Technical Memorandum

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Prepared For:	**Army Base Realignment and Closure Directorate**
Subject:	**Parcel 3 Arroyo Sweep Work Plan**
Site:	**Unnamed Arroyo Exiting HWMU, Fort Wingate Depot Activity, NM**
Date:	**March 26, 2026**

1.0 INTRODUCTION

This Arroyo Sweep Work Plan (WP) was prepared for the "arroyo sweep" to be performed as part of the Munitions and Explosives of Concern (MEC) Remediation Project at Parcel 3, located within the Fort Wingate Depot Activity (FWDA), McKinley County, New Mexico (see **Figure 1**). The project will be conducted by GSIA-Parsons JV LLC (GSIA-Parsons) per requirements specified by New Mexico Environment Department (NMED) request via e-mail communication on 28 June 2024.

This WP is provided to NMED as an update to the previous NMED-approved Arroyo Sweep Work Plan (AECOM, 2024). The procedures outlined in this WP are to be implemented for the arroyo sweeps to be conducted on an annual basis in calendar years 2026 through 2030. Annual sweeps of the arroyos will be conducted to limit offsite migration of MEC.

This WP presents the technical approach for the surface and subsurface removal of MEC and Material Potentially Presenting an Explosive Hazard (MPPEH) within the arroyo downgradient of the 209A gate (immediately outside of the Inner Fence) in Parcel 3 (referred to as "arroyo sweep"). The arroyo sweep area for this project consists of the previous 2024 arroyo sweep area, which starts outside of the Hazardous Waste Management Unit (HWMU), near the 209A gate, and extends downgradient to the north for approximately 4 miles (see **Figure 2**). The fieldwork will consist of analog geophysical surveys, anomaly resolution, MEC disposal via explosives demolition (blow-in-place [BIP] or disposal at the Corrective Action Management Unit [CAMU]), Material Documented as Safe (MDAS) management and disposal, munitions constituent (MC) sampling at BIP locations, and soil removal (if necessary).

1.1 BACKGROUND

FWDA's mission, beginning in 1940, was primarily to receive, store, maintain, and ship explosives and military munitions, as well as disassemble and dispose of unserviceable or obsolete explosives and other military munitions. In 1993, the installation closed due to Base Realignment and Closure (BRAC). FWDA is currently undergoing final environmental characterization and restoration activities prior to final property transfer and reuse.

FWDA has two munitions disposal hazardous waste management units (hereinafter referred to as "units") permitted under its Resource Conservation and Recovery Act (RCRA) permit, the inactive Open Burn/Open Detonation (OB/OD) unit, also referred to as the HWMU, and the active CAMU (see **Figure 2**). The OB/OD unit was used for the destruction and desensitization of MEC by OB/OD while it was operational and the CAMU is currently being used for the same purpose.

Historically, MEC were expelled or "kicked out" beyond the boundaries of the OB/OD unit (PIKA-Pirnie JV, 2015). This resulted in the deposition of munitions in the arroyo adjacent to the OB/OD unit. Due to the high potential for stormwater erosion in the arroyo, any MEC present is subject to migration.

The following sections describe the previous sweep results, technical approach, field methods and procedures to be implemented for the arroyo sweeps, including risk screening, waste management, quality control (QC), and reporting requirements to be implemented for the arroyo sweeps.

1.2 PREVIOUS ARROYO SWEEP RESULTS

In August and September 2024, a sweep was conducted in the arroyo starting at 209A gate and extending downgradient to the north for approximately 4 miles (see **Figure 3**). A total of 193 MEC items were identified during the arroyo sweep at depths ranging from 0 to 18 inches below ground surface (bgs); eight of the MEC items were determined to be unacceptable to move and BIP was performed. The remaining MEC items were moved to Earth Covered Magazines (ECMs) for later disposal at the CAMU. The recovered MEC locations are shown in **Figure 3,** and a summary of MEC found is presented in **Table 1**.

A composite soil sample was collected from each of the eight BIP locations and analyzed for explosives by United States (U.S.) Environmental Protection Agency (EPA) Method 8330B. At one BIP location, 2,4,6-trinitrotoluene (2,4,6-TNT) was detected in sample P2-ARROYO-0005 (collected on 21 September 2024) at a concentration of 38 milligrams per kilogram (mg/kg), which exceeded the NMED residential soil screening level (SSL) noncancer endpoint of 36 mg/kg. Approximately 3 inches of surface soil was removed from the demolition crater and from 1 foot around the BIP location and containerized for offsite disposal. After soil removal, a second sample (P2-ARROYO-0005-002) was collected on 2 December 2024 from the same BIP location and analyzed for explosives. 2,4,6-TNT was detected in P2-ARROYO-0005-002 at a concentration of 830 mg/kg, which exceeded the residential SSL noncancer endpoint of 36 mg/kg and the residential SSL cancer endpoint of 211 mg/kg. As a result, an additional 6 inches of soil was removed from throughout the BIP location and containerized for offsite disposal. A third (confirmation) sample (P2-ARROYO-0005-003) was collected on 16 December 2024 from the same BIP location and analyzed for explosives by EPA Method 8330B. Explosives, including 2,4,6-TNT, were not detected in sample P2-ARROYO-0005-003. Approximately 160 pounds of soil removed from the BIP location was disposed of at the Northwest New Mexico Regional Solid Waste Landfill. The 2024 arroyo sweep results are available in the Arroyo Sweep Completion Report (AECOM, 2025) submitted to NMED in February 2025.

2.0 ARROYO SWEEP APPROACH

The arroyo sweep will begin immediately outside of the inner fence at the 209A gate and extend downgradient in the arroyo for a quarter mile past the location of the furthest MEC encountered during the 2024 sweep (approximately 4 miles). The arroyo sweep will include the arroyo bottom and up the arroyo banks to the apparent high-water line, which is the extent of previous stormwater

flow determined by visual observations of the local topography, indications of erosion, and/or locations of stormwater-carried debris/detritus. If the high-water line is not apparent, the sweep will extend 4 feet from the intersection of the edge of the arroyo bottom and the arroyo bank. The location of the arroyo sweep area is shown in **Figure 2**. If MEC is encountered within the quarter mile buffer, the arroyo sweep will continue at quarter mile increments from the last MEC location until no MEC is encountered within the increment or at the intersection of the arroyo and Navajo Boulevard, whichever comes first.

The arroyo sweep will be conducted using an analog survey and removal approach (i.e., "mag and dig" or "mag, flag, and dig"). Unexploded Ordnance (UXO) Technicians (Techs) will locate and remove metallic anomalies such as MEC, MPPEH, and non-munitions related debris (NMRD) using an analog all-metals detector (Minelab E-TRAC, CTX3030, or equivalent) up to the equipment's maximum reliable detection depth as determined during Instrument Test Strip (ITS) testing. **Table 2** presents the anticipated maximum detection depth which is based on the munitions size and orientation and physical properties of the soil. Refer to **Section 2.2** for details on the sweep methodology.

2.1 INSTRUMENT TEST STRIP

An ITS will be installed in an area free of anomalies prior to the arroyo sweep to verify the geophysical system (i.e., individual instrument operator and equipment) are functioning properly. The ITS will be installed in the vicinity of the arroyo and exact location will be determined at the start of field operations. Additional ITS locations may be established to facilitate field operations, as necessary. The ITS will consist of three industry standard objects (ISOs) (i.e., steel pipe nipples), including a small ISO buried at 8 inches, a medium ISO buried at 15 inches, and a large ISO buried at 30 inches. The initial ITS testing will establish the maximum reliable detection depth, instrument settings and sweep height. The results of the initial ITS testing will be summarized in an ITS memorandum for review by the U.S. Army Corps of Engineers (USACE) Project Geophysicist and USACE Ordnance and Explosives Safety Specialist (OESS). The ITS memorandum may be addended if new munitions types are discovered during sweep operations. The Conceptual Site Model for the site would also need to be updated to reflect any new munitions types found at the site (types, depth found, etc.). Potential updates to the Explosives Safety Submission would also need to be evaluated to determine if the munition with the greatest fragmentation distance has changed. Daily operator and equipment testing will occur at the ITS at the beginning of fieldwork activities. The daily test results will be documented on the Daily Operator Test Report (DOTR) for each operator and verified by the UXO Team Leader or Senior UXO Supervisor (SUXOS) prior to sweep operations. The UXO Quality Control Supervisor (UXOQCS) will also perform periodic inspections to verify compliance.

2.2 SWEEP PROCEDURES

Upon mobilization, the UXO team will hold indoctrination training to review the WP and receive training on potential biological and cultural resources that may be encountered during the arroyo sweep. Training will be provided by GSIA-Parsons biological/cultural resource specialists and

will be based on the findings of cultural resource surveys and tribal consultations and biological surveys conducted by USACE. If sensitive resources are encountered, the UXO Team Leader will contact the SUXOS, who will in turn contact the USACE OESS. The USACE OESS will notify the Army personnel.

Prior to arroyo sweep operations, blind seeds will be placed using mapping grade Global Positioning System (GPS) equipment to test operator detection proficiency and verify proper coverage. The UXOQCS will place blind QC seeds at a frequency that allows for the sweep team to encounter an average of three seeds per day. The seed locations will be firewalled from non-QC project personnel. QC seeding operations will conform to the reliable detection depths determined during ITS testing. The UXOQCS will monitor the UXO team's recovery of the blind seeds and document the results in the QC Seed Log and Daily QC Reports. If a seed is not recovered, root cause analysis (RCA) will be performed, and corrective action (CA) will be implemented.

The sweep team will consist of six UXO Tech IIs and a UXO Tech III Team Leader. A SUXOS and UXO Safety Officer (UXOSO), and UXOQCS will provide oversight. The team will establish a sweep line in an echelon formation maintaining approximately 5-foot-wide sweep lanes between each sweep team member. The lead and last person on the sweep line will also be equipped with mapping grade GPS recording track plots within ArcGIS FieldMaps demonstrating the areas swept. Variations in sweep lane coverage will only occur when terrain and vegetation make deviations unavoidable and necessary. Obstructions preventing full coverage of a sweep lane will be documented (e.g., nature and magnitude of deviation) via GPS. During the sweep, the UXO Techs will scan each lane using an all-metals detector to identify surface debris and subsurface anomalies, stopping at each visually identifiable item or audible sound and either place a non-metallic pin flag or investigate the anomaly. The UXO Techs will maintain sufficient separation distance to not cause interference between the two detectors when personnel are sweeping in the same area.

Detected surface and subsurface anomalies will be removed in accordance with (IAW) Engineer Manual (EM) 385-1-97. Once the anomaly has been located, it will be visually inspected and/or excavated. If MPPEH is identified, it will be assessed for explosives hazards by qualified UXO Techs, one of whom will be UXO Tech III qualified. Refer to **Section 2.3** for MPPEH identification and management procedures. As items are recovered, their depths, classification (e.g., MEC, munitions debris [MD], NMRD), and descriptions will be documented on the dig sheet. Documentation requirements for encountered MEC are discussed in **Section 2.4.1**. A photograph will be collected for each MEC item as well as the daily representative collection of MD and NMRD encountered. Once the anomaly source has been removed, the UXO Tech will recheck the subsurface anomaly locations to verify the source was completely removed and to ensure it was not masking deeper anomalies. After the anomaly location is resolved, the hole will be backfilled with the excavated soil.

2.3 MPPEH MANAGEMENT

The purpose of MPPEH management is to locate and inspect MPPEH to determine its explosives safety status for disposal then consolidate, certify, and transfer MDAS to a qualified receiver. MPPEH is managed in strict compliance with EM 385-1-97, Department of Defense (DoD) Instruction (DoDI) 4140.62 (DoD, 2019), DoD Manual (DoDM) 4140.72 (DoD, 2021), and State of New Mexico requirements. Only qualified UXO Techs can identify and determine the explosives safety status of MPPEH found during field activities. MPPEH will initially be 100 percent (%) inspected by a UXO Tech II and a UXO Tech III to confirm if the items present an explosive hazard. If no explosive hazards are present, the SUXOS and the UXOQCS will conduct another 100% re-inspection of the material and certify the material as MDAS.

MPPEH items determined to be MEC will undergo explosive demolition operations. MPPEH items determined to be free of explosive hazards will be certified as MDAS as described in **Section 2.5.** MDAS will be secured in a locked container and stored in a holding area until final disposition. The container will clearly be labeled on the outside with the following information: Unique identification that will start with USACE/Installation Name/Contractor's Name/0001/Seal's unique identification and continue sequentially for each additional container used. The seal will be attached in such a manner that the container cannot be opened without damaging the seal.

2.4 MEC DOCUMENTATION AND DISPOSAL OPERATIONS

2.4.1 MEC DOCUMENTATION

Once an item is confirmed as MEC, the item will be marked with a pin flag, location recorded via mapping grade GPS, and recorded with the following information in the MEC Accountability Log:

- Assigned item number;
- Date encountered;
- Type of munitions item, including nomenclature, if possible;
- Coordinates of item's location;
- Depth;
- Planned disposition (i.e., BIP or CAMU); and
- Date of disposal.

A photograph will be collected of each MEC encountered. The MEC will either be photographed in-situ if the planned disposition is by BIP, or on a whiteboard if the planned disposition is at the CAMU.

2.4.2 MEC DISPOSAL OPERATIONS

All MEC encountered during the arroyo sweep will be properly disposed of by explosives demolition (i.e., BIP or in the CAMU). If the MEC is determined to be safe to move by the SUXOS

and UXOSO, it will be transported to the designated ECM in B Block for later destruction at the CAMU. If the MEC is determined unsafe to move, a BIP disposal will be performed.

Explosive disposal operations are performed on the MEC item to render all potentially explosive materials safe for offsite disposal as MDAS. Donor explosives will be procured prior to the start of the arroyo sweep and will be stored in a designated ECM in B Block. Inventories will be performed on all donor material received and used throughout the project as well as all items disposed. All MEC will either be destroyed the same day it is recovered, secured in an ECM, or the item(s) will be guarded until they are destroyed. MEC disposal operations will be supervised by the SUXOS and coordinated with the USACE OESS and other site contractors, if applicable. MEC disposal operations will be conducted IAW the procedures outlined in EM 385-1-97.

2.4.3 CORRECTIVE ACTION MANAGEMENT UNIT OPERATIONS

The CAMU, located in Parcel 3, SWMU 14, is operated under Section IX of the FWDA RCRA Permit (NMED, 2015). The CAMU will be used for MEC destruction, either by burning or by detonation. CAMU operations will be conducted IAW the *Final Corrective Action Management Unit (CAMU) Management Plan*, dated 27 June 2025 (USACE, 2025).

The amount of MEC treated at the CAMU will not exceed 200 pounds of net explosive weight (NEW) per event IAW the FWDA RCRA Permit. Treatments will not exceed 1,000 pounds NEW in any seven-day period. Recordkeeping will be IAW with the CAMU Management Plan.

2.5 MDAS DISPOSITION

The SUXOS will certify the MDAS is free of explosive hazards and the USACE OESS, or UXOQCS if the USACE OESS is not on site, will verify the MPPEH inspection process has been followed and appropriate for certification as MDAS. The Form 1348-lA, Issue Release/Receipt Document, will be used to document the description of the container and be the certification documentation for each container. The Form 1348-lA will include the names, organization, phone numbers, and signatures of the SUXOS and UXOQCS certifying and verifying the debris as free of explosive hazards.

The chain of custody (COC) of the materials will be maintained from certification/verification through final disposition. The MDAS will be released under COC to a smelter/recycler who will provide documentation of the receipt and final disposition of the material.

2.6 SCHEDULE

The arroyo sweeps will be conducted on an annual basis in calendar years 2026 through 2030. Because the purpose of the arroyo sweeps is to remove surface and shallow subsurface MEC exposed by erosion from the current year's monsoon rains, the arroyo sweeps will be conducted after the monsoon season, which runs from approximately 15 June through 30 September. Work in the arroyos will be scheduled for periods when the forecast is for dry conditions so standing or flowing water in the arroyos does not interfere with the ability to detect and remove surface or subsurface MEC.

3.0 SOIL SAMPLING APPROACH

Composite soil samples will be collected from locations where a BIP MEC disposal was performed to determine if an MC (explosives) release occurred as a result of the MEC disposal operation. Each composite sample will be comprised of 12 subsamples collected from the impacted surface soils observed within and adjacent to the disposal crater remaining after each MEC BIP. The 12 subsamples will be collected from 0 to 6 inches bgs and consist of six subsamples collected from within the crater and six subsamples collected from the surface soils immediately surrounding each crater. The subsamples will be composited into a single sample for that MEC BIP location.

As the arroyo sweep MEC clearance nears completion, GSIA-Parsons will mobilize a MC sampling team to collect soil samples at all BIP locations. A UXO escort will conduct anomaly avoidance during sampling activities to locate a safe access route that is free of munitions-related hazards IAW USACE EM 385-1-97 (USACE, 2013a). Sampling in these areas will only occur after MEC items are removed and the area is deemed safe by UXO-qualified personnel.

Samples will be analyzed for explosives analytes listed in **Table 3** by EPA Method 8330B. Sample volumes, container specifications, preservation requirements, and maximum holding times are identified in **Table 4**. The sample matrices, number of samples, and the number and types of quality assurance (QA)/QC samples are included in **Table 5**. All samples will be properly labeled and packaged carefully to avoid breakage or cross contamination.

The soil sampling results will be validated and compared to human health screening levels (HHSLs) for explosives (**Table 6**) as described in **Section 4.0**, to confirm if MC at the locations are less than the screening levels. If explosives are detected above HHSLs in soil from the BIP location, then the soil will be removed vertically to a depth of 3 inches and horizontally to 1 foot beyond the extent of the BIP location. Once the contaminated soil at the MEC disposal location is removed, confirmation soil samples will be collected to verify that the MC contamination has been removed, and contaminants are below screening levels. Confirmation sample aliquots will be collected from the bottom and sides of the excavation where the soil is removed. If the confirmation samples exceed the screening levels, further excavation would continue followed by confirmation sampling until contaminant levels in the soil are below the project screening levels in **Table 6**. Excavated soil will be disposed of IAW **Section 5.0** Waste Management.

If non-disposable sampling equipment is used, decontamination will be performed to prevent cross-contamination between sampling locations. Equipment will be decontaminated by removing as much debris or contamination as possible using a dry brush or paper towel and the sampling equipment will be washed with distilled/deionized water and Liquinox® (or equivalent) detergent. Liquid investigation-derived waste (IDW) from decontamination will be containerized and disposed as described in **Section 5.0** Waste Management.

4.0 SOIL SAMPLE RISK SCREENING

The results of the soil sample analyses collected from MEC BIP locations will be evaluated using NMED Risk Guidance (NMED, 2022) as described in **Section 4.1**.

4.1 HUMAN HEALTH SCREENING

Concentrations of explosives detected in soil samples will be compared with the residential HHSLs shown in **Table 6**, which are based on NMED screening values presented in Table A-1 of the NMED guidance (NMED, 2022) and EPA Regional Screening Levels (RSLs) as described below.

- NMED Residential SSLs: The most current values from the NMED Risk Assessment Guidance for Site Investigations and Remediation, as presented in **Table 6** will be used (NMED 2022). The lower of the values for the cancer and noncancer endpoints will be selected as the screening value.
- EPA Residential RSLs: If an NMED SSL did not exist for a constituent, the EPA RSL was utilized as presented in **Table 6**. Values were obtained from the most current RSL Residential Soil Table (target cancer risk [TR]=1E-06, target hazard quotient [THQ] =1.0) on the EPA RSLs- Generic Tables database (EPA, 2024). The lower of the values for the cancer and noncancer endpoint will be used as the screening value. EPA RSLs based on a carcinogenic endpoint were adjusted by a factor of 10 to achieve the target cancer risk of 1E-05 IAW NMED guidance.

If explosives are detected at concentrations greater than the selected HHSLs, soil will be removed as described in **Section 3.0**.

5.0 WASTE MANAGEMENT

Several different types of waste may be generated during the field activities and will be managed and disposed of IAW local, state, and federal regulations. Based on the planned activities, the potential types of waste that are anticipated to be generated during field operations include:

- Trash – items such as personal protective equipment (PPE), plastic/paper bags, cardboard, plastic containers, and paper;
- Sampling Materials – items used for sample collection such as scoops;
- Munitions-Related Waste – metallic debris that has been certified as MDAS prior to offsite transport and disposal;
- Excavated Soil – excavated MC-contaminated soil for offsite disposal, if applicable; and
- Liquid waste generated as part of decontamination procedures during sampling, if applicable.

No hazardous waste is expected to be generated as of the date of this document.

5.1 SOLID WASTE

In general, generation of waste will be kept to a minimum, and every effort will be made to segregate and recycle materials where appropriate. Potential solid waste that may be generated during the field operations includes solid waste trash, PPE, munitions-related waste, excavated soil, and residual soil on reusable sampling equipment from sampling activities.

5.1.1 TRASH

Trash consisting of plastic/paper bags, cardboard, plastic containers, and paper that are not used for collection of samples can be disposed of in municipal waste receptacles specifically designated by the FWDA and/or USACE. Likewise, construction debris (e.g., stakes, flagging, expended paint cans) and general office-type trash generated in the field will be segregated and disposed of or recycled consistent with the method used for municipal solid waste (i.e., non-hazardous domestic trash). Disposal of significant volumes of trash items will only occur at receptacles designated by FWDA/USACE for the duration of the project.

5.1.2 SAMPLING MATERIALS

Every effort will be made during field operations to collect the minimum amount of soil necessary to obtain a representative sample volume that fills the sample container(s) with limited to no excess soil remaining as IDW. Disposable sampling equipment will be preferred for use during field activities, minimizing the need for liquid decontamination and generation of liquid IDW. Disposable sampling materials used during sample collection are considered IDW that have been in incidental contact with sample media. However, due to the removal of surficial media by dry decontamination procedures, residual soil mass will be minimal or absent. The condition of the IDW will not meet the characteristics of ignitability, reactivity, or corrosivity. In addition, any residual adhering media will be insufficient to result in the soil/material IDW exceeding toxicity characteristic leaching procedure (TCLP) levels for individual analytes. Therefore, disposable sampling items and PPE will be assumed as non-hazardous and disposed consistent with solid waste trash.

Although not anticipated for this project, if reusable sampling equipment is used, such as stainless-steel scoops and hand augers, it will undergo a gross, dry decontamination to remove any residual solids, followed by decontamination with fluids.

5.1.3 EXCAVATED SOIL

Following soil sampling activities at BIP MEC disposal locations, if MC-contaminated soil is determined to be present, the soil will be excavated and disposed. MC-contaminated soil will be removed using hand shovels and placed into 55-gallon drums. Characterization samples will be collected from the drummed soil and tested for Federal requirements and specific landfill disposal acceptance criteria to ensure proper waste characterization and disposal. Upon characterization, GSIA-Parsons will notify USACE personnel regarding proper management and disposal options. Designated USACE personnel will sign as the waste generator. Once signed, the profiles will be sent to the approved disposal facility to obtain the manifests for transportation and disposal. The soil drums will be transported by a licensed transport company to an approved disposal facility IAW applicable local standards and Federal transportation regulations. Waste disposal is described in **Section 5.5**.

5.1.4 MUNITIONS-RELATED WASTE

Non-hazardous munitions-related waste (i.e., MD) recovered or resulting from field investigation activities and explosive disposal operations will be handled by UXO-qualified personnel and

managed IAW EM 385-1-97 (USACE, 2013a). Although MEC items are hazardous, once disposed of via demolition, the remaining material requiring disposal will be scrap metal. All MDAS certified items will be stored in locked drums and/or inside a locked metal container. The storage location at each point of waste generation will be coordinated with and approved by USACE and FWDA personnel. Each container will be properly stored, labeled, secured, and inventoried for subsequent offsite disposal.

The local fire and police departments may be notified of the location and types of materials stored, as appropriate, until final disposition of the materials is complete. Records will be maintained for all recycled scrap metal generated during the field activities, including inspections, explosive free certification, government property transfer form, and disposal facility receipt and treatment certifications for MDAS final disposition.

Detailed procedures regarding MPPEH inspections, demolition, certification, and disposition of MDAS are provided in and the Explosives Safety Submission (USACE, 2013b).

5.2 LIQUID WASTE

Although not anticipated, if non-disposable equipment is used for sampling, then it will be decontaminated following each use. A stiff, nylon-bristle brush will be used to remove any dirt adhering to the tools. Additional decontamination will be performed using a three-phase procedure with a non-phosphate detergent and rinsate water (potable and distilled). The volumes of decontamination liquids are not anticipated to be significant for sampling decontamination activities (not greater than five gallons). Decontamination fluids (if generated) will be containerized at the sample site in clean buckets and/or tanks with a watertight lid. Depending on the volumes generated, decontamination water from multiple sample locations 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.

5.3 IDW LABELING

Containers of IDW will be appropriately identified with weather resistant labels marked with a paint pen. Information provided on the label will include the project name, generation date, point of contact (including name and phone number), location of the IDW origin, unique assigned container number, applicable sample number, and a description of the IDW contents. Following characterization of the waste, the label will identify the contents as either non-hazardous or hazardous.

5.4 WASTE STORAGE

The storage location at each point of generation will be coordinated with and approved by FWDA and USACE personnel. The local fire and police departments may be notified of the location and types of materials stored, as appropriate, until final disposition of the materials is complete.

All necessary documentation regarding receipt of waste at the designated facilities will be obtained to provide a complete record of waste management to FWDA and USACE, as applicable.

5.5 TRANSPORTATION AND DISPOSAL PROCEDURES

5.5.1 NON-HAZARDOUS WASTE

Non-hazardous solid waste materials, such as trash and general debris, will be removed and transported off site for disposal through the municipal waste system. Routine disposal of municipal solid waste (at least weekly) will be performed to avoid incurring excess waste storage within the work area. If applicable, all excavated soil and non-hazardous decontamination water drums will be packaged, labeled, marked, and manifested according to applicable state and Federal regulations. The waste manifests will be approved by and provided to the FWDA prior to and following transport and disposal of the waste at the appropriate waste disposal facility.

5.5.2 HAZARDOUS WASTES

The generation of potentially hazardous waste could occur in association with a leak or spill of hazardous materials. Any soil, absorbent, or fluids containing regulated substances in those situations would be treated as potentially hazardous waste and stored in U.S. Department of Transportation specified containers, labeled IAW applicable regulations, and sampled for waste characterization. Storage of potentially hazardous waste pending characterization and disposal will be coordinated with the USACE, FWDA, and NMED. If a secure location is not available for storage of waste pending classification and disposal, then arrangements will be made for appropriate transport to an alternate location/facility approved by the USACE, FWDA, and NMED.

Although not anticipated for this project, any material (liquid or solid) determined to be hazardous waste will be disposed of at a RCRA permitted hazardous waste treatment, storage, and disposal facility IAW all applicable Federal, state, and local rules and regulations.

Appropriately trained individuals will be tasked with managing hazardous waste and arranging for disposal. For the purpose of disposal, the generator of all waste is the government unless specified otherwise by the Contracting Officer's Representative.

No hazardous waste disposal can be performed without agreement by USACE and FWDA personnel, who require completed copies of all manifests, land disposal restriction notification forms, and waste profiles a minimum of 10 days prior to shipment. In addition, no disposal can occur without an authorized representative of FWDA signature on the manifest. Hazardous waste manifests will be prepared IAW 40 Code of Federal Regulations (CFR) 260-268 and 49 CFR 171-178. Copies of manifests and associated paperwork will be provided with the annual Parcel 3 Arroyo Sweep Report and maintained for a minimum of three years in the project file to comply with 40 CFR 262.40.

6.0 QUALITY CONTROL

The goal of QC is to identify and correct deficiencies in a process or product. One of the important functions of QC is prevention. The preventive aspect is designed to prevent quality problems before they occur. GSIA-Parsons will implement proactive QC measures including the use of check sheets and standardized data recording forms to promote and document consistency in performance of specific activities. Data gathered during QC activities will be used to evaluate compliance and make appropriate decisions to ensure a quality product is delivered to the client. QC personnel will ensure all work performed by GSIA-Parsons adheres to the applicable Federal, State, and local regulations and requirements specified in industry standard guidance documents published by the DoD. QC activities that will be performed for the project include geophysical system verification (ITS testing, QC blind seeding), three-phase control inspections, surveillance and acceptance sampling, QC sample collection, and QC laboratory analyses.

6.1 GEOPHYSICAL SYSTEM VERIFICATION

The Geophysical System Verification (GSV) is a QC process used to confirm that a geophysical sensor is operating properly and to provide ongoing monitoring of the quality of geophysical data collection, data processing/target picking, and anomaly resolution processes. The GSV process includes two main components, an ITS and the blind seeding program, to monitor geophysical survey data quality.

The ITS will be constructed and tested as described in **Section 2.1**. Prior to arroyo sweep operations, the UXOQCS will place blind seeds within the clearance footprint to test operator detection proficiency and verify proper coverage. Seeds will consist of small ISOs buried at approximately 4 to 8 inches. The UXOQCS will place sufficient seeds so that the sweep team will encounter an average of three seeds per day. The UXOQCS will record the seed location using mapping grade GPS and monitor the UXO team's recovery of the blind seeds. Documentation of the QC seeding placement and recovery results will be tracked in the QC Seed Log. As seed items are recovered by the UXO teams, the seed number will be reported on the digsheet and item photographed. The digsheet and recovered seed photographs will be reviewed and the date found will be recorded in the QC Seed Log. The UXOQCS will verify all recovered seeds daily. If a seed is not recovered, an RCA will be performed and CA will be implemented.

6.2 THREE PHASE CONTROL SYSTEM

A three-phase control system will be used for this project to ensure that the fieldwork is conducted IAW the WP and contract requirements. The preparatory, initial, and follow-up phase inspections will be performed for each key field work task.

6.2.1 PREPARATORY PHASE INSPECTION

The preparatory phase inspection includes conducting the necessary training and equipment inspections to ensure that processes are followed and opportunities for improving processes are captured and implemented. The purpose of the preparatory inspection is to review applicable specifications and verify that the necessary resources, equipment, conditions, and controls are in

place before starting work activities. The preparatory phase inspections will be conducted by the UXOQCS prior to beginning each key field work task.

The following actions are performed by the UXOQCS for each preparatory phase inspection:

- Verify the WP and performance requirements have been reviewed and understood by the project personnel;
- Verify personnel identified are available, trained, and meet the requirements and qualifications for the position;
- Verify appropriate plans and procedures are developed, approved, and available;
- Verify the project equipment, especially critical project equipment (e.g., positioning or geophysical) is available, functional, and appropriate for the job;
- Verify the preliminary work and coordination have been accomplished; and
- Identify a process improvement program.

The specific activities performed during the preparatory phase inspection and results of those activities will be documented in the Preparatory Phase Inspection Report.

6.2.2 INITIAL PHASE INSPECTION

The initial phase inspection includes conducting inspections the first time a key field work task is performed to verify that personnel and equipment are ready and that all the processes are followed, and deficiencies are caught and corrected before work continues. The initial phase inspections will check the preliminary work for compliance with procedures and WP specifications. Inspections may include, but are not limited to, QC seeds and communications to USACE OESS, MDAS verification, CAMU operation checks, and waste inspections. The following actions will be performed by the UXOQCS during the initial phase inspection for each key field work task:

- Verify that deficiencies identified during the preparatory phase have been corrected;
- Check safety compliance;
- Verify requirements of quality of workmanship will be established; and
- Resolve differences of interpretation in execution of the project plans.

The specific activities performed during the initial phase inspection and results of those activities will be documented in the Initial Phase Inspection Report.

6.2.3 FOLLOW-UP PHASE INSPECTION

The purpose of the follow-up inspection is to verify the continuous quality of workmanship. The follow-up phase inspections will also verify that CAs identified are being correctly implemented. The following actions will be performed by the UXOQCS during the follow-up phase inspection for each key field work task:

- Monitor work on a daily basis to ensure that all requirements are being met in a timely manner; and

- Verify that the tasks or key field work tasks are being performed correctly up until their completion.

The specific activities performed during the follow-up phase inspection and results of those activities will be documented in the Follow-up Phase Inspection Report.

6.3 SURVEILLANCE AND ACCEPTANCE SAMPLING

Quality personnel will conduct surveillance activities to monitor and verify the status of overarching procedures, methods, conditions, processes, and products meet the established quality requirements. Acceptance sampling will be performed at the completion of each applicable key field work task to ensure the project's performance requirements are met.

The UXOQCS will perform acceptance sampling of 10% of the daily arroyo sweep footprint using the same methodology and equipment utilized by the field team. The results of the UXOQCS acceptance sampling will be compared with the following criteria:

- Accept: All work features are determined acceptable, acceptance sampling does not identify any residual anomalies, and all blind seed items have been successfully detected and recovered; and
- Reject: Failure to perform tasks IAW the WP, acceptance sampling identifies a missed anomaly, or a blind seed item is missed.

If failures are observed during periodic inspections or acceptance sampling, RCA will be performed and documented on a nonconformance report (NCR). Following the RCA, the project team will develop a CA and quality personnel will be responsible for verifying that implementing the CA is effective at preventing similar future failures.

6.4 FIELD SAMPLING AND ANALYTICAL QUALITY CONTROL

The following sections discuss the collection of field and analytical QC samples, and how the QC sampling results will be evaluated against the principal indicators of data quality including accuracy/bias, precision, representativeness, comparability, completeness, and sensitivity (EPA, 2012).

6.4.1 QC FIELD SAMPLING

The Field QC samples consist of field duplicates, equipment blanks (aka equipment rinsates) (as applicable), and matrix spike (MS)/matrix spike duplicate (MSD). Each type of field QC sample undergoes the same preservation, analysis, and reporting procedures as the related environmental samples. Frequencies of field QC sample collection and analysis are listed below:

- Field Duplicates - Field duplicates are collected in the field from a single aliquot of the sample to determine the precision and accuracy of the field team's sampling procedures. Field duplicates will be collected and analyzed at a rate of one field duplicate for every 10 samples or part thereof (10%) per mobilization;
- Equipment Blanks – Disposable sampling equipment is planned for use during this project, however, if non-disposable sampling equipment is utilized, equipment blank samples will

be collected and analyzed to determine the effectiveness of decontamination practices. Equipment blanks will be collected for any parameters sampled using reusable equipment at a rate of one per day per equipment. Equipment blanks will be collected by pouring distilled water or laboratory-provided deionized water (same water source utilized for sampling decontamination) through non-disposable sampling equipment into sample containers; and

- MS/MSD Samples – MS/MSD samples are utilized to evaluate the matrix-specific analyte and method performance. Extra soil sample volume for MS/MSD analysis may be necessary, therefore, the laboratory shall be consulted on volume requirements for each project. MS/MSD samples are specified at a rate of one for every 20 samples or part thereof (5%).

6.4.2 LABORATORY QC ANALYSES

Laboratory QC encompasses a host of other checks performed during sample preparation and analysis which the laboratory will perform IAW analytical method specific requirements. Laboratory QC samples will include, but are not limited to, method blanks, laboratory control samples (LCSs) as listed below:

- Method Blanks – The laboratory will process one method blank per preparation or analytical batch to evaluate for interference and/or contamination introduced during the analytical process; and
- LCSs – The laboratory will process one LCS per preparation or analytical batch to evaluate the analytical calibration range control limits.

6.4.3 DATA QUALITY INDICATORS

The following parameters will be used to assess the data quality and usability of the field and laboratory QC samples:

- Precision – The precision of the field sampling procedures and laboratory analyses will be assessed by comparing the relative percent differences between the parent and field duplicate results and the matrix spike and matrix spike duplicate results, respectively. The precision criteria for the relative percent differences will be plus or minus 35%;
- Accuracy – The accuracy of the laboratory results will be assessed using the percent recovery of the LCSs compared to the established QC criteria listed in Appendix C of the *DoD and Department of Energy (DOE) Quality Systems Manual Version 6* (DoD and Department of Energy [DOE], 2023);
- Completeness – The completeness of the laboratory analytical results will be assessed for compliance with the amount of data required for decision making with a completeness goal of 90% (i.e., less than 10% of the data rejected) for each analytical method;
- Representativeness and Comparability – Sampling and analytical data will be considered representative and comparable based on verification of proper sampling location, collection procedures, handling protocols, COC, sample preservation, analytical procedures, and holding times; and

- Sensitivity – The sensitivity of the laboratory results will be assessed through data validation. The performance criteria for this project are the screening levels identified in **Table 6**.

6.4.4 DATA VERIFICATION, VALIDATION, AND USABILITY

The GSIA-Parsons Project Chemist will be responsible for the oversight of data verification, review, and validation. 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.

For this project, 100% of the data packages will undergo data verification and data review, 100% to Stage 2B, and 10% to Stage 4 IAW with DoD General Data Validation Guidelines and DoD published data validation modules. Data validation will be performed by GSIA-Parsons using automated data review software and/or manual data validation. Data validation report will be included in the annual Arroyo Sweep Reports.

The Stage 2 laboratory analytical reports, in a digital format with searchable electronic data tables, will be included in the annual Arroyo Sweep Report. The results of the data validation will also be discussed so that overall data quality can be verified through the precision, accuracy, representativeness, comparability, and completeness of sample results. Any limitations on data usability based on the data validation results will be documented in the reports, if appropriate.

7.0 REPORTING

The annual Parcel 3 Arroyo Sweep Report will document the results of the fieldwork and will be submitted within 90 days of completion of field work and data validation. The report will include a summary of the work performed, results of the fieldwork, an analysis of the sampling results, and provide conclusions based on the data collected. Specific elements to be included in the annual Arroyo Sweep Report include:

- Summary tables with field measurements and chemical analyses;
- Maps (relevant features, investigation locations, and locations of detected contaminants);
- Photographs;
- Evaluation of human health risk pathways and receptors evaluation IAW the most current NMED Risk Assessment Guidance; and
- Conclusions based on the data collected and type and extent of contamination (qualitative and quantitative) in relation to cleanup levels.

8.0 REFERENCES

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_____, 2025. *Final Corrective Action Management Unit (CAMU) Management Plan, Fort Wingate Depot Activity, McKinley County, New Mexico*. Prepared for USACE, Albuquerque District, prepared by Parsons. 27 June.

Table 1: Summary of MEC Found 2024 Arroyo Sweep

Item Type	Size	Nomenclature	2024 Recovery Count	2024 Maximum Recovery Depth (inches)	Previous Average Recovery Depth (inches)
Fuze	various	AN-M110, AN-M120, M149, M503, M51, M52, M53, M56, M64, M71, MK 2	154	14	3.6
Projectile	20mm	M210 20mm HEI	1	3	3
Projectile	40mm	Mk II Mod 0	2	0	0
Projectile	75mm	M48, M89	20	18	6.5
Bomblet	3.18in	M83	14	11	5
Mortar	81mm	M57	1	0	0

Notes:
HEI = high explosive incendiary
mm = millimeters

Table 2: Anticipated Detection Depth

Item Type	Size	Nomenclature	Anticipated Max Depth of Detection Using Handheld Analog Detectors (inches) (1)	Detection Depth Greater Than Previous Max Recovery Depth?
Fuze	various	AN-M110, AN-M120, M149, M503, M51, M52, M53, M56, M64, M71, MK 2	6	No
Projectile	20mm	M210 20mm HEI	6	Yes
Projectile	40mm	Mk II Mod 0	12	Yes
Projectile	75mm	M48, M89	23	Yes
Bomblet	3.18-in	M83	24	Yes
Mortar	81mm	M57	25	Yes

Note:
(1) Anticipated reliable analog geophysical depth of detection is conservatively based on eight times the diameter of the munitions.

Table 3: Explosives Analytes for Soil Sample Analysis

Analyte	CAS Number
1,3,5-trinitrobenzene	99-35-4
1,3-dinitrobenzene	99-65-0
2,4,6-trinitrotoluene	118-96-7
2,4-dinitrotoluene	121-14-2
2,6-dinitrotoluene	606-20-2
2-amino-4,6-dinitrotoluene	35572-78-2
2-nitrotoluene	88-72-2
3-nitrotoluene	99-08-1
4-amino-2,6-dinitrotoluene	19406-51-0
4-nitrotoluene	99-99-0
hexahydro-1,35-trinitro-1,3,5-triazine (RDX)	121-82-4
methyl-2,4,6-trinitrophenylnitramine (tetryl)	479-45-8
Nitrobenzene	98-95-3
Nitroglycerine	55-63-0
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0
Pentaerythritol tetranitrate (PETN)	78-11-5

Note:
CAS - Chemical Abstract Service

Table 4: Sampling Containers, Preservation, and Hold Times

Matrix	Analytical Group	Analytical Method	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation / analysis)
Soil	Explosives	SW-846 8330B	1 – 8 oz glass jar	Cool to 4 ± 2 °C	14 days – 40 days from extract

Notes:
± = plus or minus
°C = degrees Celsius
oz = ounce

Table 5: Sampling Location and Methods

Location[(1)]	Sample ID[(2)]	Matrix	Sample Depth[(3)]	Type	Analytical Group
MEC BIP #x	FPxxx	Soil	0-6 inches below surface of impact	Primary	Explosives
MEC BIP #x	FPxxx	Soil	0-6 inches below surface of impact	Field Duplicate[(4)]	Explosives
MEC BIP #x	FPxxx	Soil	0-6 inches below surface of impact	MS/MSD[(5)]	Explosives
N/A	FPxxx	Water	N/A	Equipment Rinsate[(6)]	Explosives
Confirmation Sampling MEC BIP #x	FPxxx	Soil	0-6 inches below excavation	Primary	Explosives

Notes:

(1) Soil samples (and associated QC samples) will only be collected if a BIP MEC disposal is performed. The total number of QC samples will be dependent on total number of primary samples collected. Confirmation soil samples will only be collected if soil removal is performed. IDW soil samples will only be collected if soil removal is performed.

(2) Sample ID where xxx is chronological numbers, starting from 001. The Sample ID is the blind sample ID that is listed on COC forms, labels, etc. which allows samples to be submitted blind to the laboratory.

(3) The depth interval of the soil samples will be 0 to 6 inches. The actual depth bgs is dependent on the surface of impact depth. For example, if bottom of the MEC disposal excavation was 2 feet bgs, the samples will be collected 0 to 6 inches below that surface, thus 24 to 30 inches bgs.

(4) Field duplicates will be collected in the same manner and at the same time as the primary sample. The field duplicate samples are intended to replicate the primary sample collected in order to test the precision of the overall sampling method and will be submitted to the laboratory "blind" as separate samples. A field duplicate will be collected for every 10 primary samples or part thereof.

(5) MS/MSD pairs will be collected at a rate of 1 MS/MSD pair for every 20 field samples or part thereof. MS/MSD pairs are additional sample volume to which the laboratory spikes target analytes to determine the matrix effect. The sample designated for MS/MSD analysis will be identified in the comments column of the COC record and triplicate sample volume may need to be provided to the laboratory for that sample, if required.

(6) Equipment rinsate blanks will be collected for any parameters sampled using reusable equipment at a rate of 1 per equipment per day. If disposable equipment is used, no equipment blanks will be collected. Equipment rinsate blanks will consist of clean water run over or through decontaminated field sampling equipment.

ID = identifier

N/A = not applicable

Table 6: Human Health Screening Levels for Soil

Analyte	CAS Number	Residential Value (cancer endpoint) (mg/kg)	Residential Value (non-cancer endpoint) (mg/kg)	Source[(1), (2)]
1,3,5-trinitrobenzene	99-35-4	NS	2,200	RSL
1,3-dinitrobenzene	99-65-0	NS	6.3	RSL
2,4,6-trinitrotoluene	118-96-7	211	36	NMED
2,4-dinitrotoluene	121-14-2	17.1	123	NMED
2,6-dinitrotoluene	606-20-2	3.56	18.5	NMED
2-amino-4,6-dinitrotoluene	35572-78-2	NS	7.70	NMED
2-nitrotoluene	88-72-2	31.6	70.4	NMED
3-nitrotoluene	99-08-1	NS	6.16	NMED
4-amino-2,6-dinitrotoluene	19406-51-0	NS	7.64	NMED
4-nitrotoluene	99-99-0	333	247	NMED
hexahydro-1,35-trinitro-1,3,5-triazine (RDX)	121-82-4	83.1	301	NMED
methyl-2,4,6-trinitrophenylnitramine (tetryl)	479-45-8	NS	156	NMED
Nitrobenzene	98-95-3	60.4	131	NMED
Nitroglycerine	55-63-0	313	6.16	NMED
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	NS	3850	NMED
Pentaerythritol tetranitrate (PETN)	78-11-5	1,300 [(3)]	570	RSL

Notes:

(1) EPA RSL, *U.S. Environmental Protection Agency Regional Screening Levels (RSLs) – Generic Tables, Resident Soil Table, Target Risk 1x10-6, Hazard Quotient of 1.0* (EPA, 2024). The lower of the values for the cancer and noncancer endpoint will be used as the screening value.

(2) NMED, *New Mexico Environment Department, Risk Assessment Guidance for Site Investigations and Remediation, Volume I Soil Screening for Human Health Risk Assessments, Table A-1* (NMED, 2022). The lower of the values for the cancer and noncancer endpoint will be used as the screening value.

(3) EPA RSL based on a carcinogenic endpoint was adjusted by a factor of 10 to achieve the target cancer risk of $1x10^{-5}$ required in NMED guidance.

NS - No Standard

1

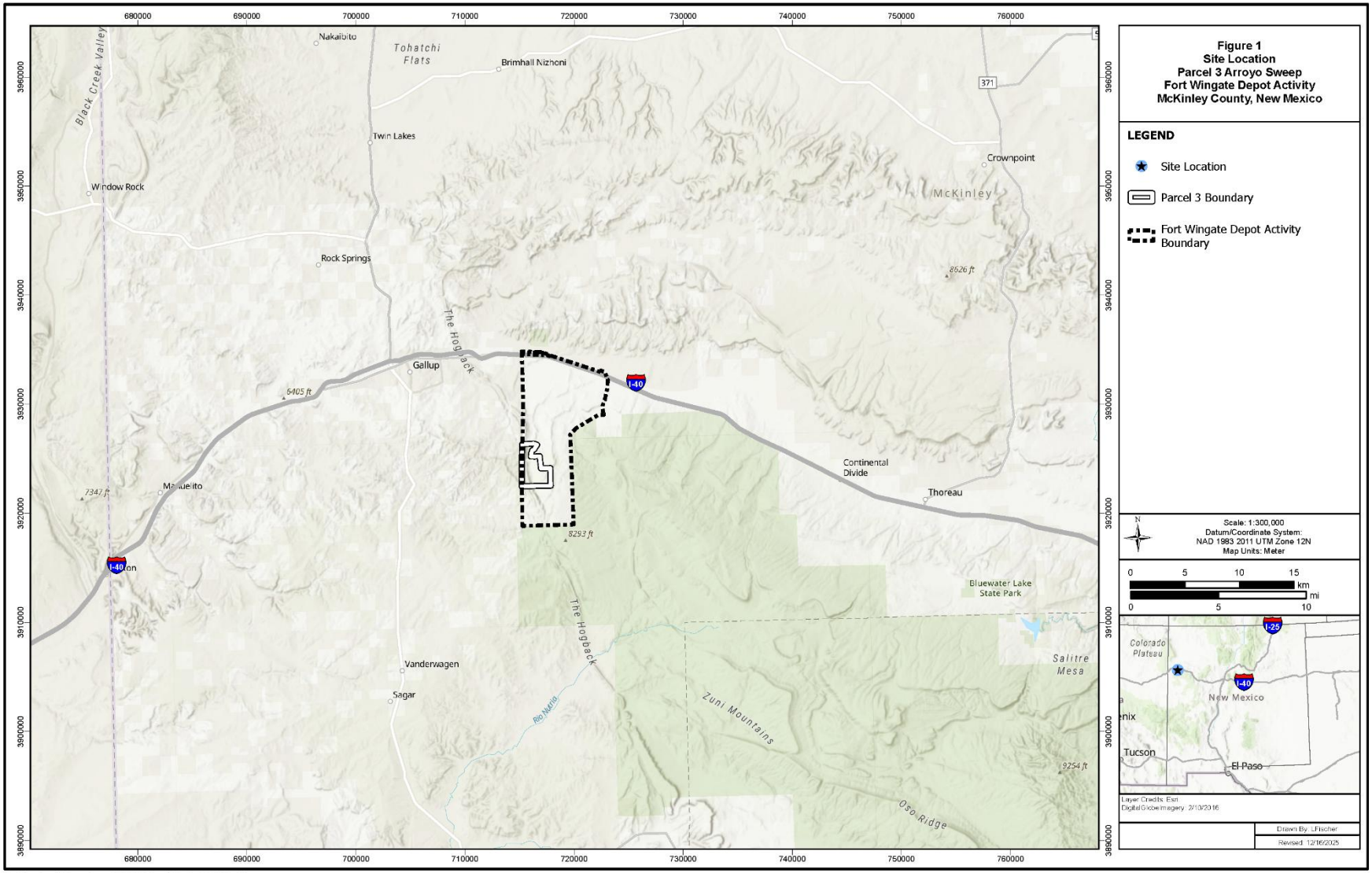
Figure 1
Site Location
Parcel 3 Arroyo Sweep
Fort Wingate Depot Activity
McKinley County, New Mexico
LEGEND
Site Location
Parcel 3 Boundary
Fort Wingate Depot Activity Boundary
Scale: 1:300,000
Datum/Coordinate System:
NAD 1983 2011 UTM Zone 12N
Map Units: Meter
0 5 10 15 km
0 5 10 mi
Layer Credits: Esri
Digital Globe Imagery: 2/10/2016
Drawn By: LFischer
Revised: 12/16/2025
Work Plan. Parcel 3 Arroyo Sweep. FWDA MEC Remediation Project. FWDA. NM
Nakaibito
Tohatchi Flats
Brimhall Nizhoni
Twin Lakes
Crownpoint
Window Rock
McKinley
Rock Springs
8626 ft
The Hogback
Gallup
6405 ft
I-40
Continental Divide
Thoreau
7347 ft
8293 ft
Bluewater Lake State Park
Vanderwagen
Sagar
Salitre Mesa
Zuni Mountains
Oso Ridge
9254 ft
Colorado Plateau
New Mexico
Tucson
El Paso
I-25
371
680000
690000
700000
710000
720000
730000
740000
750000
760000
3960000
3950000
3940000
3930000
3920000
3910000
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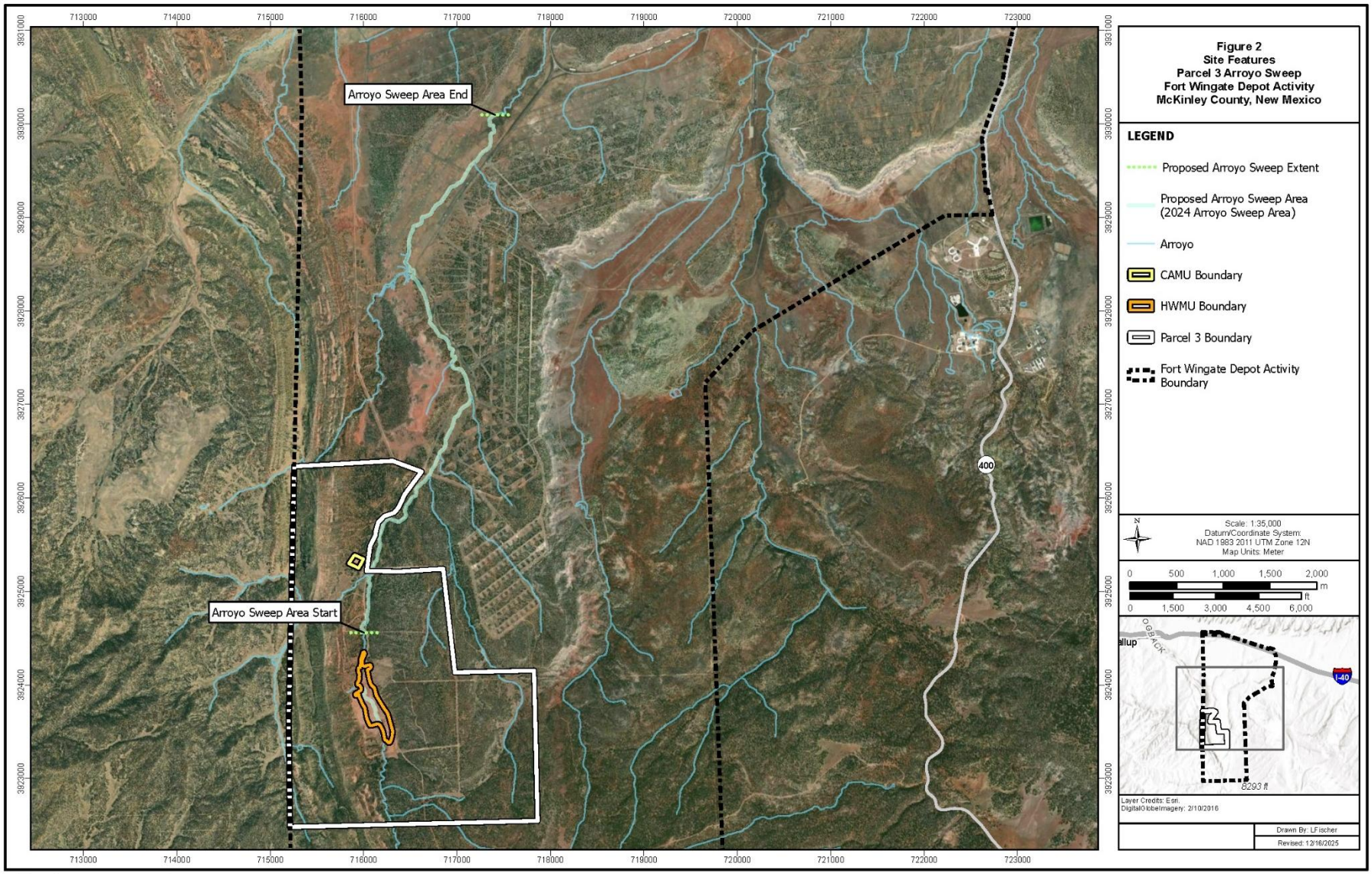
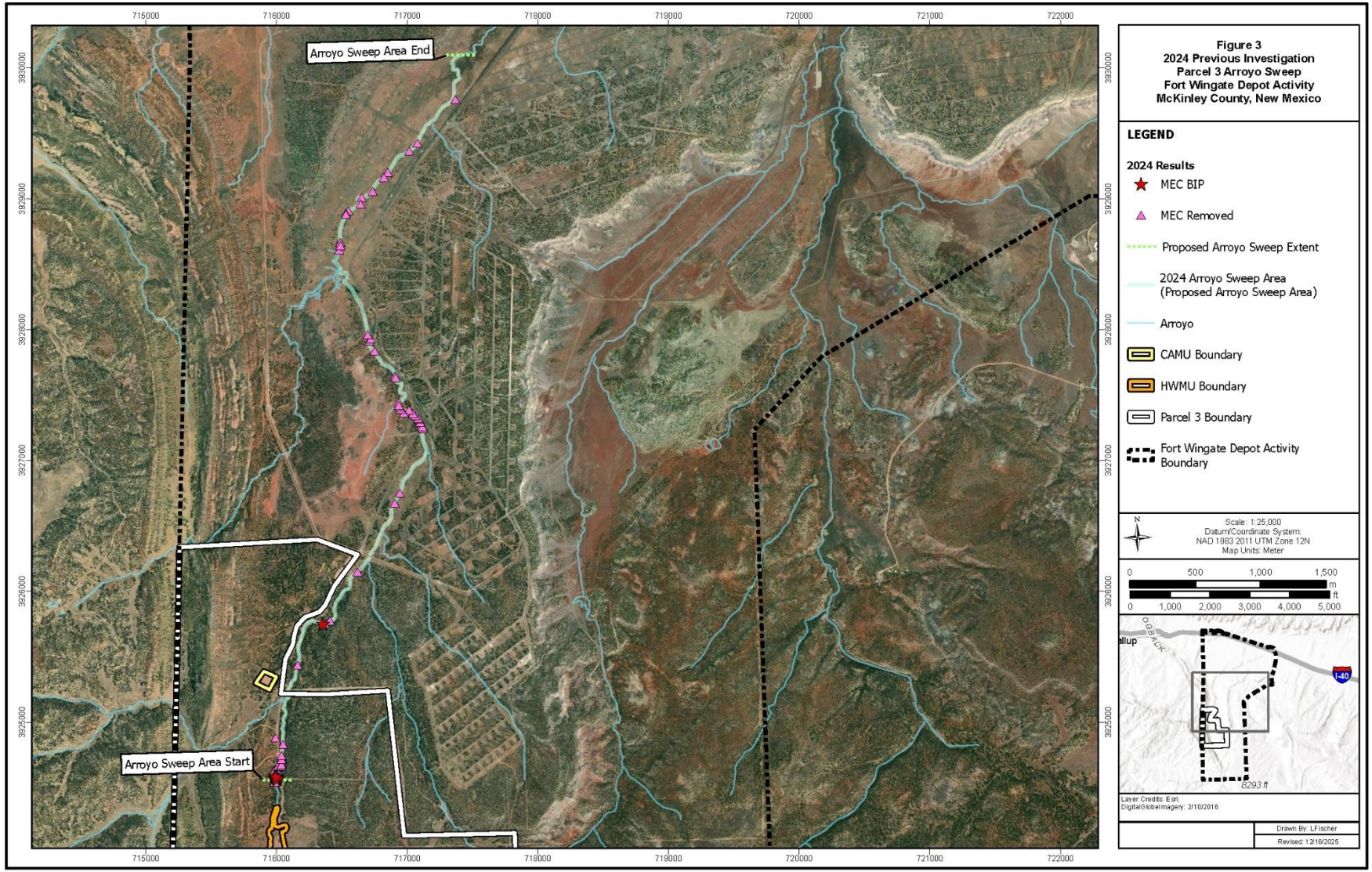

Arroyo Sweep Area End
Arroyo Sweep Area Start
400
Figure 2
Site Features
Parcel 3 Arroyo Sweep
Fort Wingate Depot Activity
McKinley County, New Mexico
LEGEND
Proposed Arroyo Sweep Extent
Proposed Arroyo Sweep Area (2024 Arroyo Sweep Area)
Arroyo
CAMU Boundary
HWMU Boundary
Parcel 3 Boundary
Fort Wingate Depot Activity Boundary
Scale: 1:35,000
Datum/Coordinate System:
NAD 1983 2011 UTM Zone 12N
Map Units: Meter
0 500 1,000 1,500 2,000 m
0 1,500 3,000 4,500 6,000 ft
Gallup
I-40
8293 ft
Layer Credits: Esri,
DigitalGlobeImagery: 2/10/2016
Drawn By: LFischer
Revised: 12/16/2025

1


Arroyo Sweep Area End
Arroyo Sweep Area Start
715000
716000
717000
718000
719000
720000
721000
722000
3930000
3929000
3928000
3927000
3926000
3925000
Figure 3
2024 Previous Investigation
Parcel 3 Arroyo Sweep
Fort Wingate Depot Activity
McKinley County, New Mexico
LEGEND
2024 Results
MEC BIP
MEC Removed
Proposed Arroyo Sweep Extent
2024 Arroyo Sweep Area
(Proposed Arroyo Sweep Area)
Arroyo
CAMU Boundary
HWMU Boundary
Parcel 3 Boundary
Fort Wingate Depot Activity
Boundary
N
Scale: 1:25,000
Datum/Coordinate System:
NAD 1983 2011 UTM Zone 12N
Map Units: Meter
0
500
1,000
1,500
m
0
1,000
2,000
3,000
4,000
5,000
ft
Gallup
I-40
8293 ft
Layer Credits: Esri,
DigitalGlobeImagery: 2/10/2016
Drawn By: LFischer
Revised: 12/16/2025