

1 Final
2 RCRA Facility Investigation
3 Phase 2 Work Plan
4 Parcel 23
5 Revision 1.0
6

7 Fort Wingate Depot Activity
8 McKinley County, New Mexico
9

10 November 27, 2024
11

12 Contract No. W912PP22D0014
13 Task Order No. W912PP23F0040
14

15 Prepared for:



16
17 **US Army Corps**
18 **of Engineers®**
19

20 United States Army Corps of Engineers
21 Albuquerque District
22 4101 Jefferson Plaza NE
23 Albuquerque, NM 87109-3435
24

25 Prepared by:
26



27
28 Amec Foster Wheeler Environment & Infrastructure, Inc.
29 4600 E. Washington Street, Ste. 600
30 Phoenix, Arizona 85034
31

32 Updated by:
33 Parsons
34 999 18th St., Suite 1555N
35 Denver, CO 80202

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
<p>The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of Information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p> <p>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</p>					
1. REPORT DATE (DD-MM-YYYY) 27-11-2024		2. REPORT TYPE RFI Phase 2 Work Plan		3. DATES COVERED (From – To) July 2015 – November 2024	
4. TITLE AND SUBTITLE Final RCRA Facility Investigation Phase 2 Work Plan Parcel 23 Fort Wingate Depot Activity McKinley County, New Mexico			5a. CONTRACT NUMBER W912PP22D0014		
			5b. GRANT NUMBER N/A		
			5c. PROGRAM ELEMENT NUMBER N/A		
			5d. PROJECT NUMBER N/A		
6. AUTHOR(S) Julie Hamilton/Amec Foster Wheeler Dr. Steve Rembish/Parsons Cortnie Krissman-Lewis/Parsons Jessica Hinger/Parsons			5e. TASK NUMBER W912PP23F0040		
			5d. WORK UNIT NUMBER N/A		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Amec Foster Wheeler Environment & Infrastructure, Inc. 4600 E. Washington Street, Ste 600 Phoenix, Arizona 85034 and Parsons Government Services, Inc. 999 18 th St., Suite 1555N Denver, CO 80202				8. PERFORMING ORGANIZATION REPORT NUMBER N/A	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Corps of Engineers, Albuquerque District 4101 Jefferson Plaza NE Albuquerque, NM 87109-3435 Project Manager: Alan Soicher, PG (CESPA)				10. SPONSOR/MONITOR'S ACRONYM(S) USACE	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) N/A	
12. DISTRIBUTION/AVAILABILITY STATEMENT Unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT This RCRA Facility Investigation Phase 2 Work Plan describes additional investigation activities within Parcel 23 at Fort Wingate Depot Activity, McKinley County, New Mexico. This document has been prepared for submission to the New Mexico Environment Department (NMED) Hazardous Waste Bureau (HWB), as required by Section VII.F.1 of the Resource Conservation and Recovery Act (RCRA) Permit, No. NM6213820974 and in response to an NMED Approval with Modifications dated 3 July 2019 for Final RCRA Facility Investigation Phase 2 Work Plan, Parcel 23.					
15. SUBJECT TERMS Fort Wingate Depot Activity, Phase 2 RFI Work Plan, Parcel 23.					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 184	19a. NAME OF RESPONSIBLE PERSON George Cushman
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (Include area code) (703) 455-3234



Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

**NEW MEXICO
ENVIRONMENT DEPARTMENT**

Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov



James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

July 3, 2019

Mark Patterson
BRAC Environmental Coordinator
Fort Wingate Depot Activity
13497 Elton Road
North Lima, OH 44452

Steve Smith
USACE
CESWF-PER-DD
819 Taylor Street, Room 3B06
Fort Worth, TX 76102

**RE: APPROVAL WITH MODIFICATIONS
FINAL RCRA FACILITY INVESTIGATION PHASE 2 WORK PLAN
PARCEL 23 REVISION 1.0
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA ID# NM6213820974
HWB-FWDA-18-004**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity (Permittee) *Final RCRA Facility Investigation Phase 2 Work Plan Parcel 23 Revision 1.0* (Work Plan), dated April 29, 2019. NMED has reviewed the Work Plan and hereby issues this Approval with Modifications. The Permittee must address the following comments.

1. Permittee's Response to NMED's Disapproval Comment 6

Permittee Statement: "If target analytes are detected in blank samples, the contractor will U qualify detected results from the associated field samples, at the higher of the detected concentration or the limit of detection, if the concentration detected in the sample is less than five times the concentration detected in the blank."

NMED Comment: The proposed protocol is too general to be applied for every instance. If the detected concentration in blank samples are five time higher than that of field samples,

collection of additional samples and associate QA/QC samples may be more appropriate to verify the occurrence of potential sample handling error (e.g., mislabeling). Provide criteria for collection of additional samples (e.g., frequency of detections, concentrations of constituents in blanks) to verify the occurrence of sampling errors. Revise the statement and provide a replacement page.

2. Permittee's Response to NMED's Disapproval Comment 15

Permittee Statement: "PAHs are the only COCs present in surficial soils that show low-level concentrations exceeding DAF 20 soil-to-groundwater SSLs over the length of the SWMU."

NMED Comment: According to Table 3-1, *Sample Locations and Analytes Exceeding 2019 Screening Levels – 1999 Sampling Effort*, and Table 3-2, *Sample Locations and Analytes Exceeding 2019 Screening Levels – 2000 Sampling Effort*, thallium and 2,4,6-trinitrotoluene concentrations exceeded the applicable screening levels. Therefore, metals and explosive compounds may be present on the surficial soils and are more mobile in water compared to PAHs. Nevertheless, the Permittee may use dilution attenuation factor (DAF) of 20 as default soil screening levels for the Phase 2 Investigation. Once the investigation is complete, reevaluate the appropriateness of the use of a DAF of 20 for the screening level.

3. Permittee's Response to NMED's Disapproval Comment 18

Permittee Statement: "The text (bullet item 2) was revised to strike the sentence: "SWMU 21 consists of two separate, non-contiguous areas that may be evaluated separately." Reference to non-contiguous areas in other sections was also removed, including section 5.1.5, 5.2.4, and Figure 5-1."

NMED Comment: Although the Permittee acknowledges that SWMU 21 is contiguous, the figures showing the SWMU boundaries (e.g., Figure 3-1) presents two separate boundaries. Revise all relevant figures and provide replacement figures.

The Permittee must address all comments in this Approval with Modifications and submit a response letter with revised figures and replacement pages as well as an electronic redline-strikeout version of the revised Work Plan showing all changes that have been made to the Work Plan no later than **September 16, 2019**. The Permittee must also include an electronic version of the final revised Work Plan with the response letter.

This approval is based on the information presented in the document as it relates to the objectives of the work identified by NMED at the time of review. Approval of this document does not constitute agreement with all information or every statement presented in the document.

Messrs. Patterson and Smith

July 3, 2019

Page 3

Should you have any questions, please contact Michiya Suzuki of my staff at (505) 476-6059.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
M. Suzuki, NMED HWB
C. Hendrickson, U.S. EPA Region 6
L. Rodgers, Navajo Nation
S. Begay-Platero, Navajo Nation
M. Harrington, Pueblo of Zuni
C. Seoutewa, Southwest Region BIA
G. Padilla, Navajo BIA
J. Wilson, BIA
B. Howerton, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2018 and Reading, Parcel 23

1 Final
2
3 RCRA Facility Investigation
4 Phase 2 Work Plan
5 Parcel 23
6 Revision 1.0

7
8 Fort Wingate Depot Activity
9 McKinley County, New Mexico
10

11 November 27, 2024

12
13 Contract No. W912PP22D0014
14 Task Order No. W912PP23F0040
15

16
17 Prepared for:
18 United States Army Corps of Engineers
19 Albuquerque District
20 4101 Jefferson Plaza NE
21 Albuquerque, NM 87109-3435
22

23
24 Prepared by:
25 Amec Foster Wheeler Environment & Infrastructure, Inc.
26 4600 E. Washington Street, Ste. 600
27 Phoenix, Arizona 85034
28

29 Updated by:
30 Parsons
31 999 18th St., Suite 1555N
32 Denver, CO 80202

1 **DOCUMENT CERTIFICATION**

2 **40 CFR 270.11**

3 **November 2024**

4 I certify under penalty of law that this document and all attachments were prepared under my
5 direction or supervision in accordance with a system designed to assure that qualified personnel
6 properly gather and evaluate the information submitted. Based on my inquiry of the person or
7 persons who manage the system, or those persons directly responsible for gathering the
8 information, the information submitted is, to the best of my knowledge and belief, true, accurate,
9 and complete. I am aware that there are significant penalties for submitting false information,
10 including the possibility of fine and imprisonment for knowing violations.

11 *George H. Cushman IV*

12 Mr. George H. Cushman IV
13 Base Realignment and Closure Division (BRAC), Environmental Coordinator
14 Fort Wingate Depot Activity, BRAC Operations Branch
15 DCS G-9, Environmental Division

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

PREFACE

This Resource Conservation and Recovery Act Facility Investigation Phase 2 Work Plan describes the supplemental field activities that will be conducted within Parcel 23 at Fort Wingate Depot Activity (FWDA), New Mexico.

This Work Plan (Revision 1.0) was prepared by Amec Foster Wheeler Environment & Infrastructure, Inc. on July 24, 2018 and revised in response to New Mexico Environment Department (NMED) disapproval letter dated October 31, 2018. The Work Plan was updated by Parsons on September 20, 2024 in response to the NMED approval with modifications letter dated July 3, 2019. Mr. George H. Cushman IV served as the FWDA Defense Base Realignment and Closure Environmental Coordinator and Mr. Alan Soicher served as the USACE Project Manager.

Carrie Ross

Carrie Ross
Project Manager

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

1

DOCUMENT DISTRIBUTION LIST

Organization (Name)	Number of Printed Copies	Number of Electronic Copies
JohnDavid Nance (NMED HWB)	2	2
Neelam Dhawan (NMED HWB)	with Nance	with Nance
Michiya Suzuki (NMED HWB)	with Nance	with Nance
Dale Thrush (USEPA Region 6)	0	1
FWDA Admin Record (NM)	1	1
Cheryl Frischkorn (BRACD)	0	1
Alan Soicher, USACE Albuquerque District	0	1
Behnaum Moayyad, USACE Albuquerque District	0	1
Sharlene Begay- Platero (NN)	1	7
Kelly Noble, Zuni Tribe	1	8
Lovena Epaloose (BIA Zuni)	1	1
George Padilla (BIA-NR)	1	2
Administrative Record, OH	1	1
Totals	8	26

BIA Zuni - Bureau of Indian Affairs – Zuni Representative
 BIA-NR - Bureau of Indian Affairs – Navajo Representative
 BRACD – (U. S. Army) Base Realignment and Closure Division
 NM - New Mexico
 NMED HWB - New Mexico Environment Department Hazardous Waste Bureau
 NN - Navajo Nation
 OH - Ohio
 USACE - U. S. Army Corps of Engineers
 USEPA - United States Environmental Protection Agency

2

TABLE OF CONTENTS

Section	Page
DOCUMENT CERTIFICATION.....	i
PREFACE	iii
DOCUMENT DISTRIBUTION LIST	v
LIST OF ACRONYMS AND ABBREVIATIONS	xi
SECTION 1.0 INTRODUCTION.....	1-1
1.1 Purpose and Scope	1-1
1.2 Background Information.....	1-1
1.3 Cultural Resources	1-4
SECTION 2.0 DESCRIPTION OF INVESTIGATION ACTIVITIES.....	2-1
2.1 Site Safety and Awareness.....	2-1
2.2 Sampling and Analysis	2-1
2.2.1 Subsurface Soil Sampling	2-1
2.2.2 Groundwater Sampling.....	2-2
2.3 Quality Control.....	2-2
2.3.1 Field and Laboratory Quality Control Samples.....	2-3
2.3.2 Data Precision, Accuracy, Representativeness, Comparability and Completeness.....	2-5
2.3.3 Data Verification and Data Review Procedures	2-7
2.3.4 Data Assessment	2-8
2.4 Chain-of-Custody.....	2-8
2.5 Packaging and Shipping Procedures.....	2-8
2.6 Sample Documentation	2-8
2.7 Field Instrument Calibration.....	2-9
2.8 Survey of Sample Locations	2-9
2.9 Sample Identification	2-9
2.10 Investigation-Derived Waste.....	2-10
SECTION 3.0 SOIL SAMPLING AND ANALYSIS AT SWMU 21 – CENTRAL LANDFILL	3-1
3.1 Borings in Areas of Previous Exceedances.....	3-1
3.2 Borings to Characterize the Backfill Material	3-1
3.3 Borings to Assess Arroyo	3-2
3.4 Thickness and Extent of Backfill Material	3-2
SECTION 4.0 GROUNDWATER INVESTIGATION AT SWMU 21 – CENTRAL LANDFILL	4-1
SECTION 5.0 POST-IMPLEMENTATION REPORTING	5-1
5.1 Human Health Risk Evaluation	5-1
5.1.1 NMED Target Risk Thresholds.....	5-1
5.1.2 Selection of Screening Levels	5-1
5.1.3 Identification of COPCs	5-4
5.1.4 Preliminary Exposure Pathway Evaluation.....	5-4
5.1.5 Conceptual Site Model	5-5
5.1.6 Risk Evaluation Approach	5-7
5.2 Ecological Risk Evaluation.....	5-13
5.2.1 Define NMED Target Risk Thresholds	5-14

1	5.2.2	Selection of Screening Levels	5-14
2	5.2.3	Selection of COPEC	5-14
3	5.2.4	Exposure Pathway Evaluation.....	5-14
4	5.2.5	Conceptual Site Model	5-14
5	5.2.6	Risk Evaluation Approach	5-15
6	5.2.7	Uncertainty Discussion	5-17
7	SECTION 6.0 SCHEDULE		6-1
8	SECTION 7.0 REFERENCES		7-1

LIST OF TABLES

Table 2-1	Summary of Analytical Methods, Sample Containers, Preservation, and Holding Times	2-T1
Table 2-2	Quality Control Samples for Precision and Accuracy	2-T2
Table 2-3	Comparison of Human Health Soil Screening Levels to Laboratory Quantitation Limits.....	2-T5
Table 2-4	Comparison of Human Health Groundwater Screening Levels to Laboratory Quantitation Limits.....	2-T9
Table 2-5	Comparison of Ecological Soil Screening Levels to Laboratory Quantitation Limits	2-T15
Table 2-6	Data Validation Flags	2-T21
Table 3-1	Sample Locations and Analytes Exceeding 2019 Screening Levels – 1999 Sampling Effort.....	3-T1
Table 3-2	Sample Locations and Analytes Exceeding 2019 Screening Levels – 2000 Sampling Effort.....	3-T1
Table 3-3	Sample Locations and Analytes Exceeding 2019 Screening Levels – 2011 Sampling Effort.....	3-T1
Table 3-4	Summary of Samples to be Collected from Soil Borings at SWMU 21 – Central Landfill	3-T3

LIST OF FIGURES

Figure 1-1	Facility Location Map.....	1-F1
Figure 1-2	Parcel Map	1-F2
Figure 1-3	Site Location Map, SWMU 21 - Central Landfill and AOC 73 - Former Buildings or Structures Along Road C-3.....	1-F3
Figure 3-1	Previous Sample Locations with Analytes Exceeding 2019 NMED SSLs.....	3-F1
Figure 3-2	Proposed Phase 2 Soil Boring Locations	3-F2
Figure 4-1	Proposed Boring/Temporary Well Locations	4-F1
Figure 5-1	SWMU 21 - Conceptual Site Model for Human Receptors.....	5-F1
Figure 5-2	SWMU 21 - Conceptual Site Model for Ecological Receptors.....	5-F2

LIST OF APPENDICES

Appendix A	Correspondence with NMED
------------	--------------------------

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

LIST OF ACRONYMS AND ABBREVIATIONS

1		
2	°C	Degrees Centigrade
3	%	Percent
4	§	Section
5		
6	AOC	Area of Concern
7	Army	United States Department of the Army
8	atm-m ³ /mol	Atmospheres – cubic meter (s) per mole
9	AUF	Area use factor
10	AwM	Approval with Modifications
11		
12	bgs	Below ground surface
13		
14	CFR	Code of Federal Regulations
15	CLS	Claystone
16	COC	Chain-of-custody
17	COPC	Chemical of potential concern
18	COPEC	Chemical of potential ecological concern
19	CSM	Conceptual site model
20		
21	DAF	Dilution attenuation factor
22	DoD	Department of Defense
23	DRO	Diesel range organics
24		
25	EC	Effect concentration
26	EDD	Electronic data deliverable
27	EPC	Exposure point concentration
28	ESL	Ecological Screening Level
29		
30	FWDA	Fort Wingate Depot Activity
31		
32	g/mol	Grams per mole
33	GIS	Geographic information system
34	GPS	Global Positioning System
35		
36	HASP	Health and Safety Plan
37	HCl	Hydrochloric acid
38	Hg	Mercury
39	HI	Hazard Index
40	HNO ₃	Nitric acid
41	HQ	Hazard quotient
42	HSA	Hollow stem auger
43	HWB	Hazardous Waste Bureau
44		

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

1		
2	ID	Identification
3	IDW	Investigation-derived waste
4		
5	L	Liter
6	LCS	Laboratory Control Sample
7	LOAEL	Lowest observed adverse effect level
8	LOD	Limit of detection
9	LOQ	Limit of quantitation
10		
11	MCL	Maximum contaminant level
12	mg/kg	Milligrams per kilogram
13	mL	Milliliter
14	MS	Matrix spike
15	MSD	Matrix spike duplicate
16		
17	NMAC	New Mexico Administrative Code
18	NMED	New Mexico Environment Department
19	NMOSE	New Mexico Office of the State Engineer
20	NOAEL	No observed adverse effect level
21	NOD	Notice of Disapproval
22		
23	Oz	Ounce
24		
25	PPE	Personal protective equipment
26	Permit	Resource Conservation and Recovery Act Permit NM 6213820974 for the Fort
27		Wingate Depot Activity
28		
29	QA	Quality assurance
30	QC	Quality control
31	QSM	Quality Systems Manual
32		
33	RCRA	Resource Conservation and Recovery Act
34	RFI	RCRA Facility Investigation
35	RPD	Relative percent difference
36	RSL	Regional screening level
37		
38	SDG	Sample delivery group
39	SEDD	Staged Electronic Data Deliverables
40	Shaw	Shaw Environmental, Inc.
41	SLERA	Screening level ecological risk assessment
42	SLHQ	Screening level hazard quotient
43	SSL	Soil Screening Level
44	SSO	Site Safety Officer

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

1		
2	SVOC	Semi-volatile organic compound
3	SWMU	Solid Waste Management Unit
4	TAL	Target analyte list
5	TPH	Total petroleum hydrocarbons
6	TRV	Toxicity reference values
7		
8	UCL	Upper confidence limit
9	USACE	United States Army Corps of Engineers
10	USEPA	United States Environmental Protection Agency
11	USGS	United States Geological Survey
12	UTL	upper tolerance limit
13		
14	VI	Vapor intrusion
15	VISL	Vapor intrusion screening level
16	VOA	Volatile organic analysis
17	VOC	Volatile organic compound
18		
19	WQCC	New Mexico Water Quality Control Commission

1

2

[THIS PAGE INTENTIONALLY LEFT BLANK]

SECTION 1.0 INTRODUCTION

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Phase 2 Work Plan describes the additional investigation activities to be completed within Parcel 23 at Fort Wingate Depot Activity (FWDA), McKinley County, New Mexico (see **Figures 1-1** and **1-2**).

This RFI Phase 2 Work Plan has been prepared by the United States Army Corps of Engineers (USACE) Fort Worth District for submission to the New Mexico Environment Department's (NMED) Hazardous Waste Bureau (HWB), as required by Section VII.H.1.a of the RCRA Permit (hereinafter referred to as "Permit"; NM 6213820974) for the FWDA, which became effective December 31, 2005 and was most recently modified in February 2015 (NMED, 2015a).

Revision 1.0 of this work plan was submitted on April 29, 2019, and addressed NMED comments provided in a disapproval letter dated October 31, 2018. A copy of the disapproval letter along with the Army's response letter is included in Appendix A. NMED approved Revision 1.0 of the Phase 2 RFI Work Plan in an Approval with Modifications (AwM) letter dated July 3, 2019. This work plan has been updated to 1) address NMED comments in the AwM letter dated July 3, 2019 and 2) to update material that was no longer in compliance with the most recent NMED guidance. A copy of the Army's response letter to the AwM letter dated July 3, 2019 is included in Appendix A.

1.1 Purpose and Scope

The purpose of this RFI Phase 2 Work Plan is to propose additional investigation at select areas within Parcel 23 as recommended by the United States Department of the Army (Army) in the *RCRA Facility Investigation Report, Parcel 23, Revision 1.0, Fort Wingate Depot Activity*, hereafter referred to as the RFI Report, as prepared by the United States Geological Survey (USGS; 2015). This RFI Phase 2 Work Plan also addresses NMED comments related to the RFI Report as presented in the Notice of Disapproval (NOD) dated August 19, 2014 (NMED, 2014) and the AwM dated August 12, 2015 (NMED, 2015b). The additional sampling has been recommended to fill data gaps identified by previous investigations and reviews of previous investigations in order to better characterize the nature and extent of contamination.

1.2 Background Information

The Permit lists one Solid Waste Management Unit (SWMU) and one Area of Concern (AOC) within Parcel 23, as follows:

- SWMU 21 – Central Landfill;
- AOC 73 – Former buildings or structures along Road C-3.

The locations of SWMU 21 and AOC 73 are illustrated in **Figure 1-3**. Complete background information regarding FWDA and Parcel 23 is provided in numerous documents previously submitted to NMED, including the following:

- Final Historical Information Report, Parcel 23, Fort Wingate Depot Activity (CH2M Hill, 2009);
- Final – NMED Revision, RCRA Facility Investigation Work Plan, Parcel 23, Fort Wingate Depot Activity (hereafter referred to as the “RFI Work Plan”, CH2M Hill, 2010); and
- RFI Report (USGS, 2015).

RFI activities were detailed in the RFI Report submitted to NMED in April 2012. NMED responded to submittal of the RFI Report with a NOD in August 2014 (NMED, 2014). The RFI Report was revised based on the NOD comments and submitted as Revision 1.0 in February 2015 (USGS, 2015). An AwM was received from NMED in August of 2015 (NMED, 2015b).

The investigation activities described in this RFI Phase 2 Work Plan have been developed to address the Army recommendations contained in the RFI Report and comments from NMED in the AwM. The AwM also requires that Army address all comments within the NOD, specifically those comments referencing future actions through the development of a RFI Phase 2 Work Plan. For reference, the following documents are included in **Appendix A**:

- NMED NOD Letter - August 19, 2014
- Army Response to NOD - February 28, 2015
- NMED AwM - August 12, 2015
- Correspondence between NMED and Army regarding downgradient well location – April/May 2018

Appendix A also includes the following documents:

- NMED Work Plan Extension Request Approval Letters – December 22, 2015, January 19, 2016, December 1, 2016, December 6, 2017
- NMED Work Plan NOD Letter – October 31, 2018
- Army Response to NOD Letter – March 30, 2019
- NMED AwM of Final RCRA Facility Investigation Phase 2 Work Plan, Parcel 23, Revision 1.0, Fort Wingate Depot Activity, McKinley County, New Mexico, - July 3, 2019
- Army Response to NMED AwM – November 27, 2024

The following summarizes how this work plan addresses the October 31, 2018 NOD comments that were not already addressed as part of the revised RFI Report:

- **Comments 4 and 10:** NMED requested clarification of the excavation boundaries and the details of the additional landfill cell.

In 1999, all waste and visibly impacted soil below the former Central Landfill was removed and disposed of at an offsite disposal facility (SCIENTECH, 1999a). An additional cell to

1 the south of the original Central Landfill boundary was discovered during the excavation
2 and its contents were also excavated (SCIENTECH, 1999b).

3 The actual excavation boundaries for the new cell are not documented; however, the
4 Release Assessment Report (Tetra Tech NUS, 2000) describes the samples being taken
5 along the center line of the former excavation.

6 The additional area is illustrated as SWMU 21 as depicted in **Figure 1-3** and is planned
7 to be added to SWMU 21 as part of a future permit action.

- 8 • **Comment 6:** NMED requested additional investigation within the arroyo to assess
9 potential impact from surface water run off or leachate migration.

10 Proposed additional sample locations have been added to the north of the excavation area
11 within the arroyo as described in Section 3.0.

- 12 • **Comment 9:** NMED requested additional information with respect to the backfill material
13 used for landfill closure.

14 Previous reports suggested that clean fill material was utilized for backfill; however, soil
15 sample results collected after the backfill and grading activities indicated exceedances of
16 semi-volatile organics (SVOCs) and metal. The revised RFI Report suggests that
17 observed impacts may be the result of runoff from the adjacent coal burning boiler plant
18 (Building 535).

19 Sampling of the fill material is proposed as described in Section 3.0.

- 20 • **Comments 11 and 12:** NMED has requested a groundwater investigation to evaluate
21 potential impacts associated with the former landfill.

22 The proposed investigation activities are described in Section 4.0.

- 23 • **Comment 15:** NMED has requested three additional soil borings related to the
24 exceedance at soil boring SB08 as described in the RFI Report.

25 The proposed borings are described in Section 3.0.

26 The August 12, 2015 AwM included five comments. Two of these comments were substantive
27 comments pertaining to further investigation activities. The following addresses how each of the
28 comments have been addressed within this work plan:

- 29 • **AwM Comment 4:** This comment provides an additional clarification to Comments 9 and
30 15 of the NOD. NMED agrees with the proposed approach for the three additional borings
31 but requests that samples be taken in the upper portion of the boring to characterize the
32 backfill material. It further requests a site survey.

33 The proposed boring and site survey are described in Section 3.0.

- 34 • **AwM Comment 5:** The RFI Report recommended no further action for AOC 73. This
35 recommendation was made after comparison of the arsenic concentration of 4.1 mg/kg,
36 detected at a single sample location, to the site-specific background concentration of 7.07

1 mg/kg for arsenic. In the AwM, NMED concurred with this recommendation pending an
2 evaluation of the data collected for a soil background study based on incremental samples.

3 The background study based upon incremental samples is no longer relevant. The arsenic
4 concentration detected at AOC 73 is below the 2019 NMED Residential SSL of 7.07 mg/kg
5 (NMED, 2019). As such, the Army considers Comment 5 of the AwM satisfied and no
6 further actions are necessary for AOC 73.

- 7 • **AwM Comments 1, and 3:** These comments pertain to the request for a Phase 2 Work
8 Plan, in accordance with current NMED guidance, that must address both the AwM
9 Comments (NMED, 2015b) and NMED's NOD (NMED, 2014).
- 10 • **AwM Comment 2:** This comment states that future response letters to disapproval letters
11 contain additional detail including a cross-reference to changes within the document.

12 The July 3, 2019 AwM included three comments. Two of these comments requested additional
13 clarification and one comment requested figure revisions. The following addresses how each of
14 the comments have been addressed within this work plan:

- 15 • **Comment 1:** NMED requested clarification regarding how method blank contamination
16 will be addressed. Section 2.3.1.1 was revised accordingly.
 - 17 • **Comment 2:** NMED requested that the appropriateness of the use of a dilution attenuation
18 factor (DAF) of 20 for the soil screening levels be reevaluated once the investigation is
19 complete. The Phase 2 RFI Report risk assessment will include this evaluation. Sections
20 5.1.2 (f) and 5.1.6.5 were revised accordingly.
 - 21 • **Comment 3:** NMED requested figures be revised to show the SWMU 21 boundaries as
22 one contiguous area instead of the previous two non-contiguous areas of SWMU 21 and
23 the additional landfill cell.
- 24 Figures 1-3, 3-1, 3-2, and 4-1 have been revised to show proposed SWMU 21 boundary
25 revision, which will be formally added revised in a future permit modification.

26 In accordance with the current NMED Risk Assessment Guidance for Site Investigation and
27 Remediation, dated November 2022, soil screening criteria have been updated since the RFI
28 Phase 2 Work Plan Revision 1.0 was approved in 2019. In addition, United States Environmental
29 Protection Agency (USEPA) Regional Screening Levels (RSLs) are updated regularly. The most
30 current RSLs are May 2024. The most current screening levels are shown in Tables 2-3 through
31 2-5. Applicable sections of the Work Plan have been revised, including Sections 2.3.2, 5.0, and
32 7.0 (References).

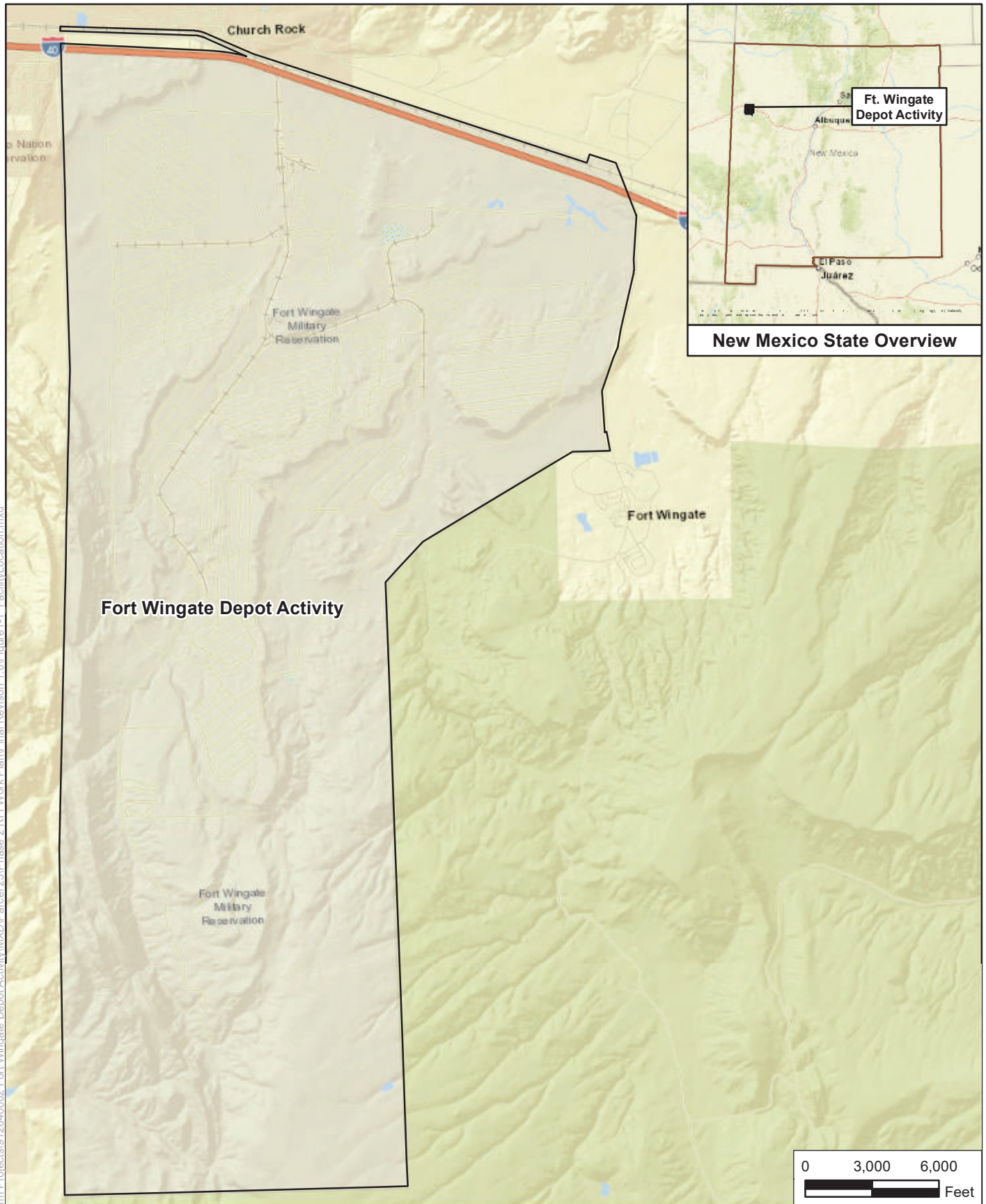
33 **1.3 Cultural Resources**

34 Previous sampling was undertaken within Parcel 23 in 2010 and at that time, the Army
35 coordinated with the Navajo Nation and the Pueblo of Zuni to determine if there were any cultural
36 resource concerns associated with the sampling.

1 In response to the current proposed sampling within Parcel 23, a current review of the geographic
2 information system (GIS) shape files of locations of archaeological sites recorded at FWDA
3 determined that numerous archaeological sites have been recorded within this parcel. No
4 archaeological sites recorded at FWDA are located within the horizontal footprint of SWMU 21.
5 Should any sites outside of SWMU 21 show potential to be impacted by site related activities,
6 these will be flagged and avoided during field work. Pursuant to the 2008 Programmatic
7 Agreement for Cultural Resources on FWDA, avoidance is the first choice of RCRA Permit
8 activities. As such, these archaeological sites will be temporarily flagged for avoidance during
9 sampling within SWMU 21.

1

[THIS PAGE INTENTIONALLY LEFT BLANK]



Job No.: 912640002
PM: JH
Date: 3/19/2019
Scale: 1" = 6000 feet



Final RFI Phase 2 Work Plan, Revision 1.0
Parcel 23 - Fort Wingate Depot Activity
McKinley County, New Mexico

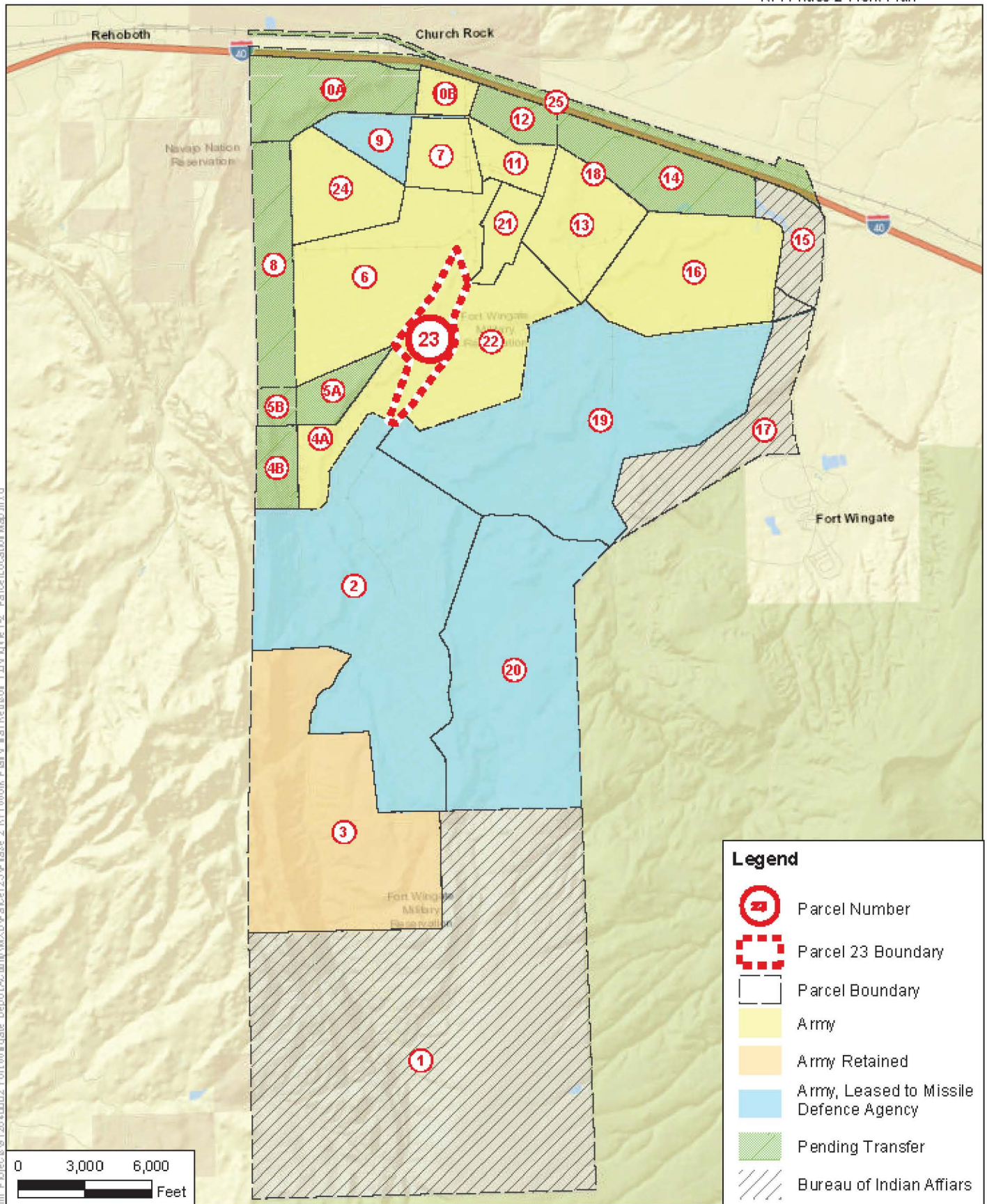
The map shown here has been created with all due and reasonable care and is strictly for use with Amec Foster Wheeler Project Number 912640002. This map has not been certified by a licensed land surveyor, and any third party use of this map comes without warranties of any kind. Amec Foster Wheeler assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.

Facility Location Map

FIGURE
1-1



Path: X:\Projects\20-Longterm Projects\912640002 Fort Wingate Depot Activity\MXD\Parcel 23\Phase 2 RFI Work Plan\Final Revision 1.0\Figure 1-1 Facility Location.mxd



Parcel Map

FIGURE
1-2



1

[THIS PAGE INTENTIONALLY LEFT BLANK]

SECTION 2.0 DESCRIPTION OF INVESTIGATION ACTIVITIES

This section provides general information regarding the planned field activities to be completed as part of this RFI Phase 2 Work Plan. Information related to specific sample locations within SWMU 21 is presented in Sections 3.0 and 4.0.

2.1 Site Safety and Awareness

All work will be accomplished in accordance with Army safety measures. A project-specific Health and Safety Plan (HASP) has been developed for sampling activities at FWDA. The HASP defines the roles and responsibilities of site personnel, establishes proper levels of personal protective equipment (PPE), and describes emergency response and contingency procedures. The associated Activity Hazard Analyses define hazards associated with each type of work activity and how those hazards will be mitigated. The HASP will be reviewed by site personnel prior to performing any site work. In addition, task-specific Activity Hazard Analyses will be reviewed before any new tasks are performed and periodically during daily tailgate safety meetings.

All work will be completed by a supervisor, operators, and technicians that have successfully completed 40-hour Hazardous Waste Operations and Emergency Response training in accordance with 29 *U.S. Code of Federal Regulations* 1910.120. A dedicated Site Safety Officer (SSO) will be on site during all field activities associated with implementation of this RFI Phase 2 Work Plan. The SSO will be responsible for conducting site-specific training, daily tailgate safety meetings, and conducting periodic safety inspections.

2.2 Sampling and Analysis

This section provides general information regarding the methods that will be employed for various sampling activities to be completed during site investigation. A summary of analytical methods, sample containers, preservatives, and holding times is provided in **Table 2-1**. The following subsections provide details regarding sample collection and management, quality assurance (QA) and quality control (QC).

2.2.1 Subsurface Soil Sampling

Shallow subsurface samples (up to 3 feet below ground surface [bgs]) will be collected from the bottom of the borehole using a decontaminated hand auger. Deeper subsurface samples (greater than 3 feet) will be collected using Direct-Push Technology or hollow-stem auger (HSA) equipment utilizing decontaminated split spoons, as appropriate. Samples will be collected from the sampling device using a decontaminated stainless-steel spoon or disposable plastic trowel.

For samples collected using split spoons, the liner containing the soil core will be split in half lengthwise using a decontaminated knife. If a sample is to be submitted for analysis of volatile organic compounds (VOCs), the VOC sample will be collected immediately after opening the sampling device by inserting the laboratory-supplied sampling device into the soil core; this sample will then be immediately extruded into the appropriate laboratory-supplied sample container(s) containing sodium bisulfate. Samples for all other analyses will be placed using either

1 a stainless-steel spoon/trowel or a disposable scoop directly in laboratory supplied clean
2 containers with a moisture-tight lid. The sample containers will then be placed into a cooler with
3 ice and cooled to less than or equal to six degrees Centigrade ($\leq 6^{\circ}\text{C}$). Lids will be sealed by labels
4 or custody seals to prevent tampering.

5 After soil samples are collected (to preserve sample integrity), the remaining lithologic samples
6 will be fully described. After the contents of the sampler are measured, sampled, and described
7 the core will be discarded and handled as Investigation-Derived Waste (IDW) as described in
8 Section 2.10.

9 All HSA borings will be abandoned by grouting to surface, unless the boring will be completed as
10 a monitoring well (see Section 4.0). For deeper borings (those extending into the water table),
11 rigid tremie pipe will be extended to the bottom of the boring and pump grout through the pipe
12 until undiluted grout flows from the boring at ground surface. For shallow borings (those not
13 penetrating the water table), grout will be poured into the boring from the surface until grout flows
14 from the boring at ground surface. Grout will be composed of 20 parts cement (Portland cement,
15 Type II or V), up to 1 part bentonite, and a maximum of 8 gallons of approved water per 94-pound
16 bag of cement.

17 All non-disposable drilling and sampling equipment will be decontaminated prior to initiation of
18 drilling activities and between each borehole following standard operating procedures to prevent
19 cross contamination. A temporary decontamination pad area will be constructed to contain
20 decontamination water, which will be managed as IDW as described in Section 2.10.

21 **2.2.2 Groundwater Sampling**

22 In order to address comments from NMED in the NOD (NMED, 2014; specifically Comments 11
23 and 12), a groundwater investigation will be implemented to assess whether groundwater quality
24 has been impacted as a result of former landfill. The general approach to evaluating whether or
25 not groundwater is impacted will be to collect groundwater samples from the first water-bearing
26 zone by means of a temporary well. All boreholes will be logged using a USACE Drilling Log
27 (Form 1836 and 1836a). All boreholes will also be permitted through the New Mexico Office of
28 the State Engineer (NMOSE). Additional details regarding temporary well installation and
29 sampling are provided in Section 4.0.

30 **2.3 Quality Control**

31 In order to obtain data of sufficient quality to support project objectives, specific procedures are
32 required to allow evaluation of data quality. The QA/QC procedures and requirements for their
33 evaluation will comply with the Department of Defense (DoD) Quality Systems Manual (QSM),
34 Version 5.4 (or the version that is current when data are evaluated; DoD, 2021). The applicable
35 aspects of these reference documents, as they apply specifically to FWDA, are summarized
36 below.

2.3.1 Field and Laboratory Quality Control Samples

Evaluation of field sampling procedures and laboratory equipment accuracy and precision requires the collection and evaluation of field and laboratory QC samples. **Table 2-2** summarizes the planned QC samples for this project. A description of each QC sample type is provided in the following sections.

2.3.1.1 Quality Control Analyses/Parameters Originated by the Laboratory

Method Blank

Method blanks are used to monitor each preparation or analytical batch for interference and/or contamination from glassware, reagents, and other potential sources within the laboratory. A method blank is a contaminant-free matrix (laboratory reagent water for aqueous samples or Ottawa sand, sodium sulfate, or glass beads [metals] for soil samples) to which all reagents are added in the same amount or proportions as are added to the samples. It is processed through the entire sample preparation and analytical procedures along with the samples in the batch.

There will be at least one method blank per preparation or analytical batch. If a target constituent is found at a concentration that exceeds one-half the limit of quantitation (LOQ) in the method blank, the laboratory must perform corrective action in an attempt to identify and, if possible, eliminate the contamination source. If sufficient sample volume remains in the sample container, samples associated with the blank contamination should be re-prepared and re-analyzed after the contamination source has been eliminated. If reanalysis cannot be performed, data will be qualified and explained in the Case Narrative. B-flags will be applied to all results for the specific analyte(s) in all samples in the associated batch.

To determine if elimination is appropriate, the contractor will use the following protocol, during data validation, to determine if results should be qualified because of blank detections. If target analytes are detected in blank samples, the contractor will U qualify detected results from the associated field samples, at the higher of the detected concentration or the limit of detection, if the concentration detected in the sample is less than five times the concentration detected in the blank. Sample results do not require qualification if they are detected at concentrations greater than five times the blank concentration. The validation report will also include a table that summarizes blank detections, associated samples, and original and revised results that were qualified due to the blank detections.

Laboratory Control Sample

The Laboratory Control Sample (LCS) will consist of a contaminant-free matrix such as laboratory reagent water for aqueous samples or Ottawa sand, sodium sulfate, or glass beads (metals) for soil samples spiked with known amounts of constituents that come from a source different than that used for calibration standards. Target constituents will be spiked into the LCS. The spike levels will be less than or equal to the midpoint of the calibration range for each analyte. If LCS results are outside the specified control limits, corrective action must be taken, including sample re-preparation and re-analysis, if appropriate. If more than one LCS is analyzed in a preparation or analytical batch, the results for each LCS must be reported. Any LCS recovery outside QC limits affects the accuracy for the entire batch and requires corrective action.

Matrix Spike/Matrix Spike Duplicate

A sample matrix fortified with known quantities of specific compounds is called a matrix spike (MS). It is subjected to the same preparation and analytical procedures as the native sample. For this project, all target constituents will be spiked into the MS sample. Sample MS recoveries are used to evaluate the effect of the sample matrix on the recovery of the analytes of interest. A matrix spike duplicate (MSD) is a second aliquot of the MS sample, fortified at the same concentration as the MS. The Relative Percent Difference (RPD) between the results of the duplicate matrix spikes measures the precision of sample results.

Project-specific samples will be used by the laboratory for the MS/MSD samples, which will be designated on the chain-of-custody (COC) form. The spike levels will be less than or equal to the midpoint of the calibration range. MS/MSD pairs will be collected at a frequency of 5 percent (%). MS/MSDs are required in every analytical batch regardless of the rate of collection and how samples are received at the laboratory.

2.3.1.2 Quality Control Analyses Originated by the Field Team

Field QC samples will be collected to determine the accuracy and precision of the analytical results. Field sampling will be conducted from the least contaminated areas to the most contaminated areas, to minimize the potential for cross-contamination. The potential for phthalates/ plasticizers to be present in project samples will be minimized by using the appropriate type of gloves, minimizing use of plastic in sampling (i.e., maximum use of stainless steel), and when plastic is required (for example, tubing for groundwater sampling), it will be phthalate-free. Field QC samples will be used to evaluate if field equipment and sampling protocols have introduced phthalates. The QC sample frequencies are stated in the following subsections.

Equipment Blank

Equipment blanks will be collected to monitor the cleanliness of sampling equipment and the effectiveness of decontamination procedures. Contamination from the sampling equipment can bias the analytical results high or lead to false positive results being reported. Equipment blanks will be prepared by filling sample containers with laboratory-grade contaminant-free water that has been passed through a decontaminated or unused disposable sampling device. The required QC limits for equipment blank concentrations are to be less than one-half the LOQ. Equipment blanks will be collected at a frequency of 10% per sampling apparatus or as otherwise approved by the NMED regulator. Samples associated with equipment blanks that have detected target constituents will be assessed during the data validation process. The usability of the associated analytical data will be documented and affected data will be appropriately qualified. Field corrective action to improve equipment decontamination procedures may also be implemented by the field team leader at the request of the project chemist.

Field Duplicate

Field duplicates are collected in the field simultaneously from adjacent locations in the field to evaluate the heterogeneity of the medium. Field duplicates will be collected and analyzed at a frequency of 10%, or one per sampling event.

Trip Blank

Trip blanks are used to monitor for contamination during sample shipping and handling, and for cross-contamination through volatile component migration among the collected samples. They are prepared in the laboratory by pouring organic-free water into a volatile organic analysis (VOA) sample container. They are then sealed, transported to the field, and transported back to the laboratory in the same cooler as the volatile component samples. One trip blank sample set (two VOAs) will accompany each volatile component sample cooler.

2.3.2 Data Precision, Accuracy, Representativeness, Comparability and Completeness

Field QA/QC samples and laboratory internal QA/QC samples are collected and analyzed to assess the data's quality and usability. The following subsections discuss the parameters that are used to assess the data quality.

Precision

The precision of laboratory analysis will be assessed by comparing the analytical results between MS/MSD and laboratory duplicate samples. The precision of the field sampling procedures will be assessed by reviewing field duplicate sample results. The RPD will be calculated for the duplicate samples using the equation:

$$\%RPD = \frac{2 * |S - D|}{(S + D)} \times 100$$

where:

S = first sample value (original value)

D = second sample value (duplicate value)

The precision criteria for laboratory duplicate samples (between MS and MSD results, LCS and LCS duplicate results, or duplicate analyses) will be $\leq 20\%$ RPD. Precision criteria for field duplicates will be $\leq 50\%$ RPD for soil samples or $\leq 30\%$ RPD for water samples.

Accuracy

Accuracy of laboratory results will be assessed for compliance with the established QC criteria using the analytical results of method blanks, reagent/preparation blanks, LCS and MS/MSD samples and surrogate results, where applicable. Laboratory accuracy will be assessed using the laboratory's most current statistically-derived limits. LCS, MS, MSD, and surrogate recoveries will be calculated using the following equation:

$$\text{Percent Recovery (\%R)} = (A/B) \times 100$$

where:

A = the detected analyte concentration

B = the known spike concentration

1 **Completeness**

2 The data completeness of laboratory analysis results will be assessed for compliance with the
3 amount of data required for decision making. Complete data are data that are not rejected. Data
4 with qualifiers such as “J”, “J-”, “U”, “J+” or “UJ” are deemed acceptable and can be used to make
5 project decisions as qualified. The completeness of the analytical data is calculated using the
6 equation:

7
$$\text{Percent Completeness} = [(\text{complete data obtained})/(\text{total data planned})] \times 100$$

8 The percent completeness goal for this sampling event is 90% for each analytical method.

9 **Representativeness**

10 Representativeness is the degree to which sampling data accurately and precisely represent site
11 conditions and is dependent on sampling and analytical variability and the variability of
12 environmental media at the site. Representativeness is a qualitative “measure” of data quality.

13 Achieving representative data in the field starts with a properly designed and executed sampling
14 program that carefully considers the project’s overall objectives. Proper location controls and
15 sample handling are critical to obtaining representative samples.

16 The goal of achieving representative data in the laboratory is measured by assessing accuracy
17 and precision. The laboratory will provide representative data when the analytical systems are in
18 control. Laboratory representativeness is met when sample COC and sample preservation are
19 properly documented, analytical procedures are followed and holding times are met.

20 **Comparability**

21 Comparability is the degree of confidence to which one data set can be compared to another.
22 Comparability is a qualitative “measure” of data quality.

23 Achieving comparable data in the field starts with a properly designed and executed sampling
24 program that carefully considers the project’s overall objectives. Proper location controls and
25 sample handling are critical to obtaining comparable samples.

26 The goal of achieving comparable data in the laboratory is measured by assessing accuracy and
27 precision. The laboratory will provide comparable data when analytical systems are in control.
28 Therefore, comparability of data sets should be achieved if proper analytical procedures are
29 followed and holding times are met.

30 **Sensitivity**

31 Sensitivity is the ability of the method or instrument to detect the contaminant of concern and
32 other target compounds at the concentration of interest, and with acceptable precision and bias.
33 Where possible, sampling and analytical methods will be selected that result in LOQs that are
34 lower than the corresponding screening level for the analytes of interest, in order to support
35 evaluation of the data against the established screening levels. For soil, the performance criteria
36 are the screening levels presented in the NMED Risk Assessment Guidance for Site
37 Investigations and Remediation (NMED, 2017 and 2022). The NMED soil screening levels (SSLs)

and ecological screening levels (ESLs) will be used to evaluate contaminant concentrations in soil samples. If NMED does not publish an SSL for human receptors, the USEPA soil RSL may be used instead. For groundwater, the screening levels follow the hierarchy provided in Attachment 7, Section 7.1, of the Permit (NMED, 2015a), and include New Mexico Water Quality Control Commission (WQCC) standards as set forth in New Mexico Administrative Code (NMAC), USEPA maximum contaminant levels (MCLs), and USEPA tap water RSLs (USEPA, 2024). These groundwater screening levels will be used to evaluate contaminant concentrations in groundwater samples. Assessment of analytical sensitivity will require thorough data validation. A comparison of the human health screening levels to laboratory quantitation limits is provided in **Table 2-3** and **Table 2-4**. A comparison of the ecological screening levels to laboratory quantitation limits is provided in **Table 2-5**.

In cases where sampling and analytical methods with LOQs below SSLs and ESLs for an analyte are not available, or where laboratory specific LOQs exceed the SSL or ESL, laboratory reporting to the limit of detection (LOD) will be required. As the LOD represents a concentration level where result uncertainty (i.e., precision and bias) are less predictable than they are at the LOQ, data between the LOQ and the LOD will be qualified as estimated, and the uncertainty will be reflected in discussions in the risk evaluation. In addition, results between the LOQ and the LOD will be subjected to additional scrutiny during data validation to try to identify any evident positive or negative biases, and the results of this added review will be incorporated into the data validation report and reflected in the risk evaluation.

2.3.3 Data Verification and Data Review Procedures

Personnel involved in data validation will be independent of any data generation effort. The project chemist will be responsible for the oversight of data verification, review, and validation. Data verification and review will be performed when the data packages are received from the laboratory. Verification will be performed on an analytical-batch basis using the summary results of calibration and laboratory QC, as well as those of the associated field samples. There are five stages of review defined in the USEPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use (2009):

- Stage 1: Verification and validation based only on completeness and compliance of sample receipt condition checks.
- Stage 2A: Verification and validation based on completeness and compliance checks of sample receipt conditions and ONLY sample-related QC results.
- Stage 2B: Verification and validation based on completeness and compliance checks of sample receipt conditions and BOTH sample-related and instrument-related QC results.
- Stage 3: Verification and validation based on completeness and compliance checks of sample receipt conditions, both sample-related and instrument-related QC results, AND recalculation checks.
- Stage 4: Verification and validation based on completeness and compliance checks of sample receipt conditions, both sample-related and instrument-related QC results, recalculation checks, AND the review of actual instrument outputs.

For this project, 100% of the data packages will undergo data verification and data review (Stage 2B); specifically, 90% will undergo Stage 2B and 10% will undergo Stage 4.

2.3.4 Data Assessment

Limitations on data usability will be assigned, if appropriate, as a result of the validation process described earlier. The results of the data validation will be discussed in a separate report so that overall data quality can be verified through the precision, accuracy, representativeness, comparability, and completeness of sample results. Data qualifiers that may be assigned based on the validation process are listed in **Table 2-6**.

2.4 Chain-of-Custody

The COC forms will be completed and will accompany each sample at all times. A completed COC form will accompany each cooler. Data on the COC will include the sample identification (ID) (as described in Section 2.9), depth interval, date sampled, time sampled, project name, project number, and signatures of those in possession of the sample. The COC forms will accompany those samples shipped to the designated laboratory so that sample possession information can be maintained. The field team will retain a separate copy of the COC at the field office. Additionally, the sample ID, date and time collected, collection location, and analysis requested will be documented in the field logbook as discussed in Section 2.6.

2.5 Packaging and Shipping Procedures

All samples will be shipped by overnight air freight to the laboratory or hand-delivered. Unless otherwise indicated, samples will be treated as environmental samples, shipped in heavy duty coolers, packed in materials to prevent breakage, and preserved with ice in sealed plastic bags. Each shipment will include the appropriate field QC samples (i.e., trip blanks, duplicates, and equipment blanks).

Corresponding COC forms will be placed in waterproof bags and taped to the inside of the cooler lids. Each cooler shipped from the laboratory containing aqueous sample bottles for VOC analyses will contain a trip blank. The trip blank will stay with the cooler until the cooler is returned to the analytical laboratory. All coolers will be taped shut and will include a custody seal to ensure tampering has not occurred during transit.

2.6 Sample Documentation

Sample control and tracking information will be recorded in bound dedicated field logbooks and will include the following information: sample number and location, date, sampler's name, method of sampling, sample depth, soil sample physical description, ambient weather conditions, and miscellaneous observations. At the conclusion of each day in the field, the sampling team leader will review each page of the logbook for errors and omissions. Each reviewed page will be signed and dated.

2.7 Field Instrument Calibration

All field instruments will be calibrated following manufacturer recommended calibration procedures and frequencies. Field instrument calibrations will be recorded in a designated portion of the field logbook at the time of the calibration. Adverse trends in instrument calibration behavior will be corrected.

2.8 Survey of Sample Locations

The location of each sample collected will be surveyed using appropriate instrumentation and procedures to obtain horizontal accuracy of less than 0.1 foot. A Trimble Total Station Global Positioning System (GPS), Trimble Static GPS, or equivalent, will be utilized to document each soil sample location. A North American Datum 1983 Northing and Easting in United States Survey Feet will be established for all surveyed points and recorded in a dedicated field notebook. Survey data will be supplied in the Final Report in New Mexico State Plane and Universal Transverse Mercator Index coordinates.

2.9 Sample Identification

During sampling, unique sample ID numbers will be assigned to each sample or subsample. Each sample ID number will consist of a combination of the Parcel number, SWMU/AOC number, additional site identifier, source of sample, increment or boring number, type of sample, and depth of sample collection in accordance with the latest version of the FWDA Environmental Information Management Plan (USACE, 2007). Following is an example sample number and a description of the sample identifiers to be used during implementation of this RFI Phase 2 Work Plan.

<u>Example Sample ID:</u>	2321CLANDSB01A-0.5-1.0D-SO
Parcel:	23
SWMU or AOC:	in this case SWMU 21
Additional Site Identifier:	in this case CLAND (for Central Landfill)
Source of Sample:	in this case SB (soil boring)
Increment Number:	Samples collected within each SWMU/AOC will be assigned sequential 2-digit or 3-digit numbers (in this case 01)
Depth Identifier:	For samples collected at multiple depths at the same sample location, use of an alphabetic letter after the Increment Number will denote the different depths (in this case A)
Depth Range:	In feet (in this case 0.5-1.0 foot)
Type of Sample:	D (discrete)
Matrix:	SO (Soil)

QA/QC samples will carry the same sample nomenclature as the parent sample with a unique suffix and numeral (if required) to distinguish individual samples. Equipment blanks, trip blanks, and field blanks will carry the sample location identifier with an additional designation of TBXX or

EBXX (where XX represents the sequence number of the sample). Each blank will have a unique tracking number.

2.10 Investigation-Derived Waste

Four types of IDW may be generated during the sampling of environmental media during the Parcel 23 Phase 2 RFI activities: residual soil volume; decontamination fluids; development water, purge water and excess sample water from monitoring wells; and disposable sampling equipment/PPE. These IDW categories will be managed as follows:

- Limited surface and shallow subsurface soil that remains after required sample volumes have been collected from drive samplers and hand augers will be returned to the hole as allowed by NMED. Drill cuttings from HSA borings will be containerized pending analysis of samples sent to the laboratory; disposal will be based on sample analytical results.
- Decontamination fluids will be contained within a temporary decontamination pad area during active sampling and decontamination activities at a site. Volumes of decontamination fluids are anticipated to be small. Accumulated wash and rinse water will be left within the decontamination pad area and allowed to evaporate. In the event of rainfall events, decontamination fluids will be containerized in drums temporarily and allowed to evaporate at a later date, but prior to demobilization for the sampling event. In no circumstance will accumulated fluids be stored on-site following the sampling event.
- Development water, purge water and excess sample water from monitoring wells will be containerized at the sample site in clean buckets and/or tanks with a watertight lid. Depending on the volumes generated, water from multiple wells may be consolidated into one or more containers. At the end of the sampling day, the filled IDW containers will be emptied into one of two low-density polyethylene-lined evaporation tanks. The evaporation tanks are located at the former Building 542 in Parcel 6.
- Used, non-decontaminated disposable sampling equipment or PPE will be placed in polyethylene trash bags and treated as general refuse. Refuse will be placed in suitable facility trash receptacles on a daily basis.

1

Table 2-1 Summary of Analytical Methods, Sample Containers, Preservation, and Holding Times

Target Analytes	Matrix	Analytical Method (USEPA SW846)	Sample Volume/Container	Preservative	Maximum Holding Time (collection until extraction/ extraction until analysis)
Volatile Organic Compounds	Soil	8260D	2 x Terracore, 40-mL VOA Vials with septa cap, pre-tared with stir bar and DI Water or Sodium Bisulfate 1 x Terracore, 40-mL VOA vial with closed cap, pre-tared with Methanol 2 oz jar for % moisture	DI Water vials are frozen within 48 hours Methanol, Cool, 0-6°C	14 days if preserved with sodium bisulfate and methanol 14 days (48 hours to preserve if collected with Encore® or Terra Core®) Freeze DI preserved within 48-hours.
	Water	8260D	3 x 40-mL VOA Vial	HCl to pH < 2 Cool to ≤ 6°C	14 days preserved 7 days unpreserved
Semi-Volatile Organic Compounds	Soil	8270E	4-oz or 8-oz Glass Jar	Cool to ≤ 6°C	14/7 days to extraction (soil/water) 40 days to analysis
	Water		2 x 125 mL Amber Glass Bottle		
TAL Metals / Mercury	Soil	6020B / 7470A (water) / 7471B (soil)	4-oz Glass Jar	Cool to ≤ 6°C (only required for Hg)	6 months (28 days for Hg)
	Water		1 x 250 mL HDPE; dissolved metals filtered on site	HNO3 to pH < 2	
Total Petroleum Hydrocarbons – Diesel Range Organics (extended)	Soil	8015D	4-oz Glass Jar	Cool to ≤ 6°C	14/7 days to extraction (soil/water) 40 days to analysis
	Water		2 x 1L Amber Bottle		
Explosives	Soil	8330B	4-oz Glass Jar or HDPE Jar	Cool to ≤ 6°C	14/7 days to extraction (soil/water) 40 days to analysis
	Water		2 x 500 mL Amber Bottle		
Perchlorate	Soil	6850	4-oz Amber Glass Jar	Cool to ≤ 6°C	28 days
	Water		125 mL HDPE		

1 **Notes:**

2 °C = Degrees Centigrade

3 Hg = Mercury

4 L = Liter

5 oz = Ounce

6 HCl = Hydrochloric acid

HNO₃ = Nitric acid

mL = Milliliter

TAL = Target Analyte List metals

USEPA = United States Environmental Protection Agency

VOA = Volatile organic analysis

7 More than one analysis may be performed from the same sample container, as long as all preservation requirements have been met and there is sufficient sample
8 mass available.

1

Table 2-2 Quality Control Samples for Precision and Accuracy

Quality Control Type	Measurement Performance Criteria (MPC)	QC Type	Minimum Frequency
Field	Relative Percent Difference (RPD) of $\leq 50\%$ for soil and $\leq 30\%$ for water when target analytes are detected in both samples with concentrations $> \text{LOQ}$	Duplicate Sample Laboratory Analysis	One every 10 samples (10%)
	No analytes detected $> \frac{1}{2} \text{LOQ}$ or $> 1/10\text{th}$ the amount measured in any sample or $1/10\text{th}$ the regulatory limit, whichever is greater	Equipment Blank	One every 10 samples (10%) for reusable equipment
	No analytes detected $> \frac{1}{2} \text{LOQ}$ or $> 1/10\text{th}$ the amount measured in any sample or $1/10\text{th}$ the regulatory limit, whichever is greater	Trip Blank	One set (two VOA vials) per each cooler containing VOC samples
Laboratory	No analytes detected $> \frac{1}{2} \text{LOQ}$ or $> 1/10\text{th}$ the amount measured in any sample or $1/10\text{th}$ the regulatory limit, whichever is greater	Method Blank	One per batch, at least one every 20 samples (rounded up) (5%)
	Per QSM criteria.	Laboratory Control Sample or Blank Spike	One per batch, at least one every 20 samples (rounded up) (5%)
		Matrix Spike Percent Recovery	One every 20 samples (rounded up) (5%)
		Surrogate Spike (for organics only)	All samples and QC

2 **Notes:**

3 LOQ = Limit of Quantitation

4 QC = Quality control

5 QSM = Quality Systems Manual

6 RPD = Relative Percent Difference

7 VOA = volatile organic analysis

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

Table 2-3 Comparison of Human Health Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Screening Level Surrogate	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	NMED Table A-1 and Table 6-2 Human Health Screening Levels Direct Contact ⁽³⁾						EPA-RSL Table Human Health Screening Levels Direct Contact ⁽⁴⁾				Lowest Human Health Screening Level Direct Contact ⁽⁵⁾	Lowest Human Health Screening Level Direct Contact Source ⁽⁵⁾	Human Health Screening Levels - Groundwater Protection			Achievable Laboratory Limits		
						Residential		Industrial/ Occupational		Construction Worker		Residential		Industrial				NMED Table A-3 and Table 6-4 Risk-based SSL ⁽⁶⁾	NMED Table A-3 NMGW/MCL based SSL ⁽⁶⁾	EPA-RSL Calculator Risk-based SSL ⁽⁷⁾	LOQ	LOD	DL
						cancer	noncancer	cancer	noncancer	cancer	noncancer	cancer adj to 1x10 ⁻⁵	noncancer HQ=1	cancer adj to 1x10 ⁻⁵	noncancer HQ=1								
TAL Metals																							
Aluminum	-	SW6020B	7429-90-5	mg/kg	23,340	NS	78000	NS	1290000	NS	41400	-	-	-	-	41400	NMED SSL	597000	NS	-	11	10	3.77
Antimony	-	SW6020B	7440-36-0	mg/kg	0.23	NS	31.3	NS	519	NS	142	-	-	-	-	31.3	NMED SSL	6.56	5.42	-	0.2	0.12	0.0376
Arsenic	-	SW6020B	7440-38-2	mg/kg	5.60	7.07	13.0	35.9	208	216	41.2	-	-	-	-	7.07	NMED SSL	0.499	5.83	-	0.6	0.2	0.0506
Barium	-	SW6020B	7440-39-3	mg/kg	482	NS	15600	NS	255000	NS	4390	-	-	-	-	4390	NMED SSL	2700	1650	-	0.4	0.2	0.0723
Beryllium	-	SW6020B	7440-41-7	mg/kg	1.49	64400	156	313000	2580	2710	148	-	-	-	-	148	NMED SSL	196	63.2	-	0.1	0.08	0.0225
Cadmium	-	SW6020B	7440-43-9	mg/kg	0.224	85900	70.5	417000	1110	3610	72.1	-	-	-	-	70.5	NMED SSL	9.39	7.52	-	0.1	0.06	0.0203
Calcium	-	SW6020B	7440-70-2	mg/kg	91,760	NS	13000000	NS	32400000	NS	8850000	-	-	-	-	8850000	NMED SSL	NS	NS	NS	50	25	8.9
Cobalt	-	SW6020B	7440-48-4	mg/kg	6.82	17200	23.4	83400	388	722	36.7	-	-	-	-	23.4	NMED SSL	5.40	NS	-	0.1	0.025	0.00663
Copper	-	SW6020B	7440-50-8	mg/kg	18.4	NS	3130	NS	51900	NS	14200	-	-	-	-	3130	NMED SSL	556	915	-	0.6	0.45	0.2
Iron	-	SW6020B	7439-89-6	mg/kg	22,660	NS	54800	NS	908000	NS	248000	-	-	-	-	54800	NMED SSL	6960	NS	-	15	14	3.94
Lead (8)	-	SW6020B	7439-92-1	mg/kg	12.4	NS	NS	NS	NS	NS	NS	NS	200	NS	800	200	EPA RSL	NS	270	-	0.4	0.12	0.0385
Magnesium	-	SW6020B	7439-95-4	mg/kg	8,170	NS	15600000	NS	5680000	NS	1550000	-	-	-	-	1550000	NMED SSL	NS	NS	NS	50	10	2.5
Magnesium	-	SW6020B	7439-96-5	mg/kg	1,058	NS	10500	NS	160000	NS	464	-	-	-	-	464	NMED SSL	2630	NS	-	0.5	0.3	0.0961
Mercury	-	SW7471B	7439-97-6	mg/kg	0.0300	NS	23.8	NS	112	NS	20.7	-	-	-	-	20.7	NMED SSL	0.654	2.09	-	0.017	0.0133	0.00553
Nickel	-	SW6020B	7440-02-0	mg/kg	19.5	595000	1560	2890000	25700	25000	753	-	-	-	-	753	NMED SSL	485	NS	-	0.6	0.35	0.169
Potassium	-	SW6020B	7440-09-7	mg/kg	3,950	NS	15600000	NS	76200000	NS	20800000	-	-	-	-	15600000	NMED SSL	NS	NS	NS	25	19	5.29
Selenium	-	SW6020B	7782-49-2	mg/kg	0.513	NS	391	NS	6490	NS	1750	-	-	-	-	391	NMED SSL	10.2	5.17	-	0.5	0.12	0.0347
Silver	-	SW6020B	7440-22-4	mg/kg	0.130	NS	391	NS	6490	NS	1770	-	-	-	-	391	NMED SSL	13.8	NS	-	0.1	0.02	0.00539
Sodium	-	SW6020B	7440-23-5	mg/kg	2,526	NS	7820000	NS	37300000	NS	10200000	-	-	-	-	7820000	NMED SSL	NS	NS	NS	40	36	9.04
Thallium	-	SW6020B	7440-28-0	mg/kg	0.213	NS	0.782	NS	13.0	NS	3.54	-	-	-	-	0.782	NMED SSL	0.281	2.85	-	0.1	0.06	0.0177
Total Chromium	-	SW6020B	7440-47-3	mg/kg	18.1	96.6	45200	505	314000	468	134	-	-	-	-	96.6	NMED SSL	205000	3600	-	0.6	0.2	0.0964
Vanadium	-	SW6020B	7440-62-2	mg/kg	27.2	NS	394	NS	6530	NS	614	-	-	-	-	394	NMED SSL	1260	NS	-	0.5	0.3	0.104
Zinc	-	SW6020B	7440-66-6	mg/kg	49.2	NS	23500	NS	389000	NS	106000	-	-	-	-	23500	NMED SSL	7410	NS	-	2	1.4	0.688
Semi-Volatile Organic Compounds																							
2,2-Oxybis(1-chloropropane)	-	SW8270E	108-60-1	mg/kg	N/A	99.3	NS	519	NS	3540	NS	-	-	-	-	99.3	NMED SSL	0.0475	NS	-	0.33	0.067	0.023
2,4,5-Trichlorophenol	-	SW8270E	95-95-4	mg/kg	N/A	NS	6160	NS	91600	NS	26900	-	-	-	-	6160	NMED SSL	66.2	NS	-	0.33	0.033	0.01
2,4,6-Trichlorophenol	-	SW8270E	88-06-2	mg/kg	N/A	484	61.6	2330	916	17000	269	-	-	-	-	61.6	NMED SSL	0.674	NS	-	0.33	0.033	0.01
2,4-Dichlorophenol	-	SW8270E	120-83-2	mg/kg	N/A	NS	185	NS	2750	NS	807	-	-	-	-	185	NMED SSL	0.825	NS	-	0.33	0.033	0.01
2,4-Dimethylphenol	-	SW8270E	105-67-9	mg/kg	N/A	NS	1230	NS	18300	NS	5380	-	-	-	-	1230	NMED SSL	6.45	NS	-	0.33	0.133	0.066
2,4-Dinitrophenol	-	SW8270E	51-28-5	mg/kg	N/A	NS	123	NS	1830	NS	538	-	-	-	-	123	NMED SSL	0.669	NS	-	1.6	1	0.333
2,4-Dinitrotoluene	-	SW8270E	121-14-2	mg/kg	N/A	17.1	123	82.3	1820	600	536	-	-	-	-	17.1	NMED SSL	0.0492	NS	-	0.33	0.133	0.066
2,6-Dinitrotoluene	-	SW8270E	606-20-2	mg/kg	N/A	3.56	18.5	17.2	276	165	80.9	-	-	-	-	3.56	NMED SSL	0.0102	NS	-	0.33	0.067	0.028
2-Chloronaphthalene	-	SW8270E	91-58-7	mg/kg	N/A	NS	6260	NS	104000	NS	28300	-	-	-	-	6260	NMED SSL	57.0	NS	-	0.33	0.033	0.01
2-Chlorophenol	-	SW8270E	95-57-8	mg/kg	N/A	NS	391	NS	6490	NS	1770	-	-	-	-	391	NMED SSL	1.15	NS	-	0.33	0.067	0.021
2-Methylphenol	-	SW8270E	95-48-7	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	3200	NS	41000	3200	EPA RSL	NS	NS	15.1	0.33	0.033	0.013
2-Nitroaniline	-	SW8270E	88-74-4	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	630	NS	8000	630	EPA RSL	NS	NS	1.60	1.6	0.133	0.05
2-Nitrophenol	-	SW8270E	88-75-5	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS	0.33	0.033	0.01
3 & 4 Methylphenol	p-cresol	SW8270E	15831-10-4	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	1300	NS	16000	1300	NMED SSL	NS	NS	5.94	0.33	0.067	0.033
3,3'-Dichlorobenzidine	-	SW8270E	91-94-1	mg/kg	N/A	11.8	NS	57.0	NS	410	NS	-	-	-	-	11.8	NMED SSL	0.124	NS	-	1.6	0.267	0.09
3-Nitroaniline	4-Nitroaniline	SW8270E	99-09-2	mg/kg	N/A	NS	NS	NS	NS	NS	NS	270	250	1100	3300	250	EPA RSL	NS	NS	0.316	1.6	0.267	0.073
4,6-Dinitro-2-Methylphenol	-	SW8270E	534-52-1	mg/kg	N/A	NS	4.93	NS	73.3	NS	21.5	-	-	-	-	4.93	NMED SSL	0.0398	NS	-	1.6	1	0.33
4-Bromophenyl-phenyl ether	-	SW8270E	101-55-3	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS	0.33	0.067	0.019
4-Chloro-3-Methylphenol	-	SW8270E	59-50-7	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	6300	NS	82000	6300	EPA RSL	NS	NS	34.3	0.33	0.067	0.0248
4-Chloroaniline	-	SW8270E	106-47-8	mg/kg	N/A	NS	NS	NS	NS	NS	NS	27	32	110	410	27.0	EPA RSL	NS	NS	0.0311	0.33	0.267	0.0819
4-Chlorophenyl-phenyl ether	-	SW8270E	7005-72-3	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS	0.33	0.067	0.021
4-Nitroaniline	-	SW8270E	100-01-6	mg/kg	N/A	NS	NS	NS	NS	NS	NS	270	250	1100	3300	250	EPA RSL	NS	NS	0.316	1.6	0.2	

Table 2-3 Comparison of Human Health Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Screening Level Surrogate	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	NMED Table A-1 and Table 6-2 Human Health Screening Levels Direct Contact ⁽³⁾						EPA-RSL Table Human Health Screening Levels Direct Contact ⁽⁴⁾				Lowest Human Health Screening Level Direct Contact ⁽⁵⁾	Lowest Human Health Screening Level Direct Contact Source ⁽⁵⁾	Human Health Screening Levels - Groundwater Protection			Achievable Laboratory Limits		
						Residential		Industrial/ Occupational		Construction Worker		Residential		Industrial				NMED Table A-3 and Table 6-4 Risk-based SSL ⁽⁶⁾	NMED Table A-3 NMGW/MCL based SSL ⁽⁶⁾	EPA-RSL Calculator Risk-based SSL ⁽⁷⁾	LOQ	LOD	DL
						cancer	noncancer	cancer	noncancer	cancer	noncancer	cancer adj to 1x10 ⁻⁶	noncancer HQ=1	cancer adj to 1x10 ⁻⁶	noncancer HQ=1								
Semi-Volatile Organic Compounds (Continued)																							
Di-N-Butylphthalate	-	SW8270E	84-74-2	mg/kg	N/A	NS	6160	NS	91600	NS	26900	-	-	-	-	6160	NMED SSL	33.8	NS	-	0.33	0.067	0.029
Di-n-Octylphthalate	-	SW8270E	117-84-0	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	630	NS	8200	630	EPA RSL	NS	NS	1,130	0.33	0.133	0.0405
Hexachlorobenzene	-	SW8270E	118-74-1	mg/kg	N/A	3.33	49.3	16.0	733	117	215	-	-	-	-	3.33	NMED SSL	0.0185	0.189	-	0.33	0.067	0.029
Hexachlorobutadiene	-	SW8270E	87-68-3	mg/kg	N/A	68.3	61.6	52.1	916	2400	269	-	-	-	-	52.1	NMED SSL	0.0413	NS	-	0.33	0.033	0.01
Hexachlorocyclopentadiene	-	SW8270E	77-47-4	mg/kg	N/A	68.3	61.6	52.1	916	2400	269	-	-	-	-	52.1	NMED SSL	0.0413	NS	-	1.7	0.333	0.111
Hexachloroethane	-	SW8270E	67-72-1	mg/kg	N/A	133	43.1	641	641	4670	188	-	-	-	-	43.1	NMED SSL	0.0320	NS	-	0.33	0.067	0.0213
Isophorone	-	SW8270E	78-59-1	mg/kg	N/A	5610	12300	27000	183000	198000	53700	-	-	-	-	5610	NMED SSL	4.23	NS	-	0.33	0.067	0.017
Nitrobenzene	-	SW8270E	98-95-3	mg/kg	N/A	60.4	131	293	1540	1350	353	-	-	-	-	60.4	NMED SSL	0.0144	NS	-	0.33	0.067	0.022
N-Nitroso-Di-N-Propylamine	-	SW8270E	621-64-7	mg/kg	N/A	NS	NS	NS	NS	NS	NS	0.78	NS	3.3	NS	0.780	EPA RSL	NS	NS	0.00162	0.33	0.167	0.068
N-Nitrosodiphenylamine	-	SW8270E	86-30-6	mg/kg	N/A	1090	NS	5240	NS	37900	NS	-	-	-	-	1090	NMED SSL	10.0	NS	-	0.33	0.067	0.021
Pentachlorophenol	-	SW8270E	87-86-5	mg/kg	N/A	9.85	234	44.5	3180	346	989	-	-	-	-	9.85	NMED SSL	0.0629	0.152	-	1.6	1	0.33
Phenol	-	SW8270E	108-95-2	mg/kg	N/A	NS	18500	NS	275000	NS	77400	-	-	-	-	18500	NMED SSL	52.3	NS	-	0.33	0.067	0.018
Polycyclic Aromatic Hydrocarbons																							
2-Methylnaphthalene	-	SW8270E	91-57-6	mg/kg	N/A	NS	232	NS	3370	NS	1000	-	-	-	-	232	NMED SSL	2.76	NS	-	0.33	0.067	0.019
Acenaphthene	-	SW8270E	83-32-9	mg/kg	N/A	NS	3480	NS	50500	NS	15100	-	-	-	-	3480	NMED SSL	82.5	0.0309	-	0.33	0.033	0.0103
Acenaphthylene	Pyrene	SW8270E	208-96-8	mg/kg	N/A	NS	1740	NS	25300	NS	7530	-	-	-	-	1740	NMED SSL	192	NS	-	0.33	0.267	0.0821
Anthracene	-	SW8270E	120-12-7	mg/kg	N/A	NS	17400	NS	253000	NS	75300	-	-	-	-	17400	NMED SSL	851	NS	-	0.33	0.067	0.017
Benzo(a)anthracene	-	SW8270E	56-55-3	mg/kg	N/A	1.53	NS	32.3	NS	240	NS	-	-	-	-	1.53	NMED SSL	0.637	NS	-	0.33	0.067	0.02
Benzo(a)pyrene	-	SW8270E	50-32-8	mg/kg	N/A	1.12	17.4	23.6	251	173	15.0	-	-	-	-	1.12	NMED SSL	4.42	3.53	-	0.33	0.067	0.02
Benzo(b)fluoranthene	-	SW8270E	205-99-2	mg/kg	N/A	1.53	NS	32.3	NS	240	NS	-	-	-	-	1.53	NMED SSL	6.17	NS	-	0.33	0.067	0.0262
Benzo(k)fluoranthene	-	SW8270E	207-08-9	mg/kg	N/A	15.3	NS	323	NS	2310	NS	-	-	-	-	15.3	NMED SSL	60.5	NS	-	0.33	0.133	0.04
Benzo(g,h,i)perylene	Pyrene	SW8270E	191-24-2	mg/kg	N/A	NS	1740	NS	25300	NS	7530	-	-	-	-	1740	NMED SSL	192	NS	-	0.33	0.033	0.016
Chrysene	-	SW8270E	218-01-9	mg/kg	N/A	153	NS	3230	NS	23100	NS	-	-	-	-	153	NMED SSL	186	NS	-	0.33	0.067	0.027
Dibenz(a,h)anthracene	-	SW8270E	53-70-3	mg/kg	N/A	0.153	NS	3.23	NS	24.0	NS	-	-	-	-	0.153	NMED SSL	1.97	NS	-	0.33	0.067	0.019
Fluoranthene	-	SW8270E	206-44-0	mg/kg	N/A	NS	2320	NS	33700	NS	10000	-	-	-	-	2320	NMED SSL	1340	NS	-	0.33	0.133	0.036
Fluorene	-	SW8270E	86-73-7	mg/kg	N/A	NS	2320	NS	33700	NS	10000	-	-	-	-	2320	NMED SSL	80.0	NS	-	0.33	0.067	0.018
Indeno(1,2,3-cd)pyrene	-	SW8270E	193-39-5	mg/kg	N/A	1.53	NS	32.3	NS	240	NS	-	-	-	-	1.53	NMED SSL	20.1	NS	-	0.33	0.067	0.022
Naphthalene	-	SW8270E	91-20-3	mg/kg	N/A	22.6	162	108	843	633	159	-	-	-	-	22.6	NMED SSL	0.0583	NS	-	0.33	0.067	0.031
Phenanthrene	-	SW8270E	85-01-8	mg/kg	N/A	NS	1850	NS	27500	NS	8070	-	-	-	-	1850	NMED SSL	85.9	NS	-	0.33	0.067	0.017
Pyrene	-	SW8270E	129-00-0	mg/kg	N/A	NS	1740	NS	25300	NS	7530	-	-	-	-	1740	NMED SSL	192	NS	-	0.4	0.033	0.0121
Volatile Organic Compounds																							
1,1,1,2-Tetrachloroethane	-	SW8260D	630-20-6	mg/kg	N/A	28.1	2350	137	38900	659	10600	-	-	-	-	28.1	NMED SSL	0.0360	NS	-	0.005	0.004	0.00222
1,1,1-Trichloroethane	-	SW8260D	71-55-6	mg/kg	N/A	NS	14400	NS	72500	NS	13600	-	-	-	-	13600	NMED SSL	51.1	1.28	-	0.005	0.004	0.00198
1,1,2,2-Tetrachloroethane	-	SW8260D	79-34-5	mg/kg	N/A	7.98	1560	39.4	26000	197	7080	-	-	-	-	7.98	NMED SSL	0.00481	NS	-	0.005	0.0008	0.000285
1,1,2-Trichloroethane	-	SW8260D	79-00-5	mg/kg	N/A	18.8	2.61	92.1	12.4	4300	2.30	-	-	-	-	2.30	NMED SSL	0.00223	0.0268	-	0.005	0.0032	0.00088
1,1-Dichloroethane	-	SW8260D	75-34-3	mg/kg	N/A	78.6	15600	383	260000	1820	70800	-	-	-	-	78.6	NMED SSL	0.136	NS	-	0.005	0.0008	0.00021
1,1-Dichloroethene	-	SW8260D	75-35-4	mg/kg	N/A	NS	440	NS	2260	NS	424	-	-	-	-	424	NMED SSL	1.95	0.0479	-	0.005	0.0016	0.00059
1,1-Dichloropropene	1,3-Dichloropropene	SW8260D	563-58-6	mg/kg	N/A	29.3	141	146	695	781	130	-	-	-	-	29.3	NMED SSL	0.0281	NS	-	0.005	0.0004	0.000164
1,2,3-Trichlorobenzene	-	SW8260D	87-61-6	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	63	NS	930	63.0	EPA RSL	NS	NS	0.418	0.005	0.0032	0.00081
1,2,3-Trichloropropane	-	SW8260D	96-18-4	mg/kg	N/A	0.0510	7.09	1.21	34.0	8.26	6.31	-	-	-	-	0.0510	NMED SSL	0.0000582	NS	-	0.005	0.0008	0.000218
1,2,4-Trichlorobenzene	-	SW8260D	120-82-1	mg/kg	N/A	240	82.9	1250	423	8540	79.1	-	-	-	-	79.1	NMED SSL	0.176	3.10	-	0.005	0.0016	0.00073
1,2,4-Trimethylbenzene	-	SW8260D	95-63-6	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	300	NS	1800	300	EPA RSL	NS	NS	1.62	0.005	0.004	0.00231
1,2-Dibromo-3-Chloropropane	-	SW8260D	96-12-8	mg/kg	N/A	0.0858	5.88	1.18	41.1	5.53	8.29	-	-	-	-	0.0858	NMED SSL	0.0000233	0.00139	-	0.01	0.009	0.00366
1,2-Dibromoethane	-	SW8260D	106-93-4	mg/kg	N/A	0.672	135	3.31	738	16.3	140	-	-	-	-	0.672	NMED SSL	0.000352	0.000236	-	0.005	0.0016	0.00052
1,2-Dichlorobenzene	-	SW8260D	95-50-1	mg/kg	N/A	NS	2150	NS	13000	NS	2500	-	-	-	-	2150	NMED SSL	4.58	9.08	-	0.005	0.004	0.00187
1,2-Dichloroethane	-	SW8260D	107-06-2	mg/kg	N/A	8.32	55.6	40.7	286	195	53.8	-	-	-	-	8.32	NMED SSL	0.00814	0.				

Table 2-3 Comparison of Human Health Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Screening Level Surrogate	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	NMED Table A-1 and Table 6-2 Human Health Screening Levels Direct Contact ⁽³⁾						EPA-RSL Table Human Health Screening Levels Direct Contact ⁽⁴⁾				Lowest Human Health Screening Level Direct Contact ⁽⁵⁾	Lowest Human Health Screening Level Direct Contact Source ⁽⁵⁾	Human Health Screening Levels - Groundwater Protection			Achievable Laboratory Limits		
						Residential		Industrial/ Occupational		Construction Worker		Residential		Industrial				NMED Table A-3 and Table 6-4 Risk-based SSL ⁽⁶⁾	NMED Table A-3 NMGW/MCL based SSL ⁽⁶⁾	EPA-RSL Calculator Risk-based SSL ⁽⁷⁾	LOQ	LOD	DL
						cancer	noncancer	cancer	noncancer	cancer	noncancer	cancer adj to 1x10 ⁻⁵	noncancer HQ=1	cancer adj to 1x10 ⁻⁵	noncancer HQ=1								
Volatile Organic Compounds (Continued)																							
Acetone	-	SW8260D	67-64-1	mg/kg	N/A	NS	66300	NS	960000	NS	242000	-	-	-	-	66300	NMED SSL	49.8	NS	-	0.072	0.07	0.0356
Benzene	-	SW8260D	71-43-2	mg/kg	N/A	17.8	114	87.2	729	423	142	-	-	-	-	17.8	NMED SSL	0.0380	0.0418	-	0.005	0.0004	0.000151
Bromobenzene	-	SW8260D	108-86-1	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	290	NS	1800	290	EPA RSL	NS	NS	0.842	0.005	0.0016	0.00049
Bromochloromethane	-	SW8260D	74-97-5	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	150	NS	630	150	EPA RSL	NS	NS	0.415	0.005	0.004	0.00246
Bromodichloromethane	-	SW8260D	75-27-4	mg/kg	N/A	6.19	1560	30.2	26000	143	7080	-	-	-	-	6.19	NMED SSL	0.00621	NS	-	0.005	0.004	0.00213
Bromoform	-	SW8260D	75-25-2	mg/kg	N/A	674	1230	1760	18300	23700	5380	-	-	-	-	674	NMED SSL	0.147	NS	-	0.0051	0.005	0.00255
Bromomethane	-	SW8260D	74-83-9	mg/kg	N/A	NS	17.7	NS	94.5	NS	17.9	-	-	-	-	17.7	NMED SSL	0.0343	NS	-	0.01	0.0032	0.00135
Carbon Disulfide	-	SW8260D	75-15-0	mg/kg	N/A	NS	1550	NS	8540	NS	1620	-	-	-	-	1550	NMED SSL	4.42	NS	-	0.005	0.004	0.00166
Carbon Tetrachloride	-	SW8260D	56-23-5	mg/kg	N/A	10.7	144	52.5	1020	252	202	-	-	-	-	10.7	NMED SSL	0.0334	0.0367	-	0.005	0.004	0.00201
Chlorobenzene	-	SW8260D	108-90-7	mg/kg	N/A	NS	378	NS	2160	NS	412	-	-	-	-	378	NMED SSL	0.836	1.08	-	0.005	0.004	0.00206
Chloroethane	-	SW8260D	75-00-3	mg/kg	N/A	NS	19000	NS	89500	NS	16600	-	-	-	-	16600	NMED SSL	107	NS	-	0.01	0.0064	0.00199
Chloroform	-	SW8260D	67-66-3	mg/kg	N/A	5.90	306	28.7	2000	134	391	-	-	-	-	5.90	NMED SSL	0.0109	NS	-	0.01	0.0008	0.00029
Chloromethane	-	SW8260D	74-87-3	mg/kg	N/A	41.1	268	201	1260	956	235	-	-	-	-	41.1	NMED SSL	0.0952	NS	-	0.01	0.0016	0.00077
cis-1,2-Dichloroethene	-	SW8260D	156-59-2	mg/kg	N/A	NS	156	NS	2600	NS	708	-	-	-	-	156	NMED SSL	0.184	0.352	-	0.005	0.0008	0.000201
cis-1,3-Dichloropropene	1,3-Dichloropropene	SW8260D	10061-01-5	mg/kg	N/A	29.3	141	146	695	781	130	-	-	-	-	29.3	NMED SSL	0.0281	NS	-	0.005	0.0004	0.0001
Dibromochloromethane	-	SW8260D	124-48-1	mg/kg	N/A	13.9	1230	67.4	18300	340	5380	-	-	-	-	13.9	NMED SSL	0.00755	NS	-	0.005	0.004	0.00227
Dibromomethane	-	SW8260D	74-95-3	mg/kg	N/A	NS	57.9	NS	288	NS	53.9	-	-	-	-	53.9	NMED SSL	0.0335	NS	-	0.005	0.0008	0.000317
Dichlorodifluoromethane	-	SW8260D	75-71-8	mg/kg	N/A	NS	182	NS	865	NS	161	-	-	-	-	161	NMED SSL	7.23	NS	-	0.01	0.0064	0.00274
Ethylbenzene	-	SW8260D	100-41-4	mg/kg	N/A	75.1	3930	368	29000	1770	5800	-	-	-	-	75.1	NMED SSL	0.264	12.3	-	0.005	0.0008	0.000305
Hexachlorobutadiene	-	SW8260D	87-68-3	mg/kg	N/A	68.3	61.6	52.1	916	2400	269	-	-	-	-	52.1	NMED SSL	0.0413	NS	-	0.005	0.004	0.00217
Isopropylbenzene	-	SW8260D	98-82-8	mg/kg	N/A	NS	2360	NS	14200	NS	2740	-	-	-	-	2360	NMED SSL	11.4	NS	-	0.005	0.004	0.00241
Methyl acetate	-	SW8260D	79-20-9	mg/kg	N/A	NS	78200	NS	1300000	NS	354000	-	-	-	-	78200	NMED SSL	71.1	NS	-	0.0085	0.008	0.00275
m,p-Xylenes	Xylenes	SW8260D	179601-23-1	mg/kg	N/A	NS	871	NS	4280	NS	798	-	-	-	-	798	EPA RSL	2.98	154	-	0.0032	0.003	0.00104
Methyl Tert-Butyl Ether	-	SW8260D	1634-04-4	mg/kg	N/A	975	37800	4820	178000	24200	33100	-	-	-	-	975	NMED SSL	0.553	NS	-	0.02	0.0064	0.00211
Methylene Chloride	-	SW8260D	75-09-2	mg/kg	N/A	766	409	14400	5130	89600	1210	-	-	-	-	409	NMED SSL	0.471	0.0221	-	0.005	0.0032	0.0016
Naphthalene	-	SW8260D	91-20-3	mg/kg	N/A	22.6	162	108	843	633	159	-	-	-	-	22.6	NMED SSL	0.0583	NS	-	0.0067	0.005	0.00331
n-Butylbenzene	-	SW8260D	104-51-8	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	3900	NS	58000	3900	EPA RSL	NS	NS	64.6	0.005	0.0016	0.00056
n-Propylbenzene	-	SW8260D	103-65-1	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	3800	NS	24000	3800	EPA RSL	NS	NS	24.5	0.005	0.0016	0.00058
o-Xylene	-	SW8260D	95-47-6	mg/kg	N/A	NS	805	NS	3940	NS	736	-	-	-	-	736	NMED SSL	2.98	NS	-	0.005	0.0008	0.000266
4-Isopropyltoluene	Isopropylbenzene	SW8260D	99-87-6	mg/kg	N/A	NS	2360	NS	14200	NS	2740	-	-	-	-	2360	NMED SSL	11.4	NS	-	0.005	0.0032	0.00114
Sec-Butylbenzene	-	SW8260D	135-98-8	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	7800	NS	120000	7800	EPA RSL	NS	NS	117	0.005	0.0016	0.00077
Styrene	-	SW8260D	100-42-5	mg/kg	N/A	NS	7260	NS	51300	NS	10200	-	-	-	-	7260	NMED SSL	20.6	1.71	-	0.005	0.0008	0.00028
Tert-Butylbenzene	-	SW8260D	98-06-6	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	7800	NS	120000	7800	EPA RSL	NS	NS	31.1	0.005	0.0016	0.0005
Tetrachloroethene	-	SW8260D	127-18-4	mg/kg	N/A	337	111	1650	629	7910	120	-	-	-	-	111	NMED SSL	0.321	0.0398	-	0.005	0.004	0.00191
Toluene	-	SW8260D	108-88-3	mg/kg	N/A	NS	5230	NS	61300	NS	14000	-	-	-	-	5230	NMED SSL	12.1	11.1	-	0.005	0.0008	0.000227
Trans-1,2-Dichloroethene	-	SW8260D	156-60-5	mg/kg	N/A	NS	210	NS	1100	NS	206	-	-	-	-	206	NMED SSL	0.342	0.503	-	0.005	0.0008	0.00039
Trans-1,3-Dichloropropene	1,3-Dichloropropene	SW8260D	10061-02-6	mg/kg	N/A	29.3	141	146	695	781	130	-	-	-	-	29.3	NMED SSL	0.0281	NS	-	0.005	0.0002	0.000083
Trichloroethene	-	SW8260D	79-01-6	mg/kg	N/A	15.5	6.77	112	36.5	5370	6.90	-	-	-	-	6.77	NMED SSL	0.0161	0.0310	-	0.005	0.004	0.00191
Trichlorofluoromethane	-	SW8260D	75-69-4	mg/kg	N/A	NS	1230	NS	6030	NS	1130	-	-	-	-	1130	NMED SSL	15.7	NS	-	0.01	0.009	0.0032
Vinyl Chloride	-	SW8260D	75-01-4	mg/kg	N/A	0.742	113	28.4	816	161	162	-	-	-	-	0.742	NMED SSL	0.00217	0.0134	-	0.005	0.0032	0.00134
Explosives																							
1,3,5-Trinitrobenzene	-	SW8330B	99-35-4	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	2200	NS	32000	2200	EPA RSL	NS	NS	42.4	0.1	0.04	0.0138
1,3-Dinitrobenzene	-	SW8330B	99-65-0	mg/kg	N/A	NS	NS	NS	NS	NS	NS	NS	6.3	NS	82	6.30	EPA RSL	NS	NS	0.0353	0.1	0.04	0.0166
2,4-Dinitrotoluene	-	SW8330B	121-14-2	mg/kg	N/A	17.1	123	82.3	1820	600	536	-	-	-	-	17.1	NMED SSL	0.0492	NS	-	0.1	0.04	0.0147
2,6-Dinitrotoluene	-	SW8330B	606-20-2	mg/kg	N/A	3.56	18.5	17.2	276	165	80.9	-	-	-	-	3.56	NMED SSL	0.0102	NS	-	0.1	0.04	0.0191
2,4,6-Trinitrotoluene (TNT)	-	SW8330B	118-96-7	mg/kg	N/A	211	36.0																

Table 2-3 Comparison of Human Health Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Screening Level Surrogate	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	NMED Table A-1 and Table 6-2 Human Health Screening Levels Direct Contact ⁽³⁾						EPA-RSL Table Human Health Screening Levels Direct Contact ⁽⁴⁾				Lowest Human Health Screening Level Direct Contact ⁽⁵⁾	Lowest Human Health Screening Level Direct Contact Source ⁽⁵⁾	Human Health Screening Levels - Groundwater Protection			Achievable Laboratory Limits		
						Residential		Industrial/ Occupational		Construction Worker		Residential		Industrial				NMED Table A-3 and Table 6-4 Risk-based SSL ⁽⁶⁾	NMED Table A-3 NMGW/MCL based SSL ⁽⁶⁾	EPA-RSL Calculator Risk-based SSL ⁽⁷⁾	LOQ	LOD	DL
						cancer	noncancer	cancer	noncancer	cancer	noncancer	cancer adj to 1x10 ⁻⁵	noncancer HQ=1	cancer adj to 1x10 ⁻⁵	noncancer HQ=1			DAF = 20	DAF = 20	adjusted to DAF = 20			
Explosives (Continued)																							
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	-	SW8330B	2691-41-0	mg/kg	N/A	NS	3850	NS	63300	NS	17400	-	-	-	-	3850	NMED SSL	19.4	NS	-	0.1	0.07	0.0227
Pentaerythritol Tetranitrate (PETN)	-	SW8330B	78-11-5	mg/kg	N/A	NS	NS	NS	NS	NS	NS	1300	570	5300	7400	570	EPA RSL	NS	NS	5.18	2	1	0.493
Total Petroleum Hydrocarbons																							
DRO Extended (C10-C36)	-	SW8015D	68334-30-5	mg/kg	N/A	NS	1000	NS	3000	NS	3000	-	-	-	-	1000	NMED SSL	13.2	NS	-	8	7	3.64
Perchlorate																							
Perchlorate	-	SW6850	14797-73-0	mg/kg	N/A	NS	54.8	NS	908	NS	248	-	-	-	-	54.8	NMED SSL	0.117	0.0127	-	0.0008	0.0004	0.000088

Notes:

1. Analytical Method - EPA Test Methods for Evaluating Solid Waste latest edition (the most current version of each method the laboratory is accredited to will be used).

2. Selected FWDA background values are presented in Table 8-1 from *Soil Background Study and Data Evaluation Report* (Shaw, 2010), except arsenic and antimony:

- The arsenic background reference value is 5.6 mg/kg per Evaluation of Background Levels for Arsenic in Soil (NMED, 2013b). If the maximum arsenic concentration is greater than 5.6 mg/kg, then the range of arsenic concentrations in the sample data set is to be compared to the range of arsenic concentrations in the site-specific background data set (0.2 mg/kg to 11.2 mg/kg).
- The antimony background level of 0.23 mg/kg is from soil unit 350ss as presented in Table 4-1 of the *Phase 2 Soil Background Report* (USACE, 2013).

3. NMED *Risk Assessment Guidance for Site Investigations and Remediation*, November 2022 Revised (Appendix A, Table A-1, residential, commercial/industrial, construction worker).

4. USEPA RSL Summary Table (TR=1E-06, HQ=1), May 2024 (resident soil and industrial soil). The RSLs for carcinogenic analytes are adjusted to a TR=1E-05. Provided for analytes without a NMED SSL. Residential RSL for lead was changed to 200 mg/kg following USEPA's January 17, 2024, memorandum *Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (USEPA, 2024)*.

5. The lesser of the NMED screening levels for residents, industrial/occupational workers, and construction workers (or USEPA RSL (target excess cancer risk level of 1 x 10⁻⁵) if there is no NMED screening level. The most recent screening levels published by NMED and USEPA at the time the risk evaluation is conducted will be used in the risk evaluation.

6. NMED *Risk Assessment Guidance for Site Investigations and Remediation*, November 2022 Revised (Appendix A, Table A-3, risk-based SSL and NMGW/MCL-based SSL, and Table 6-4 for petroleum hydrocarbon mixtures; DAF=20).

7. USEPA RSL Calculator (TR=1E-05, HQ=1), May 2024 (protection of groundwater risk-based SSL). All anal ytes are adjusted to a DAF of 20.

8. Lead human health screening levels appear in the non-cancer column, but the health effects of lead are not correlated with the typical carcinogenic or non-carcinogenic dose-based toxicity values that characterize other chemicals. Instead, the screening level for lead is based on a modeled concentration in soil that results in an acceptable blood lead level protective of adverse developmental health effects (USEPA, 2024).

9. The background value for manganese is greater than the NMED human health screening level for direct contact.

■ Cells shaded in blue show that the screening level is lower than the achievable LOQ. If identified as a chemical of potential concern, these analytes will be addressed in the uncertainty discussion.

Acronyms and Abbreviations:

CASRN = Chemical Abstracts Service Registry Number	LOD = Limit of detection	NS = No standard
DAF = Dilution attenuation factor	LOQ = Limit of quantitation	RSL = Regional screening level
DL = Detection limit	MCL = Maximum contaminant level	SL-SSL = soil leachate-based SSL
DRO = Diesel-range organics	mg/kg = Milligram per kilogram	SSL = Soil screening level
EPA = United States Environmental Protection Agency	N/A = Not applicable	TAL = Target analyte list
FWDA = Fort Wingate Depot Activity	NMED = New Mexico Environment Department	
HQ = Hazard quotient	NMGW = New Mexico groundwater	

Table 2-4 Comparison of Human Health Groundwater Screening Levels to Laboratory Quantitation Limits

Analyte	Surrogate Analyte (used for groundwater criteria selection)	Analytical Method	CASRN	Units	EPA MCL ⁽¹⁾	20.6.2 NMAC NM WQCC ⁽²⁾	USEPA Tap Water RSL ⁽³⁾ (cancer)	USEPA Tap Water RSL ⁽⁴⁾ (non-cancer)	Selected Screening Value ^(5,6)	Screening Value Reference	Limit of Quantitation (LOQ)	Limit of Detection (LOD)	Detection Limit (DL)
TAL Metals													
Aluminum	-	6020B	7429-90-5	µg/L	200	5,000		20,000	200	WQCC	200	30	8.25
Antimony	-	6020B	7440-36-0	µg/L	6	6		7.8	6	WQCC	2	1	0.4
Arsenic	-	6020B	7440-38-2	µg/L	10	10	0.52	6	10	WQCC	5	2	0.5
Barium	-	6020B	7440-39-3	µg/L	2,000	2,000		3,800	2,000	WQCC	3	0.95	0.38
Beryllium	-	6020B	7440-41-7	µg/L	4	4		25	4	WQCC	1	0.6	0.303
Cadmium	-	6020B	7440-43-9	µg/L	5	5		1.8	5	WQCC	1	0.75	0.19
Calcium ⁽⁷⁾	-	6020B	7440-70-2	µg/L					NA		200	100	32.3
Chromium (Total)	-	6020B	7440-47-3	µg/L	100	50			50	WQCC	3	1.8	0.5
Cobalt	-	6020B	7440-48-4	µg/L		50		6	50	WQCC	1	0.9	0.33
Copper	-	6020B	7440-50-8	µg/L	1,300	1,000		800	1,000	WQCC	2	1.8	0.71
Iron	-	6020B	7439-89-6	µg/L	300	1,000		14,000	300	WQCC	200	40	8.67
Lead	-	6020B	7439-92-1	µg/L	15	15		15	15	WQCC	1	0.7	0.23
Magnesium ⁽⁷⁾	-	6020B	7439-95-4	µg/L					NA		200	15	4.16
Manganese	-	6020B	7439-96-5	µg/L	50	200		430	50	WQCC	3	1.8	0.51
Mercury	-	7470A	7439-97-6	µg/L	2	2		0.63	2	WQCC	0.2	0.08	0.061
Nickel	-	6020B	7440-02-0	µg/L		200		390	200	WQCC	3	1.9	0.83
Potassium ⁽⁷⁾	-	6020B	7440-09-7	µg/L					NA		1000	76	52
Selenium	-	6020B	7782-49-2	µg/L	50	50		100	50	WQCC	5	4	1
Silver	-	6020B	7440-22-4	µg/L	100	50		94	50	WQCC	1	0.15	0.045
Sodium ⁽⁷⁾	-	6020B	7440-23-5	µg/L					NA		1000	150	73.3
Thallium	-	6020B	7440-28-0	µg/L	2	2		0.2	2	WQCC	1	0.75	0.21
Vanadium	-	6020B	7440-62-2	µg/L				86	86	RSL	5	3	1.12
Zinc	-	6020B	7440-66-6	µg/L	5,000	10,000		6,000	5,000	WQCC	10	8	2
Perchlorate													
Perchlorate	-	6850	14797-73-0	µg/L				14	14	RSL	0.2	0.1	0.013
Total Petroleum Hydrocarbons													
Diesel Range Organics (DRO) Extended (C10-C36)	-	8015D	68334-30-5	µg/L					16.7	NMED RAG ⁽⁶⁾	250	120	32.6
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	-	8260D	630-20-6	µg/L			5.7	480	5.7	RSL	1	0.8	0.577
1,1,1-Trichloroethane	-	8260D	71-55-6	µg/L	200	200		8,000	200	WQCC	1	0.5	0.39
1,1,2,2-Tetrachloroethane	-	8260D	79-34-5	µg/L		10	0.76	360	10	WQCC	1	0.8	0.21
1,1,2-Trichloroethane	-	8260D	79-00-5	µg/L	5	5	2.8	0.41	5	WQCC	1	0.8	0.27
1,1-Dichloroethane	-	8260D	75-34-3	µg/L		25	28	3,800	25	WQCC	1	0.8	0.22
1,1-Dichloroethene	-	8260D	75-35-4	µg/L	7	7		280	7	WQCC	1	0.8	0.23
1,1-Dichloropropene	1,3-Dichloropropene	8260D	563-58-6	µg/L			4.7	39	4.7	RSL	1	0.8	0.416
1,2,3-Trichlorobenzene	-	8260D	87-61-6	µg/L				7	7	RSL	2	0.8	0.704
1,2,3-Trichloropropane	-	8260D	96-18-4	µg/L			0.0075	0.62	0.0075	RSL	2.5	1.8	0.858

Table 2-4 Comparison of Human Health Groundwater Screening Levels to Laboratory Quantitation Limits

Analyte	Surrogate Analyte (used for groundwater criteria selection)	Analytical Method	CASRN	Units	EPA MCL ⁽¹⁾	20.6.2 NMAC NM WQCC ⁽²⁾	USEPA Tap Water RSL ⁽³⁾ (cancer)	USEPA Tap Water RSL ⁽⁴⁾ (non-cancer)	Selected Screening Value ^(5,6)	Screening Value Reference	Limit of Quantitation (LOQ)	Limit of Detection (LOD)	Detection Limit (DL)
Volatile Organic Compounds (Continued)													
1,2,4-Trichlorobenzene	-	8260D	120-82-1	µg/L	70	70	12	4	70	WQCC	1	0.8	0.584
1,2,4-Trimethylbenzene	-	8260D	95-63-6	µg/L				56	56	RSL	1	0.4	0.15
1,2-Dibromo-3-Chloropropane	-	8260D	96-12-8	µg/L	0.2		0.0033	0.37	0.2	MCL	5	4	1.76
1,2-Dibromoethane	-	8260D	106-93-4	µg/L	0.05	0.05	0.075	17	0.05	MCL	1	0.8	0.404
1,2-Dichlorobenzene	-	8260D	95-50-1	µg/L	600	600		300	600	WQCC	1	0.5	0.372
1,2-Dichloroethane	-	8260D	107-06-2	µg/L	5	5	1.7	13	5	WQCC	1	0.8	0.541
1,2-Dichloropropane	-	8260D	78-87-5	µg/L	5	5	8.5	8.2	5	MCL	1	0.8	0.515
1,3,5-Trimethylbenzene	-	8260D	108-67-8	µg/L				60	60	RSL	1	0.5	0.368
1,3-Dichlorobenzene	1,4-Dichlorobenzene	8260D	541-73-1	µg/L	75	75	4.8	570	75	WQCC	1	0.4	0.334
1,3-Dichloropropane	-	8260D	142-28-9	µg/L				370	370	RSL	1	0.8	0.379
1,4-Dichlorobenzene	-	8260D	106-46-7	µg/L	75	75	4.8	570	75	WQCC	1	0.5	0.389
2,2-Dichloropropane	1,2-Dichloropropane	8260D	594-20-7	µg/L	5	5	8.5	8.2	5	MCL	1	0.8	0.38
2-Butanone (MEK)	-	8260D	78-93-3	µg/L				5,600	5,600	RSL	15	12	5.95
2-Chlorotoluene	-	8260D	95-49-8	µg/L				240	240	RSL	1	0.4	0.341
2-Hexanone	-	8260D	591-78-6	µg/L				38	38	RSL	5	4	1.7
4-Chlorotoluene	-	8260D	106-43-4	µg/L				250	250	RSL	1	0.8	0.21
4-Methyl-2-pentanone (MIBK)	-	8260D	108-10-1	µg/L				6,300	6,300	RSL	5	3.2	0.98
Acetone	-	8260D	67-64-1	µg/L				18,000	18,000	RSL	15	8	6.6
Benzene	-	8260D	71-43-2	µg/L	5	5	4.6	33	5	WQCC	1	0.8	0.308
Bromobenzene	-	8260D	108-86-1	µg/L				62	62	RSL	1	0.5	0.397
Bromochloromethane	-	8260D	74-97-5	µg/L				83	83	RSL	1	0.8	0.403
Bromodichloromethane	-	8260D	75-27-4	µg/L	80		1.3	150	80	MCL	1	0.5	0.386
Bromoform	-	8260D	75-25-2	µg/L	80		33	380	80	MCL	2	1.8	1.21
Bromomethane	-	8260D	74-83-9	µg/L				7.5	7.5	RSL	5	4	2.36
Carbon disulfide	-	8260D	75-15-0	µg/L				810	810	RSL	2	0.8	0.631
Carbon tetrachloride	-	8260D	56-23-5	µg/L	5	5	4.6	49	5	WQCC	1	0.8	0.566
Chlorobenzene	-	8260D	108-90-7	µg/L	100			78	100	MCL	1	0.8	0.422
Chloroethane	-	8260D	75-00-3	µg/L				8,300	8,300	RSL	4	1.6	1.37
Chloroform	-	8260D	67-66-3	µg/L	80	100	2.2	4.0	80	MCL	1	0.8	0.358
Chloromethane	-	8260D	74-87-3	µg/L				190	190	RSL	2	1	0.753
cis-1,2-Dichloroethene	-	8260D	156-59-2	µg/L	70	70		25	70	WQCC	1	0.4	0.321
cis-1,3-Dichloropropene	1,3-Dichloropropene	8260D	10061-01-5	µg/L			4.7	39	4.7	RSL	2	1.8	0.626
Dibromochloromethane	-	8260D	124-48-1	µg/L	80		8.7	380	80	MCL	2	1.8	0.618
Dibromomethane	-	8260D	74-95-3	µg/L				8.3	8.3	RSL	1	0.4	0.343
Dichlorodifluoromethane	-	8260D	75-71-8	µg/L				200	200	RSL	3	2.5	0.962
Ethylbenzene	-	8260D	100-41-4	µg/L	700	700	15	500	700	WQCC	1	0.4	0.303

Table 2-4 Comparison of Human Health Groundwater Screening Levels to Laboratory Quantitation Limits

Analyte	Surrogate Analyte (used for groundwater criteria selection)	Analytical Method	CASRN	Units	EPA MCL ⁽¹⁾	20.6.2 NMAC NM WQCC ⁽²⁾	USEPA Tap Water RSL ⁽³⁾ (cancer)	USEPA Tap Water RSL ⁽⁴⁾ (non-cancer)	Selected Screening Value ^(5,6)	Screening Value Reference	Limit of Quantitation (LOQ)	Limit of Detection (LOD)	Detection Limit (DL)
Volatile Organic Compounds (Continued)													
Hexachlorobutadiene	-	8260D	87-68-3	µg/L			1.4	6.5	1.4	RSL	2	1.8	1.17
Isopropylbenzene	-	8260D	98-82-8	µg/L				450	450	RSL	1	0.5	0.363
Methyl acetate	-	8260D	79-20-9	µg/L				20,000	20,000	RSL	5	4	1.64
Methyl tert butyl ether	-	8260D	1634-04-4	µg/L		100	140	6,300	100	WQCC	5	0.8	0.25
Methylene Chloride	-	8260D	75-09-2	µg/L	5	5	110	110	5	WQCC	2	1.8	0.938
m-Xylene & p Xylene	Xylenes	8260D	179601-23-1	µg/L	10,000	620		190	620	WQCC	2	0.8	0.356
Naphthalene	-	8260D	91-20-3	µg/L		30	1.2	6.1	30	WQCC	2	0.8	0.634
n-Butylbenzene	-	8260D	104-51-8	µg/L				1000	1,000	RSL	1	0.8	0.475
N-Propylbenzene	-	8260D	103-65-1	µg/L				660	660	RSL	1	0.8	0.531
o-Xylene	-	8260D	95-47-6	µg/L	10,000	620		190	620	WQCC	1	0.4	0.331
4-Isopropyltoluene	-	8260D	99-87-6	µg/L				450	450	RSL	1	0.8	0.428
sec-Butylbenzene	-	8260D	135-98-8	µg/L				2,000	2,000	RSL	1	0.8	0.447
Styrene	-	8260D	100-42-5	µg/L	100	100		1,200	100	WQCC	1	0.8	0.356
tert-Butylbenzene	-	8260D	98-06-6	µg/L				690	690	RSL	1	0.8	0.421
Tetrachloroethene	-	8260D	127-18-4	µg/L	5	5	110	41	5	MCL	1	0.8	0.403
Toluene	-	8260D	108-88-3	µg/L	1,000	1,000		1,100	1,000	WQCC	1	0.4	0.322
trans-1,2-Dichloroethene	-	8260D	156-60-5	µg/L	100	100		68	100	WQCC	1	0.5	0.368
trans-1,3-Dichloropropene	1,3-Dichloropropene	8260D	10061-02-6	µg/L			4.7	39	4.7	RSL	2	1.8	0.646
Trichloroethene	-	8260D	79-01-6	µg/L	5	5	4.9	2.8	5	WQCC	1	0.4	0.3
Trichlorofluoromethane	-	8260D	75-69-4	µg/L				5,200	5,200	RSL	2	0.8	0.566
Vinyl chloride	-	8260D	75-01-4	µg/L	2	2	0.19	44	2	WQCC	2	1	0.505
Semi-Volatile Organic Compounds													
2,2-Oxybis(1-chloropropane)	-	8270E	108-60-1	µg/L				710	710	RSL	10	8	1.31
2,4,5-Trichlorophenol	-	8270E	95-95-4	µg/L				1,200	1,200	RSL	10	8	2.56
2,4,6-Trichlorophenol	-	8270E	88-06-2	µg/L			41	12	12	RSL	10	8	2.32
2,4-Dichlorophenol	-	8270E	120-83-2	µg/L				46	46	RSL	10	8	3.01
2,4-Dimethylphenol	-	8270E	105-67-9	µg/L				360	360	RSL	10	8	1.36
2,4-Dinitrophenol	-	8270E	51-28-5	µg/L				39	39	RSL	30	20	12.8
2,4-Dinitrotoluene	-	8270E	121-14-2	µg/L			2.4	38	2.4	RSL	10	8	1.43
2,6-Dinitrotoluene	-	8270E	606-20-2	µg/L			0.49	5.7	0.49	RSL	10	8	1.42
2-Chloronaphthalene	-	8270E	91-58-7	µg/L				750	750	RSL	4	3.2	1.27
2-Chlorophenol	-	8270E	95-57-8	µg/L				91	91	RSL	10	8	2.57
2-Methylnaphthalene	-	8270E	91-57-6	µg/L		30		36	30	WQCC	4	3.2	1.22
2-Methylphenol	-	8270E	95-48-7	µg/L				930	930	RSL	10	8	0.77
2-Nitroaniline	-	8270E	88-74-4	µg/L				190	190	RSL	10	3.2	2.61
2-Nitrophenol	-	8270E	88-75-5	µg/L					NS		10	8	3.48
3 & 4 Methylphenol	p-cresol	8270E	15531-10-4	µg/L				370	370	RSL	10	8	2.17
3,3-Dichlorobenzidine	-	8270E	91-94-1	µg/L			1.3		1.3	RSL	50	30	3.38
3-Nitroaniline	4-Nitroaniline	8270E	99-09-2	µg/L			38	78	38	RSL	10	8	3.34
4,6-Dinitro-2-methylphenol	-	8270E	534-52-1	µg/L				1.5	1.5	RSL	50	30	4.03

Table 2-4 Comparison of Human Health Groundwater Screening Levels to Laboratory Quantitation Limits

Analyte	Surrogate Analyte (used for groundwater criteria selection)	Analytical Method	CASRN	Units	EPA MCL ⁽¹⁾	20.6.2 NMAC NM WQCC ⁽²⁾	USEPA Tap Water RSL ⁽³⁾ (cancer)	USEPA Tap Water RSL ⁽⁴⁾ (non-cancer)	Selected Screening Value ^(5,6)	Screening Value Reference	Limit of Quantitation (LOQ)	Limit of Detection (LOD)	Detection Limit (DL)
Semi-Volatile Organic Compounds (Continued)													
4-Bromophenyl phenyl ether	-	8270E	101-55-3	µg/L					NS		10	8	1.01
4-Chloro-3-methylphenol	-	8270E	59-50-7	µg/L				1,400	1,400	RSL	10	8	1.69
4-Chloroaniline	-	8270E	106-47-8	µg/L			3.7	9.5	3.7	RSL	20	12.8	6.28
4-Chlorophenyl phenyl ether	-	8270E	7005-72-3	µg/L					NS		10	8	1.24
4-Nitroaniline	-	8270E	100-01-6	µg/L			38	78	38	RSL	10	8	2.61
4-Nitrophenol	-	8270E	100-02-7	µg/L					NS		25	12.8	9.05
Acenaphthene	-	8270E	83-32-9	µg/L				530	530	RSL	4	3.2	0.96
Acenaphthylene	Pyrene	8270E	208-96-8	µg/L				120	120	RSL	4	3.2	0.746
Anthracene	-	8270E	120-12-7	µg/L				1,800	1,800	RSL	4	3.2	0.58
Benzaldehyde	-	8270E	100-52-7	µg/L			190	1,900	190	RSL	5	3.2	1.16
Benzo[a]anthracene	-	8270E	56-55-3	µg/L			0.3		0.3	RSL	4	3.2	0.96
Benzo[a]pyrene	-	8270E	50-32-8	µg/L	0.2	0.2	0.25	6	0.2	WQCC	4	3.2	0.5
Benzo[b]fluoranthene	-	8270E	205-99-2	µg/L			2.5		2.5	RSL	4	3.2	2.15
Benzo[g,h,i]perylene	Pyrene	8270E	191-24-2	µg/L				120	120	RSL	4	3.2	2.84
Benzo[k]fluoranthene	-	8270E	207-08-9	µg/L			25		25	RSL	4	3.2	1.05
bis-(2-Chloroethoxy)methane	-	8270E	111-91-1	µg/L				59	59	RSL	10	8	2.4
bis-(2-Chloroethyl)ether	-	8270E	111-44-4	µg/L			0.14		0.14	RSL	10	8	2.02
bis-(2-Ethylhexyl)phthalate	-	8270E	117-81-7	µg/L	6		56	400	6	MCL	10	8	3.32
Butyl benzyl phthalate	-	8270E	85-68-7	µg/L			160	1,700	160	RSL	4	3.2	1.53
Caprolactam	-	8270E	105-60-2	µg/L				9,900	9,900	RSL	15	10	5.51
Carbazole	Fluorene	8270E	86-74-8	µg/L				290	290	RSL	4	3.2	1.41
Chrysene	-	8270E	218-01-9	µg/L			250		250	RSL	4	3.2	0.97
Dibenz(a,h)anthracene	-	8270E	53-70-3	µg/L			0.25		0.25	RSL	10	8	4.76
Dibenzofuran	-	8270E	132-64-9	µg/L				7.9	7.9	RSL	4	3.2	0.95
Diethyl phthalate	-	8270E	84-66-2	µg/L				15,000	15,000	RSL	4	3.2	1.37
Dimethyl phthalate	-	8270E	131-11-3	µg/L					NS		4	3.2	0.75
Di-n-butyl phthalate	-	8270E	84-74-2	µg/L				900	900	RSL	4	3.2	2.08
Di-n-octyl phthalate	-	8270E	117-84-0	µg/L				200	200	RSL	10	8	3.6
Fluoranthene	-	8270E	206-44-0	µg/L				800	800	RSL	4	3.2	1.1
Fluorene	-	8270E	86-73-7	µg/L				290	290	RSL	4	3.2	0.784
Hexachlorobenzene	-	8270E	118-74-1	µg/L	1		0.098	0.2	1	MCL	10	8	2.28
Hexachlorobutadiene	-	8270E	87-68-3	µg/L			1.4	6.5	1.4	RSL	10	8	2.86
Hexachlorocyclopentadiene	-	8270E	77-47-4	µg/L	50			0.41	50	MCL	50	48	16
Hexachloroethane	-	8270E	67-72-1	µg/L			3.3	6.2	3.3	RSL	10	8	4.46
Indeno(1,2,3-cd)pyrene	-	8270E	193-39-5	µg/L			2.5		2.5	RSL	10	8	3.43
Isophorone	-	8270E	78-59-1	µg/L			780	3,800	780	RSL	10	8	1.98
Naphthalene	-	8270E	91-20-3	µg/L		30	1.2	6.1	30	WQCC	4	3.2	1.51
Nitrobenzene	-	8270E	98-95-3	µg/L			1.4	13	1.4	RSL	10	8	1.25
N-Nitrosodi-n-propylamine	-	8270E	621-64-7	µg/L			0.11		0.11	RSL	10	8	1.91

Table 2-4 Comparison of Human Health Groundwater Screening Levels to Laboratory Quantitation Limits

Analyte	Surrogate Analyte (used for groundwater criteria selection)	Analytical Method	CASRN	Units	EPA MCL ⁽¹⁾	20.6.2 NMAC NM WQCC ⁽²⁾	USEPA Tap Water RSL ⁽³⁾ (cancer)	USEPA Tap Water RSL ⁽⁴⁾ (non-cancer)	Selected Screening Value ^(5,6)	Screening Value Reference	Limit of Quantitation (LOQ)	Limit of Detection (LOD)	Detection Limit (DL)
Semi-Volatile Organic Compounds (Continued)													
N-Nitrosodiphenylamine	-	8270E	86-30-6	µg/L			120		120	RSL	10	8	1.82
Pentachlorophenol	-	8270E	87-86-5	µg/L	1	1	0.41	23	1	MCL	50	48	20
Phenanthrene	-	8270E	85-01-8	µg/L					170	NMED RAG ⁽⁶⁾	4	3.2	1.58
Phenol	-	8270E	108-95-2	µg/L		5		5,800	5	WQCC	10	8	0.92
Pyrene	-	8270E	129-00-0	µg/L				120	120	RSL	10	8	2.39
Explosives													
1,3,5-Trinitrobenzene	-	8330B	99-35-4	µg/L				590	590	RSL	0.21	0.2	0.0841
1,3-Dinitrobenzene	-	8330B	99-65-0	µg/L				2	2	RSL	0.11	0.1	0.0369
2,4,6-Trinitrotoluene	-	8330B	118-96-7	µg/L			25	9.8	9.8	RSL	0.11	0.1	0.045
2,4-Dinitrotoluene	-	8330B	121-14-2	µg/L			2.4	38	2.4	RSL	0.1	0.08	0.0274
2,6-Dinitrotoluene	-	8330B	606-20-2	µg/L			0.49	5.7	0.49	RSL	0.1	0.08	0.0401
2-Amino-4,6-dinitrotoluene	-	8330B	35572-78-2	µg/L				1.9	1.9	RSL	0.11	0.1	0.0507
4-Amino-2,6-dinitrotoluene	-	8330B	19406-51-0	µg/L				1.9	1.9	RSL	0.15	0.12	0.0577
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	-	8330B	2691-41-0	µg/L				1,000	1,000	RSL	0.21	0.2	0.0876
m-Nitrotoluene	-	8330B	99-08-01	µg/L				1.7	1.7	RSL	0.4	0.35	0.195
Nitrobenzene	-	8330B	98-95-3	µg/L			1.4	13	1.4	RSL	0.21	0.2	0.091
Nitroglycerin	-	8330B	55-63-0	µg/L			45	2	2	RSL	2.1	2	0.921
o-Nitrotoluene	-	8330B	88-72-2	µg/L			3.1	16	3.1	RSL	0.21	0.2	0.0855
Pentaerythritol tetranitrate (PETN)	-	8330B	78-11-5	µg/L			170	170	170	RSL	1.1	1	0.447
p-Nitrotoluene	-	8330B	99-99-0	µg/L			43	71	43	RSL	0.41	0.4	0.1
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	-	8330B	121-82-4	µg/L			9.7	80	9.7	RSL	0.21	0.2	0.0515
Trinitrophenylmethylnitramine (Tetryl)	-	8330B	479-45-8	µg/L				39	39	RSL	0.11	0.1	0.0318

Notes:

1. U.S. Environmental Protection Agency (USEPA), Drinking Water Primary and Secondary Maximum Contaminant Level (MCL) per 40 Code of Federal Regulations Sections 141 and 143. If an analyte has both a primary and secondary MCL, the primary was provided.

2. New Mexico Water Quality Control Commission (NM WQCC) standards per 20 New Mexico Administrative Code § 6.2.4103.A and B.


3. USEPA RSLs for Tap Water for carcinogenic analytes (adjusted to TR=1E-05), May 2024.

4. USEPA RSLs for Tap Water for noncarcinogenic analytes, May 2024.

5. The selected screening value is the lowest of the NMWQCC standard or USEPA MCL, or the lowest of the USEPA tap water RSLs considering carcinogenic and noncarcinogenic effects, if no NWWQCC standard or USEPA MCL is published. This hierarchy is taken from Section 7.1 of Attachment 7 of the RCRA Permit (NMED, 2005 and updated in February 2015).

6. The most recent screening levels published by NMED and USEPA at the time the risk evaluation is conducted will be used in the risk evaluation.

7. Analyte is considered an essential nutrient and risk is not evaluated.

 shaded in blue show that the screening level is lower than the achievable LOQ. If identified as a chemical of potential concern, these analytes will be addressed in the uncertainty discussion.

Cells

Acronyms and Abbreviations:

µg/L = micrograms per liter

CASRN = Chemical Abstract Service registry number

MCL = U.S. Environmental Protection Agency

NS = no screening value

N/A = not applicable

WQCC = New Mexico Water Quality Control Commission standard

RSL = U.S. Environmental Protection Agency Regional Screening Level - Tap water screening level with cancer risk adjusted to 1x10⁻⁵

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

Table 2-5 Comparison of Ecological Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	Ecological Screening Level ^(3, 4)			Most Protective ESL or Background Value ⁽⁵⁾	Achievable Laboratory Limits		
					Plants	Deer Mouse	Horned Lark		LOQ	LOD	DL
TAL Metals											
Aluminum	SW6020B	7429-90-5	mg/kg	23,340	NS	564	520	23,340	11	10	3.77
Antimony	SW6020B	7440-36-0	mg/kg	2.20	11.4	0.536	NS	2.20	0.2	0.12	0.0376
Arsenic	SW6020B	7440-38-2	mg/kg	5.60	18.0	9.45	10.6	9.45	0.6	0.2	0.0506
Barium	SW6020B	7440-39-3	mg/kg	482	118	471	348	482	0.4	0.2	0.0723
Beryllium	SW6020B	7440-41-7	mg/kg	1.49	2.50	4.84	NS	2.50	0.1	0.08	0.0225
Cadmium	SW6020B	7440-43-9	mg/kg	0.224	32.0	7.00	6.95	6.95	0.1	0.06	0.0203
Calcium	SW6020B	7440-70-2	mg/kg	91,760	NS	NS	NS	91,760	50	25	8.9
Cobalt	SW6020B	7440-48-4	mg/kg	6.82	13.0	66.6	36.0	13.0	0.1	0.025	0.00663
Copper	SW6020B	7440-50-8	mg/kg	18.4	70.0	50.9	19.2	19.2	0.6	0.45	0.2
Iron	SW6020B	7439-89-6	mg/kg	22,660	NS	NS	NS	22,660	15	14	3.94
Lead	SW6020B	7439-92-1	mg/kg	12.4	120	42.7	7.71	12.4	0.4	0.12	0.0385
Magnesium	SW6020B	7439-95-4	mg/kg	8,170	NS	NS	NS	8,170	50	10	2.5
Manganese	SW7471B	7439-96-5	mg/kg	1,058	220	468	847	1,058	0.5	0.3	0.0961
Mercury	SW6020B	7439-97-6	mg/kg	0.0300	34.9	12.8	0.0899	0.0899	0.017	0.0133	0.00553
Nickel	SW6020B	7440-02-0	mg/kg	19.5	38.0	15.5	31.7	19.5	0.6	0.35	0.169
Potassium	SW6020B	7440-09-7	mg/kg	3,950	NS	NS	NS	3,950	25	19	5.29
Selenium	SW6020B	7782-49-2	mg/kg	0.513	0.520	1.30	1.37	0.520	0.5	0.12	0.0347
Silver	SW6020B	7440-22-4	mg/kg	0.130	560	54.7	10.4	10.40	0.1	0.02	0.00539
Sodium	SW6020B	7440-23-5	mg/kg	2,526	NS	NS	NS	2,526	40	36	9.04
Thallium	SW6020B	7440-28-0	mg/kg	0.213	0.0500	0.0645	1.66	0.213	0.1	0.06	0.0177
Total Chromium	SW6020B	7440-47-3	mg/kg	18.1	NS	21.8	12.6	18.1	0.6	0.2	0.0964
Vanadium	SW6020B	7440-62-2	mg/kg	27.2	60.0	37.8	1.63	27.2	0.5	0.3	0.104
Zinc	SW6020B	7440-66-6	mg/kg	49.2	160	685	313	160	2	1.4	0.688
Semi-Volatile Organic Compounds											
2,2-Oxybis(1-chloropropane)	SW8270E	108-60-1	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.023
2,4,5-Trichlorophenol	SW8270E	95-95-4	mg/kg	N/A	NS	NS	NS	NS	0.33	0.033	0.01
2,4,6-Trichlorophenol	SW8270E	88-06-2	mg/kg	N/A	NS	NS	NS	NS	0.33	0.033	0.01
2,4-Dichlorophenol	SW8270E	120-83-2	mg/kg	N/A	NS	NS	NS	NS	0.33	0.033	0.01
2,4-Dimethylphenol	SW8270E	105-67-9	mg/kg	N/A	NS	NS	NS	NS	0.33	0.133	0.066
2,4-Dinitrophenol	SW8270E	51-28-5	mg/kg	N/A	NS	NS	NS	NS	1.6	1	0.333
2,4-Dinitrotoluene	SW8270E	121-14-2	mg/kg	N/A	6.00	24.4	NS	6.00	0.33	0.133	0.066
2,6-Dinitrotoluene	SW8270E	606-20-2	mg/kg	N/A	NS	16.1	284	16.1	0.33	0.067	0.028
2-Chloronaphthalene	SW8270E	91-58-7	mg/kg	N/A	NS	NS	NS	NS	0.33	0.033	0.01
2-Chlorophenol	SW8270E	95-57-8	mg/kg	N/A	NS	4.55	5.34	4.55	0.33	0.067	0.021
2-Methylphenol	SW8270E	95-48-7	mg/kg	N/A	0.670	2,000	NS	0.670	0.33	0.033	0.013
2-Nitroaniline	SW8270E	88-74-4	mg/kg	N/A	NS	27.3	NS	27.3	1.6	0.133	0.05
2-Nitrophenol	SW8270E	88-75-5	mg/kg	N/A	NS	NS	NS	NS	0.33	0.033	0.01
3 & 4 Methylphenol	SW8270E	15831-10-4	mg/kg	N/A	0.690	NS	NS	0.690	0.33	0.067	0.033
3,3'-Dichlorobenzidine	SW8270E	91-94-1	mg/kg	N/A	NS	NS	NS	NS	1.6	0.267	0.09
3-Nitroaniline	SW8270E	99-09-2	mg/kg	N/A	NS	NS	NS	NS	1.6	0.267	0.073
4,6-Dinitro-2-Methylphenol	SW8270E	534-52-1	mg/kg	N/A	NS	NS	NS	NS	1.6	1	0.33
4-Bromophenyl-phenyl ether	SW8270E	101-55-3	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.019
4-Chloro-3-Methylphenol	SW8270E	59-50-7	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.0248
4-Chloroaniline	SW8270E	106-47-8	mg/kg	N/A	NS	NS	NS	NS	0.33	0.267	0.0819
4-Chlorophenyl-phenyl ether	SW8270E	7005-72-3	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.021
4-Nitroaniline	SW8270E	100-01-6	mg/kg	N/A	NS	NS	NS	NS	1.6	0.267	0.0725
4-Nitrophenol	SW8270E	100-02-7	mg/kg	N/A	NS	NS	NS	NS	1.6	0.267	0.097
Benzaldehyde	SW8270E	100-52-7	mg/kg	N/A	NS	NS	NS	NS	0.33	0.167	0.067

Table 2-5 Comparison of Ecological Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	Ecological Screening Level ^(3, 4)			Most Protective ESL or Background Value ⁽⁵⁾	Achievable Laboratory Limits		
					Plants	Deer Mouse	Horned Lark		LOQ	LOD	DL
Semi-Volatile Organic Compounds (Continued)											
Bis(2-Chloroethoxy)Methane	SW8270E	111-91-1	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.023
Bis(2-Chloroethyl)Ether	SW8270E	111-44-4	mg/kg	N/A	NS	NS	NS	NS	0.33	0.033	0.0166
Bis(2-Ethylhexyl)Phthalate	SW8270E	117-81-7	mg/kg	N/A	NS	166	5.20	5.20	0.33	0.133	0.046
Butylbenzylphthalate	SW8270E	85-68-7	mg/kg	N/A	NS	1,450	NS	1,450	0.33	0.133	0.043
Caprolactam	SW8270E	105-60-2	mg/kg	N/A	NS	NS	NS	NS	1.6	0.267	0.106
Carbazole	SW8270E	86-74-8	mg/kg	N/A	NS	207	NS	207	0.33	0.133	0.036
Dibenzofuran	SW8270E	132-64-9	mg/kg	N/A	6.17	NS	NS	6.17	0.33	0.067	0.02
Diethylphthalate	SW8270E	84-66-2	mg/kg	N/A	100	41,800	NS	100	0.66	0.067	0.026
Dimethylphthalate	SW8270E	131-11-3	mg/kg	N/A	NS	618	NS	618	0.33	0.067	0.023
Di-N-Butylphthalate	SW8270E	84-74-2	mg/kg	N/A	167	12,200	0.662	0.662	0.33	0.067	0.029
Di-n-Octylphthalate	SW8270E	117-84-0	mg/kg	N/A	NS	592	NS	592	0.33	0.133	0.0405
Hexachlorobenzene	SW8270E	118-74-1	mg/kg	N/A	10.0	64.5	23.7	10.0	0.33	0.067	0.029
Hexachlorobutadiene	SW8270E	87-68-3	mg/kg	N/A	NS	NS	NS	NS	0.33	0.033	0.01
Hexachlorocyclopentadiene	SW8270E	77-47-4	mg/kg	N/A	NS	NS	NS	NS	1.7	0.333	0.111
Hexachloroethane	SW8270E	67-72-1	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.0213
Isophorone	SW8270E	78-59-1	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.017
Nitrobenzene	SW8270E	98-95-3	mg/kg	N/A	NS	53.6	NS	53.6	0.33	0.067	0.022
N-Nitroso-Di-N-Propylamine	SW8270E	621-64-7	mg/kg	N/A	NS	NS	NS	NS	0.33	0.167	0.068
N-Nitrosodiphenylamine	SW8270E	86-30-6	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.021
Pentachlorophenol	SW8270E	87-86-5	mg/kg	N/A	5.00	76.5	31.8	5.00	1.6	1	0.33
Phenol	SW8270E	108-95-2	mg/kg	N/A	0.790	545	NS	0.790	0.33	0.067	0.018
2-Methylnaphthalene	SW8270E	91-57-6	mg/kg	N/A	NS	NS	NS	NS	0.33	0.067	0.019
Acenaphthene	SW8270E	83-32-9	mg/kg	N/A	0.250	636	NS	0.250	0.33	0.033	0.0103
Acenaphthylene	SW8270E	208-96-8	mg/kg	N/A	NS	636	NS	636	0.33	0.267	0.0821
Anthracene	SW8270E	120-12-7	mg/kg	N/A	6.88	909	NS	6.88	0.33	0.067	0.017
Benzo(a)anthracene	SW8270E	56-55-3	mg/kg	N/A	18.0	1.55	0.506	0.506	0.33	0.067	0.02
Benzo(a)pyrene	SW8270E	50-32-8	mg/kg	N/A	NS	50.7	NS	50.7	0.33	0.067	0.02
Benzo(b)fluoranthene	SW8270E	205-99-2	mg/kg	N/A	18.0	36.4	NS	18.0	0.33	0.067	0.0262
Benzo(k)fluoranthene	SW8270E	207-08-9	mg/kg	N/A	NS	65.4	NS	65.4	0.33	0.133	0.04
Benzo(g,h,i)perylene	SW8270E	191-24-2	mg/kg	N/A	NS	65.4	NS	65.4	0.33	0.033	0.016
Chrysene	SW8270E	218-01-9	mg/kg	N/A	NS	1.55	NS	1.55	0.33	0.067	0.027
Dibenz(a,h)anthracene	SW8270E	53-70-3	mg/kg	N/A	NS	12.1	NS	12.1	0.33	0.067	0.019
Fluoranthene	SW8270E	206-44-0	mg/kg	N/A	NS	114	NS	114	0.33	0.133	0.036
Fluorene	SW8270E	86-73-7	mg/kg	N/A	NS	1,140	NS	1,140	0.33	0.067	0.018
Indeno(1,2,3-cd)pyrene	SW8270E	193-39-5	mg/kg	N/A	NS	65.4	NS	65.4	0.33	0.067	0.022
Naphthalene	SW8270E	91-20-3	mg/kg	N/A	1.00	130	71.0	1.00	0.33	0.067	0.031
Phenanthrene	SW8270E	85-01-8	mg/kg	N/A	NS	46.7	NS	46.7	0.33	0.067	0.017
Pyrene	SW8270E	129-00-0	mg/kg	N/A	NS	68.2	97.0	68.2	0.4	0.033	0.0121
Volatile Organic Compounds											
1,1,1,2-Tetrachloroethane	SW8260D	630-20-6	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00222
1,1,1-Trichloroethane	SW8260D	71-55-6	mg/kg	N/A	NS	9,080	NS	9,080	0.005	0.004	0.00198
1,1,2,2-Tetrachloroethane	SW8260D	79-34-5	mg/kg	N/A	NS	403	NS	403	0.005	0.0008	0.000285
1,1,2-Trichloroethane	SW8260D	79-00-5	mg/kg	N/A	NS	35.5	NS	35.5	0.005	0.0032	0.00088
1,1-Dichloroethane	SW8260D	75-34-3	mg/kg	N/A	NS	3,470	NS	3,470	0.005	0.0008	0.00021
1,1-Dichloroethene	SW8260D	75-35-4	mg/kg	N/A	NS	273	NS	273	0.005	0.0016	0.00059
1,1-Dichloropropene	SW8260D	563-58-6	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0004	0.000164
1,2,3-Trichlorobenzene	SW8260D	87-61-6	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0032	0.00081
1,2,3-Trichloropropane	SW8260D	96-18-4	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0008	0.000218

Table 2-5 Comparison of Ecological Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	Ecological Screening Level ^(3, 4)			Most Protective ESL or Background Value ⁽⁵⁾	Achievable Laboratory Limits		
					Plants	Deer Mouse	Horned Lark		LOQ	LOD	DL
Volatile Organic Compounds (Continued)											
1,2,4-Trichlorobenzene	SW8260D	120-82-1	mg/kg	N/A	NS	13.5	NS	13.5	0.005	0.0016	0.00073
1,2,4-Trimethylbenzene	SW8260D	95-63-6	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00231
1,2-Dibromo-3-Chloropropane	SW8260D	96-12-8	mg/kg	N/A	NS	NS	NS	NS	0.01	0.009	0.00366
1,2-Dibromoethane	SW8260D	106-93-4	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.00052
1,2-Dichlorobenzene	SW8260D	95-50-1	mg/kg	N/A	NS	22.7	NS	22.7	0.005	0.004	0.00187
1,2-Dichloroethane	SW8260D	107-06-2	mg/kg	N/A	NS	452	21.8	21.8	0.005	0.0016	0.0007
1,2-Dichloropropane	SW8260D	78-87-5	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.00055
1,3,5-Trimethylbenzene	SW8260D	108-67-8	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00242
1,3-Dichloropropane	SW8260D	142-28-9	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0004	0.000173
1,3-Dichlorobenzene	SW8260D	541-73-1	mg/kg	N/A	NS	22.7	NS	22.7	0.005	0.0016	0.00048
1,4-Dichlorobenzene	SW8260D	106-46-7	mg/kg	N/A	NS	22.7	NS	22.7	0.005	0.0008	0.000245
2,2-Dichloropropane	SW8260D	594-20-7	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.00044
2-Butanone (MEK)	SW8260D	78-93-3	mg/kg	N/A	NS	16,100	NS	16,100	0.02	0.0128	0.00389
2-Chlorotoluene	SW8260D	95-49-8	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.00051
2-Hexanone	SW8260D	591-78-6	mg/kg	N/A	NS	75.2	4.73	4.73	0.02	0.0128	0.00489
4-Chlorotoluene	SW8260D	106-43-4	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0008	0.000361
4-Methyl-2-Pentanone (MIBK)	SW8260D	108-10-1	mg/kg	N/A	NS	227	NS	227	0.02	0.0128	0.00436
Acetone	SW8260D	67-64-1	mg/kg	N/A	NS	90.9	951	90.9	0.072	0.07	0.0356
Benzene	SW8260D	71-43-2	mg/kg	N/A	NS	240	NS	240	0.005	0.0004	0.000151
Bromobenzene	SW8260D	108-86-1	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.00049
Bromochloromethane	SW8260D	74-97-5	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00246
Bromodichloromethane	SW8260D	75-27-4	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00213
Bromoform	SW8260D	75-25-2	mg/kg	N/A	NS	NS	NS	NS	0.0051	0.005	0.00255
Bromomethane	SW8260D	74-83-9	mg/kg	N/A	NS	NS	NS	NS	0.01	0.0032	0.00135
Carbon Disulfide	SW8260D	75-15-0	mg/kg	N/A	NS	2.27	NS	2.27	0.005	0.004	0.00166
Carbon Tetrachloride	SW8260D	56-23-5	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00201
Chlorobenzene	SW8260D	108-90-7	mg/kg	N/A	NS	545	284	284	0.005	0.004	0.00206
Chloroethane	SW8260D	75-00-3	mg/kg	N/A	NS	NS	NS	NS	0.01	0.0064	0.00199
Chloroform	SW8260D	67-66-3	mg/kg	N/A	NS	136	NS	136	0.01	0.0008	0.00029
Chloromethane	SW8260D	74-87-3	mg/kg	N/A	NS	NS	NS	NS	0.01	0.0016	0.00077
cis-1,2-Dichloroethene	SW8260D	156-59-2	mg/kg	N/A	NS	411	NS	411	0.005	0.0008	0.000201
cis-1,3-Dichloropropene	SW8260D	10061-01-5	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0004	0.0001
Dibromochloromethane	SW8260D	124-48-1	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00227
Dibromomethane	SW8260D	74-95-3	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0008	0.000317
Dichlorodifluoromethane	SW8260D	75-71-8	mg/kg	N/A	NS	NS	NS	NS	0.01	0.0064	0.00274
Ethylbenzene	SW8260D	100-41-4	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0008	0.000305
Hexachlorobutadiene	SW8260D	87-68-3	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00217
Isopropylbenzene	SW8260D	98-82-8	mg/kg	N/A	NS	NS	NS	NS	0.005	0.004	0.00241
Methyl acetate	SW8260D	79-20-9	mg/kg	N/A	NS	NS	NS	NS	0.0085	0.008	0.00275
m,p-Xylenes	SW8260D	179601-23-1	mg/kg	N/A	NS	19.1	506	19.1	0.0032	0.003	0.00104
Methyl Tert-Butyl Ether	SW8260D	1634-04-4	mg/kg	N/A	NS	NS	NS	NS	0.02	0.0064	0.00211
Methylene Chloride	SW8260D	75-09-2	mg/kg	N/A	1,670	53.2	NS	53.2	0.005	0.0032	0.0016
Naphthalene	SW8260D	91-20-3	mg/kg	N/A	1.00	130	71.0	1.00	0.0067	0.005	0.00331
n-Butylbenzene	SW8260D	104-51-8	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.00056
n-Propylbenzene	SW8260D	103-65-1	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.00058
o-Xylene	SW8260D	95-47-6	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0008	0.000266
4-Isopropyltoluene	SW8260D	99-87-6	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0032	0.00114
Sec-Butylbenzene	SW8260D	135-98-8	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.00077

Table 2-5 Comparison of Ecological Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	Ecological Screening Level ^(3, 4)			Most Protective ESL or Background Value ⁽⁵⁾	Achievable Laboratory Limits		
					Plants	Deer Mouse	Horned Lark		LOQ	LOD	DL
Volatile Organic Compounds (Continued)											
Styrene	SW8260D	100-42-5	mg/kg	N/A	3.20	NS	NS	3.20	0.005	0.0008	0.00028
Tert-Butylbenzene	SW8260D	98-06-6	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0016	0.0005
Tetrachloroethene	SW8260D	127-18-4	mg/kg	N/A	10.0	18.2	NS	10.0	0.005	0.004	0.00191
Toluene	SW8260D	108-88-3	mg/kg	N/A	200	236	NS	200	0.005	0.0008	0.000227
Trans-1,2-Dichloroethene	SW8260D	156-60-5	mg/kg	N/A	NS	411	NS	411	0.005	0.0008	0.00039
Trans-1,3-Dichloropropene	SW8260D	10061-02-6	mg/kg	N/A	NS	NS	NS	NS	0.005	0.0002	0.000083
Trichloroethene	SW8260D	79-01-6	mg/kg	N/A	NS	909	NS	909	0.005	0.004	0.00191
Trichlorofluoromethane	SW8260D	75-69-4	mg/kg	N/A	NS	1,930	NS	1,930	0.01	0.009	0.0032
Vinyl Chloride	SW8260D	75-01-4	mg/kg	N/A	NS	1.55	NS	1.55	0.005	0.0032	0.00134
Explosives											
1,3,5-Trinitrobenzene	SW8330B	99-35-4	mg/kg	N/A	NS	122	NS	122	0.1	0.04	0.0138
1,3-Dinitrobenzene	SW8330B	99-65-0	mg/kg	N/A	NS	1.03	2.00	1.03	0.1	0.04	0.0166
2,4-Dinitrotoluene	SW8330B	121-14-2	mg/kg	N/A	6.00	24.4	NS	6.00	0.1	0.04	0.0147
2,6-Dinitrotoluene	SW8330B	606-20-2	mg/kg	N/A	NS	16.1	284	16.1	0.1	0.04	0.0191
2,4,6-Trinitrotoluene (TNT)	SW8330B	118-96-7	mg/kg	N/A	62.1	315	46.1	46.1	0.1	0.07	0.0307
2-Amino-4,6-Dinitrotoluene	SW8330B	35572-78-2	mg/kg	N/A	14.0	126	NS	14.0	0.1	0.07	0.0329
2-Nitrotoluene	SW8330B	88-72-2	mg/kg	N/A	NS	81.0	NS	81.0	0.2	0.1	0.0472
3-Nitrotoluene	SW8330B	99-08-1	mg/kg	N/A	NS	97.3	NS	97.3	0.2	0.15	0.064
4-Amino-2,6-Dinitrotoluene	SW8330B	19406-51-0	mg/kg	N/A	33.0	87.2	NS	33.0	0.1	0.07	0.0299
4-Nitrotoluene	SW8330B	99-99-0	mg/kg	N/A	NS	178	NS	178	0.2	0.1	0.0365
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	SW8330B	121-82-4	mg/kg	N/A	NS	81.3	11.2	11.2	0.2	0.1	0.043
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	SW8330B	479-45-8	mg/kg	N/A	NS	11.8	NS	11.8	0.2	0.1	0.0439
Nitrobenzene	SW8330B	98-95-3	mg/kg	N/A	NS	53.6	NS	53.6	0.3	0.2	0.085
Nitroglycerin	SW8330B	55-63-0	mg/kg	N/A	21.0	876	NS	21.0	2	0.7	0.215
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	SW8330B	2691-41-0	mg/kg	N/A	2,740	682	NS	682	0.1	0.07	0.0227
Pentaerythritol Tetranitrate (PETN)	SW8330B	78-11-5	mg/kg	N/A	NS	636	NS	636	2	1	0.493
Total Petroleum Hydrocarbons											
DRO Extended (C10-C36)	SW8015D	68334-30-5	mg/kg	N/A	NS	NS	NS	NS	8	7	3.64
Perchlorate											
Perchlorate	SW6850	14797-73-0	mg/kg	N/A	NS	NS	NS	NS	0.0008	0.0004	0.000088

Table 2-5 Comparison of Ecological Soil Screening Levels to Laboratory Quantitation Limits

Analyte	Analytical Method ⁽¹⁾	CASRN	Units	Background Value ⁽²⁾	Ecological Screening Level ^(3, 4)			Most Protective ESL or Background Value ⁽⁵⁾	Achievable Laboratory Limits		
					Plants	Deer Mouse	Horned Lark		LOQ	LOD	DL

Notes:

1. Analytical Method - EPA Test Methods for Evaluating Solid Waste latest edition (the most current version of each method the laboratory is accredited to will be used).
2. FWDA background levels as taken from:

- All metals except for arsenic and antimony - Table 8-1 from "Soil Background Study and Data Evaluation Report" (Shaw, 2010).

- Arsenic - "Evaluation of Background Levels for Arsenic in Soil" (NMED, 2013b)

- The antimony background level of 0.23 mg/kg is from soil unit 350ss as presented in Table 4-1 of the Phase 2 Soil Background Report (USACE, 2013).
3. NMED Risk Assessment Guidance for Site Investigations and Remediation, Volume II - Soil Screening Guidance for Ecological Risk Assessments, Appendix C. March 2017 Revised.
4. The most recent screening levels published by NMED at the time the risk evaluation is conducted will be used in the risk evaluation.
5. The selected screening level (lowest NMED ESL or Background Value) shown in this table is for use in the screening level ecological risk assessment, except for some metals where the background value is selected if it is greater than the lowest ecological screening level. For these metals, the ecological screening level will be used in the risk evaluation if the metal is found to be present at concentrations that are not consistent with background levels.
- Cells shaded in blue show that the screening level is lower than the achievable LOQ. If identified as a chemical of potential ecological concern, they will be addressed in the uncertainty discussion.

Acronyms and Abbreviations:

- CASRN = Chemical Abstracts Service Registry Number
- DAF = Dilution attenuation factor
- DL = Detection limit
- DRO = Diesel range organics
- EPA = United States Environmental Protection Agency
- ESL = Ecological Screening Level
- FWDA = Fort Wingate Depot Activity
- LOD = Limit of detection
- LOQ = Limit of quantitation
- mg/kg = Milligram per kilogram
- N/A = Not applicable
- NMED = New Mexico Environment Department
- NS = No standard
- TAL = Target analyte list

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

1

Table 2-6 Data Validation Flags

Flag	Interpretation
UJ	The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.
U	The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.
J	The reported result was an estimated value with an unknown bias.
J+	The result was an estimated quantity, but the result may be biased high.
J-	The result was an estimated quantity, but the result may be biased low.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance (J-flag) or rejection (R-flag) of the data should be decided by the project team during the data usability assessment and documented in the data usability assessment report.
R	Only to be applied as a result of the Data Usability Assessment process. The results was rejected as unusable. The decision to reject the data point was made by the project team based on serious deficiencies in the data.

2

1

2

[THIS PAGE INTENTIONALLY LEFT BLANK]

SECTION 3.0 SOIL SAMPLING AND ANALYSIS AT SWMU 21 – CENTRAL LANDFILL

The purpose of the soil sampling at the former landfill is to address data gaps that were identified in the findings of the RFI (USGS, 2015) and as required by the NMED, as discussed in Section 1.2 of this Work Plan. Specifically, the investigation activities are: 1) to further define the extent of impact in areas where previous samples exceeded the SSLs; 2) evaluate the backfill material that was placed after the landfill removal activities; and, 3) to assess the soil in the arroyo to the north of the former landfill for potential impacts from surface water runoff or leachate migration. Sampling locations and depths were determined based on the findings and recommendations in the RFI report (USGS, 2015). Section 3.4 was added to this revised work plan to clarify how the proposed borings will be utilized to determine the backfill and native soil interface as well as provide information regarding the lateral extent of the backfill material.

3.1 Borings in Areas of Previous Exceedances

Previous sample locations and analytes which exceed the lowest 2019 NMED SSLs for a residential receptor (which is either the direct contact SSL or the groundwater protection SSL) are summarized in **Tables 3-1** through **3-3** and illustrated in **Figure 3-1**.

Planned sample locations and depths are listed in **Table 3-4**; planned sample locations are illustrated in **Figure 3-2**. A description of each sample location is presented below. All samples will be analyzed for SVOCs, VOCs, extended diesel-range organics (DRO), target analyte list (TAL) metals, perchlorate, and explosives. The analyte list was selected to fill data gaps after completion of the RFI Report (USGS, 2015).

To better define the vertical and lateral extent of impacted soils, a total of nine step-out soil borings will be drilled within an approximate 10-foot radius of previous sample locations where analytes were detected above 2019 SSLs. These samples correspond to soil boring ID numbers 2321CLAND-SB24 through 2321CLAND-SB32. Samples will be collected from the depth intervals corresponding to 0-1 foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet below the depth of backfill.

Based on recommendations in the RFI Report (USGS, 2015), soil borings will be completed at a distance of 25 feet to the north, east, and west of previous sample ID 2321CLAND-SB08. These borings will be identified with soil boring ID numbers 2321CLAND-SB33 through 2321CLAND-SB35. Samples will be collected within a 4-foot horizon above and a 4-foot horizon below the sample previously collected at location SB08 at 17-18 feet bgs. Sample locations will be surveyed in order to accurately apply elevation correction factors for terrain slope.

3.2 Borings to Characterize the Backfill Material

No data exists regarding soils used for backfill after removal of the landfill contents. In order to fill this data gap, samples will be collected from soils overlaying the native soil. A total of eleven shallow soil borings will be conducted within the boundaries of the former landfill (soil boring ID numbers 2321CLAND-SB13 through 2321CLAND-SB23). Samples will be collected from the 0-1

foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet bgs depth intervals. These samples specifically address Comment 9 from NMED contained in the 2014 NOD.

3.3 Borings to Assess Arroyo

Two shallow soil borings (10 feet total depth) will be conducted in the arroyo, one 25 feet northwest and one 50 feet northwest of the northern border of the former landfill (soil boring ID numbers 2321CLAND-SB11 and 2321CLAND-SB12). Samples will be collected from the 0-1 foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet bgs depth intervals. These samples specifically address Comment 6 from NMED contained in the 2014 NOD. Sample intervals and total depth of the borings may be adjusted to ensure samples are collected in the upper 6 inches of the surface and at the native soil and fill interface, as requested by Comment 10 of the 2018 NOD.

3.4 Thickness and Extent of Backfill Material

In order to determine the interface between the fill material and native soils, each borehole described in Sections 3.1, 3.2, and 3.3 will be drilled using a hollow stem auger rig with continuous split-spoon soil sampling techniques at the direction of a field geologist. The field geologist will be responsible for identifying the interface between the fill material and the native soil. The field geologist will monitor for differences in material density as determined by blow counts as the split spoon sampler is driven into the material. The field geologist will also visually observe each sample for differences in color and/or consistency. The proposed sample intervals will be adjusted as necessary to ensure that soil samples are collected immediately above and below the interface. All information obtained from these borings will be utilized to obtain a better understanding of the extent and thickness of the backfill material.

The split-spoon sampling protocol in accordance with American Society for Testing and Materials (ASTM) Designation D 1586 is described below.

- The split-spoon sampler (spoon) consists of a 2-inch (outside diameter) by 1-3/8 inch (inside diameter), 18-inch to 24-inch length, heat-treated, case-hardened steel head, split-spoon, and shoe assembly.
- The drive rods, which connect the spoon to the drive head, have a stiffness equal to or greater than that of the A-rod. The size of the drive rods are kept constant throughout a specific drilling program, as the energy absorbed by the rods will vary with the size and weight of the rod employed.
- The drive head consists of a guide rod to give the drop hammer (140 pounds) free fall in order to strike the anvil attached to the lower end of the assembly. The drop hammer used in determining standard penetration test (SPT) resistance weighs 140 pounds and has a 2.5 inch diameter hole through the center, for passage of the drive head guide rod. The hammer is raised with a rope activated by the drill rig cathead. A 30 inch hammer drop is mandatory for proper SPT determination.

- 1 • The pre-cleaned split-spoon sampler is attached to the drill rods and lower the assembly
2 to the bottom of the borehole. The 140-pound hammer is raised 30 inches above the drive-
3 head anvil and then allowed to free fall and strike the anvil. This procedure is repeated
4 until the sampler has penetrated the full length of the sampler (18 to 24 inches depending
5 on the sampler) into the stratum at the bottom of the borehole.
- 6 • The number of blows of the hammer required for each 6 inch penetration is counted and
7 recorded on the boring log. The penetration resistance (N) is determined by adding the
8 second and third 6-inch resistance blow counts together.
- 9 • The sampler is then withdrawn from the borehole, preferably by pulling on the rope. If the
10 sampler is difficult to remove from the stratum, it may be necessary to remove it by hitting
11 the drive head upward with short, light hammer strokes. The sampler is removed from the
12 bottom of the borehole slowly to minimize disturbance.
- 13 • Careful measurement of all drilling tools, samplers, and casing will be exercised during all
14 phases of the boring operations, to ensure maximum quality and recovery of the sample.
- 15 • The split-spoon is opened and carefully examined, noting all soil characteristics, color
16 seam, disturbance, etc. A representative sample from the specified interval is selected
17 and placed into the sampling containers.
- 18 • The field geologist shall record, at a minimum, the weight of the hammer, the length of the
19 split spoon sampler, and the number of hammer blows on the spoon per 6 inches of
20 penetration.
- 21 • The field geologist will manually describe soils encountered in accordance with American
22 Society for Testing and Materials (ASTM) Standard D2488-93, *Standard Practice for*
23 *Description and Identification of Soils (Visual-Manual Procedure)*. These descriptions will
24 be recorded on a boring log for each boring.

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

Table 3-1 Sample Locations and Analytes Exceeding 2019 Screening Levels - 1999 Sampling Effort

Analyte	Screening Level	Sample Identification Number												
		E507	E553	E554	E555	61699CTB E556	E559	E5560	E562	E565	E566	E567	E568	E569
Arsenic	5.83	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	0.782	NA	10	<8.9	<8.9	<8.9	<8.9	<8.9	11	<8.9	<8.9	<8.9	9.2	<8.9
Benzo(a)anthracene	0.637	0.160	0.69	2.1	1.6	3.7	0.17	2.1	ND	0.18	1.9	1.10	0.68	0.5
Benzo(a)pyrene	1.12	0.082	0.57	2.1	1.3	3.4	0.18	1.9	ND	0.17	1.7	0.88	0.56	0.47
Benzo(b)fluoranthene	1.53	0.11	0.68	2.6	1.7	3.8	0.21	2.1	ND	0.19	1.9	1.20	0.55	0.44
Dibenzo(a,h)anthracene	0.15	ND	0.11	0.43	0.22	0.6	0.075	0.370	ND	ND	0.27	ND	0.17	0.095
Indeno(1,2,3-cd)pyrene	1.53	ND	0.44	1.7	1.0	3.0	0.20	1.5	ND	0.15	1.3	0.75	0.54	0.34

Table 3-2 Sample Locations and Analytes Exceeding 2019 Screening Levels - 2000 Sampling Effort

Analyte	Screening Level	Sample Identification Number												
		CMAIN05	CMAIN07	CMAIN08	CMAIN10	CMAIN11	CMAIN12	CMAIN14	CMAIN16	CMAIN19	CMAIN20	CMAIN21	CMAIN22	CMAIN24
Benzo(a)anthracene	0.637	1.22	0.956	3.21	6.89	0.611	0.474	9.88	14.6	4.7	1.71	0.997	6.26	0.762
Benzo(a)pyrene	1.12	1.26	0.991	3.3	6.89	0.603	0.424	9.99	14.6	4.77	1.71	1.02	5.35	0.726
Benzo(b)fluoranthene	1.53	0.984	0.667	2.24	4.76	0.495	0.37	7.09	11.1	3.54	1.28	0.815	4.36	0.646
Dibenzo(a,h)anthracene	0.15	0.227	ND	0.579	1.54	ND	ND	1.29	2.92	0.659	0.281	ND	0.879	ND
Indeno(1,2,3-cd)pyrene	1.53	1.12	0.888	3.23	7.41	0.44	ND	6.94	15.2	3.12	1.36	0.788	4.65	ND
2,4,6-Trinitrotoluene	0.861	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	69	ND	ND

Table 3-3 Sample Locations and Analytes Exceeding 2019 Screening Levels - 2011 Sampling Effort

Analyte	Screening Level	Sample Identification Number
		2321CLAND-SB08
Benzo(a)anthracene	0.637	9
Benzo(a)pyrene	1.12	6.7
Benzo(b)fluoranthene	1.53	12
Indeno(1,2,3-cd)pyrene	1.53	3.2

Notes:

All concentrations reported in mg/kg.

Highlighted cells with **bold** results indicate the concentration exceeds the 2019 NMED SSL - based upon the lower of the 2019 screening levels for residential direct contact and soil to groundwater (based upon DAF 20).

1
2

3

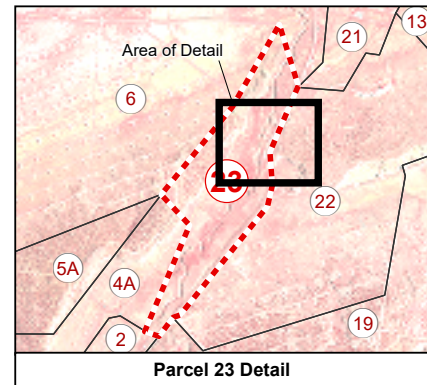
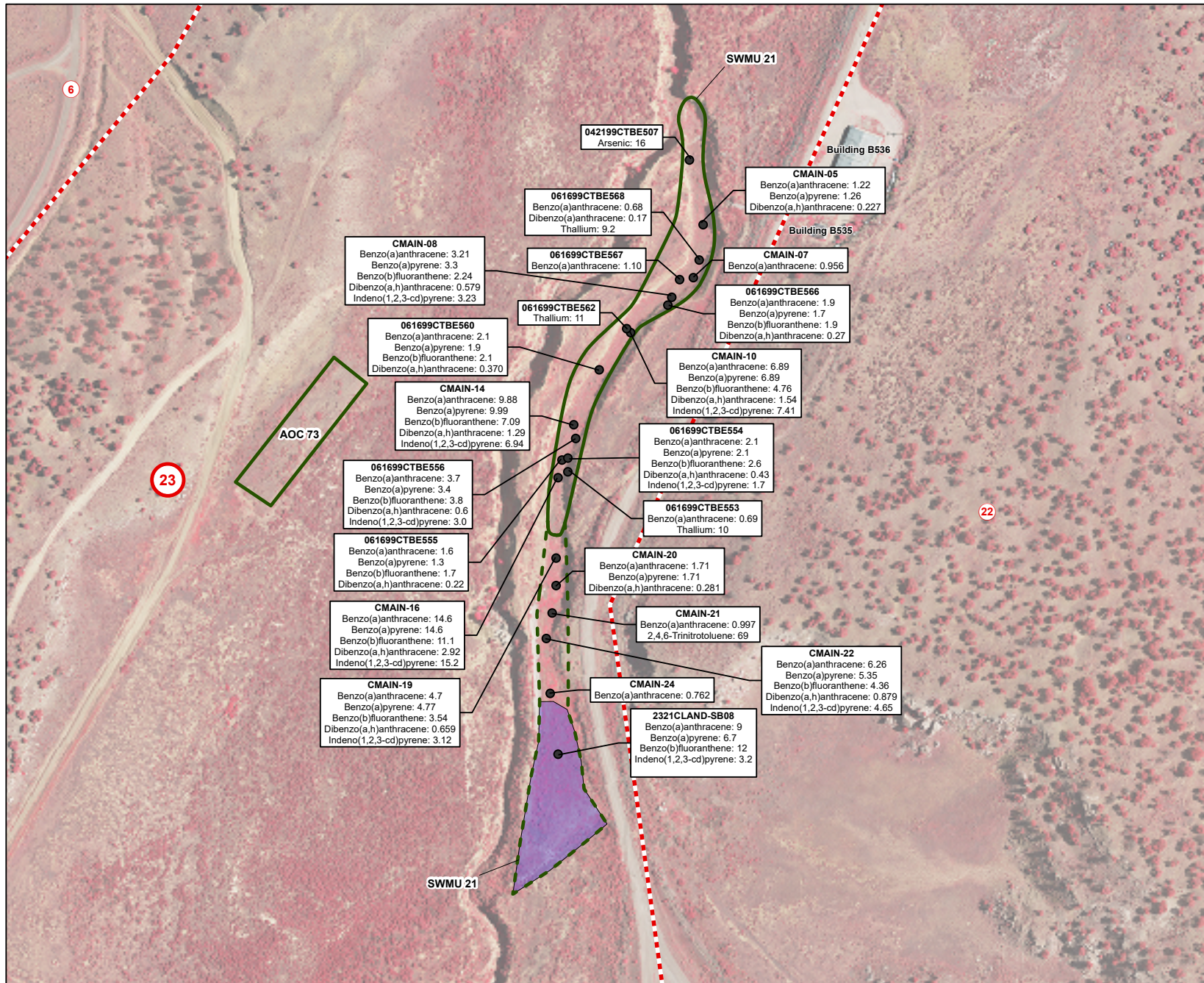
[THIS PAGE INTENTIONALLY LEFT BLANK]

Table 3-4 Summary of Samples to be Collected from Soil Borings at SWMU 21 – Central Landfill

Soil Boring ID Number	Target Soils	Sample Depth Interval (feet)	Sample Analyses
2321CLAND-SB11	Arroyo	0-1, 1-2, 3-4, 5-6, 7-8, 8-9, and 9-10 bgs	VOCs - 8260C SVOCs - 8270D DRO extended TAL metals – 6020A/7471B Explosives – 8330B Perchlorate - 6860
2321CLAND-SB12			
2321CLAND-SB13	Backfill		
2321CLAND-SB14			
2321CLAND-SB15			
2321CLAND-SB16			
2321CLAND-SB17			
2321CLAND-SB18			
2321CLAND-SB19			
2321CLAND-SB20			
2321CLAND-SB21			
2321CLAND-SB22			
2321CLAND-SB23			
2321CLAND-SB24	Native Soil	0-1, 1-2, 3-4, 5-6, 7-8, 8-9, and 9-10 below depth of backfill	
2321CLAND-SB25			
2321CLAND-SB26			
2321CLAND-SB27			
2321CLAND-SB28			
2321CLAND-SB29			
2321CLAND-SB30			
2321CLAND-SB31			
2321CLAND-SB32		13-14, 15-16, 17-18, 19-20, and 21-22 bgs (plus 0-1 interval for SB33 for risk evaluation purposes)	
2321CLAND-SB33			
2321CLAND-SB34			
2321CLAND-SB35			

1

[THIS PAGE INTENTIONALLY LEFT BLANK]



Legend

- Previous Sample Location with Analytes Exceeding 2019 NMED SSLs (NMED, 2019a) as Listed:
 - Arsenic - 7.07 mg/kg
 - Benzo(a)anthracene - 0.637 mg/kg
 - Benzo(a)pyrene - 1.12 mg/kg
 - Benzo(b)fluoranthene - 1.53 mg/kg
 - Dibenzo(a,h)anthracene - 0.15 mg/kg
 - Indeno(1,2,3-cd)pyrene - 1.53 mg/kg
 - 2,4,6-Trinitrotoluene - 0.861 mg/kg
 - Thallium - 0.782 mg/kg
- Additional landfill area identified and removed (Tetra Tech NUS, 2000)
- SWMU 21 boundary revision, which will be formally revised in a future permit modification
- AOC/SWMU Boundary
- Parcel 23 Boundary
- Parcel Number

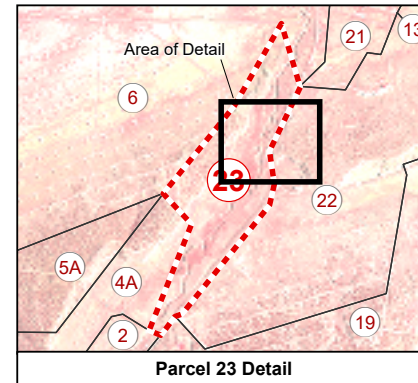
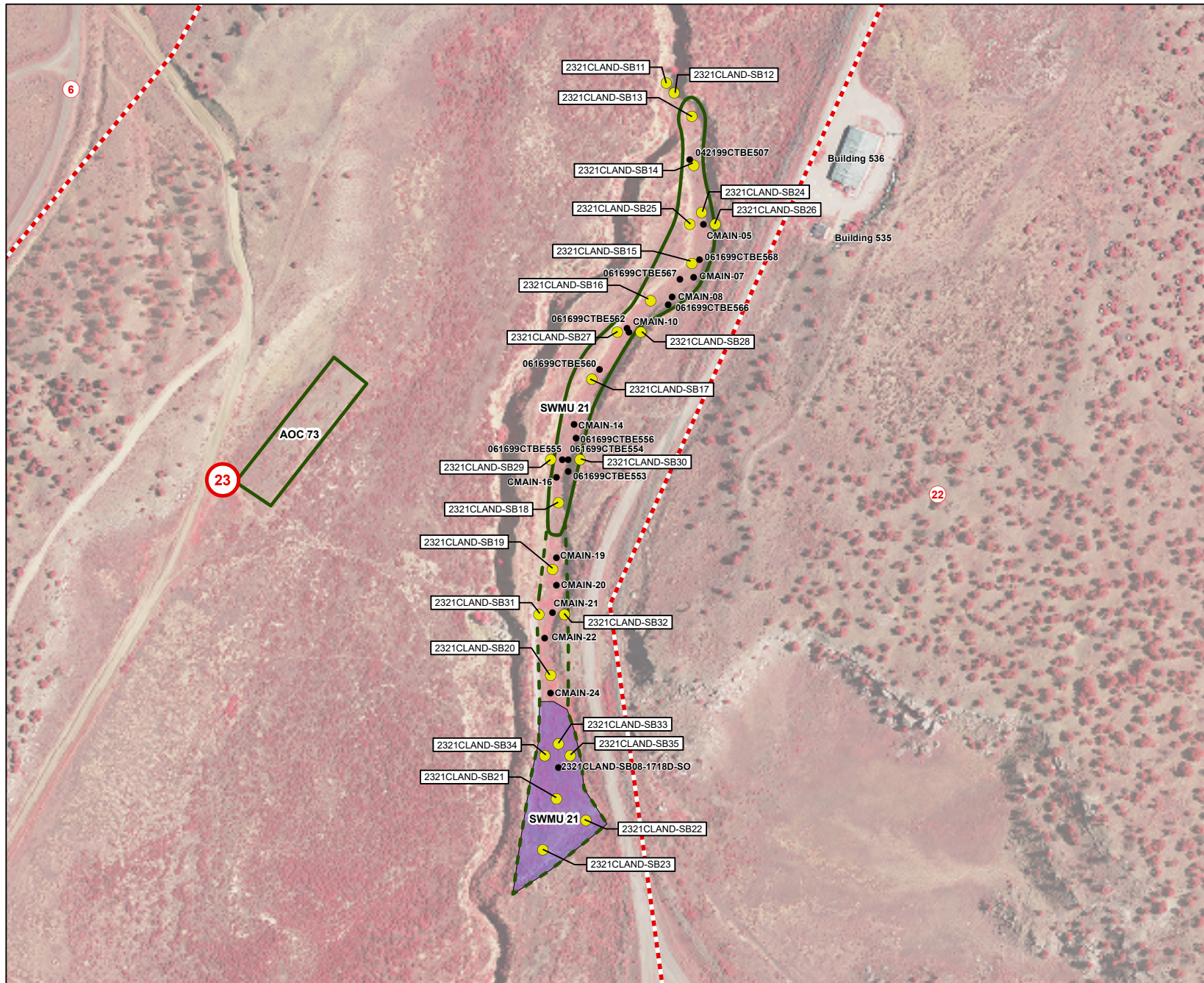
Notes:

- AOC Area of Concern
- mg/kg Milligrams per Kilogram
- NMED New Mexico Environment Department
- SSL Soil Screening Level
- SWMU Solid Waste Management Unit
- Sample Identification Explanation:
23_21_CLAND_SB_08
Parcel SWMU Additional Site Source of Increment
Identifier Samples
- Aerial Image Source: 2009, CIR
- 0 100 200 Feet
- N

Final RFI Phase 2 Work Plan, Revision 1.0
Parcel 23 - Fort Wingate Depot Activity
McKinley County, New Mexico

FIGURE 3-1
Previous Sample Locations
with Analytes Exceeding
2019 NMED SSLs

Client	USACE, Albuquerque District	GIS by	AM	9/5/2024
		Checked by	CL	9/5/2024
		PM	CR	9/5/2024



- Legend**
- Proposed Phase 2 Soil Boring Location
 - Previous Sample Location with Analytes Exceeding 2019 NMED SSLs (NMED, 2019a)
 - Additional landfill area identified and removed (Tetra Tech NUS, 2000)
 - SWMU 21 boundary revision, which will be formally revised in a future permit modification
 - ▭ AOC/SWMU Boundary
 - 23 Parcel Number
 - Parcel 23 Boundary

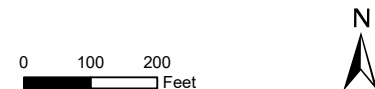
Notes:

AOC Area of Concern
NMED New Mexico Environment Department
SSL Soil Screening Level
SWMU Solid Waste Management Unit

Sample Identification Explanation:

23, 21, CLAND, SB, 13
Parcel SWMU Additional Site Source of Increment
Identifier Samples

Aerial Image Source: 2009, CIR



Final RFI Phase 2 Work Plan, Revision 1.0
Parcel 23 - Fort Wingate Depot Activity
McKinley County, New Mexico

FIGURE 3-2 Proposed Phase 2 Soil Boring Locations				
Client	USACE, Albuquerque District	GIS by	AM	9/5/2024
		Checked by	KL	9/5/2024
		PM	CR	9/5/2024

SECTION 4.0 GROUNDWATER INVESTIGATION AT SWMU 21 – CENTRAL LANDFILL

As discussed in Section 1.2, the NOD (NMED, 2014) Comments 11 and 12 require an investigation of the groundwater to assess whether groundwater quality has been impacted as a result of operations of the former landfill. The approach to achieve this objective was discussed between the Army and NMED during the April 25, 2018 meeting at FWDA. Email correspondence confirming the agreed-upon approach is included in **Appendix A**.

The investigation will include the collection a groundwater sample via a temporary well placed in a downgradient direction from the former landfill (2321CLAND-MW-1). If groundwater is impacted, a permanent well will be installed and an additional well will be drilled and installed in an upgradient direction (2321CLAND-MW-2). **Figure 4-1** depicts the location of the proposed upgradient and downgradient well locations.

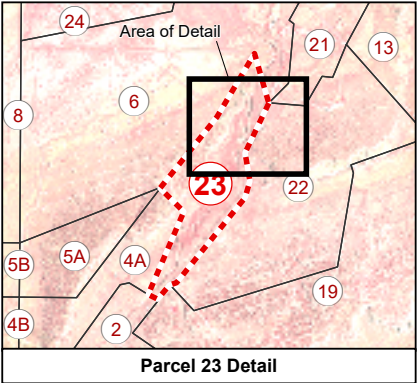
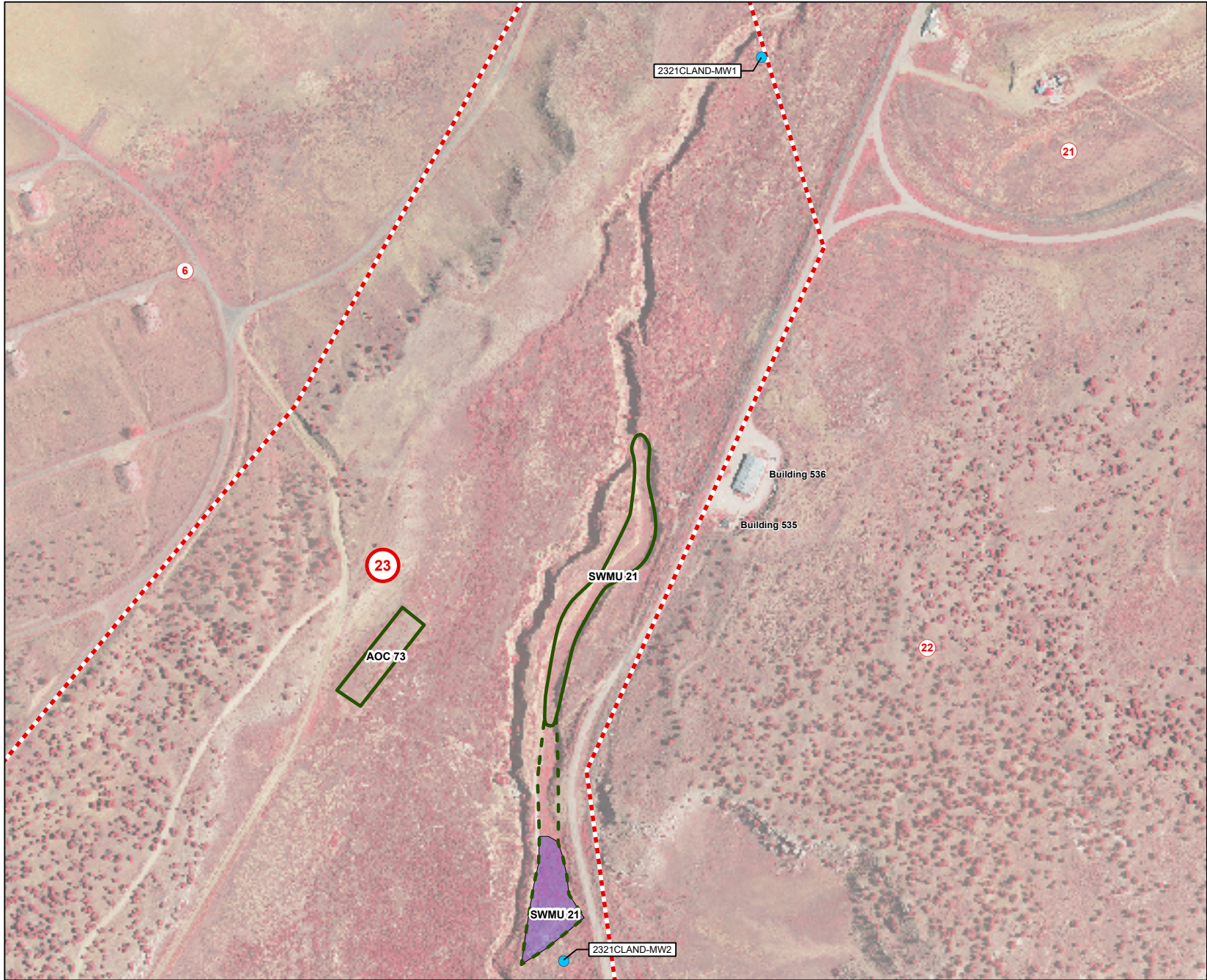
The downgradient boring/temporary well will be placed as close as possible to the arroyo without jeopardizing the safety of the drilling equipment and field staff. The drilling will be performed by a New Mexico licensed driller using one of, or a combination of, the following techniques: hollow stem auger, air rotary, or roto sonic drilling. The borings will be advanced to the first water bearing zone or a maximum depth of 120 feet if groundwater is not encountered.

The borehole will be converted to a temporary well and screened in the first water bearing zone. If no water bearing zone is encountered, the borehole will still be converted to a temporary well and the NMED will be contacted for concurrence on a proposed screening interval, which the field geologist will propose after reviewing the borehole lithology. The temporary well will be constructed with a filter-pack, 2-inch diameter 0.010-inch slot screen, and casing. Development will be performed by pumping until the groundwater is sufficiently clear to collect a groundwater sample. The well will be left in place for a minimum of two years. During this time the well will be sampled on a quarterly basis in general accordance with the procedures detailed in the Final 2017 Interim Measures Facility-Wide Groundwater Monitoring Plan Version 10, Revision 1 (Sundance, July 2018) as approved with modifications by NMED on October 22, 2018. Even if groundwater is not present in the well at the time of installation, the Army will check the well for the presence of seasonal water on a quarterly basis.

The temporary well will be covered and left in place until groundwater sample analytical results are reviewed and evaluated. Sample results will be compared to current state or federal drinking water standards (or USEPA tap water RSLs for analytes without published drinking water standards), in accordance with the hierarchy of screening values presented in Section 7.1 of the Permit (NMED, 2015a).

If there are no indications of impact to the groundwater quality after the two-year period, the temporary well will be abandoned with NMED's approval. Temporary boreholes will be abandoned following NMOSE guidance and regulations. The casing will be removed as the bentonite slurry is pumped into the borehole. If the casing cannot be removed, it will be cut below the ground surface and abandoned in place.

- 1 If it appears that the groundwater quality is impacted, the temporary well will be converted to a
- 2 permanent groundwater monitoring well. An additional well would also be installed in an
- 3 upgradient direction. Monitoring wells will be constructed in accordance with *NMED Ground Water*
- 4 *Quality Bureau Monitoring Well Construction and Abandonment Guidelines* (Revision 1.1,
- 5 NMED 2011).



- Legend**
- Proposed Phase 2 Temporary Well Location
 - SWMU 21 boundary revision, which will be formally revised in a future permit modification
 - Additional landfill area identified and removed (Tetra Tech NUS, 2000)
 - AOC/SWMU Boundary
 - 23 Parcel Number
 - Parcel 23 Boundary

Notes:

AOC = Area of Concern
SWMU = Solid Waste Management Unit
Sample Identification Explanation:

Parcel #	SWMU #	Additional Site Identifier	Source of Increment	Sample #
23	21	CLAND	MW	1

Aerial Image Source: 2009, CIR



Final RFI Phase 2 Work Plan, Revision 1.0
Parcel 23 - Fort Wingate Depot Activity
McKinley County, New Mexico

**FIGURE 4-1
Proposed Temporary
Well Locations**

Client	USACE, Albuquerque District	GIS by	AM	9/5/2024
		Checked by	KL	9/5/2024
		PM	CR	9/5/2024

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

SECTION 5.0 POST-IMPLEMENTATION REPORTING

All activities conducted as part of this RFI Phase 2 Work Plan will be documented in a Phase 2 RFI Report. The final report will contain, at a minimum, a detailed schedule of completed activities, a summary of analytical data, and an evaluation comparing analytical results to the appropriate screening levels, including an evaluation of cumulative risk. The approach to be used in the human health and ecological risk evaluations is described in the following sections, and is based on the requirements contained in the NMED Risk Assessment Guidance for Site Investigations and Remediation (NMED, 2017 and 2022).

5.1 Human Health Risk Evaluation

A human health risk evaluation will be conducted for SWMU 21 as described in this section.

5.1.1 NMED Target Risk Thresholds

NMED risk guidance (NMED, 2022; Section 1.2.3 and Section 5) identifies two target risk thresholds that are used to evaluate if cancer risks and noncancer hazards are acceptable. NMED indicates that adverse health impacts are unlikely when the cancer risk is less than 1×10^{-5} for carcinogenic analytes, and when the hazard index (HI) is less than 1.0 for noncarcinogenic analytes. These are the target risk thresholds used in the human health risk evaluation for Parcel 23.

5.1.2 Selection of Screening Levels

Two media will be evaluated: 1) soil, and 2) groundwater (assuming it is encountered during investigation activities). These media will be evaluated through use of screening levels selected to reflect the requirements of the Permit (NMED, 2015a; Attachment 7, Section 7.2) and the NMED risk guidance (NMED, 2022).

The hierarchy of soil screening levels is provided below for potentially complete pathways identified by the preliminary exposure pathway evaluation and included in the conceptual site model (CSM):

1. Screening levels published by NMED in Appendix A of the NMED risk guidance (NMED, 2022) for direct contact and groundwater protection.
2. RSLs published by USEPA for residential and industrial receptors for soil are selected when NMED does not publish a value. USEPA RSLs based on a noncancer endpoint correspond to the NMED target hazard quotient (HQ) of 1.0 for noncarcinogenic analytes. USEPA RSLs based on a cancer endpoint will be adjusted to a cancer risk of 1×10^{-5} for consistency with the NMED target risk threshold of 1×10^{-5} (NMED, 2022; Section 1.2). USEPA risk-based SSLs for the protection of groundwater will be adjusted to a DAF of 20 based upon the following justification:
 - a) Contaminants of Concern and Their Characteristics: PAHs are the only COCs present in surficial soils that show low-level concentrations exceeding DAF 20 soil-to-

groundwater SSLs over the length of the SWMU. PAHs have low water solubility and are not likely to leach vertically and migrate to groundwater (WHO, 2003 https://www.who.int/water_sanitation_health/water-quality/guidelines/chemicals/polyaromahydrocarbons.pdf and USEPA, 1976 <https://nepis.epa.gov/Exe/ZyPDF.cgi/9100RZ55.PDF?Dockkey=9100RZ55.PDF>).

- b) Lack of Infinite Source: This Phase 2 RFI work plan is in follow-up to the removal of the landfill in 1999. All landfill waste and visibly impacted soil below the former landfill was removed and disposed of at an off-site disposal facility (Final RCRA Facility Investigation Parcel 23 (2012)). This removal will have mitigated the "infinite source" of on-going contamination.
- c) Soil Characteristics: The boring logs located in Appendix K of the Parcel 23 RFI Report identified the soils using the Unified Soil Classification System (USCS) and classified them as being within the silty clay (CL-ML) and sandy silt (ML) classes (ASTM D2487-17), both of which are classified as fine grained materials composed of fifty percent or more by dry mass of particles passing the No. 200 (75 µm) sieve. Such fine grained materials will bind PAHs and retard their vertical migration (ATSDR, 1995 <https://www.atsdr.cdc.gov/ToxProfiles/tp69-c1-b.pdf>).
- d) Infiltration Rates: "Infiltration rates across much of New Mexico are substantially less than the average range of 0.15 to 0.24 m/yr reported for many of the hydrogeologic regions used in the USEPA analysis" (NMED, 2022 [Section 4.4]). Aller et al (1987, EPA/600/2-87/035) described the hydrogeologic setting for FWDA as the Colorado Plateau and Wyoming Basin. The infiltration rates used for these arid to semi-arid regions in the USEPA analysis were 0.03 to 0.14 m/y, rates which are 40-80% less than the average range reported for many regions in the U.S., as noted above. Reduced infiltration rates reduce vertical migration.
- e) Surface Water: The topographic contours for Parcel 23 are relatively flat with the exception of the arroyo channel. Surface runoff during rainfall/snowmelt events collects in the arroyo channel, which only flows intermittently during precipitation events or pools locally in low areas where it evaporates. No other intermittent surface water bodies exist within Parcel 23. However, southwest of Parcel 23 is Parcel 2, which surface water samples have been intermittently collected since 1992. No COCs that were analyzed for results were non-detect to low detects.
- f) Comparative Source Area Size to DAFs: Default DAFs of 10 for a 30-acre source and 20 for a 0.5-acre source have been proposed by USEPA as values generally protective nationwide. When the relative area of the Parcel 23 source area is considered, it is much closer to the 0.5-acre site than the 30 acre site making the application of the DAF 20 reasonable for screening purposes. The Phase 2 RFI Report risk assessment will include a revaluation of the appropriateness of the use of a DAF of 20 for the soil screening levels.
- g) Depth to Groundwater: Depth to the first water-bearing zone is unknown for this area, but is expected to be between approximately 50 and 60 feet bgs, based on installed groundwater monitoring wells to the north of SWMU 21. Depth to the second water-

bearing zone is unknown for SWMU 21, but is expected to be between 70 and 120 feet bgs, based on installed groundwater wells to the north of SWMU 21 (Parcel 23 RFI Report Final).

h) Vulnerable Groundwater Environment: Vulnerable groundwater is defined as “areas close to perennial streams or where groundwater is very shallow” (NMED, 2022 [Section 4.4, pg 79]). SWMU 21 is not near a perennial stream and shallow groundwater has not been detected to date. The impacts to groundwater at FWDA need to be investigated and is responding to this in the facility wide groundwater assessment program.

i) Lack of Presence of Liquids: Land use around SWMU 21 does not include any liquid source(s) that could drive the vertical migration of COCs.

j) Weather Regimes: semi-arid/arid weather regimes at FWDA result in little precipitation and significant evaporation on an annual basis, further attenuating dissolution and vertical migration.

Although the source area orientation is generally to the northeast and parallels both the arroyo and groundwater, this is not expected to override the attenuation of vertical transport supported by the lines of evidence presented above.

The hierarchy of groundwater screening levels is provided below:

1. WQCC standards for the analytes listed in NMAC § 20.6.2.7.WW having the values listed in NMAC § 20.6.2.3103.A and B.
2. USEPA drinking water MCLs provided under Title 40 Code of Federal Regulations (CFR) Parts 141 and 143.
3. If both a WQCC standard and an USEPA MCL have been established for a chemical of potential concern (COPC), the lowest value of (1) and (2) above will be selected.
4. If no WQCC standard or USEPA MCL has been established for a carcinogenic hazardous constituent, values will be selected from the most recent version of the USEPA RSLs for tap water (currently dated May 2024), adjusted to a target excess cancer risk threshold of 1×10^{-5} .
5. If no WQCC standard or USEPA MCL has been established for a noncarcinogenic hazardous constituent, values will be selected from the most recent version of the USEPA RSLs for tap water (currently dated May 2024) with a target HI of 1.0.
6. No current WQCC or USEPA MCL standard is published for perchlorate. The RCRA Permit directs use of USEPA tap water RSLs when no WQCC or USEPA MCL is published, and thus the most recently published USEPA tap water RSL for perchlorate is selected (currently dated May 2024), until a WQCC or USEPA MCL is published.

If volatile analytes are detected in soil or groundwater and indicate that the vapor intrusion (VI) pathway is complete or potentially complete, an evaluation of the VI pathway will be conducted. For soil, a qualitative evaluation will be performed because NMED does not publish VI screening levels (VISLs) for soil. NMED follows USEPA VI guidance, which does not support reliance on

bulk soil as an effective means of quantifying potential risks through the VI pathway. The qualitative discussion will present lines of evidence consistent with Section 2.5.2.2 of the NMED risk guidance (NMED, 2022) as listed below:

1. Number and magnitude of detections of volatile compounds;
2. If there is a suspected source of volatile compounds within the SWMU;
3. Decreasing concentration trends;
4. No evidence of sinking or dense vapors; and
5. If a removal action has, or could, mitigate the presence of VOCs in soil.

Where the qualitative discussion provides sufficient evidence that risk to future land use is unlikely, no further work to evaluate or mitigate for VI will be required.

For groundwater, a quantitative evaluation will be performed using the VISLs published in the NMED risk guidance (NMED, 2022; Appendix A [Table A-4]). Values are published for residential and industrial receptors. Both will be used to evaluate potential human health risks. The VI pathway is not evaluated for construction workers because they work outdoors.

Analytes without screening levels published by NMED or USEPA will be evaluated using surrogate analytes that are structurally similar or that provide a conservative estimate of toxicity. Surrogate analytes are identified in **Tables 2-3** through **Table 2-6**. The uncertainty introduced by use of surrogate analytes in the risk evaluation, or the lack of appropriate surrogate for quantitative evaluation, will be addressed in the uncertainty discussion, where applicable.

5.1.3 Identification of COPCs

Analytes detected in one or more samples in each medium of concern from the Phase 2 RFI data set will be retained as COPCs. Analytes that are not detected in any sample will not be retained as COPCs. Analytical testing will be performed for VOCs, SVOCs, total petroleum hydrocarbons (TPH)-DRO extended, TAL metals, mercury, perchlorate, and explosives.

5.1.4 Preliminary Exposure Pathway Evaluation

NMED risk guidance (NMED, 2022) requires the evaluation of four types of exposure to COPCs in soil: 1) direct contact, 2) ingestion of beef that has bioaccumulated COPCs while grazing, 3) inhalation of volatile COPCs that have migrated from the soil to indoor air, and 4) exposure to COPCs in soil that migrate to groundwater that is used as a potable water source.

NMED risk guidance also requires evaluation of exposure to COPCs in tap water from domestic use.

5.1.4.1 Direct Contact

NMED risk guidance (NMED, 2022) identifies three receptor types: 1) residential receptors, 2) commercial/industrial workers, and 3) construction workers with the potential for exposure through

direct contact with soil. Although these receptors are not currently living or working at SWMU 21, they have the potential to be present in the future. These three receptors could be exposed to site-related COPCs in soil via dermal contact, incidental ingestion, and inhalation of dust/volatiles in ambient air.

5.1.4.2 Beef Ingestion

NMED risk guidance (NMED, 2022) requires a qualitative evaluation for the beef ingestion pathway for sites that are greater than 2 acres. A qualitative evaluation will be completed.

5.1.4.3 Vapor Intrusion

NMED risk guidance (NMED, 2022) requires an evaluation of VI from subsurface media to indoor air when volatile analytes are detected. This pathway is not currently complete because there are no structures present at SWMU 21. Volatile analytes were not found during prior investigations at concentrations that exceeded screening criteria; however, VOCs are included in the analytical testing suite for the Phase 2 RFI. Therefore, the VI pathway is considered potentially complete in the southern portion of SWMU 21 where site topography and geography provide few limitations on future redevelopment and use. The VI pathway in the northern portion of SWMU 21 that falls within the arroyo is considered incomplete because there are no current structures, and the physical setting makes it unlikely that structures would be constructed in the future.

5.1.4.4 Soil to Groundwater

NMED risk guidance (NMED, 2022) requires that the potential for COPCs in soil to leach to groundwater, which could be subsequently used as a potable water source, should be evaluated if this exposure pathway is potentially complete for a site. There are no domestic water wells present at SWMU 21, but this pathway will be considered potentially complete and assessed in the risk evaluation. This pathway is considered potentially complete for residential receptors, consistent with Table 1-1 of the NMED risk guidance (NMED, 2022).

5.1.4.5 Domestic Tap Water Use

The scope of the Phase 2 RFI includes collection and testing of groundwater, if encountered within 100 feet bgs. This pathway is not currently complete because there are no domestic water wells present at SWMU 21, but it will be considered potentially complete and assessed in the risk evaluation if groundwater is encountered. This pathway is considered potentially complete for residential receptors, consistent with Table 1-1 of the NMED risk guidance (NMED, 2022).

5.1.5 Conceptual Site Model

Site investigations are conducted within the context of a human health CSM. The purpose of the CSM is to describe complete or potentially complete exposure pathways for current or reasonably anticipated future receptors that may be exposed to site-related contamination. Based on the summary of RFI investigation results described in previous sections, potential receptors accessing the site could potentially be exposed to chemicals released from historical activities

1 conducted at Fort Wingate and remaining in the subsurface. At SWMU 21, the potential source
2 of exposure is residual contamination in surface and subsurface soil, and potentially in
3 groundwater, from a historical landfill. Currently, no buildings or other structures are present within
4 SWMU 21. The site is currently vacant and current land use is as an out-of-use military installation
5 undergoing remediation.

6 The preliminary exposure pathway analysis presented in Section 5.1.4 identified that the direct
7 contact, VI, soil to groundwater, beef ingestion, and domestic tap water use pathways were
8 complete or potentially complete.

9 Potential health risks will be evaluated for residential, commercial/industrial worker, and
10 construction worker receptors exposed to site-related COPCs in soil or groundwater as illustrated
11 in the CSM presented in **Figure 5-1** and as summarized below:

- 12 • Future residents – Potentially complete pathways include direct contact with surface (0-1
13 foot bgs) and subsurface soil (1-10 feet bgs), VI from COPCs in soil and groundwater in
14 the southern portion of SWMU 21, soil leaching to groundwater used domestically as tap
15 water, and from tap water use, if groundwater is present. The direct contact pathway for
16 residential receptors will be evaluated using results for samples collected from 0-10 feet
17 bgs (NMED, 2022 [Section 2.8.2]). The VI and soil to groundwater pathways will be
18 evaluated using all results regardless of depth because volatilization and leaching can
19 occur at depths greater than 10 feet. The tap water pathway will be evaluated using all
20 results regardless of depth or location because there is currently no restriction on where
21 a drinking water well could be installed.
- 22 • Future commercial/industrial workers – Potentially complete exposure pathways include
23 direct contact with surface soil (0-1 foot bgs) and VI from COPCs in soil and groundwater
24 in the southern portion of SWMU 21. Commercial/industrial workers are not evaluated for
25 the soil to groundwater pathway or tap water use, consistent with NMED risk guidance
26 which indicates that groundwater exposure is not a concern for commercial/industrial
27 workers (NMED, 2022 [Section 1.2.1]). The direct contact pathway for
28 commercial/industrial workers will be evaluated using results for samples collected from
29 0-1 foot bgs (NMED, 2022 [Section 2.8.2]). The VI pathway will be evaluated using all
30 results regardless of depth because volatilization can occur at depths greater than 10 feet.
- 31 • Future construction workers – Potentially complete pathways include direct contact with
32 surface (0-1 foot bgs) and subsurface soil (1-10 feet bgs). Construction workers are not
33 exposed to site groundwater because they bring their own drinking water to job sites and
34 because groundwater occurs at depths greater than the typical exposure horizon (10 feet)
35 for a construction worker. Construction workers are also not exposed to volatile analytes
36 through the VI pathway because they spend the majority of their time outdoors. The direct
37 contact pathway for construction workers will be evaluated using results for samples
38 collected from 0-10 feet bgs (NMED, 2022 [Section 2.8.2]).

39 There are no complete exposure pathways for contaminants in surface water or sediment
40 because there are no year-round surface water bodies at SWMU 21. Drainages within SWMU 21
41 carry precipitation and stormwater flow only during rainfall events, but are otherwise dry.

5.1.6 Risk Evaluation Approach

The potential for unacceptable health risks from exposure to remaining FWDA-related contamination will be evaluated for potentially complete pathways as defined by the exposure pathway evaluation and presented in the CSM. The risk evaluation will consist of four parts:

1. Part 1 is a risk screening step that compares the analytical results in each medium for each detected constituent in each sample to the corresponding medium-specific screening level.
2. Part 2 is an evaluation of metals background concentrations and essential nutrients.
3. Part 3 is a cumulative risk evaluation to assess the potential health risks from simultaneous exposure to multiple analytes in soil and potentially in groundwater.
4. Part 4 is an evaluation of the VI pathway.

The details for each part of the risk evaluation are presented below.

5.1.6.1 Risk Screening (Part 1)

The risk screening step presents a sample-by-sample evaluation of analyte detections in soil and groundwater compared to screening levels, based on the hierarchy presented in Section 5.1.2 and as relevant for the complete exposure pathways within SWMU 21. The background level for metals is selected when it is greater than the selected screening value for each exposure pathway. Background levels are discussed further in the next section. The screening levels considered for use in the risk screening step are presented in **Table 2-3** (for soil) and **Table 2-4** (for groundwater). The most current risk evaluation guidelines will be used at the time of the risk evaluation.

As discussed previously in Section 4.0, groundwater results from the first temporary well location will be screened against current state or federal drinking water standards (or USEPA tap water RSLs for analytes without published drinking water standards). If there are no indications of impact to the groundwater quality based on the risk screening step, the temporary well will be abandoned and no further evaluation of groundwater will be required.

5.1.6.2 Evaluation of Metals Background Levels (Part 2)

As allowed by NMED risk guidance (NMED, 2022 [Section 2.8.3.2]), the risk evaluation process may incorporate a comparison to background concentrations before evaluating cumulative risks. This is consistent with Attachment 7 (Section 7.6) of the Permit (NMED, 2015a) which indicates that the screening level for naturally occurring (in other words, background) constituents can be set at the background level if a background level is approved by NMED. NMED risk guidance (NMED, 2022 [Section 5.3]) also allows for an evaluation of essential nutrients prior to evaluating cumulative risks. This section provides a summary of the background studies completed at the site, and the steps to be performed to evaluate if metals and essential nutrients should be retained as COPCs.

5.1.6.2.1 Summary of Metals Background Studies

At FWDA, site-specific background concentrations for metals in soil were established through the completion of a background study conducted in 2009 and documented in a report titled *Soil Background Study and Data Evaluation Report* (Shaw, 2010). The study included collection of 124 samples from areas of FWDA in Parcels 1, 2, 5A, 8, 14, 15, 17, 19, and 20 believed to be unimpacted by historical operations. Table 8-1 of the 2010 background study report presents the background value selected for each metal in soil included in the study. A supplemental background study was conducted in 2012 and documented in a report titled *Final Phase 2 Soil Background Report* (USACE, 2013). The purpose of the supplemental investigation was to refine the background levels for arsenic and antimony. The study resulted in a revised background value of 0.23 mg/kg for antimony, which is the 95% upper tolerance limit (UTL) from soil unit 350ss, as presented in Table 4-1 of the *Final Phase 2 Soil Background Report*, but arsenic concentrations at investigation areas without known arsenic sources continued to exceed the background level.

In 2013, NMED issued a letter titled *The Evaluation of Background Levels for Arsenic in Soil* (NMED, 2013). This letter provides a summary of the background evaluations and provides a refined arsenic background value and guidance on how to use that value to assess investigation results. Specifically, the NMED letter states that if the maximum arsenic concentration is less than 5.6 mg/kg, then arsenic may be considered representative of background and no further action for arsenic is required. If the maximum arsenic concentration is greater than 5.6 mg/kg, then the range of arsenic concentrations in the sample data set is to be compared to the range of arsenic concentrations in the site-specific background data set (0.2 mg/kg to 11.2 mg/kg). If the range of arsenic concentrations in the sample data set is consistent with the range of concentrations in the site-specific background data set, then the arsenic concentrations can be considered representative of background and no further action for arsenic is required. If the range of arsenic concentrations in the sample dataset are not consistent with the range of concentrations in the background data set, then additional investigation or corrective action may be required.

The background values for soil that will be used to evaluate sample results are presented in **Table 2-3** and **Table 2-5**. Background values for groundwater have not been established or approved by NMED as of the date of this work plan. A metals background evaluation for groundwater will not be conducted if groundwater background levels for FWDA have not been approved at the time the risk evaluation is completed. A metals background evaluation for groundwater will not be conducted if the concentrations of detected analytes are less than current state or federal drinking water standards (or USEPA tap water RSLs for analytes without published drinking water standards).

5.1.6.2.2 Evaluate the Maximum Concentration

NMED risk guidance (NMED, 2022 [Section 2.8.3.2]) allows metals to be eliminated from further consideration when the maximum detected concentration is less than or equal to its background threshold value (BTV), defined as its calculated UTL. Metals detected in soil at concentrations less than their respective background threshold values will not be retained as COPCs and will not be evaluated further. Metals detected in soil at concentrations greater than background levels or that are considered essential nutrients will be further evaluated.

5.1.6.2.3 Evaluate Essential Nutrients

NMED risk guidance (NMED, 2022 [Section 5.3]) allows for an evaluation of metals and other inorganics classified as essential nutrients separate from the cumulative risk evaluation. The metals and other inorganics classified as essential nutrients are calcium, chloride, magnesium, phosphorous, potassium, and sodium. SSLs for essential nutrients were developed by NMED based on dietary guidelines developed by the Institute of Medicine and the National Academy of Sciences.

The maximum concentration will be compared to the SSL. Essential nutrients with maximum concentrations less than the SSL will not be retained as COPCs and are not evaluated further. Essential nutrients that are not metals and that have maximum concentrations greater than the essential nutrient SSLs will be retained as COPCs. Essential nutrients that are metals with maximum concentrations greater than the essential nutrient SSLs will be further evaluated.

5.1.6.2.4 Conduct Statistical Evaluation of the Metals

Metals with maximum concentrations greater than background levels and the essential nutrient SSLs from discrete samples may undergo additional evaluation in the form of a more robust statistical evaluation as described in Section 2.8.3.2 of the NMED risk guidance (NMED, 2022) using ProUCL statistical software (most current version). The more robust statistical evaluation, if performed, would include conducting a two-sample hypothesis test for data sets consisting of at least eight samples and at least five detections, conducting a point-by-point comparison to background levels for data sets that are smaller, and preparation of graphical displays to provide further rationale to determine if metals concentrations are consistent with background levels or elevated above background levels.

Metals determined to be consistent with background levels will not be retained as COPCs and are not evaluated further. Metals determined to be elevated above background levels will be further evaluated through a lines of evidence discussion.

5.1.6.2.5 Present Additional Lines of Evidence

NMED allows for a lines-of-evidence discussion to be developed to support exclusion of one or more metals as representative of background rather than being site-related, as long as there are sufficient data to define the nature and extent of potential hotspots. The lines of evidence could include information regarding site history and historical operations, an assessment of the number of detections versus non-detects, an assessment of whether or not the distribution of results for one or more metals is indicative of a release or source area. Metals for which sufficient lines of evidence demonstrate they are not site-related or not significantly elevated above the background level will not be retained as COPCs and are not evaluated further. Metals without sufficient lines of evidence to eliminate them as COPCs will be carried forward to the cumulative risk evaluation.

5.1.6.3 Cumulative Risk Evaluation (Part 3)

The cumulative risk evaluation assesses if there are potential health risks from simultaneous exposure to multiple analytes. The cumulative risk evaluation incorporates the results of the metals background concentrations and proceeds to evaluate potential health risks based on the maximum detected concentrations of each COPC. Subsequent refinements may be incorporated into the cumulative risk evaluation if an unacceptable cancer risk or noncancer hazard is identified in the initial cumulative risk evaluation. The cumulative risk evaluation may include up to three steps to evaluate potential health risks.

The cumulative risk evaluation will focus on soil. It will not address groundwater because the data set to be generated under this work plan will too small to warrant a separate cumulative evaluation (up to two wells, up to two samples). If the concentrations of detected analytes exceed screening levels, then further evaluation of groundwater at Parcel 23 will be conducted separately as part of the FWDA groundwater monitoring program.

5.1.6.3.1 Step 1 – Initial Cumulative Risk Evaluation

The initial cumulative risk evaluation provides an assessment of potential health risks from exposure to COPCs in soil for the worst-case exposure. The maximum detected concentration in the sample data set for each COPC is used to evaluate the complete exposure pathways identified by the exposure pathway analysis and CSM. Cumulative cancer risks and non-cancer hazards will be calculated for soil using the following steps:

1. Select the maximum concentration for each detected COPC. Exclude compounds not detected in any sample within a given medium for that AOC or SWMU. Also exclude metals determined to be present at background levels and essential nutrients found at concentrations below screening levels based on dietary intake.
2. Divide the maximum concentration by the screening level to calculate a risk ratio. Multiply the ratio for carcinogenic analytes by 1×10^{-5} . Multiply the ratio for noncarcinogenic analytes by 1.0.
3. Sum the risk ratios for carcinogenic analytes to calculate the cumulative cancer risk. Sum the risk ratios for noncarcinogenic analytes to calculate the HI.
4. Lead is evaluated separately through comparison to the screening level because its health effects are not correlated with the typical carcinogenic or noncarcinogenic dose-based toxicity values that characterize other chemicals. Instead, the screening level for lead is based on a modeled concentration in soil that results in an acceptable blood lead level protective of adverse developmental health effects, or that is the action level identified by USEPA for groundwater.
5. The TPH is evaluated separately because its indicator chemicals, as identified in Section 6.2 of the NMED risk guidance (NMED, 2022), will be included in the cumulative risk evaluation when they are detected through analysis of VOCs and SVOCs. The TPH concentrations will be compared to the appropriate NMED screening level as published in

Table 6.2 of the NMED risk guidance (NMED, 2022). Justification for the selection of the TPH screening level will be provided in the risk evaluation.

The NMED target risk thresholds are 1×10^{-5} for carcinogenic analytes and 1.0 for noncarcinogenic analytes. If the initial cumulative cancer risks and noncancer hazards for soil are less than NMED target risk thresholds, and the maximum concentrations of lead and TPH are less than their respective screening levels, then the predicted health risks will be considered acceptable and the cumulative risk evaluation is complete. No further investigation or removal action is required. If initial cumulative cancer risks or noncancer hazards exceed the target risk thresholds, or if the maximum concentration of either lead or TPH exceeds its respective screening level, the analytes contributing to the exceedance will be carried forward to Step 2.

5.1.6.3.2 Step 2 – Refined Cumulative Risk Evaluation

If the initial cumulative risks or hazards exceed the NMED target risk thresholds, then a refined cumulative risk evaluation will be conducted using one or more of the following in the evaluation:

1. Development of a refined exposure concentration, specifically the 95% UCL, where sufficient data are available to support development of a UCL. ProUCL (most current version) will be used to calculate the 95% UCL which will be used in place of the maximum concentration.
2. Evaluation of cumulative risks within a smaller exposure area, using the maximum concentrations, or a 95% UCL (if sufficient data are available), from within the smaller area, where it is reasonable to consider that receptor exposure over the entire SWMU is unlikely.
3. Segregation of noncancer hazards by toxic endpoint to determine if cumulative hazards exceed target the risk threshold for a particular organ or body system. The toxic endpoint includes the critical or primary organ or body system effected by exposure to a noncarcinogenic analyte, as well as organs or health effects secondary to the critical effect associated with the chronic toxicity criteria used to establish the NMED screening level. The sources of toxicity information reviewed when toxic endpoints are evaluated are those listed in Section 2.1 of the NMED risk guidance (NMED, 2022).
4. Qualitative discussion of additional lines of evidence relevant to the COPC to describe why a potentially unacceptable level of cancer risk or noncancer hazard may not be significant. Examples of lines of evidence could include a review of the subsurface conditions, the physical and chemical properties of an analyte, frequency of detection, number and/or magnitude of exceedances, visual evidence of contamination, concentration trends, and statements about historical use or sources of an analyte at FWDA.

The cumulative cancer risks and noncancer hazards will be recalculated. If the cumulative risk/hazard sums are less than target risk thresholds, then the cumulative risk evaluation is complete, no further evaluation is required and no removal actions are required. If the refined

cumulative risk evaluation still indicates unacceptable health risks, then analytes contributing to the exceedance will be carried forward to Step 3.

5.1.6.3.3 Step 3 – Additional Cumulative Risk Evaluation

When unacceptable risks are predicted from both the initial and refined cumulative risk evaluations, additional site-specific data evaluation could be conducted to further characterize the nature and uncertainty of the estimated risks or hazards. The additional evaluation, if performed, may include an evaluation of cumulative risk on a sample-by-sample basis, incorporation of refined exposure assumptions or other appropriate refinement. This step would only be performed if the results of the Steps 1 and 2 indicate that further evaluation would provide additional understanding of potential risks that could further characterize the significance of the unacceptable risks/hazards, or aid in developing a corrective action measure to mitigate the potential health risks.

The results of the cumulative risk evaluation will be presented in the RFI Phase 2 Report, and will include tables showing the cumulative risk calculations and appendices presenting the relevant backup documentation.

5.1.6.4 Vapor Intrusion Pathway Evaluation (Part 4)

NMED requires this pathway be evaluated when volatile analytes are detected in soil or groundwater (NMED, 2022). As described in Section 2.5 of the NMED risk guidance (NMED, 2022), volatile chemicals are those chemicals with Henry's Law constant greater than 1×10^{-5} atmospheres – cubic meter per mole (atm-m³/mol) and molecular weights less than 200 grams per mole (g/mol). NMED risk guidance requires that the VI pathway be identified with one of the following designations:

1. Incomplete pathway and no action required.
2. Potentially complete pathway and a qualitative evaluation required.
3. Complete pathway and quantitative evaluation required.

The VI pathway evaluation will assess the potential for health risk from exposure to COPCs and soil, and in groundwater (if it is encountered and if concentrations are less than groundwater screening levels), from inhalation inside buildings.

NMED does not publish VISLs for bulk soil because NMED follows USEPA VI guidance, which does not support reliance on bulk soil as an effective means of quantifying potential risks through the VI pathway. Therefore, the evaluation of volatile analytes in soil will be qualitative and rely on a lines-of-evidence discussion to characterize the potential for health risks. The lines of evidence referenced in Section 2.5.2.2 of the NMED risk guidance (NMED, 2022), along with discussion of historical use of volatile analytes at FWDA and the results of the groundwater VI evaluation, will be provided in the RFI Phase 2 Report.

NMED does publish VISLs for groundwater that will be used to quantitatively evaluate volatile analytes detected in groundwater, if groundwater is encountered. If volatile analyte concentrations in groundwater are less than VISLs, then no further work to evaluate or mitigate the VI pathway for groundwater will be required. If volatile analyte concentrations in groundwater are greater than VISLs, the VI pathway for groundwater will be further evaluated through a lines-of-evidence discussion that addresses historical uses of volatile analytes at the FWDA, the nature and extent of volatile analyte detections, the frequency and magnitude of exceedances, and may also consider if the assumptions underlying the VISLs are appropriate for the site being evaluated.

If sufficient lines of evidence are developed to support that volatile analytes in soil and groundwater are unlikely to pose health risks through the VI pathway, then no further evaluation or mitigation of the VI pathway is required. If there are not sufficient lines of evidence to rule out health risk through the VI pathway, then additional evaluation of the VI pathway through a site-specific assessment, sampling of soil-gas, or additional sampling of groundwater may be recommended in the conclusions of the RFI Phase 2 Report.

5.1.6.5 Migration to Groundwater Evaluation (Part 5)

Per Section 4.9 of the NMED Risk Assessment Guidance for Human Health (NMED, 2022), soil concentrations of contaminants will be directly compared to the NMED migration to groundwater soil leachate-based SSLs (SL-SSLs) (included in **Table 2-4**). Migration to groundwater SL-SSLs were derived using two criteria: tap water screening levels and the NMED groundwater and surface water protection levels (20.6.2 NMAC), and/or Federal Maximum Contaminant Levels (MCLs) (Table A-3, NMED, 2022). The migration to groundwater SL-SSL for a chemical based on a DAF of 20 will be applied for initial screening to evaluate potential leaching and migration of contaminants from the vadose zone to groundwater. The Phase 2 RFI Report risk assessment will include a reevaluation of the appropriateness of the use of a dilution attenuation factor DAF of 20 for the soil screening levels. All soil data, regardless of depth of detection, will be used in the evaluation of the migration to groundwater pathway. The maximum detected concentrations in soil will initially be compared to the SL-SSLs. If the initial comparison results in an exceedance of the migration to groundwater SL-SSLs, a refined EPC and/or site-specific data will be compared to the NMED migration to groundwater SL-SSL.

5.1.6.6 Uncertainty Discussion (Part 6)

An uncertainty discussion will be prepared to address the uncertainty associated with the specific data set and risk evaluation. The uncertainty discussion considers the effects of qualifiers added during data validation and of LOQs that may be greater than the screening levels. It also addresses the use of surrogates, or the lack of surrogates if no appropriate surrogate is available. The uncertainty discussion will provide an assessment of whether the uncertainty contributes to an overestimation of risk, an underestimation of risk, or has a neutral impact on estimated risks.

5.2 Ecological Risk Evaluation

A screening level ecological risk evaluation will be conducted for SWMU 21 in Parcel 23 as described in this section. The Screening Level Ecological Risk Assessment (SLERA) will assess

potential risks to ecological receptors as required by the Permit (NMED, 2015a; Attachment 7, Section 7.5), and using Volume 2 of the NMED risk guidance (NMED, 2017) titled *Screening-Level Ecological Risk Assessments*.

5.2.1 Define NMED Target Risk Thresholds

NMED risk guidance (NMED, 2017; Section 3.5) identifies the target risk threshold as 1.0. This risk level is the threshold over which the potential for adverse effects on ecological receptors can occur and triggers additional ecological evaluation (i.e., Tier 2).

5.2.2 Selection of Screening Levels

The screening levels selected for evaluating ecological hazards for SWMU 21 are those published for representative receptors by NMED in Attachment C of its risk guidance (NMED, 2017). The ecological screening levels are presented in **Table 2-5**. The screening levels in effect at the time the risk evaluation is conducted will be used in the risk evaluation.

5.2.3 Selection of COPEC

Analytes detected at least once in the Phase 2 RFI data set will be considered chemicals of potential ecological concern (COPEC). Analytes that are not detected in any sample will not be retained as COPECs.

5.2.4 Exposure Pathway Evaluation

The ecological exposure pathway analysis considers the six groups of representative receptors identified in NMED risk guidance: 1) shallow-rooted and deep-rooted plants, 2) deer mouse, 3) horned lark, 4) kit fox, 5) red-tailed hawk, and 6) prong-horned antelope (NMED, 2017). The exposure pathway analysis serves to focus the evaluation on only those receptors for which the pathway is potentially complete. Receptors for which the exposure pathway is incomplete, or for which the home range size is much greater than the size of the area being evaluated, were eliminated from the ecological risk evaluation. The size of SWMU 21 is the primary line of evidence to support no further evaluation of a particular ecological receptor.

SWMU 21 is comprised of approximately 2.6.7 acres. Based upon this area, three large home range receptors can be eliminated from further evaluation: 1) kit fox (only for sites greater than 267 acres), 2) red tailed hawk (only for sites greater than 177 acres), and 3) prong-horned antelope (only for sites greater than 342 acres). NMED risk guidance requires plants, the deer mouse and the horned lark to be evaluated at all sites, regardless of size (NMED, 2017). Therefore, the ecological risk evaluation will consider each of these three receptors.

5.2.5 Conceptual Site Model

The CSM is based on the exposure pathway evaluation and includes potentially complete exposure pathways in soil for plants, the deer mouse, and the horned lark as illustrated on **Figure 5-2**. The primary exposure route for plants is through direct contact. The deer mouse and horned lark may be exposed through direct contact, inhalation, and ingestion. Shallow-rooted plants and

the horned lark will be evaluated using the results from samples collected from 0-1 foot bgs (NMED, 2017; Section 3.2). Deep-rooted plants and the deer mouse will be evaluated using the results from samples collected from 0-10 feet bgs (NMED, 2017; Section 3.2). There are no complete pathways for groundwater because it occurs at depths greater than 10 feet and does not discharge to any surface water features.

5.2.6 Risk Evaluation Approach

The ecological risk evaluation consists of two tiers:

1. Tier 1 – Presents an initial quantitative assessment of ecological risk under the most conservative conditions (for example, maximum concentrations, minimum body weights, use of no observed adverse effect level [NOAEL] toxicity reference values [TRV], and other conservative assumptions). A refined Tier 1 risk evaluation may be developed to assess the two areas of SWMU 21 separately.
2. Tier 2 – Presents a refined quantitative assessment of ecological risk that incorporates revisions to the exposure dose input parameters and that uses the lowest observed adverse effect level (LOAEL) TRVs (provided in Attachment C of NMED, 2017), and re-assesses ecological risk using more realistic assumptions. A lines-of-evidence discussion may also be developed as part of the Tier 2 risk evaluation.

5.2.6.1 Tier 1 Ecological Risk Evaluation

The Tier 1 risk evaluation provides an assessment of potential ecological risks by using the maximum detected concentration in surface soil (0-1 foot bgs) for non-burrowing receptors, and 0-10 feet bgs for burrowing receptors for each COPEC and the most protective ESL (or the effect concentration for plants) for the representative receptors with complete exposure pathways identified by the CSM. Any detected analyte that is identified as a COPEC, except for those metals that are found to be present at background levels as determined in the human health risk evaluation using the process described in Section 5.1.6.2.1, will be evaluated.

Ecological risks will be calculated using the following steps:

1. Select the maximum concentration for each detected analyte. Exclude compounds not detected in any sample. Also exclude metals determined to be present at naturally occurring levels in the background evaluation.
2. Divide the maximum concentration by the most protective Tier 1 ESL (or the effect concentration for plants) to calculate the screening level hazard quotient (SLHQ) using Equations 6 and 8 as provided in the NMED risk guidance (NMED, 2017; Section 3.5).
3. Sum the individual SLHQs to calculate the overall HI.
4. Compare the overall HI to the NMED target risk threshold of 1.0.
5. If the overall HI is less than 1.0, then there is no ecological hazard predicted and no further evaluation is required. If the overall HI is greater than 1.0, then there is the potential for an

unacceptable ecological hazard and the risk evaluation progresses to a refined Tier 1 evaluation or to a Tier 2 evaluation.

5.2.6.2 Refined Tier 1 Risk Evaluation

The Refined Tier 1 risk evaluation will be conducted to evaluate the ecological hazard posed by each area of SWMU 21. The same process described in Section 5.2.6.1 will be applied to each exposure area.

If the HI for receptors with complete exposure pathways in a given exposure area are less than the NMED target risk threshold of 1.0, then no ecological hazard is predicted for that receptor in that exposure area and no further evaluation was required. If the HI is greater than 1.0 for a receptor in a particular exposure area, then that receptor and exposure area will be carried forward to a Tier 2 risk evaluation.

5.2.6.3 Tier 2 Risk Evaluation

The Tier 2 ecological risk evaluation allows for multiple assumptions to be refined before re-calculating the SLHQ and HI for those receptors having SLHQs or overall HIs greater than 1.0 in the refined Tier 1 ecological risk evaluation. This section describes the refinements allowed by NMED risk guidance that will be considered for use in the Tier 2 ecological risk evaluation (NMED, 2017).

5.2.6.3.1 Refine the Toxicity Reference Values

NMED risk guidance (NMED, 2017; Section 4.1.1) provides for revisions to the TRVs (or effect concentrations for plants) to those based on LOAELs. Tier 2 TRVs/effect concentrations (ECs) represent concentrations that are protective of the population as a whole, as opposed to NOAEL-based TRVs that are protective of the most sensitive individuals.

5.2.6.3.2 Develop Refined Exposure Doses for Affected Receptors

NMED risk guidance (NMED, 2017; Section 4.0) provides for revisions to multiple factors in the calculation of exposure doses for Tier 2 evaluations. These factors, and the refinements that are allowed, are listed below:

- Exposure point concentration (EPC): The maximum concentration may be refined by calculating the 95% UCL, if there are sufficient data to support a UCL calculation. ProUCL (most current version) will be to calculate the 95% UCL.
- Area use factor (AUF): This value may be refined using the actual exposure area size and the receptor's average home range size. If the average home range size is less than the size of the exposure area, the AUF will remain at 1.
- Body weight: The average body weight may be used instead of the minimum body weight.
- Ingestion rate: The average reported food ingestion rate may be used instead of the maximum food ingestion rate.

- Wet-weight to dry-weight conversion factor: This may be included to account for the difference in reporting body weight (as wet-weight) and soil concentrations (as dry weight).

In addition, a lines-of-evidence discussion may be developed where appropriate to provide additional context for the results of the Tier 2 risk evaluation or to demonstrate that a particular COPEC is not site-related.

5.2.6.3.3 Conduct the Tier 2 Risk Evaluation

The Tier 2 risk evaluation is conducted using the same procedure as used in the Tier 1 risk evaluation, for those receptors and exposure area that progress into the Tier 2 risk evaluation. The Tier 2 risk evaluation incorporates one or more of the refinements listed in the prior two sections to re-assess the ecological risks.

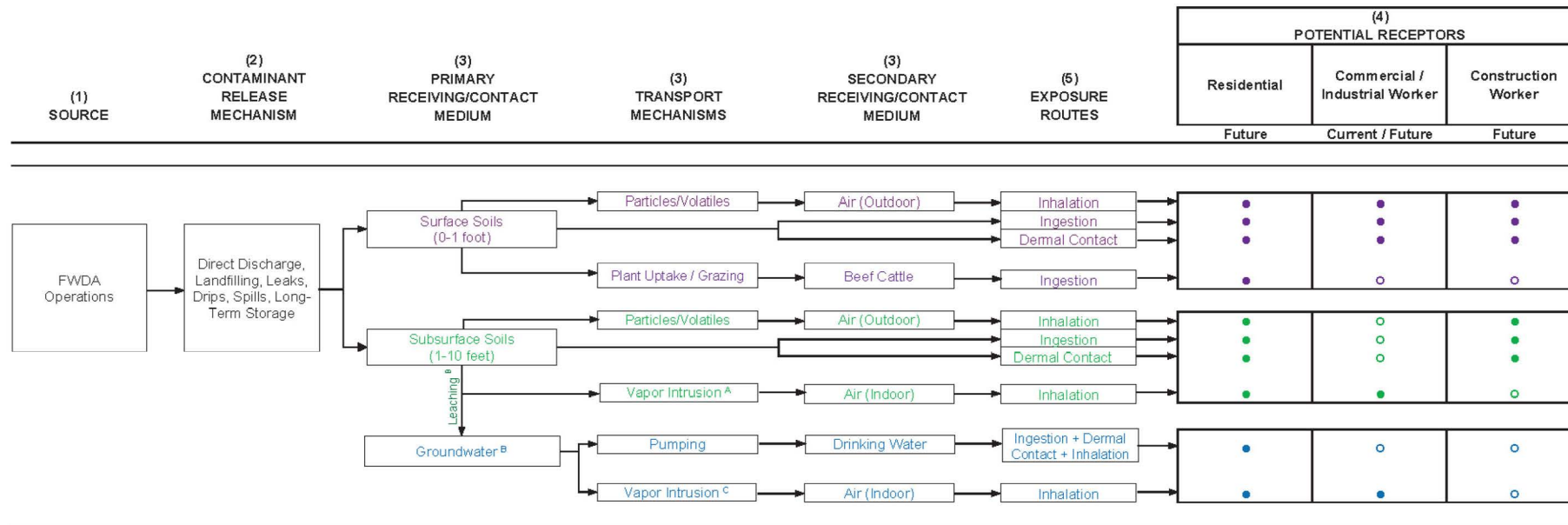
The Tier 2 risk evaluation is considered complete, and no further evaluation is needed, when the HI for each receptor is less than 1.0. In circumstances where the HI for one or more receptors is greater than 1.0 after applying all refinements, the Army will consider if a site-specific ecological risk evaluation is warranted, or if a soil removal action is preferred to additional ecological risk evaluation. The approach to performing a site-specific ecological risk evaluation is not addressed in this RFI Phase 2 Work Plan. The Army will work in consultation with NMED on the approach to a site-specific ecological risk evaluation if that is the Army's selected course of action.

5.2.7 Uncertainty Discussion

An uncertainty discussion will be prepared to address the uncertainty associated with the specific dataset and risk evaluation. The uncertainty discussion will consider the effects of qualifiers added during data validation, of LOQs that may be greater than the ESLs (or ECs for plants), and of exposure assumptions that may not be representative of anticipated receptor use at Parcel 23. The uncertainty discussion will provide an assessment of whether the uncertainty contributes to an overestimation of risk, an underestimation of risk, or has a neutral impact on estimated risks.

1

[THIS PAGE INTENTIONALLY LEFT BLANK]




Notes: The numbers appearing at the top of each column are taken from the 5 elements that make up a complete exposure pathway presented in Section 1.2.1 of the NMED Risk Guidance (NMED, 2019 Revised).

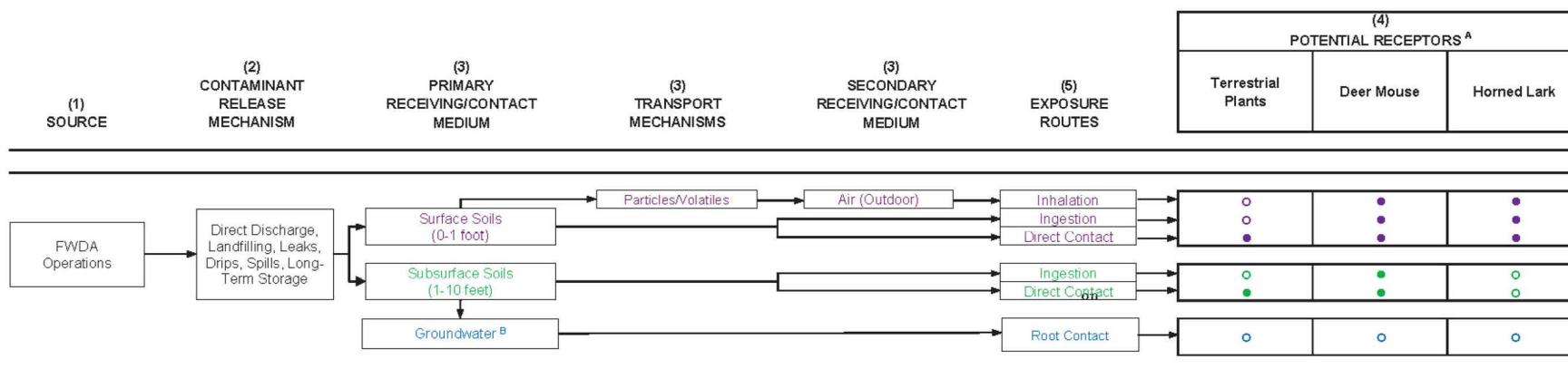
- Potentially complete exposure pathway.
- Incomplete exposure pathway.

^A The vapor intrusion pathway for soil is incomplete for the northern portion of SWMU 21 because it is within the arroyo, no structures are currently present and none are reasonably likely to be built in the future. The vapor intrusion pathway for soil for the southern portion of SWMU 21 will be considered complete if volatile analytes are detected in the Phase 2 RFI samples.

^B The soil leaching to groundwater pathway will be evaluated if the geologic conditions indicate the potential for soil contamination to leach to groundwater.

^C The vapor intrusion pathway for groundwater is only considered potentially complete for the southern portion of SWMU 21 because no structures are currently located within the arroyo and none are reasonably likely to be constructed in the future.

Final RFI Phase 2 Work Plan, Revision 1.0 Parcel 23 - Fort Wingate Depot Activity McKinley County, New Mexico	
SWMU 21 - Conceptual Site Model for Human Receptors	
FIGURE 5-1	Job No.: 912640002 PM: JH Date: 4/15/2019 Scale: NTS
<small>The map shown here has been created with all due and reasonable care and is a study for use with Amec Foster Wheeler Project Number 912640002. This map has not been certified by a professional land surveyor, and any third party use of this map is done without warranty of any kind. Amec Foster Wheeler assumes no liability, direct or indirect, whatsoever for any such third party or subsequent use.</small>	
	




Notes: The numbers appearing at the top of each column are taken from the 5 elements that make up a complete exposure pathway presented in Section 1.2.1 of the NMED Risk Guidance (NMED, 2017 Revised).

- Potentially complete exposure pathway.
- Incomplete exposure pathway.

^A The size of SWMU 21 is less than 10% of the home range size for the kit fox, red-tailed hawk, and pronghorn antelope, and thus the risk to these receptors from SWMU are negligible; these receptors are not evaluated further.

^B Groundwater does not discharge to surface water, it is too deep for root contact by plants, and there are no year-round surface water bodies within SWMU 21. Thus, groundwater, surface water and sediment are not media of concern for ecological receptors at SWMU 21.

Final RFI Phase 2 Work Plan, Revision 1.0 Parcel 23 - Fort Wingate Depot Activity McKinley County, New Mexico		
SWMU 21 - Conceptual Site Model for Ecological Receptors		
FIGURE 5-2	Job No.: 912640002 PM: JH Date: 3/19/2019 Scale: NTS	 amec foster wheeler
<small>The map shown here has been created with all due and reasonable care and is a study for use with Amec Foster Wheeler Project Number 912640002. This map has not been certified by a professional land surveyor, and any third party's use of this map comes without warranty of any kind. Amec Foster Wheeler assumes no liability, direct or indirect, whatsoever for any such third party's use or interpretation.</small>		

SECTION 6.0 SCHEDULE

The approximate schedule for conducting the Phase 2 RFI activities at Parcel 23 is presented below.

- Work Plan delivered to NMED – November 27, 2024
- Fieldwork – Provide 30 day notice to NMED
- Final RFI Report Phase 2 to NMED – provided to NMED 120 days subsequent to completion of investigation activities including laboratory reporting, data validation, waste disposal and site restoration

1

[THIS PAGE INTENTIONALLY LEFT BLANK]

SECTION 7.0 REFERENCES

- CH2M Hill, 2009. *Final Historical Information Report, Parcel 23*. CH2M Hill, 27 April 2009.
- CH2M Hill, 2010. *Final – NMED Revision, RCRA Facility Investigation Work Plan, Parcel 23*. CH2M Hill, 06 April 2010.
- Department of Defense (DoD), 2021. *DoD Quality Systems Manual Version 5.4*. United States Department of Defense, 2021.
- Innovar and CB&I, 2015. *Final 2015 Interim Measures Facility-Wide Groundwater Monitoring Plan, Version 8, Revision 1, Fort Wingate Depot Activity, McKinley County, New Mexico*. Innovar Environmental, Inc. and CB&I, 28 April 2015.
- New Mexico Environment Department (NMED), 2011. *New Mexico Environment Department Groundwater Quality Bureau Monitoring Well Construction and Abandonment Guidelines, Revision 1.1*. New Mexico Environment Department, March 2011.
- NMED, 2013. *Evaluation of Background Levels for Arsenic in Soil, Fort Wingate Depot Activity, New Mexico*. Letter, December 18, 2013.
- NMED, 2014. Letter from the New Mexico Environment Department to Mark Patterson (FWDA, BRAC Coordinator) and Steve Smith (USACE FWDA Program Manager) *Re: Disapproval, Final RCRA Facility Investigation Report, Parcel 23, Fort Wingate Depot Activity, McKinley County, New Mexico, USEPA ID# NM6213820974, HWB-FWDA-12-002*. New Mexico Environment Department, August 19, 2014.
- NMED, 2015a. Resource Conservation and Recovery Act Permit, USEPA ID No. NM 6213820974. New Mexico Environment Department Hazardous Waste Bureau, December 1, 2005, Revised February 2015.
- NMED, 2015b. Letter from the New Mexico Environment Department to Mark Patterson (FWDA, BRAC Coordinator) and Steve Smith (USACE FWDA Program Manager) *Re: Approval with Modifications, Final RCRA Facility Investigation Report, Parcel 23, Revision 1.0, Fort Wingate Depot Activity, McKinley County, New Mexico, USEPA ID# NM6213820974, HWB-FWDA-12-002*. New Mexico Environment Department, August 12, 2015.
- NMED, 2017. *Risk Assessment Guidance for Site Investigations and Remediation*. Volume II Soil Screening Guidance for Ecological Risk Assessments, NMED Hazardous Waste Bureau. March, 2017 Revised.
- NMED, 2018. Letter from the New Mexico Environment Department to Mark Patterson (FWDA, BRAC Coordinator) and Steve Smith (USACE FWDA Program Manager) *Re: Disapproval Final RCRA Facility Investigation Phase 2 Work Plan, Parcel 23, Fort Wingate Depot Activity, McKinley County, New Mexico, USEPA ID# NM6213820974, HWB-FWDA-18-004*. New Mexico Environment Department, October 31, 2018.

- 1 NMED, 2022. *Risk Assessment Guidance for Site Investigations and Remediation*. Volume I Soil
2 Screening Guidance for Human Health Risk Assessments. NMED Hazardous Waste
3 Bureau. December 2022 Revised.
- 4 SCIENTECH, Inc., 1999a. *Chemical Quality Control Summary Report for the Landfill Closure:
5 Removal and Disposal of Group "C" and Central Landfills, Fort Wingate, New Mexico*.
6 August 1999.
- 7 SCIENTECH, Inc., 1999b. *Chemical Quality Control Summary Report for Confirmation Soil
8 Sampling of Central Landfill in Support of Landfill Closure: Removal and Disposal of Group
9 "C" and Central Landfills, Fort Wingate, New Mexico*. December 1999.
- 10 Shaw Environmental Inc. (Shaw), 2010. *Soil Background Study and Data Evaluation Report*, Fort
11 Wingate Depot Activity, Gallup, New Mexico. Shaw Environmental, Inc. October 2010.
- 12 Tetra Tech NUS, 2000. *Final Release Assessments Report*. December 2000.
- 13 United States Army Corp of Engineers (USACE), 2007. *Environmental Information Management
14 Plan, Fort Wingate Depot Activity*. USACE, 21 December 2007.
- 15 USACE, 2013. *Final Phase 2 Soil Background Report*, Fort Wingate Depot Activity, McKinley
16 County, New Mexico, USACE, February 5, 2013.
- 17 United States Environmental Protection Agency (USEPA), 2009. *Guidance for Labeling Externally
18 Validated Laboratory Analytical Data for Superfund Use*. United States Environmental
19 Protection Agency, 13 January 2009.
- 20 USEPA, 2024. Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1), May.
- 21 USEPA, 2019. *SEDD Specification and Data Element Dictionary*, Version 5.2. March.
- 22 United States Geological Survey (USGS), 2015. *Final RCRA Facility Investigation Report, Parcel
23 11, Revision 1.0, Fort Wingate Depot Activity*. USGS New Mexico Water Science Center,
24 28 February 2015.

1
2

APPENDIX A
CORRESPONDENCE WITH NMED

[THIS PAGE INTENTIONALLY LEFT BLANK]

Army Response Letter dated November 27, 2024
to Approval with Modification Letter dated July 3, 2019

[THIS PAGE INTENTIONALLY LEFT BLANK]



DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF, G-9
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

November 27, 2024

Army Environmental Division - BRAC Operations Branch

Mr. JohnDavid Nance
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

RE: Response to Approval with Modifications Final RCRA Facility Investigation Phase 2 Work Plan, Parcel 23, Revision 1.0, Fort Wingate Depot Activity, McKinley County, New Mexico, dated July 3, 2019. EPA# NM6213820974, HWB-FWDA-18-004

Dear Mr. Nance:

This letter provides responses to the comments issued in the Approval with Modifications, Final RCRA Facility Investigation Phase 2 Work Plan, Parcel 23, Revision 1.0 dated July 3, 2019.

General Comments:

1. Permittee's Response to NMED Disapproval Comment 6

Permittee Statement: "If target analytes are detected in blank samples, the contractor will U qualify detected results from the associated field samples, at the higher of the detected concentration or the limit of detection, if the concentration detected in the sample is less than five times the concentration detected in the blank."

NMED Comment: The proposed protocol is too general to be applied for every instance. If the detected concentration in blank samples are five time higher than that of field samples, collection of additional samples and associate QA/QC samples may be more appropriate to verify the occurrence of potential sample handling error (e.g., mislabeling). Provide criteria for collection of additional samples (e.g., frequency of detections, concentrations of constituents in blanks) to verify the occurrence of sampling errors. Revise the statement and provide a replacement page.

Permittee Response: Concur. To clarify with regards to method blank contamination, if detections $>1/2$ the LOQ or $>1/10$ th the amount measured in the associated sample (whichever is greater) are observed in the method blanks, then the lab will perform corrective action (i.e., reprepare and reanalyze the samples). If reparation/reanalysis is not possible or the detection in the blank is below $1/2$ the LOQ or $< 1/10$ th the amount measured in the associated sample, then the validator will apply appropriate flagging. For example, in accordance with General Data Validation Guidelines (Revised Table for Sample Qualification in the Presence of Blank Contamination, DoD, October 23; <https://www.denix.osd.mil/edqw/denix-files/sites/43/2023/10/>

Replacement-Blank-Qualification-Table-2023-10-03.pdf), if detections are observed in the samples at > LOD and < 5 times the concentration found in the blank, then results are qualified as estimated with a high bias (J+). Sample results do not require qualification if they are detected at concentrations greater than five times the blank concentration. Qualified data will be discussed in the Case Narrative. This methodology is consistent with the Quality Systems Manual (Version 5.4,2021;<https://www.denix.osd.mil/edqw/denix-files/sites/43/2021/10/QSM-Version-5.4-FINAL.pdf>). The following text is included in Section 2.3.1.1 of the Phase 2 RFI Work Plan (underlined text represents text added for clarification):

“There will be at least one method blank per preparation or analytical batch. If a target constituent is found at a concentration that exceeds one-half the limit of quantitation (LOQ) in the method blank, the laboratory must perform corrective action in an attempt to identify and, if possible, eliminate the contamination source. If sufficient sample volume remains in the sample container, samples associated with the blank contamination should be re-prepared and re-analyzed after the contamination source has been eliminated. If reanalysis cannot be performed, data will be qualified and explained in the Case Narrative. B-flags will be applied to all results for the specific analyte(s) in all samples in the associated batch.

To determine if elimination is appropriate, the contractor will use the following protocol during data validation to determine if results should be qualified because of blank detections. If target analytes are detected in blank samples, the contractor will U qualify detected results from the associated field samples at the higher of the detected concentration or the limit of detection if the concentration detected in the sample is less than five times the concentration detected in the blank. Sample results do not require qualification if they are detected at concentrations greater than five times the blank concentration. The validation report will also include a table that summarizes blank detections, associated samples, and original and revised results that were qualified due to the blank detections.”

2. Permittee’s Response to NMEDs Disapproval Comment 15

Permittee Statement: “PAHs are the only COCs present in surficial soils that show low-level concentrations exceeding DAF 20 soil-to-groundwater SSLs over the length of the SWMU.”

NMED Comment: According to Table 3-1, *Sample Locations and Analytes Exceeding 2019 Screening Levels — 1999 Sampling Effort*, and Table 3-2, *Sample Locations and Analytes Exceeding 2019 Screening Levels — 2000 Sampling Effort*, thallium and 2,4,6-trinitrotoluene concentrations exceeded the applicable screening levels. Therefore, metals and explosive compounds may be present on the surficial soils and are more mobile in water compared to PAHs. Nevertheless, the Permittee may use dilution attenuation factor (DAF) of 20 as default soil screening levels for the Phase 2 Investigation. Once the investigation is complete, reevaluate the appropriateness of the use of a DAF of 20 for the screening level.

Permittee Response: Concur. The Phase 2 RFI Report risk assessment will include an evaluation of the appropriateness of a DAF of 20 if the source area is determined to be greater than 0.5 acre. The following text has been included in Sections 5.1.2 (f) and 5.1.6.5: “The Phase 2 RFI Report risk assessment will include a revaluation of the appropriateness of the use of a DAF of 20 for the soil screening levels.”

3. Permittee's Response to NMED's Disapproval Comment 18

Permittee Statement: "The text (bullet item 2) was revised to strike the sentence: "SWMU 21 consists of two separate, non-contiguous areas that may be evaluated separately." Reference to non-contiguous areas in other sections was also removed, including sections 5.1.5, 5.2.4, and Figure 5-1."

NMED Comment: Although the Permittee acknowledges that SWMU 21 is contiguous, the figures showing the SWMU boundaries (e.g., Figure 3-1) presents two separate boundaries. Revise all relevant figures and provide replacement figures.

Permittee Response: Concur. Figures 1-3, 3-1, 3-2, and 4-1 have been revised to show the proposed SWMU 21 boundary revision.

Additional significant updates included in this submittal are:

In accordance with the current NMED Risk Assessment Guidance for Site Investigation and Remediation, dated November 2022, soil screening criteria have been updated since the RFI Phase 2 Work Plan Revision 1.0 was approved in 2019. In addition, USEPA RSLs are updated regularly. The most current RSLs are in May 2024. The most current screening levels are shown in Tables 2-3 through 2-5. Applicable sections of the Work Plan have been revised, including Sections 2.3.2, 5.0, and 7.0 (References).

Note to preserve the integrity of the decisions documented in the approved Work Plan, the comparison of previous data to the 2019 screening levels used in Section 3.0 has not been revised. However, this is not anticipated to affect the proposed sample plan. All applicable data will be evaluated using risk assessment guidance and criteria current at the time of preparation of the Phase 2 RFI Report.

The parameter groups (i.e., VOCs, SVOCs, DRO—extended, TAL metals, perchlorate, and explosives) are consistent with those included in Revision 1.0 of the Phase 2 RFI Work Plan. Based on the change in the laboratory (Eurofins - Denver) for this contract, some individual analytes in the VOC and SVOC analyte lists have changed. These are indicated with redline formatting on Tables 2-3 through 2-5. Tables 2-3 through 2-5 include up-to-date laboratory quantitation limits.

Section 2.3 Quality Control has been updated with information to be consistent with the DoD Quality Systems Manual, Version 5.4 (2021).

Revisions to the work plan text are shown in redline.

Although the 2019 NMED Approval with Modifications requested replacement pages to address the NMED comments, the Army is submitting the entire document in order to address the additional updates described above.

If you have any questions or require further information, please contact me at Cheryl.a.frischkorn.civ@army.mil, 703-624-6429 (Temporary Mobile), or George.h.cushman.civ@army.mil, 703-455-3234 (Temporary Home Office, preferred) or 703-608-2245 (Mobile).

Sincerely,

Cheryl Frischkorn

Cheryl Frischkorn
BRAC Environmental Coordinator
Fort Wingate Depot Activity
BRAC Operations Branch
Environmental Division

Enclosures:

CF:

Neelam Dhawan, NMED, HWB
Michiya Suzuki, NMED, HWB
Dale Thrush, U.S. EPA Region 6
Laurie King, U.S. EPA Region 6
Ian Thomas, BRAC Ops
George Cushman, BRAC Ops
Alan Soicher, USACE
Ben Moayyad, USACE
Lovenia Epaloose, SW BIA
George Padilla, BIA, NRO
Darren Sanchez, The Zuni Tribe
Sharlene Begay-Platero, Navajo Nation
Admin Record, NM / Ohio

NMED AwM Letter to Work Plan
July 3, 2019

[THIS PAGE INTENTIONALLY LEFT BLANK]



Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

**NEW MEXICO
ENVIRONMENT DEPARTMENT**

Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov



James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

July 3, 2019

Mark Patterson
BRAC Environmental Coordinator
Fort Wingate Depot Activity
13497 Elton Road
North Lima, OH 44452

Steve Smith
USACE
CESWF-PER-DD
819 Taylor Street, Room 3B06
Fort Worth, TX 76102

**RE: APPROVAL WITH MODIFICATIONS
FINAL RCRA FACILITY INVESTIGATION PHASE 2 WORK PLAN
PARCEL 23 REVISION 1.0
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA ID# NM6213820974
HWB-FWDA-18-004**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity (Permittee) *Final RCRA Facility Investigation Phase 2 Work Plan Parcel 23 Revision 1.0* (Work Plan), dated April 29, 2019. NMED has reviewed the Work Plan and hereby issues this Approval with Modifications. The Permittee must address the following comments.

1. Permittee's Response to NMED's Disapproval Comment 6

Permittee Statement: "If target analytes are detected in blank samples, the contractor will U qualify detected results from the associated field samples, at the higher of the detected concentration or the limit of detection, if the concentration detected in the sample is less than five times the concentration detected in the blank."

NMED Comment: The proposed protocol is too general to be applied for every instance. If the detected concentration in blank samples are five time higher than that of field samples,

collection of additional samples and associate QA/QC samples may be more appropriate to verify the occurrence of potential sample handling error (e.g., mislabeling). Provide criteria for collection of additional samples (e.g., frequency of detections, concentrations of constituents in blanks) to verify the occurrence of sampling errors. Revise the statement and provide a replacement page.

2. Permittee's Response to NMED's Disapproval Comment 15

Permittee Statement: "PAHs are the only COCs present in surficial soils that show low-level concentrations exceeding DAF 20 soil-to-groundwater SSLs over the length of the SWMU."

NMED Comment: According to Table 3-1, *Sample Locations and Analytes Exceeding 2019 Screening Levels – 1999 Sampling Effort*, and Table 3-2, *Sample Locations and Analytes Exceeding 2019 Screening Levels – 2000 Sampling Effort*, thallium and 2,4,6-trinitrotoluene concentrations exceeded the applicable screening levels. Therefore, metals and explosive compounds may be present on the surficial soils and are more mobile in water compared to PAHs. Nevertheless, the Permittee may use dilution attenuation factor (DAF) of 20 as default soil screening levels for the Phase 2 Investigation. Once the investigation is complete, reevaluate the appropriateness of the use of a DAF of 20 for the screening level.

3. Permittee's Response to NMED's Disapproval Comment 18

Permittee Statement: "The text (bullet item 2) was revised to strike the sentence: "SWMU 21 consists of two separate, non-contiguous areas that may be evaluated separately." Reference to non-contiguous areas in other sections was also removed, including section 5.1.5, 5.2.4, and Figure 5-1."

NMED Comment: Although the Permittee acknowledges that SWMU 21 is contiguous, the figures showing the SWMU boundaries (e.g., Figure 3-1) presents two separate boundaries. Revise all relevant figures and provide replacement figures.

The Permittee must address all comments in this Approval with Modifications and submit a response letter with revised figures and replacement pages as well as an electronic redline-strikeout version of the revised Work Plan showing all changes that have been made to the Work Plan no later than **September 16, 2019**. The Permittee must also include an electronic version of the final revised Work Plan with the response letter.

This approval is based on the information presented in the document as it relates to the objectives of the work identified by NMED at the time of review. Approval of this document does not constitute agreement with all information or every statement presented in the document.

Messrs. Patterson and Smith

July 3, 2019

Page 3

Should you have any questions, please contact Michiya Suzuki of my staff at (505) 476-6059.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
M. Suzuki, NMED HWB
C. Hendrickson, U.S. EPA Region 6
L. Rodgers, Navajo Nation
S. Begay-Platero, Navajo Nation
M. Harrington, Pueblo of Zuni
C. Seoutewa, Southwest Region BIA
G. Padilla, Navajo BIA
J. Wilson, BIA
B. Howerton, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2018 and Reading, Parcel 23

[THIS PAGE INTENTIONALLY LEFT BLANK]

Army Response to October 31, 2018 Disapproval Letter
April 25, 2019

[THIS PAGE INTENTIONALLY LEFT BLANK]



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

April 25, 2019

Base Realignment and Closure Division

Mr. John Kieling
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

RE: Response to October 31, 2018 Disapproval Letter, Final RCRA Facility Investigation Phase 2 Work Plan, Parcel 23, Fort Wingate Depot Activity, McKinley County, NM EPA #NM6213820974, HWB-FWDA-18-004

Dear Mr. Kieling:

This letter presents our responses to your comments presented in the Disapproval Letter dated October 31, 2018 regarding the Final RCRA Facility Investigation Phase 2 Work Plan, Parcel 23 for the Fort Wingate Depot Activity (FWDA) under RCRA Permit USEPA ID No. NM6213820974 (October 5, 2016). The report has been revised to address each comment as described below and is being submitted under separate cover as *Final RCRA Facility Investigation Phase 2 Work Plan, Parcel 23, Revision 1.0*, April 29, 2019. The revised report describes the removal activities at Parcel 23 FWDA, McKinley County, New Mexico and is being submitted concurrently for tribal and regulatory review.

In addition to changes specific to NMED comments, changes were also made to reference to the NMED 2019 Risk Assessment Guidance for Site Investigations and Remediation.

NMED COMMENT 1 - Section 1.2, Background Information, lines 7-9, page 1-2

Permittee Statement: "The Approval with Modifications (AwM) (Comment 6) also requires that Army address all comments within the NOD, specifically those comments referencing future actions through the development of a RFI Phase 2 Work Plan."

NMED Comment: Although the Permittee's statement is true, the referenced correspondence (Approval with Modifications) does not contain Comment 6. Correct the typographical error in the revised Work Plan.

Permittee Response:

The edit has been made as requested. The sentence now reads as follows:

The Approval with Modifications AwM also requires that Army address all comments within the NOD, specifically those comments referencing future actions through the development of a RFI Phase 2 Work Plan.

NMED COMMENT 2 - Section 1.2, Background Information, lines 9-12, page 1-2

Permittee Statement: "For reference, the following documents are included in Appendix A:

- NOD Letter - August 19, 2014
- Response to NOD - February 28, 2015
- AwM – August 12, 2015."

NMED Comment: Appendix A also contains email correspondence between the Permittee and NMED regarding the proposed locations of monitoring wells and a figure showing the locations. Provide a more accurate description. In addition, include all extension request approval letters for this document in Appendix A.

Permittee Response:

The text has been edited to reference all documents in Appendix A as follows:

For reference, the following documents are included in **Appendix A:**

- NMED NOD Letter - August 19, 2014
- Army Response to NOD - February 28, 2015
- NMED AwM - August 12, 2015
- Correspondence between NMED and Army regarding downgradient well location – April/May 2018

Appendix A also includes the following documents:

- NMED Work Plan Extension Request Approval Letters – December 22, 2015, January 19, 2016, December 1, 2016, December 6, 2017
- NMED Work Plan NOD Letter – October 31, 2018
- Army Response to NOD Letter – April 29, 2019

NMED COMMENT 3 - Section 1.2, Background information, Comment 9, lines34-36, page 1-2

Permittee Statement: "The revised RFI Report suggests that observed impacts may be the result of runoff from the adjacent coal burning boiler plant (Building 535)."

NMED Comment: A figure showing the location of Building 536 was included in the Work Plan; however, the locations of Building 535 and the borrow pit that supplied the fill material are not indicated in any figure in the Work Plan. Include a figure depicting these locations in the revised Work Plan.

Permittee Response:

Figures 1-3, 3-1, 3-2, and 4-1 have been revised to call out the location of Former Buildings 535 and 536.

The source of the fill material is unknown and therefore not indicated on a figure. Because the source is unknown, samples are proposed to be collected from the backfill. This is discussed in Section 3.0 of the work plan.

NMED COMMENT 4 - Section 1.3, Cultural Resources, lines 36-37, page 1-3 and line 1, page 1-4

Permittee Statement: "No archaeological site is within the horizontal footprint of SWMU 21; however, several archaeological sites are within close proximity to these locations (LA101952 and LA101743)."

NMED Comment: The locations of archaeological sites are designated as LA101952 and LA101743; however, they are not shown in any figure. The designation is meaningless unless referenced in a figure. Include a figure showing these locations in the revised Work Plan or remove the reference to the archeological sites from the statement.

Permittee Response:

The text has been revised as follows:

No archaeological sites recorded at FWDA are located within the horizontal footprint of SWMU 21. Should any sites outside of SWMU 21 show potential to be impacted by site related activities, these will be flagged and avoided during field work.

NMED COMMENT 5 - Section 2.2.2, Groundwater Sampling, lines 24-26, page 2-2

Permittee Statement: "The general approach to evaluating whether or not groundwater is impacted will be to collect groundwater samples from the first water-bearing zone by means of a temporary well."

NMED Comment: The Parcel 3 groundwater investigation indicates that some wells close to arroyos initially retained groundwater; however, the wells went dry during the subsequent monitoring event. The groundwater conditions in Parcel 23 may be similar to Parcel 3, especially along the arroyos. Since the presence of groundwater may be ephemeral, similar to the arroyos, propose to install and monitor the temporary well for a minimum of two years, even if groundwater is not present at the time of installation. Revise the Work Plan accordingly.

Permittee Response:

The Army concurs with installing a monitoring well and leaving it open for approximately 2 years. Text within Section 2.2.2 has not been changed. The revision was made in Section 4.0. The text has been revised as follows:

The downgradient boring/temporary well will be placed as close as possible to the arroyo without jeopardizing the safety of the drilling equipment and field staff. The drilling will be performed by a New Mexico licensed driller using one of, or a combination of, the following techniques: hollow stem auger, air rotary, or roto sonic drilling. The borings will be advanced to the first water bearing zone or a maximum depth of 120 feet if groundwater is not encountered.

The borehole will be converted to a temporary well and screened in the first water bearing zone. If no water bearing zone is encountered the borehole will still be converted to a temporary well and the NMED will be contacted for concurrence on a proposed screening interval, which the field geologist will propose after reviewing the borehole lithology. The

temporary well will be constructed with a filter-pack, 2-inch diameter 0.010-inch slot screen, and casing. Development will be performed by pumping until the groundwater is sufficiently clear to collect a groundwater sample. The well will be left in place for a minimum of two years. During this time the well will be sampled on a quarterly basis in general accordance with the procedures detailed in the Final 2017 Interim Measures Facility-Wide Groundwater Monitoring Plan Version 10, Revision 1 (Sundance, July 2018) as approved with modifications by NMED on October 22, 2018. Even if groundwater is not present in the well at the time of installation, the Army will check the well for the presence of seasonal water on a quarterly basis.

The temporary well will be covered and left in place until groundwater sample analytical results are reviewed and evaluated. Sample results will be compared to current state or federal drinking water standards (or USEPA tap water RSLs for analytes without published drinking water standards), in accordance with the hierarchy of screening values presented in Section 7.1 of the Permit (NMED, 2015a).

If there are no indications of impact to the groundwater quality after the two-year period, the temporary well will be abandoned with NMED's approval. Temporary boreholes will be abandoned following NMOSE guidance and regulations. The casing will be removed as the bentonite slurry is pumped into the borehole. If the casing cannot be removed, it will be cut below the ground surface and abandoned in place.

NMED COMMENT 6 - Section 2.3.1.1, Quality Control Analyses/Parameters Originated by the Laboratory, Method Blank, lines 14-19, page 2-3

Permittee Statement: "If a target constituent is found at a concentration that exceeds one-half the limit of quantitation (LOQ) in the method blank, the laboratory must perform corrective action in an attempt to identify and, if possible, eliminate the contamination source. If sufficient sample volume remains in the sample container, samples associated with the blank contamination should be re-prepared and re-analyzed after the contamination source has been eliminated."

NMED Comment: Several contaminants were eliminated from risk assessment in the Final RCRA Facility Investigation Report Parcel 7 Revision 1, dated June 27, 2018 because these contaminants were detected in blanks. However, the rationale for the elimination must be validated. Regardless of the detection level, if contaminants are detected in both blanks and samples and unless re-analysis after eliminating the source of contamination is performed, provide a table that lists detected contaminant concentrations in both blanks and samples. These concentrations must be compared and evaluated to determine whether elimination is appropriate. Include the protocol in the revised Work Plan.

Permittee Response:

The following paragraph was added to this section (Method Blank):

To determine if elimination is appropriate, the contractor will use the following protocol, during data validation, to determine if results should be qualified because of blank detections. If target analytes are detected in blank samples, the contractor will U qualify detected results from the associated field samples, at the higher of the detected concentration or the limit of detection, if the concentration detected in the sample is less than five times the concentration detected in the blank. The validation report will also include a table that summarizes blank

detections, associated samples, and original and revised results that were qualified due to the blank detections.

NMED COMMENT 7 - Section 3.1, Borings in Areas of Previous Exceedances, lines 11-14, page 3-1

Permittee Statement: "Previous sample locations and analytes which exceed the lowest 2017 NMED SSLs for a residential receptor (which is either the direct contact SSL or the groundwater protection SSL, except for arsenic where the site-specific background level is used instead of an SSL) are summarized in Tables 3-1 through 3-3 and illustrated in Figure 3- 1."

NMED Comment: The site-specific background level of 5.6 mg/kg was used to screen arsenic as a potential COPC and for assessing site risk. The agreement with NMED to use 5.6 mg/kg for screening purposes was based on the fact that at the time of this agreement, the SSL for arsenic was below the background level. However, the 2017 direct contact SSL for arsenic is 7.07 mg/kg (residential). The current SSL for arsenic must be used for estimating risk to avoid an overly conservative evaluation for arsenic in future investigations at the site.

Permittee Response:

The text, tables and figures have been revised to remove the reference to arsenic site specific background. Further all references to NMED Guidance have been changed to 2019. The revised text for this specific section is as follow:

Previous sample locations and analytes which exceed the lowest 2019 NMED SSLs for a residential receptor (which is either the direct contact SSL or the groundwater protection SSL) are summarized in **Tables 3-1** through **3-3** and illustrated in **Figure 3-1**.

NMED COMMENT 8 - Section 3.1, Borings in Areas of Previous Exceedances, lines 16-18, page 3-1

Permittee Statement: "All samples will be analyzed for SVOCs, VOCs, extended diesel-range organics (DRO), target analyte list (TAL) metals, and explosives."

NMED Comment: Perchlorate may also be a chemical of potential concern due to the past activities at the site. Perchlorate was detected in groundwater samples collected from wells in Parcel 3. The arroyo may be a conduit for contaminants; therefore, perchlorate may be present in groundwater. Include perchlorate analysis for groundwater samples collected at the site. Revise the Work Plan accordingly.

Permittee Response:

The analyte list has been revised to include perchlorate. The text has been revised as follows:

All samples will be analyzed for SVOCs, VOCs, extended diesel- range organics (DRO), target analyte list (TAL) metals, perchlorate, and explosives.

NMED COMMENT 9 - Section 3.1, Boring in Areas of Previous Exceedances, lines 23-25, page 3-1, and Section 3.2, Borings to Characterize the Backfill Material, lines 36-37

Permittee Statements: "[Native soil] [s]amples will be collected from the depth intervals - corresponding to 0-1 foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet below the depth of backfill." - and, "[Backfill] [s]amples will be collected from the 0-1 foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet bgs depth intervals."

NMED Comment: It is not clear how the Permittee determines the interface between backfill and native soils. Describe the method for identifying the interface in the revised Work Plan. Residual contaminants likely accumulate close to the fill-native soil interface. Revise the Work Plan to propose to collect all soil samples from immediately above and below the fill-native soil interface. Furthermore, provide information regarding (1) the lateral extent of backfill placement and (2) the thickness of backfill. The thickness of backfill appears to exceed 10 feet at the site. Revise the Work Plan to include this information or provide references to the reports that include the information.

Permittee Responses:

A sentence was added to the end of Section 3.0 as follows:

Section 3.4 was added to this revised work plan to clarify how the proposed borings will be utilized to determine the backfill and native soil interface as well as provide information regarding the lateral extent of the backfill material.

The new Section 3.4 reads as follows:

Section 3.4 has been added to the work plan to describe the approach to determining the interface between the native soil and fill material. This section indicates that proposed sample intervals will be adjusted to ensure samples are collected immediately above and below the interface. Further, it notes that the information from all the borings will be utilized to provide a better understand of the thickness and extent of the backfill material, as this information does not currently exist.

The revised section reads as follows:

3.4 Thickness and Extent of Backfill Material

In order to determine the interface between the fill material and native soils, each borehole described in sections 3.1, 3.2 and 3.3 will be drilled using a hollow stem auger rig with continuous split-spoon soil sampling techniques at the direction of a field geologist. The field geologist will be responsible for identifying the interface between the fill material and the native soil. The field geologist will monitor for differences in material density as determined by blow counts as the split spoon sampler is driven into the material. The field geologist will also visually observe each sample for differences in color and/or consistency. The proposed sample intervals will be adjusted as necessary to ensure that soil samples are collected immediately above and below the interface. All information obtained from these borings will be utilized to obtain a better understanding of the extent and thickness of the backfill material. The split-spoon sampling protocol in accordance with American Society for Testing and Materials (ASTM) Designation D 1586 is described below.

- The split-spoon sampler (spoon) consists of a 2-inch (outside diameter) by 1-3/8 inch (inside diameter), 18-inch to 24-inch length, heat-treated, case-hardened steel head, split-spoon, and shoe assembly.
- The drive rods, which connect the spoon to the drive head, have a stiffness equal to or greater than that of the A-rod. The size of the drive rods are kept constant throughout a specific drilling program, as the energy absorbed by the rods will vary with the size and weight of the rod employed.
- The drive head consists of a guide rod to give the drop hammer (140 pounds) free fall in order to strike the anvil attached to the lower end of the assembly. The drop hammer used in determining standard penetration test (SPT) resistance weighs 140 pounds and has a 2.5-inch diameter hole through the center, for passage of the drive head guide rod. The hammer is raised with a rope activated by the drill rig cathead. A 30-inch hammer drop is mandatory for proper SPT determination.
- The pre-cleaned split-spoon sampler is attached to the drill rods and lower the assembly to the bottom of the borehole. The 140-pound hammer is raised 30 inches above the drive-head anvil and then allowed to free fall and strike the anvil. This procedure is repeated until the sampler has penetrated the full length of the sampler (18 to 24 inches depending on the sampler) into the stratum at the bottom of the borehole.
- The number of blows of the hammer required for each 6-inch penetration is counted and recorded on the boring log. The penetration resistance (N) is determined by adding the second and third 6-inch resistance blow counts together.
- The sampler is then withdrawn from the borehole, preferably by pulling on the rope. If the sampler is difficult to remove from the stratum, it may be necessary to remove it by hitting the drive head upward with short, light hammer strokes. The sampler is removed from the bottom of the borehole slowly to minimize disturbance.
- Careful measurement of all drilling tools, samplers, and casing will be exercised during all phases of the boring operations, to insure maximum quality and recovery of the sample.
- The split-spoon is opened and carefully examined, noting all soil characteristics, color seam, disturbance, etc. A representative sample from the specified interval is selected and placed into the sampling containers.
- The field geologist shall record, at a minimum, the weight of the hammer, the length of the split spoon sampler, and the number of hammer blows on the spoon per 6 inches of penetration.
- The field geologist will manually describe soils encountered in accordance with American Society for Testing and Materials (ASTM) Standard D2488-93, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*. These descriptions will be recorded on a boring log for each boring.

NMED COMMENT 10 - Section 3.3, Borings to Assess Arroyo, lines 2-5, page 3-2

Permittee Statement: "Two shallow soil borings (10 feet total depth) will be conducted in the arroyo, one 25 feet northwest and one 50 feet northwest of the northern border of the former landfill (soil boring ID numbers 2321CLAND-SB11 and 2321CLAND-SB12). [Arroyo sediment] [s]amples will be collected from the 0-1 foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet bgs depth intervals."

NMED Comment: The location of the backfill was unidentified. The depth to the interface between backfill and native soils, if present, must be identified. Soil samples must be

collected from the depths where residual contaminants are most likely to accumulate (see Comment 9). In this case, contaminants associated with surface water runoff from the landfill are likely detected at (1) six inches below the apparent ground surface and (2) six inches below and above the interface where native soils are encountered. Revise the Work Plan accordingly.

Permittee Response:

Determination of the depth to interface between fill material and native soil as well as the extent of backfill is discussed in response to comment 9.

Section 3.3 has been revised to include the following sentence:

Sample intervals and total depth of the borings may be adjusted to ensure samples are collected in the upper 6 inches of the surface and at the native soil and fill interface, as requested by Comment 10 of the 2018 NOD.

NMED COMMENT 11 - Section 4.0, Groundwater Investigation at SWMU 21- Central Landfill, lines 7-8, page 4-1

Permittee Statement: "The investigation will include the collection a groundwater sample via a temporary well placed in a downgradient direction from the former landfill (2321CLAND-MW-1)."

NMED Comment: The wells are designated as P23-TMW01A and P23-TMW01B in a figure included in Appendix A. Provide an explanation for the variance in nomenclature; otherwise, revise the Work Plan to correct the discrepancy.

Permittee Response:

The narrative text is the correct nomenclature. The figure included in the Appendix A has been revised with a notation to indicate the correct nomenclature.

NMED COMMENT 12 - Section 4.0, Groundwater Investigation at SWMU 21 - Central Landfill, lines 15-16, page 4-1, and Section 5.1.4.5, Domestic Tap Water Use, lines 14-15, page 5-4

Permittee Statements: "The borings will be advanced to the first water bearing zone or a maximum depth of 100 feet if groundwater is not encountered."

and,

"The scope of the Phase 2 RFI includes collection and testing of groundwater, if encountered within 100 feet bgs."

NMED Comment: The floor of arroyo may be more than 20 feet below the elevation where temporary wells are to be installed. A maximum boring depth of 100 feet below the floor of arroyo must be proposed if groundwater is not encountered. In addition, since the presence of groundwater may be ephemeral, similar to the arroyos, propose to preserve and monitor the temporary well for a period of two years, even if groundwater is not present at the time of installation. Revise the Work Plan accordingly. See Comment 5.

Permittee Response:

Section 4.0 of the work plan has been revised as follows:

The downgradient boring/temporary well will be placed as close as possible to the arroyo without jeopardizing the safety of the drilling equipment and field staff. The drilling will be performed by a New Mexico licensed driller using one of, or a combination of, the following techniques: hollow stem auger, air rotary, or rotosonic drilling. The borings will be advanced to the first water bearing zone or a maximum depth of 120 feet if groundwater is not encountered.

The borehole will be converted to a temporary well and screened in the first water bearing zone. If no water bearing zone is encountered the borehole will still be converted to a temporary well and the NMED will be contacted for concurrence on a proposed screening interval. The field geologist will propose the screened interval after reviewing the borehole lithology. The temporary well will be constructed with a filter-pack, 2-inch diameter 0.010-inch slot screen, and casing. Development will be performed by pumping until the groundwater is sufficiently clear to collect a groundwater sample. The well will be left in place for a minimum of two years. During this time the well will be sampled on a quarterly basis in general accordance with the procedures detailed in the Final 2017 Interim Measures Facility-Wide Groundwater Monitoring Plan Version 10, Revision 1 (Sundance, July 2018) as approved with modifications by NMED on October 22, 2018. Even if groundwater is not present in the well at the time of installation, the Army will check the well for the presence of seasonal water on a quarterly basis.

The temporary well will be covered and left in place until groundwater sample analytical results are reviewed and evaluated. Sample results will be compared to current state or federal drinking water standards (or USEPA tap water RSLs for analytes without published drinking water standards), in accordance with the hierarchy of screening values presented in Section 7.1 of the Permit (NMED, 2015a).

If there are no indications of impact to the groundwater quality after the two-year period, the temporary well will be abandoned with NMED's prior approval. Temporary boreholes will be abandoned following NMOSE guidance and regulations. The casing will be removed as the bentonite slurry is pumped into the borehole. If the casing cannot be removed, it will be cut below the ground surface and abandoned in place.

NMED COMMENT 13 - Section 4.0, Groundwater Investigation at SWMU 21 - Central Landfill, lines 20-22, page 4-1

Permittee Statement: "Sample collection will be conducted in general accordance with the procedures detailed in the Final 2015 Interim Measures Facility-Wide Groundwater Monitoring Plan (Innovar and CB&I, 2015)."

NMED Comment: The referenced submittal is not an approved plan. Sample collection must be conducted in accordance with an approved groundwater monitoring plan. Revise the Work Plan accordingly.

Permittee Response:

The work plan has been revised as follows:

During this time the well will be sampled on a quarterly basis in general accordance with the procedures detailed in the Final 2017 Interim Measures Facility-Wide Groundwater Monitoring Plan Version 10, Revision 1 (Sundance, July 2018) as approved with modifications by NMED on October 22, 2018.

NMED COMMENT 14 - Section 5.1.2, Selection of Screening Levels, lines 26-29, page 5-1

Permittee Statement: "Screening levels published by NMED in Appendix A of the NMED risk guidance (NMED, 2017a) for direct contact and groundwater protection. The exception to this is for evaluation of arsenic in soil, where NMED is allowing use of the site-specific background level of 5.6 milligrams per kilogram (mg/kg) in lieu of the NMED screening level."

NMED Comment: The site-specific background level of 5.6 mg/kg was used to evaluate arsenic as a potential COPC and for assessing site risk. The agreement with NMED to use 5.6 mg/kg for screening purposes was based on the fact that at the time of this agreement, the SSL for arsenic was below the background level. However, the 2017 SSL for arsenic is 7.07 mg/kg (residential). The current SSL for arsenic must be used for estimating risk for future investigations at the site (see Comment 7).

Permittee Response:

The text has been revised to remove reference to using the site-specific background for arsenic. The entire sentence was deleted. The text now reads as follows:

Screening levels published by NMED in Appendix A of the NMED risk guidance (NMED, 2019) for direct contact and groundwater protection.

NMED COMMENT 15 - Section 5.1.2, Selection of Screening Levels, line 37, page 5-1 and lines 1-2, page 5-2

Permittee Statement: "USEPA risk-based SSLs for the protection of groundwater will be adjusted to a dilution attenuation factor (DAF) of 20 for consistency with the NMED presumption that this DAF is reasonably protective."

NMED Comment: The contaminant distribution shown in Figure 3-1, Previous Sample Locations with Analytes Exceeding 2017 NMED SSLs, suggests that the source area of potential groundwater contamination easily exceeds 0.5 acre. Since the DAF of 20 is protective of groundwater for a 0.5-acre source but not for a larger source area, the DAF values must be revised if groundwater is found to be affected. Discuss whether a DAF of 20 is appropriate for the site in the revised Work Plan.

Permittee Response:

The Army believes the DAF 20 is appropriate for Parcel 23, SWMU 21, in spite of the fact that NMEDs soil-to-groundwater soil screening levels using a DAF of 20 are based upon a source area of 0.5 acres and the estimated Parcel 23 SWMU 21 source area is estimated to

be slightly in excess of 2 acres. The text of the work plan (Section 5.1.2, bullet 2) has been revised as follows:

2. RSLs published by USEPA for residential and industrial receptors for soil are selected when NMED does not publish a value. USEPA RSLs based on a noncancer endpoint correspond to the NMED target hazard quotient (HQ) of 1.0 for noncarcinogenic analytes. USEPA RSLs based on a cancer endpoint will be adjusted to a cancer risk of 1×10^{-5} for consistency with the NMED target risk threshold of 1×10^{-5} (NMED, 2017a; Section 1.2). USEPA risk-based SSLs for the protection of groundwater will be adjusted to a dilution attenuation factor (DAF) of 20 based upon the following justification:

a) Contaminants of Concern and Their Characteristics: PAHs are the only COCs present in surficial soils that show low-level concentrations exceeding DAF 20 soil-to-groundwater SSLs over the length of the SWMU. PAHs have low water solubility and are not likely to leach vertically and migrate to groundwater (WHO, 2003

https://www.who.int/water_sanitation_health/water-quality/guidelines/chemicals/polyaromahydrocarbons.pdf

USEPA, 1976

<https://nepis.epa.gov/Exe/ZyPDF.cgi/9100RZ55.PDF?Dockey=9100RZ55.PDF>)

b) Lack of Infinite Source: This Phase 2 RFI work plan is in follow-up to the removal of the landfill in 1999. All landfill waste and visibly impacted soil below the former landfill was removed and disposed of at an off-site disposal facility (Final RCRA Facility Investigation Parcel 23 (2012)). This removal will have mitigated the "infinite source" of on-going contamination

c) Soil Characteristics: The boring logs located in Appendix K of the Parcel 23 RFI Report identified the soils using the Unified Soil Classification System (USCS) and classified them as being within the silty clay (CL-ML) and sandy silt (ML) classes (ASTM D2487-17), both of which are classified as fine grained materials composed of fifty percent or more by dry mass of particles passing the No. 200 (75 μ m) sieve. Such fine grained materials will bind PAHs and retard their vertical migration

(ATSDR, 1995 <https://www.atsdr.cdc.gov/ToxProfiles/tp69-c1-b.pdf>)

d) Infiltration Rates: "Infiltration rates across much of New Mexico are substantially less than the average range of 0.15 to 0.24 m/yr. reported for many of the hydrogeologic regions used in the USEPA analysis" (NMED 2019 (revised), Section 4.4). Aller et al (1987, EPA/600/2-87/035) described the hydrogeologic setting for FWDA as the Colorado Plateau and Wyoming Basin. The infiltration rates used for these arid to semi-arid regions in the USEPA analysis were 0.03 to 0.14 m/y, rates which are 40-80% less than the average range reported for many regions in the U.S., as noted above. Reduced infiltration rates reduce vertical migration

e) Surface Water: The topographic contours for Parcel 23 is relatively flat with the exception of the arroyo channel. Surface runoff during rainfall/snowmelt events collects in the arroyo channel, which only flows intermittently during precipitation events or pools locally in low areas where it evaporates. No other intermittent surface water bodies exist within Parcel 23. However, southwest of Parcel 23 is Parcel 2, which surface water samples have been intermittently collected since 1992. No COC that were analyzed for results were non-detect to low detects.

f) Comparative Source Area Size to DAFs: Default DAFs of 10 for a 30-acre source and 20 for a 0.5-acre source have been proposed by USEPA as values generally protective nationwide. When the relative area of the Parcel 23 source area is considered, it is much closer to the 0.5-acre site than the 30-acre site making the application of the DAF 20 reasonable for screening purposes.

g) Depth to Groundwater: Depth to the first water-bearing zone is unknown for this area, but it is expected to be between approximately 50 and 60 feet bgs, based on installed groundwater monitoring wells to the north of SWMU 21. Depth to the second water-bearing zone is unknown for SWMU 21, but is expected to be between 70 and 120 feet bgs, based on installed groundwater wells to the north of SWMU 21 (Parcel 23 RFI Report Final).

h) Vulnerable Groundwater Environment: Vulnerable groundwater is defined as “areas close to perennial streams or where groundwater is very shallow” (NMED 2017 Revised Guidance Section 4.4 pg77). SWMU 21 is not near a perennial stream and shallow groundwater has not been detected to date. The Army agrees that impacts to groundwater at FWDA need to be investigated and is responding to this in the facility wide groundwater assessment program

i) Lack of Presence of Liquids: Land use around SWMU 21 does not include any liquid source(s) that could drive the vertical migration of COCs.

j) Weather Regimes: semi-arid/arid weather regimes at FWDA result in little precipitation and significant evaporation on an annual basis, further attenuating dissolution and vertical migration.

Although the source area orientation is generally to the northeast and parallels both the arroyo and groundwater, this is not expected to override the attenuation of vertical transport supported by the lines of evidences presented above.

NMED COMMENT 16 - Section 5.1.3, Identification of COPCs, lines 10-12, page 5-3

Permittee Statement: "Analytes that are not detected in any sample will not be retained as COPCs. Analytical testing will be performed for VOCs, SVOCs, total petroleum hydrocarbons (TPH)-DRO, TAL metals, mercury, and explosives."

NMED Comment: Perchlorate analysis must also be performed for all groundwater and soil samples collected at the site. Revise the Work Plan accordingly. Refer to Comment 8.

Permittee Response:

The work plan has been revised to include perchlorate. The revised text will read as follows:

Analytes that are not detected in any sample will not be retained as COPCs. Analytical testing will be performed for VOCs, SVOCs, total petroleum hydrocarbons (TPH)-DRO, TAL metals, mercury, perchlorate and explosives.

Tables 2-1, 2-3, 2-4, 2-5 and 3-4 have also been revised to include perchlorate.

NMED COMMENT 17 - Section 5.1.4.2, Beef Ingestion, lines 28-30, page 5-3, and Section 5.1.5, Conceptual Site Model, lines 32-33, page 5-4

Permittee Statement: "The total acreage of SWMU 21 is 2.2 acres, but the beef ingestion pathway is not considered to be complete because SWMU 21 is comprised of two non-contiguous areas, each of which are less than 2 acres in size."

NMED Comment: In Figure 3-1, a distribution of SVOC exceedances was observed in the area between the two boundaries as well as in the areas within the boundaries. Therefore, these two areas must be considered to be contiguous and must not be evaluated separately. In addition, the lateral extent of SVOC exceedances is not defined to the north and south along the arroyo. The extent of contamination has not been defined. The beef ingestion pathway must be evaluated in the Phase 2 Investigation Report. Revise the Work Plan accordingly.

Permittee Response:

Section 5.1.4.2 has been revised as follows:

NMED risk guidance (NMED, 2019) requires a qualitative evaluation for the beef ingestion pathway for sites that are greater than 2 acres. A qualitative evaluation will be completed.

NMED COMMENT 18 - Section 5.1.6.3.2, Step 2 - Refined Cumulative Risk Evaluation, lines 14-15, page 5-10

Permittee Statement: "SWMU 21 consists of two separate, non-contiguous areas that may be evaluated separately."

NMED Comment: SWMU 21 is contiguous due to the distribution of SVOCs along the arroyo. Refer to Comment 17. The Permittee must evaluate risks associated with SWMU 21 as a continuous area. Revise the Work Plan accordingly.

Permittee Response:

The text (bullet item 2.) was revised to strike the sentence: "SWMU 21 consists of two separate, non-contiguous areas that may be evaluated separately." Reference to non-contiguous areas in other sections was also removed, including section 5.1.5, 5.2.4, and Figure 5-1.

If you have questions or require further information, please call me at (505) 721-9770.

Sincerely,

PATTERSON.MARK.
C.1229214493

Digitally signed by
PATTERSON.MARK.C.1229214493
Date: 2019.04.25 15:18:24 -04'00'

Mark Patterson
BRAC Environmental Coordinator
Fort Wingate Depot Activity

CF:

John Kieling (NMED HWB)
Dave Cobrain with NMED
Ben Wear with NMED
Michiya Suzuki with NMED
Chuck Hendrickson (USEPA 6)
Mark Patterson (FWDA BEC)
FWDA Admin Record (NM)
Ian Thomas (BRACD)
Steve Smith (USACE SWF)
Cheryl Montgomery (USACE ERDC)
Sharlene Begay-Platero (NN)
Mark Harrington (POZ)
Clayton Seoutewa (BIA Zuni)
B.J Howerton (DOI/BIA)
George Padilla (BIA-NR)
Jennifer Turner, DOI-Office of the Solicitor
Admin Record, OH

Media

2 hard copies, 2 CDs

1 hard copy, 1 CD
1 hard copy, 1 CD
2 hard copies, 2 CDs
0 hard copy, 1 CD
1 hard copy, 2 CDs
0 hard copy, 1 CD
1 hard copy, 7 CDs
1 hard copy, 8 CDs
1 hard copy, 1 CD
0 hard copy, 1 CD
1 hard copy, 2 CDs
0 hard copy, 1 CD
0 hard copy, 1 CD

NMED NOD Letter to Work Plan
October 31, 2018

[THIS PAGE INTENTIONALLY LEFT BLANK]



SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

State of New Mexico
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov



BUTCH TONGATE
Cabinet Secretary
BRUCE YURDIN
Acting Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

October 31, 2018

Mark Patterson
BRAC Environmental Coordinator
Fort Wingate Depot Activity
13497 Elton Road
North Lima, OH 44452

Steve Smith
USACE
CESWF-PER-DD
819 Taylor Street, Room 3B06
Fort Worth, TX 76102

**RE: DISAPPROVAL
FINAL RCRA FACILITY INVESTIGATION PHASE 2 WORK PLAN
PARCEL 23
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA ID# NM6213820974
HWB-FWDA-18-004**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity (Permittee) *Final RCRA Facility Investigation Phase 2 Work Plan Parcel 23* (Work Plan), dated July 24, 2018. NMED has reviewed the Work Plan and hereby issues this Disapproval. The Permittee must address the following comments.

1. Section 1.2, Background Information, lines 7-9, page 1-2

Permittee Statement: "The [Approval with Modifications] AwM (Comment 6) also requires that Army address all comments within the NOD, specifically those comments referencing future actions through the development of a RFI Phase 2 Work Plan."

NMED Comment: Although the Permittee's statement is true, the referenced correspondence (Approval with Modifications) does not contain Comment 6. Correct the typographical error in the revised Work Plan.

2. Section 1.2, Background Information, lines 9-12, page 1-2

Permittee Statement: “For reference, the following documents are included in Appendix A:

- NOD Letter - August 19, 2014
- Response to NOD - February 28, 2015
- AwM - August 12, 2015.”

NMED Comment: Appendix A also contains email correspondence between the Permittee and NMED regarding the proposed locations of monitoring wells and a figure showing the locations. Provide a more accurate description. In addition, include all extension request approval letters for this document in Appendix A.

3. Section 1.2, Background Information, Comment 9, lines 34-36, page 1-2

Permittee Statement: “The revised RFI Report suggests that observed impacts may be the result of runoff from the adjacent coal burning boiler plant (Building 535).”

NMED Comment: A figure showing the location of Building 536 was included in the Work Plan; however, the locations of Building 535 and the borrow pit that supplied the fill material are not indicated in any figure in the Work Plan. Include a figure depicting these locations in the revised Work Plan.

4. Section 1.3, Cultural Resources, lines 36-37, page 1-3 and line 1, page 1-4

Permittee Statement: “No archaeological site is within the horizontal footprint of SWMU21; however, several archaeological sites are within close proximity to these locations (LA101952 and LA101743).”

NMED Comment: The locations of archaeological sites are designated as LA101952 and LA101743; however, they are not shown in any figure. The designation is meaningless unless referenced in a figure. Include a figure showing these locations in the revised Work Plan or remove the reference to the archeological sites from the statement.

5. Section 2.2.2, Groundwater Sampling, lines 24-26, page 2-2

Permittee Statement: “The general approach to evaluating whether or not groundwater is impacted will be to collect groundwater samples from the first water-bearing zone by means of a temporary well.”

NMED Comment: The Parcel 3 groundwater investigation indicates that some wells close to arroyos initially retained groundwater; however, the wells went dry during the subsequent monitoring event. The groundwater conditions in Parcel 23 may be similar to Parcel 3, especially along the arroyos. Since the presence of groundwater may be ephemeral, similar to the arroyos, propose to install and monitor the temporary well for a minimum of two years,

even if groundwater is not present at the time of installation. Revise the Work Plan accordingly.

6. Section 2.3.1.1, Quality Control Analyses/Parameters Originated by the Laboratory, Method Blank, lines 14-19, page 2-3

Permittee Statement: "If a target constituent is found at a concentration that exceeds one-half the limit of quantitation (LOQ) in the method blank, the laboratory must perform corrective action in an attempt to identify and, if possible, eliminate the contamination source. If sufficient sample volume remains in the sample container, samples associated with the blank contamination should be re-prepared and re-analyzed after the contamination source has been eliminated."

NMED Comment: Several contaminants were eliminated from risk assessment in the *Final RCRA Facility Investigation Report Parcel 7 Revision 1*, dated June 27, 2018 because these contaminants were detected in blanks. However, the rationale for the elimination must be validated. Regardless of the detection level, if contaminants are detected in both blanks and samples and unless re-analysis after eliminating the source of contamination is performed, provide a table that lists detected contaminant concentrations in both blanks and samples. These concentrations must be compared and evaluated to determine whether elimination is appropriate. Include the protocol in the revised Work Plan.

7. Section 3.1, Borings in Areas of Previous Exceedances, lines 11-14, page 3-1

Permittee Statement: "Previous sample locations and analytes which exceed the lowest 2017 NMED SSLs for a residential receptor (which is either the direct contact SSL or the groundwater protection SSL, except for arsenic where the site-specific background level is used instead of an SSL) are summarized in Tables 3-1 through 3-3 and illustrated in Figure 3-1."

NMED Comment: The site-specific background level of 5.6 mg/kg was used to screen arsenic as a potential COPC and for assessing site risk. The agreement with NMED to use 5.6 mg/kg for screening purposes was based on the fact that at the time of this agreement, the SSL for arsenic was below the background level. However, the 2017 direct contact SSL for arsenic is 7.07 mg/kg (residential). The current SSL for arsenic must be used for estimating risk to avoid an overly conservative evaluation for arsenic in future investigations at the site.

8. Section 3.1, Borings in Areas of Previous Exceedances, lines 16-18, page 3-1

Permittee Statement: "All samples will be analyzed for SVOCs, VOCs, extended diesel-range organics (DRO), target analyte list (TAL) metals, and explosives."

NMED Comment: Perchlorate may also be a chemical of potential concern due to the past activities at the site. Perchlorate was detected in groundwater samples collected from wells in Parcel 3. The arroyo may be a conduit for contaminants; therefore, perchlorate may be

present in groundwater. Include perchlorate analysis for groundwater samples collected at the site. Revise the Work Plan accordingly.

9. Section 3.1, Boring in Areas of Previous Exceedances, lines 23-25, page 3-1, and Section 3.2, Borings to Characterize the Backfill Material, lines 36-37

Permittee Statements: “[Native soil] [s]amples will be collected from the depth intervals corresponding to 0-1 foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet below the depth of backfill.”

and,

“[Backfill] [s]amples will be collected from the 0-1 foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet bgs depth intervals.”

NMED Comment: It is not clear how the Permittee determines the interface between backfill and native soils. Describe the method for identifying the interface in the revised Work Plan. Residual contaminants likely accumulate close to the fill-native soil interface. Revise the Work Plan to propose to collect all soil samples from immediately above and below the fill-native soil interface. Furthermore, provide information regarding (1) the lateral extent of backfill placement and (2) the thickness of backfill. The thickness of backfill appears to exceed 10 feet at the site. Revise the Work Plan to include this information or provide references to the reports that include the information.

10. Section 3.3, Borings to Assess Arroyo, lines 2-5, page 3-2

Permittee Statement: “Two shallow soil borings (10 feet total depth) will be conducted in the arroyo, one 25 feet northwest and one 50 feet northwest of the northern border of the former landfill (soil boring ID numbers 2321CLAND-SB11 and 2321CLAND-SB12). [Arroyo sediment] [s]amples will be collected from the 0-1 foot, 1-2 feet, 3-4 feet, 5-6 feet, 7-8 feet, 8-9 feet, and 9-10 feet bgs depth intervals.”

NMED Comment: The location of the backfill was unidentified. The depth to the interface between backfill and native soils, if present, must be identified. Soil samples must be collected from the depths where residual contaminants are most likely to accumulate (see Comment 9). In this case, contaminants associated with surface water runoff from the landfill are likely detected at (1) six inches below the apparent ground surface and (2) six inches below and above the interface where native soils are encountered. Revise the Work Plan accordingly.

11. Section 4.0, Groundwater Investigation at SWMU 21 – Central Landfill, lines 7-8, page 4-1

Permittee Statement: “The investigation will include the collection a groundwater sample via a temporary well placed in a downgradient direction from the former landfill (2321CLAND-MW-1).”

NMED Comment: The wells are designated as P23-TMW01A and P23-TMW01B in a figure included in Appendix A. Provide an explanation for the variance in nomenclature; otherwise, revise the Work Plan to correct the discrepancy.

12. Section 4.0, Groundwater Investigation at SWMU 21 – Central Landfill, lines 15-16, page 4-1, and Section 5.1.4.5, Domestic Tap Water Use, lines 14-15, page 5-4

Permittee Statements: “The borings will be advanced to the first water bearing zone or a maximum depth of 100 feet if groundwater is not encountered.”

and,

“The scope of the Phase 2 RFI includes collection and testing of groundwater, if encountered within 100 feet bgs.”

NMED Comment: The floor of arroyo may be more than 20 feet below the elevation where temporary wells are to be installed. A maximum boring depth of 100 feet below the floor of arroyo must be proposed if groundwater is not encountered. In addition, since the presence of groundwater may be ephemeral, similar to the arroyos, propose to preserve and monitor the temporary well for a period of two years, even if groundwater is not present at the time of installation. Revise the Work Plan accordingly. See Comment 5.

13. Section 4.0, Groundwater Investigation at SWMU 21 – Central Landfill, lines 20-22, page 4-1

Permittee Statement: “Sample collection will be conducted in general accordance with the procedures detailed in the Final 2015 Interim Measures Facility-Wide Groundwater Monitoring Plan (Innovar and CB&I, 2015).”

NMED Comment: The referenced submittal is not an approved plan. Sample collection must be conducted in accordance with an approved groundwater monitoring plan. Revise the Work Plan accordingly.

14. Section 5.1.2, Selection of Screening Levels, lines 26-29, page 5-1

Permittee Statement: “Screening levels published by NMED in Appendix A of the NMED risk guidance (NMED, 2017a) for direct contact and groundwater protection. The exception to this is for evaluation of arsenic in soil, where NMED is allowing use of the site-specific background level of 5.6 milligrams per kilogram (mg/kg) in lieu of the NMED screening level.”

NMED Comment: The site-specific background level of 5.6 mg/kg was used to evaluate arsenic as a potential COPC and for assessing site risk. The agreement with NMED to use 5.6 mg/kg for screening purposes was based on the fact that at the time of this agreement, the SSL for arsenic was below the background level. However, the 2017 SSL for arsenic is 7.07 mg/kg (residential). The current SSL for arsenic must be used for estimating risk for future investigations at the site (see Comment 7).

15. Section 5.1.2, Selection of Screening Levels, line 37, page 5-1 and lines 1-2, page 5-2

Permittee Statement: “USEPA risk-based SSLs for the protection of groundwater will be adjusted to a dilution attenuation factor (DAF) of 20 for consistency with the NMED presumption that this DAF is reasonably protective.”

NMED Comment: The contaminant distribution shown in Figure 3-1, *Previous Sample Locations with Analytes Exceeding 2017 NMED SSLs*, suggests that the source area of potential groundwater contamination easily exceeds 0.5 acre. Since the DAF of 20 is protective of groundwater for a 0.5-acre source but not for a larger source area, the DAF values must be revised if groundwater is found to be affected. Discuss whether a DAF of 20 is appropriate for the site in the revised Work Plan.

16. Section 5.1.3, Identification of COPCs, lines 10-12, page 5-3

Permittee Statement: “Analytes that are not detected in any sample will not be retained at [sic] COPCs. Analytical testing will be performed for VOCs, SVOCs, total petroleum hydrocarbons (TPH)-DRO, TAL metals, mercury, and explosives.”

NMED Comment: Perchlorate analysis must also be performed for all groundwater and soil samples collected at the site. Revise the Work Plan accordingly. Refer to Comment 8.

17. Section 5.1.4.2, Beef Ingestion, lines 28-30, page 5-3, and Section 5.1.5, Conceptual Site Model, lines 32-33, page 5-4

Permittee Statement: “The total acreage of SWMU 21 is 2.2 acres, but the beef ingestion pathway is not considered to be complete because SWMU 21 is comprised of two non-contiguous areas, each of which are less than 2 acres in size.”

NMED Comment: In Figure 3-1, a distribution of SVOC exceedances was observed in the area between the two boundaries as well as in the areas within the boundaries. Therefore, these two areas must be considered to be contiguous and must not be evaluated separately. In addition, the lateral extent of SVOC exceedances is not defined to the north and south along the arroyo. The extent of contamination has not been defined. The beef ingestion pathway must be evaluated in the Phase 2 Investigation Report. Revise the Work Plan accordingly.

18. Section 5.1.6.3.2, Step 2 – Refined Cumulative Risk Evaluation, lines 14-15, page 5-10

Permittee Statement: “SWMU 21 consists of two separate, noncontiguous areas that may be evaluated separately.”

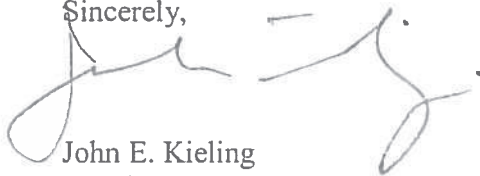
NMED Comment: SWMU 21 is contiguous due to the distribution of SVOCs along the arroyo. Refer to Comment 17. The Permittee must evaluate risks associated with SWMU 21 as a continuous area. Revise the Work Plan accordingly.

Messrs. Patterson and Smith
October 31, 2018
Page 7

The Permittee must submit a revised Work Plan that addresses all comments contained in this Disapproval. In addition, the Permittee must include a response letter that cross-references where NMED's numbered comments were addressed. The Permittee must also submit an electronic redline-strikeout version of the revised Work Plan showing all changes that have been made. The revised Work Plan must be submitted no later than **April 30, 2019**.

Should you have any questions, please contact Michiya Suzuki of my staff at (505) 476-6059.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
M. Suzuki, NMED HWB
C. Hendrickson, U.S. EPA Region 6
L. Rodgers, Navajo Nation
S. Begay-Platero, Navajo Nation
M. Harrington, Pueblo of Zuni
C. Seoutewa, Southwest Region BIA
G. Padilla, Navajo BIA
J. Wilson, BIA
B. Howerton, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2018 and Reading, Parcel 23, FWDA-18-004

[THIS PAGE INTENTIONALLY LEFT BLANK]

Army and NMED Correspondence Regarding Proposed Well Locations as Determined
during April 25, 2015 Site Visit

[THIS PAGE INTENTIONALLY LEFT BLANK]

Hamilton, Julie

From: Cobrain, Dave, NMENV <dave.cobrain@state.nm.us>
Sent: Thursday, May 10, 2018 2:02 PM
To: Smith, Steven W CIV USARMY CESWF (US); Wade, Roy CIV (US); Wear, Benjamin, NMENV; Suzuki, Michiya, NMENV
Cc: Mark Patterson (mark.c.patterson.civ@mail.mil); Theel, Heather J CIV USARMY CEERD-EL (US); Khan, Mohammad S CIV USARMY CESWF (US); Scoville, Michael G CIV USARMY CESWF (US); Hamilton, Julie
Subject: RE: Parcel 23 Central Landfill Well and Boring Locations (UNCLASSIFIED)

Steve,

I'm not sure what you're referring to but my email was only referring to a downstream well location and 2 proposed borings where (SVOC?) contamination was detected at the deepest sampling depths. I wasn't relying on the attached map.

Dave

-----Original Message-----

From: Smith, Steven W CIV USARMY CESWF (US) [mailto:Steve.W.Smith@usace.army.mil]
Sent: Thursday, May 10, 2018 12:34 PM
To: Wade, Roy CIV (US) <Roy.Wade@usace.army.mil>; Cobrain, Dave, NMENV <dave.cobrain@state.nm.us>; Wear, Benjamin, NMENV <Benjamin.Wear@state.nm.us>
Cc: Mark Patterson (mark.c.patterson.civ@mail.mil) <mark.c.patterson.civ@mail.mil>; Theel, Heather J CIV USARMY CEERD-EL (US) <Heather.J.Theel@usace.army.mil>; Khan, Mohammad S CIV USARMY CESWF (US) <Mohammad.S.Khan@usace.army.mil>; Scoville, Michael G CIV USARMY CESWF (US) <Michael.G.Scoville@usace.army.mil>; Hamilton, Julie <julie.hamilton@woodplc.com>
Subject: RE: Parcel 23 Central Landfill Well and Boring Locations (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Dave,

Just to clarify, the Figure 5-5 sent on the email below was from the Phase 1 RFI Work Plan not the upcoming Phase 2 RFI work plan.

Steve

-----Original Message-----

From: Wade, Roy CIV (US)
Sent: Monday, April 30, 2018 12:28 PM
To: Cobrain, Dave, NMENV <dave.cobrain@state.nm.us>; Wear, Benjamin, NMENV <Benjamin.Wear@state.nm.us>
Cc: Mark Patterson (mark.c.patterson.civ@mail.mil) <mark.c.patterson.civ@mail.mil>; Smith, Steven W CIV USARMY CESWF (US) <Steve.W.Smith@usace.army.mil>; Theel, Heather J CIV USARMY CEERD-EL (US) <Heather.J.Theel@usace.army.mil>; Khan, Mohammad S CIV USARMY CESWF (US) <Mohammad.S.Khan@usace.army.mil>; Scoville, Michael G CIV USARMY CESWF (US) <Michael.G.Scoville@usace.army.mil>
Subject: Parcel 23 Central Landfill Well and Boring Locations

Good Morning Dave,

It was a pleasure meeting you last week, we appreciate you taking the time to visit FWDA to clarify outstanding P23 issues related to monitoring wells and develop a coordinated path forward as summarized below:

Attached is a GPS location of a temporary monitoring well location at Parcel 23 that we marked Wednesday (April 25) afternoon.

P23 Army/NMED Coordinated Path Forward:

1. The drill rig is to get as close to the Arroyo as safely as possible, i.e. labeled TMW-01A or TMW-01B (P23NMEDWellLoc.pdf)
2. The temporary monitoring well (TMW 1) is located downgradient of former Central Landfill (P23NMEDWellLoc.pdf)
3. If no groundwater is found at suitable depth (100 feet) then no need to install monitoring wells.
4. If groundwater is found, we will collect water samples for analyses of chemical of potential concerns (COPCs).
 - 4a: If the samples come back non-detect or below the corresponding SSL, no further sampling of groundwater is warranted.
 - 4b: If the samples come back with COPCs, above the SSLs, we will convert the well into a permanent well and add the well into the monitoring network. At this point, we would install an upgradient well.
5. Within the landfill footprint, Army will collect samples at locations (2321-SB-1 thru -SB-10). These locations will be at the location where previous investigation showed contaminants (P23_BoringLocations Figure 5-5).

Recap from previous email dated 3/27/18 07:58 AM: Soil Sampling: Additional sub-surface soil samples will be collected from 5 locations (2321-SB-1 thru -SB-10) beginning at the bottom of the landfill backfill (beginning of native soil) with samples collected at 5 feet intervals to a total depth of 30 feet below the bottom of the landfill backfill. These samples will be submitted to the laboratory for the analysis of COPCs. The results will be compared with the New Mexico risk guidance 2017. The soil boring locations are presented in the attached file (P23_BoringLocations Figure 5-5).

Please provide concurrence on the NMED/ARMY coordinated path forward for P23 monitoring wells as discussed during the April 25, 2018 site visit, and Army will incorporate this procedure into the revised work plan.

Thanks.....Roy

Roy Wade
Environmental Engineer
USACE-ERDC
Fort Wingate Technical Manager
601-634-4019

CLASSIFICATION: UNCLASSIFIED

Hamilton, Julie

From: Khan, Mohammad S CIV USARMY CESWF (US) <Mohammad.S.Khan@usace.army.mil>
Sent: Tuesday, May 15, 2018 1:08 PM
To: Hamilton, Julie
Cc: Wade, Roy CIV (US)
Subject: FW: Parcel 23 Central Landfill Well and Boring Locations

Hi Julie: Here is the email you requested.
Thanks

M. Saqib Khan, P.G.
Project Manager
Regional Planning & Environmental Center (RPEC) Suite 1600
2488 E 81st Street
Tulsa OK 74137.
918-669-7374 (D)
816-223-0392 (M)

-----Original Message-----

From: Cobrain, Dave, NMENV [mailto:dave.cobrain@state.nm.us]
Sent: Wednesday, May 9, 2018 10:58 AM
To: Wade, Roy CIV (US) <Roy.Wade@usace.army.mil>; Wear, Benjamin, NMENV <Benjamin.Wear@state.nm.us>
Cc: Mark Patterson (mark.c.patterson.civ@mail.mil) <mark.c.patterson.civ@mail.mil>; Smith, Steven W CIV USARMY CESWF (US) <Steve.W.Smith@usace.army.mil>; Theel, Heather J CIV USARMY CEERD-EL (US) <Heather.J.Theel@usace.army.mil>; Khan, Mohammad S CIV USARMY CESWF (US) <Mohammad.S.Khan@usace.army.mil>; Scoville, Michael G CIV USARMY CESWF (US) <Michael.G.Scoville@usace.army.mil>
Subject: [Non-DoD Source] RE: Parcel 23 Central Landfill Well and Boring Locations

Roy,

NMED agrees with your summary with the following:

If groundwater is present in the well labeled either P23-TMW01A or P23-TMW01B in the attached figure and constituents are detected at any concentration, then a permanent well must be installed. If the detected constituents are solely concentrations of metals, we should discuss the need for a well before a decision is made to install a permanent well. Assuming that the two boring locations in the arroyo correspond to the locations of previously detected SVOCs, NMED agrees with those locations.

Dave

-----Original Message-----

From: Wade, Roy CIV (US) [mailto:Roy.Wade@usace.army.mil]
Sent: Monday, April 30, 2018 11:28 AM
To: Cobrain, Dave, NMENV <dave.cobrain@state.nm.us>; Wear, Benjamin, NMENV <Benjamin.Wear@state.nm.us>
Cc: Mark Patterson (mark.c.patterson.civ@mail.mil) <mark.c.patterson.civ@mail.mil>; Smith, Steven W CIV USARMY CESWF (US) <Steve.W.Smith@usace.army.mil>; Theel, Heather J CIV USARMY CEERD-EL (US) <Heather.J.Theel@usace.army.mil>; Khan, Mohammad S CIV USARMY CESWF (US) <Mohammad.S.Khan@usace.army.mil>; Scoville, Michael G CIV USARMY CESWF (US) <Michael.G.Scoville@usace.army.mil>

Subject: Parcel 23 Central Landfill Well and Boring Locations

Good Morning Dave,

It was a pleasure meeting you last week, we appreciate you taking the time to visit FWDA to clarify outstanding P23 issues related to monitoring wells and develop a coordinated path forward as summarized below:

Attached is a GPS location of a temporary monitoring well location at Parcel 23 that we marked Wednesday (April 25) afternoon.

P23 Army/NMED Coordinated Path Forward:

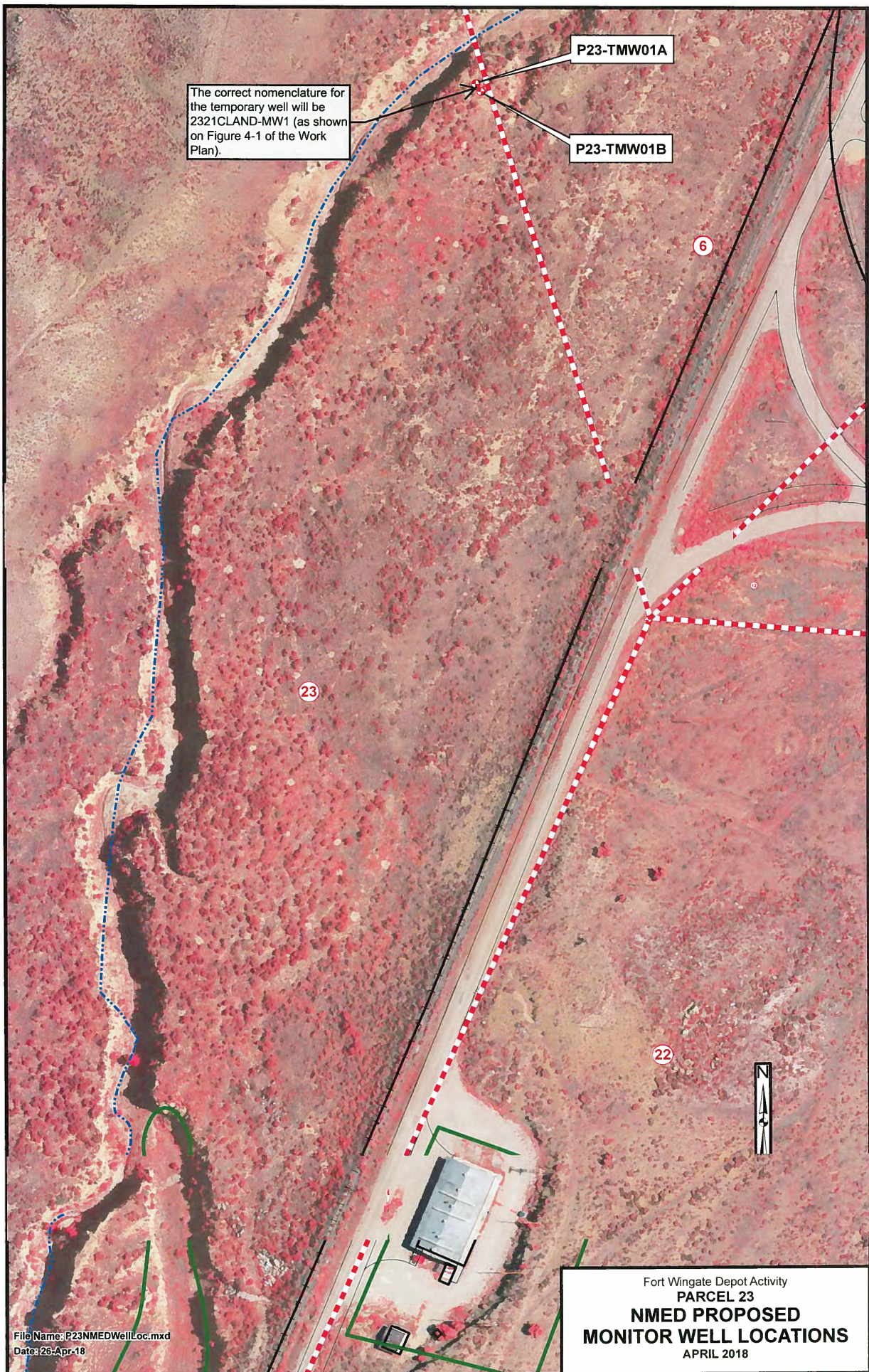
1. The drill rig is to get as close to the Arroyo as safely as possible, i.e. labeled TMW-01A or TMW-01B (P23NMEDWellLoc.pdf)
2. The temporary monitoring well (TMW 1) is located downgradient of former Central Landfill (P23NMEDWellLoc.pdf)
3. If no groundwater is found at suitable depth (100 feet) then no need to install monitoring wells.
4. If groundwater is found, we will collect water samples for analyses of chemical of potential concerns (COPCs).
 - 4a: If the samples come back non-detect or below the corresponding SSL, no further sampling of groundwater is warranted.
 - 4b: If the samples come back with COPCs, above the SSLs, we will convert the well into a permanent well and add the well into the monitoring network. At this point, we would install an upgradient well.
5. Within the landfill footprint, Army will collect samples at locations (2321-SB-1 thru -SB-10). These locations will be at the location where previous investigation showed contaminants (P23_BoringLocations Figure 5-5).

Recap from previous email dated 3/27/18 07:58 AM: Soil Sampling: Additional sub-surface soil samples will be collected from 5 locations (2321-SB-1 thru -SB-10) beginning at the bottom of the landfill backfill (beginning of native soil) with samples collected at 5 feet intervals to a total depth of 30 feet below the bottom of the landfill backfill. These samples will be submitted to the laboratory for the analysis of COPCs. The results will be compared with the New Mexico risk guidance 2017. The soil boring locations are presented in the attached file (P23_BoringLocations Figure 5-5).

Please provide concurrence on the NMED/ARMY coordinated path forward for P23 monitoring wells as discussed during the April 25, 2018 site visit, and Army will incorporate this procedure into the revised work plan.

Thanks.....Roy

Roy Wade
Environmental Engineer
USACE-ERDC
Fort Wingate Technical Manager
601-634-4019



[THIS PAGE INTENTIONALLY LEFT BLANK]

NMED Work Plan
Extension Approvals

[THIS PAGE INTENTIONALLY LEFT BLANK]



SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov



RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

December 22, 2015

Mark Patterson
FWDA, BRAC Coordinator
P.O. Box 93
Ravenna, OH 44266

Steve Smith
USACE
CESWF-PER-DD
819 Taylor Street, Room 3B06
Fort Worth, TX 76102

**SUBJECT: EXTENSION REQUEST FOR PARCEL 23 REVISED PHASE II RCRA
FACILITY INVESTIGATION WORK PLAN,
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA # NM6213820974
HWB-FWDA-12-002**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity's (Permittee) letter requesting an extension for the Parcel 23 Revised Phase II RCRA Facility Investigation Work Plan, dated November 17, 2015 and received November 23, 2015.

The Permittees request an extension to submit the revision of the *Phase II RCRA Facility Investigation Work Plan for Parcel 23* (IWP). The Permittee requires additional time to respond to and clarify comments from NMED and to prepare the revised IWP.

The Permittees have shown good cause for an extension; therefore, NMED grants the requested extension. The date to submit the revised IWP has been changed to January 29, 2016, as requested.

Messrs. Patterson and Smith
December 22, 2015
Page 2

Should you have any questions, please contact Ben Wear of my staff at (505) 476-6041.
Sincerely,

A handwritten signature in dark ink, appearing to read "John Kieling", followed by a small "for" written in a cursive script.

John Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
B. Wear, NMED HWB
C. Hendrickson, U.S. EPA Region 6
T. Perry, Navajo Nation
V. Panteah, Zuni Pueblo
C. Seoutewa, Southwest Region BIA
R. Duwyenie, Navajo BIA
J. Wilson, BIA
E. Stevens, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2015 and Reading, Parcel 23, FWDA-12-002



SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov



RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

January 19, 2016

Mark Patterson
FWDA, BRAC Coordinator
P.O. Box 93
Ravenna, OH 44266

Steve Smith
USACE
CESWF-PER-DD
819 Taylor Street, Room 3B06
Fort Worth, TX 76102

**SUBJECT: SECOND EXTENSION REQUEST FOR THE PARCEL 23 PHASE II
RCRA FACILITY INVESTIGATION WORK PLAN,
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA # NM6213820974
HWB-FWDA-12-002**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity's (Permittee) letter requesting an extension for the revised *Parcel 23 Phase II RCRA Facility Investigation Work Plan*, dated January 7, 2016.

The Permittees request an extension to submit the *Phase II RCRA Facility Investigation Work Plan for Parcel 23* (IWP). This is the second request for an extension to submit the IWP (the previous extension was granted on December 22, 2015). The Permittee requires additional time to respond to and clarify comments from NMED and to prepare the revised IWP.

The letters sent by the Permittees requesting the extensions for this document both refer to the document as a revision; this is not accurate. The Phase II IWP was required in NMED's August 12, 2015 Approval with Modifications for the Final RCRA Facility Investigation Report for Parcel 23. Ensure all documents are accurately cited in all future correspondence in order to facilitate document and project tracking. In addition, for future extension requests, please request

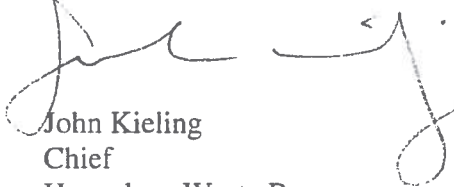
Messrs. Patterson and Smith
January 19, 2016
Page 2

adequate time to complete the project in lieu of submitting multiple requests over short periods of time.

The Permittees have shown good cause for an extension; therefore, NMED grants the requested extension. Because this is the second request for an extension for this deliverable and multiple extension requests over short periods of time cause issues for project tracking, the date to submit the revised IWP has been extended for one year from the original due date specified in NMED's August 12, 2015 Approval with Modifications, to **November 30, 2016**.

Should you have any questions, please contact Ben Wear of my staff at (505) 476-6041.

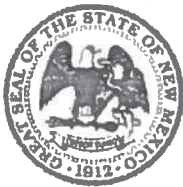
Sincerely,



John Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
B. Wear, NMED HWB
C. Hendrickson, U.S. EPA Region 6
T. Perry, Navajo Nation
V. Panteah, Zuni Pueblo
C. Seoutewa, Southwest Region BIA
R. Duwyenie, Navajo BIA
J. Wilson, BIA
E. Stevens, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2016 and Reading, Parcel 23, FWDA-12-002



SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov



RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

December 1, 2016

Mark Patterson
FWDA, BRAC Coordinator
P.O. Box 93
Ravenna, OH 44266

Steve Smith
USACE
CESWF-PER-DD
819 Taylor Street, Room 3B06
Fort Worth, TX 76102

**SUBJECT: THIRD EXTENSION REQUEST FOR THE PARCEL 23 PHASE 2 RCRA
FACILITY INVESTIGATION WORK PLAN,
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA # NM6213820974
HWB-FWDA-12-002**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity's (Permittee) letter requesting an extension for the *Parcel 23 Phase II RCRA Facility Investigation Work Plan*, dated November 17, 2016 and received November 28, 2016.

The Permittees request an extension to submit the *Phase II RCRA Facility Investigation Work Plan for Parcel 23 (IWP)*. This is the third request for an extension to submit the IWP (the previous extensions were granted on December 22, 2015 and January 19, 2016). The Permittee requires additional time to respond to and clarify comments from NMED and to prepare the revised IWP. For future extension requests, please request adequate time to complete the project in lieu of submitting multiple extension requests.

The Permittees have shown good cause for an extension; therefore, NMED grants the requested extension. Because this is the third request for an extension for this deliverable and multiple extension requests cause issues for project tracking, the date to submit the revised IWP has been

Messrs. Patterson and Smith
December 1, 2016
Page 2

extended for one year from the most recent due date specified in NMED's January 19, 2016 Extension Approval, to **November 30, 2017**.

Should you have any questions, please contact Ben Wear of my staff at (505) 476-6041.

Sincerely,



John Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
C. Hendrickson, U.S. EPA Region 6
L. Rodgers, Navajo Nation
S. Begay-Platero, Navajo Nation
M. Harrington, Pueblo of Zuni
C. Seoutewa, Southwest Region BIA
R. Duwyenie, Navajo BIA
J. Wilson, BIA
E. Stevens, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2016 and Reading, Parcel 23, FWDA-12-002



State of New Mexico
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6313
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov



BUTCH TONGATE
Cabinet Secretary
J. C. BORREGO
Deputy Secretary

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

December 6, 2017

Mark Patterson
BRAC Environmental Coordinator
Fort Wingate Depot Activity
13497 Elton Road
North Lima, OH 44452

Steve Smith
USACE
CESWF-PER-DD
819 Taylor Street, Room 3B06
Fort Worth, TX 76102

**RE: FOURTH EXTENSION REQUEST FOR PARCEL 23 PHASE 2 RCRA
FACILITY INVESTIGATION WORK PLAN
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA # NM6213820974
HWB-FWDA-12-002**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity (Permittee) letter requesting an extension for the *Parcel 23 Phase 2 RCRA Facility Investigation Work Plan* (Plan), dated November 17, 2017 and received November 27, 2017.

This is the fourth request for an extension to submit the Plan (previous extensions were granted on December 22, 2015, January 19, 2016, and December 1, 2016). The Permittee requires additional time to evaluate existing data and investigate additional potential activities that may need to be included in the plan. For future extension requests, please request adequate time to complete the project in lieu of submitting multiple extension requests.

The Permittees have shown good cause for an extension; therefore, NMED grants the requested extension. Because this is the fourth request within a two-year period for an extension for this deliverable and multiple extension requests can cause issues for project tracking, the date to

Messrs. Patterson and Smith
December 6, 2017
Page 2

submit the revised Plan has been extended for two years from the most recent due date specified in NMED's December 1, 2016 Extension Approval, to **November 30, 2019**.

If you have any questions regarding this letter, please contact Ben Wear at (505) 476-6041.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
B. Wear, NMED HWB
M. Suzuki, NMED HWB
C. Hendrickson, U.S. EPA Region 6
L. Rodgers, Navajo Nation
S. Begay-Platero, Navajo Nation
M. Harrington, Pueblo of Zuni
C. Seoutewa, Southwest Region BIA
G. Padilla, Navajo BIA
J. Wilson, BIA
B. Howerton, BIA
R. White, BIA
C. Esler, Sundance Consulting, Inc.

File: FWDA 2017 and Reading, Parcel 23, FWDA-12-002

NMED NOD Letter to RFI Report
April 19, 2014

[THIS PAGE INTENTIONALLY LEFT BLANK]



SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us



RYAN FLYNN
Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

August 19, 2014

Mark Patterson
FWDA, BRAC Coordinator
P.O. Box 93
Ravenna, OH 44266

Steve Smith
USACE FWDA Program Manager
CESWF-PEC-EF
819 Taylor Street, Room 3A12
Fort Worth, TX 76102

**RE: DISAPPROVAL
FINAL RCRA FACILITY INVESTIGATION REPORT
PARCEL 23
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA ID# NM6213820974
HWB-FWDA-12-002**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) has reviewed the *Final RCRA Facility Investigation Report; Parcel 23* (Report) dated April 30, 2012 for Fort Wingate Depot Activity (FWDA). NMED hereby disapproves this Report with the following comments:

Comment 1.

In Section 2.2.2, Topography, lines 30 – 3, page 2-2, the Permittee states “[t]he elevation of FWDA ranges from approximately 8,200 feet above mean sea level (MSL) in the south to 6,660 feet above MSL in the north, as shown in Figure 2-7.” Refer to Figure 2-4 as Figure 2-7 was not included in the document. Provide the correct references in a revised Report.

Comment 2.

In Section 2.2.5.1, Stratigraphy, lines 2-3, page 2-4, the Permittee states “[a] stratigraphic column and description of the various lithologic units in the FWDA area is presented in Figure 2-10 at the end of this section.” The Report does not include Figure 2-10. Correct the reference.

Comment 3.

Table 3-1F, 1999, listed dilution attenuation factors (DAFs) for some of the detected constituents of concern; however, some constituents are listed “NA” but have a listed DAF. For example, Table 3-1F lists the 2009 NMED DAF-20 value NA for Dieldrin. Although the 2009 NMED Table A-1 listed a DAF-20 value of 0.0135 mg/kg. Screening criteria must be applied to all data and consistently. Additionally, superscript “e” for NMED DAF-20 Values was not located in the notes section at the end of the table. Provide a revised Report to include revised tables that compare the 2009 NMED DAF-20 values to the results.

Note: Table 3-1F states that the depth of the samples was not known. However, these samples were collected at a depth of 12 inches. The information was located on the chain-of-custody forms in the analytical data package and can be found in the NMED library under FWDA 1999 Soil Analysis, Central and Group C landfill. Provide revised tables to include the depth.

Comment 4.

Figure 3-2, Previous Soil Sampling Locations at SWMU 21, page 3-52 provides the Calendar Year (CY) 2000 soil sampling locations for SWMU 21 as well as for the new cell that was located during the excavation. Figure 3-5, page 3-55 (Proposed Soil Sampling Locations for SWMU 21), states in the legend that the outlined green line was the area that was excavated in 1999. The excavated area depicted in Figure 3-5 does not correspond to the area that Figure 3-2 shows as being sampled. Provide clarification regarding the excavation boundaries and whether or not the newly discovered cell was excavated. If the new cell was excavated, provide an updated figure that depicts the extent of the excavation.

Comment 5.

As stated in comment 4 above; it appears that the boundary at SWMU 21 has changed and would need a Class 1 permit modification. Request a Class 1 permit modification to change the SWMU 21 boundary.

Comment 6.

Figure 2-4, Topographic Map, page 2-14, demonstrates that surface water flows to the north. In addition, ground water flows in the same general direction as the surface water flow. However, data has not been collected to the north of the landfill boundary in the arroyo where the landfill is located. Surface water runoff could have transported contamination into this arroyo; therefore, soils in the arroyo must be investigated. Provide a work plan proposing additional sampling locations to the north of the landfill within the general area of surface water runoff into the arroyo.

Comment 7.

In Section 2.3, Current Investigation (2011), page 2-6, line 27, the Permittee refers to Section 5.4.7. However, Section 5.4.7 does not exist within this Report. Provide a replacement page with the correct reference.

Comment 8.

Tables 3-3 through 3-8, Parcel 23 SWMU 21 Soil Investigation Data, include a column to compare the values to the 2012 NMED DAF-20 values. Revise the tables to provide a comparison to the 2012 NMED DAF-20 values.

Comment 9.

In Section 3.2.2.3, (Chemical Quality Control Summary Report for the Landfill Closure), page 3-5, line 36-37, the Permittee states “[t]he excavation was backfilled with clean soil, graded and re-seeded with native vegetation. The depth of the backfill was not reported.” The 1999 Operations Plan for SWMU 21 states that grading operation will consist of re-grading the site by cutting the native soil surrounding the landfill and using the material to fill in the excavated area. Although, the plan states the soil will be tested and certified clean, no data was provided to demonstrate “clean fill.” The soil data from the 2000 sampling event, which was collected after the re-grading, indicates exceedances of semi volatile organic compounds (SVOCs) and metals. Provide a statement that clarifies the use of existing soil and, if the soil contained contaminants, that the concentrations were below NMED’s residential soil screen levels (SSLs).

Comment 10.

In Section 3.2.2.4, Chemical Quality Control Summary Report for Confirmation Soil Sampling [...], page 3-6 line 7-8, the Permittee states “[d]uring excavation of the Central Landfill, an additional landfill cell was discovered immediately to the south. The cell measured 40 feet by 450 feet. A total of 18 soil samples were collected from this area at a frequency of one sample every 25 feet at a depth of 1 foot bgs, or approximately 20 feet below the original landfill grade.” Provide information that clarifies whether or not the newly discovered cell was excavated when the soil samples were collected in a revised Report. See Comment 4.

Comment 11.

In Section 3.2.3.2, Fate and Transport, page 3-7, line 18 -19, the Permittee states, “[i]f contamination is present at SWMU 21, it could pose a threat to human health and the environment through exposure to contaminated surface or subsurface soils.” SWMU 21 most likely generated leachate, which may have contaminated ground water. Given the proximity of SWMU 21 to the arroyo, contamination of ground water is a potential exposure pathway. Provide this information in a revised Report.

Comment 12.

In Section 3.4.1, Soil Characterization, page 3-10, line 33-34, the Permittee states “[a] ground water monitoring well was not installed in SWMU 21 because the water table was not encountered during the soil boring investigations.” The Permittee attempted to utilize SB01,

SB03, SB05, and SB07 in an effort to search for ground water. SB01 was drilled to a total depth of 35 feet bgs, SB03 was drilled to a total depth of 9-10 feet bgs, SB05 was not drilled due to refusal, and SB08 was drilled to a total depth of 24 feet bgs. It appears that the Permittee used a drilling method that was unsuitable for the site conditions, using a geoprobe direct push technology to identify bedrock can sometimes be misleading since refusal can be caused by cobble, a boulder or cemented soil conditions. Propose to use an alternative drilling method as direct push did not provide the data needed to make an assessment of ground water contamination. If as stated within this Report; the hydrogeology at SWMU 21 is similar to the TNT beds, then ground water should be located at a depth of 50 to 70 feet bgs. Provide a work plan and propose to drill up to three ground water monitoring wells: one in the up-gradient direction and two down-gradient direction from the site using hollow stem auger. When ground water is encountered the following constituents of concern must be analyzed: volatile organic compounds (VOCs), SVOCs, diesel-range (extended) organics (DRO), explosives and TAL metals.

Comment 13.

In Section 4.2.2, Sampling Data and Section 4.2.3.3, Data Gaps, the Permittee refers to Section 6.3.2; the correct reference in Section 4.3.2. Provide this information in the revised Report.

Comment 14.

NMED is unable to find a reference and explanation for Table 4-1. Provide this information in the revised Report.

Comment 15.

In Section 3.6.2, SWMU 21, Conclusions and Recommendations, page 3-12, lines 4-10, the Permittee proposes to conduct three additional borings in an effort to evaluate the horizontal extent of contamination near soil boring SB08. The Permittee must submit a Work Plan in accordance with Section VII.H.1.b of the Permit prior to conducting any field activity. The work plan must describe the proposed soil sampling activities and include figures identifying the proposed soil borings locations.

Comment 16.

Tables such as Table 3-1A, Soil Analytical Results from ESE, 1981 for SWMU 21, Central landfill, FWDA, that contain data collected prior to the excavation should be removed from the report as they have no relevance to existing conditions. Submit a revised Report to exclude all pre-excavation data from this Report and reference the appropriate documents in the appropriate sections where they can be located.

The Permittee must submit a table that details where the NMEDs comments were addressed in the work plan. The Permittee must submit a revised Report with responses to NMED's comments, cross-referencing NMED's numbered comments. The revised Report must be submitted on or before **October 31, 2014**. In addition, submit a Work Plan for the additional monitoring wells and boreholes at SWMU 21 must be submitted on or before **December 31,**

Messrs. Patterson and Smith
August 19, 2014
Page 5

2014 (See comment 12 and 15). The Permittee must also submit an electronic version of the Work Plan.

If you have any questions regarding this letter, please contact Vicky Baca at (505) 476-6059.

Sincerely,



John E. Kieling
Chief
Hazardous Waste Bureau

cc: Dave Cobrain, NMED, HWB
Neelam Dhawan, NMED, HWB
Kristen Vanhorn, NMED, HWB
Shannon Duran, NMED, HWB
Chuck Hendrickson, EPA-6PD-N
Tony Perry, Navajo Nation
Darrell Tsabetsaye, Zuni Pueblo
Clayton Seoutewa, Southwest Region BIA
Rose Duwyenie, Navajo BIA
Judith Wilson, BIA
Eldine Stevens, BIA
Robin White, BIA
Mike Scoville, USACE Ft. Worth
Eric Kirwan, USACE Ft. Worth

File: FWDA 2014 and Reading
FWDA-12-002

Army Response to NOD Letter for RFI Report
February 28, 2015

[THIS PAGE INTENTIONALLY LEFT BLANK]

February 28, 2015

**RE: RESPONSE TO THE NOTICE OF DISAPPROVAL, AUGUST 19, 2014
FINAL RCRA FACILITY INVESTIGATION REPORT
PARCEL 23
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA ID# NM6213820974
HWB-FWDA-12-002**

Dear Mr. Kieling:

This letter documents the Department of the Army's response to comments in the Notice of Disapproval letter (August 19, 2014) for the *Final RCRA Facility Investigation Report; Parcel 23* (Report) dated April 30, 2012 for Fort Wingate Depot Activity (FWDA). This letter is submitted with the *Final RCRA Facility Investigation Report; Parcel 23 Revision 1.0* dated February 28, 2015.

Comment 1.

In Section 2.2.2, Topography, lines 30 – 3, page 2-2, the Permittee states “[t]he elevation of FWDA ranges from approximately 8,200 feet above mean sea level (MSL) in the south to 6,660 feet above MSL in the north, as shown in Figure 2-7.” Refer to Figure 2-4 as Figure 2-7 was not included in the document. Provide the correct references in a revised Report.

- Response: Figure reference corrected.

Comment 2.

In Section 2.2.5.1, Stratigraphy, lines 2-3, page 2-4, the Permittee states “[a] stratigraphic column and description of the various lithologic units in the FWDA area is presented in Figure 2-10 at the end of this section.” The Report does not include Figure 2-10. Correct the reference.

- Response: Figure reference removed.

Comment 3.

Table 3-1F, 1999, listed dilution attenuation factors (DAFs) for some of the detected constituents of concern; however, some constituents are listed “NA” but have a listed DAF. For example, Table 3-1F lists the 2009 NMED DAF-20 value NA for Dieldrin. Although the 2009 NMED Table A-1 listed a DAF-20 value of 0.0135 mg/kg. Screening criteria must be applied to all data and consistently. Additionally, superscript “e” for NMED DAF-20 Values was not located in the notes section at the end of the table. Provide a revised Report to include revised tables that compare the 2009 NMED DAF-20 values to the results.

Note: Table 3-1F states that the depth of the samples was not known. However, these samples were collected at a depth of 12 inches. The information was located on the chain-of-custody forms in the analytical data package and can be found in the NMED library under FWDA 1999 Soil Analysis, Central and Group C landfill. Provide revised tables to include the depth.

- Response: Tables were pulled directly from work plan, unfortunately there was a formatting error that was identified after reviewing the source files. The tables are reformatted and exclude the references noted above.

Comment 4.

Figure 3-2, Previous Soil Sampling Locations at SWMU 21, page 3-52 provides the Calendar Year (CY) 2000 soil sampling locations for SWMU 21 as well as for the new cell that was located during the excavation. Figure 3-5, page 3-55 (Proposed Soil Sampling Locations for SWMU 21), states in the legend that the outlined green line was the area that was excavated in 1999. The excavated area depicted in Figure 3-5 does not correspond to the area that Figure 3-2 shows as being sampled. Provide clarification regarding the excavation boundaries and whether or not the newly discovered cell was excavated. If the new cell was excavated, provide an updated figure that depicts the extent of the excavation.

- Response: The actual excavation boundaries for the new cell is not documented, however the Release Assessment Report, 2000 describes the samples being taken along the center line of the former excavation. A figure will be presented in a Phase 2 RFI work plan based on field observations and historical aerial photographs.

Comment 5.

As stated in comment 4 above; it appears that the boundary at SWMU 21 has changed and would need a Class 1 permit modification. Request a Class 1 permit modification to change the SWMU 21 boundary.

- Response: The Army will request a change to the boundaries through the Permit Renewal to add the new cell as shown in the attached figure. The limit of the new area is approximated using available information.

Comment 6.

Figure 2-4, Topographic Map, page 2-14, demonstrates that surface water flows to the north. In addition, ground water flows in the same general direction as the surface water flow. However, data has not been collected to the north of the landfill boundary in the arroyo where the landfill is located. Surface water runoff could have transported contamination into this arroyo; therefore, soils in the arroyo must be investigated. Provide a work plan proposing additional sampling locations to the north of the landfill within the general area of surface water runoff into the arroyo.

- Response: The Army will provide a phase 2 RFI work plan for the additional work.

Comment 7.

In Section 2.3, Current Investigation (2011), page 2-6, line 27, the Permittee refers to Section 5.4.7. However, Section 5.4.7 does not exist within this Report. Provide a replacement page with the correct reference.

- Response: Corrected reference to 3.4

Comment 8.

Tables 3-3 through 3-8, Parcel 23 SWMU 21 Soil Investigation Data, include a column to compare the values to the 2012 NMED DAF-20 values. Revise the tables to provide a comparison to the 2012 NMED DAF-20 values.

- Response: The sampling was performed and the report was initiated prior to the publication of the 2012 SSL update and analytical results are compared to the current residential soil screening levels as directed in the approved Work Plan.

Comment 9.

In Section 3.2.2.3, (Chemical Quality Control Summary Report for the Landfill Closure), page 3-5, line 36-37, the Permittee states “[t]he excavation was backfilled with clean soil, graded and re-seeded with native vegetation. The depth of the backfill was not reported.” The 1999 Operations Plan for SWMU 21 states that grading operation will consist of re-grading the site by cutting the native soil surrounding the landfill and using the material to fill in the excavated area. Although, the plan states the soil will be tested and certified clean, no data was provided to demonstrate “clean fill.” The soil data from the 2000 sampling event, which was collected after the re-grading, indicates exceedances of semi volatile organic compounds (SVOCs) and metals. Provide a statement that clarifies the use of existing soil and, if the soil contained contaminants, that the concentrations were below NMED’s residential soil screen levels (SSLs).

- Response: Information on the back fill was not able to be located. The Army reviewed the historic reports again and due to an oversight did show the exceedances found in the document referenced in NMED’s comment on Figures 3-7 and 3-8 of the RFI report. The low hits and consistent concentrations of SVOCs appear to be ubiquitous at SWMU 21. The coal burning boiler plant (Building 535) across the street may have impacted the area. The Building 535 site drains directly to the SWMU 21 site. The Army will contract and prepare a phase 2 RFI work plan for submittal to the stakeholders. The work plan will look further into the potential impacts of the coal burning boiler at Building 535.

Comment 10.

In Section 3.2.2.4, Chemical Quality Control Summary Report for Confirmation Soil Sampling [...], page 3-6 line 7-8, the Permittee states “[d]uring excavation of the Central Landfill, an additional landfill cell was discovered immediately to the south. The cell measured 40 feet by 450 feet. A total of 18 soil samples were collected from this area at a frequency of one sample every 25 feet at a depth of 1 foot bgs, or approximately 20 feet below the original landfill grade.” Provide information that clarifies whether or not the newly discovered cell was excavated when the soil samples were collected in a revised Report. See Comment 4.

- Response: The actual excavation boundaries for the new cell are not documented, however the Release Assessment Report, 2000 describes the samples a being taken along the center line of the former excavation. Refer to response to comment No. 4.

Comment 11.

In Section 3.2.3.2, Fate and Transport, page 3-7, line 18 -19, the Permittee states, “[i]f contamination is present at SWMU 21, it could pose a threat to human health and the environment through exposure to contaminated surface or subsurface soils.” SWMU 21 most likely generated leachate, which may have contaminated ground water. Given the proximity of

SWMU 21 to the arroyo, contamination of ground water is a potential exposure pathway. Provide this information in a revised Report.

- Response: The Army proposes to address this comment by initiating a Phase 2 RFI to determine if leachate exists, and whether this potential leachate migrated to the arroyo below the central landfill. USACE plans to conduct soil and groundwater sample using a hollow-stem auger drill. Groundwater sample will be collected from temporary boreholes to determine if contamination reached groundwater. If contamination is found in groundwater, permanent monitoring wells will be installed.

Comment 12.

In Section 3.4.1, Soil Characterization, page 3-10, line 33-34, the Permittee states “[a] ground water monitoring well was not installed in SWMU 21 because the water table was not encountered during the soil boring investigations.” The Permittee attempted to utilize SB01, SB03, SB05, and SB07 in an effort to search for ground water. SB01 was drilled to a total depth of 35 feet bgs, SB03 was drilled to a total depth of 9-10 feet bgs, SB05 was not drilled due to refusal, and SB08 was drilled to a total depth of 24 feet bgs. It appears that the Permittee used a drilling method that was unsuitable for the site conditions, using a geoprobe direct push technology to identify bedrock can sometimes be misleading since refusal can be caused by cobble, a boulder or cemented soil conditions. Propose to use an alternative drilling method as direct push did not provide the data needed to make an assessment of ground water contamination. If as stated within this Report; the hydrogeology at SWMU 21 is similar to the TNT beds, then ground water should be located at a depth of 50 to 70 feet bgs. Provide a work plan and propose to drill up to three ground water monitoring wells: one in the up-gradient direction and two down-gradient direction from the site using hollow stem auger. When ground water is encountered the following constituents of concern must be analyzed: volatile organic compounds (VOCs), SVOCs, diesel-range (extended) organics (DRO), explosives and TAL metals.

- Response: To address this comment, the Army proposes a Phase 2 RFI to address this comment. The work plan for the Phase 2 RFI will recommend the use of a hollow-stem auger to determine the depth of bedrock, or groundwater if encountered. If groundwater is encountered, grab sample will be collected from temporary borehole to determine if leachate migrated to groundwater. If contamination is found in groundwater, permanent groundwater monitoring wells will be installed.

Comment 13.

In Section 4.2.2, Sampling Data and Section 4.2.3.3, Data Gaps, the Permittee refers to Section 6.3.2; the correct reference in Section 4.3.2. Provide this information in the revised Report.

- Response: corrected reference

Comment 14.

NMED is unable to find a reference and explanation for Table 4-1. Provide this information in the revised Report.

- Response: added reference in section 4.3.2

Comment 15.

In Section 3.6.2, SWMU 21, Conclusions and Recommendations, page 3-12, lines 4-10, the Permittee proposes to conduct three additional borings in an effort to evaluate the horizontal extent of contamination near soil boring SB08. The Permittee must submit a Work Plan in accordance with Section VII.H.1.b of the Permit prior to conducting any field activity. The work plan must describe the proposed soil sampling activities and include figures identifying the proposed soil borings locations.

- Response: A Phase 2 Work Plan will be completed under a separate contract.

Comment 16.

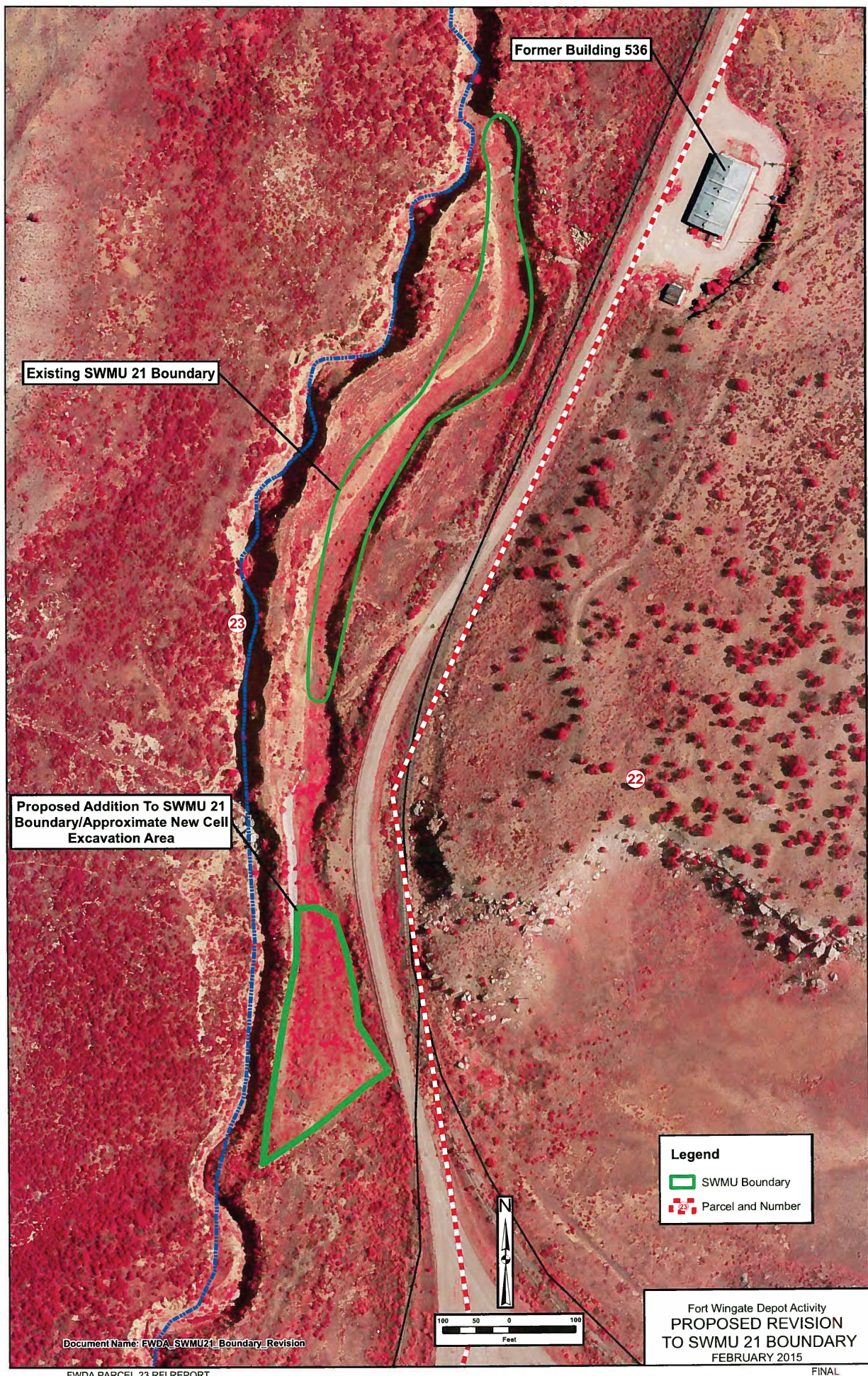
Tables such as Table 3-1A, Soil Analytical Results from ESE, 1981 for SWMU 21, Central landfill, FWDA, that contain data collected prior to the excavation should be removed from the report as they have no relevance to existing conditions. Submit a revised Report to exclude all pre-excavation data from this Report and reference the appropriate documents in the appropriate sections where they can be located.

- Response: The RFI is written as a stand-alone report that documents, not only the current investigation, but also the historical use and characterizations that preceded this work. NMED has previously directed the Army to include a complete summary of the historical information about the site in prior report submissions confirming the intent and approach of the RFI.

Sincerely,

Mark Patterson
BRAC Environmental Coordinator

[THIS PAGE INTENTIONALLY LEFT BLANK]



[THIS PAGE INTENTIONALLY LEFT BLANK]

NMED Approval with Modifications to Final RFI Report
August 12, 2015

[THIS PAGE INTENTIONALLY LEFT BLANK]



SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

NEW MEXICO
ENVIRONMENT DEPARTMENT

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.env.nm.gov



RYAN FLYNN
Cabinet Secretary
BUTCH TONGATE
Deputy Secretary

CERTIFIED MAIL, – RETURN RECEIPT REQUESTED

August 12, 2015

Mark Patterson
FWDA, BRAC Coordinator
P.O. Box 93
Ravenna, OH 44266

Steve Smith
USACE FWDA Program Manager
CESWF-PEC-EF
819 Taylor Street, Room 3A12
Fort Worth, TX 76102

**RE: APPROVAL WITH MODIFICATIONS
FINAL RCRA FACILITY INVESTIGATION REPORT
PARCEL 23, REVISION 1.0
FORT WINGATE DEPOT ACTIVITY
MCKINLEY COUNTY, NEW MEXICO
EPA ID# NM6213820974
HWB-FWDA-12-002**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) has reviewed the *Final RCRA Facility Investigation Report, Parcel 23, Revision 1.0* (Report), dated February 28, 2015 for Fort Wingate Depot Activity (Permittee). NMED hereby issues this Approval with Modifications with the following modifications.

Modifications

1. The Permittee must submit a Phase II Work Plan as stated in the response to NMEDs Disapproval, dated August 19, 2014. The Permittee's response letter was dated February 28, 2015 and is included in Attachment A of this Report. The Phase II Work Plan must be written and submitted in accordance with Section VII.H.1.b of the Permit prior to conducting any field activity. The work plan must describe in detail the proposed soil sampling activities and include figures identifying the proposed soil boring locations.

2. In future responses to Disapprovals the Permittee must reference the Permittee's response letter comments in the applicable sections of the Report where future work is being proposed; otherwise it appears that comments in the disapproval were not addressed. The Permittee is required to provide a response letter that cross-references NMEDs comments and demonstrates where changes have been made to the revised document.

3. The Permittee must use the 2014 NMED Risk Assessment Guidance as updated for the work proposed performed in the Phase II Work Plan.

4. In Section 3.6.2, the Permittee proposed to install three additional borings at SWMU 21 in an effort to evaluate the horizontal extent of contamination near soil boring SB08. The proposed method is acceptable; however, a survey must be conducted in order to accurately apply correction factors for terrain slope in order to ensure that the proposed depth of 17-18 feet-below ground surface (ft-bgs), relative to soil boring 08 (SB08) to equal the baseline ground surface depth of 0 feet. NMED recommends that samples be collected at two-and-one-half-foot intervals for the upper ten feet and at five foot intervals from the surface thereafter. This recommendation stems from the exceedances in the "clean fill" and the fact that residential risk is applicable to 10 ft-bgs. The method proposed by the Permittee would not provide data to determine an acceptable risk for the first 10 ft-bgs as proposed in this Report.

5. In Section 4.6.2, the Permittee recommends no further corrective action for AOC 73. NMED concurs with this recommendation pending an evaluation of the data collected for a soil background study based on incremental (IM) samples. The approved 2010 Shaw soil background study conducted at FWDA represents grab samples, which are discrete sample data. Discrete sample results provide a measure of the distribution of concentrations in relatively small volumes of soil in a specified area, where IM samples provides measure of the distribution of mean concentrations, each of which is an estimate of the population mean for the entire decision unit. Due to the differences in attributes, a comparison of IM results to discrete background data cannot be conducted. Comparison of an IM estimate of the mean to a discrete sample collected from soil representing background is likely to lead to decision errors in which one incorrectly concludes that the contaminant distribution on site is consistent with background conditions (refer to Chapter 4 ITRC Incremental Sampling Methodology: <http://www.itrcweb.org/>). Submit a Phase II Work Plan to conduct a soil background study for IM data for comparison to the site IM data.

The Permittee must submit a Phase II Work Plan to address comments contained in NMED's Disapproval dated August 19, 2014 and must address all comments contained in this Approval with Modifications. The Phase II Work Plan must be submitted on or before **November 30, 2015**.

Messrs. Patterson and Smith
August 12, 2015
Page 3 of 3

If you have any questions regarding this letter, please contact Vicky Baca at (505) 476-6059.

Sincerely,



John E. Kieling
Chief

Hazardous Waste Bureau

cc: Dave Cobrain, NMED, HWB
Neelam Dhawan, NMED, HWB
Kristen Vanhorn, NMED, HWB
Chuck Hendrickson, EPA-6PD-N
Tony Perry, Navajo Nation
Val Panteah, Governor, Pueblo of Zuni
Clayton Seoutewa, Southwest Region BIA
Rose Duwyenie, Navajo BIA
Judith Wilson, BIA
Eldine Stevens, BIA
Christy Esler, Sundance Consulting, Inc.

File: FWDA 2015 and Reading
FWDA-12-002