section 20, Township 3 North, Range 64 West Weld County, Colorado	Site Overview	FIGURE 2
DESIGNED BY: JW					
DRAWN BY: MG					







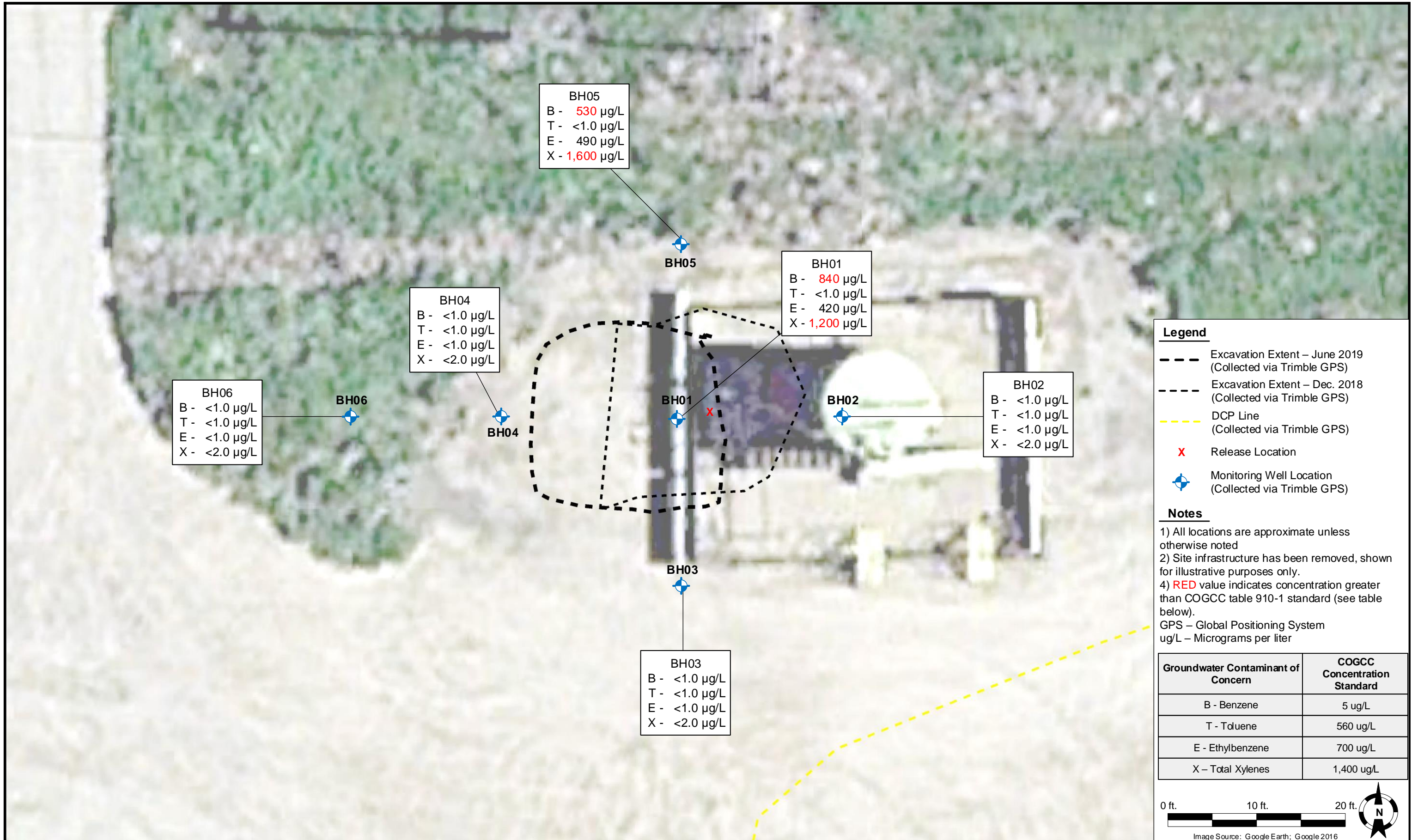
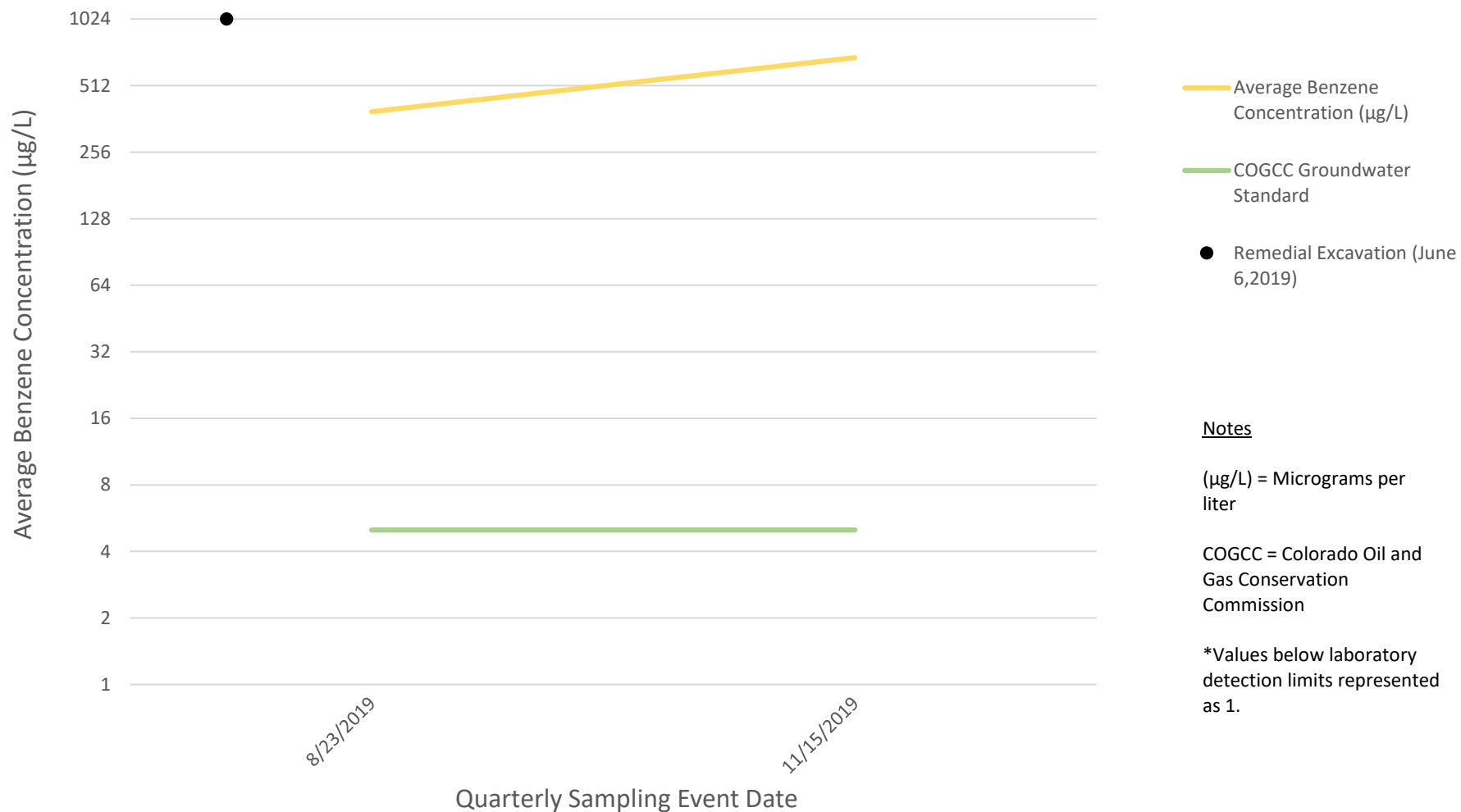


Figure 5  
Duncan D20-12, 20-13  
Average Benzene Concentration VS Quarterly Sampling Event Date





# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

November 21, 2019

Brandon Bruns

Tasman Geosciences

6855 W. 119th Ave.

Broomfield, CO 80020

RE: Noble - Duncan D20-12, 20-13

Work Order # 1911234

Enclosed are the results of analyses for samples received by Summit Scientific on 11/15/19 17:20. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink on a light blue background. The signature is written in a cursive style and reads "Muri Premier".

Muri Premier For Paul Shrewsbury

President



Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1911234-01	Water	11/15/19 14:00	11/15/19 17:20
BH02	1911234-02	Water	11/15/19 13:35	11/15/19 17:20
BH03	1911234-03	Water	11/15/19 13:48	11/15/19 17:20
BH04	1911234-04	Water	11/15/19 14:02	11/15/19 17:20
BH05	1911234-05	Water	11/15/19 13:45	11/15/19 17:20
BH06	1911234-06	Water	11/15/19 13:35	11/15/19 17:20

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



1911234

# Summit Scientific

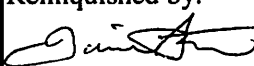

S<sub>2</sub>

4653 Table Mountain Drive ♦ Golden, Colorado 80403  
303-277-9310

Page 1 of 1

Client: Noble / Tasman Project Manager: Brandon Bruns, Invoice: Jacob Evans  
Address: 6899 Pecos Street E-Mail: Bbruns@tasman-geo.com  
City/State/Zip: Denver / CO/ 80221  
Phone: 303-487-1228 Project Name: ~~B. Bruns~~ Duncan D20-12, 20-13  
Sampler Name: GB, DS Project Number:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested						Special Instructions
					HCl	HNO <sub>3</sub>	None	Other	Water	Soil	Air-Canister #	Other	8260 BTEX	8260B GBTEXN	8015 DRO	pH, EC, SAR			
1	BH01	11/15/19	14:00	3			x		x					x					
2	BH02	11/15/19	13:35	3			x		x					x					
3	BH03	11/15/19	13:48	3			x		x					x					
4	BH04	11/15/19	14:02	3			x		x					x					
5	BH05	11/15/19	13:45	3			x		x					x					
6	BH06	11/15/19	13:35	3			x		x					x					
7																			
8																			
9																			
10																			

Relinquished by: 	Date/Time: 11/15/19 15:20	Received by: Tasman's Lock Box	Date/Time: 11/15/19 15:20	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 hours <input type="checkbox"/> 24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 hours <input type="checkbox"/>	Notes:
Relinquished by: Tasman's Lock Box	Date/Time: 11/15/19 17:20	Received by: 	Date/Time: 11/15/19 17:20	Sample Integrity: Temperature Upon Receipt: 2.4	
Relinquished by:	Date/Time:	Received by:	Date/Time:	Samples Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

# Sample Receipt Checklist

S2 Work Order

1911234

Client:

Noble/Tasman

Client Project ID:

Duncan D20-12, 20-13

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other

Airbill #:

Matrix (check all that apply):

Air

Soil/Solid

☒ Water

Other:

(Describe)

Temp (°C)

2.4

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ?				
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	<input checked="" type="checkbox"/>			
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.			<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	

Additional Comments (if any):

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

Custodian Printed Name or Initials

Signature of Custodian

11/15/19  
Date/Time

1804





Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Brun

**Reported:**  
11/21/19 16:00

**BH01**  
**1911234-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **11/15/19 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>Benzene</b>	<b>840</b>	100	ug/l	100	1911215	11/19/19	11/20/19	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
<b>Ethylbenzene</b>	<b>420</b>	100	"	100	"	"	"	"	
<b>Xylenes (total)</b>	<b>1200</b>	200	"	"	"	"	"	"	

Date Sampled: **11/15/19 14:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		138 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

**BH02**  
**1911234-02 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **11/15/19 13:35**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1911215	11/19/19	11/20/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/19 13:35**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.7 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

**BH03**  
**1911234-03 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **11/15/19 13:48**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1911215	11/19/19	11/20/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/19 13:48**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.0 %	21-167		"	"	"	"	

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

**BH04**  
**1911234-04 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **11/15/19 14:02**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1911215	11/19/19	11/20/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/19 14:02**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

**BH05**  
**1911234-05 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **11/15/19 13:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
<b>Benzene</b>	<b>530</b>	100	ug/l	100	1911215	11/19/19	11/20/19	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
<b>Ethylbenzene</b>	<b>490</b>	100	"	100	"	"	"	"	
<b>Xylenes (total)</b>	<b>1600</b>	200	"	"	"	"	"	"	

Date Sampled: **11/15/19 13:45**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		125 %		23-173	"	"	"	"	
Surrogate: Toluene-d8		96.2 %		20-170	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		123 %		21-167	"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

**BH06**  
**1911234-06 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **11/15/19 13:35**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1911215	11/19/19	11/20/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **11/15/19 13:35**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.6 %	21-167		"	"	"	"	

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

## Volatile Organic Compounds by EPA Method 8260B - Quality Control

### Summit Scientific

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

#### Batch 1911215 - EPA 5030 Water MS

##### Blank (1911215-BLK1)

Prepared & Analyzed: 11/19/19

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.3		99.1	23-173			
Surrogate: Toluene-d8	13.1		"	13.3		98.0	20-170			
Surrogate: 4-Bromofluorobenzene	12.3		"	13.3		92.4	21-167			

##### LCS (1911215-BS1)

Prepared & Analyzed: 11/19/19

Benzene	25.3	1.0	ug/l	33.3		76.0	51-132			
Toluene	26.5	1.0	"	33.3		79.6	51-138			
Ethylbenzene	27.5	1.0	"	33.3		82.6	58-146			
m,p-Xylene	54.8	2.0	"	66.7		82.1	57-144			
o-Xylene	25.4	1.0	"	33.3		76.3	53-146			
Surrogate: 1,2-Dichloroethane-d4	14.6		"	13.3		110	23-173			
Surrogate: Toluene-d8	13.3		"	13.3		99.5	20-170			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		95.7	21-167			

##### Matrix Spike (1911215-MS1)

Source: 1911197-01

Prepared & Analyzed: 11/19/19

Benzene	25.6	1.0	ug/l	33.3	ND	76.8	34-141			
Toluene	27.0	1.0	"	33.3	ND	81.2	27-151			
Ethylbenzene	28.0	1.0	"	33.3	ND	83.9	29-160			
m,p-Xylene	56.4	2.0	"	66.7	ND	84.6	20-166			
o-Xylene	26.5	1.0	"	33.3	ND	79.6	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.2		"	13.3		107	23-173			
Surrogate: Toluene-d8	13.1		"	13.3		98.0	20-170			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.2	21-167			

Summit Scientific

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Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

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

**Batch 1911215 - EPA 5030 Water MS**

Matrix Spike Dup (1911215-MSD1)		Source: 1911197-01			Prepared: 11/19/19 Analyzed: 11/20/19					
Benzene	25.2	1.0	ug/l	33.3	ND	75.6	34-141	1.61	30	
Toluene	26.2	1.0	"	33.3	ND	78.8	27-151	3.00	30	
Ethylbenzene	26.9	1.0	"	33.3	ND	80.7	29-160	3.87	30	
m,p-Xylene	53.9	2.0	"	66.7	ND	80.8	20-166	4.54	30	
o-Xylene	25.1	1.0	"	33.3	ND	75.4	33-159	5.46	30	
Surrogate: 1,2-Dichloroethane-d4	14.6		"	13.3		109	23-173			
Surrogate: Toluene-d8	12.8		"	13.3		95.8	20-170			
Surrogate: 4-Bromofluorobenzene	13.1		"	13.3		98.3	21-167			

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





Tasman Geosciences  
6855 W. 119th Ave.  
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/21/19 16:00

### 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