

# **FREMONT ENVIRONMENTAL INC.**

October 22, 2019

Mr. Jacob Evans  
Noble Energy  
2115 117<sup>th</sup> Avenue  
Greeley, CO 80634

Subject:     **Remediation and Groundwater Sampling Report**  
          Wiedeman PM J28-2, 28-7  
          API # 05-123-14002 (J28-2)  
          NWSW Sec 28, T5N, R66W  
          Weld County, Colorado  
          Fremont Project No. C016-093  
          Facility #327010, Remediation #10028

Dear Mr. Evans:

Enclosed please find a copy of the above referenced Remediation and Groundwater Sampling Report for the Wiedeman PM J28-2, 28-7 release site in Weld County, Colorado. The enclosed report describes remedial actions to address impacted groundwater as well as the recent quarterly groundwater monitoring at the site. Please contact me at (303) 956-8714 if you require any additional information.

Fremont appreciates the opportunity to provide this service.

Sincerely,  
**FREMONT ENVIRONMENTAL INC.**



Paul V. Henehan, P.E.  
Senior Consultant

Enclosure

**REMEDIATION AND GROUNDWATER SAMPLING REPORT**

**NOBLE ENERGY INC.**

**WIEDEMAN PM J28-2, 28-7**

**WELD COUNTY, COLORADO**

**FREMONT PROJECT NO. C016-110**

**FACILITY #327010, REMEDIATION #10028**

**Prepared by:**

**Fremont Environmental Inc.**

**1759 Redwing Lane**

**Broomfield, CO 80020**

**(303) 956-8714**

**October 22, 2019**

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# **REMEDICATION AND GROUNDWATER SAMPLING REPORT**

**NOBLE ENERGY INC.**

**WIEDEMAN PM J28-2, 28-7**

**WELD COUNTY, COLORADO**

**FREMONT PROJECT NO. C016-110**

**FACILITY #327010, REMEDIATION #10028**

## **1.0 INTRODUCTION**

The purpose of this document is to present information collected during the remediation of petroleum-impacted groundwater at the Wiedeman PM J28-2, 28-7 former water vault release location in Weld County, Colorado. A solar-powered groundwater remediation system consisting of a soil vapor extraction (SVE) bubbler unit was installed and activated at the site in June 2018. This remediation system was tied into one existing monitoring well (MW-2R) to remove light non-aqueous phase liquid (LNAPL).

## **2.0 BACKGROUND INFORMATION**

### **2.1 Site Location**

The Wiedeman PM J28-2, 28-7 site is in Evans, Weld County, Colorado as shown on Figure 1. The site is located on cultivated land approximately 0.3 miles southeast of the intersection of West 37th St. and 65th Ave. The location is further described as the NE  $\frac{1}{4}$  of the SW  $\frac{1}{4}$  of Section 28, Township 5N, Range 66W.

### **2.2 Site History**

The site consists of the area adjacent to and beneath the former water vault for the Wiedeman PM J28-2 natural gas well. The Wiedeman PM J28-2 well was drilled in 1988 to a total vertical depth of 7,501 feet. Soil impacts were identified adjacent to the former water vault during its removal.

A site investigation to determine the extent of soil impacts was conducted in October 2016. A total of seven soil borings were advanced utilizing a Geoprobe rig. These borings

were completed as flush-mounted 1-inch diameter monitoring wells. These monitoring wells were used to delineate the extent of soil and ground water impacts at the site. The locations of the monitoring wells are illustrated on the attached figures.

An excavation to remediate the source impacts was undertaken in September 2017. Approximately 160 cubic yards of impacted soil were removed and transported to the landfill. Soil samples were collected from the excavation sidewalls and floor and analyzed for petroleum constituents. The laboratory analyses of the soil samples indicated that petroleum constituent concentrations were less than the Colorado Oil and Gas Conservation Commission's (COGCC's) Table 910-1 limits in the samples.

### **3.0 GROUND WATER MONITORING AND REMEDIATION ACTIVITIES**

#### **3.1 Ground Water Level Measurements**

Ground water levels were measured in the eight monitoring wells on October 7, 2019 in accordance with the Sampling Plan included in Appendix A. The data are summarized in Table 1.

Water table contours inferred from the October 7, 2019 data are illustrated on Figure 3. Based on these data, ground water is inferred to flow to the northwest. The water table gradient was calculated at approximately 0.017 feet per foot (ft/ft) for the October 2019 data.

#### **3.2 Ground Water Sampling and Analysis**

Groundwater samples were collected from eight monitoring wells on October 7, 2019 to monitor the magnitude and extent of groundwater impacts at the site. No monitoring wells contained LNAPL.

The groundwater samples were submitted to Summit Scientific Inc. in Golden, Colorado for analyses of benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA Method 8260B. The groundwater chemistry data is illustrated on Figure 4.

The laboratory data indicate that the BTEX constituents were below their respective COGCC Table 910-1 limits in seven of the eight wells for the October 2019 sampling event. MW-2 had a benzene concentration of 300 ug/L and a xylenes concentration of 2,700 ug/L. The groundwater analytical data are summarized in Table 1. A copy of the laboratory reports, quality control data, and chain-of-custody documentation are presented in Appendix A.

### **3.3 Ground Water Remediation System**

As a result of groundwater impacts in monitoring well MW-2, Noble installed a solar-powered soil vapor extraction (SVE) bubbler system at this site in June 2018. The remediation system consists of one monitoring well (MW-2) that was retrofitted to accommodate SVE and bubbler tubes. The SVE system is primarily for the removal of LNAPL rather than remediation of the vadose zone. The SVE well is piped directly to the solar-powered remediation trailer. Figure 6 illustrates the layout of the remediation system.

The recent quarterly groundwater sampling event, which was conducted on October 7, 2019, as well as previous sampling events, indicates that LNAPL remediation via SVE remains effective. Due to an influx of sedimentation, MW-2 was abandoned and replaced with MW-2R in April 2019. MW-8 was also added to establish a point of compliance to the north. As of October 7, 2019, LNAPL was not present in MW-2R. Concentrations of benzene, toluene and xylene in MW-2 are decreasing but remain above the COGCC Table 910-1 limits.

#### **4.0 DISCUSSION**

As demonstrated by soil sampling and analyses, the petroleum-impacted soil was removed from the site by excavation in September 2017. Approximately 160 cubic yards of impacted soil were removed and transported to the landfill.

Since groundwater impacts (LNAPL and dissolved constituents) were present after the excavation was completed, an SVE/bubbler remediation system was installed and activated in June 2018 to address LNAPL impacts. The remediation system has effectively removed LNAPL from MW-2 over the past year of its operation.

Noble will sample the ground water on a quarterly basis to evaluate the BTEX concentrations relative to COGCC's Table 910-1 requirements. After four consecutive quarters of COGCC-compliant BTEX concentrations, Noble will request closure of this site.

#### **5.0 REMARKS**

The discussion and conclusions contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. No warranty is implied or intended.

This report was prepared by **FREMONT ENVIRONMENTAL INC.**



10/22/19

Date \_\_\_\_\_

\_\_\_\_\_  
Ethan Black

Geologist

Reviewed by:



10/22/19

Date \_\_\_\_\_

\_\_\_\_\_  
Paul V. Henehan, P.E.

Senior Consultant

**TABLE**

TABLE 1  
SUMMARY OF GROUND WATER ELEVATION DATA AND CHEMISTRY DATA  
NOBLE ENERGY INC.  
WIEDEMAN PMJ 28-2, WELD COUNTY, COLORADO  
FREMONT PROJECT NO. C016-110

SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)
MW-1	10/12/16	<1.0	1.5	<1.0	<1.0	98.19	12.67	85.52	NP
	01/06/17	<1.0	<1.0	<1.0	<1.0		15.87	82.32	NP
	04/05/17	<1.0	<1.0	<1.0	<1.0		18.19	80.00	NP
	08/14/17	<1.0	<1.0	<1.0	<1.0		9.36	88.83	NP
	10/11/17	<1.0	<1.0	<1.0	<1.0		12.43	85.76	NP
	01/11/18	<1.0	<1.0	<1.0	<1.0		15.46	82.73	NP
	04/27/18	<1.0	<1.0	<1.0	<2.0		17.85	80.34	NP
	07/27/18	<1.0	<1.0	<1.0	<2.0		8.79	89.40	NP
	08/23/18	NS	NS	NS	NS		8.12	90.07	NP
	10/17/18	<1.0	<1.0	<1.0	<2.0		13.58	84.61	NP
	01/21/19	<1.0	<1.0	<1.0	<2.0		16.55	81.64	NP
	04/23/19	<1.0	<1.0	<1.0	<2.0		18.76	79.43	NP
	07/09/19	<1.0	<1.0	<1.0	<2.0		18.41	79.78	NP
10/07/19	<1.0	<1.0	<1.0	<2.0	11.49	86.70	NP		
MW-2	10/12/16	<b>20000</b>	<b>32000</b>	<b>1400</b>	<b>19000</b>	97.58	12.43	85.15	NP
	01/06/17	NS	NS	NS	NS		15.95	81.63	<b>0.34</b>
	04/05/17	NS	NS	NS	NS		18.42	79.16	<b>1.00</b>
	08/14/17	NS	NS	NS	NS		9.03	88.55	<b>0.13</b>
	10/11/17	NS	NS	NS	NS		12.11	98.19	<b>0.25</b>
	01/11/18	NS	NS	NS	NS		15.39	82.19	<b>0.24</b>
	04/27/18	NS	NS	NS	NS		18.82	78.76	<b>1.66</b>
	07/27/18	<b>1900</b>	41	27	<b>81000</b>		8.05	89.53	NP
	08/23/18	NS	NS	NS	NS		7.61	89.97	NP
	10/17/18	<b>4200</b>	<b>4800</b>	150	<b>26000</b>		13.06	84.52	NP

SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)
MW-2 MW-2R	01/21/19	DRY	DRY	DRY	DRY	97.58	DRY	DRY	DRY
	04/23/19	IW	IW	IW	IW	97.99	18.97	79.02	IW
	07/09/19	<b>1200</b>	<b>1700</b>	20	<b>5200</b>		17.59	80.40	NP
	10/07/19	<b>300</b>	<b>270</b>	36	<b>2700</b>		11.48	86.51	NP
MW-3       MW-3R	10/12/16	<b>260</b>	<b>640</b>	150	<b>2600</b>		97.52	12.53	84.99
	01/06/17	<b>1400</b>	<b>1900</b>	310	<b>6700</b>	15.99		81.53	NP
	04/05/17	Dry	Dry	Dry	Dry	Dry		Dry	Dry
	08/14/17	<1.0	<1.0	<1.0	2.2	7.61		89.91	NP
	10/11/17	2.7	2.0	7.6	280	12.18		98.19	NP
	01/11/18	Dry	Dry	Dry	Dry	Dry		Dry	Dry
	04/27/18	Dry	Dry	Dry	Dry	Dry		Dry	Dry
	07/27/18	<1.0	<1.0	<1.0	<2.0	97.55	97.55	97.55	NP
	08/23/18	NS	NS	NS	NS		5.64	91.91	NP
	10/17/18	<1.0	2.7	4.9	12		13.45	84.10	NP
	01/21/19	<b>8.6</b>	<1.0	<1.0	390		16.65	80.90	NP
	04/23/19	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/09/19	<1.0	<1.0	<1.0	<2.0		9.37	88.18	NP
10/07/19	<1.0	<1.0	<1.0	<2.0	10.91	86.64	NP		
MW-4	10/12/16	<1.0	<1.0	<1.0	<1.0	96.80	12.38	84.42	NP
	01/06/17	<1.0	<1.0	<1.0	<1.0		15.62	81.18	NP
	04/05/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	08/14/17	<1.0	<1.0	<1.0	<1.0		7.84	88.96	NP
	12/23/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	01/11/18	<1.0	<1.0	<1.0	<1.0		15.22	81.58	NP
	04/27/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/27/18	<1.0	<1.0	<1.0	<2.0		5.90	90.90	NP
	08/23/18	NS	NS	NS	NS		6.22	90.58	NP
	10/17/18	<1.0	<1.0	<1.0	<2.0		13.02	83.78	NP
	01/21/19	<1.0	<1.0	<1.0	<2.0		16.22	80.58	NP



SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)
MW-6	07/09/19	<1.0	<1.0	<1.0	<2.0	100.00	12.00	88.00	NP
	10/07/19	<1.0	<1.0	<1.0	<2.0		13.08	86.92	NP
MW-7	10/12/16	<1.0	<1.0	<1.0	<1.0	97.02	11.80	85.22	NP
	01/06/17	<1.0	<1.0	<1.0	<1.0		14.91	82.11	NP
	04/05/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	08/14/17	<1.0	<1.0	<1.0	<1.0		9.55	87.47	NP
	10/11/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	01/11/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	04/27/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/27/18	<1.0	<1.0	<1.0	<2.0		96.91		96.91
MW-7R	08/23/18	NS	NS	NS	NS	8.08		88.83	NP
	10/17/18	<1.0	<1.0	<1.0	<2.0	12.38		84.53	NP
	01/21/19	<1.0	<1.0	<1.0	<2.0	15.49		81.42	NP
	04/23/19	<1.0	<1.0	<1.0	<2.0	17.72		79.19	NP
	07/09/19	<1.0	<1.0	<1.0	<2.0	18.13	78.78	NP	
10/07/19	<1.0	<1.0	<1.0	<2.0	11.57	85.34	NP		
MW-8	04/23/19	Dry	Dry	Dry	Dry	99.30	Dry	Dry	Dry
	07/09/19	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	10/07/19	3.3	<1.0	<1.0	<2.0		12.98	86.32	NP
Table 910-1 Limits		5	560	700	1,400				

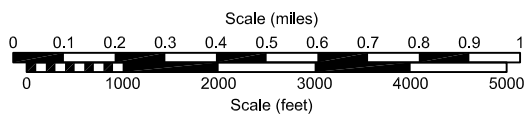
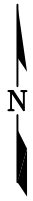
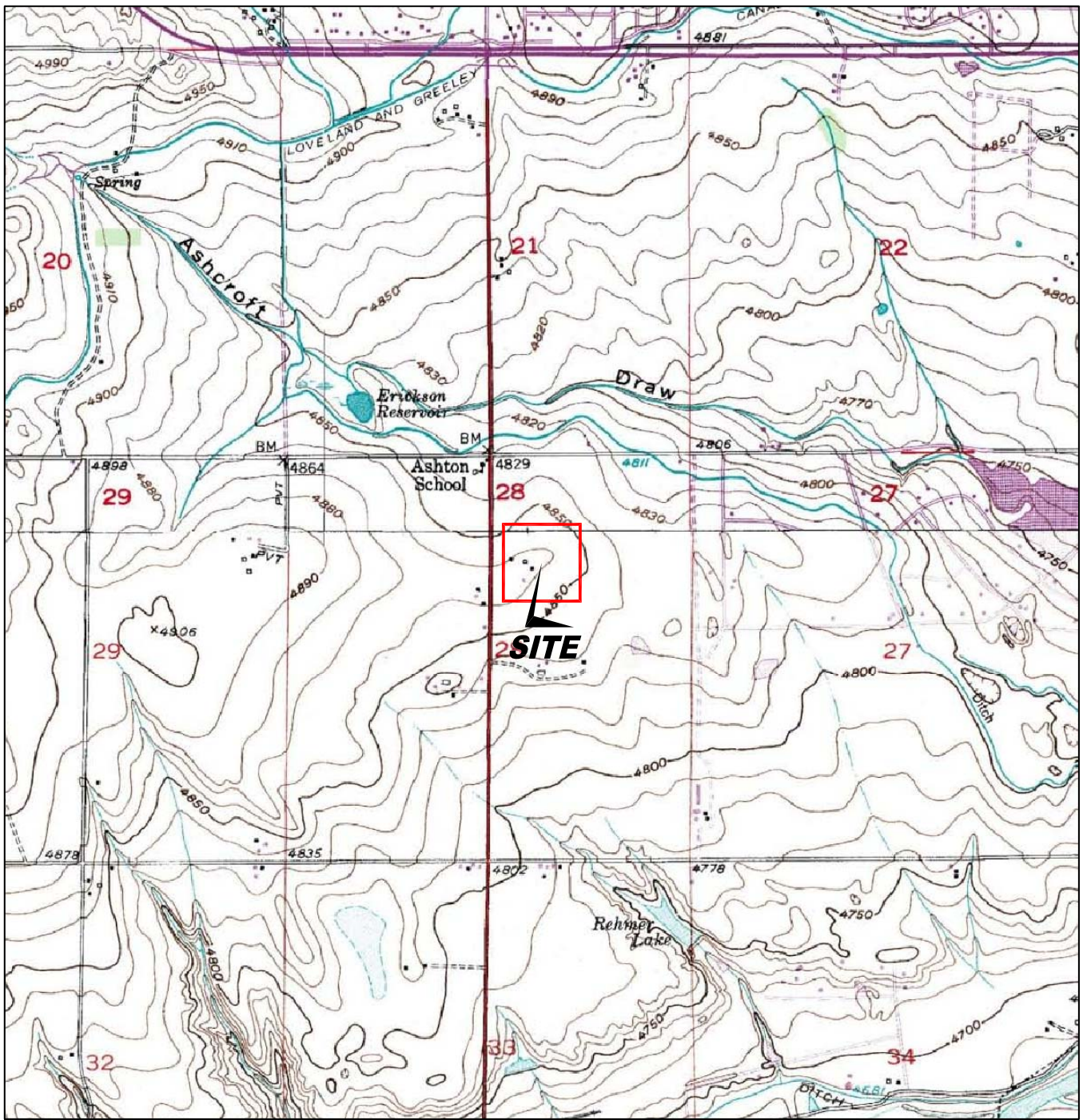
Bold face values exceed the COGCC limits

NP - No Free Product

NS - Not Sampled

IW - Insufficient Water

## FIGURES



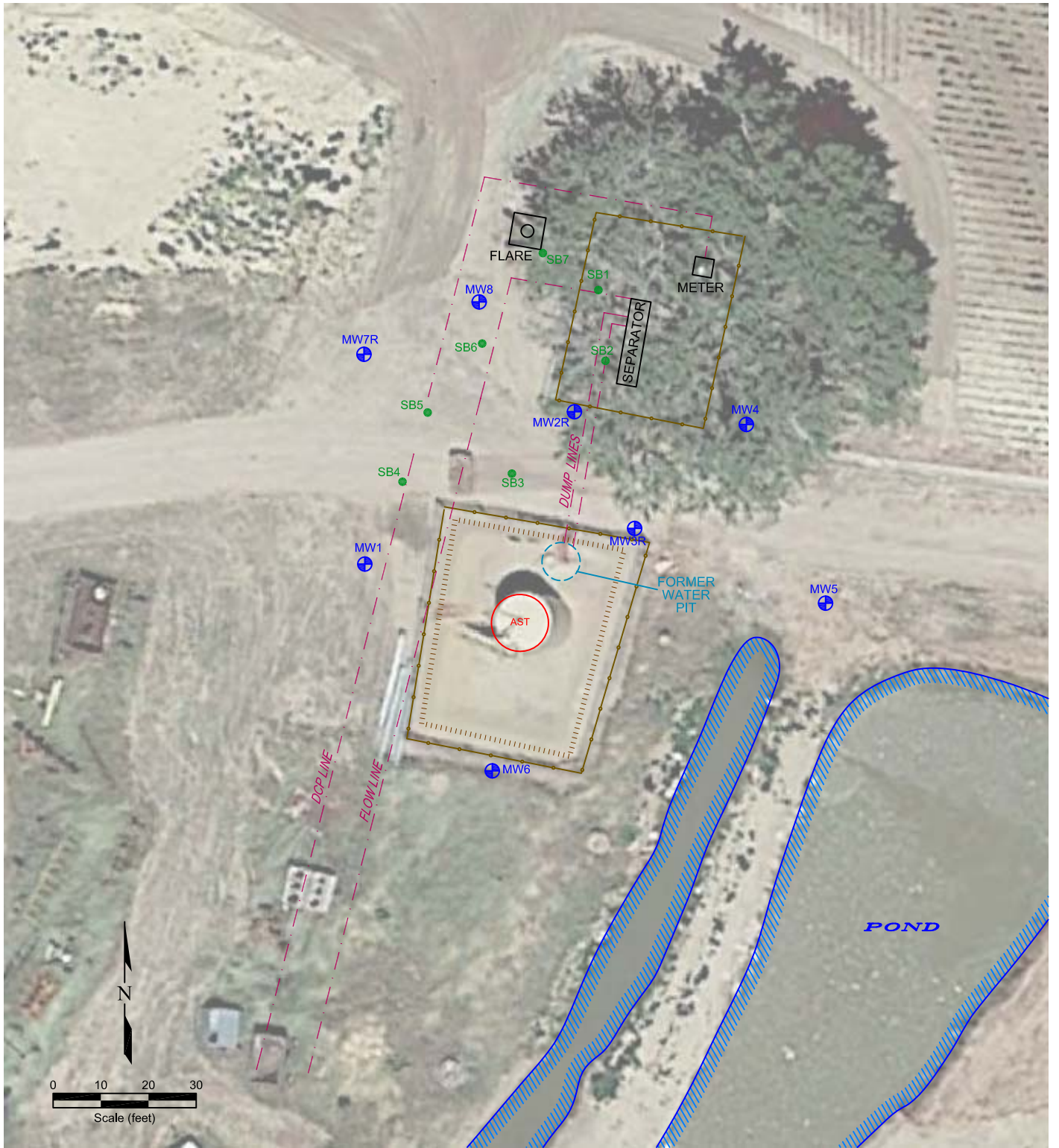
USGS 7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1  
SITE LOCATION MAP

**Noble Wiedeman PM J28-2, 28-7**  
NE SW Section 28, T5N, R66W  
Weld County, Colorado

Project No. <b>C016-110</b>	Prepared by	Drawn by <b>JMA</b>
Date <b>10/16/19</b>	Reviewed by <b>EB</b>	Filename <b>16110T</b>





**LEGEND**

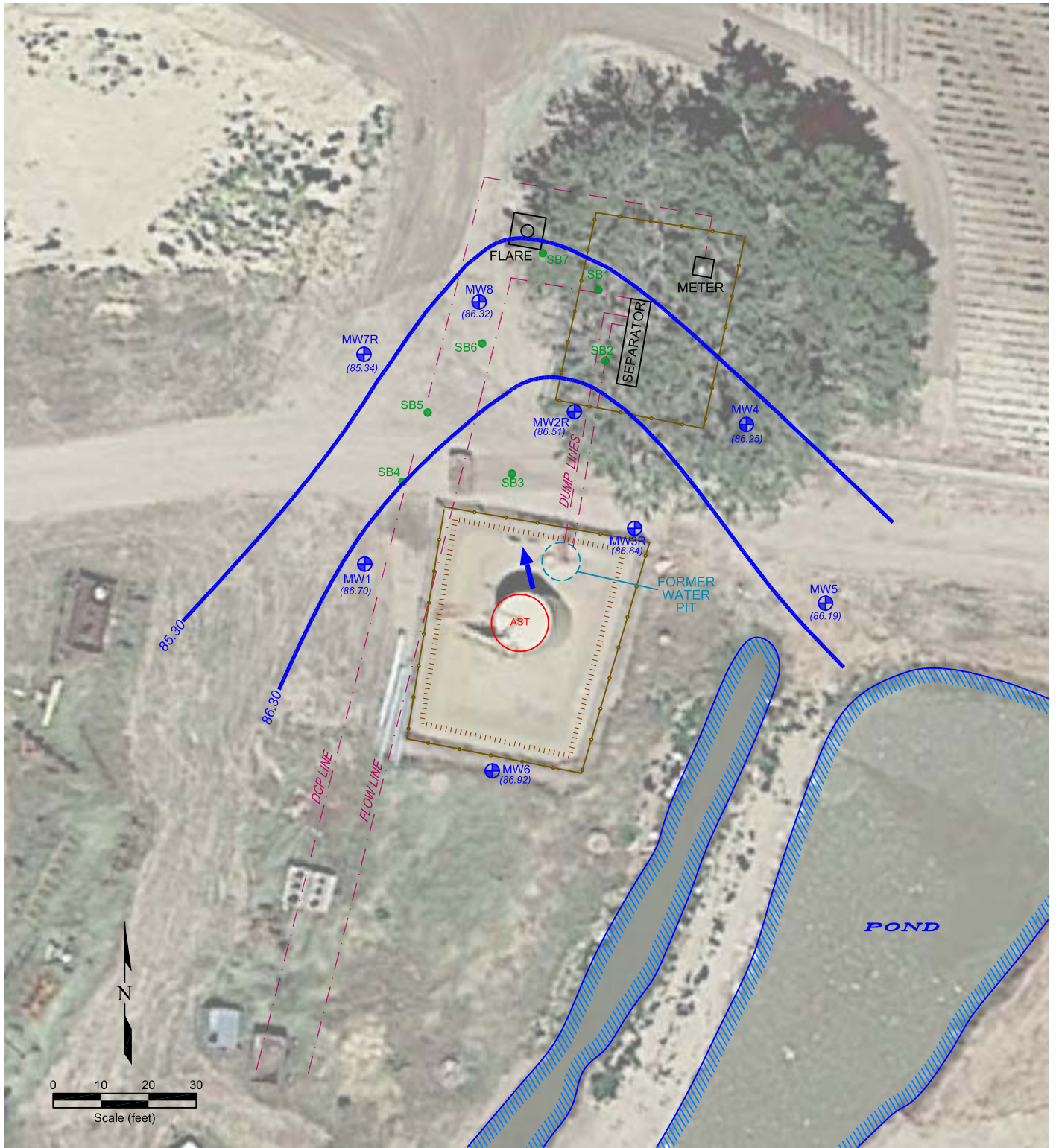
- SOIL BORING
- ⊕ MONITORING WELL
- FENCE LINE
- CONTAINMENT BERM
- PIPELINE
- ABOVE GROUND STORAGE TANK
- FORMER FORMER FACILITY

**Figure 2  
SITE MAP**

**Noble Wiedeman PM J28-2, 28-7**  
NE SW Section 28, T5N, R66W  
Weld County, Colorado

Project No. <b>C016-110</b>	Prepared by	Drawn by <b>JMA</b>
Date <b>10/16/19</b>	Reviewed by <b>EB</b>	Filename <b>16110Q</b>





**LEGEND**












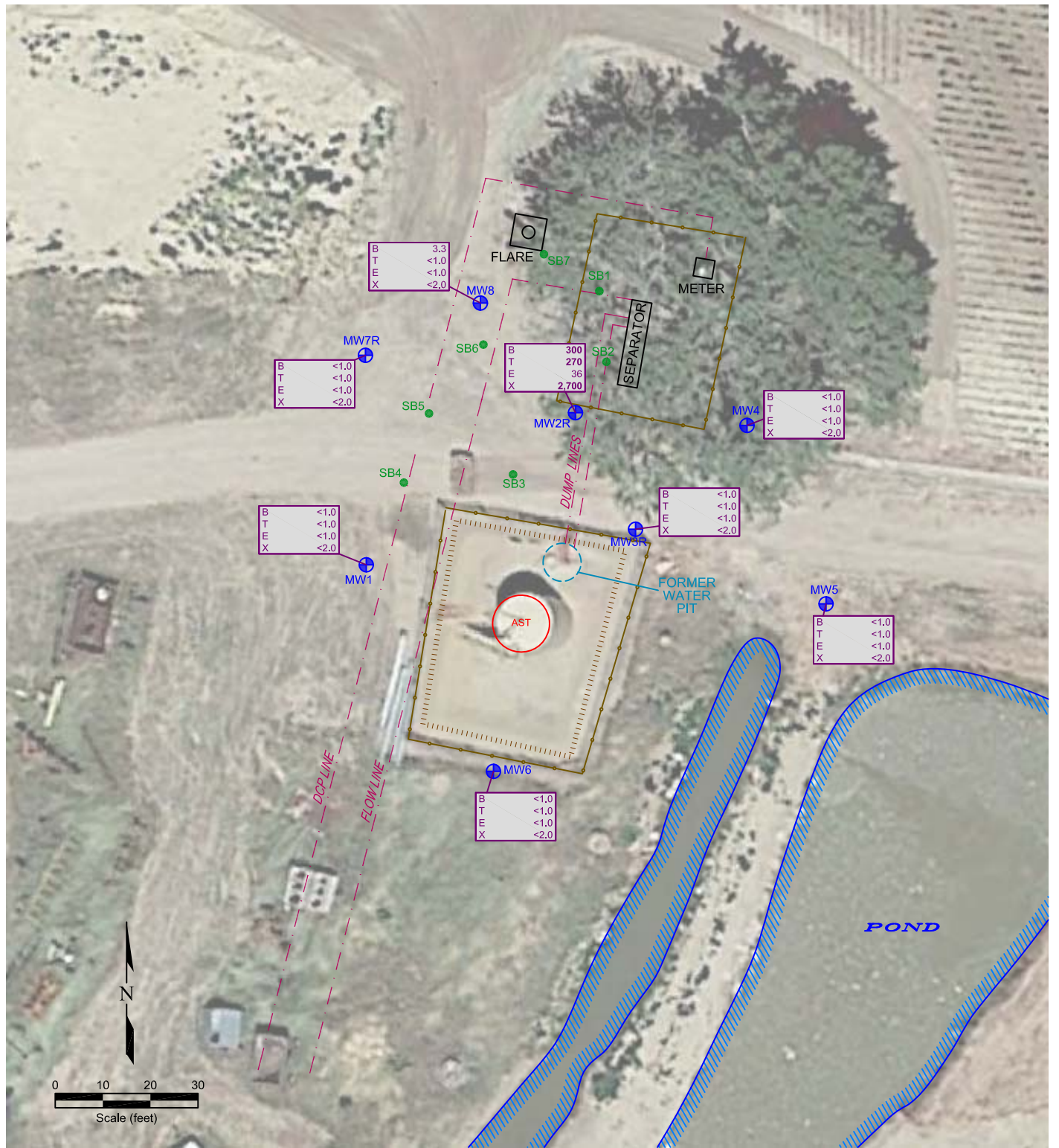
-  SOIL BORING
-  MONITORING WELL
-  FENCE LINE
-  CONTAINMENT BERM
-  PIPELINE
-  ABOVE GROUND STORAGE TANK
-  FORMER FACILITY
-  GROUND WATER ELEVATION (ft above arbitrary datum)
-  WATER TABLE CONTOUR
-  GROUND WATER FLOW DIRECTION

Figure 3  
**INFERRED GROUNDWATER CONTOUR MAP**  
 October 7, 2019

**Noble Wiedeman PM J28-2, 28-7**  
 NE SW Section 28, T5N, R66W  
 Weld County, Colorado

Project No. <b>C016-110</b>	Prepared by	Drawn by <b>JMA</b>	
Date <b>10/16/19</b>	Reviewed by <b>EB</b>	Filename <b>16110Q</b>	



**LEGEND**

	SOIL BORING		ABOVE GROUND STORAGE TANK
	MONITORING WELL		FORMER FACILITY
	FENCE LINE		
	CONTAINMENT BERM		
	PIPELINE		

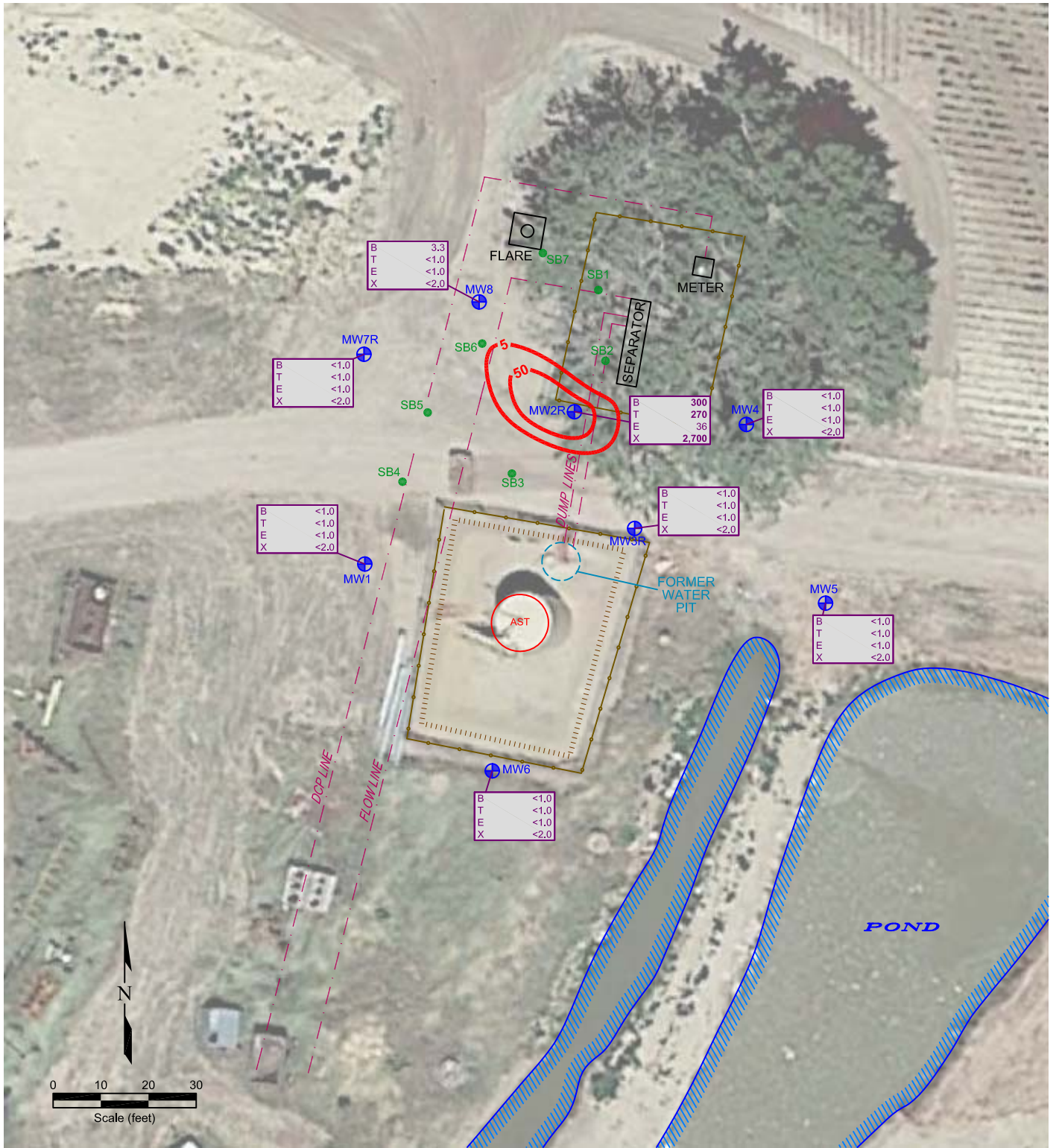
  

B	<1.0	BENZENE (ug/L)
T	<1.0	TOLUENE (ug/L)
E	<1.0	ETHYLBENZENE (ug/L)
X	<2.0	TOTAL XYLENES (ug/L)

Figure 4  
**GROUND WATER CHEMISTRY MAP**  
 October 7, 2019

**Noble Wiedeman PM J28-2, 28-7**  
 NE SW Section 28, T5N, R66W  
 Weld County, Colorado

Project No. <b>C016-110</b>	Prepared by <b>JMA</b>	Drawn by <b>JMA</b>	
Date <b>10/16/19</b>	Reviewed by <b>EB</b>	Filename <b>16110Q</b>	



**LEGEND**

	SOIL BORING		ABOVE GROUND STORAGE TANK
	MONITORING WELL		FORMER FACILITY
	FENCE LINE		
	CONTAINMENT BERM		
	PIPELINE		

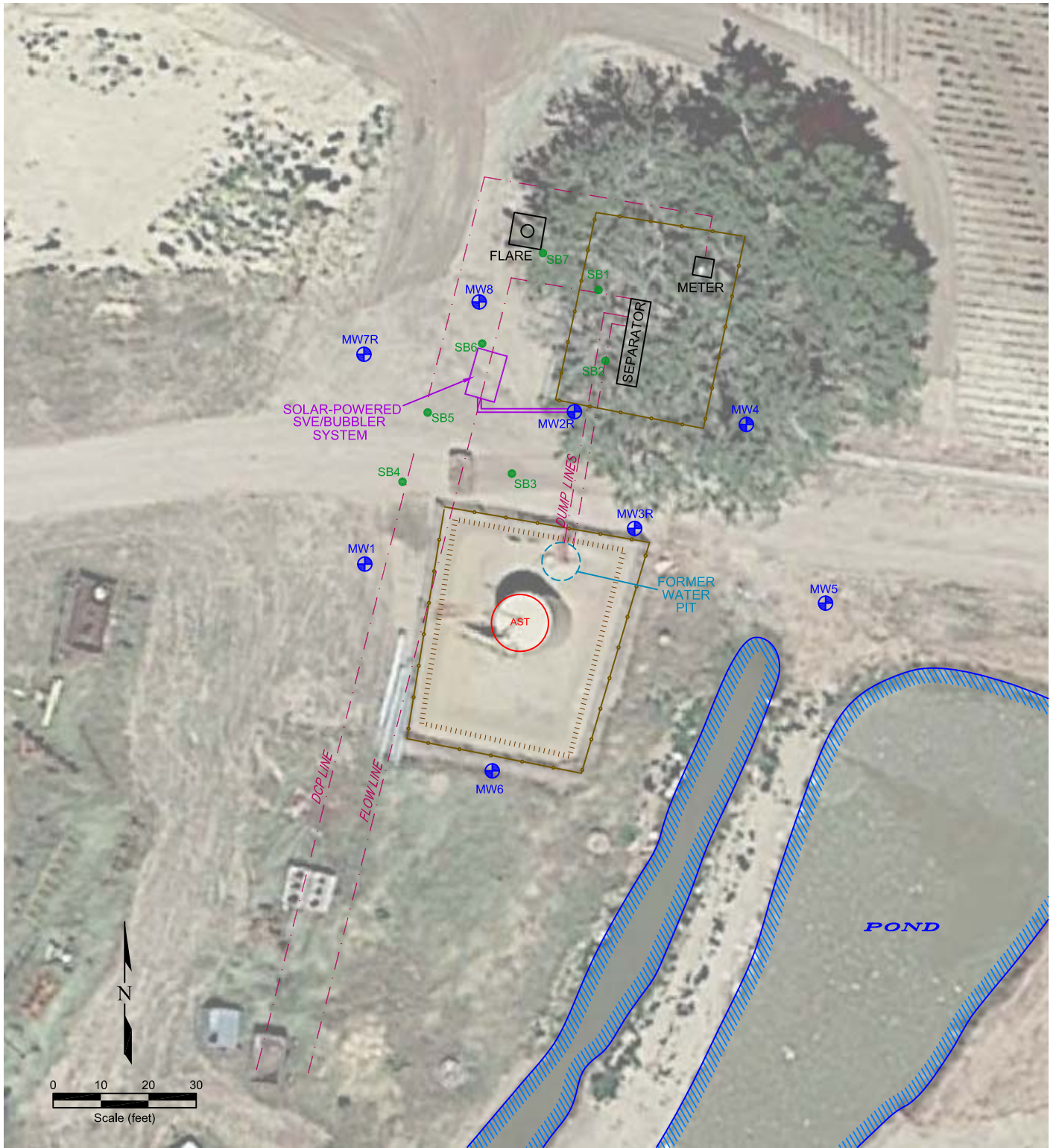
B	<1.0	BENZENE (ug/L)
T	<1.0	TOLUENE (ug/L)
E	<1.0	ETHYLBENZENE (ug/L)
X	<2.0	TOTAL XYLENES (ug/L)

BENZENE ISOCONCENTRATION (ug/L)  
 Base in part on historical data  
 Dashed where inferred

Figure 5  
**GROUND WATER CHEMISTRY WITH  
 BENZENE ISOCONCENTRATION MAP**  
 October 7, 2019  
 Noble Wiedeman PM J28-2, 28-7  
 NE SW Section 28, T5N, R66W  
 Weld County, Colorado

Project No. <b>C016-110</b>	Prepared by	Drawn by <b>JMA</b>	
Date <b>10/16/19</b>	Reviewed by <b>EB</b>	Filename <b>16110Q</b>	



**LEGEND**









-  SOIL BORING
-  MONITORING WELL
-  FENCE LINE
-  CONTAINMENT BERM
-  PIPELINE
-  SYSTEM TRENCH
-  ABOVE GROUND STORAGE TANK
-  FORMER FACILITY

Figure 6  
**AS-BUILT REMEDIATION SYSTEM LAYOUT**

**Noble Wiedeman PM J28-2, 28-7**  
NE SW Section 28, T5N, R66W  
Weld County, Colorado

Project No. <b>C016-110</b>	Prepared by	Drawn by <b>JMA</b>
Date <b>10/18/19</b>	Reviewed by <b>EB</b>	Filename <b>16110Q</b>



APPENDIX A

LABORATORY DOCUMENTATION

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

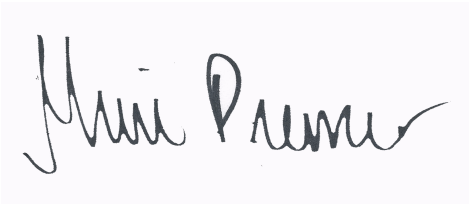
October 14, 2019

Paul Henehan  
Fremont Environmental  
PO Box 1289  
Wellington, CO 80549

RE: NOble - Wiedeman PMJ 28-7,2  
Work Order # 1910071

Enclosed are the results of analyses for samples received by Summit Scientific on 10/07/19 16:17. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Muri Premer". The signature is written in a cursive style with a large initial "M" and a long, sweeping underline.

Muri Premer For Ben Shrewsbury  
Laboratory Manager



Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
Project Manager: Paul Henehan

**Reported:**  
10/14/19 13:32

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	1910071-01	Water	10/07/19 00:00	10/07/19 16:17
MW-2	1910071-02	Water	10/07/19 00:00	10/07/19 16:17
MW-3	1910071-03	Water	10/07/19 00:00	10/07/19 16:17
MW-4	1910071-04	Water	10/07/19 00:00	10/07/19 16:17
MW-5	1910071-05	Water	10/07/19 00:00	10/07/19 16:17
MW-6	1910071-06	Water	10/07/19 00:00	10/07/19 16:17
MW-7	1910071-07	Water	10/07/19 00:00	10/07/19 16:17
MW-8	1910071-08	Water	10/07/19 00:00	10/07/19 16:17

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.*

# Summit Scientific

S<sub>2</sub>

1910071

4653 Table Mountain Drive ♦ Golden, Colorado 80403  
303-277-9310 ♦ 303-374-5933 (f)

Page 1 of 1

Client: Fremont Environmental

Project Manager: Paul Henehan

Address: P.O Box 1289

E-Mail: paulh@fremontenv.com, ethanb@fremontenv.com

City/State/Zip: Wellington, CO 80549

Bill to: ~~Robert Wiedeman~~ PMJ 28-7-2 Jacob

Phone: 303-956-8714

Project Name: Noble - Wiedeman PMJ 28-7-2

Sampler Name: Black

Project Number:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested						Special Instructions		
					HCl	HNO3	None	Other	Water	Soil	Air-Canister #	Other	BTEX	Naphthalene	GRO	DRO	SAR	EC		pH	
1	MW-1	10/7/19		2			X		X					X							
2	MW-2																				
3	MW-3																				
4	MW-4																				
5	MW-5																				
6	MW-6																				
7	MW-7																				
8	MW-8																				
9																					
10																					

Relinquished by: <u>Ethan Black</u>	Date/Time: <u>10/7/19 1617</u>	Received by: <u>[Signature]</u>	Date/Time: <u>10/07/19 1617</u>	Turn Around Time (Check) Same Day _____ 72 hours 24 hours _____ Standard <u>X</u> 48 hours _____ Sample Integrity: Temperature Upon Receipt: <u>3.2</u> Samples Intact: <u>Yes</u> No	Notes:
Relinquished by:	Date/Time:	Received by:	Date/Time:		
Relinquished by:	Date/Time:	Received by:	Date/Time:		

1910071

Sample Receipt Checklist

S2 Work Order \_\_\_\_\_

Client: Fremont Environmental Client Project ID: Noble - Wisdeman PMS 28-7,2

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

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

Temp (°C)	3.2
-----------	-----

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.	✓			
Were all samples received intact <sup>(1)</sup> ?	✗			
Was adequate sample volume provided <sup>(1)</sup> ?	✗			
If custody seals are present, are they intact <sup>(1)</sup> ?			✓	
Are samples with holding times due within 48 hours sample due within 48 hours present?		✓		
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	✓			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	✗			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	✓			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	✗			
For volatiles in water – is there headspace present? <b>If yes, contact client and note in narrative.</b>		✓		
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ? 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> ? Record the pH in Comments.			✓	
If dissolved metals are requested, were samples field filtered?			✓	

Additional Comments (if any):

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

RE  
Custodian Printed Name or Initials

[Signature]  
Signature of Custodian

10/07/19  
Date/Time 1620



Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

**MW-1**  
**1910071-01 (Water)**

**Summit Scientific**

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

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1910130	10/09/19	10/09/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		94.7 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		89.3 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		78.6 %		21-167		"	"	"	"	

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

**MW-2**  
**1910071-02 (Water)**

**Summit Scientific**

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

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>300</b>	100	ug/l	100	1910130	10/09/19	10/09/19	EPA 8260B	
<b>Toluene</b>	<b>270</b>	100	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>36</b>	1.0	"	1	"	"	"	"	
<b>Xylenes (total)</b>	<b>2700</b>	200	"	100	"	"	"	"	

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		92.5 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		91.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.8 %	21-167		"	"	"	"	

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

**MW-3**  
**1910071-03 (Water)**

**Summit Scientific**

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

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1910130	10/09/19	10/09/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/07/19 00:00**

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

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

**MW-4**  
**1910071-04 (Water)**

**Summit Scientific**

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

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1910130	10/09/19	10/09/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		87.6 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		91.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		81.4 %		21-167		"	"	"	"	

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

**MW-5**  
**1910071-05 (Water)**

**Summit Scientific**

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

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1910130	10/09/19	10/10/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		87.1 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		86.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		78.9 %		21-167		"	"	"	"	

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

**MW-6**  
**1910071-06 (Water)**

**Summit Scientific**

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

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1910130	10/09/19	10/10/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		94.9 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		93.4 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		86.2 %		21-167		"	"	"	"	

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

**MW-7**  
**1910071-07 (Water)**

**Summit Scientific**

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

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1910130	10/09/19	10/10/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		90.6 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		89.7 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		80.6 %		21-167		"	"	"	"	

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

**MW-8**  
**1910071-08 (Water)**

**Summit Scientific**

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

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>3.3</b>	1.0		ug/l	1	1910130	10/09/19	10/10/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **10/07/19 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		92.9 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		90.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		80.3 %		21-167		"	"	"	"	

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

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

**Summit Scientific**

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

**Batch 1910130 - EPA 5030 Water MS**

**Blank (1910130-BLK1)**

Prepared & Analyzed: 10/09/19

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.0		"	13.3		90.1	23-173			
Surrogate: Toluene-d8	12.0		"	13.3		90.1	20-170			
Surrogate: 4-Bromofluorobenzene	10.8		"	13.3		80.9	21-167			

**LCS (1910130-BS1)**

Prepared & Analyzed: 10/09/19

Benzene	21.7	1.0	ug/l	25.0		86.9	51-132			
Toluene	22.5	1.0	"	25.0		89.9	51-138			
Ethylbenzene	23.6	1.0	"	25.0		94.2	58-146			
m,p-Xylene	45.3	2.0	"	50.0		90.6	57-144			
o-Xylene	22.2	1.0	"	25.0		88.9	53-146			
Surrogate: 1,2-Dichloroethane-d4	12.7		"	13.3		95.0	23-173			
Surrogate: Toluene-d8	11.8		"	13.3		88.8	20-170			
Surrogate: 4-Bromofluorobenzene	11.2		"	13.3		83.8	21-167			

**Matrix Spike (1910130-MS1)**

Source: 1910069-01

Prepared & Analyzed: 10/09/19

Benzene	22.3	1.0	ug/l	25.0	ND	89.2	34-141			
Toluene	22.8	1.0	"	25.0	ND	91.1	27-151			
Ethylbenzene	24.3	1.0	"	25.0	ND	97.3	29-160			
m,p-Xylene	46.3	2.0	"	50.0	ND	92.5	20-166			
o-Xylene	23.4	1.0	"	25.0	ND	93.7	33-159			
Surrogate: 1,2-Dichloroethane-d4	12.6		"	13.3		94.6	23-173			
Surrogate: Toluene-d8	12.2		"	13.3		91.4	20-170			
Surrogate: 4-Bromofluorobenzene	10.9		"	13.3		81.7	21-167			

Summit Scientific

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Fremont Environmental  
 PO Box 1289  
 Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
 Project Manager: Paul Henehan

**Reported:**  
 10/14/19 13:32

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

**Summit Scientific**

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

**Batch 1910130 - EPA 5030 Water MS**

Matrix Spike Dup (1910130-MSD1)	Source: 1910069-01			Prepared & Analyzed: 10/09/19						
Benzene	22.1	1.0	ug/l	25.0	ND	88.3	34-141	1.08	30	
Toluene	22.1	1.0	"	25.0	ND	88.5	27-151	2.90	30	
Ethylbenzene	23.8	1.0	"	25.0	ND	95.1	29-160	2.25	30	
m,p-Xylene	45.3	2.0	"	50.0	ND	90.6	20-166	2.14	30	
o-Xylene	23.0	1.0	"	25.0	ND	91.8	33-159	1.98	30	
Surrogate: 1,2-Dichloroethane-d4	13.3		"	13.3		99.8	23-173			
Surrogate: Toluene-d8	11.8		"	13.3		88.8	20-170			
Surrogate: 4-Bromofluorobenzene	11.8		"	13.3		88.7	21-167			

Summit Scientific

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Fremont Environmental  
PO Box 1289  
Wellington CO, 80549

Project: NOble - Wiedeman PMJ 28-7,2

Project Number: [none]  
Project Manager: Paul Henehan

**Reported:**  
10/14/19 13:32

### 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