

# Noble - Archibald Site

Noble Energy

Project No.:60545343 Date: 12/05/18

## ARCHIBALD SITE SITE VICINITY MAP

**AECOM**

Figure: 1





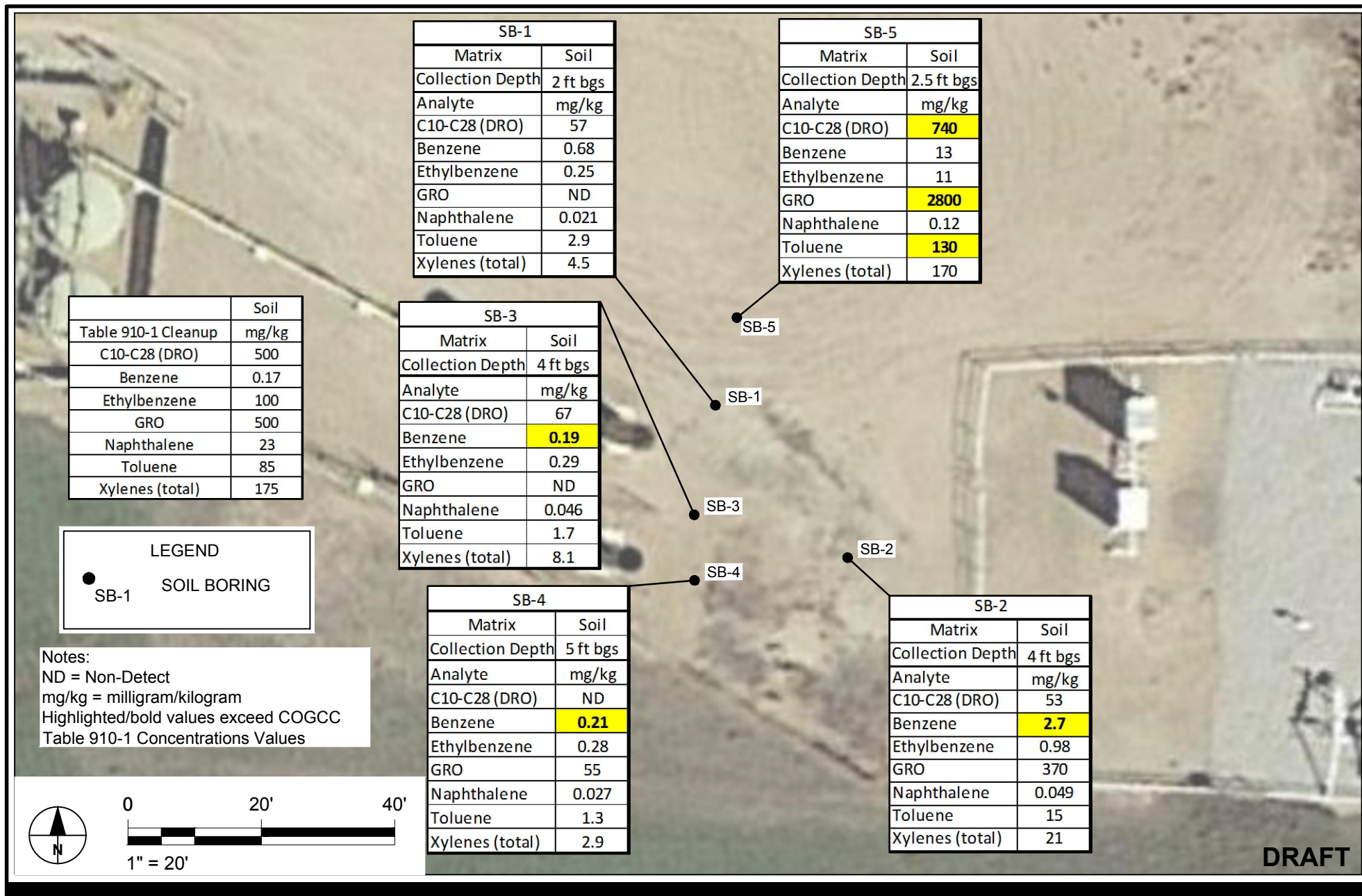
Noble - Archibald Site

Noble Energy  
Project No.:60545343 Date: 12/05/18

ARCHIBALD SITE MAP

**AECOM**

Figure: 2



**Noble - Archibald Site**

Noble Energy  
 Project No.:60545343 Date: 12/05/18

**ARCHIBALD SITE  
 ANALYTICAL RESULTS**

**AECOM**

**Figure: 3**

# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

December 05, 2018

Jim Litz  
AECOM  
1601 Prospect Parkway  
Ft. Collins, CO 80525  
RE: Noble - Archibald Site

Enclosed are the results of analyses for samples received by Summit Scientific on 12/04/18 16:05. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Paul Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury For Ben Shrewsbury  
Laboratory Manager



AECOM  
1601 Prospect Parkway  
Ft. Collins CO, 80525

Project: Noble - Archibald Site

Project Number: 60545343

Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SB-1 (2')	1812024-01	Soil	12/04/18 14:10	12/04/18 16:05
SB-2 (4')	1812024-02	Soil	12/04/18 14:20	12/04/18 16:05
SB-3 (4')	1812024-03	Soil	12/04/18 14:30	12/04/18 16:05
SB-4 (5')	1812024-04	Soil	12/04/18 14:35	12/04/18 16:05
SB-5 (2.5)'	1812024-05	Soil	12/04/18 15:00	12/04/18 16:05

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*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.*

# Summit Scientific

S<sub>2</sub>

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

1812024

Page 1 of 1

Client: Noble Energy Project Manager: Jim Litz  
Address: Archibald Site E-Mail:   
City/State/Zip: AECOM - Greenwood Village, CO  
Phone: (303) 228-3066 - Jim Litz Project Name: Archibald Site  
Sampler Name: Christopher Ahrendt Project Number: 6054534B - AECOM Project #

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	DRO 8015	GRO 8260	BTEX 8260	8260 Naphthalene		
1	SB-1 (2')	12/4/18	14:10	1			X			X				X	X	X	X	All samples are stored on ice
2	SB-2 (4')		14:20	1			X			X				X	X	X	X	
3	SB-3 (4')		14:30	1			X			X				X	X	X	X	
4	SB-4 (5')		14:35	1			X			X				X	X	X	X	
5	SB-5 (2.5')	12/4/18	15:00	1			X			X				X	X	X	X	
6																		
7																		
8																		
9																		
10																		

Relinquished by: Ch Ahndt Date/Time: 12/4/18 1605 Received by: [Signature] Date/Time: 12.4.18 1605

Relinquished by:  Date/Time:  Received by:  Date/Time:

Relinquished by:  Date/Time:  Received by:  Date/Time:

Turn Around Time (Check)  
 Same Day ☒ 72 hours ☐  
 24 hours ☐ Standard ☐  
 48 hours ☐  
 Sample Integrity:  
 Temperature Upon Receipt: 3.7  
 Samples Intact: ☒ Yes ☐ No

Notes:  
 RC: 125 859 836  
 LOE  
615315



# Sample Receipt Checklist

S2 Work Order 1812024

Client: Noble Energy Client Project ID: Archibald Site

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other H.D. Airbill #: \_\_\_\_\_

Matrix (check all that apply): ☐ Air ☒ Soil/Solid ☐ Water ☐ Other: \_\_\_\_\_  
(Describe)

Temp (°C)	<u>3.7</u>
-----------	------------

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				
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.				
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.				

CP  
Custodian Printed Name or Initials

[Signature]  
Signature of Custodian

12-4-18 1619  
Date/Time



AECOM  
1601 Prospect Parkway  
Ft. Collins CO, 80525

Project: Noble - Archibald Site

Project Number: 60545343

Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

**SB-1 (2')**  
**1812024-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **12/04/18 14:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>Benzene</b>	<b>0.68</b>	0.20	mg/kg	100	1812034	12/04/18	12/04/18	EPA 8260B	
<b>Toluene</b>	<b>2.9</b>	0.50	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.25</b>	0.0050	"	1	"	"	"	"	
<b>Xylenes (total)</b>	<b>4.5</b>	1.0	"	100	"	"	"	"	
<b>Naphthalene</b>	<b>0.021</b>	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **12/04/18 14:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		118 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		127 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/04/18 14:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>C10-C28 (DRO)</b>	<b>57</b>	50	mg/kg	1	1812035	"	12/04/18	EPA 8015M	

Date Sampled: **12/04/18 14:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		119 %	30-150		"	"	"	"	

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Project: Noble - Archibald Site

Project Number: 60545343  
Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

**SB-2 (4')  
1812024-02 (Soil)**

**Summit Scientific**

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

Date Sampled: **12/04/18 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	2.7	0.20	mg/kg	100	1812034	12/04/18	12/05/18	EPA 8260B	
Toluene	15	0.50	"	"	"	"	"	"	
Ethylbenzene	0.98	0.50	"	"	"	"	"	"	
Xylenes (total)	21	1.0	"	"	"	"	"	"	
Naphthalene	0.049	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	370	50	"	100	"	"	"	"	

Date Sampled: **12/04/18 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		147 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		167 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/04/18 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	53	50	mg/kg	1	1812035	"	12/04/18	EPA 8015M	

Date Sampled: **12/04/18 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		119 %	30-150		"	"	"	"	

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Project: Noble - Archibald Site  
Project Number: 60545343  
Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

**SB-3 (4')  
1812024-03 (Soil)**

**Summit Scientific**

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

Date Sampled: **12/04/18 14:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	0.19	0.0020	mg/kg	1	1812034	12/04/18	12/05/18	EPA 8260B	
Toluene	1.7	0.50	"	100	"	"	"	"	
Ethylbenzene	0.29	0.0050	"	1	"	"	"	"	
Xylenes (total)	8.1	1.0	"	100	"	"	"	"	
Naphthalene	0.046	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **12/04/18 14:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		115 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		127 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/04/18 14:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	67	50	mg/kg	1	1812035	"	12/04/18	EPA 8015M	

Date Sampled: **12/04/18 14:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		116 %	30-150		"	"	"	"	

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Ft. Collins CO, 80525

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Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

**SB-4 (5')  
1812024-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **12/04/18 14:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>0.21</b>	0.0020	mg/kg	1	1812034	12/04/18	12/05/18	EPA 8260B	
<b>Toluene</b>	<b>1.3</b>	0.50	"	100	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.28</b>	0.0050	"	1	"	"	"	"	
<b>Xylenes (total)</b>	<b>2.9</b>	1.0	"	100	"	"	"	"	
<b>Naphthalene</b>	<b>0.027</b>	0.010	"	1	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>55</b>	50	"	"	"	"	"	"	

Date Sampled: **12/04/18 14:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		125 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.8 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		134 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/04/18 14:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1812035	"	12/04/18	EPA 8015M	

Date Sampled: **12/04/18 14:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		120 %	30-150		"	"	"	"	

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AECOM  
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Project: Noble - Archibald Site

Project Number: 60545343  
Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

**SB-5 (2.5)'**  
**1812024-05 (Soil)**

**Summit Scientific**

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

Date Sampled: **12/04/18 15:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>Benzene</b>	<b>13</b>	0.20	mg/kg	100	1812034	12/04/18	12/05/18	EPA 8260B	
<b>Toluene</b>	<b>130</b>	0.50	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>11</b>	0.50	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>170</b>	1.0	"	"	"	"	"	"	
<b>Naphthalene</b>	<b>0.12</b>	0.010	"	1	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>2800</b>	50	"	100	"	"	"	"	

Date Sampled: **12/04/18 15:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<i>Surrogate: 1,2-Dichloroethane-d4</i>		116 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		100 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		131 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/04/18 15:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>C10-C28 (DRO)</b>	<b>740</b>	50	mg/kg	1	1812035	"	12/05/18	EPA 8015M	

Date Sampled: **12/04/18 15:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<i>Surrogate: o-Terphenyl</i>		118 %	30-150		"	"	"	"	

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1601 Prospect Parkway  
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Project: Noble - Archibald Site

Project Number: 60545343

Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

## 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 1812034 - EPA 5030 Soil MS

##### Blank (1812034-BLK1)

Prepared: 12/04/18 Analyzed: 12/05/18

Benzene	ND	0.0020	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Naphthalene	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0413		"	0.0396	104		23-173			
Surrogate: Toluene-d8	0.0398		"	0.0400	99.5		20-170			
Surrogate: 4-Bromofluorobenzene	0.0421		"	0.0400	105		21-167			

##### LCS (1812034-BS1)

Prepared: 12/04/18 Analyzed: 12/05/18

Benzene	0.0753	0.0020	mg/kg	0.100	75.3		70-130			
Toluene	0.0925	0.0050	"	0.100	92.5		70-130			
Ethylbenzene	0.109	0.0050	"	0.100	109		70-130			
m,p-Xylene	0.217	0.010	"	0.200	109		70-130			
o-Xylene	0.0999	0.0050	"	0.100	99.9		70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0413		"	0.0396	104		23-173			
Surrogate: Toluene-d8	0.0380		"	0.0400	94.9		20-170			
Surrogate: 4-Bromofluorobenzene	0.0417		"	0.0400	104		21-167			

##### Matrix Spike (1812034-MS1)

Source: 1812023-02

Prepared: 12/04/18 Analyzed: 12/05/18

Benzene	0.0868	0.0020	mg/kg	0.100	0.0121	74.8	70-130			
Toluene	0.0934	0.0050	"	0.100	ND	93.4	70-130			
Ethylbenzene	0.111	0.0050	"	0.100	ND	111	70-130			
m,p-Xylene	0.229	0.010	"	0.200	0.0190	105	70-130			
o-Xylene	0.101	0.0050	"	0.100	ND	101	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0429		"	0.0396		108	23-173			
Surrogate: Toluene-d8	0.0391		"	0.0400		97.6	20-170			
Surrogate: 4-Bromofluorobenzene	0.0424		"	0.0400		106	21-167			

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Project: Noble - Archibald Site

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Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

## 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 1812034 - EPA 5030 Soil MS

Matrix Spike Dup (1812034-MSD1)	Source: 1812023-02			Prepared: 12/04/18 Analyzed: 12/05/18						
Benzene	0.0904	0.0020	mg/kg	0.100	0.0121	78.4	70-130	4.03	30	
Toluene	0.0942	0.0050	"	0.100	ND	94.2	70-130	0.864	30	
Ethylbenzene	0.109	0.0050	"	0.100	ND	109	70-130	1.93	30	
m,p-Xylene	0.226	0.010	"	0.200	0.0190	103	70-130	1.27	30	
o-Xylene	0.101	0.0050	"	0.100	ND	101	70-130	0.386	30	
Surrogate: 1,2-Dichloroethane-d4	0.0428		"	0.0396		108	23-173			
Surrogate: Toluene-d8	0.0403		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0404		"	0.0400		101	21-167			

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Project: Noble - Archibald Site

Project Number: 60545343

Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

**Extractable Petroleum Hydrocarbons by 8015 - Quality Control**  
**Summit Scientific**

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

**Batch 1812035 - EPA 3550A**

**Blank (1812035-BLK1)**

Prepared & Analyzed: 12/04/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1812035-BS1)**

Prepared & Analyzed: 12/04/18

C10-C28 (DRO) 548 50 mg/kg 500 110 70-130

**Matrix Spike (1812035-MS1)**

**Source: 1812023-01**

Prepared & Analyzed: 12/04/18

C10-C28 (DRO) 592 50 mg/kg 500 77.8 103 70-130

**Matrix Spike Dup (1812035-MSD1)**

**Source: 1812023-01**

Prepared & Analyzed: 12/04/18

C10-C28 (DRO) 613 50 mg/kg 500 77.8 107 70-130 3.55 20

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Project: Noble - Archibald Site

Project Number: 60545343  
Project Manager: Jim Litz

**Reported:**  
12/05/18 05:39

### 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