



December 2, 2022

Vertex Project #: 22E-03898

Investigation Summary: Eddy BD State #003
 County: Eddy
 Incident ID: NKMW1102626712

Prepared For: **Matador Production Company**
 One Lincoln Centre
 Dallas, Texas 75240

Matador Production Company (Matador) retained Vertex Resource Services Inc. (Vertex) to conduct a Site investigation of potential historical contamination from a drilling mud release that occurred at Eddy BD State #003 (hereafter referred to as "Eddy"). The coordinates of the investigation area at Eddy are N 32.5316582, W -103.9922333.

Site Investigation

Vertex personnel arrived on-site on November 9, 2022, and completed an inspection and delineation of the potential release area. Three sample points were established on the engineered pad and downhill to the north of the pad. Samples were to be collected at 0, 1, 2, 3 and 4 feet below ground surface (bgs). Boreholes were advanced with the use of a hand auger and rock bar; refusal was encountered at the maximum depth reached for vertical delineation at 1.5 feet. An aerial view and site schematic is included on Figure 1 (Attachment 1). During field screening activities, no contamination was identified. All samples were jarred and submitted for laboratory analysis at Hall Environmental Analysis Laboratory in Albuquerque, New Mexico. Field screening and laboratory analysis results are included in Table 2 (Attachment 2). The laboratory data report is included in Attachment 3. The daily field report with site photographs is included in Attachment 4. A copy of the New Mexico Oil Conservation Division Final C-141 is included in Attachment 5. Characterization research of the site is included in Attachment 6.

The closure criteria constituent concentration limits used for the investigation of the potential historical contamination area at Eddy are presented below in Table 1.

Minimum depth below any point within the horizontal boundary of the release to groundwater less than 10,000 mg/l TDS	Constituent	Limit
< 50 feet	Chloride	600 mg/kg
	TPH (GRO+DRO+MRO)	100 mg/kg
	BTEX	50 mg/kg
	Benzene	10 mg/kg

TDS – total dissolved solids, TPH – total petroleum hydrocarbons, GRO – gas range organics, DRO – diesel range organics, MRO – motor oil range organics, BTEX – benzene, toluene, ethylbenzene and xylenes

vertex.ca

3101 Boyd Drive, Carlsbad, New Mexico 88220, USA | P 575.725.5001

Matador Production Company
Eddy BD State #003, NKMW1102626712

2022 Site Investigation Summary
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Conclusion

The reported release area was fully investigated for potential historical contamination and characterized to refusal depth. Utilizing equipment to further delineate the top 4 feet per New Mexico Administrative Code 19.15.29.13 Reclamation Standards would be more detrimental to surrounding vegetation within the pasture area. No staining or odor was present during the site investigation. All laboratory analysis results were below NMAC 19.15.29 criteria and indicated no contamination to be present in the soils. Based on these findings, no further investigation or remedial activities are required.

This summary report was completed by Monica Peppin for Matador Production Company.



December 2, 2022

Monica Peppin, A.Sc.
PROJECT MANAGER, REPORTING
575.361.9880
mpeppin@vertex.ca

Date

Attachments

- Attachment 1. Site Schematic
- Attachment 2. Table
- Attachment 3. Laboratory Data Reports and Chain of Custody Forms
- Attachment 4. Daily Field Report with Photographs
- Attachment 5. NMOCD C-141 Report
- Attachment 6. Closure Criteria Determination Research

Matador Production Company
Eddy BD State #003, NKMW110262712

2022 Site Investigation Summary
December 2022

Limitations

This report has been prepared for the sole benefit of Matador Production Company (Matador). This document may not be used by any other person or entity, with the exception of the New Mexico Oil Conservation Division, without the express written consent of Vertex Resource Services Inc. (Vertex) and Matador. Any use of this report by a third party, or any reliance on decisions made based on it, or damages suffered as a result of the use of this report are the sole responsibility of the user.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted scientific practices current at the time the work was performed. The conclusions and recommendations presented represent the best judgement of Vertex based on the data collected during the assessment. Due to the nature of the assessment and the data available, Vertex cannot warrant against undiscovered environmental liabilities. Conclusions and recommendations presented in this report should not be considered legal advice.

ATTACHMENT 1

Document Path: \\vr-s-4s01.corp.internatsharea\VPS\04 - Geomatics\1-Projects\ US PROJECTS\Manador Resources\22E-03898\Figure 1 Sample Schematic (22E-03898).mxd



-  Sample Point
-  Approximate Lease Boundary



0 25 50 Feet
 Map Center:
 Lat/Long: 32.531644, -103.992250

NAD 1983 UTM Zone 13N
 Date: Nov 14/22



**Sample Schematic
 Eddy BD State #003**

FIGURE:

1



Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Background imagery from Google Earth Pro., 2019. Feature locations from Vertex Professional Services Ltd., 2022.

ATTACHMENT 2

Client Name: Matador Production Company
 Site Name: Eddy BD State #003
 NMOCD Tracking #: NKMW110262712
 Project #: 22E-03898
 Lab Report: 2211716

Table 2. Initial Characterization Sample Field Screen and Laboratory Results - Depth to Groundwater <50 feet bgs													
Sample Description			Field Screening			Petroleum Hydrocarbons							Inorganic
Sample ID	Depth (ft)	Sample Date	Volatile Organic Compounds (PID) (ppm)	Extractable Organic Compounds (PetroFlag) (ppm)	Chloride Concentration (ppm)	Volatile		Extractable					Chloride Concentration (mg/kg)
						Benzene (mg/kg)	BTEX (Total) (mg/kg)	Gasoline Range Organics (GRO) (mg/kg)	Diesel Range Organics (DRO) (mg/kg)	Motor Oil Range Organics (MRO) (mg/kg)	(GRO + DRO) (mg/kg)	Total Petroleum Hydrocarbons (TPH) (mg/kg)	
BH22-01	0	11/9/2022	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
	1	11/9/2022	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH22-02	0	11/9/2022	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
	1	11/9/2022	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
	1.5	11/9/2022	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
BH22-03	0	11/9/2022	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
	1	11/9/2022	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND

"ND" Not Detected at the Reporting Limit

"-" indicates not analyzed/assessed

Bold and grey shaded indicates exceedance outside of NMOCD Closure Criteria (on-pad)

Bold and green shaded indicates exceedance outside of NMOCD Reclamation Criteria (off-pad)



ATTACHMENT 3



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

November 22, 2022

Monica Peppin

Vertex Resources Services, Inc.
3101 Boyd Drive
Carlsbad, NM 88220
TEL: (505) 506-0040
FAX:

RE: Eddy BD State 003

OrderNo.: 2211716

Dear Monica Peppin:

Hall Environmental Analysis Laboratory received 7 sample(s) on 11/11/2022 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a white background.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report

Lab Order 2211716

Date Reported: 11/22/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.

Client Sample ID: BH22-01 0'

Project: Eddy BD State 003

Collection Date: 11/9/2022 11:00:00 AM

Lab ID: 2211716-001

Matrix: SOIL

Received Date: 11/11/2022 10:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: SB
Diesel Range Organics (DRO)	ND	14		mg/Kg	1	11/16/2022 1:19:27 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	11/16/2022 1:19:27 AM
Surr: DNOP	82.5	21-129		%Rec	1	11/16/2022 1:19:27 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: CCM
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/15/2022 1:59:00 PM
Surr: BFB	106	37.7-212		%Rec	1	11/15/2022 1:59:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: CCM
Benzene	ND	0.025		mg/Kg	1	11/15/2022 1:59:00 PM
Toluene	ND	0.049		mg/Kg	1	11/15/2022 1:59:00 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/15/2022 1:59:00 PM
Xylenes, Total	ND	0.099		mg/Kg	1	11/15/2022 1:59:00 PM
Surr: 4-Bromofluorobenzene	115	70-130		%Rec	1	11/15/2022 1:59:00 PM
EPA METHOD 300.0: ANIONS						Analyst: NAI
Chloride	ND	60		mg/Kg	20	11/16/2022 3:53:27 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Above Quantitation Range/Estimated Value
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Limit
	S % Recovery outside of standard limits. If undiluted results may be estimated.	

Analytical Report

Lab Order 2211716

Date Reported: 11/22/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.

Client Sample ID: BH22-01 1'

Project: Eddy BD State 003

Collection Date: 11/9/2022 11:05:00 AM

Lab ID: 2211716-002

Matrix: SOIL

Received Date: 11/11/2022 10:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: SB
Diesel Range Organics (DRO)	ND	15		mg/Kg	1	11/16/2022 1:32:00 AM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	11/16/2022 1:32:00 AM
Surr: DNOP	83.5	21-129		%Rec	1	11/16/2022 1:32:00 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: CCM
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/15/2022 2:19:00 PM
Surr: BFB	107	37.7-212		%Rec	1	11/15/2022 2:19:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: CCM
Benzene	ND	0.024		mg/Kg	1	11/15/2022 2:19:00 PM
Toluene	ND	0.049		mg/Kg	1	11/15/2022 2:19:00 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/15/2022 2:19:00 PM
Xylenes, Total	ND	0.097		mg/Kg	1	11/15/2022 2:19:00 PM
Surr: 4-Bromofluorobenzene	116	70-130		%Rec	1	11/15/2022 2:19:00 PM
EPA METHOD 300.0: ANIONS						Analyst: NAI
Chloride	ND	60		mg/Kg	20	11/16/2022 4:05:52 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Above Quantitation Range/Estimated Value
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Limit
	S % Recovery outside of standard limits. If undiluted results may be estimated.	

Analytical Report

Lab Order 2211716

Date Reported: 11/22/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.

Client Sample ID: BH22-02 0'

Project: Eddy BD State 003

Collection Date: 11/9/2022 11:10:00 AM

Lab ID: 2211716-003

Matrix: SOIL

Received Date: 11/11/2022 10:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: SB
Diesel Range Organics (DRO)	ND	14		mg/Kg	1	11/16/2022 1:44:29 AM
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	11/16/2022 1:44:29 AM
Surr: DNOP	86.9	21-129		%Rec	1	11/16/2022 1:44:29 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: CCM
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	11/15/2022 2:39:00 PM
Surr: BFB	105	37.7-212		%Rec	1	11/15/2022 2:39:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: CCM
Benzene	ND	0.025		mg/Kg	1	11/15/2022 2:39:00 PM
Toluene	ND	0.050		mg/Kg	1	11/15/2022 2:39:00 PM
Ethylbenzene	ND	0.050		mg/Kg	1	11/15/2022 2:39:00 PM
Xylenes, Total	ND	0.10		mg/Kg	1	11/15/2022 2:39:00 PM
Surr: 4-Bromofluorobenzene	113	70-130		%Rec	1	11/15/2022 2:39:00 PM
EPA METHOD 300.0: ANIONS						Analyst: NAI
Chloride	ND	60		mg/Kg	20	11/16/2022 5:45:09 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Above Quantitation Range/Estimated Value
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Limit
	S % Recovery outside of standard limits. If undiluted results may be estimated.	

Analytical Report

Lab Order 2211716

Date Reported: 11/22/2022

Hall Environmental Analysis Laboratory, Inc.**CLIENT:** Vertex Resources Services, Inc.**Client Sample ID:** BH22-02 1'**Project:** Eddy BD State 003**Collection Date:** 11/9/2022 11:15:00 AM**Lab ID:** 2211716-004**Matrix:** SOIL**Received Date:** 11/11/2022 10:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: SB
Diesel Range Organics (DRO)	ND	14		mg/Kg	1	11/16/2022 1:56:58 AM
Motor Oil Range Organics (MRO)	ND	45		mg/Kg	1	11/16/2022 1:56:58 AM
Surr: DNOP	81.0	21-129		%Rec	1	11/16/2022 1:56:58 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: CCM
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	11/15/2022 2:58:00 PM
Surr: BFB	102	37.7-212		%Rec	1	11/15/2022 2:58:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: CCM
Benzene	ND	0.025		mg/Kg	1	11/15/2022 2:58:00 PM
Toluene	ND	0.050		mg/Kg	1	11/15/2022 2:58:00 PM
Ethylbenzene	ND	0.050		mg/Kg	1	11/15/2022 2:58:00 PM
Xylenes, Total	ND	0.10		mg/Kg	1	11/15/2022 2:58:00 PM
Surr: 4-Bromofluorobenzene	113	70-130		%Rec	1	11/15/2022 2:58:00 PM
EPA METHOD 300.0: ANIONS						Analyst: NAI
Chloride	ND	60		mg/Kg	20	11/16/2022 5:57:34 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Above Quantitation Range/Estimated Value
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of standard limits. If undiluted results may be estimated.		

Analytical Report

Lab Order 2211716

Date Reported: 11/22/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.

Client Sample ID: BH22-02 1.5'

Project: Eddy BD State 003

Collection Date: 11/9/2022 11:20:00 AM

Lab ID: 2211716-005

Matrix: SOIL

Received Date: 11/11/2022 10:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: SB
Diesel Range Organics (DRO)	ND	15		mg/Kg	1	11/16/2022 2:09:17 AM
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	11/16/2022 2:09:17 AM
Surr: DNOP	92.6	21-129		%Rec	1	11/16/2022 2:09:17 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: CCM
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/15/2022 3:18:00 PM
Surr: BFB	97.1	37.7-212		%Rec	1	11/15/2022 3:18:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: CCM
Benzene	ND	0.024		mg/Kg	1	11/15/2022 3:18:00 PM
Toluene	ND	0.049		mg/Kg	1	11/15/2022 3:18:00 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/15/2022 3:18:00 PM
Xylenes, Total	ND	0.098		mg/Kg	1	11/15/2022 3:18:00 PM
Surr: 4-Bromofluorobenzene	109	70-130		%Rec	1	11/15/2022 3:18:00 PM
EPA METHOD 300.0: ANIONS						Analyst: NAI
Chloride	ND	60		mg/Kg	20	11/16/2022 6:34:47 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Above Quantitation Range/Estimated Value
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Limit
	S % Recovery outside of standard limits. If undiluted results may be estimated.	

Analytical Report

Lab Order 2211716

Date Reported: 11/22/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.

Client Sample ID: BH22-03 0'

Project: Eddy BD State 003

Collection Date: 11/9/2022 11:25:00 AM

Lab ID: 2211716-006

Matrix: SOIL

Received Date: 11/11/2022 10:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: SB
Diesel Range Organics (DRO)	ND	14		mg/Kg	1	11/16/2022 2:21:37 AM
Motor Oil Range Organics (MRO)	ND	46		mg/Kg	1	11/16/2022 2:21:37 AM
Surr: DNOP	89.2	21-129		%Rec	1	11/16/2022 2:21:37 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: CCM
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	11/15/2022 3:37:00 PM
Surr: BFB	96.5	37.7-212		%Rec	1	11/15/2022 3:37:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: CCM
Benzene	ND	0.024		mg/Kg	1	11/15/2022 3:37:00 PM
Toluene	ND	0.048		mg/Kg	1	11/15/2022 3:37:00 PM
Ethylbenzene	ND	0.048		mg/Kg	1	11/15/2022 3:37:00 PM
Xylenes, Total	ND	0.096		mg/Kg	1	11/15/2022 3:37:00 PM
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	11/15/2022 3:37:00 PM
EPA METHOD 300.0: ANIONS						Analyst: NAI
Chloride	ND	60		mg/Kg	20	11/16/2022 7:12:01 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Above Quantitation Range/Estimated Value
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Limit
	S % Recovery outside of standard limits. If undiluted results may be estimated.	

Analytical Report

Lab Order **2211716**

Date Reported: **11/22/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Vertex Resources Services, Inc.

Client Sample ID: BH22-03 1'

Project: Eddy BD State 003

Collection Date: 11/9/2022 11:30:00 AM

Lab ID: 2211716-007

Matrix: SOIL

Received Date: 11/11/2022 10:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: SB
Diesel Range Organics (DRO)	ND	14		mg/Kg	1	11/16/2022 2:33:51 AM
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	11/16/2022 2:33:51 AM
Surr: DNOP	87.7	21-129		%Rec	1	11/16/2022 2:33:51 AM
EPA METHOD 8015D: GASOLINE RANGE						Analyst: CCM
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	11/15/2022 3:57:00 PM
Surr: BFB	104	37.7-212		%Rec	1	11/15/2022 3:57:00 PM
EPA METHOD 8021B: VOLATILES						Analyst: CCM
Benzene	ND	0.025		mg/Kg	1	11/15/2022 3:57:00 PM
Toluene	ND	0.049		mg/Kg	1	11/15/2022 3:57:00 PM
Ethylbenzene	ND	0.049		mg/Kg	1	11/15/2022 3:57:00 PM
Xylenes, Total	ND	0.098		mg/Kg	1	11/15/2022 3:57:00 PM
Surr: 4-Bromofluorobenzene	113	70-130		%Rec	1	11/15/2022 3:57:00 PM
EPA METHOD 300.0: ANIONS						Analyst: NAI
Chloride	ND	60		mg/Kg	20	11/16/2022 7:49:14 PM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Above Quantitation Range/Estimated Value
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Limit
	S % Recovery outside of standard limits. If undiluted results may be estimated.	

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2211716

22-Nov-22

Client: Vertex Resources Services, Inc.

Project: Eddy BD State 003

Sample ID: MB-71532	SampType: mblk	TestCode: EPA Method 300.0: Anions								
Client ID: PBS	Batch ID: 71532	RunNo: 92613								
Prep Date: 11/16/2022	Analysis Date: 11/16/2022	SeqNo: 3332644	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: LCS-71532	SampType: ics	TestCode: EPA Method 300.0: Anions								
Client ID: LCSS	Batch ID: 71532	RunNo: 92613								
Prep Date: 11/16/2022	Analysis Date: 11/16/2022	SeqNo: 3332649	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.9	90	110			

Sample ID: MB-71534	SampType: mblk	TestCode: EPA Method 300.0: Anions								
Client ID: PBS	Batch ID: 71534	RunNo: 92613								
Prep Date: 11/16/2022	Analysis Date: 11/16/2022	SeqNo: 3332707	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: LCS-71534	SampType: ics	TestCode: EPA Method 300.0: Anions								
Client ID: LCSS	Batch ID: 71534	RunNo: 92613								
Prep Date: 11/16/2022	Analysis Date: 11/16/2022	SeqNo: 3332708	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	97.4	90	110			

Sample ID: LCS-71534	SampType: ics	TestCode: EPA Method 300.0: Anions								
Client ID: LCSS	Batch ID: 71534	RunNo: 92613								
Prep Date: 11/16/2022	Analysis Date: 11/16/2022	SeqNo: 3332712	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	15	1.5	15.00	0	97.2	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of standard limits. If undiluted results may be estimated.
- B Analyte detected in the associated Method Blank
- E Above Quantitation Range/Estimated Value
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2211716

22-Nov-22

Client: Vertex Resources Services, Inc.

Project: Eddy BD State 003

Sample ID: MB-71492	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 71492		RunNo: 92578							
Prep Date: 11/14/2022	Analysis Date: 11/15/2022		SeqNo: 3331679		Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	12		10.00		116	21	129			

Sample ID: LCS-71492	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 71492		RunNo: 92578							
Prep Date: 11/14/2022	Analysis Date: 11/15/2022		SeqNo: 3331680		Units: %Rec					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: DNOP	6.0		5.000		119	21	129			

Sample ID: MB-71465	SampType: MBLK		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: PBS	Batch ID: 71465		RunNo: 92578							
Prep Date: 11/14/2022	Analysis Date: 11/15/2022		SeqNo: 3331704		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	15								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.1		10.00		90.9	21	129			

Sample ID: LCS-71465	SampType: LCS		TestCode: EPA Method 8015M/D: Diesel Range Organics							
Client ID: LCSS	Batch ID: 71465		RunNo: 92578							
Prep Date: 11/14/2022	Analysis Date: 11/16/2022		SeqNo: 3331705		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	47	15	50.00	0	93.6	64.4	127			
Surr: DNOP	4.8		5.000		96.3	21	129			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of standard limits. If undiluted results may be estimated.
- B Analyte detected in the associated Method Blank
- E Above Quantitation Range/Estimated Value
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2211716

22-Nov-22

Client: Vertex Resources Services, Inc.

Project: Eddy BD State 003

Sample ID: ics-71459	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: LCSS	Batch ID: 71459	RunNo: 92605								
Prep Date: 11/11/2022	Analysis Date: 11/15/2022	SeqNo: 3330772	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27	5.0	25.00	0	107	72.3	137			
Surr: BFB	2300		1000		228	37.7	212			S

Sample ID: mb-71459	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range								
Client ID: PBS	Batch ID: 71459	RunNo: 92605								
Prep Date: 11/11/2022	Analysis Date: 11/15/2022	SeqNo: 3330773	Units: mg/Kg							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	1100		1000		107	37.7	212			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of standard limits. If undiluted results may be estimated.

- B Analyte detected in the associated Method Blank
- E Above Quantitation Range/Estimated Value
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2211716

22-Nov-22

Client: Vertex Resources Services, Inc.

Project: Eddy BD State 003

Sample ID: ics-71459	SampType: LCS		TestCode: EPA Method 8021B: Volatiles							
Client ID: LCSS	Batch ID: 71459		RunNo: 92605							
Prep Date: 11/11/2022	Analysis Date: 11/15/2022		SeqNo: 3330825		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.1	0.025	1.000	0	114	80	120			
Toluene	1.1	0.050	1.000	0	115	80	120			
Ethylbenzene	1.1	0.050	1.000	0	115	80	120			
Xylenes, Total	3.4	0.10	3.000	0	114	80	120			
Surr: 4-Bromofluorobenzene	1.2		1.000		117	70	130			

Sample ID: mb-71459	SampType: MBLK		TestCode: EPA Method 8021B: Volatiles							
Client ID: PBS	Batch ID: 71459		RunNo: 92605							
Prep Date: 11/11/2022	Analysis Date: 11/15/2022		SeqNo: 3330826		Units: mg/Kg					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.2		1.000		119	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- PQL Practical Quantitative Limit
- S % Recovery outside of standard limits. If undiluted results may be estimated.
- B Analyte detected in the associated Method Blank
- E Above Quantitation Range/Estimated Value
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Limit



Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **Vertex Resources Services, Inc.**

Work Order Number: **2211716**

RcptNo: **1**

Received By: **Juan Rojas**

11/11/2022 10:30:00 AM

Completed By: **Desiree Dominguez**

11/11/2022 11:02:07 AM

Reviewed By: *SEA 11/11/22*

Chain of Custody

- 1. Is Chain of Custody complete? Yes No Not Present
- 2. How was the sample delivered? Courier

Log In

- 3. Was an attempt made to cool the samples? Yes No NA
- 4. Were all samples received at a temperature of >0° C to 6.0° C Yes No NA
- 5. Sample(s) in proper container(s)? Yes No
- 6. Sufficient sample volume for indicated test(s)? Yes No
- 7. Are samples (except VOA and ONG) properly preserved? Yes No
- 8. Was preservative added to bottles? Yes No NA
- 9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes No NA
- 10. Were any sample containers received broken? Yes No
- 11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes No
- 12. Are matrices correctly identified on Chain of Custody? Yes No
- 13. Is it clear what analyses were requested? Yes No
- 14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes No

of preserved bottles checked for pH: _____
(<2 or >12 unless noted)
Adjusted? _____
Checked by: *KPA 11-11-22*

Special Handling (if applicable)

- 15. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: _____ Date: _____
By Whom: _____ Via: eMail Phone Fax In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.1	Good				

Chain-of-Custody Record

Client: Vertex
 M. Peppin
 Mailing Address:
 Phone #:
 email or Fax#:

Turn-Around Time:
 Standard Rush 5 Days
 Project Name:
Eddy BD State # 003
 Project #:
22E-03898

Project Manager:
Monica Peppin
 Sampler: MJP
 On Ice: Yes No
 # of Coolers: 1
 Cooler Temp (Including Cof): 1.1 ± 0.0 ± 1.1 (°C)

QA/QC Package:
 Standard Level 4 (Full Validation)
 Accreditation: Az Compliance
 NELAC Other
 EDD (Type)

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No.	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO ₃ , NO ₂ , PO ₄ , SO ₄	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)
11/9/22	11:00	Soil	BH22-01 0'	4 oz	ice	2211716	<input checked="" type="checkbox"/>								
	11:05		BH22-01 1'			-001	<input checked="" type="checkbox"/>								
	11:10		BH22-02 0'			-002	<input checked="" type="checkbox"/>								
	11:15		BH22-02 1'			-003	<input checked="" type="checkbox"/>								
	11:20		BH22-02 1.5'			-004	<input checked="" type="checkbox"/>								
	11:25		BH22-03 0'			-005	<input checked="" type="checkbox"/>								
	11:30		BH22-03 1'			-006	<input checked="" type="checkbox"/>								
						-007	<input checked="" type="checkbox"/>								

Analysis Request

Date	Time	Relinquished by:	Relinquished by:	Received by:	Via:	Date	Time	Remarks:
11/10/22	1900	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>		11/10/22	850	

CC: M. Peppin

Received by: [Signature] Via: Express Date: 11/22/22 Time: 1930

ATTACHMENT 4



Daily Site Visit Report

Client:	<u>Matador Resources</u>	Inspection Date:	<u>11/9/2022</u>
Site Location Name:	<u>Eddy BD State #003</u>	Report Run Date:	<u>11/9/2022 8:38 PM</u>
Client Contact Name:	<u>Arsenio Jones</u>	API #:	<u></u>
Client Contact Phone #:	<u>(575)361-4333</u>		
Unique Project ID	<u></u>	Project Owner:	<u></u>
Project Reference #	<u></u>	Project Manager:	<u></u>

Summary of Times

Arrived at Site	<u>11/9/2022 10:45 AM</u>
Departed Site	<u>11/9/2022 11:43 AM</u>



Daily Site Visit Report

Field Notes

10:45 Collect samples at one foot intervals to a depth of four feet and determine if any contamination is present from drilling mud release

11:35 Cobble rock layer being at at around 1 ft bgs.

11:36 Samples have no odor. Vegetation is lush around site

11:38 Sample taken on pad area then bottom of pad down the hill and last sample taken further north from pad

11:51 Loamy top soil and moves into a cobble layer creating a refusal with hand tools to vertically delineate

Next Steps & Recommendations

- 1 Schedule confirmation sampling
- 2 Potential further vertical delineation



Daily Site Visit Report

Site Photos

Viewing Direction: North



Sample area

Viewing Direction: North



Sample area

Viewing Direction: North



Sample area

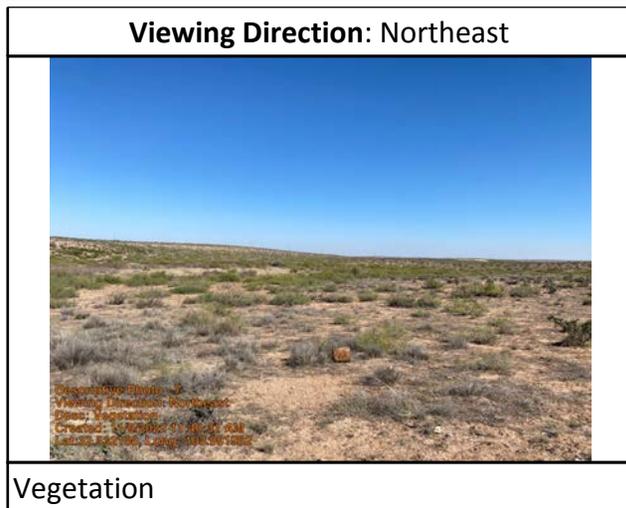
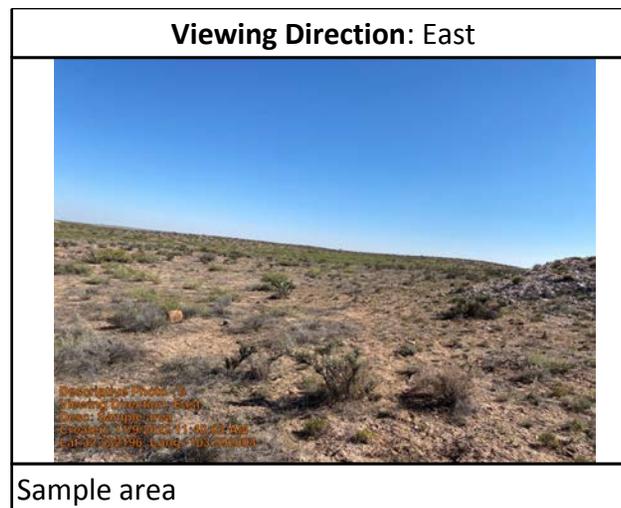
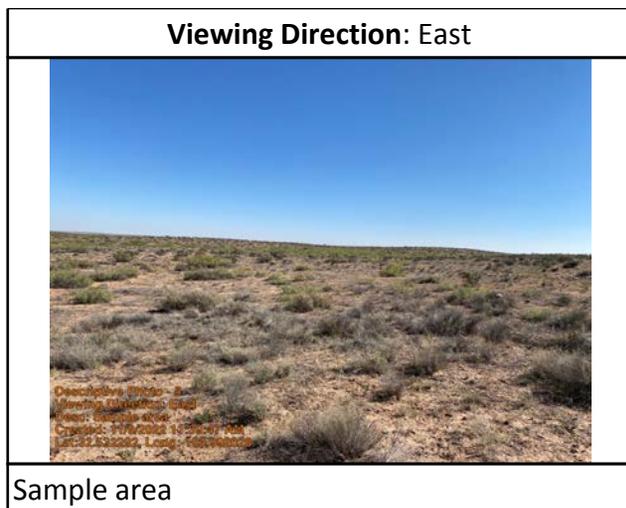
Viewing Direction: South



Sample area



Daily Site Visit Report



Daily Site Visit Report



Daily Site Visit Signature

Inspector: Monica Peppin

A handwritten signature in black ink, appearing to be 'MP', written over a horizontal line.

Signature:

Signature

ATTACHMENT 5

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural
Resources Department

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Incident ID	NKMW1102626712
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party	Matador Production Company	OGRID	228937
Contact Name	Clinton Talley	Contact Telephone	337-319-8398
Contact email	clinton.talley@matadorresources.com	Incident # (assigned by OCD)	NKMW1102626712
Contact mailing address	One Lincoln Centre Dallas, Texas 75240		

Location of Release Source

Latitude 32.5316582 Longitude -103.9922333
(NAD 83 in decimal degrees to 5 decimal places)

Site Name	Eddy BD State #003	Site Type	Oil
Date Release Discovered	01/13/2011	API# (if applicable)	30-015-38144

Unit Letter	Section	Township	Range	County
G	32	20S	30E	Eddy

Surface Owner: State Federal Tribal Private (Name: _____)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

<input type="checkbox"/> Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Condensate	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input checked="" type="checkbox"/> Other (describe) Drilling Mud	Volume/Weight Released (provide units) 25 bbls	Volume/Weight Recovered (provide units) 0 bbls

Cause of Release

Working pits ran over which did not have sufficient storage to accommodate gas kick. Area affected was location and 50 yards downhill.

State of New Mexico
Oil Conservation Division

Incident ID	NKMW1102626712
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If YES, for what reason(s) does the responsible party consider this a major release? 25 bbls released
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? C141 on 1-19-2011 - Lynx Petroleum Consultants Inc	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

<input checked="" type="checkbox"/> The source of the release has been stopped. <input checked="" type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input checked="" type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. <input checked="" type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.	
If all the actions described above have <u>not</u> been undertaken, explain why: 	
Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.	
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.	
Printed Name: <u>Clinton Talley</u>	Title: <u>RES Specialist</u>
Signature: <u><i>Clinton Talley</i></u>	Date: <u>12/06/2022</u>
email: <u>clinton.talley@matadorresources.com</u>	Telephone: <u>337-319-8398</u>
<u>OCD Only</u>	
Received by: <u>Jocelyn Harimon</u>	Date: <u>12/07/2022</u>

Incident ID	NKMW1102626712
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	187 (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas not on an exploration, development, production, or storage site?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: *Each of the following items must be included in the report.*

- Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- Field data
- Data table of soil contaminant concentration data
- Depth to water determination
- Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- Boring or excavation logs
- Photographs including date and GIS information
- Topographic/Aerial maps
- Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico
Oil Conservation Division

Page 4

Incident ID	NKMW1102626712
District RP	
Facility ID	
Application ID	

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Clinton Talley Title: RES Specialist

Signature: *Clinton Talley* Date: 12/06/2022

email: clinton.talley@matadorresources.com Telephone: 337-319-8398

OCD Only

Received by: Jocelyn Harimon Date: 12/07/2022

Incident ID	NKMW1102626712
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: *Each of the following items must be included in the closure report.*

- A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Clinton Talley Title: RES Specialist
 Signature: *Clinton Talley* Date: 12/06/2022
 email: clinton.talley@matadorresources.com Telephone: 337-319-3898

OCD Only

Received by: Jocelyn Harimon Date: 12/07/2022

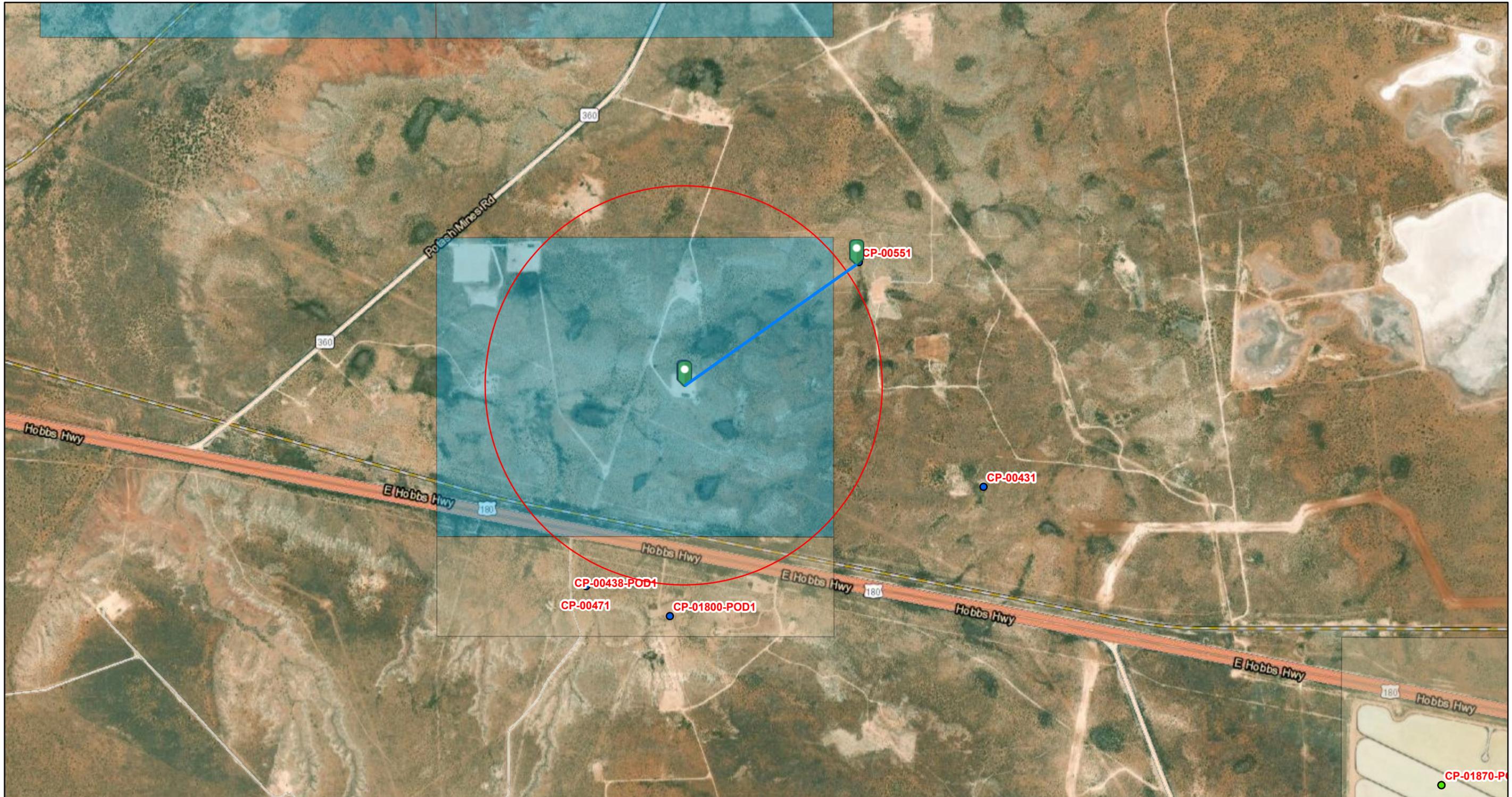
Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: *Ashley Maxwell* Date: 2/03/2023
 Printed Name: Ashley Maxwell Title: Environmental Specialist

ATTACHMENT 6

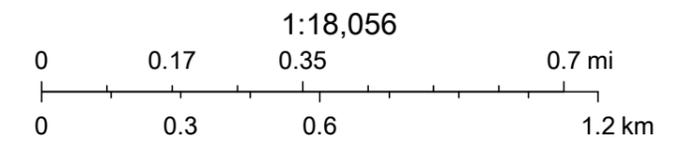
Closure Criteria Worksheet			
Site Name: Eddy BD State #003			
Spill Coordinates:		X: 32.5316582	Y: -103.9922333
Site Specific Conditions		Value	Unit
1	Depth to Groundwater	187	feet
2	Within 300 feet of any continuously flowing watercourse or any other significant watercourse	76,666	feet
3	Within 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark)	7,293	feet
4	Within 300 feet from an occupied residence, school, hospital, institution or church	2,956	feet
5	i) Within 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or	3,078	feet
	ii) Within 1000 feet of any fresh water well or spring	3,078	feet
6	Within incorporated municipal boundaries or within a defined municipal fresh water field covered under a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978 as amended, unless the municipality specifically approves	No	(Y/N)
7	Within 300 feet of a wetland	516	feet
8	Within the area overlying a subsurface mine	No	(Y/N)
9	Within an unstable area (Karst Map)	Medium	Critical High Medium Low
10	Within a 100-year Floodplain	500	year
11	Soil Type	Simona -Bippus complex	
12	Ecological Classification	Shallow Sandy	
13	Geology	Qoa	
NMAC 19.15.29.12 E (Table 1) Closure Criteria		<50'	<50' 51-100' >100'

Eddy BD State #003



11/10/2022, 2:36:08 PM

- Override 1
- OSE District Boundary
- Site Boundaries
- GIS WATERS PODs
- Active
- Pending
- Subsurface Estate
- Both Estates



Esri, HERE, GeoTechnologies, Inc., Esri, HERE, Garmin, GeoTechnologies, Inc., U.S. Department of Energy Office of Legacy Management, Maxar



New Mexico Office of the State Engineer

Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)
 (quarters are smallest to largest) (NAD83 UTM in meters)

Well Tag	POD Number	Q64 Q16 Q4	Sec	Tws	Rng	X	Y
	CP 00551	1 1 1	33	20S	30E	595343	3600320*

Driller License: 46 **Driller Company:** ABBOTT BROTHERS COMPANY

Driller Name: ABBOTT, MURRELL

Drill Start Date: 09/19/1975 **Drill Finish Date:** 09/24/1975 **Plug Date:**

Log File Date: 09/26/1975 **PCW Rcv Date:** **Source:** Shallow

Pump Type: **Pipe Discharge Size:** **Estimated Yield:** 30 GPM

Casing Size: 6.63 **Depth Well:** 286 feet **Depth Water:** 187 feet

Water Bearing Stratifications:

Top	Bottom	Description
187	286	Sandstone/Gravel/Conglomerate

Casing Perforations:

Top	Bottom
226	286

*UTM location was derived from PLSS - see Help

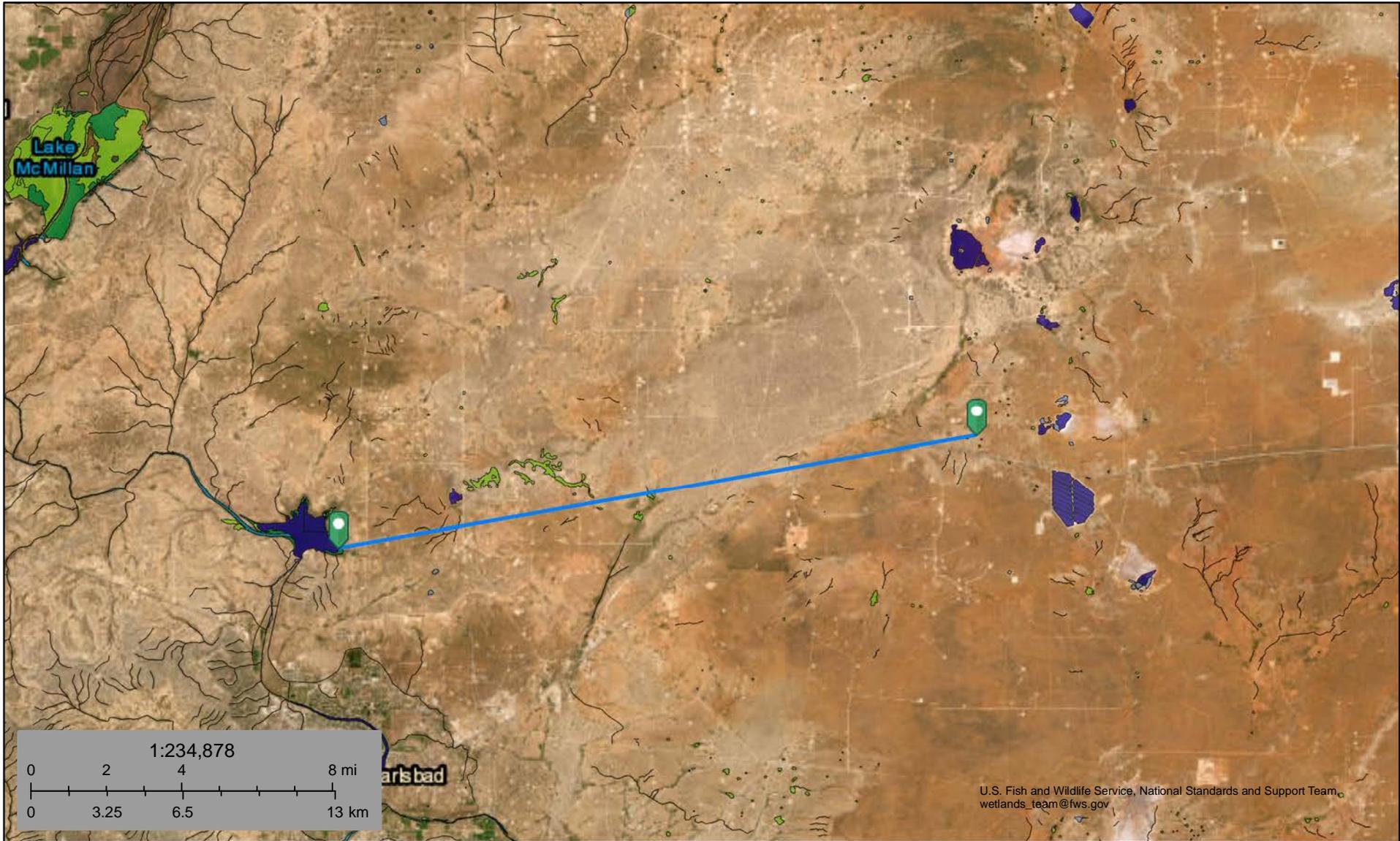
The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

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POINT OF DIVERSION SUMMARY



Eddy BD Start #003



November 10, 2022

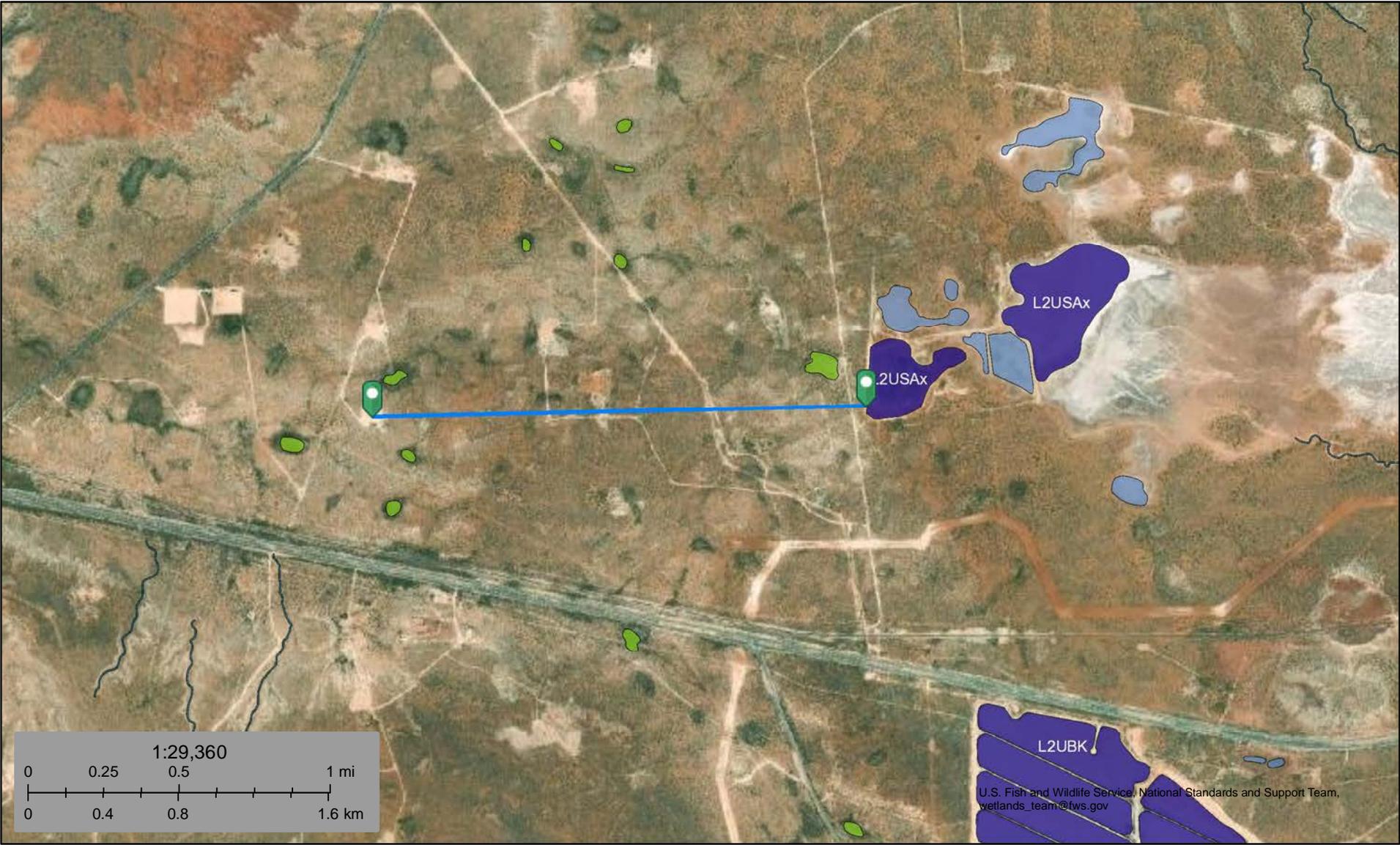
Wetlands

- Estuarine and Marine Deepwater
- Freshwater Emergent Wetland
- Lake
- Estuarine and Marine Wetland
- Freshwater Forested/Shrub Wetland
- Other
- Freshwater Pond
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.



Eddy BD State #003



U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov

November 10, 2022

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Eddy BD State #003

Nearest Residence: 0.56 miles (2,956 feet)

Legend

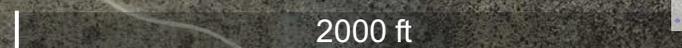
 Hudson 11 Federal #002

Eddy BD State #003 

Hobbs Hwy

62

180

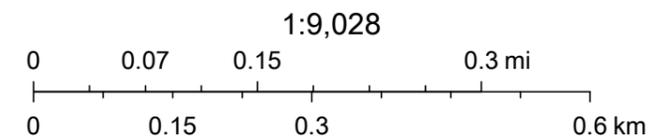


Eddy BD State #003



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- Override 1
- OSE District Boundary
- Both Estates
- SiteBoundaries
- Active
- Subsurface Estate



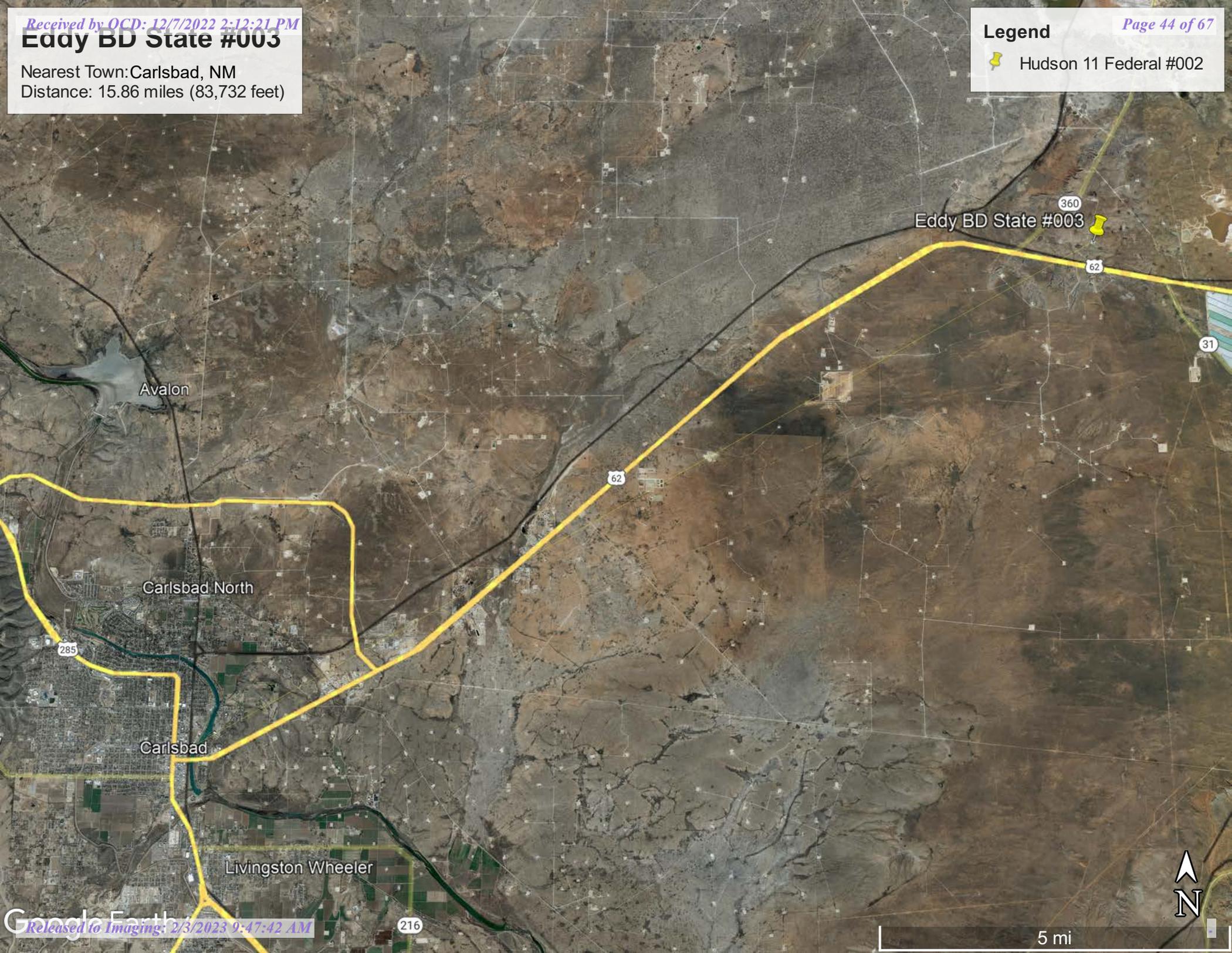
Esri, HERE, GeoTechnologies, Inc., Esri, HERE, Garmin, GeoTechnologies, Inc., U.S. Department of Energy Office of Legacy Management, Maxar

Eddy BD State #003

Nearest Town: Carlsbad, NM
Distance: 15.86 miles (83,732 feet)

Legend

-  Hudson 11 Federal #002



Eddy BD State #003 

Avalon

Carlsbad North

Carlsbad

Livingston Wheeler

285

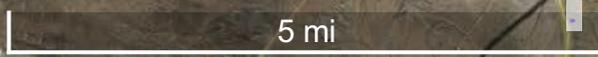
62

360

62

31

216





Eddy BD State #003



November 10, 2022

Wetlands

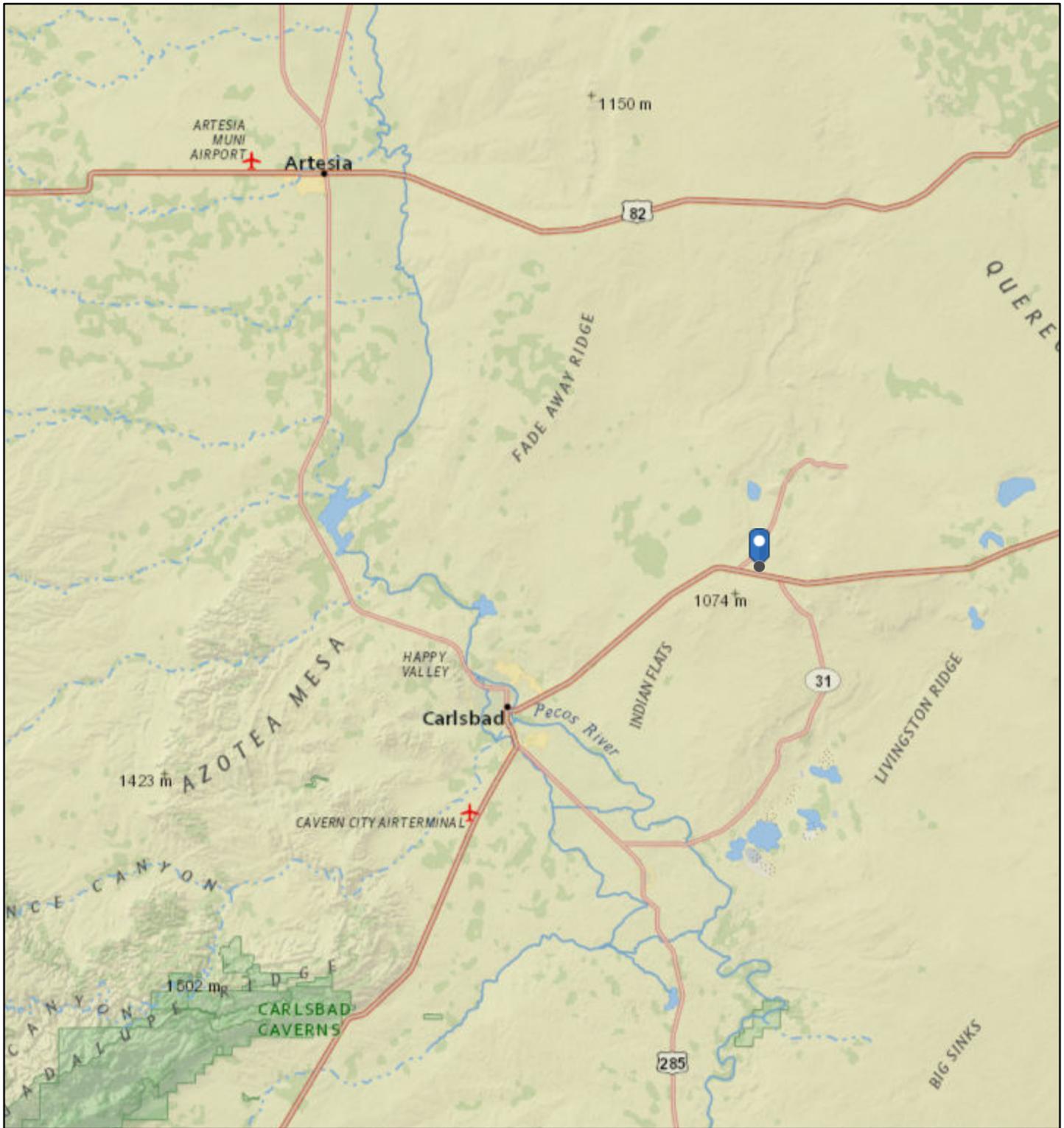
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

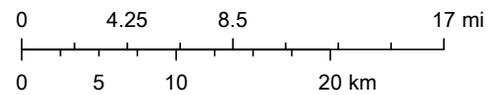
This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Eddy BD State #003



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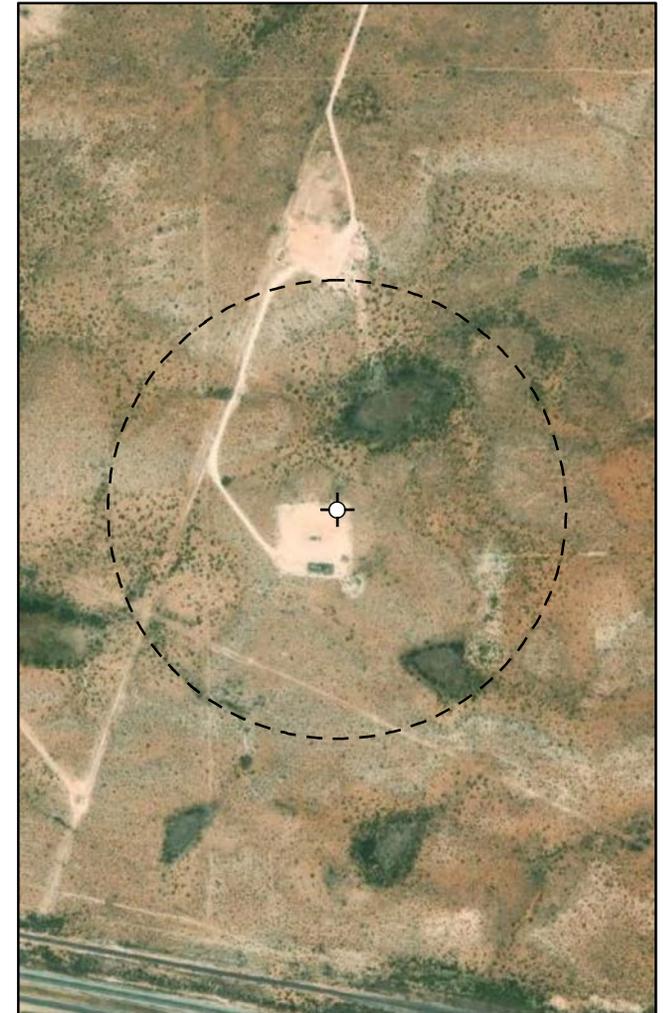
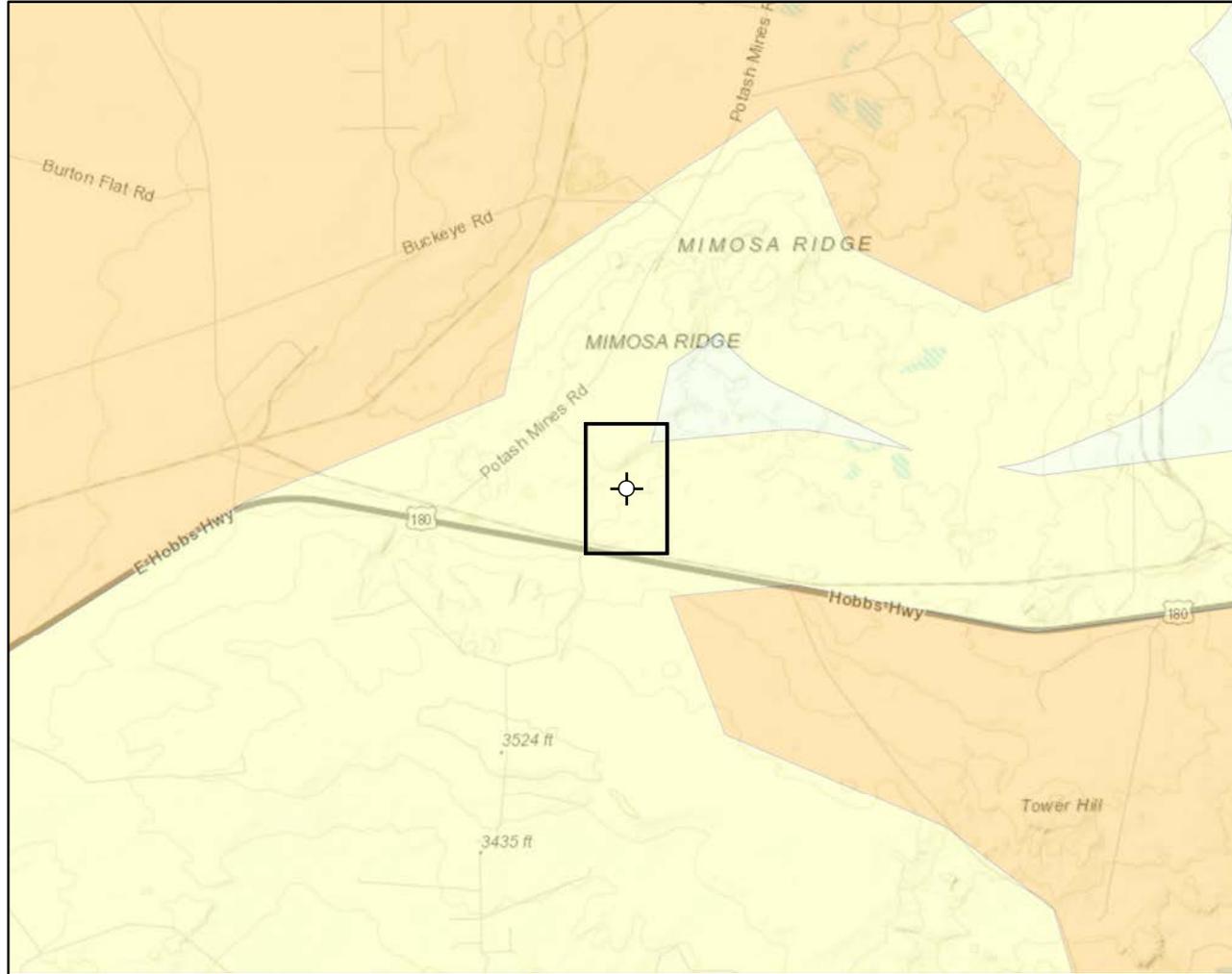
1:577,791



National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

EMNRD MMD GIS Coordinator

Document Path: \\vrs-fs01.corp.internatshared\VPS\04 - Geomatics\1-Projects\US PROJECTS\Manitor Resources\22E-03898\Figure 8 Karst Potential Schematic (22E-03898).mxd



Karst Potential

- Critical
- High
- Medium
- Low

- Site Location
- Site Buffer (1,000 ft.)

Overview Map

0 0.25 0.5 1 mi

Detail Map

0 150 300 600 ft.



Map Center:
Lat/Long: 32.532017, -103.991930

NAD 1983 UTM Zone 13N
Date: Nov 14/22



**Karst Potential Schematic
Eddy BD State #002**

FIGURE:

X



Geospatial data presented in this figure may be derived from external sources and Vertex does not assume any liability for inaccuracies. This figure is intended for reference use only and is not certified for legal, survey, or engineering purposes.

Note: Inset Map, ESRI 20XX; Overview Map: ESRI World Topographic. Karst potential data sourced from Roswell Field Office, Bureau of Land Management, 2020 or United States Department of the Interior, Bureau of Land Management. (2018). Karst Potential.

VERSATILITY. EXPERTISE.

National Flood Hazard Layer FIRMette



103°59'51"W 32°32'9"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

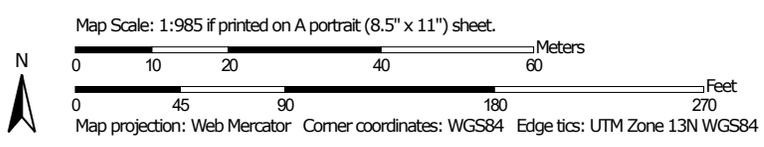
- | | | |
|-----------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPECIAL FLOOD HAZARD AREAS | | Without Base Flood Elevation (BFE)
<i>Zone A, V, A99</i> |
| | | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i> |
| | | Regulatory Floodway |
| OTHER AREAS OF FLOOD HAZARD | | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
| | | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i> |
| | | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i> |
| | | Area with Flood Risk due to Levee <i>Zone D</i> |
| OTHER AREAS | | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i> |
| | | Effective LOMRs |
| GENERAL STRUCTURES | | Area of Undetermined Flood Hazard <i>Zone D</i> |
| | | Channel, Culvert, or Storm Sewer |
| OTHER FEATURES | | Levee, Dike, or Floodwall |
| | | 20.2 Cross Sections with 1% Annual Chance |
| | | 17.5 Water Surface Elevation |
| | | Coastal Transect |
| | | Base Flood Elevation Line (BFE) |
| | | Limit of Study |
| | | Jurisdiction Boundary |
| | | Coastal Transect Baseline |
| | | Profile Baseline |
| | | Hydrographic Feature |
| MAP PANELS | | Digital Data Available |
| | | No Digital Data Available |
| | | Unmapped |
- The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.



Soil Map—Eddy Area, New Mexico



Soil Map may not be valid at this scale.



Soil Map—Eddy Area, New Mexico

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Eddy Area, New Mexico
 Survey Area Data: Version 18, Sep 8, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 7, 2020—May 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Soil Map—Eddy Area, New Mexico

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SM	Simona-Bippus complex, 0 to 5 percent slopes	4.3	100.0%
Totals for Area of Interest		4.3	100.0%

Map Unit Description: Simona-Bippus complex, 0 to 5 percent slopes---Eddy Area, New Mexico

Eddy Area, New Mexico

SM—Simona-Bippus complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1w5x
Elevation: 1,800 to 5,000 feet
Mean annual precipitation: 8 to 24 inches
Mean annual air temperature: 57 to 70 degrees F
Frost-free period: 180 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Simona and similar soils: 55 percent
Bippus and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Simona

Setting

Landform: Plains, alluvial fans
Landform position (three-dimensional): Rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Mixed alluvium and/or eolian sands

Typical profile

H1 - 0 to 19 inches: gravelly fine sandy loam
H2 - 19 to 23 inches: indurated

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D

Map Unit Description: Simona-Bippus complex, 0 to 5 percent slopes---Eddy Area, New Mexico

Ecological site: R070BD002NM - Shallow Sandy
Hydric soil rating: No

Description of Bippus

Setting

Landform: Flood plains, alluvial fans
Landform position (three-dimensional): Talf, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 37 inches: silty clay loam
H2 - 37 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R070BC017NM - Bottomland
Hydric soil rating: No

Minor Components

Simona

Percent of map unit: 8 percent
Ecological site: R070BD002NM - Shallow Sandy
Hydric soil rating: No

Bippus

Percent of map unit: 7 percent
Ecological site: R070BC017NM - Bottomland

Map Unit Description: Simona-Bippus complex, 0 to 5 percent slopes---Eddy Area, New Mexico

Hydric soil rating: No

Data Source Information

Soil Survey Area: Eddy Area, New Mexico
Survey Area Data: Version 18, Sep 8, 2022

Ecological site R070BD002NM Shallow Sandy

Accessed: 11/10/2022

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R070BD004NM	Sandy Sandy sites often occur in association or in a complex with Shallow Sandy Sites.
-------------	--------------------------------------------------------------------------------------------------

Similar sites

R070BD004NM	Sandy Sandy ecological sites are similar to Shallow Sandy sites in species composition and Transition pathways.
-------------	---------------------------------------------------------------------------------------------------------------------------

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on plains, alluvial fans, uplands, or fan piedmonts. The parent material consists of mixed loamy alluvium or eolian material derived from igneous and sedimentary bedrock. The petrocalcic layer is at a depth of 10 to 25 inches and undulating.

Slopes are nearly level to undulating, usually less than 9 percent. Elevations range from 2,842 to 4,500 feet.

Table 2. Representative physiographic features

Landforms	(1) Plain (2) Fan piedmont (3) Alluvial fan
Elevation	866–1,372 m
Slope	1–9%
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 8 to 13 inches. Variations of 5 inches, more or less, are common.

Over 80 percent of the precipitation falls from April through October. Most of the summer precipitation comes in the form of high intensity – short duration thunderstorms. Temperatures are characterized by distinct seasonal changes and large annual and diurnal temperature changes. The average annual temperature is 61 degrees with extremes of 25 degrees below zero in the winter to 112 degrees in the summer. The average frost-free season is from 207 to 220 days. The last killing frost is in late March or early April, and the first killing frost is in late October or early November. Temperature and rainfall both favor warm season perennial plant growth. In years of abundant spring moisture, annual forbs and cool season grasses can make up an important component of the site. The vegetation of this site can take advantage of the moisture and the time it falls. Because of the soil profile, little moisture can be stored in the soil for any length of time. Moisture is readily available to the plants from the time it falls. Strong winds from the southwest blow from January through June which rapidly dries out the soil profile during a critical period for plant growth.

Climate data was obtained from <http://www.wrcc.sage.dri.edu/summary/climsmnm.html> web site using 50% probability for freeze-free and frost-free seasons using 28.5 degrees F and 32.5 degrees F respectively.

Table 3. Representative climatic features

Frost-free period (average)	221 days
Freeze-free period (average)	240 days
Precipitation total (average)	330 mm

Influencing water features

This site is not influenced from water from wetlands or streams.

Soil features

Soils are very shallow to shallow, less than 20 inches in depth. Surface and subsurface textures are gravelly loamy sand, gravelly fine sandy loam or fine sandy loam.

An indurated calache layer occurs at depths of 6 to 25 inches and is at an average of 15 inches from the surface. Underlying material textures are very gravelly fine sandy loam, very gravelly sandy loam, gravelly fine sandy loam. Gravels are calcium carbonate concretions, calcium carbonate content ranges from 30 to 65 percent.

The indurated caliche layer typically holds water up in the profile for short periods within the root zone of plants. These soils will blow if left unprotected by vegetation.

Minimum and maximum values listed below represent the characteristic soils for this site.

Characteristic soils are:

- Simona
- Jerag

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Gravelly fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to moderately well drained
Permeability class	Moderately slow to moderate

Soil depth	18–61 cm
Surface fragment cover <=3"	5–25%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	2.54–5.08 cm
Calcium carbonate equivalent (0-101.6cm)	5–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	7.4–8
Subsurface fragment volume <=3" (Depth not specified)	5–25%
Subsurface fragment volume >3" (Depth not specified)	0%

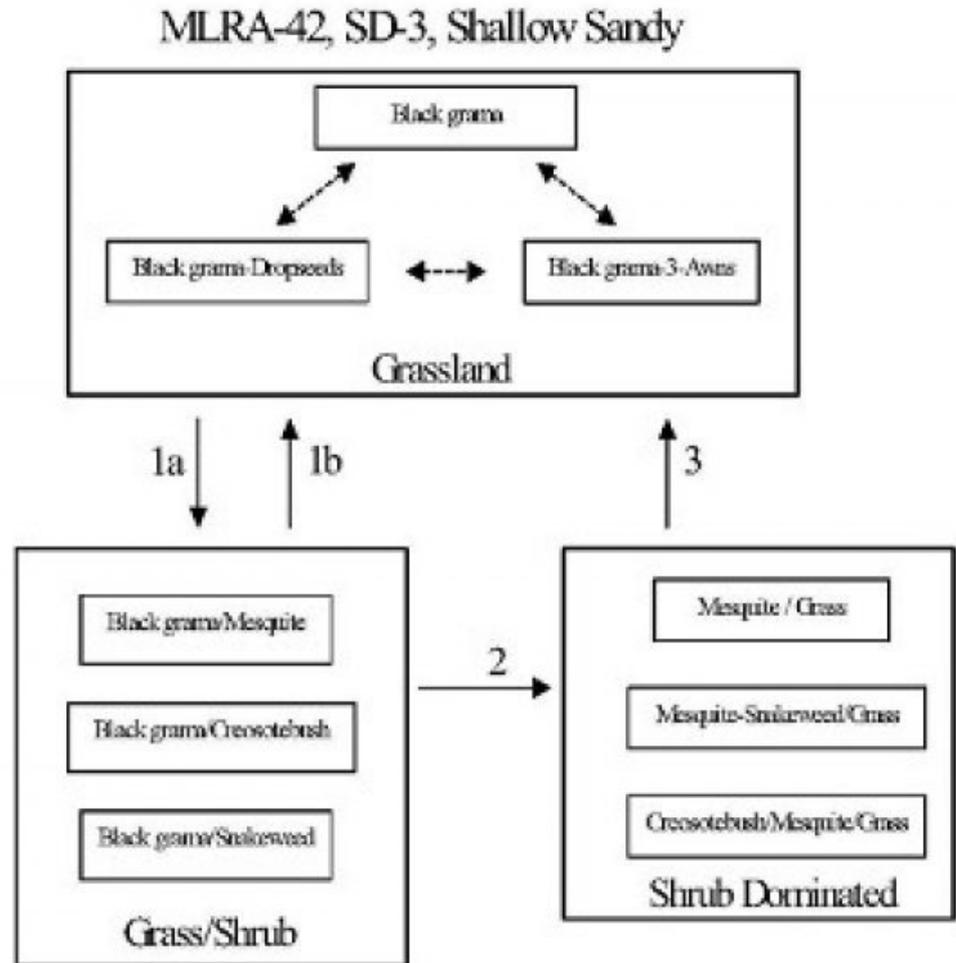
Ecological dynamics

Overview

The Shallow Sandy site occurs on upland plains, and tops of low ridges and mesas, associated with Sandy, Loamy Sand, and Shallow sites. Coarse to moderately coarse soil surface textures, shallow depth (<20 inches) to an indurated caliche layer (petrocalcic horizon), and an overwhelming dominance by black grama help to distinguish this site. The historic plant community of the Shallow Sandy site is a black grama dominated grassland sparsely dotted with shrubs. Shrubs, especially mesquite and creosotebush can increase or colonize due to the dispersal of shrub seeds by livestock or wildlife. This increase in mesquite and colonization of creosotebush may be enhanced by proximity to areas with existing high shrub densities. Fire suppression, and the loss of grass cover due to overgrazing or drought may facilitate the increase and encroachment of shrubs. Persistent loss of grass cover, competition for resources by shrubs, and periods of climate with increased winter precipitation and dry summers, may initiate the transition to a shrub-dominated state.

State and transition model

Plant Communities and Transitional Pathways (diagram)



- 1a. Seed dispersal, drought, overgrazing, fire suppression.
- 1b. Prescribed fire, brush control, prescribed grazing.
- 2. Persistent loss of grass cover, resource competition, increased winter precipitation.
- 3. Brush control, range seeding, prescribed grazing.

Figure 4.

**State 1
Historic Climax Plant Community**

**Community 1.1
Historic Climax Plant Community**

Grassland: This site responds well to management and is resistant to state change, due to the shallow depth to petrocalcic horizon and sandy surface textures. The sandy surface textures allow rapid water infiltration and the petrocalcic horizon helps to keep water perched and available to shallow rooted grasses. Black grama is the dominant species in the historic plant community, averaging 50 to 60 percent of the total production for this site. Bush muhly, blue grama, and dropseeds are present as sub-dominants. Typically, yucca, javalinabush, range

ratany, prickly pear, and mesquite are sparsely dotted across the landscape. Leatherweed croton, cutleaf happlopappus, wooly groundsel, and threadleaf groundsel are common forbs. Continuous heavy grazing or extended periods of drought will cause a loss of grass cover characterized by a decrease in black grama, bush muhly, blue and sideoats grama, plains bristlegrass, and Arizona cottontop. Dropseeds and or threeawns may increase and become sub-dominant to black grama. Continued loss of grass cover in conjunction with dispersal of shrub seeds and fire suppression is believed to cause the transition to a state with increased amounts of shrubs (Grass/Shrub state). Diagnosis: Black grama is the dominant grass species. Grass cover uniformly distributed. Shrubs are a minor component averaging only two to five percent canopy cover. Litter cover is high (40-50 percent of area), and litter movement is limited to smaller size class litter and short distances (< . 5m). Other grasses that could appear on this site would include: six-weeks grama, fluffgrass, false-buffalograss, hairy grama, little bluestem, bristle panicum, cane bluestem, Indian ricegrass, tridens spp., and red lovegrass. Other woody plants include: pricklypear, cholla, fourwing saltbush, catclaw mimosa, winterfat, American tarbush and mesquite. Other forbs include: globemallow, verbena, desert holly, senna, plains blackfoot, trailing fleabane, fiddleneck, deerstongue, wooly Indianwheat, and locoweed.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	531	731	930
Forb	87	120	152
Shrub/Vine	54	74	94
Total	672	925	1176

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	30-35%
Forb foliar cover	0%
Non-vascular plants	0%
Biological crusts	0%
Litter	40-50%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	15-25%

Figure 6. Plant community growth curve (percent production by month). NM2802, R042XC002NM-Shallow Sandy-HCPC. SD-3 Shallow Sandy - Warm season plant community.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	5	10	10	25	30	12	5	0	0

**State 2
Grass/Shrub**

**Community 2.1
Grass/Shrub**

Grass/Shrub: This state is characterized by the notable presence of shrubs, especially mesquite, broom

snakeweed, and/or creosotebush, however grasses remain as the dominant species. Black grama is the dominant grass species. Threeawns and or dropseeds are sub-dominant. The susceptibility of the Shallow Sandy site to shrub encroachment may be higher when located adjacent to other sites with high densities of mesquite or creosotebush. Retrogression within this site is characterized by decreases in grass cover and increasing densities of shrubs. Diagnosis: Black grama remains as the dominant grass species. Grass cover varies in response to the amount of shrub increase, ranging from uniform to patchy. Shrubs are found at increased densities relative to the grassland state, especially mesquite, creosotebush, or broom snakeweed. Transition to Grass/Shrub (1a) Historically fire may have kept mesquite and other shrubs in check by completely killing some species and disrupting seed production cycles and suppressing the establishment of shrub seedlings in others. Fire suppression combined with seed dispersal by livestock and wildlife is believed to be the factors responsible for the establishment and increase in shrubs. 1, 3 Loss of grass cover due to overgrazing, prolonged periods of drought, or their combination, reduces fire fuel loads and increases the susceptibility of the site to shrub establishment. Key indicators of approach to transition: Increase in the relative abundance of dropseeds and threeawns Presence of shrub seedlings Loss of organic matter—evidenced by an increase in physical soil crusts 8 Transition back to Grassland (1b) Brush control is necessary to initiate the transition back to the grassland state. If adequate fuel loads remain, possibly the reintroduction of fire as a management tool will assist in the transition back, however, mixed results have been observed concerning the effects of fire on black grama grasslands.6 Prescribed grazing will help ensure adequate rest following brush control and will assist in the establishment and maintenance of grass cover capable of sustaining fire.

**State 3
Shrub Dominated**

**Community 3.1
Shrub Dominated**

Shrub-Dominated: Across the range of soil types included in the Shallow Sandy site, mesquite is typically the dominant shrub, but it does occur as a co-dominant or sub-dominant species with creosotebush or broom snakeweed. Mesquite tends to dominate when the Shallow Sandy site occurs as part of a complex or in association with Sandy or Loamy Sand sites. Creosotebush tends to dominate on Shallow Sandy sites that occur as part of, or adjacent to Shallow Sites. Broom snakeweed increases in response to heavy grazing, but tends to cycle in and out depending on timing of rainfall. However, once the site is dominated by shrubs and snakeweed becomes well established, it tends to remain as a major component in the shrub dominated state. Diagnosis: Mesquite, creosotebush, or snakeweed cover is high, exceeding that of grasses. Grass cover is patchy with large connected bare areas present. Black grama, threeawns, or dropseeds may be the dominant grass. Evidence of accelerated wind erosion in the form of pedestalling of plants, and soil deposition around shrub bases may be common. Transition to Shrub-Dominated (2) Persistent loss of grass cover and the resulting increased competition between shrubs and remaining grasses for dwindling resources (especially soil moisture) may drive this transition.5 Additionally periods of increased winter precipitation may facilitate periodic episodes of shrub expansion and establishment. 4 Key indicators of approach to transition: Increase in size and frequency of bare patches. Loss of grass cover in shrub interspaces. Increased signs of erosion, evidenced by pedestalling of plants, and soil and litter deposition on leeward side of plants. 7 Transition back to Grassland (3) Brush control is necessary to reduce competition from shrubs and reestablish grasses. Range seeding may be necessary if insufficient grasses remain, The benefits, and costs, will vary depending upon the degree of site degradation, and adequate precipitation following seeding.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Warm Season			463–555	
	black grama	BOER4	<i>Bouteloua eriopoda</i>	463–555	–
2	Warm Season			46–93	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	46–93	–

3	Warm Season			46-93	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	46-93	-
4	Warm Season			28-46	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	28-46	-
5	Warm Season			46-93	
	spike dropseed	SPCO4	<i>Sporobolus contractus</i>	46-93	-
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	46-93	-
	mesa dropseed	SPFL2	<i>Sporobolus flexuosus</i>	46-93	-
6	Warm Season			19-46	
	threeawn	ARIST	<i>Aristida</i>	19-46	-
7	Warm Season			46-93	
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	46-93	-
	plains bristlegrass	SEVU2	<i>Setaria vulpiseta</i>	46-93	-
8	Warm Season			46-93	
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	46-93	-
	hooded windmill grass	CHCU2	<i>Chloris cucullata</i>	46-93	-
9	Other Perennial Grasses			28-46	
	Grass, perennial	2GP	<i>Grass, perennial</i>	28-46	-
Shrub/Vine					
10	Shrub			9-28	
	javelina bush	COER5	<i>Condalia ericoides</i>	9-28	-
11	Shrub			9-28	
	yucca	YUCCA	<i>Yucca</i>	9-28	-
12	Shrub			9-28	
	jointfir	EPHED	<i>Ephedra</i>	9-28	-
	littleleaf ratany	KRER	<i>Krameria erecta</i>	9-28	-
13	Shrub			9-28	
	featherplume	DAFO	<i>Dalea formosa</i>	9-28	-
14	Shrub			9-28	
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	9-28	-
15	Other Shrubs			28-46	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	28-46	-
Forb					
16	Forb			19-46	
	leatherweed	CRPOP	<i>Croton pottsii var. pottsii</i>	19-46	-
	Goodding's tansyaster	MAPIG2	<i>Machaeranthera pinnatifida ssp. gooddingii var. gooddingii</i>	19-46	-
17	Forb			19-46	
	woolly groundsel	PACA15	<i>Packera cana</i>	19-46	-
	threadleaf ragwort	SEFLF	<i>Senecio flaccidus var. flaccidus</i>	19-46	-
18	Forb			9-28	
	whitest evening primrose	OEAL	<i>Oenothera albicaulis</i>	9-28	-
19	Other Forbs			9-28	
	Forb (herbaceous, not grass	2FORB	<i>Forb (herbaceous, not grass nor grass-</i>	9-28	-

nor grass-like)

like)

Animal community

This site provides habitats which support a resident animal community that is characterized by pronghorn antelope, swift fox, black-tailed jackrabbit, spotted ground squirrel, Ord's kangaroo rat, northern grasshopper mouse, coyote, horned lark, meadowlark, lark bunting, scaled quail, morning dove, side-blotched lizard, round-tailed horned lizard, marbled whiptail, prairie rattlesnake and ornate box turtle.

Hydrological functions

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations
Soil Series Hydrologic Group
Jarag D
Simona D

Recreational uses

This site offers recreation for hiking, horseback riding, nature observation and photography, and quail and dove hunting. During years of abundant spring moisture, this site displays a riot of color from wildflowers during May and June. A few summer and fall flowers also occur.

Wood products

The natural potential plant community of this site affords little or no wood products. Where the site has been invaded by mesquite or cholla cactus the roots and stems of these plants provide attractive material for a variety of curiosities, such as lamps and small furniture.

Other products

This site is suitable for grazing by all kinds and classes of livestock during all seasons of the year. Because of the sandy textures and shallow profile, this site will respond rapidly to management. As this site deteriorates, plants such as black grama, bush muhly, blue and sideoats grama, plains bristlegrass and Arizona cottontop, will decrease and be replaced by plants such as threeawns, mesquite, creosote bush, and broom snakeweed. This also causes a decrease in ground cover, leaving the soil to blow. This site responds best to a system of management that rotates the season of use.

Other information

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month
Similarity Index Ac/AUM
100 - 76 2.5 – 3.5
75 – 51 3.2 – 4.6
50 – 26 4.5 – 7.5
25 – 0 7.6 +

Inventory data references

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Eddy County, Lea County, and Chaves County.

Other references

Literature References:

1. Brooks, M.L. and D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Pages 1–14 in K.E.M. Galley and T.P. Wilson (eds.). Proceedings of the Invasive Species Workshop: the Role of Fire in the Control and Spread of Invasive Species.
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Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

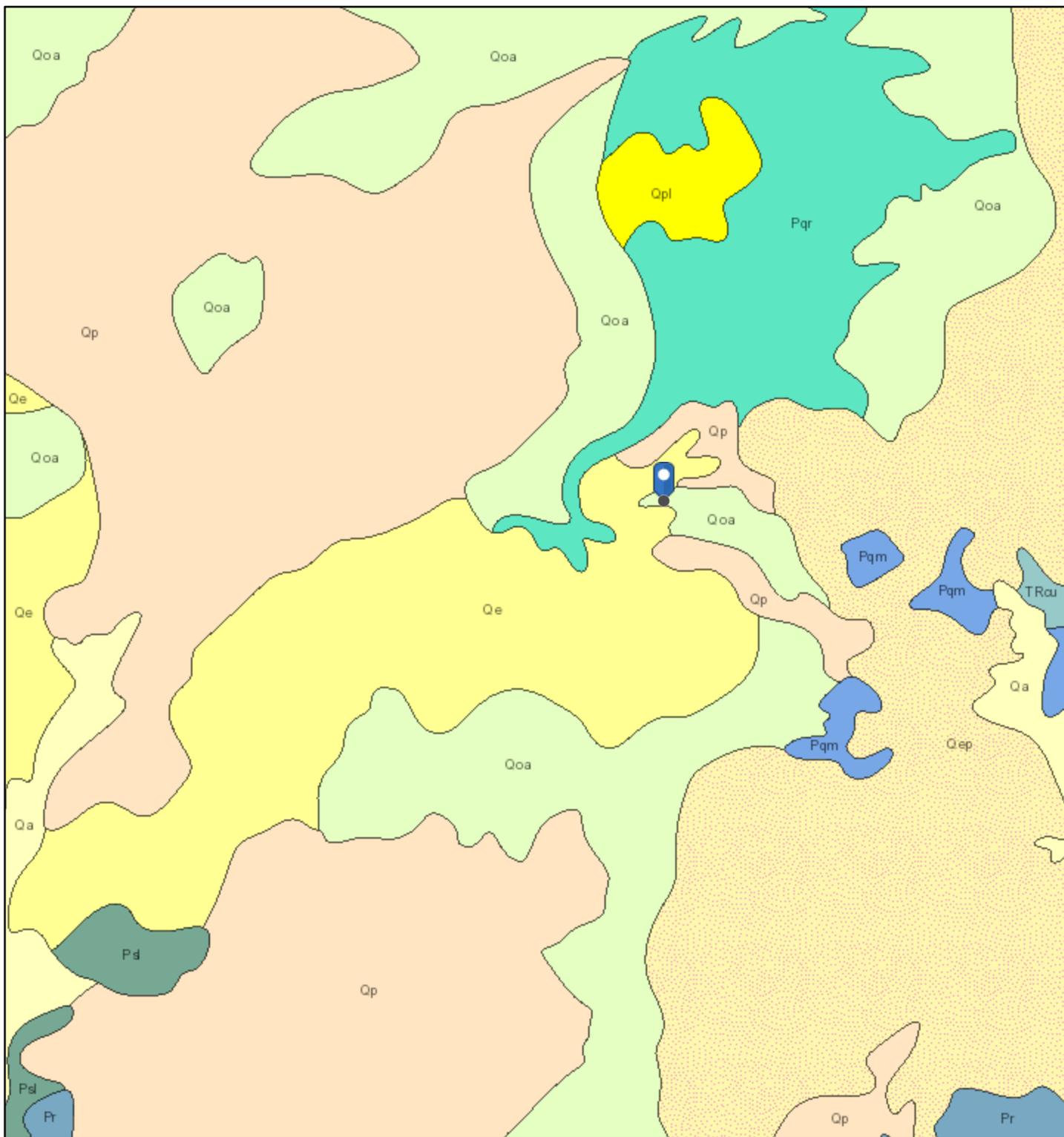
14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**

Eddy BD State #003

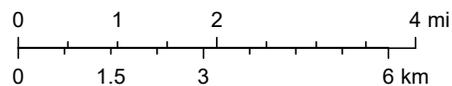


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Lithologic Units

- Playa—Alluvium and evaporite deposits (Holocene)
- Water—Perennial standing water
- Qa—Alluvium (Holocene to upper Pleistocene)



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodataslyreisen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover

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CONDITIONS
 Action 165012

CONDITIONS

Operator: MATADOR PRODUCTION COMPANY One Lincoln Centre Dallas, TX 75240	OGRID: 228937
	Action Number: 165012
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
amaxwell	None	2/3/2023