

**Final**

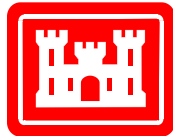
**HWMU Status Report, 2012-2018  
HWMU, Parcel 3**

**Fort Wingate Depot Activity  
McKinley County, New Mexico**

**May 19, 2020**

**Contract No. W912BV-16-C-0033**

Prepared for:



U.S. Department of the Army  
Corps of Engineers –

Tulsa District  
1645 S 101<sup>st</sup> E Avenue  
Tulsa, Oklahoma 74128

Prepared by:

**AECOM**

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60517380

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## 1 List of Acronyms

AECOM	AECOM Technical Services, Inc.
AOC	Area of Contamination
ALM	Adult Lead Exposure Model
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
bgs	below ground surface
BIA	Bureau of Indian Affairs
BRAC	Base Realignment and Closure
CAMU	Corrective Action Management Unit
CDC	Current Detonation Crater
CoC	Chain of Custody
CRP	Current Residue Pile
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
DoD	Department of Defense
ECM	Earth Covered Magazine
ft	foot/feet
FWDA	Fort Wingate Depot Activity
HWMU	Hazardous Waste Management Unit
ID	Identification number
IEUBK	Integrated Exposure Uptake Biokinetic
LOQ	Limits of Quantitation
MD	Munitions Debris
MDAS	Material Documented as Safe
MEC	Munitions and Explosives of Concern
mg/kg	milligrams per kilogram
MPPEH	Material Potentially Presenting an Explosive Hazard
MS/MSD	Matrix Spike/Matrix Spike Duplicate
ng/kg	nanograms per kilogram
NMED	New Mexico Environment Department
OB/OD	Open Burning/Open Detonation
OBDA	Open Burning and Detonation Area
QA/QC	Quality Assurance/Quality Control
RC	Remote Controlled
RCRA	Resource Conservation Recovery Act
RSL	Regional Screening Level

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SOP	Standard Operating Procedure
SSHP	Site-Specific Safety and Health Plan
SSL	Soil Screening Level
SUXOS	Senior Unexploded Ordinance Supervisor
SVOC	Semi-Volatile Organic Compound
TEAD	Tooele Army Depot
TNT	2,4,6-Trinitrotoluene
TPMC	TerranearPMC
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordinance
VOC	Volatile Organic Compound

1

**1 1.1 INTRODUCTION**

2 This status report has been prepared in response to a request by the New Mexico Environment  
3 Department (NMED) for an update on field operations and sampling results pertaining to the  
4 Removal Action at the Hazardous Waste Management Unit (HWMU) (Open Burning/ Open  
5 Detonation [OB/OD] Unit) (FTWG-002-R-01), at Fort Wingate Depot Activity (FWDA),  
6 McKinley County, New Mexico.

7 Removal action operations have been conducted at FWDA since 2012. This status report will  
8 reflect data collected from soil analysis of stockpiled soils processed through the plant,  
9 confirmation samples, and munitions and explosives of concern (MEC) recovery statistics from  
10 the start of the removal action in 2012, through the end of 2018. A separate status report will be  
11 submitted for operations occurring in 2019.

12 No operations were conducted from July 2015 through August 2017 due to the end of the initial  
13 work contract and the award of the current contract to AECOM Technical Services, Inc.  
14 (AECOM) (formerly URS Group, Inc. [URS]).

**15 1.2 PROJECT PURPOSE AND SCOPE**

16 The objective of the HWMU removal action is to satisfy the closure performance standards  
17 specified in the Resource Conservation Recovery Act (RCRA) Permit by removing hazardous  
18 wastes and hazardous waste residues from the HWMU. The primary tasks in the removal action  
19 include:

- 20 • HWMU Boundary and Topographic Land Survey
- 21 • Construction and Operation of a Corrective Action Management Unit (CAMU)
- 22 • Operate and Manage Earth Covered Magazines (ECMs)
- 23 • Debris and Soils Removal
- 24 • Debris and Soils Processing
- 25 • Soil Stockpile Management and Characterization Sampling
- 26 • Munitions Debris (MD) Flashing
- 27 • MEC and Material Documented as an Explosive Hazard Disposal
- 28 • Material Documented as Safe (MDAS) Disposal
- 29 • Post-excavation Digital Geophysical Mapping (DGM)
- 30 • Confirmation Soil Sampling
- 31 • Site Restoration

**1 1.3 PROJECT LOCATION**

2 FWDA is located in northwestern New Mexico in McKinley County, approximately 8 miles east  
3 of Gallup, New Mexico (**Figure 1-1**). FWDA currently occupies approximately 24 square miles  
4 (15,273 acres) of land with facilities formerly used to operate a reserve storage facility providing  
5 for the care, preservation, minor maintenance, and disposal of assigned commodities – primarily  
6 conventional military munitions.

**7 1.4 SITE DESCRIPTION AND BACKGROUND**

8 FWDA is an inactive United States Army Depot whose active mission was to store, ship, and  
9 receive material and dispose of obsolete or deteriorated explosives and military munitions.  
10 FWDA operated from the mid-1940s to 1993, at which time the active mission ceased, and the  
11 installation was then closed.

12 The installation was established as Fort Wingate in 1860. In 1941, Fort Wingate underwent  
13 major construction and expansion for the administration and earth covered magazine (ECM)  
14 area. In 1971, the depot was placed in reserve status and renamed Fort Wingate Depot Activity  
15 (MKM Engineers, Inc. 2008). In 1975, the installation was placed under the administrative  
16 command of Tooele Army Depot (TEAD), located near Salt Lake City, Utah. The active  
17 mission of FWDA ceased and the installation closed in January 1993 as a result of the Defense  
18 Authorization Amendments and Base Realignment and Closure (BRAC) Act of 1988. In 2002,  
19 the Army reassigned many functions at FWDA to the BRAC Division, including property  
20 disposal, caretaker duties, management of caretaker staff, and performance of environmental  
21 restoration and compliance activities. TEAD retained command and control responsibilities and  
22 continued to provide support services to FWDA until January 31, 2008. On January 31, 2008,  
23 command, control, and support functions were transferred to White Sands Missile Range;  
24 however, the BRAC office is conducting and administering the cleanup activities  
25 (TerranearPMC [TPMC] 2008). The cleanup activities are focused within Parcel 3, as illustrated  
26 in **Figure 1-2**.

27 FWDA is almost entirely surrounded by federally owned or administered lands, including both  
28 national forest and tribal lands. North and west of FWDA are Navajo tribal trust and allotted  
29 lands. The Bureau of Indian Affairs (BIA) administers the land east and south of Parcel 3  
30 (Parcel 1). The land to the west is mostly undeveloped and is tribal trust and allotment land  
31 administered by the BIA, Navajo Nation, and individual Native American allottees  
32 (MKM Engineers, Inc. 2008).

**33 1.4.1 Open Burning and Detonation Areas**

34 The historic OB/OD activities at the FWDA were conducted primarily within a designated area  
35 of the installation; the Open Burning and Detonation Area (OBDA). The OBDA is located in the  
36 west-central portion of the installation and encompasses both the Current and Closed OB/OD  
37 Areas. The Closed OB/OD Area was used from 1948 to 1955. Beginning in the mid-1940s,

1 burning and detonation operations at the installation were performed within the Current OB/OD  
2 Area which includes the HWMU. In 1980, these operations were permitted and regulated under  
3 RCRA Interim Status (Environmental Resource Management 1995). Operations within the  
4 HWMU are listed on the FWDA RCRA Part A Permit Application dated August 1980. In 2002,  
5 the pathway for environmental restoration of the HWMU was determined to be a RCRA Permit.  
6 The Permit was finalized in 2005. **Figure 1-2** shows the location of the OB/OD area relative to  
7 the HWMU.

## 8 **1.4.2 HWMU**

9 The HWMU, as identified in Attachment 12 of the FWDA RCRA Permit (NMED 2005) and  
10 shown in **Figure 1-2**, is the focus of this project. The HWMU (32 acres) is within the Current  
11 OB/OD Area (104 acres) which is within Parcel 3 (1805.8 acres). The HWMU consists of the  
12 burning ground, 10 areas identified as Current Residue Piles (CRP) 1 through 10, and 12 open  
13 detonation craters identified as Current Detonation Craters (CDC) 1 through 12. After OB/OD  
14 operations were completed within the detonation craters, residual material and wastes were  
15 placed around the HWMU, typically pushed onto or over the arroyo bank. A detailed map  
16 illustrating the CRP and CDC areas within the HWMU is included in **Figure 1-3**.

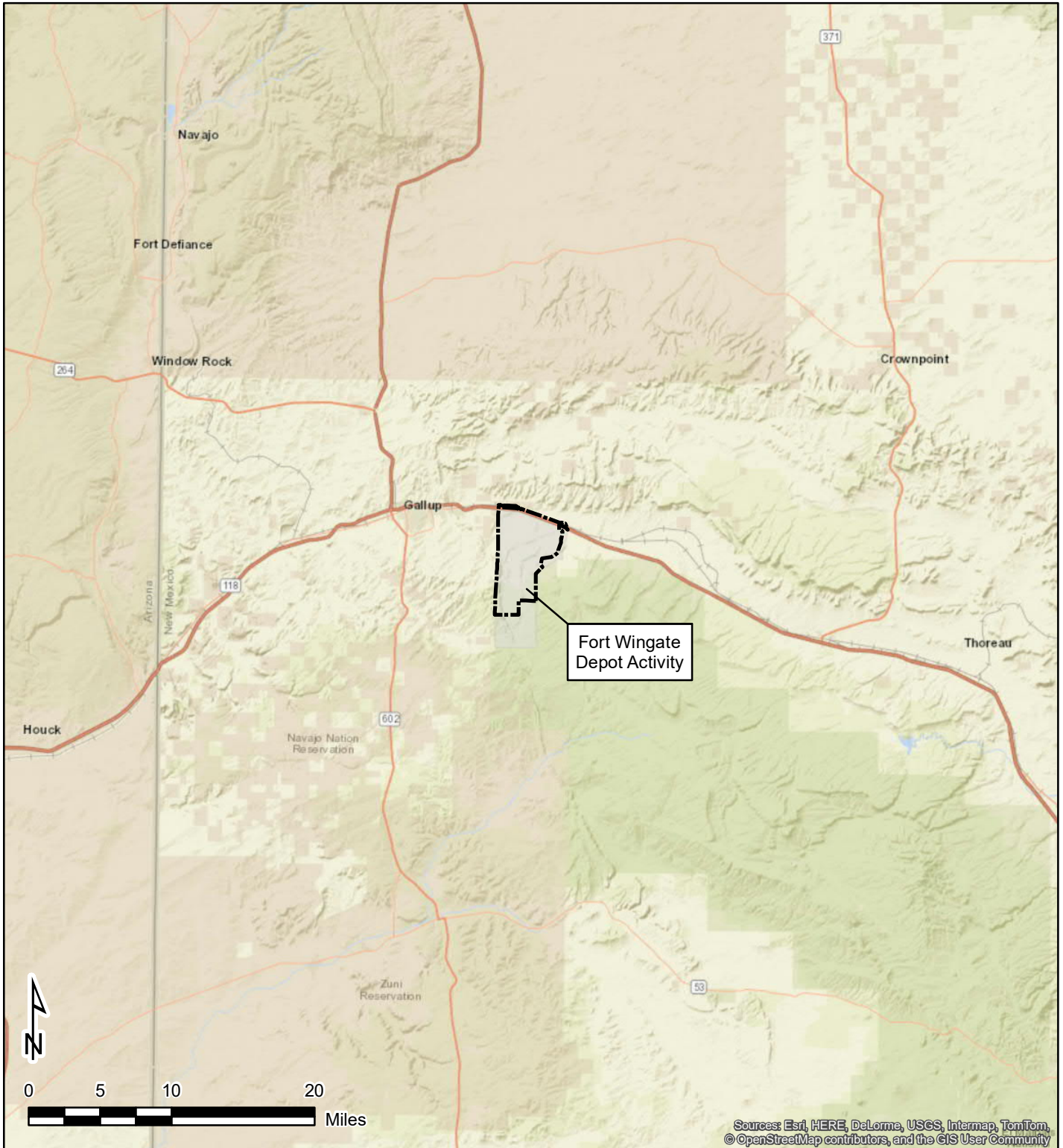
17 Demilitarization of unserviceable, obsolete, or waste explosives, propellants, munitions, and  
18 munitions components was accomplished at the HWMU. Propellants, small arms, and bulk  
19 explosives were burned as a means of disposal. Explosive munitions were disposed of by  
20 detonation. Disposals by detonation were conducted within detonation craters that may have  
21 been tamped with an earthen cover to minimize fragmentation dispersal.


22 OB/OD operations were conducted on the ground surface within the HWMU, and residual  
23 materials appear to have been relocated around the HWMU via a variety of mechanisms,  
24 including earthmoving (e.g., piles of residuals were pushed onto/over arroyo banks using  
25 earthmoving equipment during FWDA operations), erosion (e.g., surface runoff has transported  
26 residual materials from the initial piles down arroyo banks and into/along the arroyo bottoms),  
27 and explosions (e.g., detonations have forced fragments and/or MEC beneath the ground surface)  
28 (TPMC 2008).

29 Beginning in 2012, in accordance with the NMED approved workplan submitted by URS (URS  
30 2013), cleanup activities included the mechanized removal of contaminated soils from the  
31 HWMU area. The removed soils, which included MEC and other MD, were treated in a  
32 processing plant which separated ferrous and non-ferrous materials from the soil contents. All  
33 MEC items discovered during processing were inspected by trained unexploded ordinance  
34 (UXO) technicians and disposed of by burning or detonation. A discussion of MEC recovery is  
35 included in **Section 3.3**.

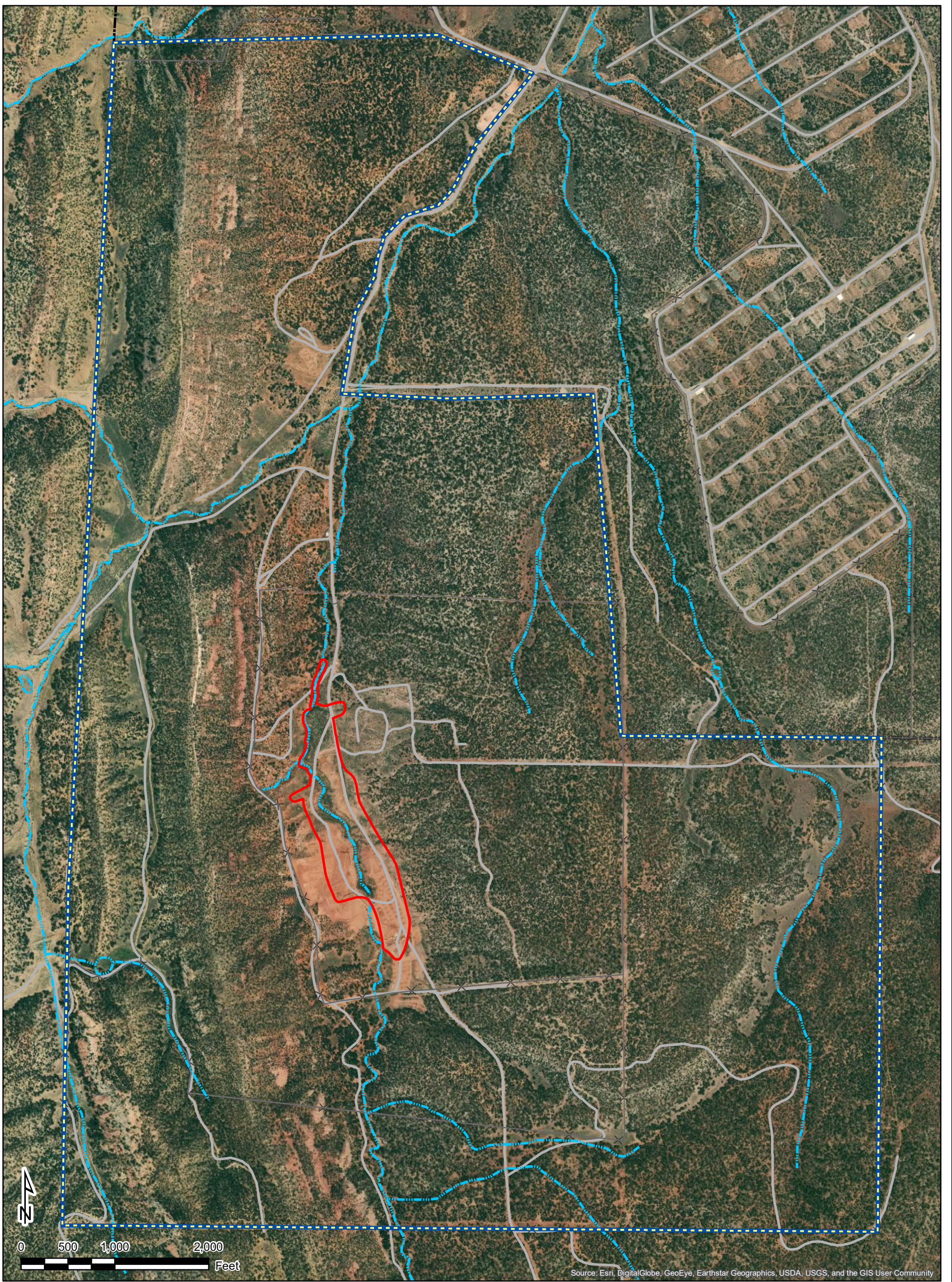
36 Soils leaving the treatment plant were placed into 250 cubic yard stockpiles. Soil samples were  
37 collected from each stockpile and analyzed by Agricultural and Priority Pollutants Laboratories,  
38 Inc. (APPL). Once laboratory results were received, a risk screening was completed for any  
39 detections in excess of the soil screening criteria. If the stockpile soil sample results were below

- 1 the screening criteria, the soil was used as backfill in the HWMU excavation area. If the  
2 stockpile soil sample results indicated that screening criteria have been exceeded, but were below  
3 hazardous waste disposal criteria, the soil was hauled to the Northwest New Mexico Regional  
4 Solid Waste Authority landfill. The soil was classified as non-hazardous waste. No hazardous  
5 waste was generated in the HWMU during the 2012-2018 removal activities.
- 6 The HWMU excavation area was divided into 100 feet (ft) by 100 ft grids. When a grid was  
7 thought to be cleared of all MEC and MD, the area was mapped with DGM to identify and  
8 removal any remaining anomalies. Once cleared, confirmation soil samples were collected from  
9 the extents of the excavation and submitted for laboratory analysis.
- 10 The NMED approval letter for the workplan submitted by URS is included in **Appendix D**. A  
11 discussion of soil sampling procedures is provided in **Section 2**, and the results and discussion  
12 are presented in **Section 3.1**.



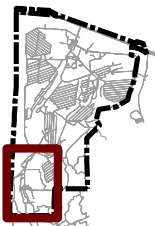
**Legend**  
 Installation Boundary

<b>FWDA Location Map</b> Fort Wingate Depot Activity McKinley County, New Mexico		
Drawn By: JZ	Date: 3/17/2020	<b>Figure 1-1</b>
Checked By: GB	Project No. 60517380	









Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, USDA, USGS, and the GIS User Community

**Locator Map**



Sources: Esri, HERE, DeLorme, USGS, Intermap, TomTom, © OpenStreetMap contributors, and the GIS User Community

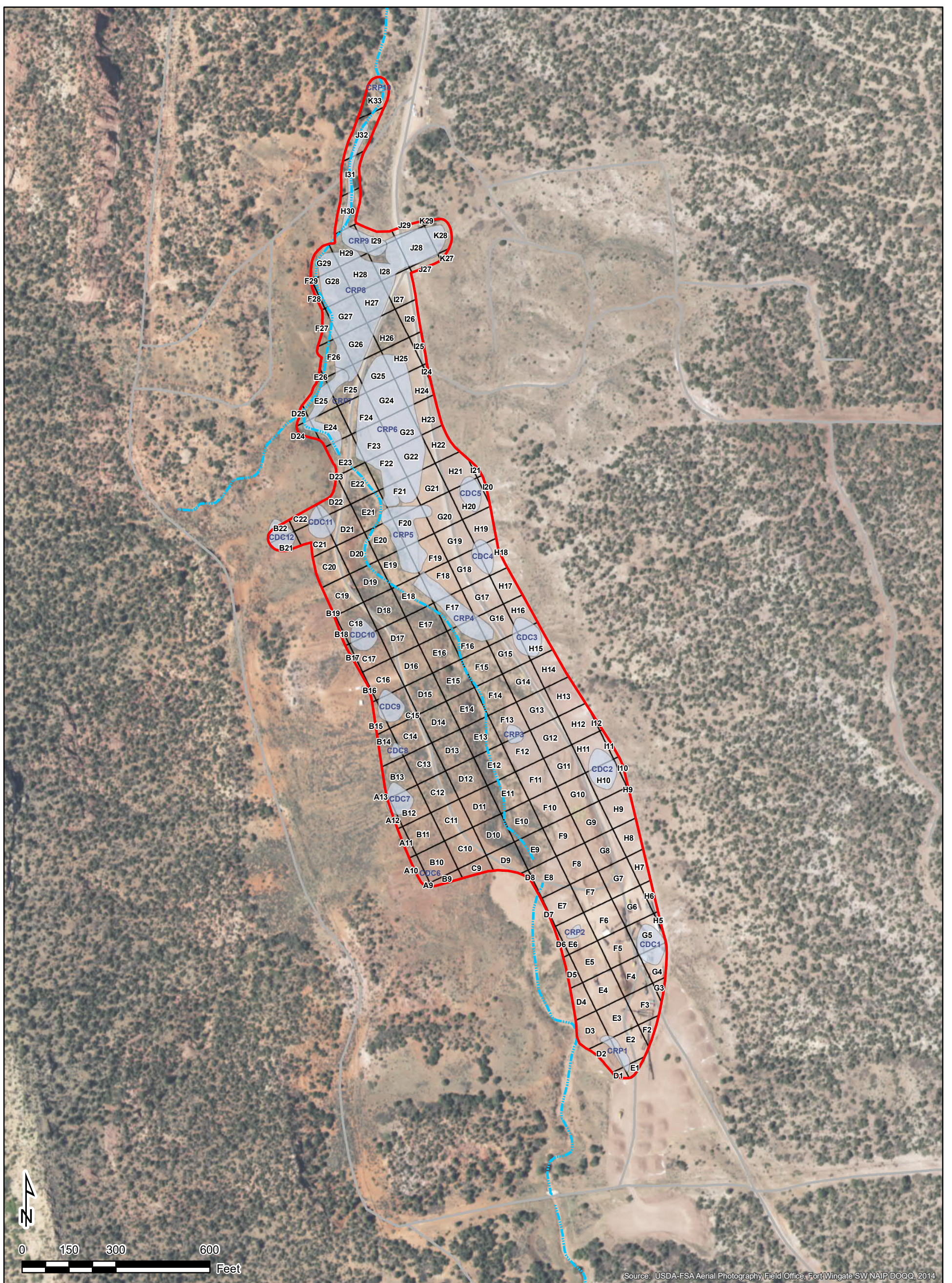
**Legend**

-  Installation Boundary
-  HWMU Boundary
-  Parcel 3 Boundary
-  Road
-  Fence
-  Arroyo

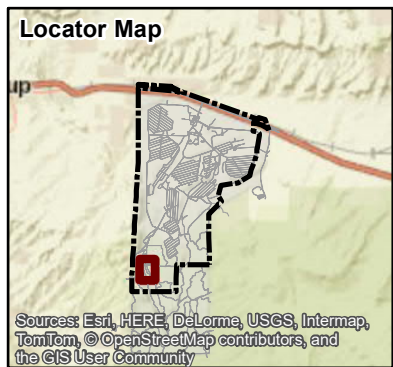
**HWMU Location Map**  
Fort Wingate Depot Activity  
McKinley County, New Mexico

Drawn By: JZ	Date: 5/6/2020
Checked By: GB	Project No. 60517380

**Figure 1-2**



Source: USDA-FSA Aerial Photography Field Office, FortWingate SW NAIP DOQQ 2014



- Legend**
- Installation Boundary
  - HWMU Boundary
  - Arroyo
  - Road
  - HWMU Survey Grid
  - CRP/CDC Area

<b>HWMU Detail</b>		<b>Figure 1-3</b>
Fort Wingate Depot Activity		
McKinley County, New Mexico		
Drawn By:	Date:	
JZ	5/6/2020	
Checked By:	Project No.	
GB	60517380	

1 This section presents a summary of the HWMU removal activities, including a description of the  
2 removal activities, removal areas, and soil sampling. For full descriptions of the soil processing  
3 plant setup, soil processing procedures, and soil sample procedures, refer to the NMED approved  
4 workplan submitted by URS in 2013. References to this document is included in **Section 5**.

## 5 **2.1 HWMU REMOVAL ACTIVITIES**

6 The overall goal for closure of the HWMU was to remove hazardous wastes and hazardous  
7 wastes residues (i.e., MEC and MD), and remove or decontaminate soils contaminated above  
8 screening levels in accordance with Section III of the RCRA Permit (NMED 2005). The  
9 objective was to remove MD and MEC from within the HWMU to a size of 5/8 inch and identify  
10 and remove any remaining contaminated soils.

### 11 **2.1.1 Excavation Activities**

12 Soils and debris were excavated from within the HWMU using remote controlled (RC)  
13 equipment. The RC equipment (i.e., excavators and dozers) worked in tandem to excavate and  
14 push material into piles, near the infeed, for conveyance to the processing plant. The soils and  
15 debris are excavated in layers to minimize the volume of material removed and facilitate periodic  
16 inspection of the excavation.

17 The RC equipment is also used to feed material to the processing plant. The infeed includes a  
18 feeder with a six-inch screen opening. The screen prevents potential ordnance larger than six  
19 inches from entering the plant, which protects the equipment and plant operators.

### 20 **2.1.2 Processing Activities**

21 Excavated material was processed through a closed-loop processing plant which separated  
22 material 5/8 inch or larger from soils. The processing plant utilized a series of electromagnets to  
23 remove ferrous metal debris from soils, a trommel screen to separate material 5/8 inch and  
24 smaller from all other material, a hammermill to decrease the size of material larger than 5/8  
25 inch, and eddy currents to remove non-ferrous metals debris. Material continued to cycle  
26 through this closed loop plant until it is either removed with the electromagnets or eddy currents  
27 or passed through the 5/8 inch screen in the trommel.

28 All metallic debris removed from soils was deposited onto a conveyor that transferred the metal  
29 to an inspection line, manned with UXO Technicians. All metal underwent a material potentially  
30 presenting an explosive hazard (MPPEH) inspection, where MEC is identified and removed from  
31 the debris. MEC items that were determined to be acceptable to move were transferred to and  
32 stored in the ECMs until destruction at a later date. MEC items that were deemed unacceptable  
33 to move, were destroyed in the HWMU.

**1 2.2 SOIL SAMPLE ACTIVITIES AND ANALYSES**

2 Soil sampling activities were completed at two separate sampling areas. Processed soils were  
3 placed into 250 cubic yard stockpiles for characterization sampling. Confirmation soil sampling  
4 was completed from the limits of the remedial excavations to characterize the soils remaining,  
5 prior to placing backfill. Samples were collected in accordance with the SOPs listed in the  
6 NMED approved workplan (URS 2013). The workplan approval letter is included in **Appendix**  
7 **D**.

**8 2.2.1 Stockpile Soil Sampling**

9 The purpose of the characterization sampling was to identify and segregate soil stockpiles that  
10 exhibited constituents meeting the screening criteria in Attachment 7 of the RCRA Permit from  
11 those that exceeded criteria. Each 250 cubic yard stockpile was placed on 6 mil poly and was  
12 given a unique numeric identifier so that when analytical results were received and validated, the  
13 results could be correlated with a specific stockpile.

14 Each processed stockpile consisted of one discrete soil sample for volatile organic compounds  
15 (VOCs) (Method 8260B), and one composite sample collected and analyzed for target analyte  
16 list metals (Method 6010B/6020A/741B), semi-volatile organic compounds (SVOCs) (Method  
17 8270D), explosives (Method 8330B), polychlorinated biphenyl aroclors (Method 8082A), nitrate  
18 (Method 9056A), cyanide (Method 9014), dioxins/furans (Method 8290), and perchlorate  
19 (Method 6850) as stipulated in Section III of the FWDA RCRA Permit. In order to be  
20 representative of the entire pile, the composite samples were composed of ten increments taken  
21 from varying locations throughout each pile. The samples were submitted to APPL for chemical  
22 analyses.

**23 2.2.1.1 Field Quality Assurance/Quality Control Procedures and Samples**

24 Field quality assurance/quality control (QA/QC) samples were designed to help identify potential  
25 sources of external sampling contamination and to evaluate potential error introduced by sample  
26 collection and handling. All QA/QC IDs were sent to the laboratory with the other samples for  
27 analysis. QA/QC samples were collected at a frequency of 10 percent.

**28 2.2.1.1.1 Duplicate Samples**

29 Duplicate samples were collected to assess precision of sampling and analysis. For the stockpile  
30 soil sampling, periodic duplicate samples were collected at the same time as the initial  
31 corresponding samples and co-located to the field sample location. The duplicate samples were  
32 packaged and handled identically to the initial samples, but were assigned a dedicated QA/QC  
33 ID.

**34 2.2.1.1.2 Matrix Spikes and Matrix Spike Duplicates (MS/MSD)**

1 MS/MSDs were utilized to assess the potential for matrix effects. Samples were designated for  
2 MS/MSD analysis on the COC form and on sampling containers. MS/MSD samples were  
3 collected at a frequency of 5 percent.

#### 4 **2.2.2 Confirmation Soil Sampling**

5 In accordance with Section III.A.4 of the Class 3 Permit Modification and the NMED approved  
6 work plan (URS 2013), soil samples were collected from the limits of the remedial excavations  
7 to characterize the remaining soils for future action(s). Confirmation samples were collected  
8 from those portions of the excavated areas where DGM data demonstrated that subsurface  
9 anomalies had been removed. The confirmation soil sampling grid locations are presented on  
10 **Figure 2-1**.

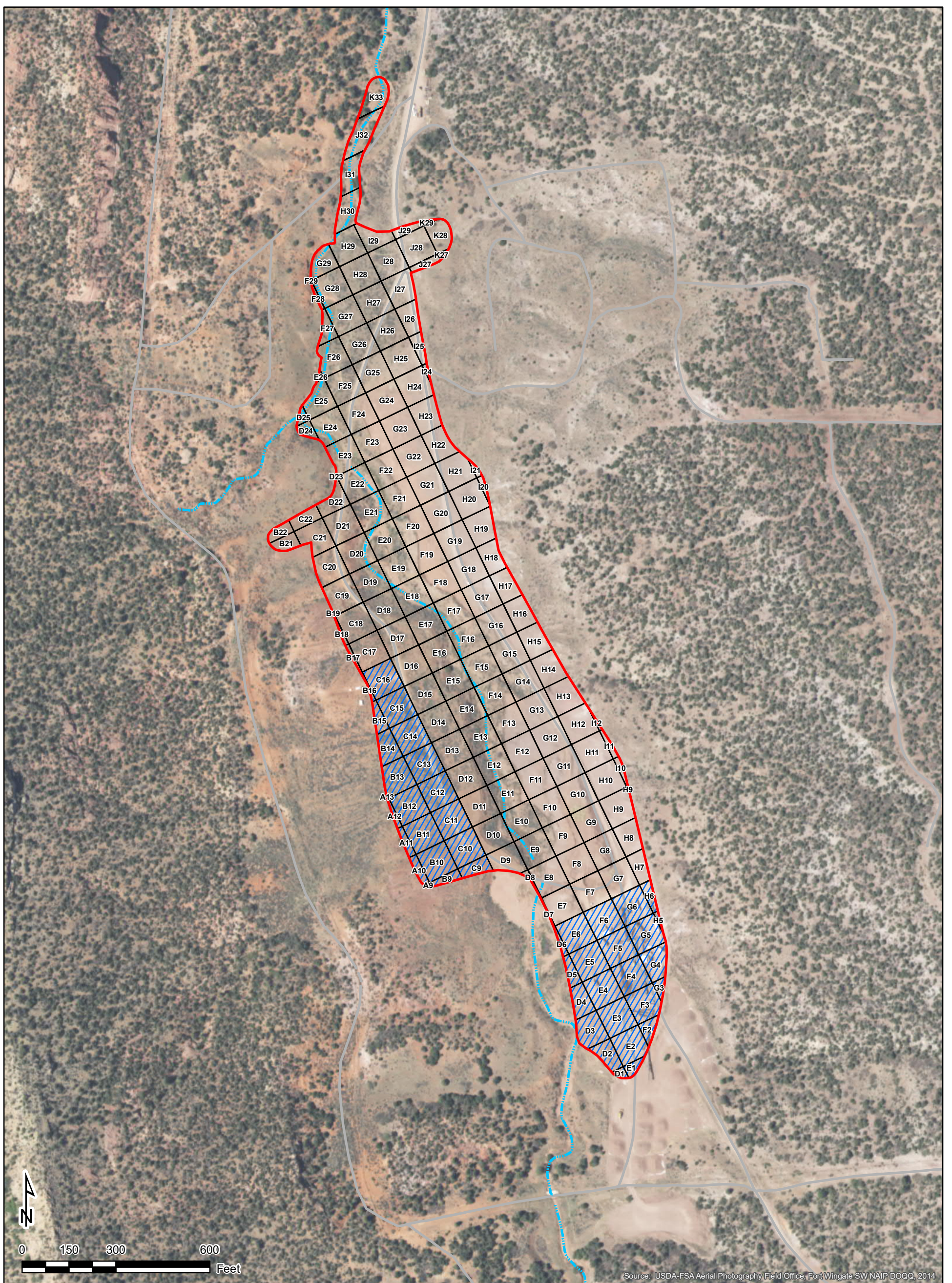
11 The purpose of the confirmation sampling was to identify any areas where constituents exceeded  
12 the screening criteria stipulated in Attachment 7 of the RCRA Permit (NMED 2005). NMED  
13 soil screening levels (SSLs) for a residential land use scenario were used, or if an NMED  
14 residential SSL was not available for an analyte, the USEPA residential regional screening level  
15 (RSL) was used. When background concentrations of a constituent exceeded the NMED  
16 residential SSL, then the background concentration for that constituent was used as the screening  
17 value. The NMED SSL table and USEPA RSL table have been updated many times since the  
18 start of the FWDA removal activity. As a new update to the guidance table was released, the  
19 screening levels were changed on the results tables in **Appendix A**, and the risk screening tables  
20 in **Appendix B**. The NMED Risk Assessment Guidance for Site Investigations and Remediation  
21 (NMED 2012, 2014, 2017) was used to obtain SSLs. The USEPA Regional Screening Levels  
22 (RSLs)- Generic Tables were used to obtain RSLs (USEPA 2013). Refer to **Section 3.1** for a  
23 discussion on background levels at FWDA.

24 The tables presented in **Appendix A** are based on NMED SSL updates. The USEPA RSLs may  
25 be listed next to a sample as a more current update, but decisions made corresponding to RSL  
26 exceedances used the RSLs available at the time a sample was collected. **Table 3-1**, found after  
27 **Section 3**, provides a summary of soil sample screening level exceedances.

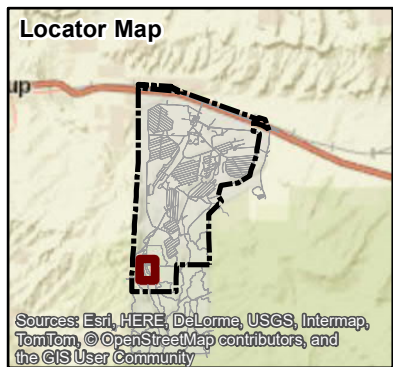
28 Confirmation soil samples were collected from the excavation. Due to the varying size and  
29 shape of each excavation, a composite sample was collected for every 100 ft of linear sidewall.  
30 If the excavation exceeded 20 ft in depth, a composite sample was collected for every 10 ft of  
31 depth every 100 ft of sidewall. Composite samples were also collected from the bottom of each  
32 100 ft by 100 ft (i.e., 10,000 square ft) excavation (URS 2013).

33 Each sample area consisted of one discrete soil sample for VOCs (Method 8260B), and one  
34 composite sample collected and analyzed for target analyte list metals (Method  
35 6010B/6020A/741B), SVOCs (Method 8270D), explosives (Method 8330B), polychlorinated  
36 biphenyl aroclors (Method 8082A), nitrate (Method 9056A), cyanide (Method 9014),  
37 dioxins/furans (Method 8290), and perchlorate (Method 6850) as stipulated in Section III of the  
38 FWDA RCRA Permit. Each composite sample consisted of nine subsamples randomly collected  
39 from within each sampling area. The samples were submitted to APPL for chemical analysis.

- 1 **2.2.2.1 Field Quality Assurance/Quality Control Procedures and Samples**
- 2 Refer to **Section 2.2.1.1** for field QA/QC procedures and samples.



Source: USDA-FSA Aerial Photography Field Office, FortWingate SW NAIP DOQQ 2014



- Legend**
- Installation Boundary
  - HWMU Boundary
  - Arroyo
  - Road
  - HWMU Survey Grid
  - Sampled Grid

<b>Confirmation Sample Locations</b>		<b>Figure 2-1</b>
Fort Wingate Depot Activity McKinley County, New Mexico		
Drawn By:	Date:	<b>Figure 2-1</b>
JZ	3/25/2020	
Checked By:	Project No.	
GB	60517380	

Sources: Esri, HERE, DeLorme, USCS, Intermap, TomTom, © OpenStreetMap contributors, and the GIS User Community

### 3.1 SOIL SAMPLING RESULTS

All analyses were performed by APPL. APPL is Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) certified. The full stockpile soil sampling results are included in **Appendix A.1** and confirmation soil sampling results are included in **Appendix A.2**. The stockpile soil samples that exceeded SSLs are summarized in **Table 3-1**. There were no confirmation samples that exceeded SSLs. Full laboratory reports were not required to be included with the yearly status reports, as stated in the Extension Request for the Parcel 3 Hazardous Waste Management Unit Investigation and Remediation Report letter from NMED on April 18, 2019. This letter is included in **Appendix D**.

The soil samples were submitted for analysis of VOCs (Method 8260B), target analyte list metals (Method 6010B/6020A/741B), SVOCs (Method 8270D), explosives (Method 8330B), polychlorinated biphenyl aroclors (Method 8082A), nitrate (Method 9056A), cyanide (Method 9014), dioxins/furans (Method 8290), and perchlorate (Method 6850) as stipulated in Section III of the FWDA RCRA Permit (NMED 2005).

**Table 3-2** summarizes chemicals with a detection limit greater than the NMED SSL. One chemical (N-Nitrosodimethylamine) exhibited this quality. There were no detections of N-Nitrosodimethylamine in any of the soil samples submitted for laboratory analysis.

To allow performance of the risk-based screen, the tables in **Appendices A.1** and **A.2** present the residential screening value, the source of the screening value (NMED Residential SSL, USEPA RSL, or background), the endpoint (cancer or noncancer), and the analytical result for each detected constituent. Limits of Quantitation (LOQs) were reviewed by the AECOM chemist to ensure that LOQs were below the screening values. The sampling results are compared to the following:

- **Soil Background Levels:** Site-specific soil background levels at FWDA are established in two documents: Soil Background Study and Data Evaluation Report (Shaw Environmental, Inc. 2010) and Phase 2 Soil Background Report (United States Army Corp of Engineers [USACE] 2013). When the background concentration of a metal exceeds the screening value, then the background concentration for that metal is used as the screening value.

Arsenic is an exception to the methodology described for metals. Prior to the 2017 NMED SSL update, according to the December 18, 2013 letter from NMED (included as **Appendix D**) regarding the arsenic screening procedure, arsenic detections were to be compared to the specified site background reference of 5.6 milligrams/kilogram (mg/kg). If the detection was greater than 5.6 mg/kg, then it was compared to the site background range of 0.2 to 11.2 mg/kg. If the result exceeds 5.6 mg/kg, then the NMED SSL of 3.9 mg/kg (June 2012-December 2014) was used to assess risk, and an SSL of 4.25 mg/kg from December 2014 through March 2017. This procedure was adapted by NMED utilizing the two background studies completed at FWDA (Shaw 2010) (USACE 2013). Following the March 2017 NMED SSL update, arsenic was screened against the SSL of 7.07 mg/kg.

1 Antimony was another exception to the methodology described for metals. The screening  
2 value for antimony was established to be 95 percent of the upper tolerance limit for soil unit  
3 350 based on the 2012 soil background study conducted by USACE (USACE 2013).

- 4
- 5 • **NMED Residential SSLs:** The most current values were obtained at the time of sampling  
6 from the NMED Risk Assessment Guidance for Site Investigations and Remediation  
7 (<https://www.env.nm.gov/hazardous-waste/guidance-documents/>) (NMED 2012, 2014,  
8 2017). The lower of the values for the cancer and noncancer endpoints was selected. This  
9 guidance was updated periodically throughout the duration of the removal activities, and  
10 updates to screening practices were made as new residential SSLs became available (NMED  
11 2012, 2014, 2017).
  - 12 • **USEPA Residential RSLs:** If an NMED SSL does not exist for a constituent, the USEPA  
13 RSL was utilized. Values were obtained from the most current RSL Residential Soil Table  
14 (TR=1E-06, HQ=1) on the USEPA RSLs- Generic Tables database  
15 (<https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>) that was available at  
16 the time a sample was collected. This table was updated periodically throughout the duration  
17 of the removal activities, and updates to screening practices were made as new RSLs became  
18 available (USEPA 2013). USEPA RSLs based on a carcinogenic endpoint were adjusted by  
19 a factor of 10 to achieve the target cancer risk of 1E-05 (per NMED guidance).

### 20 3.1.1 Stockpile Soil Sampling Results

21 Stockpile soil samples were collected from 1,228 250 cubic yard stockpiles (1 sample per soil  
22 stockpile).

23 Organics were directly compared to the residential cancer and noncancer screening levels on a  
24 sample-by-sample basis. Inorganics, except arsenic, were directly compared to established  
25 background levels and the residential cancer and noncancer screening levels on a sample-by-  
26 sample-basis. Arsenic was compared directly to the established site background as directed in  
27 the December 18, 2013 letter from NMED prior to the 2017 SSL update. Following the update,  
28 arsenic was compared directly to the NMED SSL of 7.07 mg/kg.

29 No VOCs, SVOCs, polychlorinated biphenyls, cyanide, nitrates, or perchlorate were detected at  
30 concentrations exceeding the residential cancer or noncancer screening levels in the 1,228 soil  
31 samples analyzed.

32 Explosive constituent 2,4,6-Trinitrotoluene (TNT) was detected above residential screening  
33 levels in 9 of the 1,228 stockpile soil samples analyzed. Concentrations in excess of the SSL  
34 (39.1 mg/kg) ranged from 52 mg/kg to the site maximum of 3,000 mg/kg in stockpile number  
35 P3HWMU-SKPL-0160.

36 Dioxins/furans were detected above screening levels in 1 of the 1,228 stockpile soil samples  
37 analyzed. The calculated toxicity equivalence (TEQ) for all detected dioxin and furan

1 constituents was 47.0 nanograms per kilogram (ng/kg), which exceeded the residential cancer  
2 level of 45 ng/kg.

3 Metals were detected above screening levels/background concentrations in 2 of the 1,228  
4 stockpile soil samples analyzed. One sample exhibited exceedances of two different metals:  
5 arsenic was detected at a concentration of 7.4 mg/kg, which exceeded the residential cancer  
6 screening level of 7.07 mg/kg; and iron was detected at a concentration of 94,900 mg/kg, which  
7 exceeded the residential noncancer screening level of 54,800 mg/kg. Thallium was detected in  
8 another sample at a concentration of 1.5 mg/kg, which exceeded the residential noncancer  
9 screening level of 0.213 mg/kg.

10 The stockpile soil samples that exceeded SSLs are summarized in **Table 3-1**

### 11 **3.1.2 Confirmation Soil Sampling Results**

12 Confirmation soil samples were collected from 62 excavation sidewall or bottom locations.

13 Of the 62 confirmation soil samples collected and analyzed for VOCs, SVOCs, explosives,  
14 polychlorinated biphenyls, dioxins/furans, metals, cyanide, nitrate, and perchlorate, there were  
15 no laboratory detections that exceeded the residential cancer or noncancer screening levels.

## 16 **3.2 RISK SCREENING**

### 17 **3.2.1 Human Health**

18 This section describes the general approach that was used to complete a risk screening for the  
19 HWMU Removal of Parcel 3. Confirmation samples were collected from excavation sidewalls  
20 and bottoms, or from individual soil stockpiles. Per NMED Guidance (NMED 2012, 2014,  
21 2017), all detected organic compounds and metals exceeding background levels were compared  
22 to the NMED Residential SSLs. Risk screening tables for each collected soil sample are located  
23 in **Appendix B**.

24 Groundwater sampling was not required per the NMED approved workplan (URS 2013). No  
25 groundwater samples were collected as part of the HWMU removal activities; evaluation of  
26 groundwater was not completed as part of this risk screening.

27 There are no permanent surface water bodies present within the HWMU area; therefore,  
28 according to NMED guidance (NMED 2012, 2014, 2017), the surface water exposure pathways  
29 were considered incomplete, and a risk screening was not necessary.

30 The NMED SSLs and USEPA RSLs were updated several times throughout the life of the  
31 project. As a new update was released, the risk screening tables (**Appendix B**) were updated to  
32 reflect the most current screening levels available for future sampling. The risk screening levels  
33 for previously collected samples were not changed, as these samples had already undergone the

1 decision-making process (based on the risk screening) to be used as backfill or to be properly  
2 disposed if laboratory analysis indicated the sample exceeded SSLs.

### 3 **3.2.1.1 Target Risk Levels**

4 NMED SSLs are based on 1.0E-05 (1 in 100,000) target excess cancer risk or a target hazard  
5 quotient of 1.0 for noncarcinogens (NMED 2012, 2014, 2017). Exceeded NMED SSLs  
6 indicated that further evaluation of chemical concentrations and exposure assumptions may have  
7 been warranted.

### 8 **3.2.1.2 Potentially Exposed Populations**

9 NMED guidance provides screening criteria for three types of populations: residential,  
10 commercial/industrial, and construction workers. The residential screening values are generally  
11 the most conservative, especially for organic compounds; therefore, residential screening values  
12 were used to evaluate potential risks (URS 2013).

13 Some metals, such as manganese, have screening values that are more conservative for  
14 construction workers. Metals are initially screened against established background values.  
15 Generally, those metals with nonresidential screening values lower than residential screening  
16 values are lower than background. Therefore, background values would supersede the lower risk  
17 screening values. Background is further discussed in **Section 3.2.1.4**.

### 18 **3.2.1.3 Preliminary Screening Exposure Concentrations**

19 Concentrations were evaluated on a sample by sample basis. Therefore, the preliminary  
20 screening exposure concentration was the concentration of each chemical detected in a specific  
21 sample.

### 22 **3.2.1.4 Comparison to Background Concentrations**

23 For metals, sample concentrations were compared to established Fort Wingate HWMU  
24 background values from the 2009 background document (Shaw 2010). Arsenic and antimony  
25 are an exception. The arsenic value prior to the NMED 2017 SSL update was taken from a  
26 December 18, 2013 NMED letter (**Appendix D**). Following the 2017 update, arsenic is screened  
27 against the NMED SSL. The antimony value is the 95th percent UTL of soil unit 350 based on  
28 the 2012 background study conducted by USACE (USACE 2013). The background values are  
29 presented in the risk screening tables in **Appendix B**. Metals exceeding background values were  
30 included in the calculation of cumulative health risks (see **Section 3.2.1.5**). For further  
31 information about the arsenic and antimony screening procedures, see **Section 3.1**.

### 32 **3.2.1.5 Calculation of Cumulative Human Health Risk**

33 NMED guidance (NMED 2012, 2014, 2017) indicates that the potential cumulative risks and  
34 hazards should be considered in the screening evaluation to conclude whether further evaluation

1 may be necessary. Therefore, consistent with the guidance, screening was performed by  
2 comparing maximum chemical concentrations detected at the site with NMED SSLs. NMED  
3 has published SSLs for the residential scenario. In the absence of NMED SSLs, USEPA RSLs  
4 were selected (carcinogenic RSLs were adjusted to a risk of 1.0E-05 per NMED guidance,  
5 consistent with NMED SSLs). Both NMED and USEPA soil screening level tables have been  
6 updated several times since 2012. The specific NMED SSLs and USEPA RSLs used to evaluate  
7 a specific sample are identified in the footnotes of the risk screening tables in **Appendix B**.

8 SSLs for individual carcinogenic chemicals were based on a cancer risk of 1.0E-05. SSLs for  
9 individual noncarcinogenic chemicals were based on a hazard quotient of 1.0. Cumulative  
10 cancer risks and hazard indices were calculated for each sample as follows:

11 • Cumulative Cancer Risk =  $(C1/SSL1 + C2/SSL2 + \dots + Cn/SSLn) \times 1.0E-05$

12 • Cumulative Hazard Index =  $(C1/SSL1 + C2/SSL2 + \dots + Cn/SSLn) \times 1$

13 • Where:

14 – C1...Cn = Screening exposure concentration for chemical “1” to chemical “n.”

15 SSL1...SSLn = Soil screening level for chemical “1” to chemical “n” based on an  
16 SSL carcinogenic risk of 1.0E-05 or noncarcinogenic hazard of 1.0.

17 Site risks less than the NMED target level of 1.0E-05 and hazard indices less than the  
18 NMED target level of 1.0 indicate that concentrations at the site are unlikely to result  
19 in adverse health impacts.

### 20 **3.2.1.6 Risk Refinement**

21 In accordance with NMED risk guidance current at the time a sample was evaluated (NMED  
22 2012, 2014, 2017), if the hazard index was greater than 1.0, concentrations at the site were  
23 further evaluated.

24 A target organ/system assessment was completed if the cumulative hazard index for a sample  
25 exceeded 1.0 to determine if noncarcinogenic effects are additive. The process involved  
26 calculating hazard indices for each target organ or system and assessed whether the hazard index  
27 for an organ or organ system exceeds 1.0. Target organ/system assessments were completed as  
28 necessary throughout the reporting period.

### 29 **3.2.1.7 Evaluation of Lead Concentrations**

30 Exposure to lead can result in neurotoxic and developmental effects. The primary receptors of  
31 concern are children, whose nervous systems are still undergoing development and who also  
32 exhibit behavioral tendencies that increase their likelihood of exposure (e.g., pica). These effects  
33 may occur at exposures so low they may be considered to have no threshold and are evaluated  
34 based on a blood lead level (rather than the external dose as reflected in the reference  
35 dose/reference concentration methodology) (USEPA 1994, 1996, 1998, 2016). Therefore, the  
36 risk evaluation and toxicological approach used by USEPA and other agencies for lead is unique

1 from other chemicals. For residential exposures, USEPA recommends the Integrated Exposure  
2 Uptake Biokinetic (IEUBK) Model for Lead in Children for setting site-specific preliminary risk-  
3 based remediation goals. NMED guidance (NMED 2012, 2014, 2017) also recommends the use  
4 of the IEUBK model for the evaluation of lead exposure for children. The Adult Lead Exposure  
5 Model (ALM) is the model currently used by USEPA to evaluate adult exposures in the  
6 workplace and is based on a pregnant mother's capacity to contribute to fetal blood lead levels.  
7 The models for lead back-calculate to a soil concentration that would not exceed an estimated  
8 blood-lead concentration of 10 micrograms per deciliter. NMED guidance (NMED 2012, 2014,  
9 2017) also recommends the use of the ALM for the evaluation of adult exposures to lead. The  
10 NMED lead SSL for residential exposure is 4.00E+02 mg/kg. Hazard Quotients are not  
11 calculated for lead because there is no established threshold value. For screening, the maximum  
12 detected concentration is presented simply as a comparison with the receptor-specific SSL.  
13 Based on the screening comparison, no site lead concentrations exceeded background or the  
14 NMED residential SSL; therefore, the USEPA models were not run.

### 15 **3.2.1.8 Summary of Human Health Risk Screening**

16 A total of 1,128 stockpile samples and 62 confirmation soil samples were collected from 2012 to  
17 2018 during the removal activities and were evaluated for human health risks. Two samples had  
18 cancer risks in excess of 1.0E-05. Eleven samples had hazard indices that exceeded 1.0 for a  
19 target organ. **Table 3-3** identifies the samples that exceeded the target cancer risk and target  
20 hazard quotient values.

## 21 **3.3 MEC ITEMS AND MD RECOVERED**

### 22 **3.3.1 MEC Recovery Results**

#### 23 **3.3.1.1 MEC Recovered During Surface Sweeps**

24 Prior to the start of the HWMU mechanized recovery, surface sweeps were completed from  
25 within the HWMU, AOC, and clean stockpile area south of the HWMU fence. Forty-seven  
26 items were recovered from this area. Ten items discovered were determined to be unacceptable  
27 to move and were destroyed by detonation in place. All other items were considered acceptable  
28 to move and were transferred to the ECMs for disposal at a later date. The locations of each  
29 MEC item recovered during the surface sweeps are shown on **Figure 3-1**.

#### 30 **3.3.1.2 MEC Recovered During Processing**

31 A total of 19,560 MEC items were recovered from the MPPEH inspection lines of the processing  
32 plant. 132 items were determined to be unacceptable to move and were destroyed by detonation  
33 in the HWMU at the end of each day. All other items were considered acceptable to move and  
34 were transferred to the ECMs for disposal at a later date. MEC items discovered during recovery  
35 operations are logged each day on the Military Map Table. This table tracks all MEC items  
36 identified and recovered from within the FWDA Parcel 3 Inner Fence area. Since most items

were recovered from the inspection lines, the locations of these items could not reasonably be determined; therefore, the location of each item is listed as HWMU, without coordinates. For the purposes of the Status Report, the table has been reduced to only items located from within the HWMU recovery area. The table has been further reduced to MEC items recovered by year, as shown in **Appendices C.1 – C.6**. Due to a contract change, no removal operations were conducted from July 2015 through August 2017; therefore, there is no table for 2016.

- **Appendix C.1 – 2012**

- A total of 6 MEC items were identified and recovered from the HWMU in 2012.

- **Appendix C.2 – 2013**

- A total of 54 MEC items were identified and recovered from the HWMU in 2013.

- **Appendix C.3 – 2014**

- A total of 5,428 MEC items were identified and recovered from the HWMU in 2014.

- **Appendix C.4 – 2015**

- A total of 7,297 MEC items were identified and recovered from the HWMU in 2015.

- **Appendix C.5 – 2017**

- A total of 1,997 MEC items were identified and recovered from the HWMU in 2017.

- **Appendix C.6 – 2018**

- A total of 6,325 MEC items were identified and recovered from the HWMU in 2018.

### **3.3.1.3 MEC Recovered During DGM**

In 2018, seven MEC items were located during DGM clearance activities near grid C15. Further excavation was completed to recover these seven items, and DGM was reperformed for clearance following the excavations. The item locations are illustrated in **Figure 3-1**.

### **3.3.1.4 MDAS Recovered**

All metallic debris that was removed during the project was inspected and determined to be MDAS and flashed. Each batch of MDAS that was flashed was weighed prior to flashing to estimate the quantity of MDAS recovered during the work. Approximately 3.95 million pounds (1,975 tons) of MDAS were removed and flashed from 2012 to 2018. All MDAS generated was secured in lockable roll-off containers and shipped offsite for recycling. Each shipment of MDAS was accompanied by a Form 1348-1, documenting the material as MDAS, and a bill of lading.

## **3.3.2 MEC Disposal**

MEC disposal operations were supervised by the Senior Unexploded Ordinance Supervisor (SUXOS) and coordinated with the on-site Ordinance and Explosives Safety Specialist. All

1 explosive operations followed the procedures outlined in EM 385-1-97 (USACE 2008) and  
2 contractor SOPs. Transportation of donor explosives was conducted in accordance with  
3 applicable sections of 49 CFR Part 397. All appropriate notifications were made by the SUXOS  
4 prior to all MEC disposal operations.

5 Donor explosives were initiated by a radio-firing device, non-electric shock tube detonators, or  
6 electric blasting caps. Donor explosives, consisting of jet perforators or boosters, were obtained  
7 through an explosives vendor, and were stored in two ECMs.

8 After MEC disposal operations were completed, the UXO team conducted an inspection of the  
9 disposal area to confirm all explosives were consumed, and to conduct an MPPEH inspection on  
10 any remaining material.

### 11 **3.3.2.1 AN-M66A2 Bomb Discovery**

12 The discovery of an AN-M66A2, 2,000-pound general purpose bomb, which contained  
13 1,146 pounds of high explosive filler, exceeded the allowable quantity of explosives treated at  
14 the CAMU. The discovery led the Army to request an Emergency Permit for the Onsite  
15 Treatment of the bomb from the NMED. An Emergency Permit was issued to FWDA on  
16 May 12, 2015, permitting disposal of the bomb between May 20 and June 2, 2015.

17 The AN-M66A2 bomb was destroyed by controlled detonation at a location within the HWMU.  
18 Firing operations were initiated with a remote firing device and the bomb was destroyed at 10:43  
19 a.m. on May 20, 2015. Prior to completing the treatment activities, a Legal Notice was posted in  
20 the Notices section of the May 16, 2015 printing of the Gallup Independent.

**TABLE 3-1**  
**SSL EXCEEDANCES- STOCKPILE SOIL SAMPLES**  
**FORT WINGATE DEPOT ACTIVITY**  
**MCKINLEY COUNTY, NEW MEXICO**

Stockpile Sample Location	Date Sampled	Chemical in Exceedance of SSL	Result (mg/kg)	Residential SSL Cancer Endpoint* (mg/kg)	Residential SSL Noncancer Endpoint* (mg/kg)	Background Value**	Source (Update year)
0053	5/29/2014	2,4,6-Trinitrotoluene	59	-	39.1	-	NMED (2012)
0053	5/29/2014	TEQ***	47	45	-	-	NMED (2012)
0065	6/16/2014	2,4,6-Trinitrotoluene	610	-	39.1	-	NMED (2012)
0087	7/14/2014	2,4,6-Trinitrotoluene	130	-	39.1	-	NMED (2012)
0142	9/15/2014	2,4,6-Trinitrotoluene	71	-	39.1	-	NMED (2012)
0156	9/25/2014	2,4,6-Trinitrotoluene	67	-	39.1	-	NMED (2012)
0160	10/2/2014	2,4,6-Trinitrotoluene	3000	-	39.1	-	NMED (2012)
0178	10/14/2014	2,4,6-Trinitrotoluene	52	-	39.1	-	NMED (2012)
0423	8/16/2017	2,4,6-Trinitrotoluene	870	211	36	-	NMED (2017)
0483	8/23/2017	Arsenic**	7.4	7.07	13	5.6	NMED (2017)
0483	8/23/2017	Iron	94900	-	54800	22660	NMED (2017)
0732	3/14/2018	2,4,6-Trinitrotoluene	150	211	36	-	NMED (2017)
0799	4/23/2018	Thallium	1.5	NS	0.782	0.213	NMED (2017)

Notes:

\*Residential SSL Cancer and Noncancer Endpoints reflect the levels published in the NMED Risk Assessment Guidance for Site Investigations and Remediation document, or USEPA Regional Screening Levels (RSLs)- Generic Tables that was current at the time a sample was collected. These levels have been updated several times throughout the life of this project, which explains why an SSL may change over time.

\*\*Except for arsenic and antimony, background values are the 95% UTLs from the 2009 Background document. For antimony, the background value is the 95% UTL for soil unit 350ss based on the 2012 USACE background study. The New Mexico default value for arsenic is 7.07 mg/kg; however, Fort Wingate has site-specific values for arsenic. For arsenic, prior to the 2017 NMED SSL update, according to the December 18, 2013 letter from NMED regarding the arsenic screening procedure, arsenic detections were to be compared to the specified site background reference of 5.6 mg/kg. If the detection was greater than 5.6 mg/kg, then it was compared to the site background range of 0.2 to 11.2 mg/kg. If the result exceeds 5.6 mg/kg, then the NMED SSL of 3.9 mg/kg (June 2012-December 2014) was used to assess risk, and an SSL of 4.25 mg/kg from December 2014 through March 2017. This procedure was adapted by NMED utilizing the two background studies completed at FWDA by Shaw in 2009 and USACE in 2012. Following the March 2017 NMED SSL update, arsenic was screened against the SSL of 7.07 mg/kg.

\*\*\*The dioxin and furan result and screening values are presented in ng/kg. TEQ calculation and the TEFs are from the 2005 World Health Organization (WHO) dioxin toxicity equivalence factors (TEFs) to calculate dioxin toxicity equivalence (TEQ) at CERCLA and RCRA Sites. (Van den Berg, 2005 WHO Reevaluation of Human and Mammalian TEFs Toxicological Sciences 93(2):223-241, 2006)

mg/kg- milligrams per kilogram

ng/kg- nanograms per kilogram

NMED- New Mexico Environment Department

NS- No Standard

SSL- Soil Screening Level

RSL- Regional Screening Level

USACE- United States Army Corps of Engineers

USEPA- United States Environmental Protection Agency

"-" - No available value

**TABLE 3-2**  
**CHEMICAL DETECTION LIMITS GREATER THAN SSLs**  
**FORT WINGATE DEPOT ACTIVITY**  
**MCKINLEY COUNTY, NEW MEXICO**

<b>Analyzed Chemical</b>	<b>CAS Number</b>	<b>Residential Value (Cancer Endpoint) (mg/kg)</b>	<b>Residential Value (Noncancer Endpoint) (mg/kg)</b>	<b>Limit of Detection* (mg/kg)</b>	<b>Detection Limit* (mg/kg)</b>	<b>Source (Update Year)</b>
N-Nitrosodimethylamine	62-75-9	0.0226	-	0.036	0.024	NMED (2012)
N-Nitrosodimethylamine	62-75-9	0.0234	-	0.037	0.025	NMED (2014)
N-Nitrosodimethylamine	62-75-9	0.0234	0.493	0.035	0.025	NMED (2017)

Notes:

\*Value may vary.

mg/kg- milligrams per kilogram

NMED- New Mexico Environment Department

"-" - No reported value

**TABLE 3-3  
SUMMARY OF RISK SCREENING EXCEEDANCES  
FORT WINGATE DEPOT ACTIVITY  
MCKINLEY COUNTY, NEW MEXICO**

Sample Location	Date Sampled	Chemical in Exceedance of SSL	Result (mg/kg)	Residential SSL Cancer Endpoint* (mg/kg)	Residential SSL Noncancer Endpoint* (mg/kg)	Background Value**	Target Cancer Risk	Estimated Cancer Risk	Target Hazard Quotient	Estimated Hazard Quotient	Target Organ
SKPL0053	5/29/2014	Dioxin TEQ***	47	45	-	-	1.00E-05	1.04E-05			
SKPL0053	5/29/2014	2,4,6-Trinitrotoluene	59	-	39.1	-			1.00E+00	1.51	Liver
SKPL0065	6/16/2014	2,4,6-Trinitrotoluene	610	-	39.1	-			1.00E+00	15.6	Liver
SKPL0087	7/14/2014	2,4,6-Trinitrotoluene	130	-	39.1	-			1.00E+00	3.32	Liver
SKPL0142	9/15/2014	2,4,6-Trinitrotoluene	71	-	39.1	-			1.00E+00	1.82	Liver
SKPL0156	9/25/2014	2,4,6-Trinitrotoluene	67	-	39.1	-			1.00E+00	1.71	Liver
SKPL0160	10/2/2014	2,4,6-Trinitrotoluene	3000	-	39.1	-			1.00E+00	76.73	Liver
SKPL0178	10/14/2014	2,4,6-Trinitrotoluene	52	-	39.1	-			1.00E+00	1.33	Liver
SKPL0423	8/16/2017	2,4,6-Trinitrotoluene	870	211	39.1	-	1.00E-05	4.12E-05	1.00E+00	2.42	Liver
SKPL0483	8/23/2017	Arsenic**	7.4	7.07	13	5.6					GI, Heart, Brain, Kidney
SKPL0483	8/23/2017	Iron	94900	-	54800	22660			1.00E+00	1.73	GI
SKPL0732	3/14/2018	2,4,6-Trinitrotoluene	150	211	36	-			1.00E+00	4.14	Liver
SKPL0799	4/23/2018	Thallium	1.5	NS	0.782	0.213			1.00E+00	1.92	Hair, Eyes, Skin

Notes:

\* Residential SSL Cancer and Noncancer Endpoints reflect the levels published in the NMED Risk Assessment Guidance for Site Investigations and Remediation document, or USEPA Regional Screening Levels (RSLs)- Generic Tables that was current at the time a sample was collected. These levels have been updated several times throughout the life of this project, which explains why an SSL may change over time.

\*\*Except for arsenic and antimony, background values are the 95% UTLs from the 2009 Background document. For antimony, the background value is the 95% UTL for soil unit 350ss based on the 2012 USACE background study. The New Mexico default value for arsenic is 7.07 mg/kg; however, Fort Wingate has site-specific values for arsenic. For arsenic, prior to the 2017 NMED SSL update, according to the December 18, 2013 letter from NMED regarding the arsenic screening procedure, arsenic detections were to be compared to the specified site background reference of 5.6 mg/kg. If the detection was greater than 5.6 mg/kg, then it was compared to the site background range of 0.2 to 11.2 mg/kg. If the result exceeds 5.6 mg/kg, then the NMED SSL of 3.9 mg/kg (June 2012-December 2014) was used to assess risk, and an SSL of 4.25 mg/kg from December 2014 through March 2017. This procedure was adapted by NMED utilizing the two background studies completed at FWDA by Shaw in 2009 and USACE in 2012. Following the March 2017 NMED SSL update, arsenic was screened against the SSL of 7.07 mg/kg.

\*\*\* The dioxin and furan results and screening values are presented in ng/kg. TEQ calculation and the TEFs are from the 2005 World Health Organization (WHO) dioxin toxicity equivalence factors (TEFs) to calculate dioxin toxicity equivalence (TEQ) at CERCLA and RCRA sites. (Van den Berg, 2005 WHO Reevaluation of Human and Mammalian TEFs Toxicological Sciences 93(2): 223-241, 2006)

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

GI - Gastrointestinal

mg/kg - milligrams per kilogram

ng/kg - nanograms per kilogram

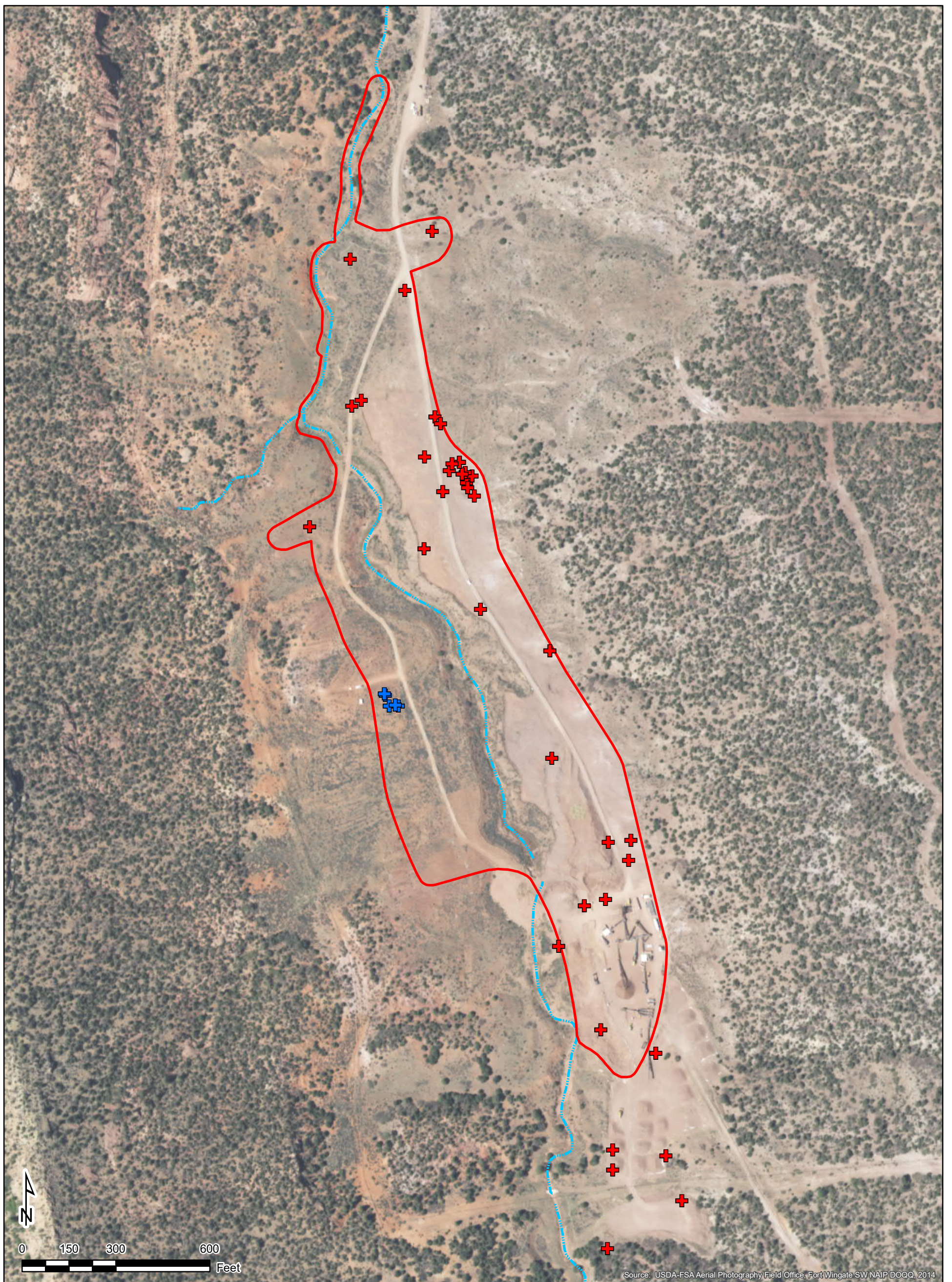
NMED - New Mexico Environment Department

NS - No Standard

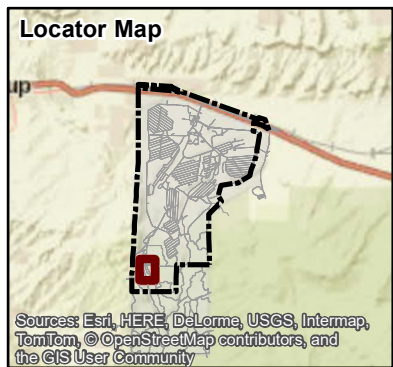
RCRA - Resource Conservation and Recovery Act

SSL - Soil Screening Level

"-" - No available value



Source: USDA-FSA Aerial Photography Field Office, FortWingate SW NAIP DOQQ 2014



- Legend**
- Installation Boundary
  - HWMU Boundary
  - · — · — Arroyo
  - + MEC (Surface Sweep)
  - + MEC (Post-Excavation DGM Dig)

<b>Surface Sweep and Post-Excavation Recovered MEC Fort Wingate Depot Activity McKinley County, New Mexico</b>	
Drawn By: JZ	Date: 3/25/2020
Checked By: GB	Project No. 60517380

**Figure 3-1**

Sources: Esri, HERE, DeLorme, USGS, Intermap, TomTom, © OpenStreetMap contributors, and the GIS User Community

1 Remedial activities at the FWDA Parcel 3 HWMU area have been in operation from 2011 to  
2 current; however, operations ceased from late 2015 through the middle of 2017 as the initial  
3 work contract ended and a new work contract was awarded to AECOM (formerly URS). As  
4 such, there was no MEC recovery or soil sampling completed during the year 2016. This  
5 HWMU Status Report discusses data collected from 2012 through 2018. A following Status  
6 Report will be submitted for 2019.

7 The NMED SSLs and USEPA RSLs have been updated several times throughout the duration of  
8 the FWDA removal activity. As a new update was released, the risk screening tables were also  
9 updated. The risk screening was conducted using the most current SSL/RSL at the time a sample  
10 was collected.

11 A total of 1,228 stockpile soil samples and 62 confirmation soil samples were collected from  
12 2012 through 2018. Of the combined 1,290 samples collected from the HWMU area, 12 samples  
13 exceeded residential screening levels. Nine samples exceeded screening levels for TNT, ranging  
14 from 52 mg/kg to 3,000 mg/kg. Other detections that exceeded residential screening levels  
15 included dioxins/furans (47.0 ng/kg TEQ), arsenic (7.4 mg/kg), iron (94,900 mg/kg), and  
16 thallium (1.5 mg/kg). All exceedances were detected in stockpile soil samples and were properly  
17 disposed of at a nearby landfill. No hazardous waste was generated from within the HWMU  
18 during the 2012 through 2018 removal activities. There were no exceedances of residential  
19 screening levels from the confirmation soil samples. Stockpile soil samples and confirmation  
20 soil samples that exceeded SSLs are summarized in **Tables 3-1** and **3-2**, respectively.

21 Risk screening was performed on all samples collected from the soil stockpiles and the  
22 confirmation samples. Two samples exhibited cancer risks in excess of 1.0E-05. Twelve  
23 samples exhibited a hazard index that exceeded 1.0 for a target organ; however, one of the  
24 samples that exceeded the 1.0 hazard index did not have any single chemical exceed 1.0, but the  
25 sum of several chemicals' hazard indices exceeded 1.0. A summary of the soil samples that  
26 exceeded risk screening levels is included in **Table 3-3**.

27 MEC recovery operations effectively identified and removed a total of 21,107 MEC items from  
28 the HWMU area. Most items were properly destroyed within the CAMU area; however, items  
29 that were designated unacceptable to move were detonated within the HWMU. MEC recovery  
30 and disposal operations were conducted by authorized on-site UXO technicians.

31 A total of 3.95 million pounds (1,975 tons) of MD was removed, inspected, designated as  
32 MDAS, flashed, and recycled.

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1

A.1 – Stockpile Soil Sampling Results

1

A.2 – Confirmation Soil Sampling Results



1

B.1 – Stockpile Soil Sampling Risk Tables

1

B.2 – Confirmation Soil Sampling Risk Tables



1

C.1 – 2012 MEC Recovered

1

C.2 – 2013 MEC Recovered

1

C.3 – 2014 MEC Recovered

1

C.4 – 2015 MEC Recovered

1

C.5 – 2017 MEC Recovered

1

C.6 – 2018 MEC Recovered

