EMID-700717

DEPARTMENT OF ENERGY
Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

DEC 16 2019

EMLA-2020-1168-04-001

Mr. David Cobrain
Acting Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

RECEIVED
DEC 16 2019
NMED Hazardous Waste Bureau

Subject: Submittal of the 2019 Triennial Ordnance Survey Report, Solid Waste Management Units 00-011(a, d, and e), Guaje/Barrancas/Rendija Canyons Aggregate Area

Dear Mr. Cobrain:

Enclosed please find two hard copies with electronic files of the "2019 Triennial Ordnance Survey Report, Solid Waste Management Units 00-011(a, d, and e), Guaje/Barrancas/Rendija Canyons Aggregate Area."

No explosive hazards were located during the 2019 triennial visual survey of unexploded ordnance (UXO) at Solid Waste Management Units (SWMUs) 00-011(a), 00-011(d), and 00-011(e). Several pieces of munitions debris (MD) were found at SWMU 00-011(e), consistent with past ordnance surveys. No unexploded ordnance, MD, or munitions and explosives of concern were found at SWMUs 00-011(a) and 00-011(d). In 2015, the U.S. Army Corps of Engineers (USACE) conducted a survey of these three SWMUs, and in 2017 USACE provided the U.S. Department of Energy (DOE) a summary report of findings and recommendations from the 2015 survey titled "Final, After Action Report for Military Munitions Response Program Munitions and Explosives of Concern Clearance at SWMUs 00-011(a), 00-011(d), 00-011(e) in Support of the Land Conveyance and Transfer Project Activities, Department of Energy, Los Alamos County, New Mexico." The report's executive summary states that "based on the results of the clearances of the three SWMUs, and review of previous LANL surveys and current land use, there is a low hazard exposure: as such, it is recommended that for SWMU 00-011(a), SWMU 00-011(d), and SWMU 00-011(e), visual surveys be conducted every 5 yr to identify any change of conditions of land use." Based on USACE's conclusion and the lack of MD discovered at SWMUs 00-011(a) and 00-011(d), along with the continued downward trend of MD discovered during each subsequent survey of SWMU 00-011(e), the DOE Environmental Management Los Alamos Field Office (EM-LA) recommends that the UXO survey be conducted on a 5-yr basis.

If you have any questions, please contact Erik Loechell at (505) 695-8730 (erik.loechell@em-la.doe.gov) or Cheryl Rodriguez at (505) 257-7941 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Arturo Q. Duran
Compliance and Permitting Manager
Environmental Management
Los Alamos Field Office

Enclosures:

1. Two hard copies with electronic files – 2019 Triennial Ordnance Survey Report, Solid Waste Management Units 00-011(a, d, and e), Guaje/Barrancas/Rendija Canyons Aggregate Area (EM2019-0410)

CC (letter with hard-copy enclosure[s]):
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Cheryl Rodriguez, EM-LA

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Harry Burgess, Los Alamos County, NM (2 copies)

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December 2019
EM2019-0410

2019 Triennial Ordnance Survey Report, Solid Waste Management Units 00-011(a, d, and e), Guaje/Barrancas/Rendija Canyons Aggregate Area

N3B Los Alamos

EM2019-0410

2019 Triennial Ordnance Survey Report, Solid Waste Management Units 00-011(a, d, and e), Guaje/Barrancas/Rendija Canyons Aggregate Area

December 2019

Responsible program director:

Printed Name	Signature	Title	Organization	Date
Michael O. Erickson		Program Director	RCRA Remediation Program	12/4/19

Responsible N3B representative:

Printed Name	Signature	Title	Organization	Date
Erich Evered		Program Manager	N3B Environmental Remediation Program	12/5/2019

Responsible DOE EM-LA representative:

Printed Name	Signature	Title	Organization	Date
Arturo Q. Duran	for	Compliance and Permitting Manager	Office of Quality and Regulatory Compliance	12/13/19

EXECUTIVE SUMMARY

Solid Waste Management Units (SWMUs) 00-011(a, d, and e) are munitions impact areas or suspected munitions impact areas within the Guaje/Barrancas/Rendija Canyons Aggregate Area at Technical Area 00 that were used by the U.S. Department of Defense. These sites were not used after the 1940s and, with the exception of SWMU 00-011(a), are now located off U.S. Department of Energy (DOE) property. Because of the potential for exposure of munitions and explosives of concern or munitions debris as a result of erosion or bioturbation at the sites, DOE is required by the New Mexico Environment Department to conduct triennial visual surveys of the ground surface to identify and remove any site hazards related to historical munitions use.

Activities conducted in 2019 included visual inspections of the sites using lines of personnel trained to recognize unexploded ordnance (UXO). The trained personnel conducted site walkovers to identify any suspect material. No UXO was found at SWMUs 00-011(a, d, and e). Triad National Security, LLC (Triad) UXO technicians determined that no explosive hazards were located during the visual sweep. Several pieces of munitions debris were identified at SWMU 00-011(e). All identified munitions debris was removed by Triad Emergency Response personnel.

Based on conclusions and recommendations in a U.S. Army Corps of Engineers (USACE) report summarizing a survey conducted by USACE in 2015, and the results of the 2016 and 2019 ordnance surveys, the DOE Environmental Management Los Alamos Field Office recommends that the UXO survey be conducted on a 5-yr basis.

CONTENTS

Figures

Acronyms and Abbreviations

AOC	area of concern
asl	above sea level
DOE	Department of Energy (U.S.)
HE	high-explosives
LANL	Los Alamos National Laboratory
MD	munitions debris
MEC	munitions and explosives of concern
N3B	Newport News Nuclear BWXT-Los Alamos, LLC
NMED	New Mexico Environment Department
SWMU	solid waste management unit
TA	technical area
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
UXO	unexploded ordnance

1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by Triad National Security, LLC. The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers 36 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above sea level (asl).

Solid Waste Management Units (SWMUs) 00-011(a, d, and e) are munitions impact areas within the Guaje/Barrancas/Rendija Canyons Aggregate Area at Technical Area 00 (TA-00) that were used by the U.S. Department of Defense in the 1940s. Because of the potential for exposure of munitions and explosives of concern (MEC) or munitions debris (MD) as a result of erosion or bioturbation at the sites, DOE is required by the New Mexico Environment Department (NMED) to conduct triennial visual surveys to identify and remove any site hazards related to historical munitions use.

1.1 General Site Information

The Guaje/Barrancas/Rendija Canyons Aggregate Area consists of SWMUs and areas of concern (AOCs) that were formerly part of Operable Unit 1071 within TA-00. Figure 1.1-1 shows the Guaje/Barrancas/Rendija Canyons Aggregate Area munition SWMUs with respect to the Laboratory boundary and surrounding landholdings. This triennial ordnance survey report for the Guaje/Barrancas/Rendija Canyons Aggregate Area includes the following SWMUs:

- SWMU 00-011(a), a mortar impact area
- SWMU 00-011(d), a mortar impact area
- SWMU 00-011(e), a mortar impact area

1.2 Report Objectives

NMED's approval with direction of the 2007 investigation report for the Guaje/Barrancas/Rendija Canyons Aggregate Area (LANL 2007, 098670; NMED 2007, 099632) directed the Laboratory to conduct visual surveys at SWMUs 00-011(a, c, d, and e) and AOC C-00-020 every 2 yr to identify and remove any MEC, MD, or unexploded ordnance (UXO). NMED issued certificates of completion for SWMU 00-011(c) and AOC C-00-20 in May of 2012 and concurred with the recommendation that visual surveys are no longer required for these sites (NMED 2012, 520388). On May 7, 2013, DOE and the Laboratory received certificates of completion with controls for SWMUs 00-011 (a, d, and e) and direction to conduct one more biennial survey and then reduce the frequency of ordnance surveys and reporting from biennial to triennial (LANL 2013, 249600). In 2015, the U.S. Army Corps of Engineers (USACE) conducted a surface clearance of SWMUs 00-011 (a, d, and e) and found munitions debris at SWMU 00-011(a). The first triennial ordnance survey was conducted by Los Alamos National Laboratory in 2016 with no UXO discovered during the survey. The second triennial ordnance survey was conducted by Newport News Nuclear BWXT-Los Alamos, LLC (N3B) in 2019. The objective of this report is to present the results of the visual ordnance surveys conducted at the three sites in 2019.

2.0 SITE DESCRIPTIONS AND OPERATIONAL HISTORY

2.1 SWMU 00-011(a)

SWMU 00-011(a) (Figures 2.1-1 and 2.1-2) is a 29-acre former mortar impact area located on DOE land about 0.4 mi east of the Sportsmen's Club small arms firing range (AOC C-00-015) in Rendija Canyon. The site was a mortar impact area in the mid-1940s for 60-mm and 81-mm rounds. Operations ceased in the late 1940s (LANL 1990, 007511).

SWMU 00-011(a) is located in a relatively flat open grassland with scattered shrubs and trees. The site is bisected east to west by Rendija Road (unpaved). On the north side of the road, the site has a gradual to steep slope to the ephemeral stream channel. The slope is covered by mulch consisting of downed trees that burned during the 2000 Cerro Grande fire.

2.2 SWMU 00-011(d)

SWMU 00-011(d) (Figures 2.2-1 and 2.2-2) is a mortar impact area located largely on Los Alamos County land, except for a small section along a cliff edge on private property. The area is in a small north-trending tributary of Bayo Canyon northeast of the intersection of San Ildefonso Road and Diamond Drive in the Los Alamos townsite. The approximately 6-acre area was used in the mid-1940s as a target area for 2.36-in. bazooka rounds; operations ceased in the late 1940s (LANL 1990, 007511).

SWMU 00-011(d) is located near a hiking trail at the head of Bayo Canyon. A north-south trending drainage channel bisects SWMU 00-011(d), and a cliff is located on the eastern edge of the site. The southern section of the site is open and grassy with some shrubs and trees; the northern section of the site is forested with pine trees. The site is open to the public.

2.3 SWMU 00-011(e)

SWMU 00-011(e) (Figures 2.3-1 and 2.3-2) is a former mortar impact area located on U.S. Forest Service (USFS) land in a tributary of Rendija Canyon known as Thirty-Seven Millimeter Canyon. The site was used from the mid- to late 1940s (LANL 1990, 007511) for training of U.S. Army personnel operating tanks firing 20-mm and 37-mm rounds. The impact area extends north along the tributary to the top of a cliff face and is approximately 15 acres in size.

SWMU 00-011(e) is located within a very steep natural amphitheater with numerous loose rocks and boulders. Vegetation at the site consists of thick weeds and small shrubs. The site is fenced with barbed wire and posted with "Explosives No Trespassing" signs.

3.0 SITE CONDITIONS

Rendija Canyon is located immediately north of the Los Alamos townsite. The watershed has a drainage area of 9.5 mi^2 and drains portions of Los Alamos townsite, DOE land, and USFS land. Elevations in the watershed range from 6300 to 9800 ft asl (LANL 1997, 055622, p. 3-2). Rendija Canyon and its tributaries contain ephemeral streams arising from storm water runoff and snowmelt. As the surface water flows downstream, it infiltrates the alluvium and the underlying formations or is lost to evapotranspiration.

Most of the sites included in the visual ordnance surveys have steep, rocky slopes and loose material. In particular, SWMU 00-011(e) is very steep, with grades of 40% to 50%. SWMU 00-011(a) was impacted by the 2000 Cerro Grande fire, and numerous downed trees, mulched trees, and standing dead trees are

present at these sites. These site conditions make the walkover visual surveys difficult and potentially hazardous, and appropriate safety precautions are incorporated into the survey methodology.

4.0 SURVEY METHODS

Surveys were accomplished under the direction of trained Laboratory UXO technicians per established U.S. Department of Defense procedures and protocol. Surveys were conducted using a line of 4 to 10 personnel trained to recognize UXO. Each person was positioned approximately an arm's-length from the next person to conduct the visual inspection of the entire area of each SWMU. Once a survey line was completed in one direction, the line was pivoted around the individual at one end of the line to survey in the opposite direction. The individual at the pivot point visually surveyed the same area going in the opposite direction to ensure overlap of each survey line.

It was often necessary to adjust survey lines to adapt to boulders and other large obstacles and variations in the terrain. The process for establishing survey lines was also modified as appropriate in areas of downed trees and thick vegetation. At SWMU 00-011(e), survey lines were staggered so downslope personnel trailed upslope personnel to minimize the safety risks from falling rocks on this very steep site.

Based on lessons learned from previous ordnance surveys, the 2019 ordnance survey was conducted at the end of September and beginning of October to reduce the quantity of autumn-related leaf fall on the ground.

MD recovered during the surveys was retained by Emergency Response personnel.

5.0 2019 SCOPE OF ACTIVITIES

Before 2019 survey activities described in this report were conducted, approval to access each site was granted by the applicable land owner(s) through access agreements and/or a permit waiver:

- SWMU 00-011(a) is located entirely on DOE land.
- SWMU 00-011(d) is located primarily on Los Alamos County land, with a small portion located on private property.
- SWMU 00-011(e) is located primarily on USFS land, with a small portion located on DOE land.

5.1 SWMU 00-011(a)

The site walkover and visual surveys of SWMU 00-011(a) were conducted on October 2, 2019. SWMU 00-011(a) is the largest of the three sites included in the 2019 triennial ordnance survey. In certain areas, the visual survey was modified as appropriate to adapt to the presence of mulch composed of downed trees and thick brush.

SWMU 00-011(a) is the only site at which MD was discovered (a total of 57 pieces) during the 2015 USACE survey. Unlike the 2016 ordnance survey, in which several 60-mm and 81-mm shell fragments, as well as a mortar tail and mortar side were discovered, no UXO, MEC, or MD was discovered or recovered during the 2019 survey. Figure 2.1-1 is a map of the munitions found during the 2016 survey, and Figure 2.1-2 shows the 2019 map with no findings.

5.2 SWMU 00-011(d)

The site walkover and visual surveys of both the privately owned portion and Los Alamos County–owned portion of SWMU 00-011(d) were conducted on October 2, 2019. This site is relatively small and very few obstacles are present to hinder the walkover or visual inspection.

No UXO, MEC, or MD was discovered or recovered at SWMU 00-011(d) during the 2019 ordnance survey, which mirrors the results from the 2015 USACE survey and the 2016 survey. Figure 2.2-1 is a map illustrating the lack of munitions found during the 2016 survey, and Figure 2.2-2 illustrates the same findings in the 2019 map.

5.3 SWMU 00-011(e)

The site walkover and visual surveys of SWMU 00-011(e) were conducted on September 30, 2019 (Figure 5.3-1).

The 2019 ordnance survey resulted in the recovery and removal of several MD fragments in the form of rotating band pieces and sidewall fragments, as well as a fuze adapter for a high-explosives (HE) round (Figure 5.3-2), scattered over the area shown in Figure 2.3-1. Figure 5.3-3 shows the MD found at SWMU 00-011(e). All of these fragments were small (less than 2 in. in the longest dimension). No noticeable distribution pattern or area of significant MD concentration was found at SWMU 00-011(e). The fragments were removed and retained by Emergency Response personnel. In addition to fragments found at the site, there is abundant evidence of impact to cliff faces and boulders (scars and holes) from larger munitions.

No UXO or MEC was discovered or recovered at SWMU 00-011(e) during the 2019 ordnance survey. No MD was discovered during the 2015 USACE survey. Figure 2.3-1 is a map of the munitions found during the 2016 survey while Figure 2.3-2 shows the 2019 map and the locations of findings.

6.0 SUMMARY

No explosive hazards were located during the visual survey at the sites during the 2019 triennial survey. Several pieces of MD were found at SWMU 00-011(e), consistent with past ordnance surveys. No UXO, MD, or MEC was found at SWMU 00-011(a and d). In 2017, USACE provided a summary report of findings and recommendations from the 2015 survey to DOE titled “Military Munitions Response Program Munitions and Explosives of Concern Clearance at SWMUs 00-011(a), 00-011(d), 00-011(e) in Support of the Land Conveyance and Transfer Project Activities” (Sundance 2017, 700691). The report’s executive summary states that “based on the results of the clearances of the three SWMUs, and review of previous LANL surveys and current land use, there is a low hazard exposure: as such, it is recommended that for SWMU 00-011(a), SWMU 00-011(d), and SWMU 00-011(e), visual surveys be conducted every 5 yr to identify any change of conditions of land use.” Based on USACE’s conclusion and the lack of MD discovered at SWMU 00-011(a and d) along with the continued downward trend of MD discovered during each subsequent survey of SWMU 00-011(e), the DOE Environmental Management Los Alamos Field Office recommends that the UXO survey be conducted on a 5-yr basis.

7.0 REFERENCES AND MAP DATA SOURCES

7.1 References

The following reference list includes documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. I of IV (TA-0 through TA-9), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007511)

LANL (Los Alamos National Laboratory), April 1997. "Core Document for Canyons Investigations," Los Alamos National Laboratory document LA-UR-96-2083, Los Alamos, New Mexico. (LANL 1997, 055622)

LANL (Los Alamos National Laboratory), August 2007. "Investigation Report for Guaje/Barrancas/ Rendija Canyons Aggregate Area at Technical Area 00," Los Alamos National Laboratory document LA-UR-07-5326, Los Alamos, New Mexico. (LANL 2007, 098670)

LANL (Los Alamos National Laboratory), September 16, 2013. "Request for Extension to Implement Controls/Certification of February 19, 2013, Letter Regarding the Transfer of Rendija Canyon Tracts," Los Alamos National Laboratory letter (EP2013-0211) to J.E. Keiling (NMED-HWB) from J. Mousseau (LANL) and P. Maggiore (DOE-NA-00-LA), Los Alamos, New Mexico. (LANL 2013, 249600)

NMED (New Mexico Environment Department), December 20, 2007. "Approval with Direction, Investigation Report for Guaje/Barrancas/Rendija Canyons, Revision 1," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2007, 099632)

NMED (New Mexico Environment Department), May 16, 2012. "Certificates of Completion, One Solid Waste Management Unit and One Area of Concern in the Guaje/Barrancas/Rendija Canyons Aggregate Area," New Mexico Environment Department letter to P. Maggiore (DOE-LASO) and M.J. Graham (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2012, 520388)

Sundance (Sundance Consulting, Inc.), November 2017. "Final, After Action Report for Military Munitions Response Program, Munitions and Explosives of Concern Clearance at SWMUs 00-011(a), 00-011(d), 00-011(e) in Support of the Land Conveyance and Transfer Project Activities, Department of Energy, Los Alamos County, New Mexico," report prepared for the U.S. Army Corps of Engineers, Albuquerque, New Mexico. (Sundance 2017, 700691)

7.2 Map Data Sources

SWMU boundary: As published; Triad SDE Spatial Geodatabase: GIS.PUB.PRD1.sde\PUB.regulatory\PUB.prs_all_reg_admin; November 2019.

Structures: As published; Los Alamos County; gis.losalamosnm.us (user)\basemaps\basemap.FeatureServer; November 2019.

LANL boundary: As published; Triad SDE Spatial Geodatabase: GIS.PUB.PRD1.sde\PUB.Boundaries\PUB.lanlarea; November 2019.

LAC paved road: As published; Triad SDE Spatial Geodatabase GIS.PUB.PRD1.sde\PUB.Infrastructure\PUB.RoadCL; November 2019.

Index Contour: As published; Q:\13-Projects\13-0094\shp\contour10.shp; November 2019.

Terrain Contour: As published; Q:\13-Projects\13-0094\shp\contour10.shp; November 2019.

Hillshade: As published; Q:\2014\Bare_Earth\BareEarth_DEM_Mosaic.gdb; November 2019.

LANL Tech Areas: As published; Triad SDE Spatial Geodatabase: GISPUBPRD1\PUB.Boundaries\PUB.Tecareas; November 2019.

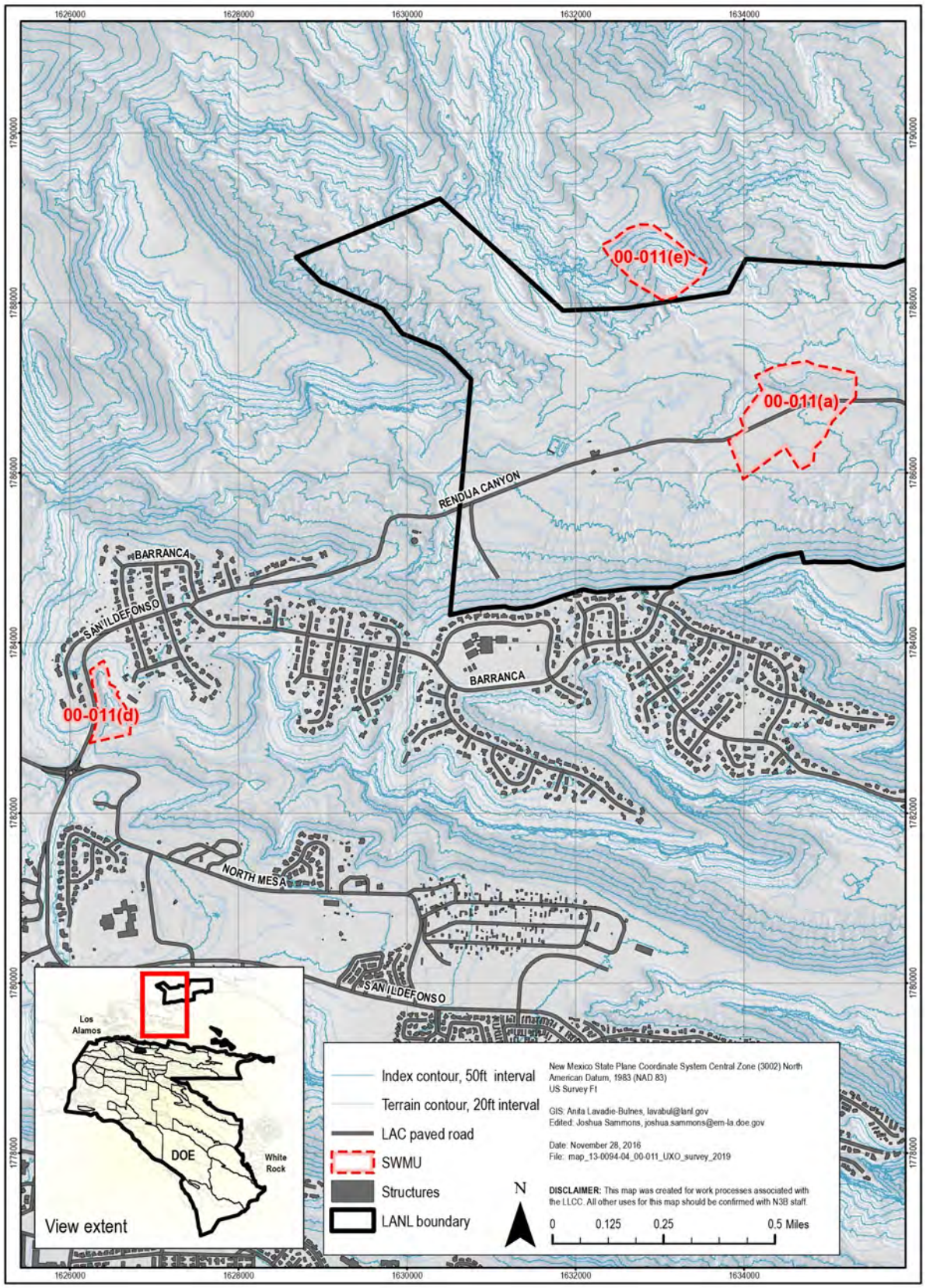

Figure 1.1-1 SWMUs 00-011(a, d, and e) within the Guaje/Barrancas/Rendija Canyons Aggregate Area

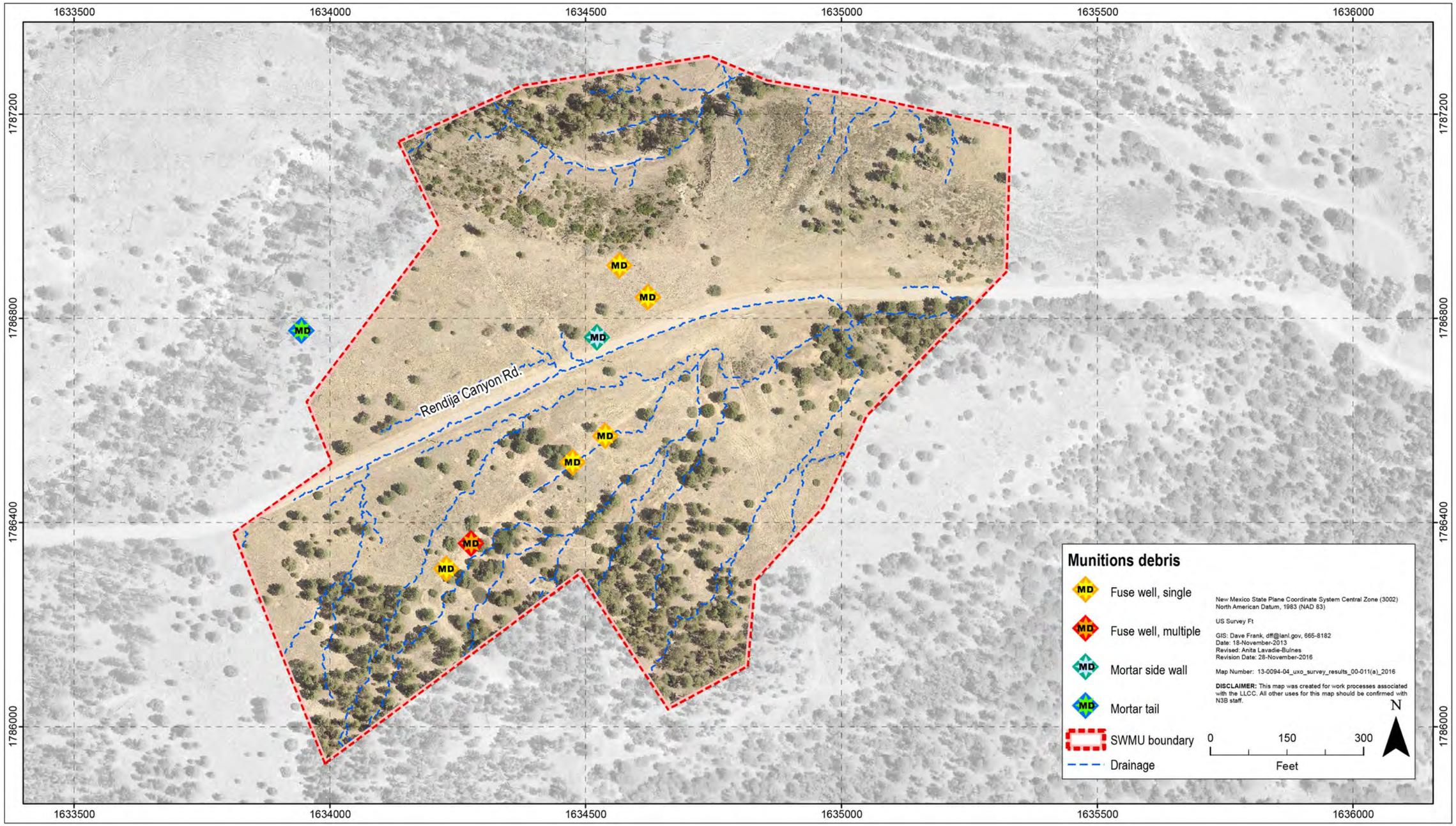

Figure 2.1-1 2016 aerial photograph of SWMU 00-011(a)

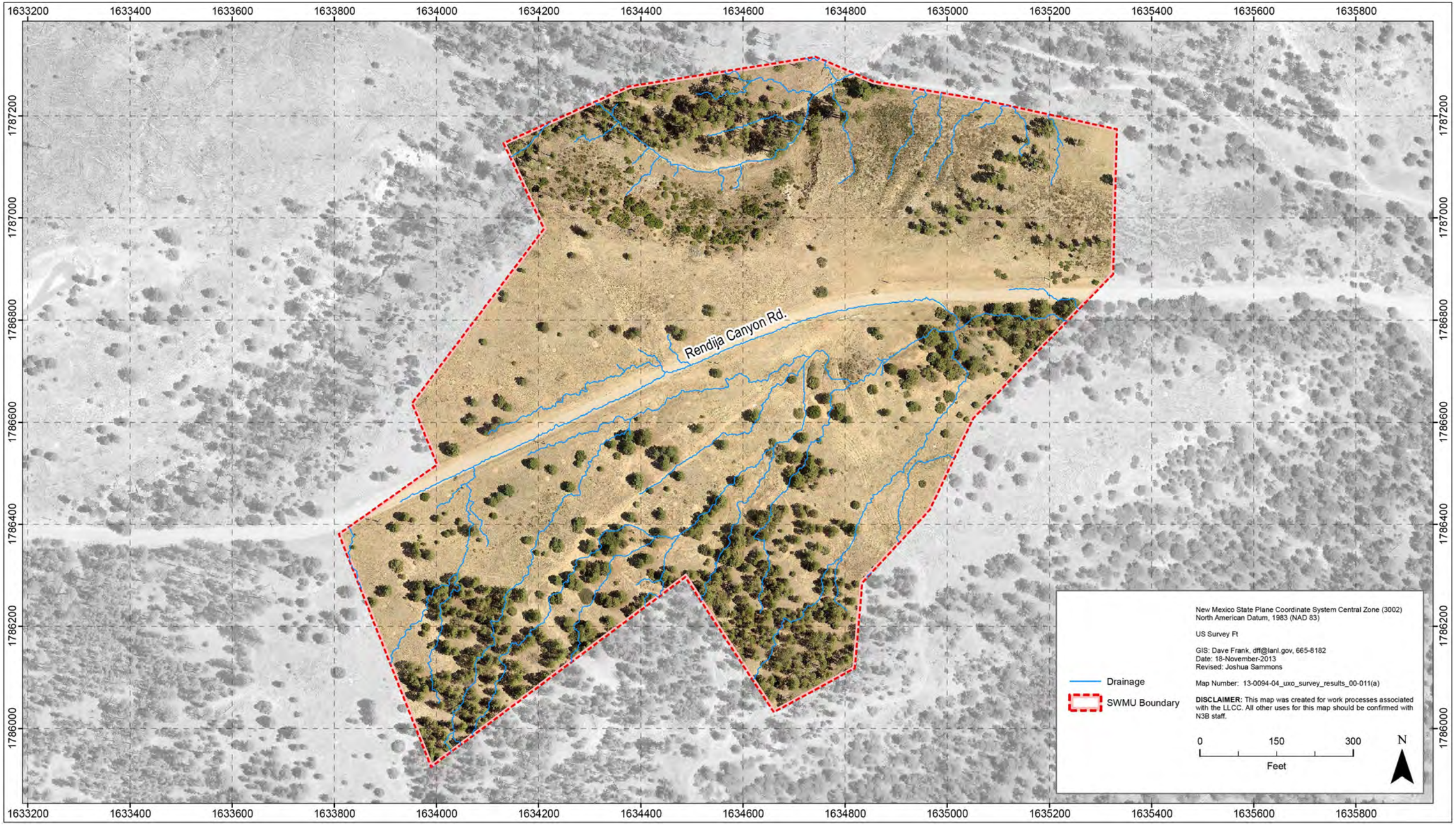

Figure 2.1-2 2019 aerial photograph of SWMU 00-011(a)

Figure 2.2-1 2016 aerial photograph of SWMU 00-011(d)

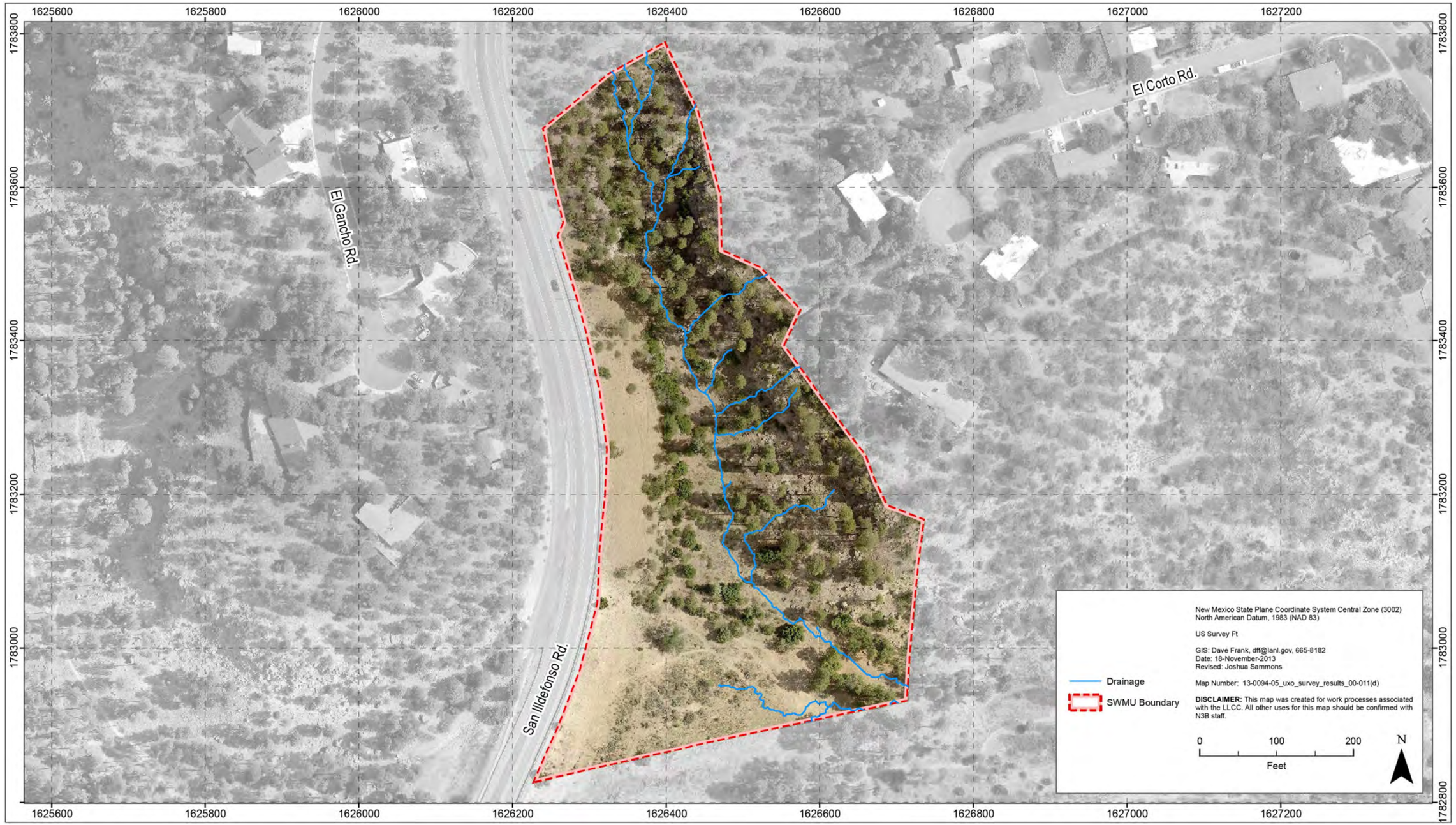

Figure 2.2-2 2019 aerial photograph of SWMU 00-011(d)

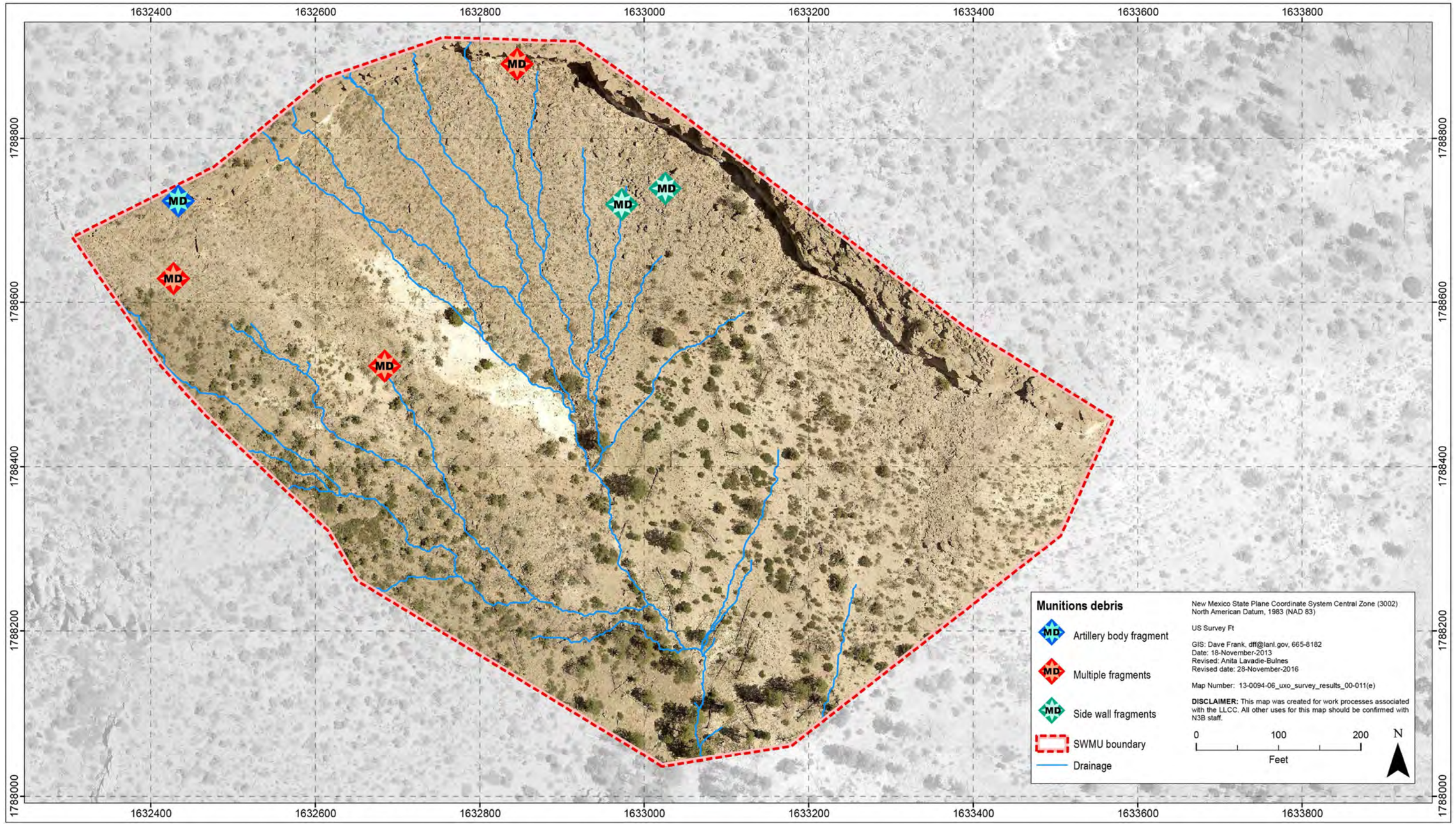

Figure 2.3-1 2016 aerial photograph of SWMU 00-011(e)

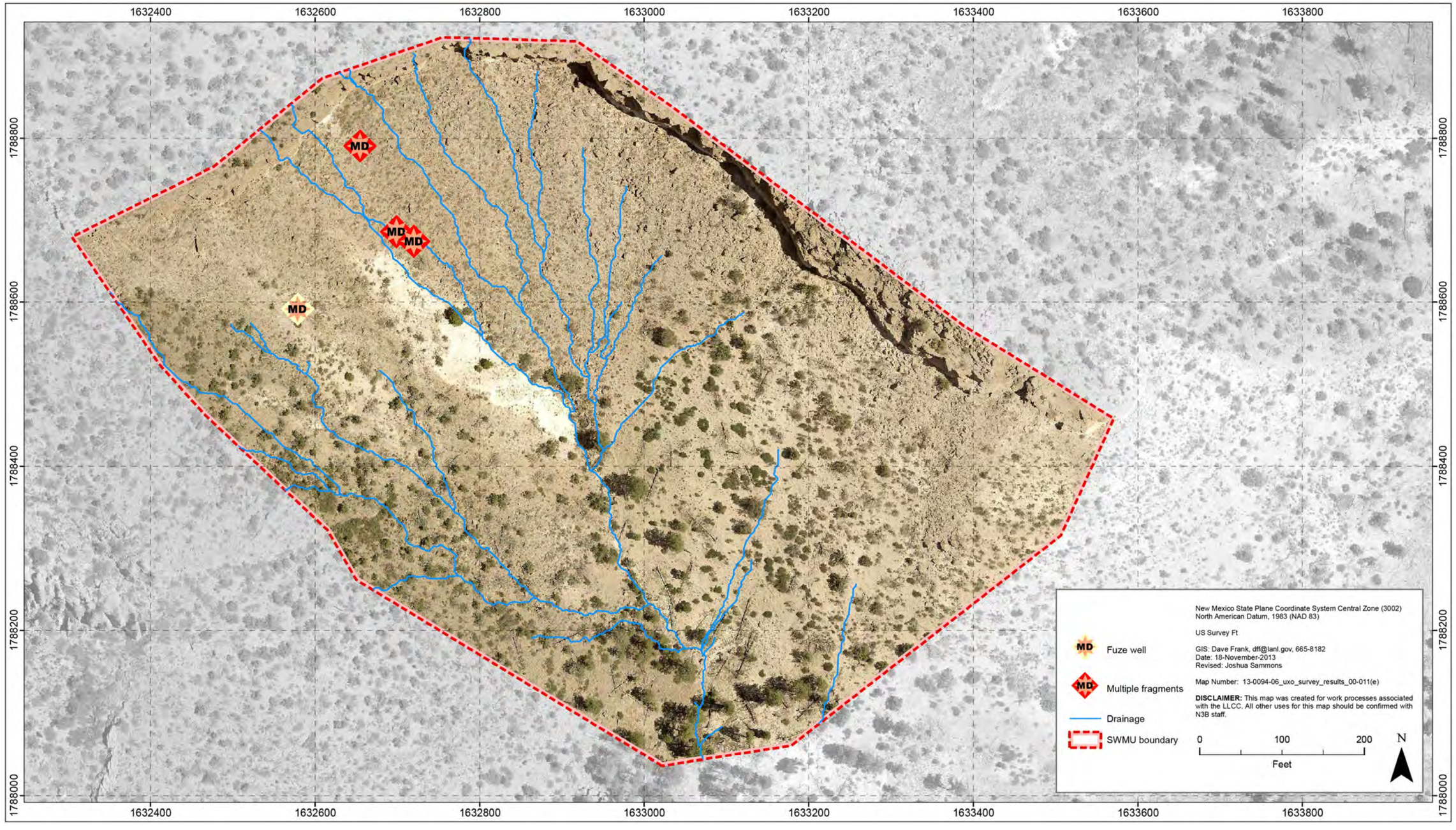

Figure 2.3-2 2019 aerial photograph of SWMU 00-011(e)

Figure 5.3-1 View of the terrain at SWMU 00-011(e)

Figure 5.3-2 A piece of a fuze adapter for an HE round at SWMU 00-011(e)

Figure 5.3-3 Fragments of MD found at SWMU 00-011(e) in 2019. The iPhone 6 (approximately 5.5 in. in height by 2.5 in. in width) is used as a reference for quantity and size of material.