LA-UR-10-0386
January 2010
EP2009-0681

Historical Investigation Report for Twomile Canyon Aggregate Area

Los Alamos
NATIONAL LABORATORY
EST.1943

Prepared by the Environmental Programs Directorate

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EXECUTIVE SUMMARY

The Twomile Canyon Aggregate Area includes a total of 146 solid waste management units and areas of concern located in Technical Area (TA-03), TA-06, TA-22, TA-40, TA-50, TA-59, TA-64, TA-69, and former TA-07 at Los Alamos National Laboratory. Of these 146 sites, 76 have been previously investigated and/or remediated and approved for no further action. For the remaining 70 sites requiring investigation, 33 are located in TA-03, 21 are in TA-06, 4 are in former TA-07, 5 are in TA-22, 3 are in TA-40, 1 is in TA-50, 2 are in TA-59, and 1 is in TA-69. This historical investigation report provides site descriptions, summarizes previous investigations, and presents historical analytical results. The background information and supporting data form the basis for the proposed sampling design necessary to complete the site investigations as presented in the Twomile Canyon Aggregate Area investigation work plan.

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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 the Los Alamos 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 40 mi^2 of the Pajarito Plateau (Figure 1.0-1), 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. The location of the Twomile Canyon Aggregate Area with respect to the Laboratory technical areas (TAs) is shown in Figure 1.0-1.

The Laboratory's Environmental Programs (EP) Directorate, which includes the former Environmental Restoration Project, is participating in a national effort by DOE to clean up sites and facilities. The goal of EP is to ensure that past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, EP is currently investigating sites potentially contaminated by past Laboratory operations. The sites under investigation are designated as either solid waste management units (SWMUs) or areas of concern (AOCs).

This historical investigation report (HIR) describes operational histories, previous investigations, and historical analytical data for SWMUs and AOCs in TAs-03, TA-06, TA-22, TA-40, TA-50, TA-59, TA-64, TA-69, and former TA-07 at the Laboratory within the Twomile Canyon Aggregate Area. The sites addressed in this HIR are potentially contaminated with hazardous and/or radioactive chemicals. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the New Mexico Environment Department (NMED) in accordance with DOE policy.

Corrective actions at the Laboratory are subject to the March 1, 2005, Compliance Order on Consent (the Consent Order). The purpose of this HIR is to provide supporting information for the activities necessary to complete the investigations as presented in the Twomile Canyon Aggregate Area investigation work plan (LANL 2010, 108329). The SWMUs and AOCs are presented in this document on the basis of their regulatory status. Table 1.0-1 provides a summary of all sites within the aggregate area and their regulatory status.

Sections 2 to 9 of this HIR provide site descriptions and operational histories, previous investigations, and historical analytical data for site(s) that are under investigation in TA-03, TA-06, TA-22, TA-40, TA-50, TA-59, TA-64, TA-69, and former TA-07, respectively. For each site, the location, historical operations, and current status are described first, followed by descriptions of historical investigations with dates and activities conducted. The sampling results of obtained from previous investigation are summarized. Plate 1 shows the locations of the sites under investigation in the Twomile Canyon Aggregate Area. The references cited in this report and the map data sources are provided in section 10.

Appendix A includes a list of acronyms and abbreviations, a metric conversion table, and a table for data qualifier definitions. Appendix B presents the decision-level and screening-level data from previous investigations (included on CD).

1.1 Data Overview

Data evaluated in this HIR include historical data collected from 1995 through 2003, as part of Resource Conservation and Recovery Act (RCRA) facility investigations (RFIs) and other corrective actions. In the Sample Management Database, all data records include a vintage code field denoting how and where samples were submitted for analyses.

Analytical samples described in this report have undergone analyses at both on-site and off-site laboratories. Because analytical practices and documentation of analyses vary in quality and completeness, analytical data presented are either screening-level or decision-level data. Screening-level data are appropriate for applications that require only determination of gross contamination areas and/or for general site characterization. Screening-level data are also often used to specify areas to collect additional data. Decision-level data are used to quantify the nature and extent of releases and to perform risk assessments. Decision-level data presented in this HIR have been qualified and/or validated for such use. The decision-level and screening-level data provide supporting information for the investigation activities proposed in the work plan.

Inorganic chemical and radionuclide data from previous investigations were compared with background values (BVs) and fallout values (FVs) (LANL 1998, 059730, p. 6-24). Organic chemicals and anthropogenic radionuclides in soil greater than a depth of 6 in. or in rock are determined to be present if detected.

2.0 SITES UNDER INVESTIGATION IN TA-03

TA-03 occupies a large area located near the western end of South Mesa between Los Alamos Canyon to the north and Twomile Canyon to the south (Plate 1). Sandia and Mortandad Canyons originate within TA-03 and divide the eastern two thirds of the area into finger-like mesas. TA-03 is the Laboratory's main technical area and houses approximately half of the Laboratory's employees and total floor space. TA-03 activities include administrative, experimental sciences, special nuclear materials, public and corporate access, theoretical/computations, and physical support operations. Outfalls and surface water runoff from sites at TA-03 adjacent to Twomile Canyon discharged to the canyon and its tributaries.

Laboratory analyses requested for TA-03 samples having decision-level data are presented in Table 2.0-1. Decision-level data for TA-03 are presented in Tables 2.0-2 to 2.0-4. All laboratory analytical data (decision-level and screening-level) are also provided in Appendix B on CD.

2.1 AOC 03-001(e), Former Storage Area, and SWMU 03-010(a), Surface Disposal Area/Drainage

2.1.1 Description and History

SWMU 03-001(e) is the former location of a storage area on the west side of building 03-0030 (Figure 2.1-1). The area was used to store containers of waste oil contaminated with radionuclides, rinse solvents, and waste mercury from vacuum pumps repaired in a shop in building 03-0030. From 1957 to the early 1960s, liquid waste was discharged from a sink in the vacuum pump repair shop in building 03-0030 directly to drums located in the storage area outside the shop. In the early 1960s, the drums were replaced by a large holding tank with a concrete secondary containment berm. In 1984, a concrete containment was constructed in the storage area, over which a metal grate was placed. The surrounding area was paved with asphalt. After the concrete containment was installed, the holding tank was no longer used and the liquid waste was pumped into drums staged on top of the metal grate. This practice continued until vacuum repair operations ceased in 1992 (LANL 1995, 057590, p. 5-17-1).

SWMU 03-010(a) is surface disposal area and drainage that received waste generated from vacuum pumps repaired at the shop in building 03-0030 [AOC 03-001(e)] (Figure 2.1-1). The surface disposal area received discharges of waste oil and mercury between 1950 and 1957 (LANL 1995, 057590, p. 5-17-1). Former site workers estimated that more than 100 lb of mercury was discharged to the area (LANL 1993, 020947, p. 6-12). The drainage site encompasses an area approximately 40 ft long by 15 ft wide on a moderately steep slope that drains into Twomile Canyon (Figure 2.1-1).

Investigation and remediation activities and data for AOC 03-001(e) and SWMU 03-010(a) are summarized below; decision-level data are not presented in this report but are presented in the reports referenced below.

2.1.2 Previous Investigations

Because AOC 03-001(e) and SWMU 03-010(a) are near each other and share the same contaminant source, investigations have been conducted concurrently at these sites.

In 1992 and 1993, soil and sediment samples were collected to identify potential contaminants, with results indicating the presence of elevated levels of lead, mercury, total petroleum hydrocarbons (TPH), and radionuclides (LANL 1992, 041928; LANL 1995, 046195, pp. 28, 34–37, 43).

In 1994, a voluntary corrective action (VCA) was conducted as a part of the RFI to remove soil containing mercury above 20 parts per million (ppm) and TPH above 100 ppm (LANL 1994, 042624, pp. 3–13). Approximately 120 yd^3 of soil containing mercury, TPH, and radionuclides was removed. During the VCA, volatile organic compounds (VOCs) were detected in the soil (LANL 1994, 042624, pp. 12–13). Because the nature and extent of VOCs have not been characterized, further investigation of the site was required.

Following the VCA, two screening assessments were conducted at SWMU 03-010(a) to identify contaminant concentrations remaining at the site. Screening assessment results identified benzene, chloroform, 1,2-dichloroethane (1,2-DCA), 1,1-dichloroethene (1,1-DCE), and cis-1,3-dichloropropene as the chemicals of potential concern (COPCs) to human health (LANL 1995, 046195, p. 42).

In 1994, as part of the ongoing RFI to identify the nature and extent of contamination, a soil-vapor survey was performed around SWMU 03-010(a) by driving a probe to the soil/tuff or fill/tuff interface, or to refusal, at a total of 32 locations (LANL 1995, 046195, pp. 46–49). Based on the results of the soil-vapor survey, locations for seven boreholes were chosen. These boreholes were augered and sampled to depths between approximately 30 and 100 ft below ground surface (bgs). Free water was encountered in two of the seven boreholes, B1 (borehole [BH] 03-2664) and B4 (BH 03-2667), at approximately 23 ft bgs; water was present in the sample collected near the same depth in B6 (BH 03-2679), but free water was not encountered and the hole was advanced to approximately 100 ft bgs (LANL 1995, 046195, pp. 9, 51).

Data from Phase II investigation soil, soil vapor, surface water seep, and groundwater samples each showed low concentrations of VOCs (primarily chlorinated solvents) (LANL 1995, 046195, p. 53–69). Based on the results of a risk assessment, the 1995 VCA report concluded that the concentrations of VOCs in subsurface soil were below levels of concern, the groundwater found in three boreholes did not represent a usable water source, the surface water did not represent a viable exposure pathway for humans, and contaminant concentrations were below a level of concern for ecological receptors (LANL 1995, 046195, p. 89-91).

In response to requests for additional characterization (NMED 1999, 064614), the Laboratory collected additional groundwater, surface water, and sediment samples (LANL 2003, 081607, pp. 3–7) between December 1999 and April 2000. The investigation concluded the only potentially complete exposure pathway was the inhalation of vapors from subsurface soil using two scenarios: long-term workers and trail users. Water was not considered a complete pathway because the volume was not sufficient to constitute a usable resource and because the COPCs were not detected in surface water (LANL 2000, 068736, pp. 12–13).

In 2001, NMED issued a request for supplemental information to the DOE and the Laboratory requiring further investigation of SWMU 03-010(a) (NMED 2001, 071422). The Laboratory proposed using geophysical techniques to help evaluate the extent of groundwater contamination, the direction of

groundwater flow in the tuff, and to identify any potential connectivity of the groundwater in the tuff to deeper zones of groundwater (LANL 2001, 071487, pp. 1–2). In 2002, NMED approved the proposal (NMED 2002, 073405).

The geophysical investigations, including high-resolution resistivity, residual potential mapping, and electromagnetics (EM), were conducted in August 2002. Although the data from the geophysical investigations were compromised by the presence of subsurface features associated with building 03-0030, they indicated a shallow saturated zone within the fill beneath the foundation of building 03-0030 (LANL 2003, 081599, Appendix B).

In 2005, a drilling investigation was conducted at SWMU 03-010(a) and AOC 03-001(e). DOE subsequently issued an investigation report (DOE 2006, 092669) that concluded the perched groundwater in the area of building 03-0030 is of limited extent and not directly connected with intermediate or regional aquifers (DOE 2006, 092669). The report further concluded that perched zone contained multiple COPCs, including VOCs and tritium. The VOCs were attributed to historical activities at SWMU 03-010(a) and AOC 03-001(e). The source of the tritium is not known.

In 2005, well MW-1 was pulled and the borehole abandoned. A compromised well vault cover seal had allowed surface runoff to enter the well vault, resulting in accumulation and possible infiltration of surface runoff into the well casing. As a result, the well was no longer useful for groundwater monitoring and was a potential contaminant transport pathway to shallow groundwater. Wells 03-B-9, 03-B-10, and 03-B-13 were installed in 2005 to replace well MW-1. Quarterly sampling of these wells began on June 23, 2006, as part of the SWMU 03-010(a) and AOC 03-001(e) perched-groundwater investigation (LANL 2006, 094043).

A tracer test was also performed in 2006 to identify the source of groundwater recharge at the site. Historical observations of water levels and precipitation generally show a rapid change in water levels in wells 03-B-9, 03-B-10, and 03-B-13 in response to precipitation events (NMED 2007, 098282). Results of the tracer study indicated that the building 03-0030 roof drains were the major source of recharge at the site. Camera logging of the culvert near the foundation of the building (beneath the former vacuum pump repair shop) indicated a break in the culvert, which may have been the pathway allowing precipitation from roof drains to recharge the perched groundwater. The culvert was repaired in 2007 resulting in an immediate drop in water levels at the site (LANL 2007, 099171). However, water levels subsequently rebounded.

An aquifer test was conducted at monitoring well 03-B-10 on September 14, 2009, to evaluate the hydraulic characteristics of the perched immediate groundwater near building 03-0030 before monitoring wells 03-B-9 and 03-B-10 were plugged and abandoned because they had been damaged by snow plows. Test results indicated the perched aquifer beneath building 03-0030 is of limited areal extent. The perched aquifer is estimated to be 160 ft × 160 ft and represents approximately 75 gal., which is consistent with the 71 gal. produced during the pump test (LANL 2009, 107631). Monitoring wells 03-B-9 and 03-B-10 were plugged and abandoned following the aquifer test (LANL 2009, 107459).

2.1.3 Analytical Results

Analytical results for all previous investigation and remediation activities have been reported in the documents listed above. Analytical samples collected through the August 2006 sampling event have been reported in Appendix D of the periodic monitoring report for Pajarito watershed (LANL 2007, 095116). Wells B-03-10 and B-03-13 consistently produce sufficient water for sampling. Well B-03-9 consistently pumps or bails dry during sampling, and only field parameters have been generated from the quarterly sampling events. The analytical results presented in the periodic monitoring report for Pajarito watershed identified lead in filtered water samples at concentrations as great as 20 µg/L (B-13). A maximum

concentration of 94 µg/L (at B-03-10) for 1,1,1-trichloroethane (TCA) and 5.39 µg/L (at B-03-13) for 1,1,1-dichloroethene were also identified and both exceeded the New Mexico groundwater standards of 60 µg/L and 5 µg/L respectively. Other analytes detected in wells B-03-10 and B-03-13 included diesel range organics (DRO), chlorinated solvents, dioxane, and chloroform at concentrations similar to those previously observed at SWMU 03-010(a) and AOC 03-001(e) (LANL 2007, 095116, p. 8-9).

Radionuclide results evaluated in the periodic monitoring report for Pajarito watershed identified tritium, a historical site contaminant, at a concentration of 300 pCi/g in wells B-03-10 and B-03-13. Also detected in water samples from the site were strontium-90 in B-03-10 and B-03-13, cesium-137 in B-10, and plutonium-239 in B-03-13. However, previous results did not identify these radionuclides, and the results may be analytical artifacts (LANL 2007, 095116, p. 9). Because these radionuclides are at estimated concentrations and were not previously detected, they may be the result of laboratory contamination. Identification of these new detections as COPCs will be evaluated as new quarterly sampling results are reported in subsequent periodic monitoring reports.

2.2 SWMU 03-001(k), Former Storage Area

2.2.1 Description and History

SWMU 03-001(k) is the former location of a less-than-90-day hazardous waste accumulation area located on the south side of building 03-0016, the inactive Van de Graaff Accelerator and Ion Beam Facility (Figure 2.2-1). SWMU 03-001(k) consists of two level asphalt areas each measuring approximately 20 ft × 30 ft. The areas are located next to doors on the south side of the building. Concrete pads located in front of each doorway are bounded by asphalt paving on three sides. SWMU 03-001(k) was used primarily as a storage yard for electrical equipment destined for salvage (LANL 1993, 020947). A 1986 field inspection of SWMU 03-001(k) noted oily unmarked drums where fresh vacuum oil for experiments was stored (DOE 1987, 008663). Asphalt chip samples collected in 1989 indicated the presence of Aroclors (LANL 1993, 020947). A 1993 inspection found the asphalt and concrete pad devoid of stains (LANL 1993, 020947).

2.2.2 Previous Investigations

In 2001, four asphalt samples and five soil samples beneath the asphalt were collected to determine if contaminants were present at SWMU 03-001(k) (LANL 2001, 070937). The samples were submitted for analysis of inorganic chemicals, PCBs and tritium; in addition, soil samples were submitted for organic chemical analysis. Data from the 2001 sampling event are screening-level data and are not presented in this report; however, the data showed metals detected above BVs, trace concentrations (<1 ppm) of aroclor-1260, and tritium detected above FVs. Samples collected in 2001, the analysis requested, and the data are presented in Appendix B.

2.2.3 Analytical Results

No decision-level data are available for SWMU 03-001(k).

2.3 SWMU 03-003(a), Former Storage Area, and AOC 03-042, Former Containment Area

2.3.1 Description and History

SWMU 03-003(a) is a former outdoor storage area used for temporary storage of electrical equipment destined for salvage, some of which contained oil. The storage area was located on the north and west sides of building 03-0218 (Figure 2.3-1). The northern portion of the storage area consisted of the asphalt paving next to the north side of building 03-0218. The western portion of the storage area consisted of a

44 ft long × 27 ft wide concrete pad surrounded by an 18 in. to 20 in. high concrete curb. The concrete pad and curb are bounded by on three sides soil covered with gravel. A 30 ft wide × 60 ft long area of asphalt paving abuts the south end of the concrete curb. During the 1986 CEARP survey, six 55-gal. drums were observed stored next to capacitors on asphalt in the storage area on the north side of building 03-0218; staining was visible on the asphalt beneath the drums (DOE 1987, 008663). Capacitors and transformers labeled as containing less than 50 ppm PCBs were stored in the west portion of the former storage area (LANL 1993, 020947). During a 1989 inspection, leaking capacitors, drums of epoxy, one or two batteries, and vacuum pumps were observed in the western portion of the storage area (LANL 1993, 020947). In the early 1990s, a small area of oil stained asphalt was excavated to a depth of 3 in. around the storm drain located in the western portion of SWMU 03-003(a) (LANL 1993, 020947). Use of the SWMU 03-003(a) storage area ceased in the early 1990s.

AOC 03-042 is a former containment area located around the concrete pad in the western portion of SWMU 03-003(a) (Figure 2.3-1). In 1965, wooden surge tanks (former structures 03-0063 and 03-0064) were erected on the concrete pad and a chainlink fence was installed along the top of the concrete curb surrounding the pad. The tanks contained non-PCB dielectric mineral oil used as insulation in experiments conducted in building 03-0218 (LANL 1995, 057590). The concrete curb around the pad was used as secondary containment in the event the tanks overflowed during pressure surges caused by experiments. During heavy rain events, water with an oily film would overflow the containment area (LANL 1995, 057590). The surge tanks and chainlink fence were removed in 1985 along with the electrical equipment destined for salvage. Stains were observed on the concrete pad during a 1992 inspection (LANL 1993, 020947). The concrete curb and pad are still present at the site beneath transportable containers (structures 03-2279 and 03-2403).

2.3.2 Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 03-003(a) and AOC 03-042, two asphalt and nine surface soil samples (0 to 0.5 ft bgs) were collected from eight locations and field screened for polychlorinated biphenyls (PCBs) and VOCs. PCBs were detected above 0.5 mg/kg in both asphalt samples and in four soil samples. Two of the soil samples were submitted for analysis of metals, VOCs, semivolatile organic compounds (SVOCs), pesticides, PCBs, and gross radiological screening. Data from the 1994 Phase I RFI are screening-level and are not presented in this report; however, the data showed mercury and zinc detected slightly above BVs in one sample and PCBs detected at concentrations below 1 ppm in both samples. Samples collected during the 1994 RFI, the analysis requested, and the data are presented in Appendix B.

2.3.3 Analytical Results

No decision-level data are available for SWMU 03-003(a) or AOC 03-042.

2.4 SWMU 03-003(b), Former Storage Area

2.4.1 Description and History

SWMU 03-003(b) is a former outdoor storage area located west of building 03-0253 (Figure 2.3-1). The storage area had a compacted base-course surface and was used temporarily to stage oil-containing electrical equipment destined for salvage. The dimensions of the area are not known (LANL 1993, 020947). While in use, up to 100 electrical capacitors were observed to be stored in the area, some of which were leaking (LANL 1996, 052930). In 1985 and 1986, the capacitors and underlying stained soil were removed and the storage area was decommissioned. In 1989, a transportable container, structure 03-1950, was installed at the site (LANL 1996, 052930).

2.4.2 Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 03-003(b), 10 surface soil samples (0 to 0.5 ft bgs) were collected from eight locations and field screened for PCBs and VOCs. PCBs were detected above 0.5 mg/kg in two soil samples. Two of the samples were submitted for analysis of metals, VOCs, SVOCs, pesticides, PCBs, and gross radiological screening. Data from the 1994 Phase I RFI are screening-level data and are not presented in this report; however, the data showed PCBs detected at a concentration below 1 mg/kg in one sample. Samples collected during the 1994 RFI, the analysis requested, and the data are presented in Appendix B.

2.4.3 Analytical Results

No decision-level data are available for SWMU 03-003(b).

2.5 AOC 03-003(h), Transformers

2.5.1 Description and History

AOC 03-003(h) is the former location of three PCB-containing transformers in the mezzanine inside building 03-0039 (Figure 2.5-1). The 1990 SWMU report incorrectly states that four transformers were located at AOC 03-003(h). A 1986 inventory of PCB transformers confirmed that only three transformers were located in this area (LANL 1990, 007511). In 1984, the three transformers were removed and replaced with non-PCB transformers; no staining was observed when the PCB transformers were removed (LANL 1995, 057590).

2.5.2 Previous Investigations

No previous investigations have been conducted at AOC 03-003(h).

2.5.3 Analytical Results

No decision-level data are available for AOC 03-003(h).

2.6 AOC 03-003(j), Transformers

2.6.1 Description and History

AOC 03-003(j) is the former location of four PCB-containing transformers in three equipment rooms (Rooms E-6, N-8, and S-18) in the basement of the Physics Building (03-0040) (Figure 2.6-1). In 1981, the transformers were removed from all three equipment rooms. No staining was observed on the concrete pad in equipment room E-6. Because oil staining was observed on the concrete pads beneath the transformers in equipment rooms N-8 and S-18, the concrete pads were also removed (LANL 1995, 057590). One soil sample was collected beneath the concrete pad in each equipment room (N-8 and S-18) and analyzed for PCBs. Analytical results showed PCB detected at 20 ppm in equipment room N-8 and at 49 ppm in equipment room S-18 (Heskett 1994, 065828). New concrete pads were poured in both equipment rooms without further sampling or soil removal (LANL 1995, 057590). Non-PCB transformers were subsequently placed in the three equipment rooms.

2.6.2 Previous Investigations

No previous investigations have been conducted at AOC 03-003(j).

2.6.3 Analytical Results

No decision-level data are available for AOC 03-003(j).

2.7 AOC 03-003(k), Area of Potential Soil Contamination

2.7.1 Description and History

AOC 03-003(k) is an area of potential soil contamination associated with the former location of a non-PCB transformer (less than 50 ppm PCB), reportedly staged on the east side of building 03-0316 (Figure 2.7-1) (LANL 1989, 011956; LANL 1993, 020947). No additional information is available for this site.

2.7.2 Previous Investigations

No previous investigations have been conducted at AOC 03-003(k).

2.7.3 Analytical Results

No decision-level data are available for AOC 03-003(k).

2.8 AOC 03-003(l), Transformers

2.8.1 Description and History

AOC 03-003(l) is the former location of two PCB-containing transformers in room 70 in the basement of the Van de Graaff facility (building 03-0016) (Figure 2.8-1). The two transformers (PCB ID 5557 and 5558) were removed in 1989 (Heskett 1994, 065828). During a 1994 inspection, staining was noted on the basement floor in room 70 (LANL 1995, 057590). Data from PCB swipe samples showed PCB concentrations between 2870 µg/100 cm^2 and 3065 µg/100 cm^2. The area was double-washed, rinsed, and resampled. Postcleanup swipe sampling results showed PCB concentrations between 352 µg/100 cm^2 and 3760 µg/100 cm^2 (Heskett 1994, 065828).

2.8.2 Previous Investigations

No previous investigations have been conducted at AOC 03-003(l).

2.8.3 Analytical Results

No decision-level data are available for AOC 03-003(l).

2.9 AOC 03-003(p), Former Storage Area

2.9.1 Description and History

AOC 03-003(p) is the former location of an outdoor storage area east of warehouse building 03-0142 (Figure 2.9-1). From the early 1960s to 1994, this area was used to store drums, miscellaneous equipment, and electrical capacitors and transformers (LANL 1995, 057590). Past site inspections documented stains and leaks from drums and equipment (LANL 1993, 020974). In 1995, the former storage area location and the entire area east of building 03-0142 were graded and paved with asphalt for a new parking lot.

2.9.2 Previous Investigations

In 1994, before the site was paved, soil samples were collected and analyzed for metals (LANL 1995, 057590). Lead was detected at concentrations above the BV at several sampling locations. A VCA was conducted in August 1995 that resulted in the removal of 10 yd^3 of soil (excavated to a maximum depth of 16 in.) from an unpaved area in the center of AOC 03-003(p) (LANL 1996, 053780). During the 1995 VCA, three confirmatory samples were collected following soil removal activities (LANL 1996, 053780). All sampling locations were field screened for PCB, VOCs, and radioactivity before samples were collected and submitted for analysis of metals and PCBs. Data collected during the 1995 VCA are screening-level data and are not presented in this work plan; however, the data showed lead and antimony detected above soil BVs and detected PCBs with a maximum concentration of 3.23 mg/kg. The entire area was subsequently graded, leveled, and paved. Samples collected during the 1995 VCA, the analysis requested, and the data are presented in Appendix B.

2.9.3 Analytical Results

No decision-level data are available for AOC 03-003(p).

2.10 AOC 03-014(a2), Floor Drains Associated with Former WWTP

2.10.1 Description and History

AOC 03-014(a2) consists of three active floor drains in building 03-0316, the high-voltage test facility (Figure 2.10-1). The drains were installed in 1969 and previously discharged to the sanitary sewer line for the former TA-03 WWTP. The TA-03 WWTP was decommissioned in 1992 when the TA-46 Sanitary Wastewater Systems Consolidation (SWSC) Plant came online; the floor drains were subsequently tied to the SWSC sanitary sewer line.

2.10.2 Previous Investigations

No previous investigations have been conducted at AOC 03-014(t).

2.10.3 Analytical Results

No decision-level data are available for AOC 03-014(a2).

2.11 SWMU 03-014(t), Lift Station Associated with Former WWTP

2.11.1 Description and History

SWMU 03-014(t) consists of an active sanitary wastewater lift station (structure 03-1869) on the north side of building 03-1612 (Figure 2.11-1). The lift station, constructed in 1987, pumped sanitary effluent from buildings in the southeast portion of TA-03 north to an elevation that yielded gravity flow to the TA-03 WWTP. The lift station was tied into the TA-46 SWSC plant when it came online in 1992.

2.11.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-014(t).

2.11.3 Analytical Results

No decision-level data are available for SWMU 03-014(t).

2.12 AOC 03-014(z), Former Floor Drain Associated with Former WWTP

2.12.1 Description and History

AOC 03-014(z) consists of a single floor drain located in the former printed circuit board shop in the Physics Building (03-0040) (Figure 2-12-1). This floor drain discharged to the sanitary sewer, which in turn drained to the former TA-03 WWTP (LANL 1995, 057590). Mop water and spills from sinks were directed to the AOC 03-014(z) floor drain. The drainline for the floor drain is visible in the utility access raceway beneath the floor of the former circuit board shop. Visual inspections of AOC 03-014(z) found that the surrounding concrete floor and drain cover were stained and corroded from acid spills (LANL 1990, 007511). The printed circuit shop ceased operations in early 1989, and the floor drain in the former shop was plugged in October 1992. The shop area in building 03-0040 was gutted and remodeled into office space in 2006–2007.

2.12.2 Previous Investigations

No previous investigations have been conducted at AOC 03-014(z).

2.12.3 Analytical Results

No decision-level data are available for AOC 03-014(z).

2.13 AOC 03-022, Former Containment Sump

2.13.1 Description and History

AOC 03-022 is the former location of a containment sump (former structure 03-0550) southwest of building 03-0316 (LANL 1990, 007511) (Figure 2.13-1). The 84 ft long × 17 ft wide × 2.3 ft deep containment sump was constructed of steel reinforced concrete walls with a sand bottom underlain by a Hypalon liner and a metal screen and steel I-beams over the top (LANL 1996, 053795). Two 500-gal. steel tanks containing Shell Diala AX dielectric fluid used to operate a generator in building 03-0316 were situated on the I-beams (LANL 1996, 053795). The containment sump provided secondary containment for the two tanks. The tanks were connected to building 03-0316 by a buried 90-ft-long 6-in.-diameter steel transfer pipe. During a 1988 field inspection, oily water was observed in the sump along with oil spills next to the sump (LANL 1990, 007511). The tanks, pumps, and aboveground piping connecting the two tanks were removed in early 1995 (LANL 1996, 057590).

2.13.2 Previous Investigations

During a 1995 VCA, the steel support structure, oily water, and the Hypalon liner were removed and disposed of along with any visibly stained soil beneath the liner. Soil beneath and surrounding the sump was sampled for TPH and benzene, toluene, ethylbenzene, and xylene (BTEX) to guide excavation activities and resulted in soil and tuff with TPH concentrations greater than the 2600 mg/kg cleanup level being excavated to a depth of 4.7 ft bgs (LANL 1996, 053795). The oil transfer line and the soil surrounding the transfer line between the containment sump and building 03-0316 were also removed and disposed of during the VCA (LANL 1996, 053795). Confirmation samples were collected and analyzed for TPH to confirm that the 2600 mg/kg TPH cleanup level had been met. Data from the 1995

VCA confirmation samples are screening-level data and are not presented in this work plan; however, the data showed TPH concentrations ranging from 257 mg/kg to 862 mg/kg in the confirmation samples (LANL 1996, 053795). Samples collected during the 1995 VCA, the analysis requested, and the data are presented in Appendix B.

2.13.3 Analytical Results

No decision-level data are available for AOC 03-022.

2.14 SWMU 03-025(b), Oil/Water Separators

2.14.1 Description and History

SWMU 03-025(b) consists of two oil/water separators, one active (above-floor) and one inactive (subfloor) in the basement of the Tech Shops Addition (building 03-0102) (LANL 1990, 007511) (Figure 2.14-1). The active oil/water separator is constructed of welded steel with dimensions of 40 in. long × 2 ft wide × 30 in. deep and is positioned on the concrete basement floor within an 8-in.-high concrete berm. The subfloor inactive oil/water separator is a 0.25-in.-thick welded steel box contained in a concrete sump (LANL 1996, 057590). Wastewater from floor, shower, and sink drains in building 03-0102 flows through the active, above-floor separator where any oil is collected in the trap. The wastewater then flows through a drainline that passes through the inactive, below-floor separator and continues on to the radioactive liquid waste (RLW) line that transfers the wastewater to the RLWTF at TA-50. Oil collected in the separator is manually suctioned into containers and disposed of off-site.

2.14.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-025(b).

2.14.3 Analytical Results

No decision-level data are available for SWMU 03-025(b).

2.15 AOC 03-025(c), Oil/Water Separator

2.15.1 Description and History

AOC 03-025(c) is the former location of an oil/water separator that was located outdoors next to the south side of the steam-cleaning room at the Tech Shop (building 03-0039) (LANL 1990, 007511) (Figure 2.15-1). The oil/water separator was contained within a concrete sump that provided secondary containment (LANL 1990, 007511). The oil/water separator was installed in 1963 and received wastewater containing radioactively contaminated oil and solvents from steam cleaning of newly machined parts. Oil and solvents in the wastewater were collected in the separator and the wastewater was discharged to the RLW line, which transferred the wastewater to the TA-50 RLWTF (LANL 1995, 057590). The RLW line was removed in the mid-1980s as part of the RLW line-removal project (Elder et al. 1986, 006666). Oil collected in the separator was manually suctioned into containers and disposed of at MDA G at TA-54. The separator was equipped with an alarm in the event the separator reached capacity, which never occurred. Discharges from steam cleaning operations in building 03-0039 ceased in 1992 and the oil/water separator was removed; however, the concrete containment remains in place (LANL 1995, 057590).

2.15.2 Previous Investigations

No previous investigations have been conducted at AOC 03-025(c).

2.15.3 Analytical Results

No decision-level data are available for AOC 03-025(c).

2.16 SWMU 03-026(d), Sump/Lift Station

2.16.1 Description and History

SWMU 03-026(d) is an inactive wastewater sump/lift station in room 50 in the basement of the Van de Graaff facility (building 03-0016) (LANL 1993, 020947) (Figure 2.2-1). The lift station was installed in 1962 and received wastewater from bathrooms and floor drains throughout the facility including tritium-contaminated flow from fixtures and drains in rooms 2, 3, 62, 64, 66, 67, 69, 70, 170, and 270; the wastewater was pumped to the former TA-03 WWTP (LANL 1990, 007511). Building 03-0316 and the lift station have been inactive since the late 1990s. Decontamination and decommissioning activities to remove radioactively contaminated equipment and fixtures from the interior of building 03-0016 were implemented in 2005–2007.

2.16.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-026(d).

2.16.3 Analytical Results

No decision-level data are available for SWMU 03-026(d).

2.17 SWMU 03-033, Former Liquid Waste Collection System

2.17.1 Description and History

SWMU 03-033 consists of the former liquid waste collection system associated with the former printed circuit board shop located in the northwest portion of the Physics Building (03-0040) (LANL 1990, 007511) (Figure 2.2-1). The printed circuit board shop operated from the mid-1970s to January 1991 (LANL 1993, 020947). Wastes from plating baths and plating rinses were discharged to the SWMU 03-033 collection system and subsequently containerized and disposed of. The wastes consisted of ammonia-etching rinsates, concentrated nitric acid, and diluting water and residues. The wastes contained trace amounts of nickel, copper, lead, silver, gold, and tin as well as cyanides, ferric chloride, pyrophosphate solutions, and hydrochloric acid (LANL 1993, 020947).

The waste collection system was located outside the Physics Building and consisted of a 200-gal. transfer tank (and pump) housed inside a section of 6-ft-diameter corrugated metal pipe. The corrugated pipe was lined with an epoxy coating and installed upright, 8 ft belowgrade. Originally, the pipe had a gravel base. In 1986, the gravel base was upgraded to a concrete base. Liquid wastes from the printed circuit board shop were discharged to the transfer tank. The liquid wastes were pumped from the tank through an underground line to a portable 800-gal. tank, tuff tanks, or drums for temporary storage pending removal and disposal. The temporary storage tanks and drums were staged above a secondary containment structure constructed of concrete and measuring 6 ft wide × 8 ft long × 2 ft deep (LANL 1993, 020947).

The printed circuit board shop ceased operation in 1991 and the 200-gal. transfer tank and associated pump were removed in October 1992. The secondary containment structure and 6-ft-diameter corrugated metal pipe remain at the site. In 2006-2007, the former location of the printed circuit board shop in building 03-0040 was gutted and remodeled into office space.

2.17.2 Previous Investigations

During the 1994 Phase I RFI, 12 samples were collected from two depths (0 to 1 ft and 1 to 1.5 ft bgs) from four locations around the secondary concrete containment and from two locations adjacent to the downgradient side of the corrugated metal pipe area (LANL 1996, 052930). Sampling locations were field screened for VOCs and the samples were submitted for analysis of metals; some samples were also submitted for analysis of VOCs and SVOCs. Data collected during the 1994 RFI are screening-level data and are not presented in this report; however, the data showed metals detected above BVs and detected organic chemicals (PAHs). Samples collected during the 1994 RFI, the analysis requested, and the data are presented in Appendix B.

In 2003, three concrete chip samples were collected from three locations in the bottom of the utility raceway located beneath the floor of the former printed circuit board shop prior to implementation of remodeling activities. The three concrete samples were submitted for analysis of metals, VOCs and SVOCs. Data collected in 2003 are screening-level data and are not presented in this report; however, the data showed metals detected above BVs. Samples collected in 2003, the analysis requested, and the data are presented in Appendix B.

2.17.3 Analytical Results

No decision-level data are available for SWMU 03-033.

2.18 AOC 03-038(f), Drainline

2.18.1 Description and History

AOC 03-038(f) consists of an abandoned section of the former industrial/acid waste line that served a transportable (structure 03-1502) (LANL 1990, 007511) (Figure 2.18-1). The drainline discharged liquid wastes from a shower, sink, and toilet in structure 03-1502 to the old industrial waste line via a manhole (structure 03-0728) (LANL 1990, 007511). In 1986, manhole 03-0728 and the majority of the RLW line within TA-03 were removed; however, a section of drainline from the manhole to structure 03-1502 (under a retaining wall) was left in place (LANL 1995, 057590). Structure 03-1502 was moved to TA-54 in 1987 after the drainline removal project was completed. Building 03-1898 is now located within the footprint of former structure 03-1502.

2.18.2 Previous Investigations

No previous investigations have been conducted at AOC 03-038(f).

2.18.3 Analytical Results

No decision-level data are available for AOC 03-038(f).

2.19 SWMU 03-043(c), Area of Potential Soil Contamination from Former Manhole

2.19.1 Description and History

SWMU 03-043(c) consists of an area of potential soil contamination associated with former manhole 03-0718, located in an alcove on the north side of building 03-0040 (LANL 1995, 057590) (Figure 2.19-1). The 1990 SWMU report incorrectly identified SWMU 03-043(c) as a tank of unknown capacity; however, structure 03-0718 is correctly identified as a manhole in subsequent reports (West 1994, 076164; LANL 1995, 057590). The manhole was constructed of steel-reinforced concrete 8 in. thick × 3 ft long × 4 ft wide × 4 ft deep and located belowgrade (LANL 1995, 057590). The manhole was part of the RLW collection system that transported RLW from building 03-0040 to the former RLWTF at TA-45. A 6-in.-diameter industrial waste line passed horizontally through the bottom of the manhole (LANL 1995, 057590). In 1984, the manhole was removed and the area remediated as part of the RLW line removal project (LANL 1995, 057590). The manhole was noted as being in good condition with no visible cracks before or during the removal action (LANL 1994, 076164).

2.19.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-043(c).

2.19.3 Analytical Results

No decision-level data are available for SWMU 03-043(c).

2.20 Consolidated Unit 03-050(a)-00, Area of Potential Soil Contamination from Stack Emissions

Consolidated Unit SWMU 03-050(a)-00 consists of four SWMUs [03-050(a), 03-050(d), 03-050(f) and 03-050(g)] all associated with areas of potential soil contamination resulting from emissions release from stacks on buildings in TA-03.

2.20.1 SWMU 03-050(a), Potential Soil Contamination from Stack Emissions

2.20.1.1 Description and History

SWMU 03-050(a) is an area of potential soil contamination associated with the exhaust emissions from 24 active stacks on the roof of building 03-0029 (LANL 1990, 007511) (Figure 2.20-1). Building 03-0029, the CMR Building, was built in 1961 and houses an irradiated-fuel examination facility and analytical chemistry operations that involve handling radioactive materials containing uranium, plutonium, iodine, mixed fission products, and tritium (LANL 1995, 057590). High-efficiency particulate air (HEPA), Aerosolve 95, and charcoal filters are used to remove radioactive particulates from stack effluent gas (Balo and Warren 1982, 007205, p. 17-435).

2.20.1.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-050(a).

2.20.1.3 Analytical Results

No decision-level data are available for SWMU 03-050(a).

2.20.2 SWMU 03-050(d), Potential Soil Contamination from Stack Emissions

2.20.2.1 Description and History

SWMU 03-050(d) is an area of potential soil contamination associated with the exhaust emissions from the air-pollution-control device located on the south side of building 03-0102 (Figure 2.20-2). The device was a shaker-type baghouse situated on a concrete pad (LANL 1990, 007511). Building 03-0102 was constructed in 1957 for machining uranium-235 and uranium-238, lithium hydride, and small quantities of other metals. The baghouse was the primary air-pollution-control device to remove lithium hydride particles from the gas stream to the stack, and it was also used as a secondary air-pollution-control device to remove uranium graphite particulates from the gas stream to the stack. The baghouse ceased operating in 1992 because of a failure detected in a test, which measured the efficiency of the collection system. The baghouse was replaced by HEPA-filter banks. Radionuclide air emissions from the baghouse were monitored from the time it became operational in 1957 until it was decommissioned in 1992. Releases of radioactive uranium particulates through the baghouse fabric were deposited on the concrete pad. The concrete pad underlying the baghouse was subsequently painted to immobilize any existing uranium particulates. Radiological field survey results showed no detectable activity on the concrete pad or surrounding soil.

2.20.2.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-050(d).

2.20.2.3 Analytical Results

No decision-level data are available for SWMU 03-050(d).

2.20.3 SWMU 03-050(f), Potential Soil Contamination from Stack Emissions

2.20.3.1 Description and History

SWMU 03-050(f) is an area of potential soil contamination associated with emissions from the exhaust stack on the Physics Building (03-0040) (Figure 2.20-3). Beryllium foil was manufactured in room S-118 in the Physics Building during the 1950s. During the 1960s, beryllium windows were cleaned with acetone and other solvents in room E-116. The cleaning solvents were allowed to evaporate in the fume hood connected to the exhaust stack. Work involving tritium was conducted in the calibration laboratory (room W-10) beginning in the mid-1980s.

2.20.3.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-050(f).

2.20.3.3 Analytical Results

No decision-level data are available for SWMU 03-050(f).

2.20.4 SWMU 03-050(g), Potential Soil Contamination from Stack Emissions

2.20.3.1 Description and History

SWMU 03-050(g) is an area of potential soil contamination associated with tritium emissions from exhaust stacks on the Van de Graaff facility (building 03-0016) (Figure 2.20-4). Tritium work was carried out at the

Van de Graaff facility from 1951 to the early 1990s when the facility became inactive. Radiological decontamination and decommissioning activities began at the Van de Graaff facility in 2005.

2.20.4.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-050(g).

2.20.4.3 Analytical Results

No decision-level data are available for SWMU 03-050(g).

2.21 AOC 03-051(a), Area of Potential Soil Contamination

2.21.1 Description and History

AOC 03-051(a) is an area of potential soil contamination associated with an inactive air compressor located in a metal shed adjacent to the southeast corner of building 03-0039 (LANL 1995, 057590) (Figure 2.21-1). The compressor was noted as leaking during the 1987 RCRA facility assessment investigation (LANL 1995, 057590). The oil used in the compressor leaked through gaskets and oil stains were observed inside the shed and on the asphalt 2 ft from the shed (LANL 1995, 057590). Data from one swipe sample collected from the compressor in 1994 was analyzed for PCBs; the results showed a PCB concentration of 2.5 µg/100 cm^2 (LANL 1995, 057590).

2.21.2 Previous Investigations

No previous investigations have been conducted at AOC 03-051(a).

2.21.3 Analytical Results

No decision-level data are available for AOC 03-051(a).

2.22 AOC 03-051(b), Area of Potential Soil Contamination

2.22.1 Description and History

AOC 03-051(b) is an area of potential soil contamination associated with the former location of two air compressors adjacent to the southwest corner of building 03-0102 (LANL 1995, 057590) (Figure 2.22-1). Lightweight mineral oil used in the compressors leaked through gaskets and stains were reported up to 15 ft south of the compressors (LANL 1995, 057590). In 1992, the stained area where the spill was located was double washed and double rinsed (LANL 1995, 057590). Swipe samples collected from each compressor in 1994 showed PCB concentrations ranging from 9.4 µg/100 cm^2 to 17 µg/100 cm^2 (LANL 1995, 057590). A concrete slab now extends from the former compressor locations to the fence line south of building 03-0102; there is no evidence of staining on the concrete.

2.22.2 Previous Investigations

No previous investigations have been conducted at AOC 03-051(b).

2.22.3 Analytical Results

No decision-level data are available for AOC 03-051(b).

2.23 Consolidated Unit 03-052(a)-00, Storm Drains and Outfall

Consolidated Unit 03-052(a)-00 includes two active storm drains [SWMUs 03-052(a) and 03-052(e)] and a shared outfall [SWMU 03-054(b)]. Each storm drain consists of a drop inlet that receives runoff from paved areas and roadways in the northwest portion of TA-03; stormwater is discharged to the SWMU 03-054(b) outfall. The active storm drain system that discharges to the SWMU 03-054(b) outfall also receives stormwater from other storm drains in the northwest portion of TA-03.

2.23.1 SWMU 03-052(a), Storm Drain

2.23.1.1 Description and History

SWMU 03-052(a) is a storm drain located on the east side of the TA-03 Tech Shop (building 03-0039) (Figure 2.23-1). From 1954 to 1991, this storm drain served a storage dock that is approximately 10 ft wide × 100 ft long (LANL 1995, 057590). Dumpsters located on the storage dock were used for the disposal of machining-operation wastes. The machining-operation wastes included aluminum, stainless steel, copper and brass filings, with traces of TCA, trichloroethene (TCE), and ethylene glycol (LANL 1995, 057590). In 1993, a metal barrier was constructed around the dumpster area and the storm drain was sealed.

2.23.1.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-052(a).

2.23.1.3 Analytical Results

No decision-level data are available for SWMU 03-052(a).

2.23.2 SWMU 03-052(e), Storm Drain

2.23.2.1 Description and History

SWMU 03-052(e) is a storm drain located near the southeast corner of building 03-0039 (Figure 2.23-1) that may have received residual paint and solvents from an indoor paint booth located in building 03-0039 (LANL 1995, 057590).

2.23.2.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-052(e).

2.23.2.3 Analytical Results

No decision-level data are available for SWMU 03-052(e).

2.23.3 SWMU 03-054(b), Outfall

2.23.3.1 Description and History

SWMU 03-054(b) is an outfall located southeast of building 03-1411 and southwest of building 03-1316 (Figure 2.23-1). The outfall receives stormwater from surface areas surrounding 26 buildings, stormwater from 94 roof drains, and noncontact cooling water from a furnace in building 03-0102 (LANL 1995, 057590). The outfall discharges to a drainage channel west of building 03-1612. The outfall was formerly

permitted as National Pollutant Discharge Elimination System (NPDES) 03A009 to receive discharge water from the cooling tower effluent blowdown from building 03-0102; however, this discharge was rerouted to the TA-46 SWSC in 1993 (LANL 1995, 057590).

2.23.3.2 Previous Investigations

Prior to the disturbance of the outfall area by the 2002-2003 construction of building 03-1411, a new parking lot, and installation of a new storm drain culvert in the outfall area, eighteen samples were collected from two depths (0 to 0.5 ft and 1 to 1.5 ft bgs) within the outfall area. The samples were submitted for analysis of metals, SVOCs, and TPH-DRO, and three of the deeper samples were submitted for analysis of VOCs. Samples collected during the Phase I RFI and the analyses requested are presented in Table 2.0-1.

2.23.3.3 Analytical Results

Decision-level data from the 2002 outfall area sampling are presented in Tables 2.0-2 for inorganic chemicals above BVs or having detection limits above BVs. Inorganic chemicals detected above BVs were antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, silver, and zinc. Antimony was detected above the soil BV in seven samples. Arsenic, beryllium, and cobalt were each detected above the soil BVs in one sample. Cadmium was detected above the soil BV in 13 samples. Chromium was detected above the soil BV in 11 samples. Copper was detected above the soil BV in 17 samples with the maximum a detected concentration of 9 times the BV. Lead was detected above the soil BV in all 18 samples. Mercury was detected slightly above the soil BV in two samples. Nickel and silver were each detected above the soil BV in six samples. Zinc was detected above the soil BV in all 18 samples with the maximum a detected concentration of 17 times the BV, probably from the galvanized metal storm drain pipes that have carried stormwater from SWMUs 03-052(a) and 03-052(e) to the SWMU 03-054(b) outfall area since the 1950s. Sampling locations and results for inorganic chemicals detected above BVs are shown in Figure 2.23-2.

Decision-level data from the 2002 outfall area sampling are presented in Tables 2.0-3 for detected organic chemicals. Thirty organic chemicals [acenaphthene; acenaphthylene; anthracene; Aroclor-1260; benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(g,h,i)perylene; benzo(k)fluoranthene; benzoic acid; bis(2-ethylhexyl)phthalate; butylbenzenephthalate; chrysene; di-n-octylphthalate; dibenz(a,h)anthracene; dibenzofuran; 2,4-dimethylphenol; ethylbenzene; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; 2-methylnaphthalene; 4-methylphenol; naphthalene; phenanthrene; pyrene; TPH-DRO; TCA; TCE; and xylene] were detected in 2 to 18 soil samples. Sampling locations and results for detected organic chemicals are shown on Plate 2.

2.24 Consolidated Unit 03-054(a)-00, Outfalls

Consolidated Unit 03-054(a)-00 includes two outfalls: SWMUs 03-054(a) and 03-054(d). Both outfalls discharged through the same culvert to the same location (next to the northwest corner of building 03-0016).

2.24.1 Description and History

The 1990 SWMU report describes SWMU 03-054(a) as an outfall from a cooling tower (former structure 03-0019) (LANL 1990, 007511) (Figure 2.24-1). The 1990 SWMU report also describes SWMU 03-054(d) as an outfall that discharged blowdown from the cooling tower on the roof of the Van de Graaff facility (building 03-0016) and wastewater from floor drains in former building 03-0208 (LANL 1990, 007511). Although the sources of each of these SWMUs is distinct, the discharge point for both SWMUs is the

same (i.e., the outfall located next to the northwest corner of the Van de Graaff facility [building 03-0016]). The cooling tower (former structure 03-0019) associated with SWMU 03-054(a) was removed in 1966. When the cooling tower was removed, the chilled water system in the Van de Graaff facility (building 03-0016) was connected to the drainline that previously drained the cooling tower. From 1966 to the time the Van de Graaff facility was decommissioned in the early 1990s, discharges from the flushing of the chilled water system in the Van de Graaff building were directed to the outfall location at the northwest corner of building 03-0016. Effluent from the outfall flowed directly to the west into Twomile Canyon.

Although the outfall operated as an NPDES-permitted outfall until 1998 (EPA 03A-025), the outfall currently receives only stormwater from the Van de Graaff building roof drains (Santa Fe Engineering Ltd. 1992, 074043).

2.24.2 Previous Investigations

No previous investigations have been conducted at Consolidated Unit 03-054(a)-00.

2.24.3 Analytical Results

No decision-level data are available for SWMUs 03-054(a) and 03-054(d).

2.25 SWMU 03-055(a), Outfall

2.25.1 Description and History

SWMU 03-055(a) is an outfall located approximately 50 ft south of the Van de Graaff facility (building 03-0016) (Figure 2.2-1). Roof drains and one floor drain in generator room 68 discharged to the outfall at the edge of the mesa into Twomile Canyon (LANL 1995, 057590). The outfall currently receives only stormwater from Van de Graaff building roof drains (Santa Fe Engineering 1993, 074043). The Van de Graaff facility was constructed in 1952. The facility has been inactive since the late 1990s; radiological decontamination and decommissioning activities began in 2005.

2.25.2 Previous Investigations

No previous investigations have been conducted at SWMU 03-055(a).

2.25.3 Analytical Results

No decision-level data are available for SWMU 03-055(a).

3.0 SITES UNDER INVESTIGATION IN TA-06

TA-06 was developed during the Manhattan Project. Activities at TA-06 focused on the recovery of materials from implosion tests and the development of detonators. Recovery tests were conducted to determine how to recover scarce nuclear materials in the event that a test of an implosion weapon failed and the nuclear material fragmented. Early efforts related to recovery involved dispersion tests, which studied the dispersion of materials from implosion shots fired above the ground. Tracers were used in the test materials to track the dispersion of materials. Subsequent recovery methods investigated at TA-06 involved: (1) water recoverr, where shots were detonated in water to slow metal fragments; (2) sand recovery, where shots were detonated under piles of sand to retain fragments; and (3) Jumbino vessels, which were large steel vessels designed to contain the shot fragments.

Detonator development work began at TA-06 in August 1944. This work was directed toward design and fabrication of electric detonators and firing systems. Pentaerythritol tetranitrate (PETN) was selected as the explosive to be used in these detonators. Because commercially available PETN was not of sufficient purity to achieve the required performance, work at TA-06 included development of a method for purification and recrystallization of PETN. In 1945, three firing chambers, a laboratory, and an explosives pressing facility were constructed at TA-06. From 1945 to 1947, TA-06 was also used for detonation of defective explosive lenses and for burial of classified wastes. In 1948, detonator fabrication was moved from TA-06 to TA-22. Detonator test firing ceased at TA-06 in 1952, when these operations were moved to TA-40. Explosives development, laser, chemical laboratory, and photographic operations were conducted at TA-06 until February 1976. A small carpentry shop, cable fabrication shop, and silk-screening facility were used at TA-06 until the 1980s. TA-06 is presently unused and most of the structures have been removed.

Laboratory analyses requested for TA-06 samples having decision-level data are presented in Table 3.0-1. Decision-level data for TA-06 are provided in Tables 3.0-2 to 3.0-4. All laboratory analytical data (decision level and screening level) are also provided in Appendix B (on CD).

3.1 SWMU 06-001(a), Septic System

3.1.1 Description and History

SWMU 06-001(a) is an inactive septic tank (structure 06-0040) and associated outfall. The septic tank is located approximately 100 ft north of former building 06-0003 (Figure 3.1-1). The septic system outfall drained to Tributary A of Twomile Canyon. The septic tank, which had a volume of 840 gal., serviced former buildings 06-0001 and 06-0003.

Former building 06-0001 was constructed in May 1944 and was originally used to develop analytical procedures for nonradioactive cobalt tracer shots. An engineering drawing shows the building to have two rooms, one identified as a carpenter shop and the other as a laboratory (McGehee et al. 2004, 108213). The laboratory had an acid-resistant work bench and a lead-lined sink connected to the septic system (LANL 1997, 056664, p. 129). In the late 1950s, silver soldering may have been conducted in the carpenter shop. In the early 1980s, cable and boxed inert supplies were warehoused in former building 06-0001 (Schott 1993, 021496). The building was not used after the carpenter shop closed in the 1980s.

Former building 06-0003 contained a restroom, a darkroom, and a laboratory with a lead-lined sink. The building was first used as a control bunker for explosives shots and was surrounded on three sides by an earthen berm. It was remodeled in 1944 with explosion-proof fixtures because diethyl ether was used in the analyses performed in the building (McGehee et al. 2004, 108213, p. 36). From 1945 to 1948, the building housed offices, and from 1948 to the early 1950s, the building had a firing control panel and a bridgewire-testing laboratory to prepare cobalt tracers. In 1972, the building was remodeled into a printed circuit shop, and was later used as a silk-screen facility until the mid-1980s. After the mid-1980s, the building was used for storage.

The septic system was decommissioned in 1986, and the drainline was plugged in 1988 (LANL 1989, 011546). During a reconnaissance visit in 1992, the tank was located, its cover removed, and the tank was found to be empty (Rofer and Guthrie 1992, 015040). Buildings 06-0001 and 06-0003 were demolished and removed in 2004. The septic system was left in place.

3.1.2 Previous Investigations

A Phase I RFI was conducted at SWMU 06-001(a) in 1994 (LANL 1997, 056664). Samples were collected from the tank sludge, adjacent to the tank, and at the outfall runoff area. One sample of tank sludge was collected. Three samples were collected from each of three boreholes in the tank area. One borehole was located at the tank inlet, one at the tank outlet, and one next to the tank. Sample depth intervals ranged from 1.5 to 2.5 ft bgs to 8.5 to 9.5 ft bgs from. Two samples (0 to 0.5 ft and 0.5 to 1.5 ft bgs) were collected at each of three locations in the outfall drainage. All samples were submitted for laboratory analysis of TAL metals, cyanide, SVOCs, and high explosives (HE) (not including PETN). The samples from the boreholes in the tank area were also analyzed for VOCs. All data collected during the Phase I RFI are screening-level data and are not presented in this report; however, the data showed metals and cyanide above BV and detected organic chemicals. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

3.1.3 Analytical Results

No decision-level data are available for SWMU 06-001(a).

3.2 SWMU 06-001(b), Septic System

3.2.1 Description and History

SWMU 06-001(b) consists of a 960-gal.-capacity septic tank (structure 06-0043) and associated drainlines, distribution box, filter trench, and outfall located approximately 200 ft north of former building 06-0006 (Figure 3.2-1). The septic system served former building 06-0006 and operated from 1945 to the 1980s. The tank's dimensions are 5 ft × 9 ft × 5 ft 9 in. deep. Effluent from the septic tank discharged north to a distribution box and then to a filter trench consisting of two parallel trenches with perforated pipe surrounded by sand and covered with gravel (LASL 1973, 108216). Overflow from the filter trench went north to an outfall that drained into Tributary A of Twomile Canyon. In 1989, the drainline was cut and capped (LANL 2006, 095626). Building 06-0006 was demolished and removed in 2004; however, the septic tank, drainlines, distribution box, and filter trenches were left in place.

Former building 06-0006 originally housed laboratory operations related to detonator assembly, an electronics work room, a chemistry laboratory, two darkrooms, restrooms, and a sink (Creamer 1993, 015063). The sink drain received rinsate containing copper, brass, and steel parts dipped in nitric acid to remove silver solder flux and oxidized metals. Solvents were also used to degrease metal. Tin and lead soldering using paste and aqueous zinc/aluminum chloride fluxes was performed on electrical circuits. Manometric apparatuses containing liquid mercury were serviced. Ionizing radiation, in the form of electrically generated x-rays, was used through the 1950s to about 1965 (Schott 1993, 021496). By 1961, the darkrooms, assembly room, and a storage area had been converted to offices (McGehee et al. 2004, 108213). In the 1970s, former building 06-0006 was used as a cable shop, where acetone, alcohol, and dilute acids may have been used. In the early 1980s, former building 06-0006 was used for printed circuit production.

The RFI work plan for Operable Unit (OU) 1111 (LANL 1993, 026068) and the 1997 RFI report (LANL 1997, 056664) state that plumbing in buildings 06-0005 and 06-0008 also drained to SWMU 06-001(b). However, engineering drawings for these two buildings show no drains or points of discharge (McGehee et al. 2004, 108213). In addition, an engineering drawing of the sanitary sewer system at TA-06 shows no waste lines coming from either building (LANL 2001, 108215). Thus, engineering records indicate the information in the RFI work plan and report concerning discharges from these buildings to SWMU 06-001(b) is incorrect.

3.2.2 Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 06-001(b), samples were collected from the tank sludge, in the tank area, within the filter trench, and in the outfall area (LANL 1997, 056664). Samples were field screened for radioactivity, metals, SVOCs, VOCs, and HE and submitted for analysis of metals, cyanide, SVOCs, and HE (not including PETN). Samples from the boreholes in the tank area were also submitted for VOC analysis. Data collected during the Phase I RFI are screening-level data and are not presented in this work plan; however, the data showed metals above BV, and one organic chemical was detected. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

3.2.3 Analytical Results

No decision-level data are available for SWMU 06-001(b).

3.3 Consolidated Unit, 06-002-00, Septic System and Area of Potential Soil Contamination

Consolidated Unit 06-002-00 consists of SWMUs 06-002 and 06-003(c) and AOCs C-06-005, C-06-006, C-06-016, and C-06-020. SWMU 06-003(c) and AOCs C-06-006, C-06-016, and C-06-020 have been approved for NFA (NMED 2000, 066381) and are not discussed in this work plan. The remaining SWMU and AOC in this consolidated unit consist of a septic system (SWMU 06-002) and an area of potential soil contamination from a former building (AOC C-06-005) (Figure 3.3-1).

3.3.1 SWMU 06-002, Septic System

3.3.1.1 Site Description and History

SWMU 06-002 is the former location of a 1000-gal. steel septic tank (structure 06-0041) and associated drainlines (Figure 3.3-1). The septic system was located approximately 420 ft southwest of the intersection of Twomile Mesa Road and Gomez Ranch Road. The tank received wastewater from two sources: process wastewater from the PETN recrystallization operation in building 06-0010 [SWMU 06-003(g)], and sanitary wastewater from the employee rest house (building 06-0020, AOC C-06-020). A 1992 memo estimates that up to 0.2 lb of PETN, with an unspecified quantity of solvents, may have been released to SWMU 06-002 during recrystallization operations (Meyers 1993, 015072). Engineering drawings show the discharge point to be 100 ft southeast of the septic tank. The septic system discharged into Tributary B of Twomile Canyon. The tank was removed in 1965, but the drainlines remain in place.

3.3.1.2 Previous Investigations

Previous investigations at SWMU 06-002 include a Phase I RFI conducted in 1995, with re-sampling in 1998 to fill in gaps identified from 1995 sampling (Kopp 1998, 059185; LANL 1998, 062227). The 1995 and 1998 sampling results are included in the 1998 RFI report (LANL 1998, 062227).

Samples were collected in 1995 at three locations at the site of the former septic tank (LANL 1998, 062227, p. 19). One surface (0 to 0.5 ft bgs) and one subsurface sample (approximately 3 to 4 ft bgs) were collected at each location. Samples collected in 1995 were field screened for HE, radioactivity, and VOCs and submitted for analysis of metals and HE (not including PETN). Subsurface samples were also submitted for analysis of VOCs, and one surface sample was submitted for analysis of tritium. All field screening showed concentrations or counts at or below background (LANL 1998, 062227, p. 22).

In 1998, two samples were collected at the septic system outfall and 10 ft beyond the outfall at depths of 0 to 0.5 ft and 4.25 to 4.5 ft bgs in both locations (LANL 1998, 062227, p. 21). Samples were field screened for HE, VOCs, and radiation, and submitted for analysis of metals and HE (including PETN). Subsurface samples were also submitted for analysis of VOCs. One 1995 RFI sampling location at the septic tank was also resampled at depths of 5.2 to 5.7 ft and 7.5 to 8.0 ft bgs. One sample was submitted for laboratory analysis of target analyte list (TAL) metals and PETN and the other sample for laboratory analysis of antimony and PETN.

Samples collected during the Phase I RFI and the analyses requested are presented in Table 3.0-1.

3.3.1.3 Analytical Results

Decision-level data from the 1995 and 1998 Phase I RFI sampling are presented in Tables 3.0-2 and 3.0-3 for inorganic chemicals above BV or having detection limits above BV and detected organic chemicals, respectively.

Inorganic chemicals detected above BV during the 1995 Phase I sampling at SWMU 06-002 were barium, cadmium, cobalt, and manganese. Barium, cobalt, and manganese were detected above the soil BV in two samples, and cadmium was detected above the soil BV in six samples.

Inorganic chemicals detected above BV during the 1998 Phase I sampling at SWMU 06-002 were barium, manganese, and thallium. Barium and manganese were detected above the soil BV in one sample. Thallium was detected above the soil BV in three samples.

Two organic chemicals (acetone and toluene) were detected in two of the 1995 samples collected in the area of the septic tank inlet lines. No organic chemicals were detected in the 1998 samples.

Figures 3.3-2 and 3.3-3 show sampling locations where inorganic chemicals were detected above BV and where organic chemicals were detected.

3.3.2 AOC C-06-005, Area of Potential Soil Contamination

3.3.2.1 Site Description and History

AOC C-06-005 is the location of former building 06-0013, a 16 ft × 16 ft × 9 ft high wood-frame building located along the west side of Gomez Ranch Road, approximately 125 ft south of the intersection with Twomile Mesa Road. Former building 06-0013 was used as a chemistry laboratory, as a detonator assembly building, and for storing explosives (Figure 3.3-1). The laboratory sink in this building discharged to a French drain next to the east side of the building. The building was destroyed by burning in 1960. Explosives used in detonators assembled in the building were PETN, tetryl, hexahydroxy-1,3,5-trinitro-1,3,5-triazine (RDX), Composition A, Composition B, Baratol, and 2,4,6-trinitrotoluene (TNT).

3.3.2.2 Previous Investigations

Previous investigations at AOC-06-005 include a Phase I RFI conducted in 1995, with re-sampling in 1998 to fill in gaps identified from 1995 sampling (LANL 1998, 062227). The 1995 and 1998 sampling results are included in the 1998 RFI report (LANL 1998, 062227). In 1995, samples were collected at one location within the footprint of former building 06-0013 and at two locations extending 5 ft from the building's outer boundary upgradient and downgradient of the building. At each location, samples were collected at the surface (0 to 0.5 ft bgs) and at the soil/tuff interface (2.6 to 3.1 ft bgs or 3 to 3.3 ft bgs) (LANL 1998, 062227). All samples were field screened for HE, radioactivity, and VOCs, and submitted for analysis of TAL metals and HE (not including PETN). Subsurface samples were also analyzed for VOCs,

and one surface sample was analyzed for tritium. All field screening showed concentrations or counts at or below background. In 1998, two of the 1995 RFI sample locations were resampled. At one location, a surface (0 to 0.5 ft) sample was collected and at the other location a subsurface sample (10.1 to 12.6 ft bgs) was collected. The samples were field screened for HE, VOCs, and radiation, and submitted for laboratory analysis of antimony, cadmium, and silver (LANL 1998, 062227, p. 24).

Samples collected during the Phase I RFI and the analyses requested are presented in Table 3.0-1.

3.3.2.3 Analytical Results

Table 3.0-2 presents decision-level data from the 1995 sampling for metals above BV. Aluminum, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, and zinc were above BV in the 1995 samples. Aluminum, chromium, cobalt, copper, and zinc were each detected above the soil BV in two samples. Barium and nickel were detected above the soil BV in three samples. Cadmium was detected above the soil BV in five samples. Iron and manganese were detected above the soil BV in one sample. Lead was detected above the soil BV in four samples. No metals were detected above BV in the 1998 samples. Locations of samples and results above BV for metals are shown in Figure 3.3-4.

Table 3.0-3 presents decision-level data from the 1995 sampling for detected organic chemicals. Toluene was detected in one 1995 sample. Locations of samples and detected organic chemicals are shown in Figure 3.3-3.

3.4 Consolidated Unit 06-003(a)-99, Firing Sites

Consolidated Unit 06-003(a)-99 consists of SWMU 06-003(a), a firing site, and AOCs 06-008 and C-06-019, two areas of potential soil contamination.

3.4.1 SWMU 06-003(a), Firing Site

3.4.1.1 Description and History

SWMU 06-003(a) is a 100-ft-radius concrete bowl (structure 06-0037) located near the center of TA-06, south of Twomile Mesa Road (Figure 3.4-1). The concrete bowl was constructed in late 1944 for water recovery shots and consisted of 16 sections with expansion joints running radially from the center of the bowl to its perimeter. Small-scale explosives tests (up to 10 lb of HE) contained in water vessels were detonated on a tower located on the central raised area of the bowl (Creamer 1993, 015063). A 5-ft × 5-ft × 10-ft-deep filter pit is still present at the low point of the bowl next to the center raised area. A 2-ft layer of graded gravel overlain by 2 ft of filter sand was placed in the bottom of the pit. Water was removed from the bowl either by draining it through a drainline running under the bowl to an outfall north of the bowl or by pumping it through the sand and gravel filter.

The firing site was used to investigate dispersal of material. Debris from a test explosion dropped into the bowl, which was then washed and wash water filtered to recover shot fragments. The water recovery shots used depleted uranium. No fissionable materials were used in the tests. The site was used until mid-1945.

The concrete bowl firing site is a historically significant structure because of its role in the Manhattan Project and is eligible for listing in the National Registry of Historic Places (McGehee et al. 2004, 108213). Therefore, any disturbance of the structure must be approved in advance by the New Mexico State Historic Preservation Office.

3.4.1.2 Previous Investigations

In 1978, SWMU 06-003(a) was monitored with a Phoswich counter; no radiation above background was detected (Elliott 1978, 004647).

During the 1994 RFI, samples were collected from three locations inside and three locations outside the bowl. Samples were field screened for radioactivity, HE, and VOCs and submitted for analysis of metals, cyanide, HE (not including PETN), isotopic uranium, cesium-137, and strontium-90. Data collected during the 1994 are screening-level data and are not presented in this work plan; however, the data showed metals above BVs and radionuclides above BVs and FVs.Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

In 1997, a sediment sample was collected from the filter pit, which was not sampled in 1994 to avoid potentially impacting salamander habitat. The sampling location was screened for radioactivity, VOCs, and HE before the sample was collected. One surface sample was collected and submitted for analysis of metals, HE (including PETN), isotopic uranium, gamma-emitting radionuclides, and strontium-90 (LANL 1997, 056664, pp. 116–117). The analyses requested for the 1997 sample are presented in Table 3.0-1.

3.4.1.3 Analytical Results

Table 3.0-2 shows inorganic chemicals detected above the soil BV in the 1997 sample. Calcium, copper, lead, sodium, vanadium, and zinc were detected above soil BVs.

Table 3.0-3 shows decision-level data from the 1997 sampling for detected organic chemicals. RDX and TNT were detected in the one sample collected.

Table 3.0-4 shows decision-level data from the 1997 sampling for radionuclides detected above the soil BVs/FVs. Americium-241 and cesium-137 were detected above soil FVs, sodium-22 was detected, and uranium-234 and uranium-238 were detected above soil BVs.

The sampling locations results for inorganic chemicals above BV, detected organic chemicals, and radionuclides detected or detected above BV/FV are shown in Figures 3.4-2, 3.4-3, and 3.4-4, respectively.

3.4.2 AOC C-06-008, Area of Potential Soil Contamination

3.4.2.1 Description and History

AOC 06-008 is the former location of an underground storage tank (structure 06-0047) that was directly adjacent to the concrete bowl [SWMU 06-003(a)] (Figure 3.4-1). The tank was partially buried, with approximately one-quarter of the tank exposed. It was approximately 12 ft long and 4.5 ft wide. Reports vary as to the use of the tank (LANL 1990, 007511; LANL 1993, 026068, p. 5-43). The tank was removed in 1987. When it was removed, the tank contained approximately 600 gal. of liquid that appeared to be water. The tank's contents were sampled and analyzed for gross-alpha, -beta, and -gamma radioactivity and tritium before it was removed. No detectable activity was associated with the tank contents. The tank contents were removed for recycling and the tank was removed for salvage (McInroy 1993, 015266).

3.4.2.2 Previous Investigations

In 1978, this area was monitored with a Phoswich counter; no radiation above background was detected (Elliott 1978, 004647).

A Phase I RFI was conducted to characterize AOC C-06-008 in 1994 (LANL 1997, 056664, pp. 116–117). Three soil cores were collected from the tank's former location. The cores were sampled at three intervals from the surface to the soil/tuff interface (0 to 0.5 ft, 1.5 to 2.5 ft, and 2 to 3, 2.5 to 3.5 or 3 to 4 ft bgs). The samples were field screened for radioactivity, HE, and organic vapors and were submitted for analysis of TAL metals, cyanide, HE (not including PETN), isotopic uranium, cesium-137, and strontium-90. All the data collected during the 1994 are screening-level data and are not presented in this report; however, the data showed metals detected above BVs and cesium-137 above FV. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

3.4.2.3 Analytical Data

No decision-level data are available for AOC C-06-008.

3.4.3 AOC C-06-019, Area of Potential Soil Contamination

3.4.3.1 Description and History

AOC C-06-019 is the former location of a generator building (06-0038) located north of the concrete bowl firing site (Figure 3.4-1). Engineering records show that this building was a wood-frame structure open on one end. The building was 10 ft × 20 ft × 10 ft high with an earthen floor. Use of building 06-0038 ceased in December 1959, and it was destroyed by burning in January 1960.

3.4.3.2 Previous Investigations

A Phase I RFI was conducted at AOC C-06-019 in 1994 (LANL 1997, 056664, pp. 116-117). Soil samples were collected from the three locations at the former generator building. Samples were collected from the surface (0 to 0.5 ft bgs) and from approximately 5 to 6 ft bgs at each location. The samples were field screened for radioactivity, HE, and organic vapors and were submitted for laboratory analysis of TAL metals, cyanide, HE (not including PETN), SVOCs, VOCs, PCBs, isotopic uranium, cesium-137, and strontium-90. All the data collected during the 1994 are screening-level data and are not presented in this report; however, the data showed metals detected above BVs and detected organic chemicals. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

3.4.2.3 Analytical Data

No decision-level data are available for AOC C-06-019.

3.5 SWMU 06-003(d), Firing Site

3.5.1 Description and History

SWMU 06-003(d) is the former location of a firing chamber, former building 06-0007, located 125 ft northwest of former building 06-0006 (Figure 3.5-1). The firing chamber was constructed of concrete and consisted of two rooms. One room was 8 ft × 10 ft with 8-in.-thick walls and was completely enclosed. The other room was 8 ft × 8 ft with 2-ft-thick concrete walls lined with steel plate and was open on one end. From 1945 to 1952, the firing chamber was used to test-fire complete or partially loaded (with PETN) detonators (LANL 1993, 026068; Schott 1993, 021496). From 1952 to 1976, the firing chamber was used for experiments on detonation and shock waves in gases. The firing chamber was demolished and removed in 2004.

3.5.2 Previous Investigations

No previous investigations have been conducted at SWMU 06-003(d).

3.5.3 Analytical Results

No decision-level data are available for SWMU 06-003(d).

3.6 SWMU 06-003(e), Firing Site

3.6.1 Description and History

SWMU 06-003(e) is the former location of a firing chamber, former building 06-0009 (LASL 1945, 015039), located 85 ft northeast of former building 06-0006 (Figure 3.6-1). The firing chamber was constructed in 1945 to use in detonator experiments and consisted of two adjacent concrete structures. One of these structures consisted of an enclosed room next to a steel-plate-lined chamber that was open on one end. The enclosed room was 8 ft × 8 ft with 8-in.-thick walls. The chamber had dimensions of 6 ft × 8 ft with 2-ft-thick walls. The second structure consisted of a single enclosed room that was 12 ft × 8 ft with 1- and 2-ft-thick walls. The area between the two structures consisted of a concrete pad covered with a steel plate. From 1945 to 1952, the firing chamber was used to test-fire complete or partially loaded (with PETN) detonators (LANL 1993, 026068; Schott 1993, 021496). From 1952 to 1976, it was used for experiments on detonation and shock waves in gases. The firing chamber was demolished and removed in 2004.

3.6.2 Previous Investigations

No previous investigations have been conducted at SWMU 06-003(e).

3.6.3 Analytical Results

No decision-level data are available for SWMU 06-003(e).

3.7 SWMU 06-003(f), Firing Site

3.7.1 Description and History

SWMU 06-003(f) is a formerly used firing site located on the north side of Twomile Mesa Road (Figure 3.7-1). Engineering drawings show that the cleared circular pad was 60 ft in diameter and constructed of a 1-ft-thick layer of sand (McGehee et al. 2004, 108213). The circular area and some of the sand are still visible at the site. Experiments conducted at the firing site used metal parts made from irradiated copper to determine material dispersal from explosions. Nonradioactive cobalt was also used as a tracer. Experiments conducted at this site were controlled from building 06-0003.

3.7.2 Previous Investigations

A Phase I RFI was conducted at SWMU 06-003(f) in 1994 (LANL 1997, 056664). Soil samples were collected from three locations within the area of the gravel pad and three locations that extended 10 ft beyond the firing site. At each location, samples were collected from the surface (0 to 0.5 ft bgs) and from the soil/tuff interface or 2 to 3 ft bgs, whichever was shallower. The site was surveyed radiologically and with a metal detector before sampling. Sampling locations were field screened for radioactivity, VOCs, and HE before samples were collected. All field-screening results were at background levels. Samples

were submitted for laboratory analysis of metals, cyanide, HE (not including PETN), isotopic uranium, cesium-137, and strontium-90. All the data collected during the 1994 are screening-level data and are not presented in this report; however, the data showed metals detected above BVs. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

3.7.3 Analytical Results

No decision-level data are available for SWMU 06-003(f).

3.8 SWMU 06-003(h), Firing Site

3.8.1 Description and History

SWMU 06-003(h) is a formerly used firing site located north of Twomile Mesa Road (Figure 3.8-1). This site was not identified in the 1990 SWMU report (LANL 1990, 007511). It was first discussed in the OU 1111 RFI work plan as part of MDA F. In describing MDA F, the RFI work plan states that defective explosive lenses manufactured for use in the Fat Man implosion weapon were destroyed in this area by detonation in 1945 (LANL 1993, 026068, p. 5-2). Some of the lenses were described as consisting of the explosive Baratol, which contains barium and TNT. A former employee involved with the detonations described this firing site as being located in the general area between the larger MDA F disposal pit [SWMU 06-007(a)] and Twomile Mesa Road (Van Vessem 1992, 015073).

In 1993, the Laboratory requested EPA add SWMU 06-003(h) to the hazardous waste permit as a separate site; EPA approved the request in 1994 (LANL 1994, 039440).

3.8.2 Previous Investigations

Phase I RFI sampling for SWMU 06-003(h) was conducted in 1994, although the results of this sampling were never documented in a report. Eleven surface soil samples (0 to 0.5 ft bgs) were collected from 11 locations. The sample collection logs provide a reference to “Aggregate 1 6-005” of the RFI work plan for OU 1111, which could be interpreted as SWMU 06-005. The sampling locations noted in the logs, however, refer to “MDA F Lens Disposal Area,” which has since been designated as SWMU 06-003(h). In addition, the sampling locations are in the eastern portion of MDA F, whereas SWMU 06-005 is located to the west of MDA F. Therefore, these samples were for SWMU 06-003(h) rather than SWMU 06-005. Sampling locations were spot-tested for HE and surveyed for radioactivity. The samples were submitted for analysis of metals, cyanide, HE (not including PETN), isotopic uranium, cesium-137, and strontium-90. Data collected in the RFI are screening-level data and are not presented in this work plan; however, the data showed metals detected above BVs and strontium-90 detected above FV..

3.8.3 Analytical Results

No decision-level data are available for SWMU 06-003(h).

3.9 SWMU 06-006, Storage Area

3.9.1 Description and History

SWMU 06-006 is a former container and equipment storage area located near the south and east sides of the former location of building 06-0006 (Figure 3.9-1). The storage area consisted of a concrete pad and asphalt parking lot, approximately 300 ft × 20 ft, and was partially surrounded by a 4-ft berm (LANL 1990,

007511). Waste containers and electrical equipment, including capacitors, were stored in this area from the late 1970s to the late 1980s (ICF Kaiser Engineers 1995, 056879, p. 10).

3.9.2 Previous Investigations

In 1994, three surface samples of engineered material and soil were collected at three locations at the northeast corner of the site and analyzed for PCBs. Surface and subsurface sediment samples were collected at three locations in drainages along the north side of the SWMU and analyzed for VOCs, SVOCs, and PCBs. The screening-level data collected in 1994 were not previously reported and are not presented in this work plan; however, the data showed PCBs detected in two engineered material samples. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

3.9.3 Analytical Results

No decision-level data are available for SWMU 06-006.

3.10 Consolidated Unit 06-007(a)-99, MDA F and Disposal Pits

Consolidated Unit 06-007(a)-99 consists of SWMUs 06-005, 06-007(a), 06-007(b), 06-007(c), 06-007(d), and 06-007(e). The consolidated unit consists of a former firing site and six disposal pits in an area approximately 2.5 acres (Weston 1986, 015243, p. 1-1). The southeast corner of the area begins north of Twomile Mesa Road approximately 400 ft northwest of SWMU 06-003(a) (Figure 3.10-1). Two pits designated as SWMU 06-007(a) were known to have been used for disposal of classified wastes. The existence of the other four pits [SWMUs 06-007(b, c, d, and e)] is inferred from records and their locations are unknown.

3.10.1 SWMU 06-005, Pit

3.10.1.1 Description and History

SWMU 06-005 is the location of a timber-lined pit (former structure 06-0042) measuring 16 ft × 16 ft × 8 ft deep (Figure 3.10-1). The purpose of the pit is not known; however, according to the 1990 SWMU report, it may have been used as a firing pit (LANL 1990, 007511). The pit was constructed in 1945 and abandoned in 1952 when it was filled with soil.

3.10.1.2 Previous Investigations

No previous investigations have been conducted at SWMU 06-005.

3.10.1.3 Analytical Results

No decision-level data are available for SWMU 06-005.

3.10.2 SWMU 06-007(a), MDA F

3.10.2.1 Description and History

SWMU 06-007(a), MDA F, consists of two pits and three disposal shafts located north of Twomile Mesa Road (Figure 3.10-1). One of the pits became operational in 1946 and the other in 1947. The pits were used to dispose of large classified objects that could not easily be destroyed by cutting. At the time the RFI work plan for OU 1111 was prepared, each of these pits was enclosed by a fence. The fences have

since been removed (LANL 1993, 026068). The larger pit was described as a bulldozed trench 50 ft wide × 20 ft deep at the deepest point and sloping up to the ground level at each end, with an overall length of 100 to 150 ft. It was reportedly used to dispose of several tons of metal parts, concrete mockups, handling fixtures, and other nonexplosive, nonradioactive classified materials (North 1974, 015083). The smaller pit was used to dispose of firing unit gaps that contained small amounts of radioactivity and small detonators with squibs (Courtright 1964, 005677). The exact location of the pits is not known.

In addition to the two pits, MDA F contains three disposal shafts located in the area of the smaller disposal pit (Van Vessem 1992, 015073). Three shafts were drilled between 1950 and 1952 to dispose of spark gaps that contained cesium-137 (LANL 1993, 026068, p. 5-2). The exact locations of the pits and the shafts are unknown, but they are believed to be next to SWMU 06-007(b).

3.10.2.2 Previous Investigations

As part of the 1986 Comprehensive Environmental Assessment and Response Program (CEARP) survey, most of MDA F was surveyed with ground-penetrating radar and magnetometry in an attempt to find the locations of pits and buried material (Weston 1986, 015243). Data from the survey are difficult to interpret because of the wide grid spacing and because fences were not removed (Sandness 1987, 015244). No definitive locations were identified.

No other previous investigations have been conducted at SWMU 06-007(a).

3.10.2.3 Analytical Results

No decision-level data are available for SWMU 06-007(a).

3.10.3 SWMU 06-007(b), Landfill

3.10.3.1 Description and History

The 1990 SWMU report identifies SWMU 06-007(b) as a single pit, estimated to be 40 ft × 70 ft based on photographs taken during an aerial survey conducted in the 1940s (LANL 1990, 007511). The exact location of this site is not known, but it is likely in the vicinity of MDA F and SWMUs 06-007(a), 06-007(c), 06-007(d), and 06-007(e) (Figure 3.10-1).

3.10.3.2 Previous Investigations

No previous investigations have been conducted at SWMU 06-007(b).

3.10.3.3 Analytical Results

No decision-level data are available for SWMU 06-007(b).

3.10.4 SWMU 06-007(c), Landfill

3.10.4.1 Description and History

SWMU 06-007(c) is a disposal pit identified in the 1990 SWMU report based on a February 1950 Laboratory work order that called for digging a 6 ft × 6 ft × 6 ft hole on Twomile Mesa to be used to bury classified material (LASL 1950, 015074).

The 1990 SWMU report identifies SWMUs 06-007(c), 06-007(d), and 06-007(e) as sites sampled by DOE in 1987 and shows the location of these pits to be south of Twomile Mesa Road (LANL 1990, 007511). The RFI work plan for OU 1111 does not provide an exact location for this site, but it identifies these three SWMUs as being within the general area of SWMU 06-007(a), north of Twomile Mesa Road (Figure 3.10-1). It is not known which of these documents provides the correct location of this disposal pit.

3.10.4.2 Previous Investigations

No previous investigations have been conducted at SWMU 06-007(c).

3.10.4.3 Analytical Results

No decision-level data are available for SWMU 06-007(c).

3.10.5 SWMU 06-007(d), Landfill

3.10.5.1 Description and History

SWMU 06-007(d) is a disposal pit (Figure 3.10.1) identified in the 1990 SWMU report based on a August 1950 Laboratory work order that called for digging a 2 ft × 2 ft × 4 ft hole on Twomile Mesa for disposal purposes (LASL 1950, 015074).

3.10.5.2 Previous Investigations

No previous investigations have been conducted at SWMU 06-007(d).

3.10.5.3 Analytical Results

No decision-level data are available for SWMU 06-007(d).

3.10.6 SWMU 06-007(e), Landfill

3.10.6.1 Description and History

SWMU 06-007(e) is a disposal pit (Figure 3.10.1) identified in the 1990 SWMU report based on an environmental survey conducted by DOE in 1987. As part of this survey, DOE conducted sampling at three pits in TA-06 (DOE 1989, 015365).

3.10.6.2 Previous Investigations

No previous investigations have been conducted at SWMU 06-007(e).

3.10.6.3 Analytical Results

No decision-level data are available for SWMU 06-007(e).

3.11 SWMU 06-007(f), Surface Disposal Area

3.11.1 Description and History

SWMU 06-007(f) is the location of a former surface disposal site located about 400 ft north of the former location of building 06-0003 (Figure 3.11-1). The site is approximately 20 ft × 30 ft. Disposal dates are not known. The site drains north into Tributary A of Twomile Canyon.

3.11.2 Previous Investigations

A Phase I RFI was conducted at SWMU 06-007(f) in 1994. Activities and sampling results from the RFI are documented in a 1996 VCA report (LANL 1996, 054330). All solid waste and debris at the site was surveyed for radioactivity; no elevated levels were detected. Soil samples were collected from three locations at the surface (0.0 to 0.5 ft) and at the soil/tuff interface (2.5 ft to 3.5 ft) (LANL 1993, 026068, pp. 60–61). The samples were field screened for radioactivity and HE and were sent for laboratory analysis of metals, cyanide, SVOCs, HE (not including PETN), cesium-137, and strontium-90. Subsurface samples were also analyzed for VOCs. Data collected in the 1994 RFI are screening-level data and are not presented in this report; however, the data showed metals above BV, detected organic chemicals, and cesium-137 above FV. Samples collected during the 1994 RFI, the analyses requested, and the data are presented in Appendix B.

A VCA was conducted at the site in 1995. Debris at the site was field screened for gross-alpha, -beta, and -gamma radioactivity and VOCs. No levels above background were detected. The VCA consisted of removing soil and debris from an area measuring approximately 20 ft x 30 ft. Debris removed from the site consisted of Manhattan Project–era artifacts, including laboratory equipment and glassware, inactive detonators, and chucks of metal. Soil was contaminated with ash, metal, and glass debris. The site also contained metal fragments from Jumbino vessels (LANL 1996, 054330, p. 2). Confirmatory samples were collected following the excavation. Soil samples were collected from three surface locations within the footprint of the SWMU, and were analyzed for TAL metals, SVOCs, and gamma-emitting radionuclides. Data collected in the 1995 RFI are screening-level data and are not presented in this report; however, the data showed metals above BV and cesium-137 was detected. No organic chemicals were detected. Samples collected during the 1995 VCA, the analyses requested, and the data are presented in Appendix B.

3.11.3 Analytical Results

No decision-level data are available for SWMU 06-007(f).

3.12 SWMU 06-007(g), Area of Potential Soil Contamination

3.12.1 Description and History

SWMU 06-007(g) is an area of potential soil contamination associated with former building 06-0012, an HE press building located north of Twomile Mesa Road (Figure 3.12-1). This SWMU also includes soil contamination from a small former surface disposal area located next to former building 06-0012. Exploded detonator housings were found discarded over an approximate 5 ft^2 area next to the former location of building 06-0012 and removed (LANL 1997, 056664, p. 200).

3.12.2 Previous Investigations

A Phase I RFI was conducted at SWMU 06-007(g) in 1994 (LANL 1997, 056664, pp. 200–202). Samples were collected from two depths at three locations in the footprint of the former location of building 6-0012. Sampling locations were field screened for radioactivity, VOCs, and HE before samples were collected. All field-screening results were negative or at background levels. Samples were submitted for analysis of metals, cyanide, SVOCs, HE (not including PETN), cesium-137, and strontium-90. Subsurface samples were also analyzed for VOCs. Data collected in the 1994 RFI are screening-level data and are not presented in this work plan; however, the data showed metals detected above BVs, detected organic chemicals, and cesium-137 above FV. Samples collected during the 1994 RFI, the analyses requested, and the data are presented in Appendix B.

3.12.3 Analytical Results

No decision-level data are available for SWMU 06-007(g).

3.13 AOC C-06-001, Area of Potential Soil Contamination

3.13.1 Description and History

AOC C-06-001 consists of an area of potential soil contamination from the footprint of former building 06-0004, an explosives magazine located west of former buildings 06-0005 and 06-0006 (Figure 3.13-1). The magazine was a wooden frame building 7 ft × 7 ft × 7 ft high with an earthen berm covering three sides. The magazine was used for explosives storage beginning in 1945 and was demolished in place in 1972 (Parker 1971, 004635).

3.13.2 Previous Investigations

A Phase I RFI was conducted at AOC C-06-001, and samples were collected in 1995 and 1998. The investigation and the sampling were not documented in a report. A surface (0 to 0.5 ft bgs) and subsurface (0.8 to 1.25 ft bgs to 3.8 to 4.3 ft bgs) sample were collected at each of three locations. The samples were submitted for laboratory analysis of metals and HE. Two of these locations were resampled in 1998 with a surface (0 to 0.5 ft bgs) and subsurface (2.2 to 2.8 ft bgs and 4.2 to 4.8 ft bgs) sample collected at each location. These samples were submitted for laboratory analysis of antimony, cadmium, and HE (including PETN).

3.13.3 Analytical Results

Table 3.0-2 shows decision-level data for inorganic chemicals above BVs in the 1995 and 1998 samples. Cadmium was detected above the soil BV in five 1995 samples and one 1998 sample. The sampling locations and results for inorganic chemicals above BV are shown in Figure 3.13-2.

4.0 SITES UNDER INVESTIGATION IN FORMER TA-07

TA-07, also known as Gomez Ranch Site, was established during the Manhattan Project. The earliest work at TA-07 consisted of firing 20-mm shells into various targets as part of gun assembly method investigations. The work lasted for a short time before activities were moved to other locations. LANL's engineering records database indicates TA-07 was abandoned in July 1945 and all buildings were removed. The site was later used until 1959 for disposal of detonators and scrap HE by open detonation.

A 1952 structure map identifies TA-07 as a 2.98-acre area inside TA-06 and no structures are identified. Two firing pits are identified on the map at the locations of SWMUs 07-001(a) and 07-001(b).

Laboratory analyses requested for TA-07 samples having decision-level data are presented in Table 4.0-1. Decision-level data for TA-07 are provided in Table 4.0-2. All laboratory analytical data (decision-level and screening-level) are also provided in Appendix B (on CD).

4.1 Consolidated Unit 07-001(a)-99, Firing Sites

Consolidated Unit 07-001(a)-99 consists of SWMUs 07-001(a–d), which are all inactive firing sites.

4.1.1 SWMU 07-001(a), Inactive Firing Pit

4.1.1.1 Description and History

SWMU 07-001(a) is an inactive firing pit located near the east end of TA-06 (Figure 4.1-1). The site consists of a circular depression, surrounded by an annular berm about 4 ft high and approximately 30 ft in diameter. The firing pit was used in the 1950s to destroy scrap detonators and explosives. The materials to be destroyed were mixed with Composition B scraps or flaked TNT and the mixture was detonated. A 1959 memorandum states this method was very effective in destroying detonators, with no intact detonators thrown out of a pit and no undestroyed detonators found during a site survey, although pellets of unexploded plastic-bonded explosive (PBX) were found (Spaulding 1959, 004574). In 1959, this method of destroying detonators was discontinued at this site.

4.1.1.2 Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 07-001(a), samples were collected from two depths at three central locations inside the annular berm and three locations away from the center of the site (two locations outside the berm and one location inside the berm) (LANL 1997, 056664). Samples were submitted for analysis of metals, cyanide, HE, isotopic uranium, cesium-137, and strontium-90. Data collected during the 1994 RFI are screening-level data and are not presented in this work plan; however the data showed metals detected above BVs. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B on CD.

All samples from the 1994 RFI at SWMU 07-001(a) were to have been submitted for analysis of SVOCs, but SVOCs were omitted from the list of requested analyses. For this reason, and because holding times were exceeded for the samples submitted for HE analysis, the locations and depths sampled in 1994 were resampled in 1996 with all samples submitted for analysis of SVOCs and HE. Data from the 1996 resampling effort are decision-level data and showed detected organic chemicals. Samples collected and analyses requested are shown in Table 4.0-1.

4.1.1.3 Analytical Results

Decision-level data from the 1996 resampling effort are presented in Table 4.0-2. One organic chemical, benzoic acid, was detected in one sample from SWMU 07-001(a). Sampling locations and results for detected organic chemicals are shown in Figure 4.1-2.

4.1.2 SWMU 07-001(b), Inactive Firing Pit

4.1.2.1 Description and History

The description and history of SWMU 07-001(b) are the same as that of SWMU 07-001(a) (section 4.1.1.1) (Figure 4.1-1).

4.1.2.2 Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 07-001(b), samples were collected from two depths at three central locations inside the annular berm and three locations away from the center of the site (two locations outside the berm and one location inside the berm) (LANL 1997, 056664). Samples were submitted for analysis of metals, cyanide, HE, isotopic uranium, cesium-137, and strontium-90. Data collected during the 1994 RFI are screening-level data and are not presented in this work plan; however the data showed metals detected above BVs and detected organic chemicals. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

All samples from the 1994 RFI at SWMU 07-001(b) were to have been submitted for analysis of SVOCs, but SVOCs were omitted from the list of requested analyses. For this reason, and because holding times were exceeded for the samples submitted for HE analysis, the locations and depths sampled in 1994 were resampled in 1996, and all samples were submitted for analysis of SVOCs and HE. Data from the 1996 resampling effort are decision-level data and showed detected organic chemicals. Samples collected and analyses requested are shown in Table 4.0-1.

4.1.2.3 Analytical Results

Decision-level data from the 1996 resampling effort are presented in Table 4.0-2. Thirteen organic chemicals [benzo(a)anthracene; benzo(k)fluoranthene; 2-chloronaphthalene; di-n-octylphthalate; 1,2-dichlorobenzene; 1,3-dichlorobenzene; diethylphthalate; hexachlorobenzene; phenanthrene; pyrene; RDX; tetryl; and 1,2,4-trichlorobenzene] were detected in samples from SWMU 07-001(b). All organic chemicals, except RDX, were detected in one sample; RDX was detected in five samples. Sampling locations and results for detected organic chemicals are shown in Figure 4.1-2.

4.1.3 SWMU 07-001(c), Inactive Firing Site

4.1.3.1 Description and History

SWMU 07-001(c) is in an inactive amphitheater-shaped firing site, approximately 50 ft × 50 ft, located near the eastern boundary of TA-06 (Figure 4.1-1). Soft metal disks imbedded with bullets have been found at this site. Little is known about this site's history, but the site may have been used briefly to study ballistic initiation of critical mass through the study of projectiles fired at lead plates (LANL 1997, 056664, p. 72).

4.1.3.2 Previous Investigations

Phase I RFI activities were conducted at SWMU 07-001(c) in 1994 (LANL 1997, 056664). Surface soil samples (0 to 0.5 ft bgs) were collected at three locations containing pieces of metal debris where contaminants were judged most likely to exist. All samples were submitted for laboratory analysis of metals, cyanide, HE, isotopic uranium, cesium-137, and strontium-90. All data collected during the 1994 RFI are screening-level data and are not presented in this report; however the data showed detections of metals detected above BVs and radionuclides detected above FVs. No explosives were detected, but

holding times were exceeded for HE analysis. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

4.1.3.3 Analytical Results

No decision-level data are available for SWMU 07-001(c).

4.1.4 SWMU 07-001(d), Inactive Firing Site

4.1.4.1 Description and History

SWMU 07-001(d) is an inactive firing site located near the eastern boundary of TA-06 (Figure 4.1-1). The site is an approximately 20-ft-diameter by 3-ft-deep crater. Detonator parts have been found near the crater. Little is known about this site's operating history, but the site is believed to be the location of a one-time "celebratory shot" fired in 1945 after the Japanese surrender at the end of World War II (LANL 1997, 056664).

4.1.4.2 Previous Investigations

During the 1994 Phase I RFI, samples were collected from two depths at three central locations inside the center of the crater and at three locations within 10 ft of the outside the crater (LANL 1997, 056664). Samples were submitted for analysis of metals, cyanide, HE, isotopic uranium, cesium-137, and strontium-90. Data collected during the 1994 RFI are screening-level data and are not presented in this work plan; however the data showed metals detected above BVs. No organic chemicals were detected, but the holding times for HE analysis were exceeded. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

4.1.4.3 Analytical Results

No decision-level data are available for SWMU 07-001(d).

5.0 SITES UNDER INVESTIGATION IN TA-22

TA-22 is used principally for developing and fabricating detonation systems. The main explosive used is pentaerylthritol tetranitrate (PETN). Operations began at TA-22 in 1945 and continue today.

Laboratory analyses requested for TA-22 samples having decision-level data are presented in Table 5.0-1. Decision-level data for TA-22 are provided in Tables 5.0-2 to 5.0-4. All laboratory analytical data (decision-level and screening-level) are provided in Appendix B (on CD).

5.1 SWMU 22-010(a), Septic System

5.1.1 Description and History

SWMU 22-010(a) consists of an inactive septic tank (structure 22-0050), drainlines, and drain field located directly north of building 22-0034 (Figure 5.1-1). The septic system was constructed in 1952 and received sanitary waste from building 22-0034, the detonator explosives building (LANL 1990, 007512). The septic tank is constructed of concrete with a 1365 gal. capacity and discharged north to an 800 ft^2 tile drain field (LANL 1993, 026068, p. 5-64). The drain field discharged into a marshy area at the head of

Tributary B of Twomile Canyon (LANL 1997, 056664, p. 149).The septic system became inactive in 1993 when building 22-0034 was tied into the TA-46 SWSC plant and the inlet drainline to the septic tank was plugged.

5.1.2 Previous Investigations

During the 1994 Phase I RFI, samples of the septic tank contents were collected and soil samples were collected beneath the septic tank inlet and outlet, beneath the tank, and surrounding the tank (LANL 1997, 056664). Sampling locations were field screened for VOCs, HE, and radioactivity; the results were nondetect or at background levels and submitted for analysis of metals, VOCs, SVOCs, and HE. Data collected during the 1994 RFI are screening-level data and are not presented in this work plan; however, the data showed metals detected above BVs and detected organic chemicals.Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

Because the drain field location was incorrectly identified during the 1994 RFI, a second sampling event was conducted in 1997 (LANL 1997, 056664). To determine the location of the drain field, GPR was used. Six samples were collected from two depths from three boreholes (4.5 to 5 ft and 7.5 to 8 ft; 3 to 3.5 ft and 6.7 ft; 4.8 to 5.5 ft and 7 to 7.7 ft bgs, respectively). Sampling locations were field screened for radioactivity, VOCs and HE before samples were collected. All samples were submitted for analysis of metals, VOCs, SVOCs, and HE. Samples collected during the 1997 Phase I RFI and the analyses requested for the decision-level data are presented in Table 5.0-1.

Analytical Results

Metals detected above BVs were barium, cobalt, and manganese. Barium and manganese were detected above the soil BV in one sample. Cobalt was detected above soil BV in two samples. Sampling locations and inorganic chemicals detected above BVs are presented in Table 5.0-2 and shown in Figure 5.1-2.

Three organic chemicals (di-n-butylphthalate, methylene chloride, trichlorofluoromethane) were each detected in two to six samples. Sampling locations and results for detected organic chemicals are presented in Table 5.0-3 and shown in Figure 5.1-3.

5.2 SWMU 22-014(a), Sump System

5.2.1 Description and History

SWMU 22-014(a) consists of an active HE sump system and associated inactive drainline and seepage pit. The sump system is located immediately south of building 22-0093 (Figure 5.2-1). The sump is constructed of concrete containing an inset aluminum tank and is approximately 4 ft deep × 9 ft long × 3 ft wide. The sump system has been operating since 1985 and receives rinse water from a washing facility for parts and clothing from explosives compacting operations in rooms C112 and C114 in building 22-0093 (LANL 1993, 007512). Before 1995, the sump discharged approximately 100 gal. of wastewater each week through a drainline to a seepage pit located 150 ft south of the sump in the upper part of Tributary B of Twomile Canyon. The seepage pit is 4 ft in diameter and 40 ft deep (LANL 1993, 026028, p. 5-25). In 1995, the outflow from the sump was capped leaving the sump drainlines and seepage pit inactive (LANL 1997, 056664, p. 185). Operations in building 22-0093 continue to discharge wastewater to the sump, where the effluent is retained and suspended solids settle out as sludge. The sump contents are periodically removed for disposal at approved facilities at TA-16 (LANL 1997, 056664, p. 185). The sump is equipped with a level monitor and an alarm that are monitored remotely in a manager's office.

5.2.2 Previous Investigations

During the 1994 Phase I RFI, one sample of sludge water was collected from the sump tank and 15 samples were collected from three depths from five borehole locations around the sump and next to the drainline outlet (LANL 1997, 056664). In addition, nine samples were collected from three depths from three boreholes in the seepage pit area. Sampling locations were field screened for VOCs, HE, and radioactivity; the results were nondetect or at background levels. The samples were submitted for analysis of HE. Data collected during the 1994 RFI are screening-level data and are not presented in this work plan; however, the data showed detected HE in samples collected around the active sump. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

5.2.3 Analytical Results

No decision-level data are available for SWMU 22-014(a).

5.3 SWMU 22-014(b), Sump System

5.3.1 Description and History

SWMU 22-014(b) consists of an inactive explosives sump and a former outfall area that serves rooms 101 through 113 in building 22-0034 (LANL 1990, 007512) (Figure 5.3-1). The sump is located on the northeast corner of building 22-0034, is constructed of concrete, and is 4 ft × 2 ft × 3 ft deep with an inset aluminum tank (LANL 1990, 007512). The sump probably began to be used shortly after building 22-0034 was completed in 1953. Building 22-0034, currently used as a laser laboratory, previously housed a chemistry laboratory, an explosives laboratory, and a photographic laboratory (LANL 1997, 056664). The sump effluent drained to the north via a drainline to an outfall located in a marshy area in the upper part of Tributary B of Twomile Canyon until 1994, when the sump outlet was plugged (LANL 1997, 056664). The sump has not been used since 1994 when building 22-0034 became a laser laboratory.

5.3.2 Previous Investigations

During the 1994 Phase I RFI, 15 samples were collected from three depths from five borehole locations around the sump and next to the drainline outlet (LANL 1997, 056664). In addition, three surface samples were collected from three locations in the outfall area. The sampling locations were field screened for VOCs, HE, and radioactivity; the results were nondetect or at background levels and submitted for analysis of metals, sulfates/copper salts, nitrates/nitrites, fluoride, cyanide, VOCs, SVOCs, and HE. Data collected during the 1994 RFI are screening-level data and are not presented in this work plan; however, the data showed metals detected above BVs, detected organic chemicals around the sump, and a single HE detect in the outfall area. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

5.3.3 Analytical Results

No decision-level data are available for SWMU 22-014(b).

5.4 SWMU 22-015(a), Seepage Pits

5.4.1 Description and History

SWMU 22-015(a) consists of two inactive seepage pits (Pits A and B), located in an open grass-covered area east of building 22-0091 (LANL 1990, 007512) (Figure 5.4-1). Each pit has an outside diameter of

4 ft and is filled with crushed gravel with a central 4-in. polypropylene perforated pipe vented to the surface (Creamer 1993, 015248). Pit A is 26 ft deep, and Pit B is 20 ft deep (LANL 1997, 056749). The seepage pits were operated in series and served rooms B102, B107, B121, B123, B145, and B160 in building 22-0091, which housed printed circuit board etching operations (DOE 1987, 008663). The seepage pits began operation shortly after building 22-0091 was occupied in 1985. From 1985 to 1987, treated waste from the etching operations was discharged through a 6-in.-diameter polyvinyl chloride drainpipe to the seepage pits (LANL 1997, 056749). As the effluent production rate exceeded the infiltration rate of liquid into the tuff causing the seepage pits to overflow, the drainline was disconnected from the seepage pits in 1987 and the pits became inactive (Creamer 1993, 015248); LANL 1997, 056749). After the pits were disconnected, effluent was allowed to daylight for only a few months before the drainlines were tied into the TA-16 WWTF (Creamer 1993, 015228).

5.4.2 Previous Investigations

In 1987, DOE sampled the marshy area in the upper part of Tributary B of Twomile Canyon east of buildings 22-0091 and 22-0093 that was impacted by releases from SWMU 22-015(a) (LANL 1990, 007512). Three surface samples and five subsurface samples (up to 5 ft bgs) were collected from six locations. Sampling locations were field screening for VOCs, HE and radioactivity; results were non-detect (ND) or at background levels. Samples were submitted for analysis of metals, VOCs, HE, asbestos, and alpha, beta and gamma emitting radionuclides. The 1987 DOE data is screening-level and not presented in this report; however, the data showed concentrations of inorganic chemicals above BVs.

During the 1994 Phase I RFI, nine samples were collected from three depths from three borehole locations: one next to and downgradient of Pit A, one next to and downgradient of Pit B, and one between the two pits (LANL 1997, 056749). Sampling locations were field screened for VOCs, HE, and radioactivity; the results were nondetect or at background levels. The samples were submitted for analysis of TAL metals, VOCs, SVOCs, and HE. The holding times for the HE analyses were exceeded, and PETN analysis was not requested. Data collected during the 1994 RFI sampling investigation are screening-level data and are not presented in this work plan; however, the data showed metals detected above BVs in the seepage pit area. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

In 1997 RFI, four samples were collected from two boreholes, each drilled through a seepage pit into the underlying tuff 3 ft below the bottom of each pit. Samples from the Pit A borehole were collected at 27.7 to 28.7 ft and 29 to 30 ft bgs, and at the Pit B borehole samples were collected at 20.5 to 21.5 and 23 to 24 ft bgs. The samples were submitted for analysis of metals, VOCs, cyanide, and HE, including PETN. Samples collected during the 1997 Phase I RFI and the analyses requested for the decision-level data are presented in Table 5.0-1.

5.4.3 Analytical Results

Decision-level data from the 1997 Phase I RFI samples are presented in Tables 5.0-2 and 5.0-3. Inorganic chemicals detected above BVs were copper and silver. Copper was detected above the sediment BV in two samples and above the soil BV in one sample. Silver was detected above the sediment BV in one sample. Sampling locations and inorganic chemicals detected above BVs are presented in Table 5.0-2 and shown in Figure 5.4-2. Acetone was detected in two samples. Sampling locations and detected results for organic chemicals are presented in Table 5.0-3 and shown in Figure 5.4-3.

5.5 SWMU 22-015(b), Sump and Outfall

5.5.1 Description and History

SWMU 22-015(b) consists of an inactive HE sump, drainline, and outfall located at the northeast corner of building 22-0025, a small structure previously used for the recrystallization of PETN (LANL 1997, 056749) (Figure 5.5-1). The sump is constructed of concrete, is 4.5 ft × 3 ft × 3.5 ft deep, and contains an inset aluminum tank (LANL 1993, 026028). A drainline from the sump extends to the outfall in an open area approximately 50 ft to the north. The outfall discharged to a hillside, which drains to a drainage channel that flows eastward into Twomile Canyon. The sump and outfall operated from 1949 to the 1960s, when the operations in building 22-0025 ceased (Creamer 1992, 015247).

5.5.2 Previous Investigations

During the 1994 Phase I RFI, 15 samples were collected from three depths from five borehole locations around the sump and adjacent to the drainline outlet (LANL 1997, 056664). In addition, three surface samples were collected from three locations in the outfall area (LANL 1997, 056749). No samples were collected from the sump because no liquid or sludge was present. Sampling locations were field screened for radioactivity, VOCs, and HE; the results were nondetect or at background levels. The samples were submitted for analysis of VOCs and HE. Samples collected during the 1994 RFI for VOC analysis were lost by the analytical laboratory, and PETN was not requested as part of the HE suite (LANL 1997, 056749). Data collected during the 1994 RFI are screening-level data and are not presented in this work plan; however, the data showed no detected HE. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

Supplemental samples collected in 1997 included three samples collected from three depths (0 to 0.5 ft, 3.5 to 4.5 ft, 6.6 to 7.7 ft bgs) beneath the sump outlet, and three samples collected from three depths (0 to 0.5 ft, 3 to 3.5 ft, 3.5 to 4 ft bgs) beneath the northeast corner of the sump. Six samples were collected from two depths (0 to 0.5 ft and from a second interval ranging in depth from 1.3 to 2.7 ft bgs) in the outfall area. Sampling locations were field screened for VOCs and HE before samples were collected; the results were nondetect or at background levels. The samples were submitted for analysis of VOCs and HE. Samples collected during the 1997 Phase I RFI and the analyses requested for the decision-level data are presented in Table 5.0-1.

5.5.3 Analytical Results

Three organic chemicals (tetryl; 2,4-dinitrotoluene; and toluene) were each detected in one sample. Sampling locations and results for detected organic chemicals are presented in Table 5.0-3 and shown in Figure 5.5-2.

6.0 SITES UNDER INVESTIGATION IN TA-40

TA-40, also known as DF Site, is used to develop special detonators for initiating HE systems. Fundamental and applied research includes investigating phenomena associated with the physics of HEs and research in rapid-shock-induced reactions. The TA is also used for investigating the physics and chemistry of detonators and shock wave propagation. TA-40 is centrally located within LANL at the end of Twomile Mesa Road and covers 68 acres.

Laboratory analyses requested for TA-40 samples having decision-level data are presented in Table 6.0-1. Decision-level data for TA-40 are provided in Tables 6.0-2. All laboratory analytical data (decision-level and screening-level) are also provided in Appendix B (on CD).

6.1 SWMU 40-001(b), Septic System

6.1.1 Description and History

SWMU 40-001(b) is an inactive septic system located southeast of building 40-0001 (Figure 6.1-1). The septic system consists of a 1215-gal. reinforced concrete septic tank (structure 40-0024), an inactive drain field, two inactive seepage pits, associated piping, an inactive distribution box, and an inactive outfall. The septic tank was installed in 1949 and originally served former building 40-0019 but currently serves buildings 40-0001 and 40-0023 (LANL 1993, 026068). The effluent from this tank was originally discharged to a drain field. In 1973, because of the inadequate percolation in the drain field, the septic tank overflow was diverted to two gravel-filled seepage pits (LASL 1973, 004636). Because percolation in the seepage pits was also inadequate, the outlet drainline was plugged in 2004. Since that time, the septic tank has operated as a holding tank and is routinely pumped out. The depth of the seepage pits is not known.

Building 40-0001 originally housed an explosives laboratory, offices, and a darkroom. In the early 1980s, the explosives laboratory was removed and the building was converted entirely to office space (LANL 1993, 026068). Building 40-0023, originally used for cable fabrication, an electronics laboratory, and a warehouse, was converted to offices, a laser laboratory, carpenter shop, and staff shop in the early 1980s (Creamer 1993, 015063). Former building 40-0019, originally a three-room guard shack was converted to a storage building in 1977 and was decommissioned and removed in 2006.

6.1.2 Previous Investigations

During the 1994 Phase I RFI, samples of the septic tank contents were collected from three depths in the tank and nine tuff samples were collected from three depths from three locations around the drain field and seepage pits and six tuff samples were collected from two depths in the outfall area. Samples were submitted for analysis of metals, cyanide, VOCs, SVOCs, and HE. Data collected during the 1991 RFI are screening-level, were not previously reported in an RFI report and are not presented in this work plan; however, the data showed metals detected above BVs and detected organic chemicals and HE. Samples collected in 1994, the analyses requested, and the data are presented in Appendix B.

6.1.3 Analytical Results

No decision-level data are available for SWMU 40-001(b).

6.2 SWMU 40-005, Sump

6.2.1 Description and History

SWMU 40-005 is an inactive sump (structure 22-0075) located at the northwest corner of building 40-0041 (formerly building 22-0041) (Figure 6.2-1). Constructed in 1952, building 40-0041 is a small structure (approximately 1000 ft^2) where explosive grinding operations were previously conducted. Before it was incorporated into TA-40, building 40-0041 and the sump were part of TA-22. Currently, the building is used to prepare for explosive tests conducted at TA-40. The sump, built in 1961, is constructed of concrete with an inset aluminum baffle tank (LANL 1990, 007512). The sump is 4 ft 6 in. × 6 ft 4 in. × 5 ft deep. Wastewater from a single sink drain discharged to the sump (Santa Fe Engineering Ltd. 1993, 031756). Originally, the sump discharged via a drainline to a former NPDES-permitted outfall (EPA 05A-154) that flowed into Tributary B of Twomile Canyon. In 1994, the sump outlet port was capped, and in December 1995 the outfall was deleted from the NPDES permit (LANL 1997, 056664). The sump has been removed from service and filled with concrete.

6.2.2 Previous Investigations

During the 1994 Phase I RFI, 14 samples were collected from two to three depths from four locations at the corners of the sump and from one location beneath the sump outlet. Three surface samples were collected within the outfall area (LANL 1997, 056664). In addition, six surface samples were collected in a small marsh area about 0.25 mi upstream and upcanyon in an area north of building 22-0034. Samples collected during the 1994 RFI were submitted for analysis of TAL metals only. Data collected in 1994 are screening-level data and are not presented in this work plan; however, the data showed metals detected above BVs. Samples collected during the 1994 RFI, the analysis requested, and the data are presented in Appendix B.

In 1996, each of the 1994 RFI sampling locations were resampled immediately next to the original sampling locations. Fifteen samples were collected in the sump area from five borehole locations around the sump. Three samples were collected from each borehole at depth intervals representing the surface (0 to 0.5 ft bgs), level with the bottom of the sump (4.5 to 5.5 ft bgs) and 3 ft below the sump (7.5 to 8.5 ft bgs). Four surface samples (0 to 0.5 ft bgs) were collected in the outfall area from one location at the outfall and three locations downgradient of the outfall. The sampling locations were field screened for radioactivity, VOCs, and HE before samples were collected and submitted for analysis of VOCs and HE; the results were nondetect or at background levels. Samples collected during the 1996 RFI and the analysis requested for the decision-level data are presented in Table 6.0-1.

6.2.3 Analytical Results

Two organic chemicals, acetone and methylene chloride, were detected. Acetone was detected in eight samples and methylene chloride in one. Sampling locations and results for detected organic chemicals are presented in Table 6.0-2 and shown in Figure 6.2-2.

6.3 AOC 40-007(e), Storage Area

6.3.1 Description and History

AOC 40-007(e) is a satellite accumulation area (SAA) located in building 40-0041 (Figure 6.3-1), which is used to prepare for explosives tests at the TA-40 firing sites. Wastes accumulated in the SAA are associated with HE detonator assembly and typically consist of rags contaminated with explosives; such wastes are generated at a rate of 1 to 2 gal./mo (LANL 1990, 007512). No historical releases are documented for this site.

6.3.2 Previous Investigations

No previous investigations have been conducted at AOC 40-007(e).

6.3.3 Analytical Results

No decision-level data are available for AOC 40-007(e).

7.0 SITES UNDER INVESTIGATION IN TA-50

TA-50 is located immediately northeast of the intersection of Pajarito Road and Pecos Drive and occupies approximately 21 acres, MDA C occupies 11.8 acres and the RLWTF and supporting facilities occupy the remaining 8.7 acres. Radioactive liquid wastewater treatment facilities include the wastewater treatment

plant and associated RLW transfer and storage systems, equipment decontamination areas and a volume reduction facility.

Only one site at TA-50 is included in the Twomile Canyon Aggregate Area investigation and the site has not been sampled.

7.1 AOC C-50-001, Transformer

7.1.1 Description and History

AOC C-50-001 is the former location of a PCB transformer (PCB ID 855023) that was situated on a 20-ft × 10-ft concrete pad surrounded by asphalt on the east side of building 50-0001 (Figure 7.1-1). There is only one documented release from the transformer, which involved a minor seep from a valve in August 1989 (LANL 2000, 067470.2). The valve was cleaned, and metal epoxy was used to seal the valve. The transformer was removed in 1994 and replaced with a non-PCB transformer.

While the PCB transformer was being replaced, oil staining was noted on the concrete pad directly beneath the transformer. A sample of the material confirmed the presence of PCBs on the concrete pad. The staining did not extend beyond the perimeter boundary of the transformer on the concrete pad. The pad was scraped and double wash-rinsed five times using an alkaline detergent in accordance with EPA's PCB Cleanup Policy (40 Code of Federal Regulations [CFR] Part 761, Subpart G). Also in accordance with 40 CFR Part 761, Subpart G, the cleaned area was encapsulated with polymeric paint/sealer before the new non-PCB transformer was placed on the pad (NMED 2000, 066400). After the non-PCB transformer was installed, the concrete transformer pad was expanded and a containment drain installed along the inside edge of the pad.

7.1.2 Previous Investigations

No previous investigations have been conducted at AOC C-50-001.

7.1.3 Analytical Results

No decision-level data are available for AOC C-50-001.

8.0 SITES UNDER INVESTIGATION IN TA-59

TA-59, the Laboratory's Occupational Health complex, provides support services for the Laboratory in the areas of health physics, risk management, industrial hygiene and safety, policy and program analysis, air quality, water quality and hydrology, hazardous and solid waste analysis, and radiation protection. In addition, the Analytical Chemistry Group provides institutional support for environmental and bioassay samples.

Only two sites at TA-59 are included in the Twomile Canyon Aggregate Area investigation and the sites have not been sampled.

8.1 AOC 59-004, Outfall

8.1.1 Description and History

AOC 59-004 consists of an inactive, former NPDES-permitted outfall (03A098) that discharged wastewater from the occupational health laboratory (building 59-0001) and cooling tower blowdown from

building 59-0010 (Santa Fe Engineering Ltd. 1992, 074043) (Figure 8.1-1). The outfall received stormwater, acidic scrubber water from fume hoods, air-conditioning condensate, and wastewater from floor drains in building 59-0001 (Santa Fe Engineering Ltd. 1992, 074043). The outfall discharged to a rock-lined drainage channel measuring approximately 4 ft wide × 50 ft long (LANL 1996, 052930, p. 139). The outfall was removed from the NPDES permit in December 1995 (LANL 1996, 108214).

8.1.2 Previous Investigations

During the 1994 Phase I RFI, three surface samples were collected from three locations in the outfall area (LANL 1996, 052930). Sampling locations were field screened for VOCs before the sample was collected; results were nondetect. Samples were submitted for analysis of TAL metals, SVOCs, tritium, and gamma-emitting radionuclides; one sample was submitted for analysis of VOCs to confirm field-screening nondetects. Data collected during the 1994 RFI are screening-level data and are not presented in this work plan; however, data showed metals detected above BVs and one detected SVOC (PAH) chemical. Samples collected during the 1994 RFI, the analyses requested, and the data are presented in Appendix B.

8.1.3 Analytical Results

No decision-level data are available for AOC 59-004.

8.2 AOC C-59-001, Transformer

8.2.1 Description and History

AOC C-59-001 is the former location of a PCB transformer in room B-1 of building 59-0001 (Figure 8.2-1). The transformer contained 212 gal. of dielectric fluid with a PCB concentration greater than 500 ppm (LANL 1991, 066133). In September 1985, stains were noted on the transformer, primarily around bushings and gaskets; no stains were noted on the pad (LANL 1991, 066133). In June 1991, the transformer was replaced with a non-PCB transformer (LANL 1991, 066133). No staining was visible during a site visit performed in 1994 (LANL 1995, 057590, p. 6-67).

8.2.2 Previous Investigations

No previous investigations have been conducted at AOC C-59-001.

8.2.3 Analytical Results

No decision-level data are available for AOC C-59-001.

9.0 SITES UNDER INVESTIGATION IN TA-69

TA-69, also known as Anchor North Site, is primarily an undeveloped technical area that serves as an environmental buffer for the high-explosives test area. The only facilities located at this site are used for physical support functions, such as a water tank for fire protection. Past operations included a building in which documents were once shredded and incinerated.

Only one site at TA-69 is included in the Twomile Canyon Aggregate Area investigation and there are decision-level data available for this site (SWMU 69-001). All laboratory analytical data (decision-level and screening-level) are provided in Appendix B (on CD).

9.1 SWMU 69-001, Twomile Incinerator Facility

9.1.1 Description and History

SWMU 69-001 is the site of the former Twomile Incinerator Facility, former building 69-0003, used from 1960 to the late 1970s to destroy classified documents (LANL 1993, 020949, p. 5-77) (Figure 9.1-1). The building was 20 ft × 28 ft × 15 ft tall. Two incinerators and a shredder were located within former building 69-0003. Cleanout water from the incinerators drained through a pipe to a pond located on the northeast side of former building 69-0003 in a shallow swale that drained into Twomile Canyon. Ash from the incinerators was manually removed and placed in the pond, which was bisected by a dirt road (LANL 1993, 020949, pp. 5-77–5-79). The portion of the pond on the south side of the road was located directly below the incinerator outflow pipe and measured approximately 15 ft by 15 ft. The portion of the pond on the north side of the road measured approximately 30 ft by 60 ft and was flanked by a 3-ft earthen berm on the east and north sides (ICF Kaiser Engineers 1995, 056712, p. 8). Demolition of building 69-003 was completed in July and August 2004 (LANL 1996, 108214).

9.1.2 Previous Investigations

During the 1994 Phase I RFI, four surface samples (0 to 0.5 ft bgs) were collected from one location next to former building 69-0003 and three locations in the pond area (LANL 1996, 054334, pp. B-1–B-12). One sample was submitted for analysis of VOCs and SVOCs; all four samples were submitted for analysis of metals. Data collected in 1994 are screening-level data and are not presented in this work plan; however, the data showed metals detected above BVs. Samples collected during the 1994 RFI investigation are screening-level data and are presented in Appendix B.

During the 1995 VCA conducted at SWMU 69-001, 265 yd^3 of ash and soil was removed from the incinerator pond, pond berm, and surrounding area (LANL 1996, 054334, pp. 7–8). Field screening of the site and potentially contaminated materials showed no detected HEs or VOCs, and radioactivity was at background levels. Following the removal, nine surface (0 to 0.5 ft bgs) confirmation samples were collected from the pond area and submitted for analysis of TAL metals. Data collected during the 1995 VCA are screening-level data and are not presented in this work plan; however, the data showed metals detected above BVs. Samples collected during the 1995 VCA, the analyses requested, and the data are presented in Appendix B.

9.1.2-1 Analytical Results

No decision-level data are available for SWMU 69-001.

10.0 REFERENCES AND MAP DATA SOURCES

10.1 References

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Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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10.2 Map Data Sources

Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, EP2009-0137; 1:2,500 Scale Data; 13 March 2009; Modified PRS boundaries contained within WES GIS Team project folder, 09-0109, until change control complete.

Canyon Reaches; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program, ER2002-0592; 1:24,000 Scale Data; Unknown publication date; Additional reach data contained in WES GIS Team project folder 09-0109

Aggregate Areas; Los Alamos National Laboratory, ENV Environmental Remediation & Surveillance Program, ER2005-0496; 1:2,500 Scale Data; 22 September 2005.

Former Structures of the Los Alamos Site; Los Alamos National Laboratory, Waste and Environmental Services Division, EP2008-0441; 1:2,500 Scale Data; 08 August 2008; Additional former structures contained within WES GIS Team project folder, 09-0109.

Primary Electric Grid; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

Primary Gas Distribution Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

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Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

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Storm Drain Line Distribution System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.

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Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 04 December 2008.

WQH Drainage_arc; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003; Additional drainage data contained within WES GIS Team project folder 08-0030.

Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, EP2009-0162; 13 March 2009; Proposed sampling and modified/new point feature data contained within WES GIS Team project folder 09-0109.

Individual Permit (IP) Site Monitoring Area (SMA) Samplers; Los Alamos National Laboratory, Water Stewardship Program; Currently unpublished 2009 data contained within WES GIS Team project folder 07-0142.

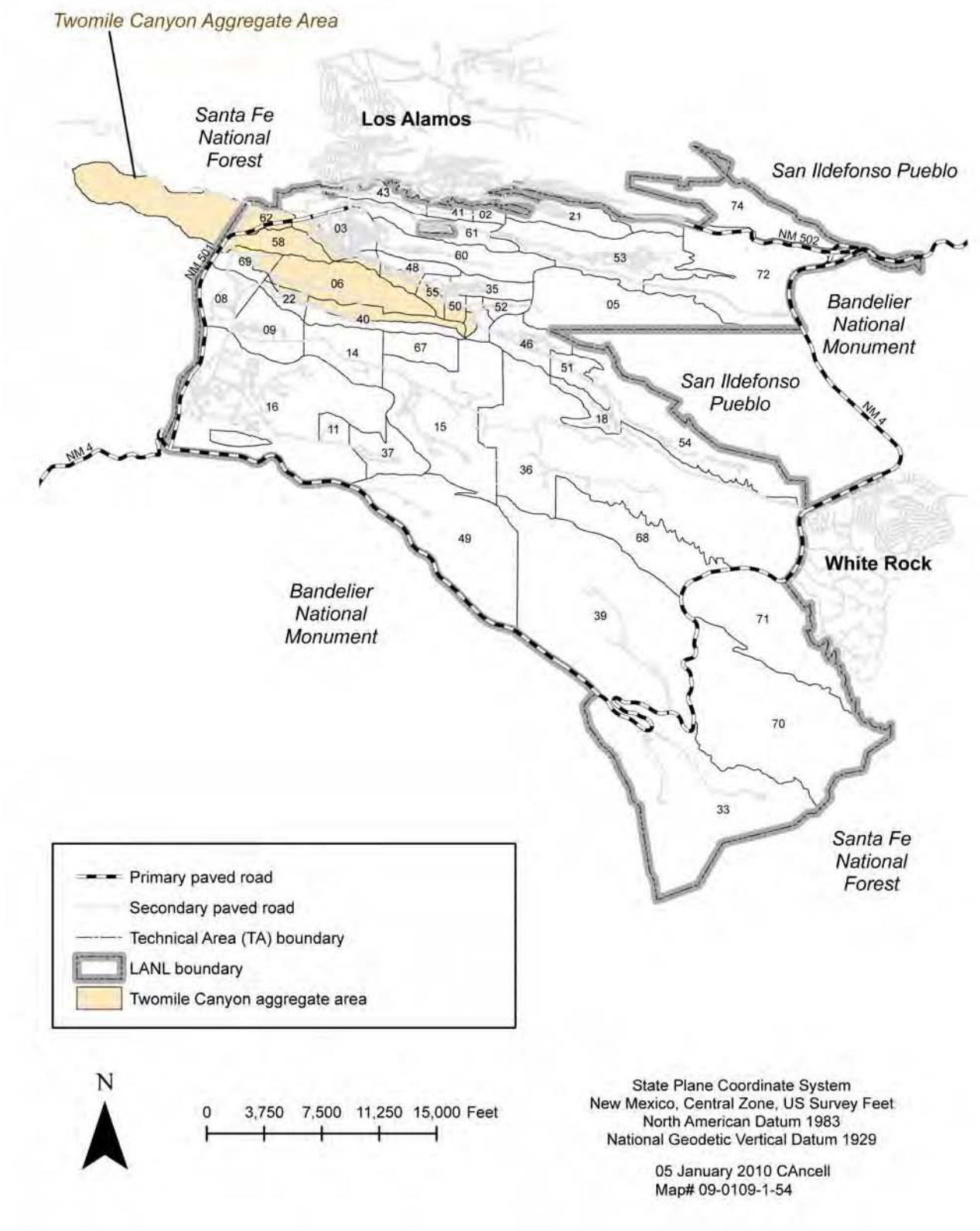

Figure 1.0-1 Twomile Canyon Aggregate Area with respect to Laboratory TAs and surrounding land holdings

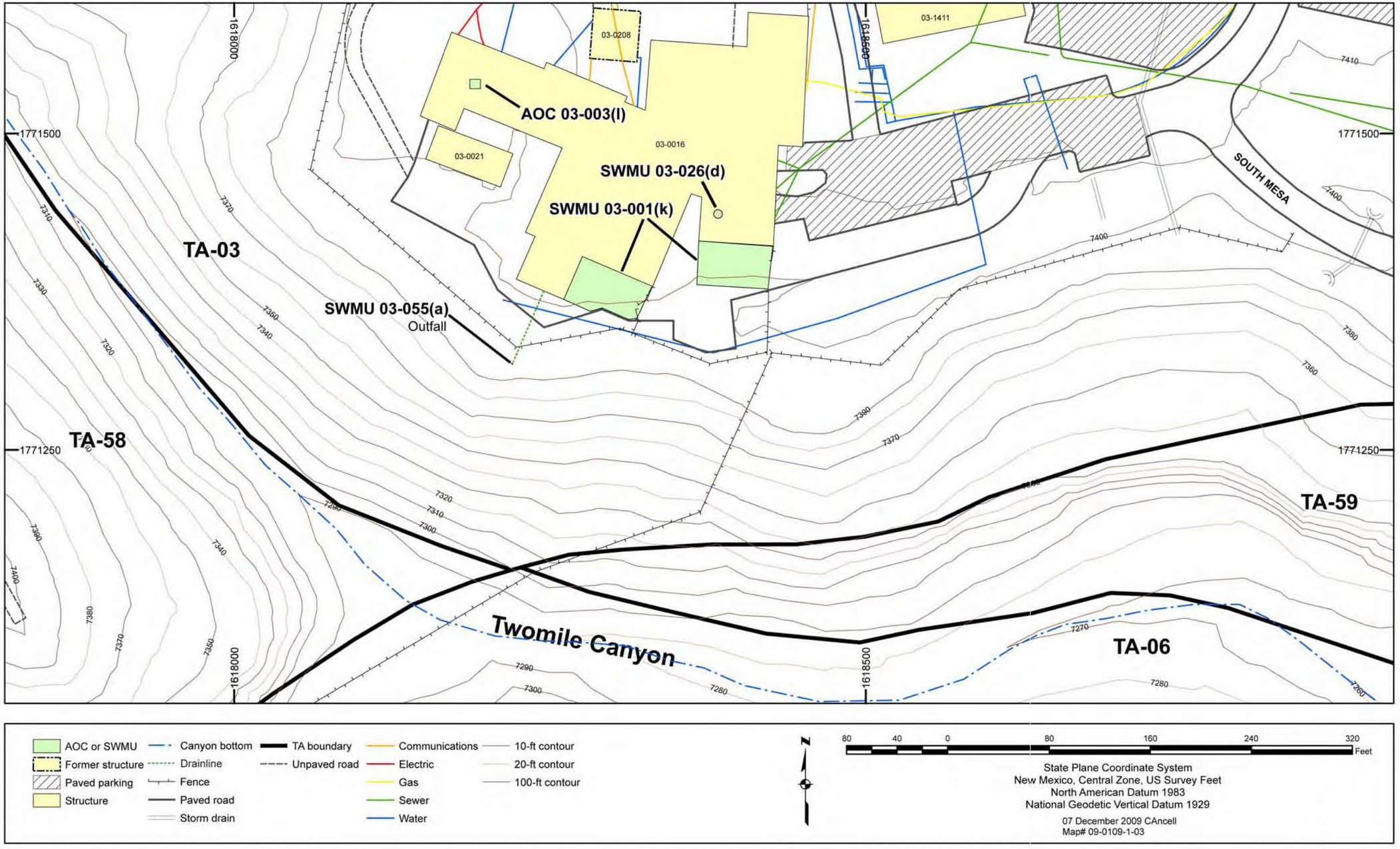

Figure 2.2-1 Site features for SWMUs 03-001(k), 03-026(d), and 03-055(a) and AOC 03-003(l)

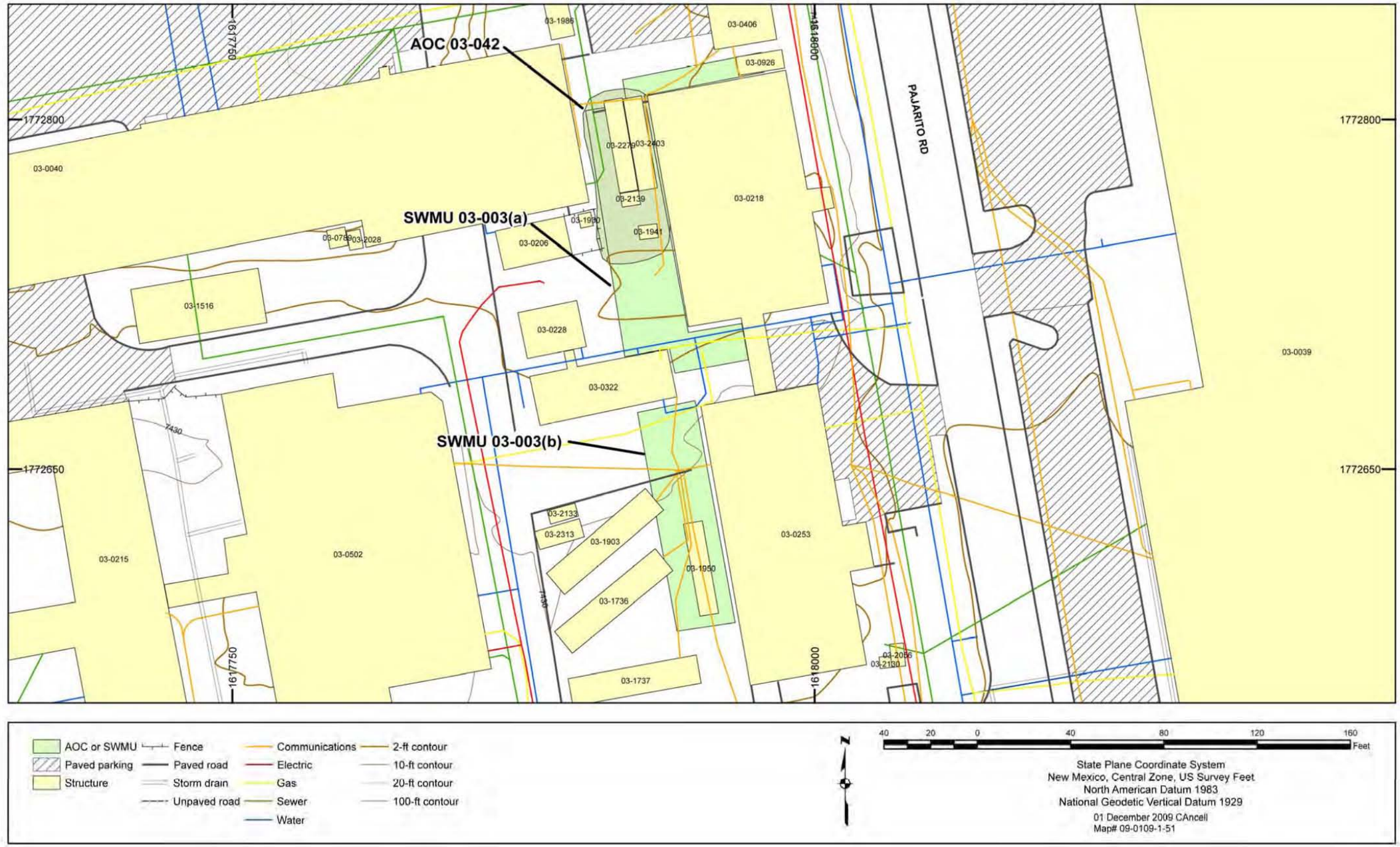

Figure 2.3-1 Site features for SWMUs 03-003(a) and 03-003(b) and AOC 03-042

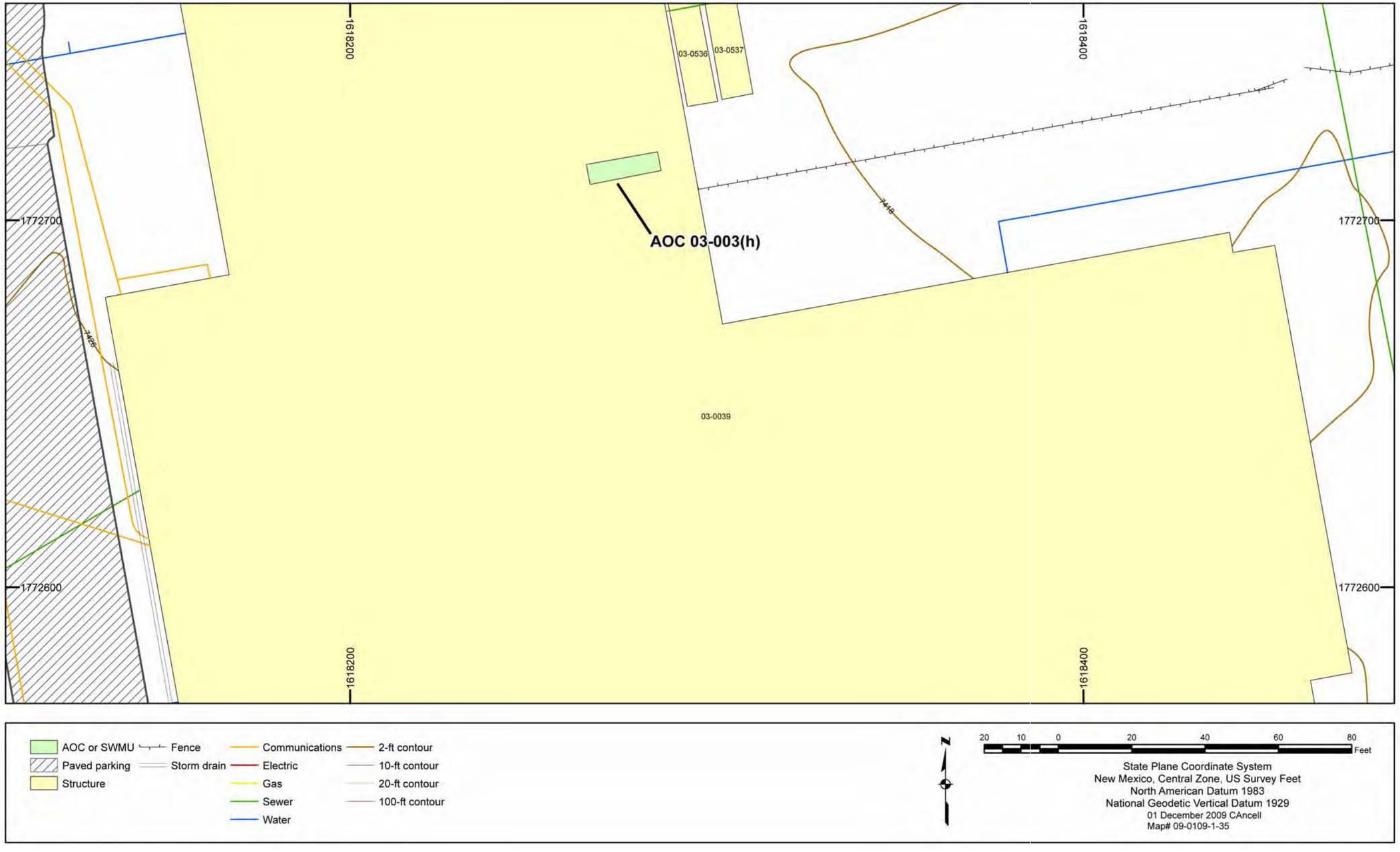

Figure 2.5-1 Site features for AOC 03-003(h)

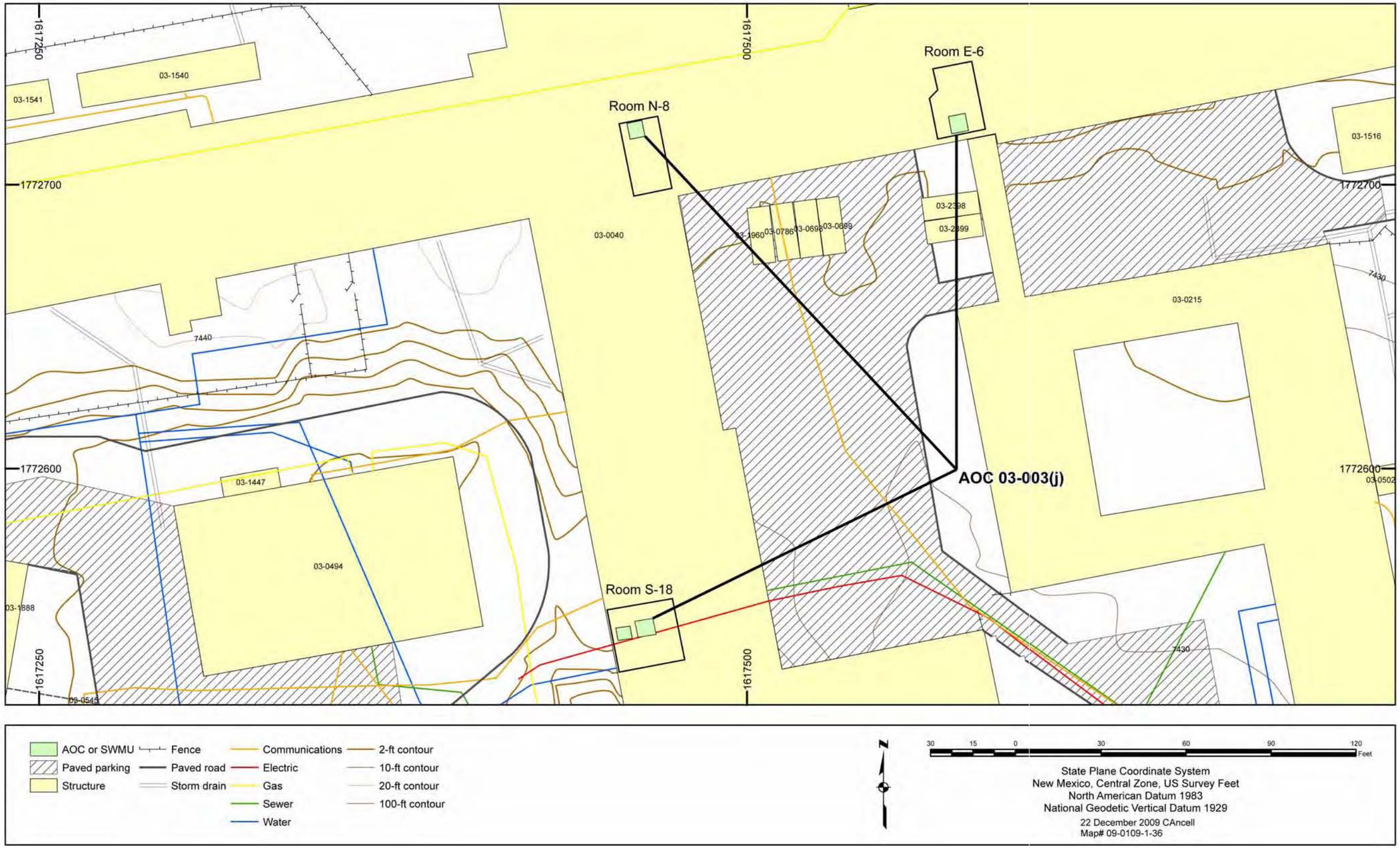

Figure 2.6-1 Site features for AOC 03-003(j)

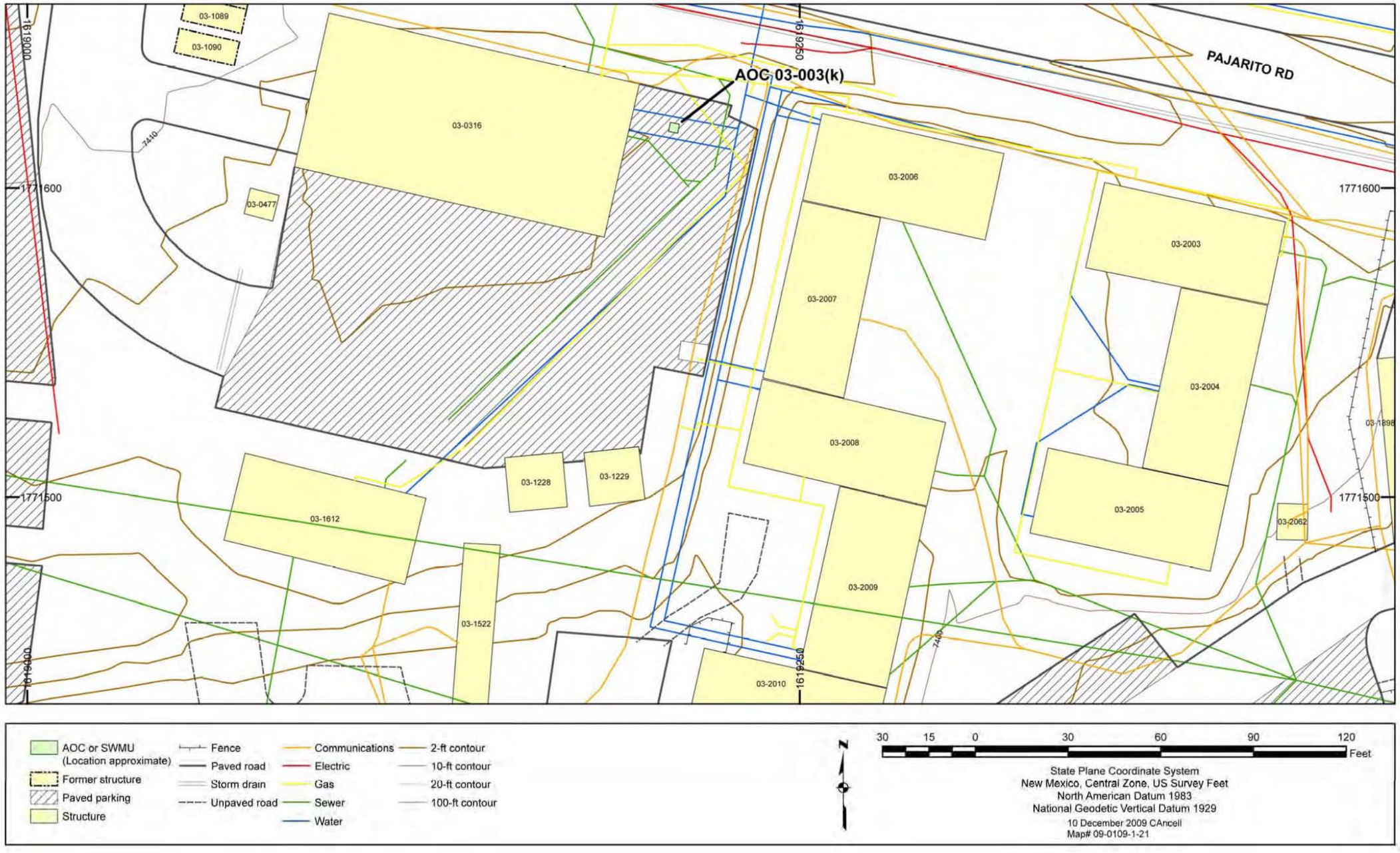

Figure 2.7-1 Site features for AOC 03-003(k)

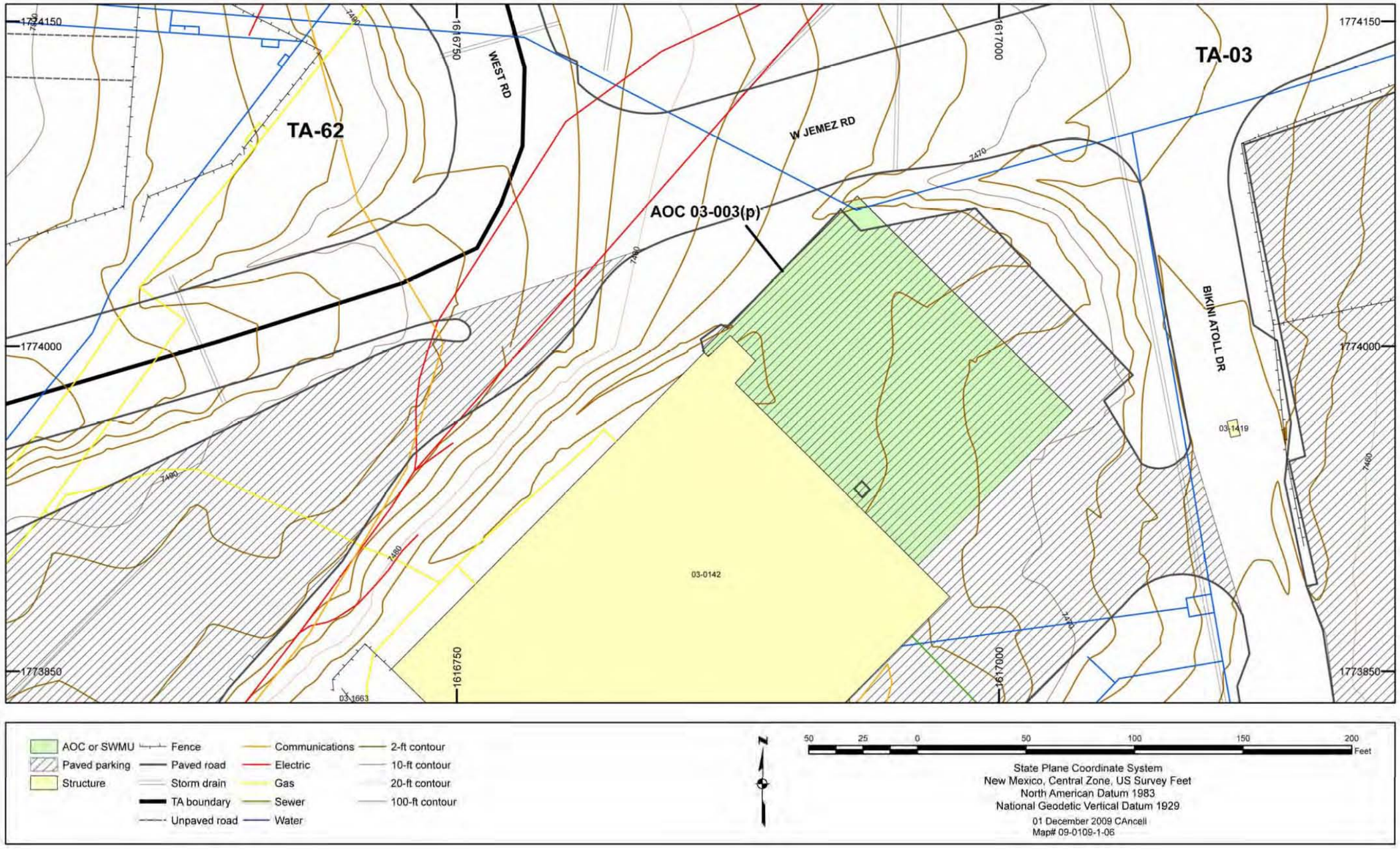

Figure 2.9-1 Site features for AOC 03-003(p)

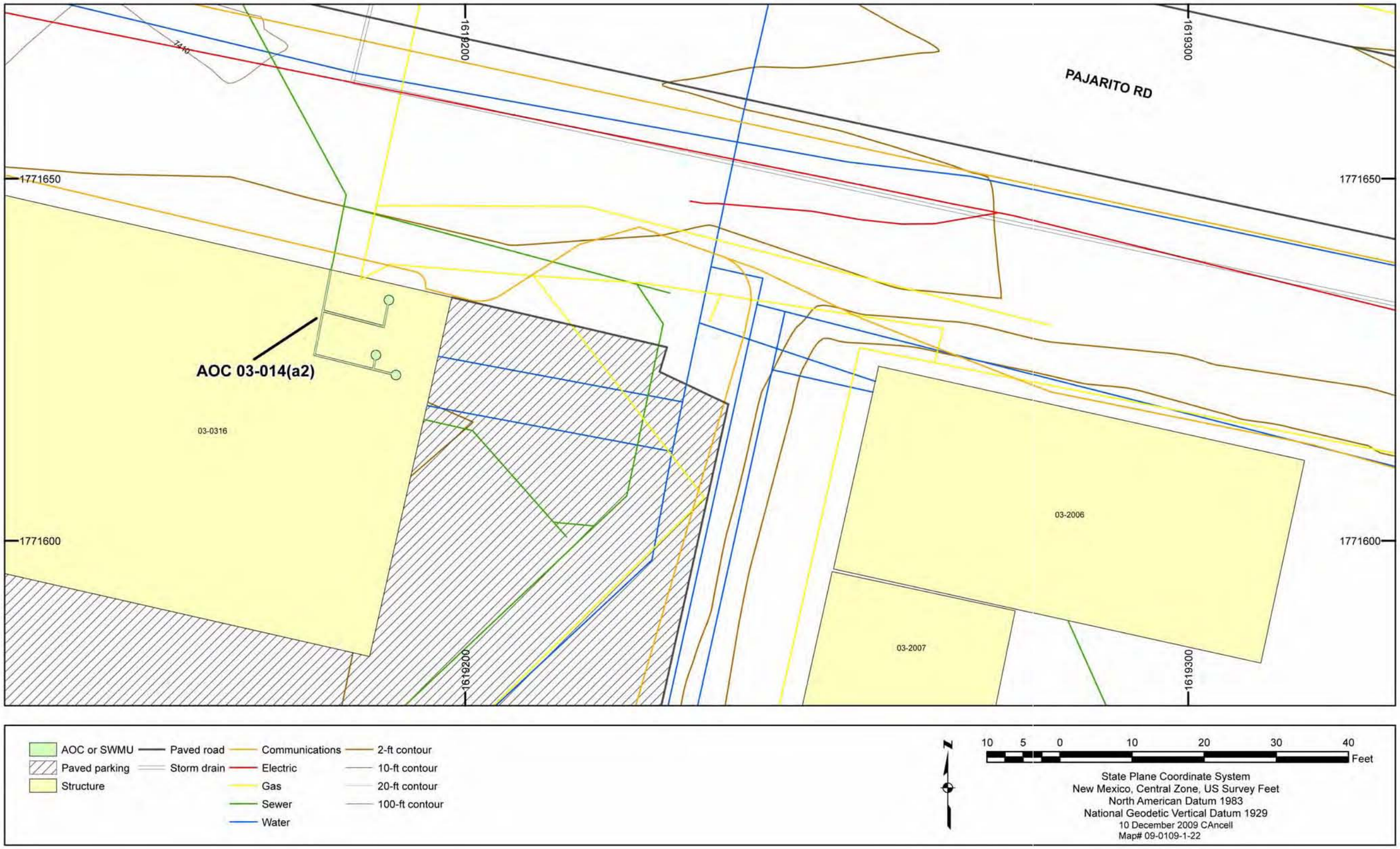

Figure 2.10-1 Site features for AOC 03-014(a2)

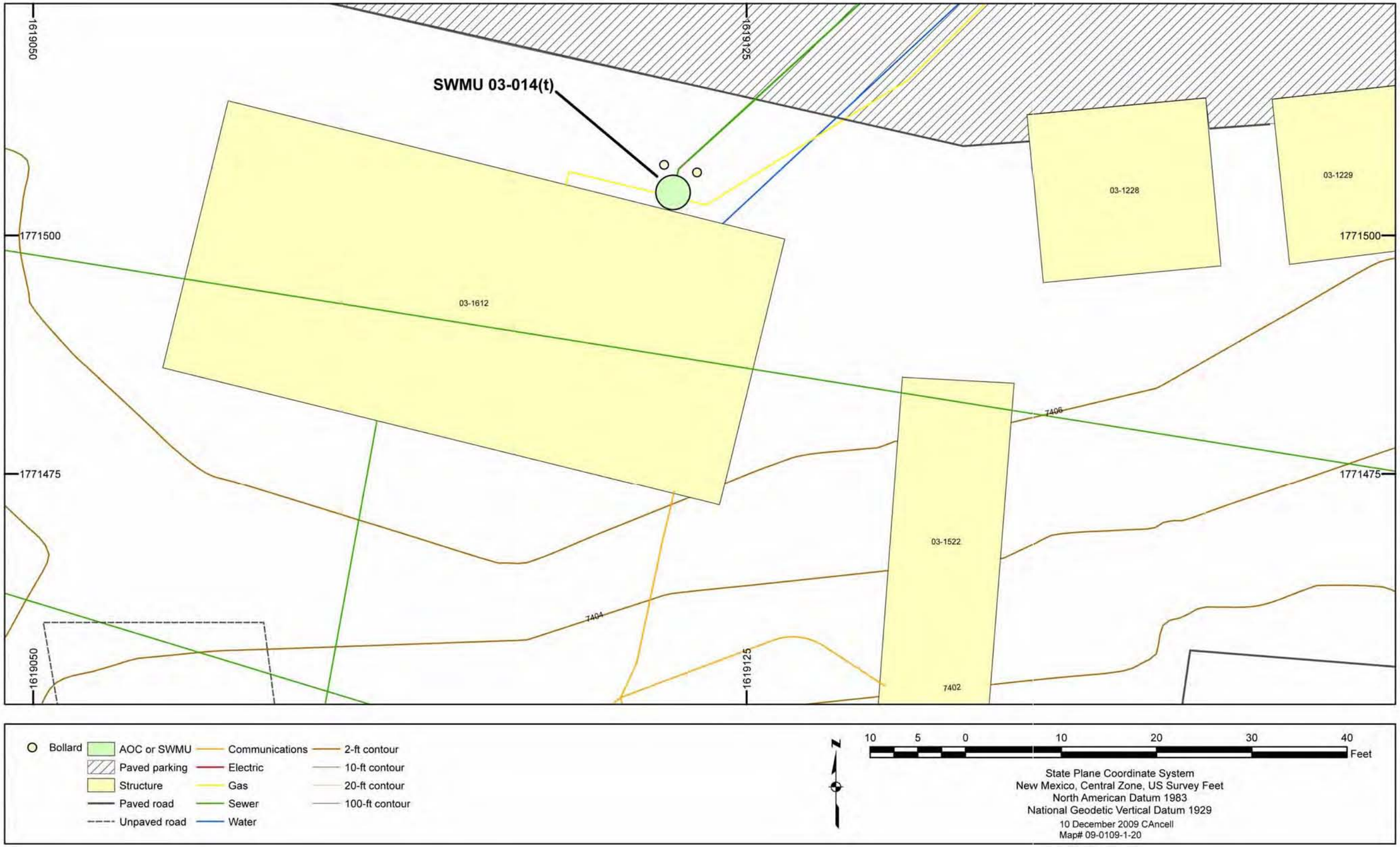

Figure 2.11-1 Site features for SWMU 03-014(t)

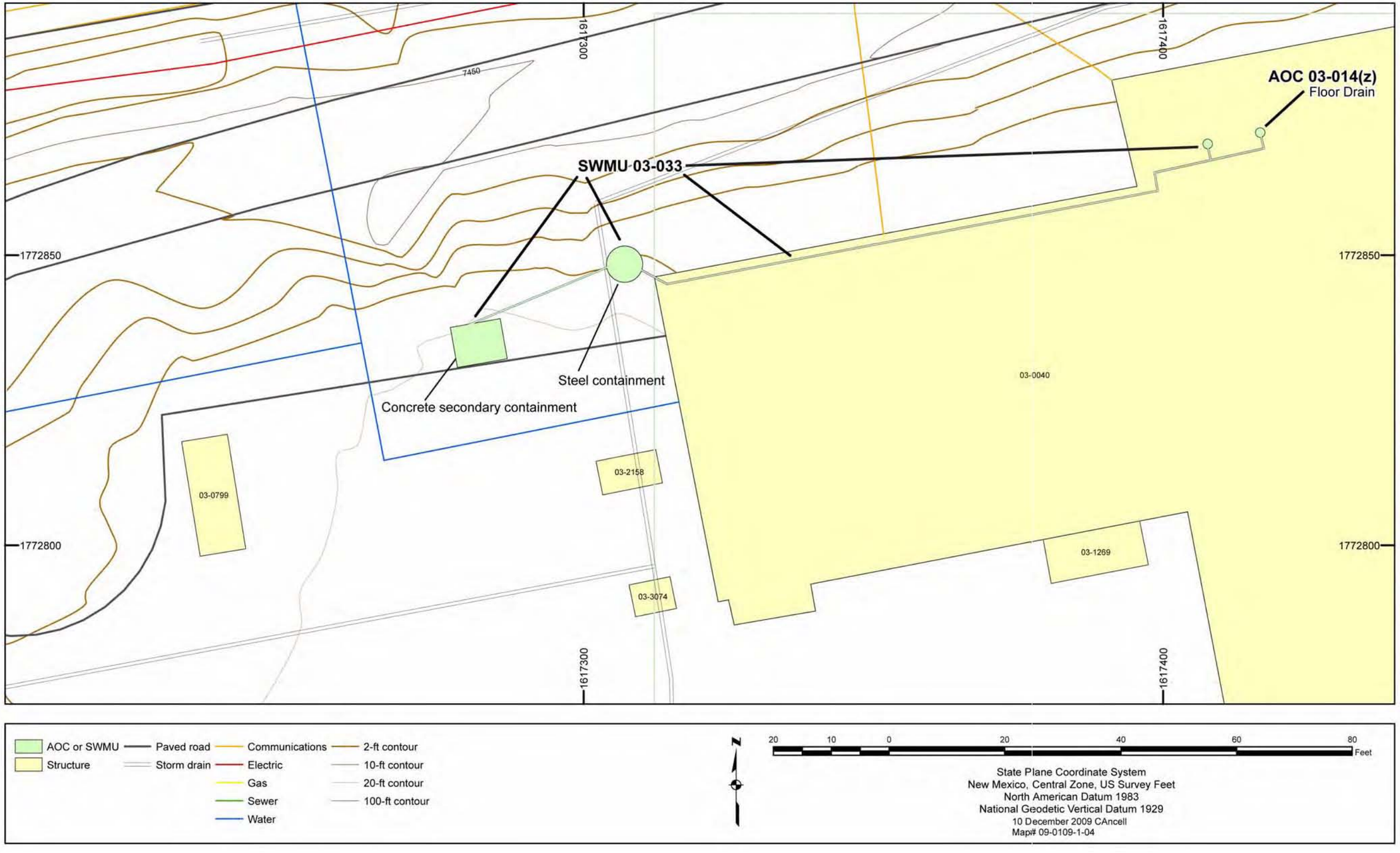

Figure 2.12-1 Site features for SWMU 03-033 and AOC 03-014(z)

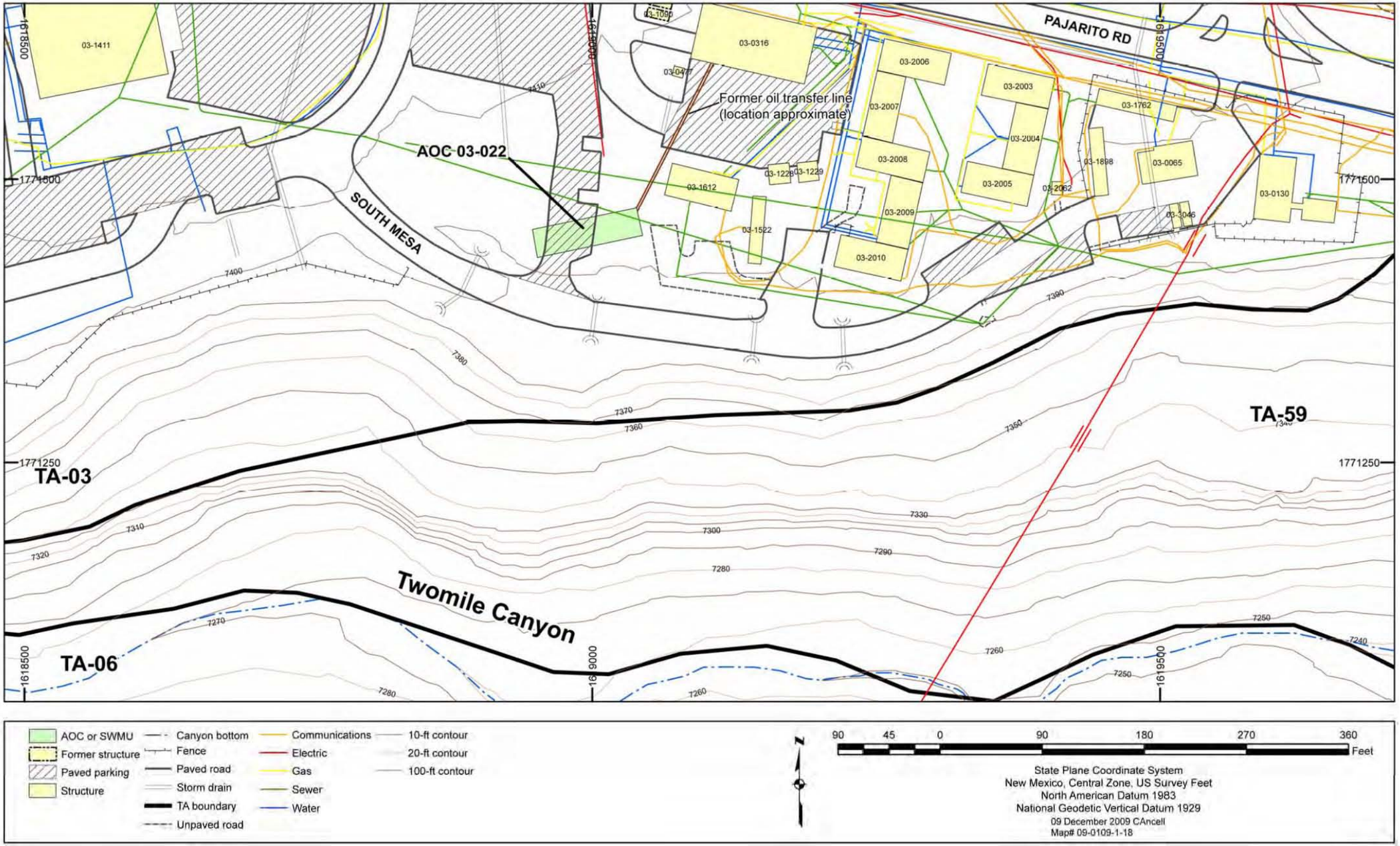

Figure 2.13-1 Site features for AOC 03-022

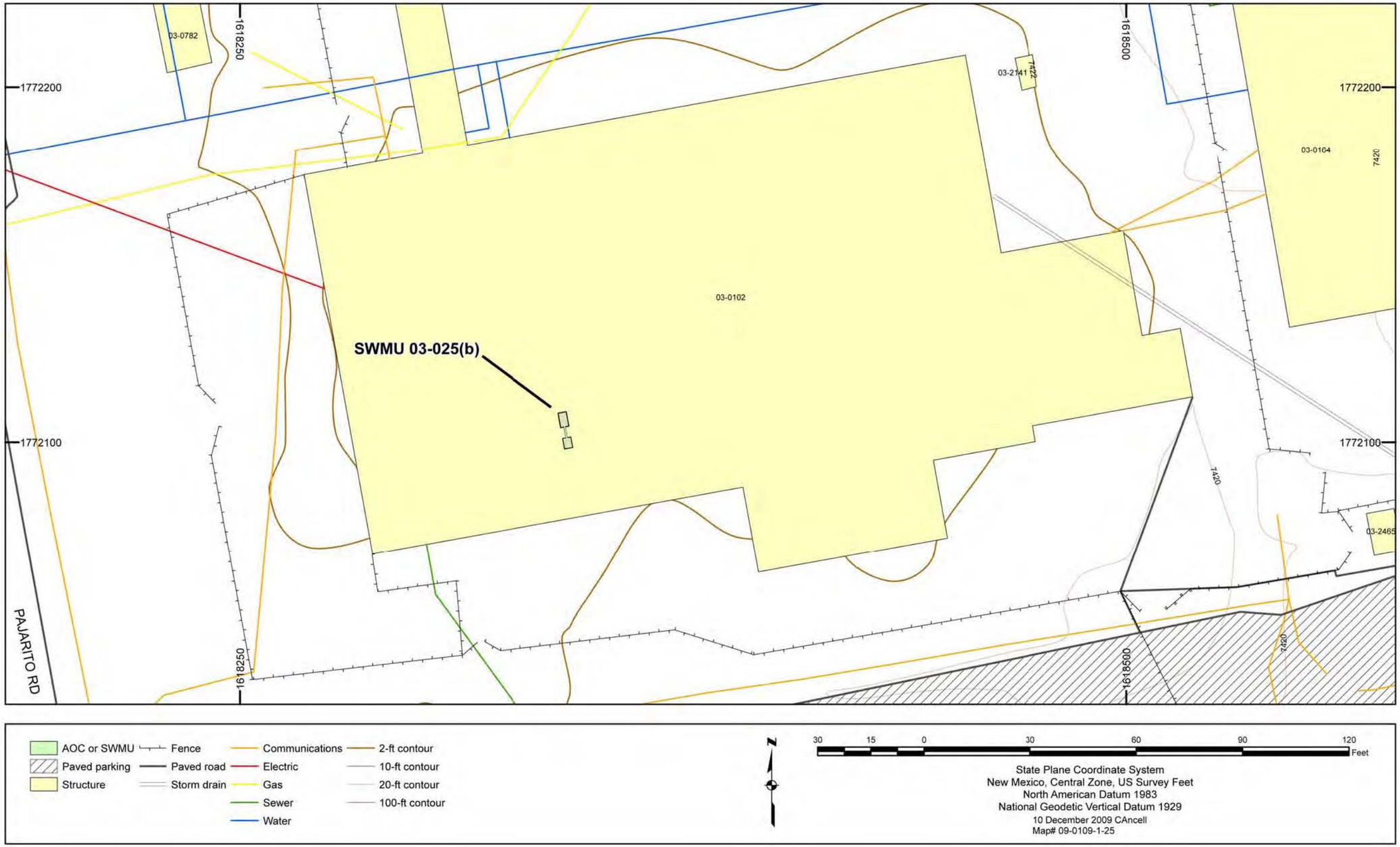

Figure 2.14-1 Site features for SWMU 03-025(b)

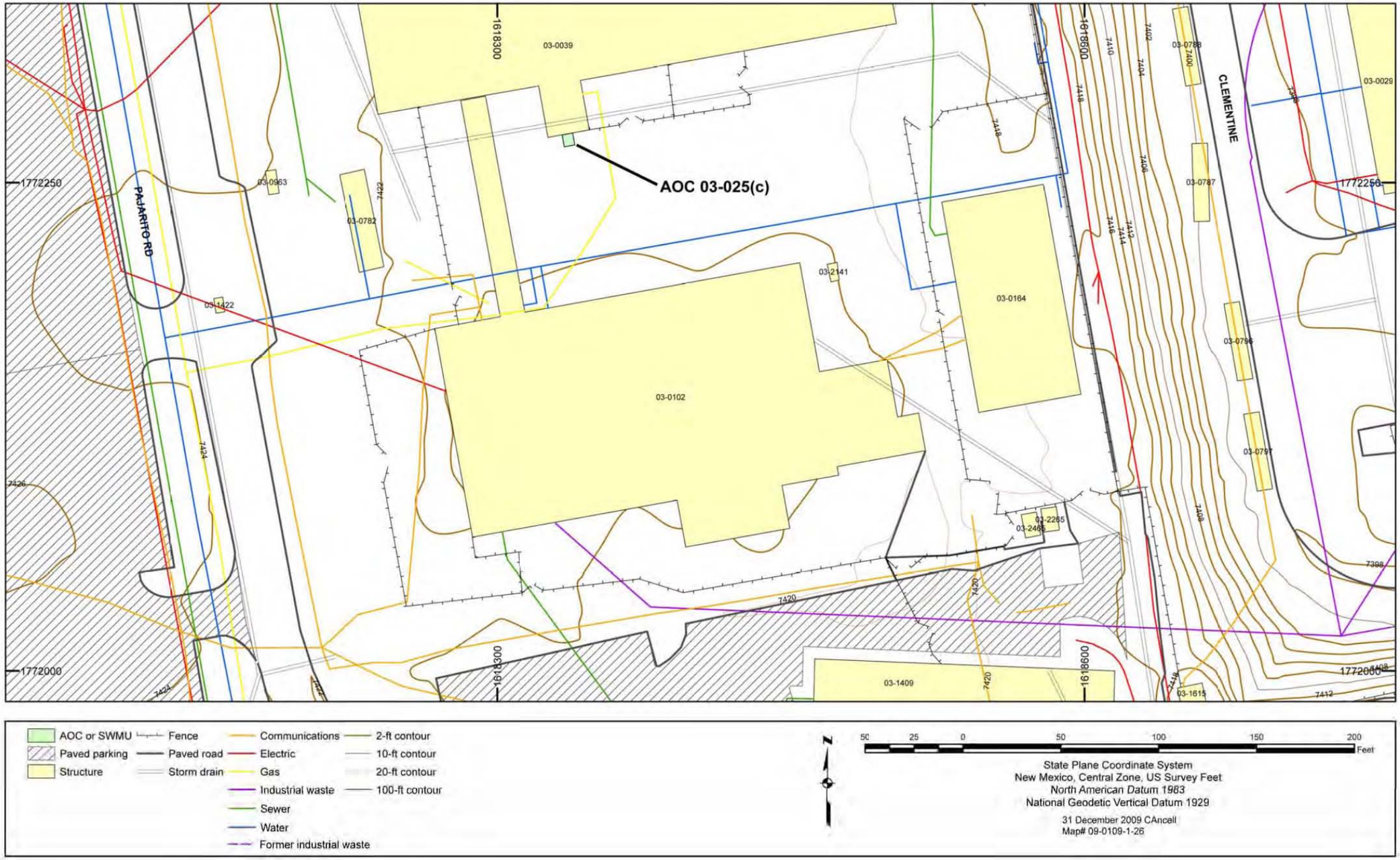

Figure 2.15-1 Site features for AOC 03-025(c)

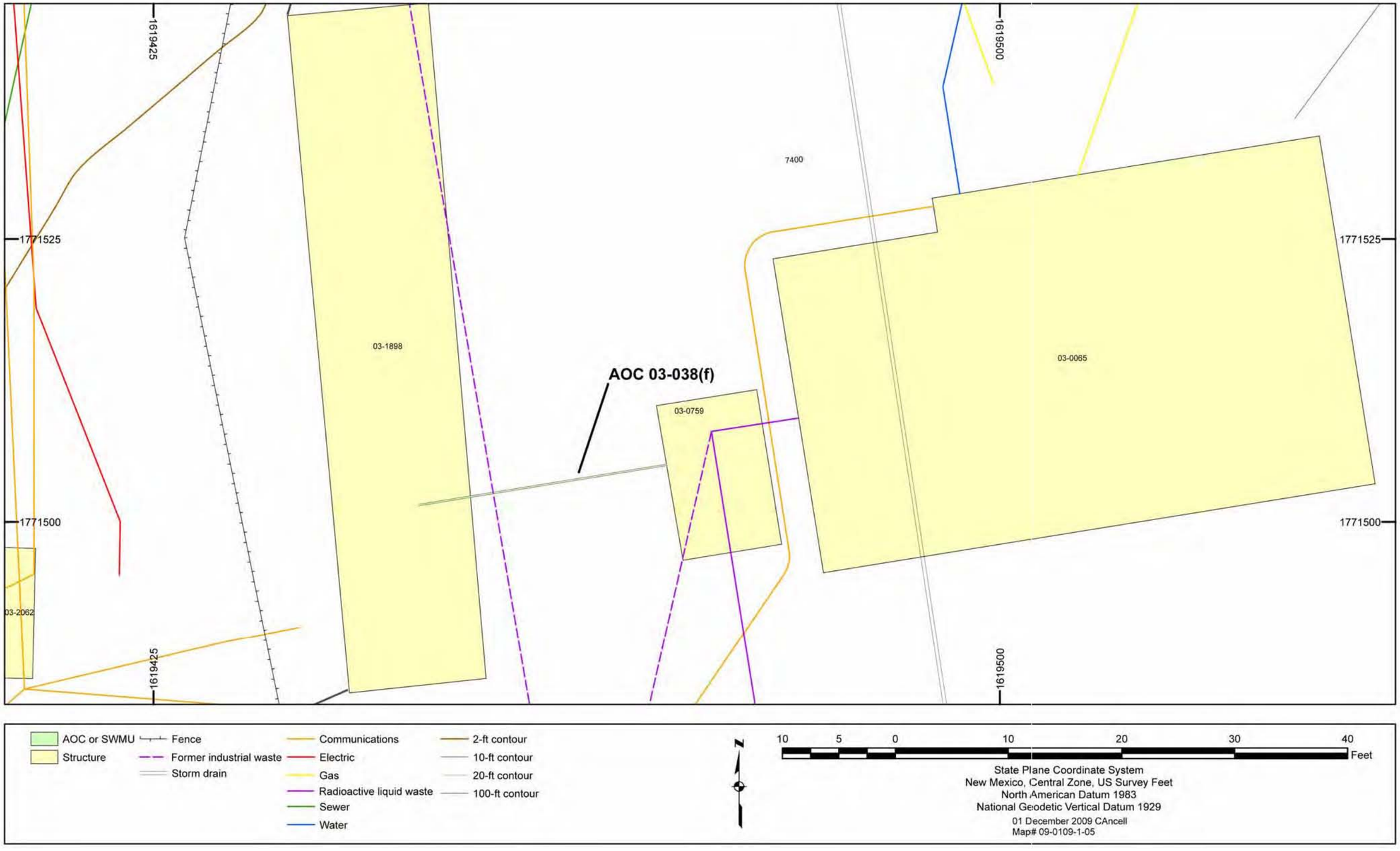

Figure 2.18-1 Site features for AOC 03-038(f)

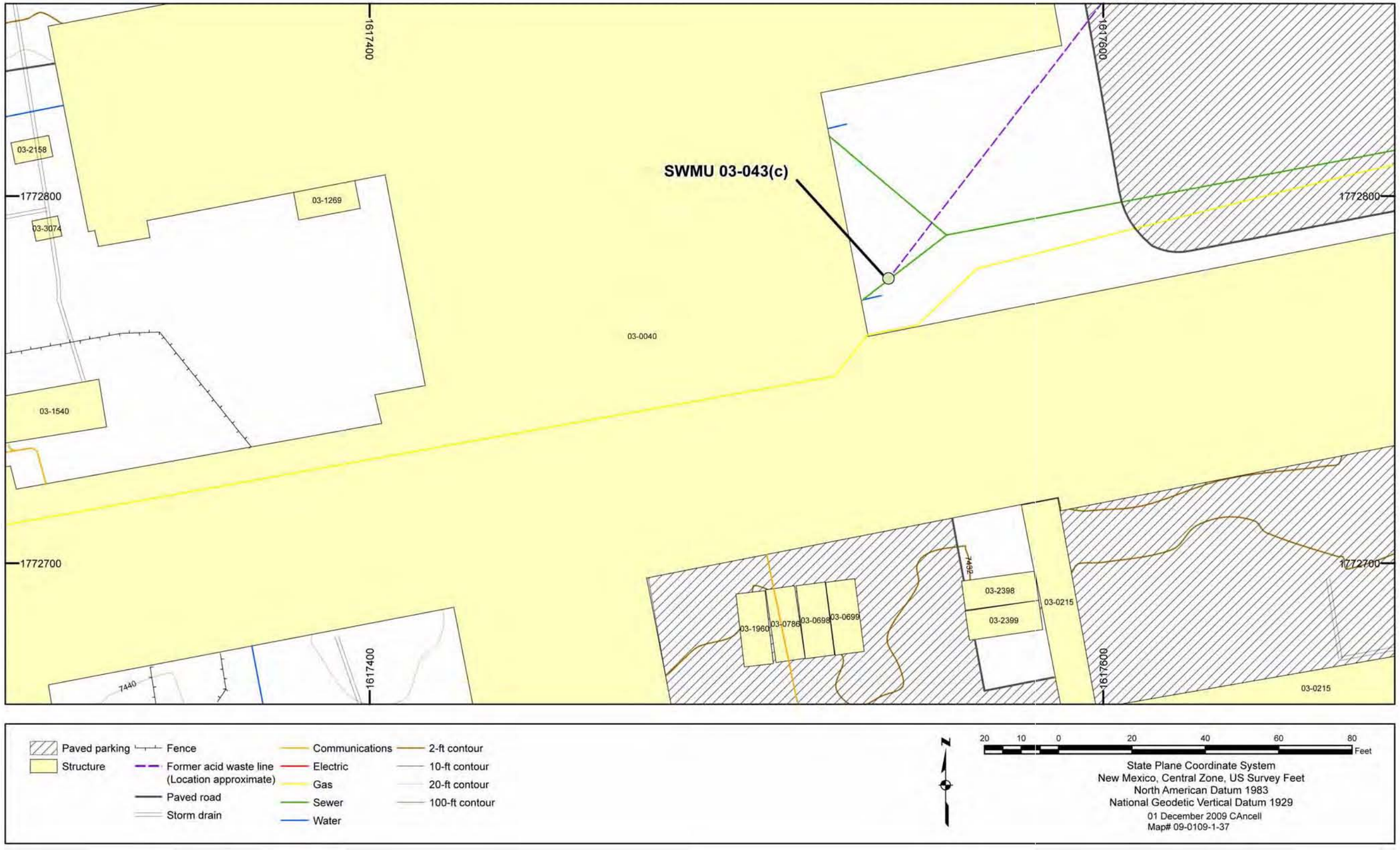

Figure 2.19-1 Site features for SWMU 03-043(c)

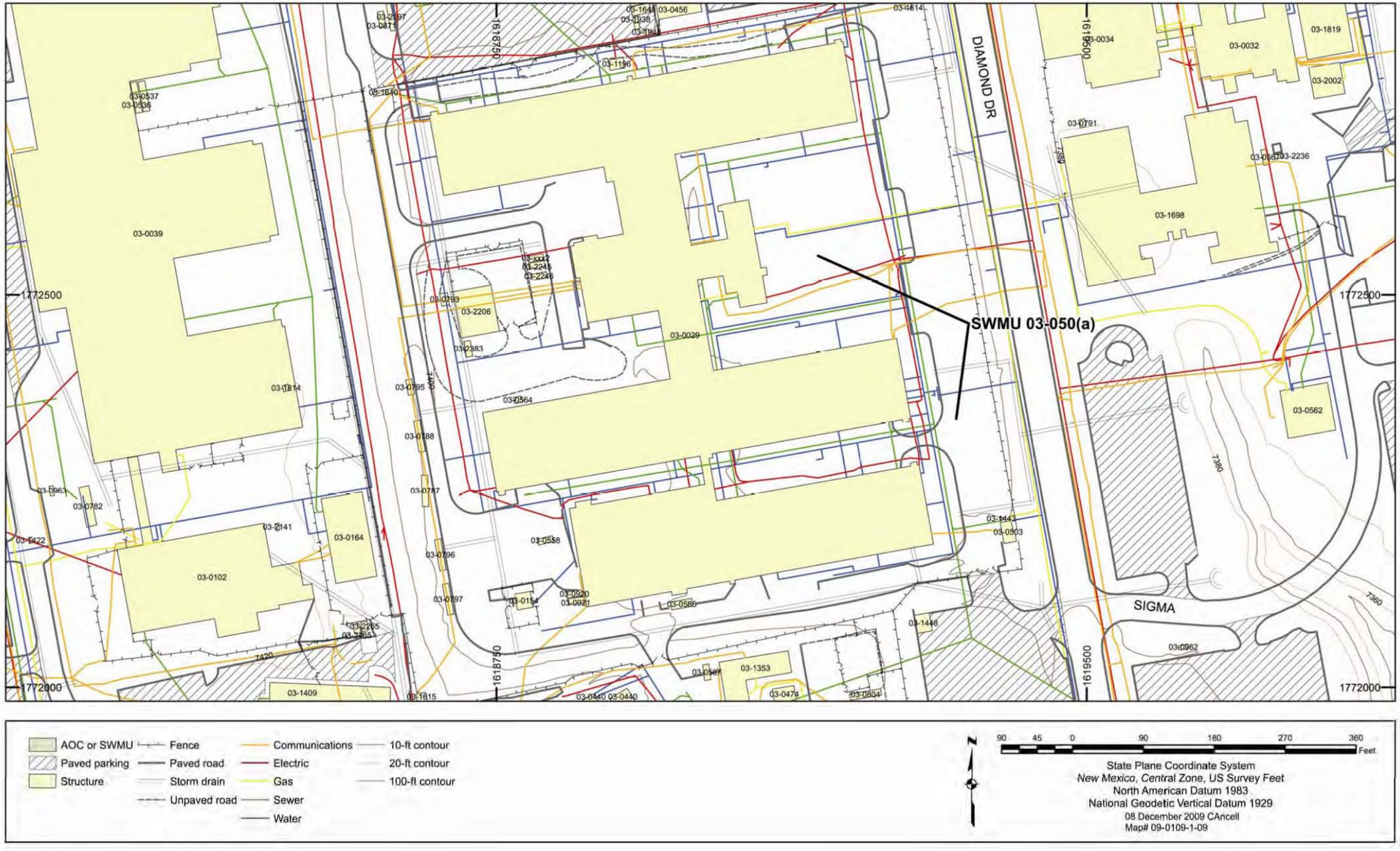

Figure 2.20-1 Site features for SWMU 03-050(a)

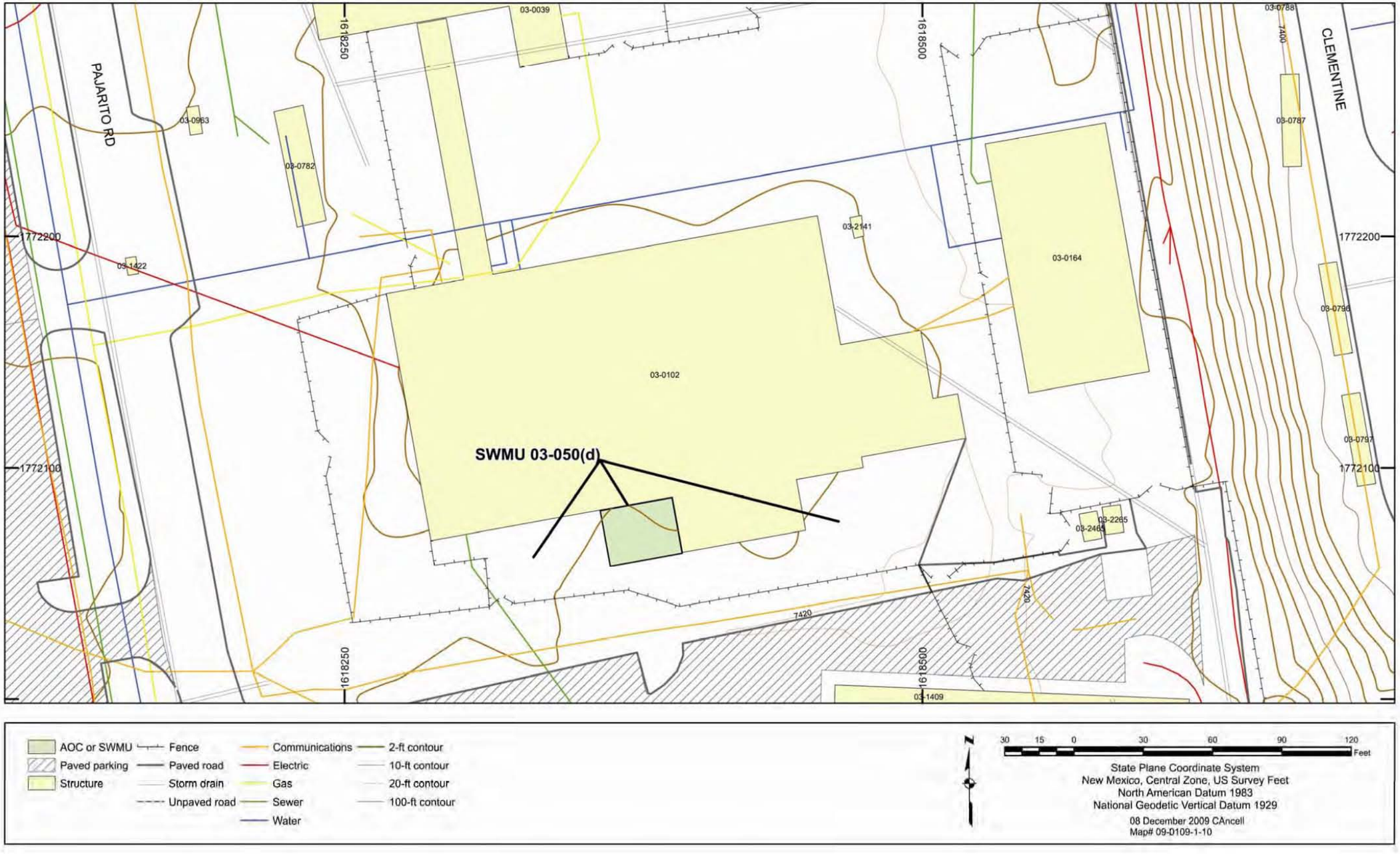

Figure 2.20-2 Site features for SWMU 03-050(d)

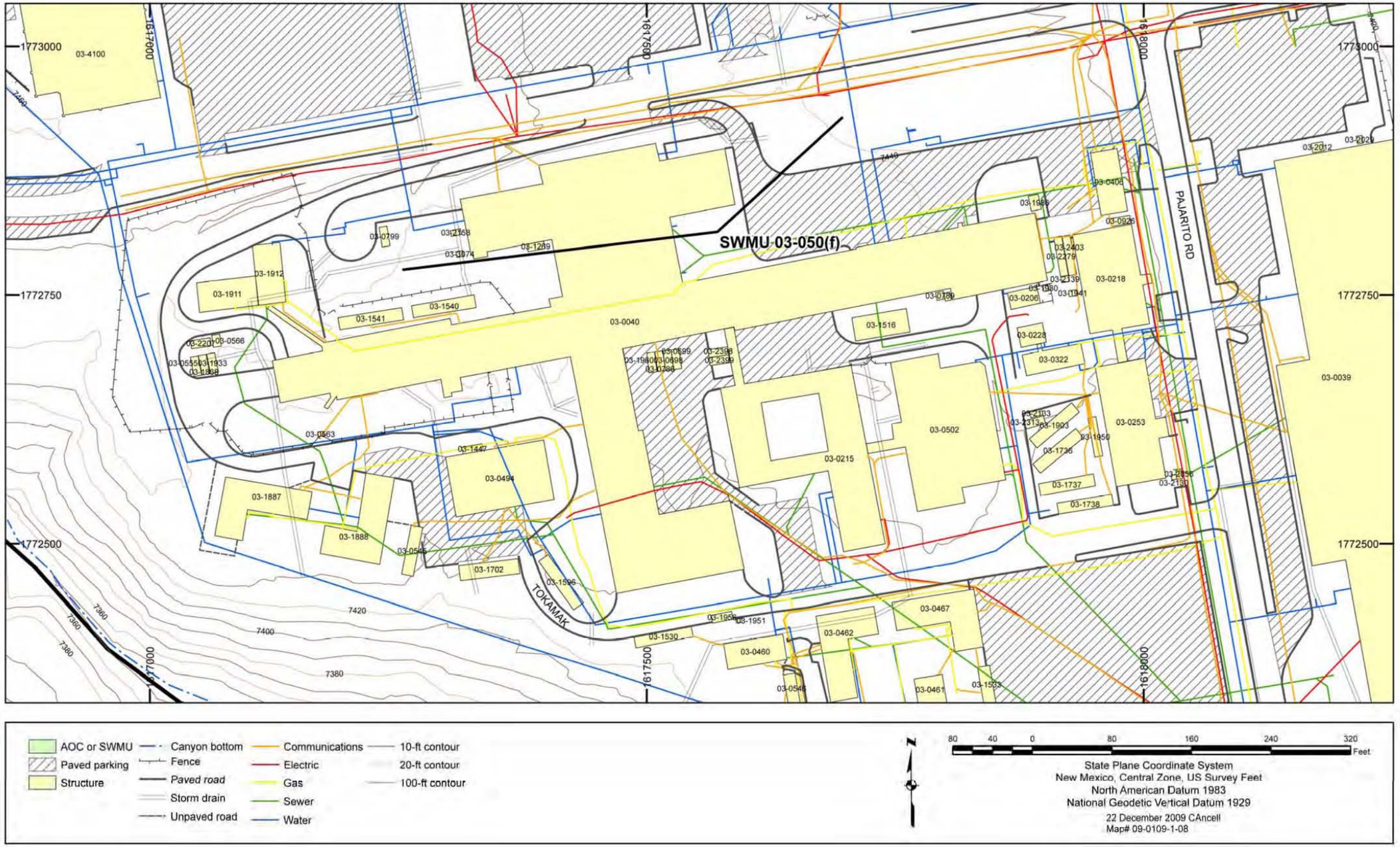

Figure 2.20-3 Site features for SWMU 03-050(f)

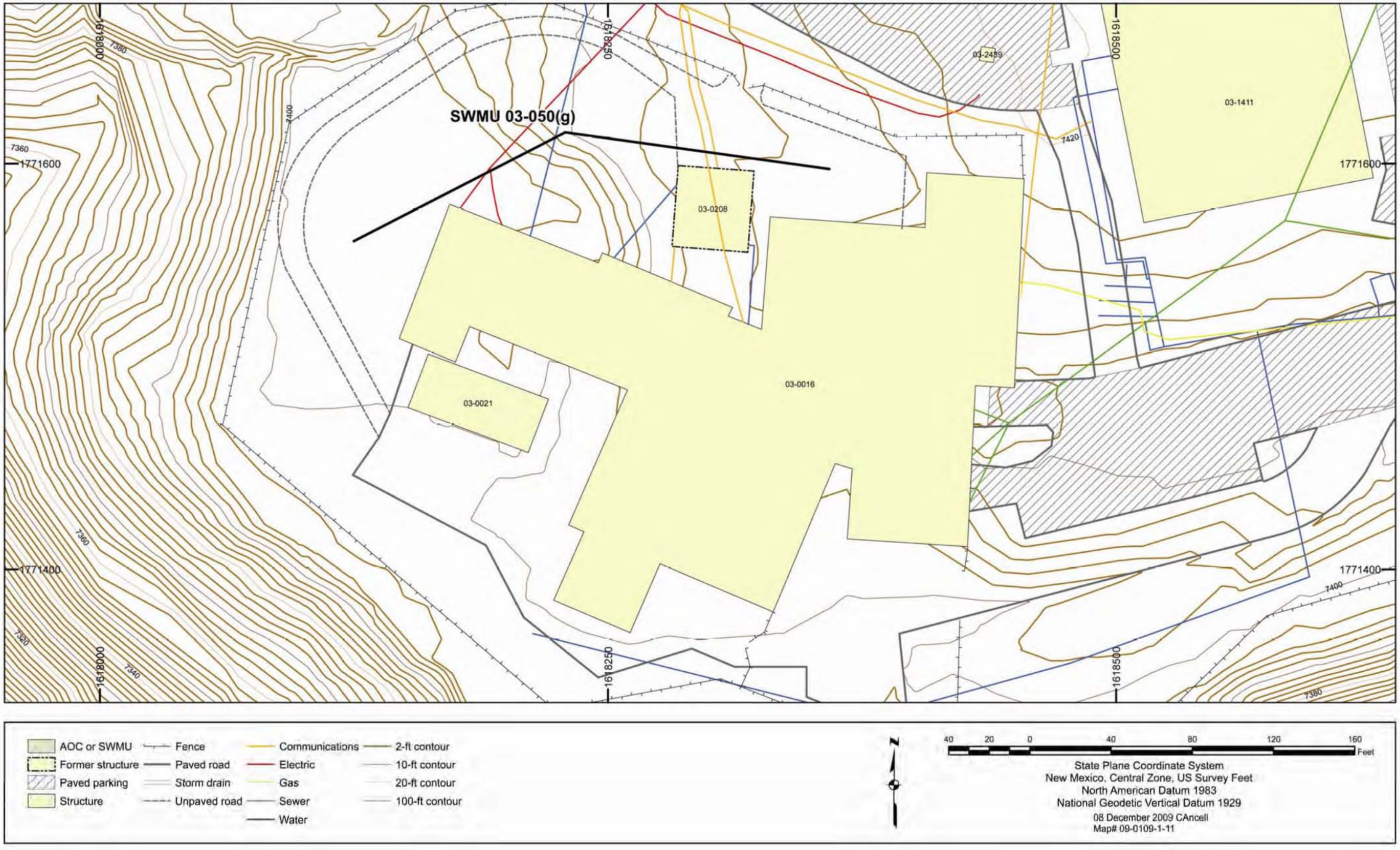

Figure 2.20-4 Site features for SWMU 03-050(g)

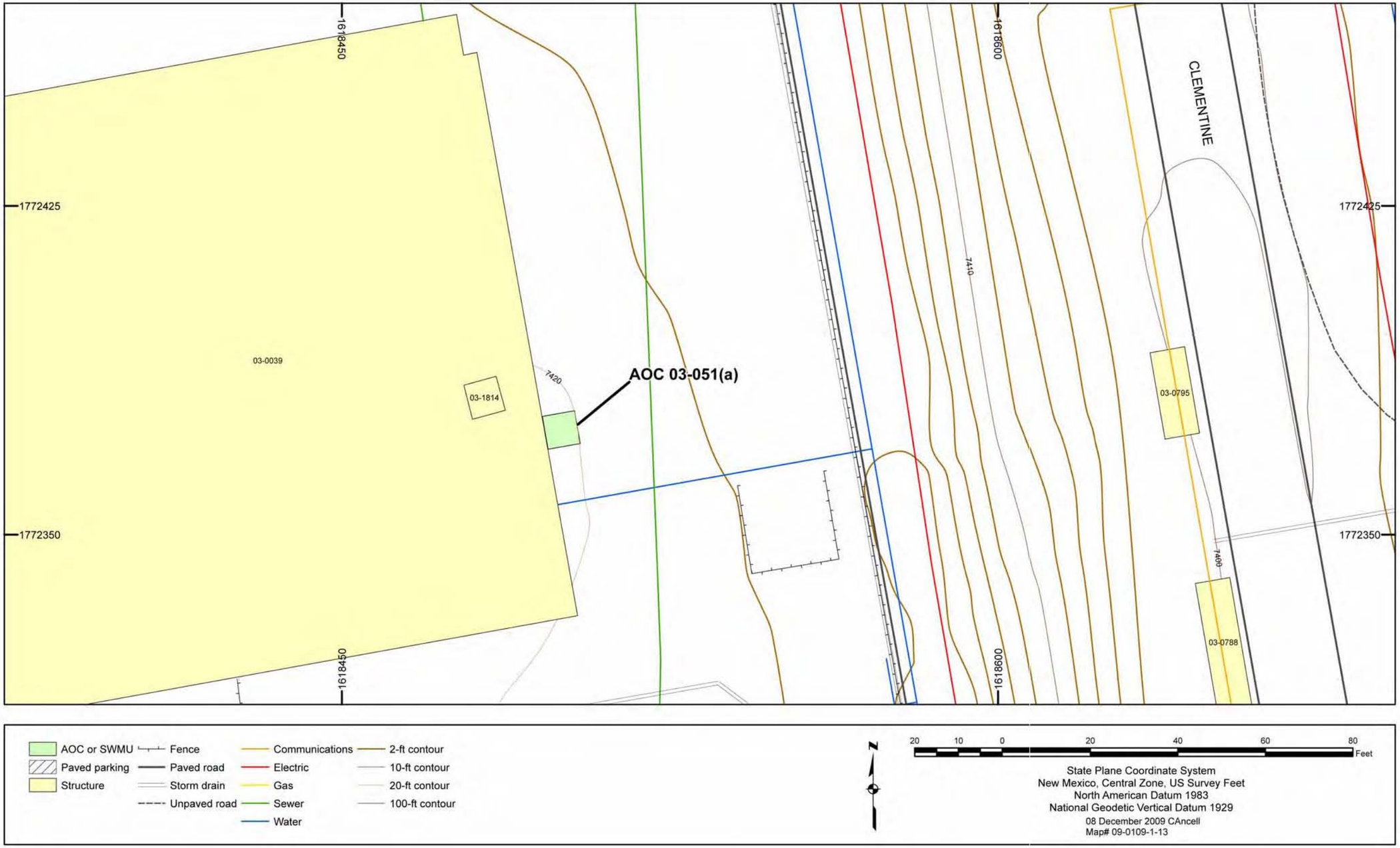

Figure 2.21-1 Site features for AOC 03-051(a)

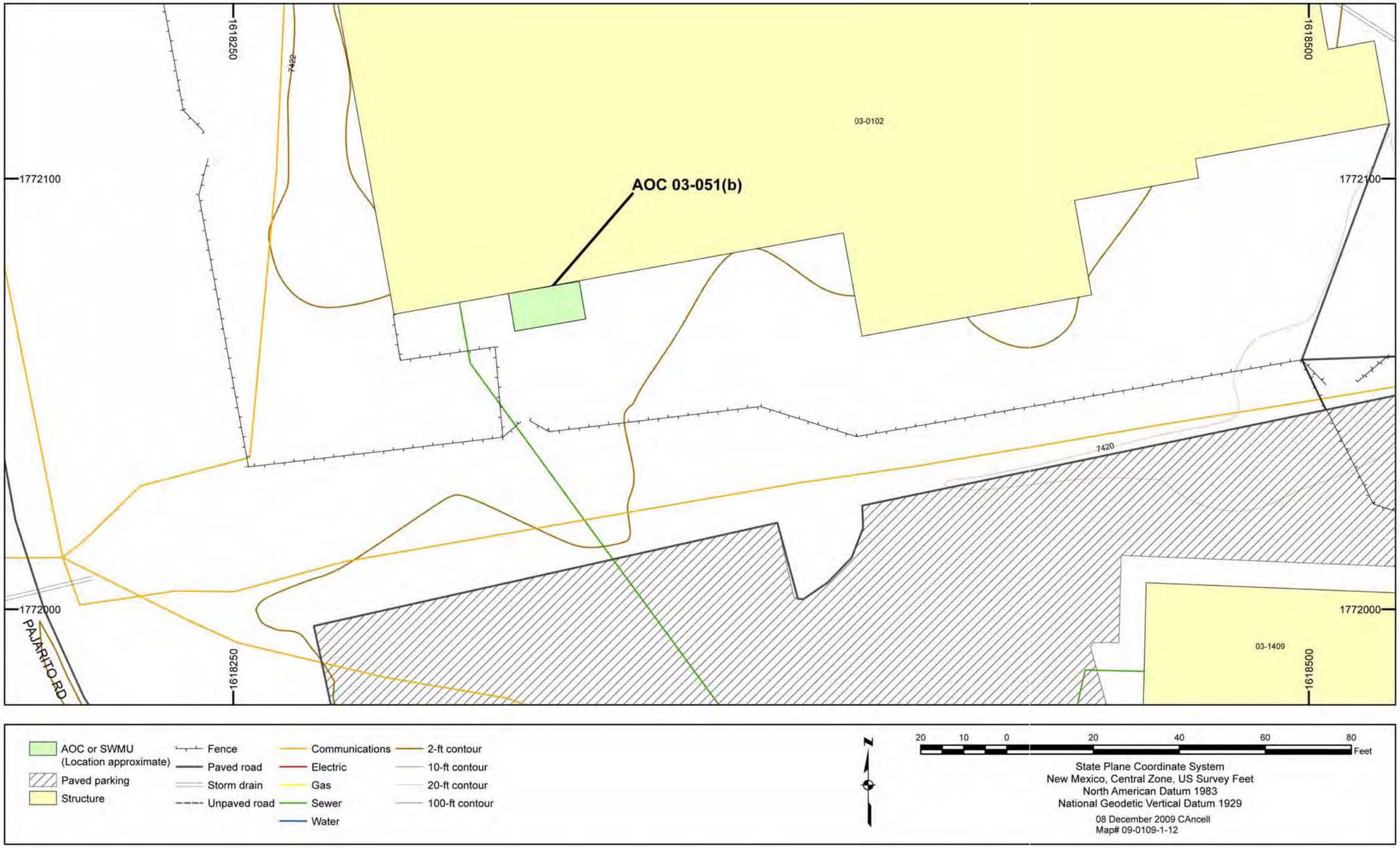

Figure 2.22-1 Site features for AOC 03-051(b)

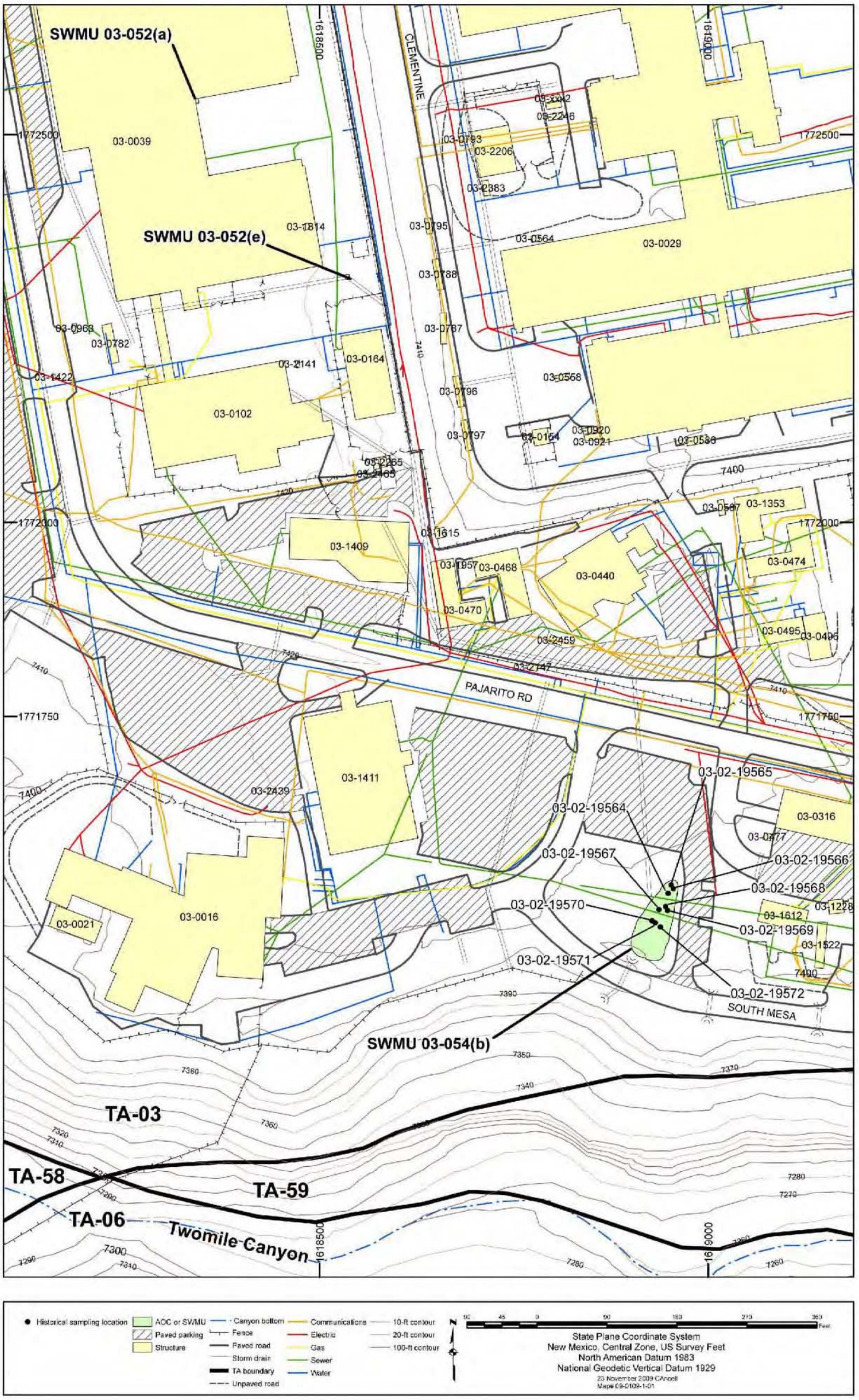

Figure 2.23-1 Site features and historical sampling locations for Consolidated Unit 03-052(a)-00

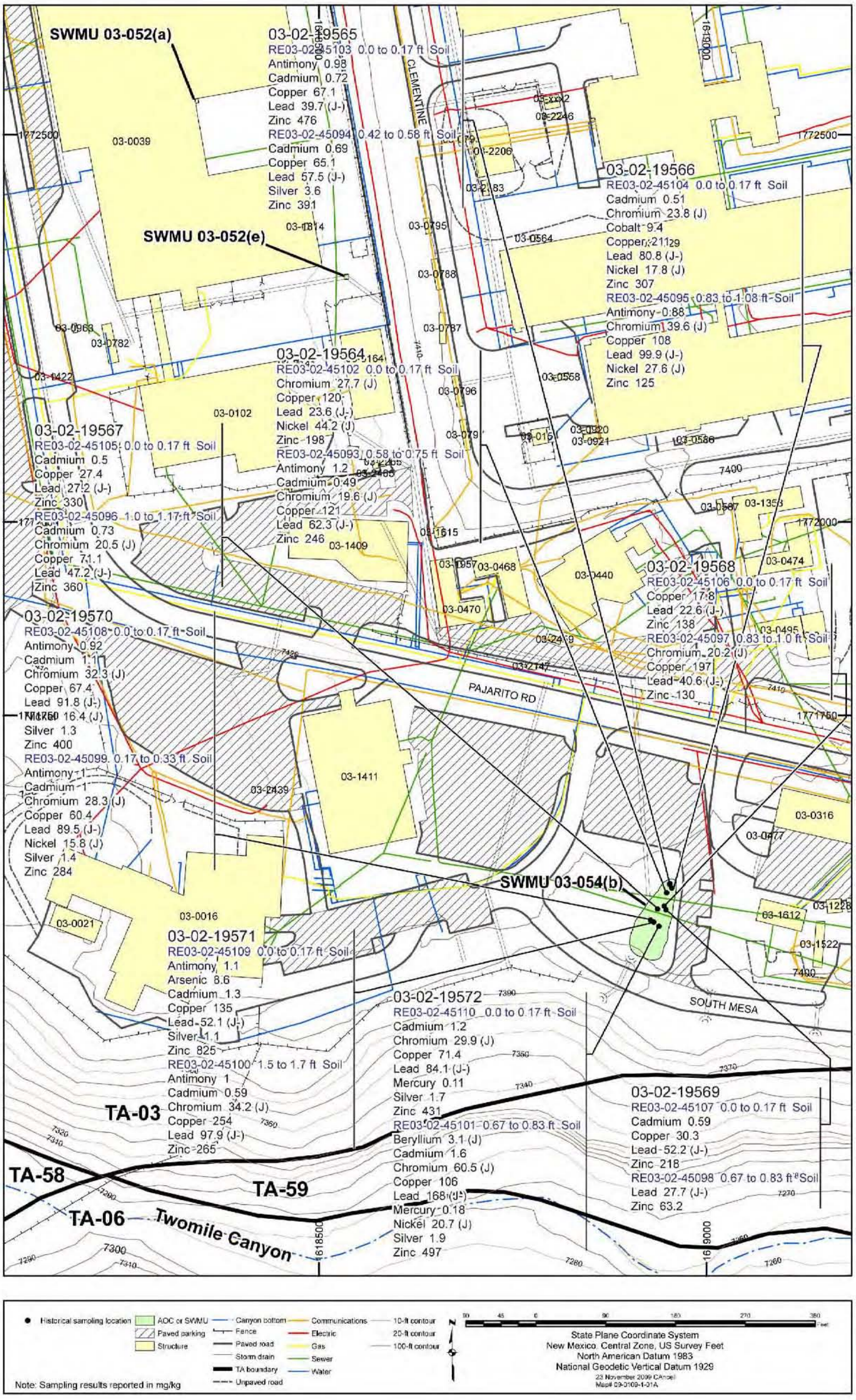

Figure 2.23-2 Inorganic chemicals detected above BVs at SWMU 03-054(b)

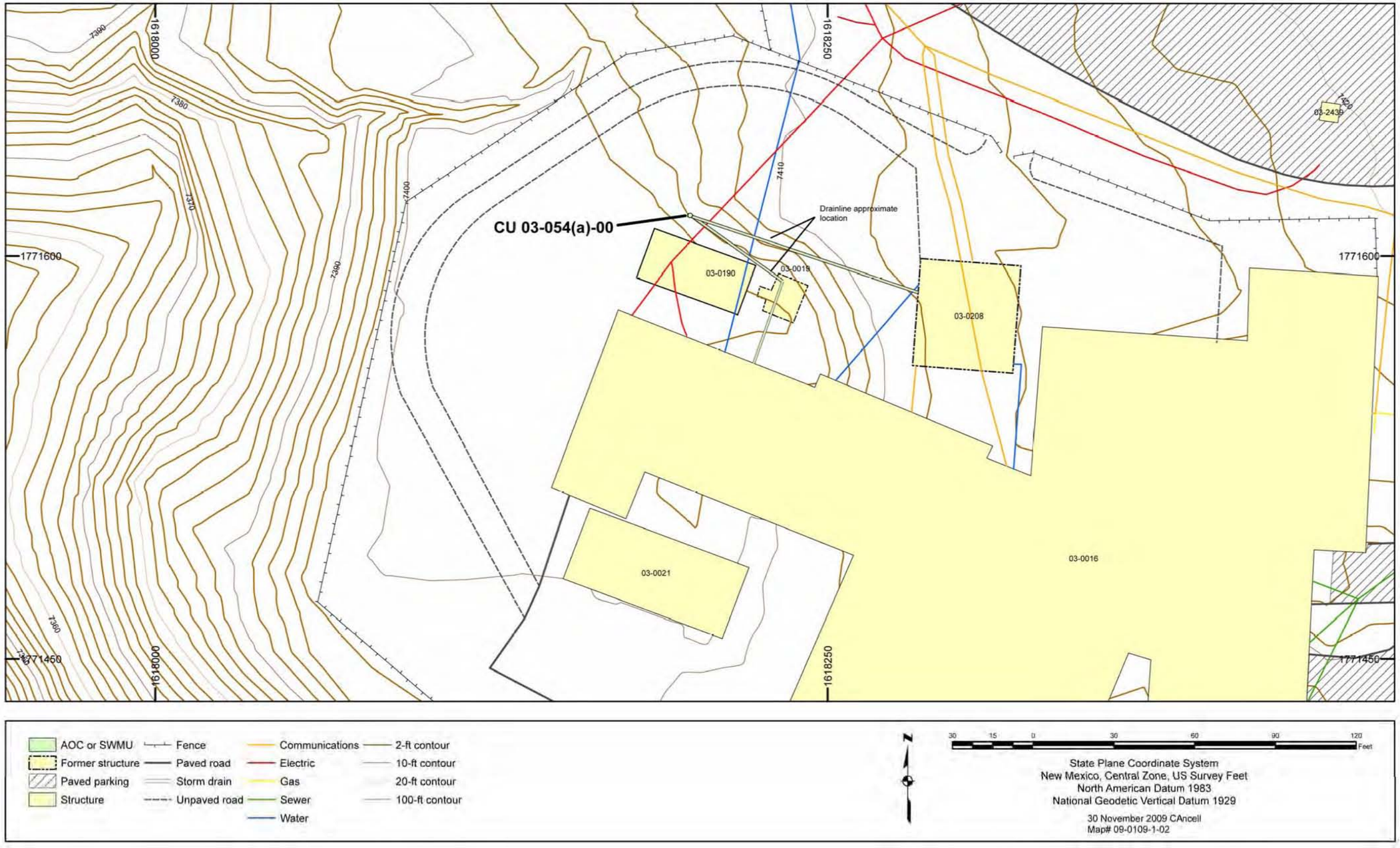

Figure 2.24-1 Site features for Consolidated Unit 03-054(a)-00

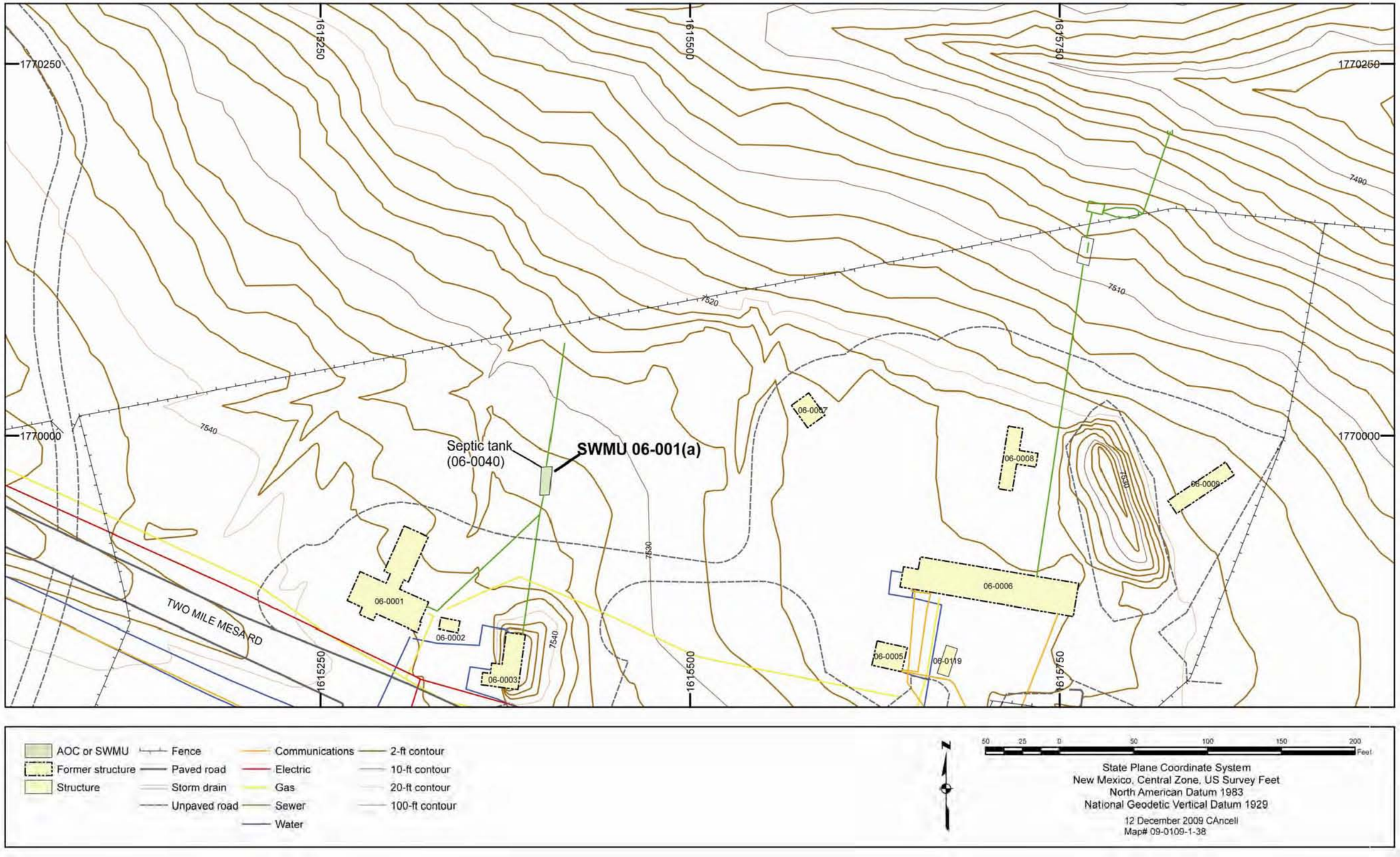

Figure 3.1-1 Site features for SWMU 06-001(a)

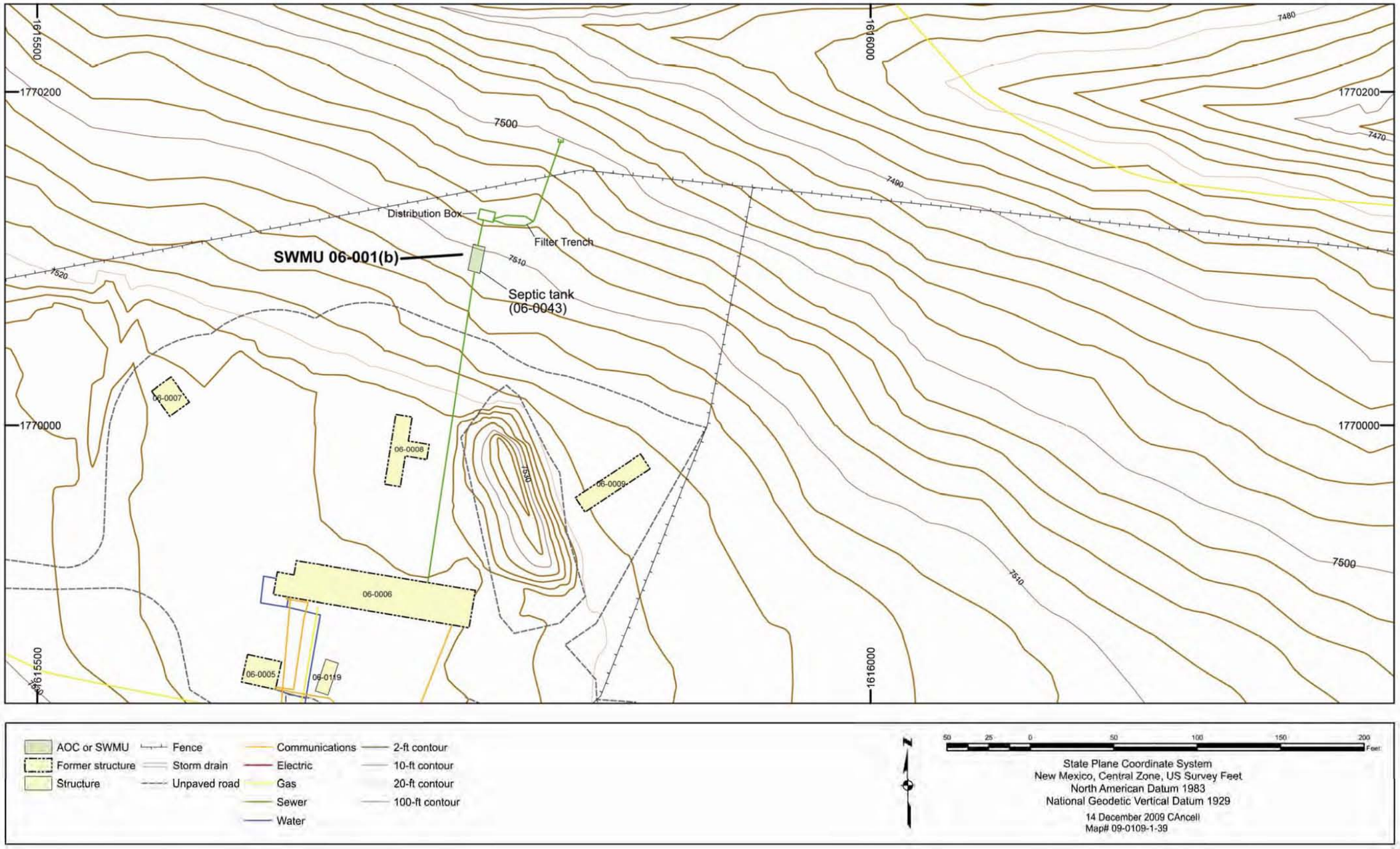

Figure 3.2-1 Site features for SWMU 06-001(b)

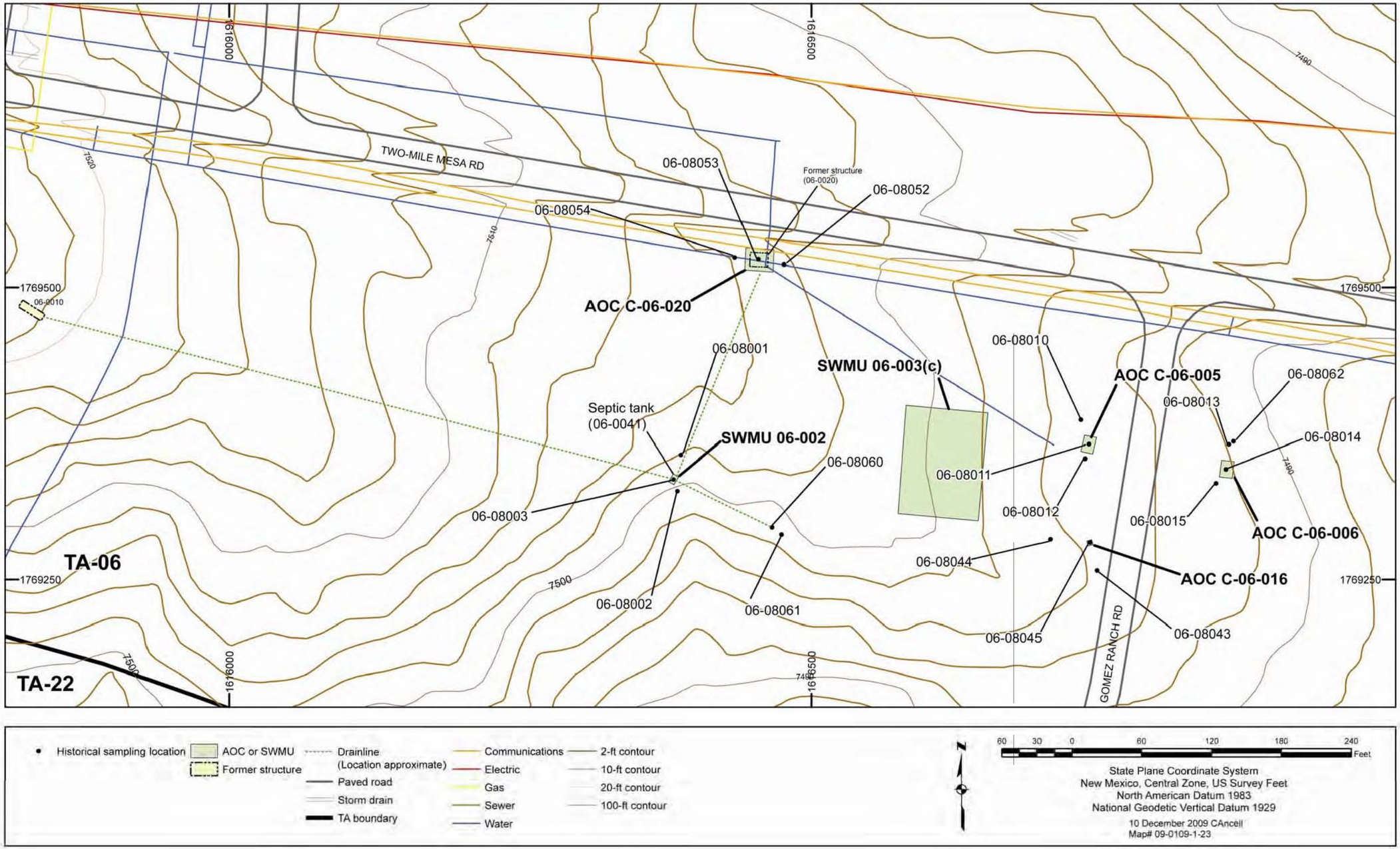

Figure 3.3-1 Site features and historical sampling locations for Consolidated Unit 06-002-00

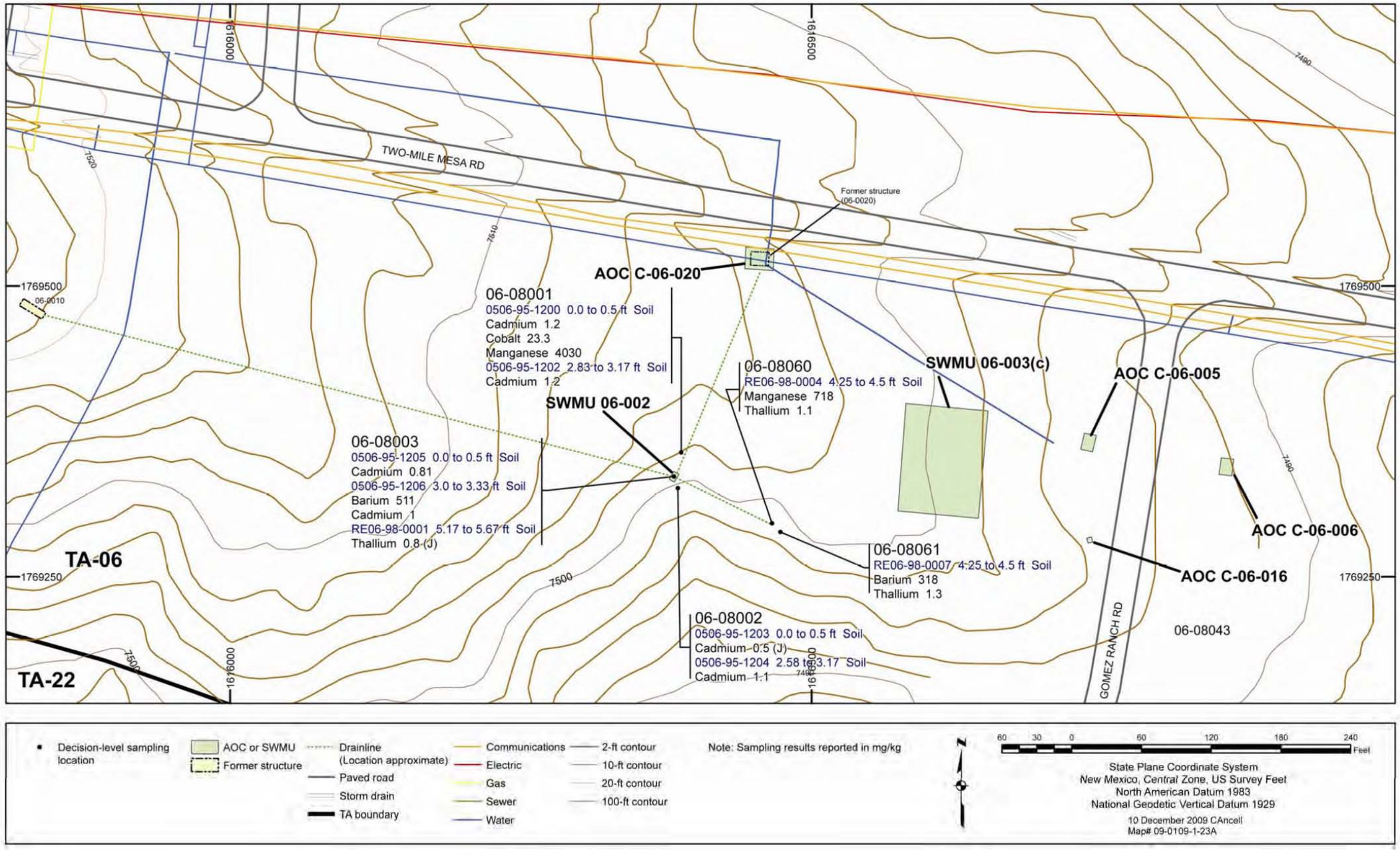

Figure 3.3-2 Inorganic chemicals detected above BVs at SWMU 06-002

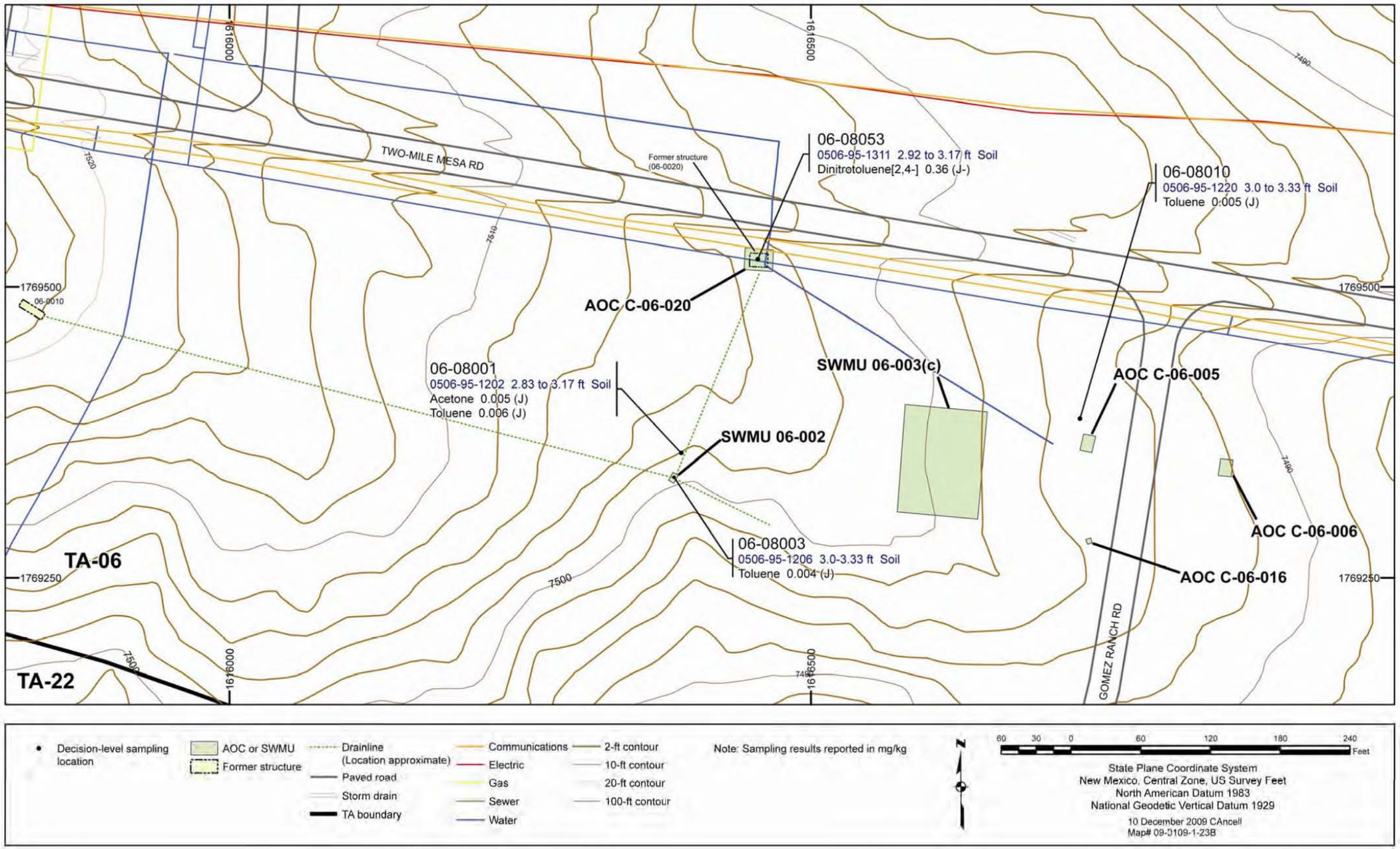

Figure 3.3-3 Organic chemicals detected at SWMU 06-002 and AOC C-06-005

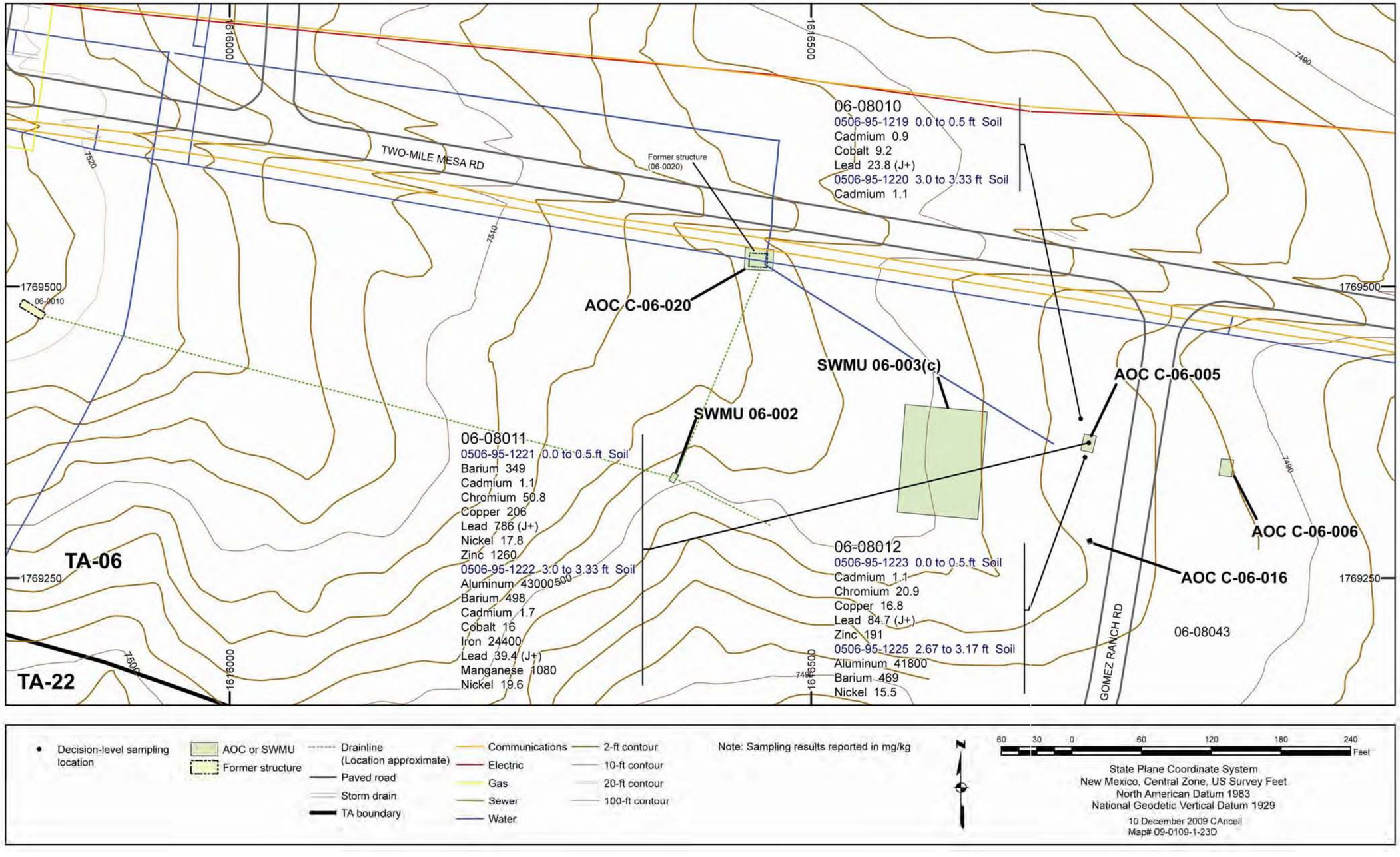

Figure 3.3-4 Inorganic chemicals detected above BVs at AOC C-06-005

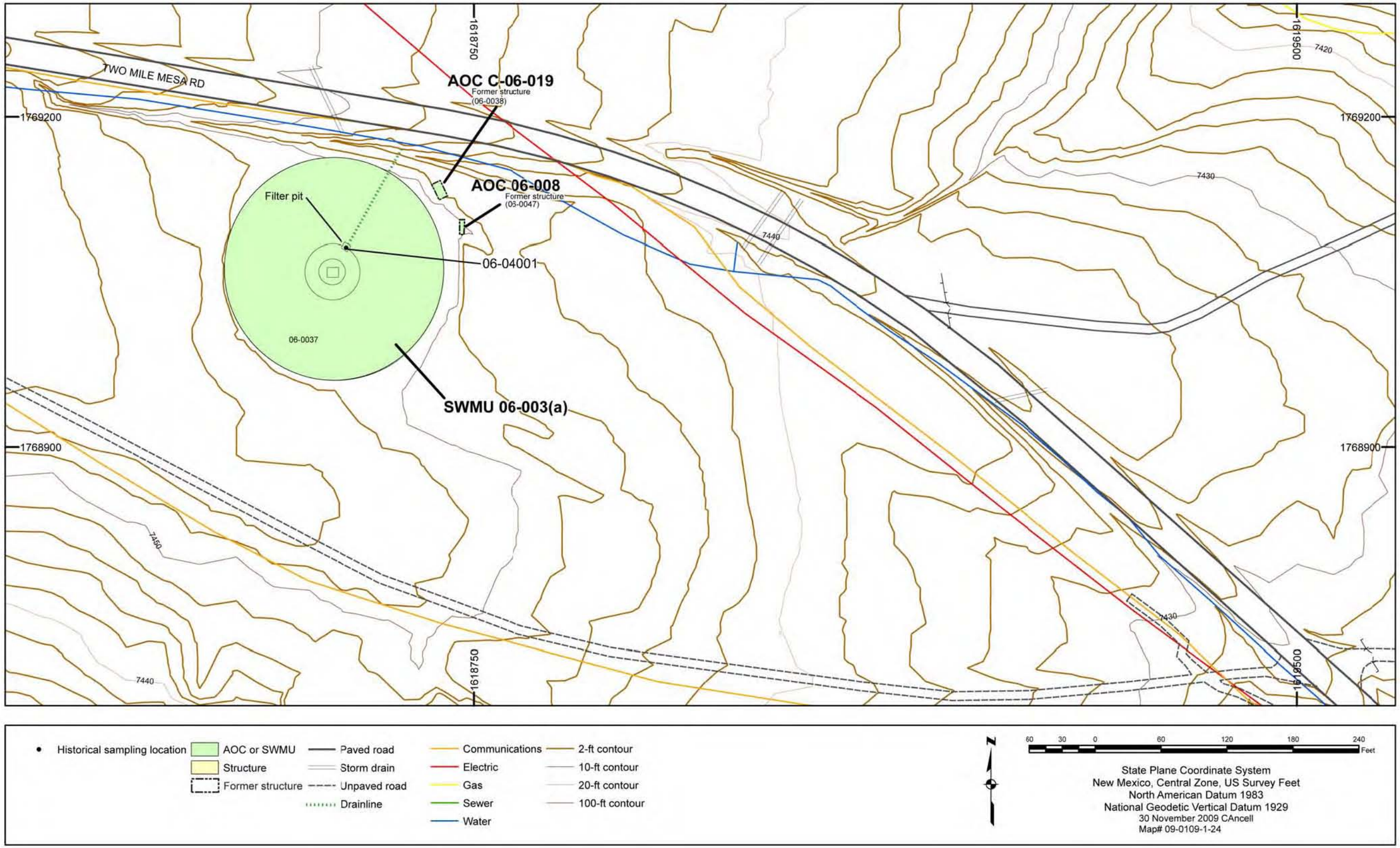

Figure 3.4-1 Site features and historical sampling locations for Consolidated Unit 06-003(a)-99

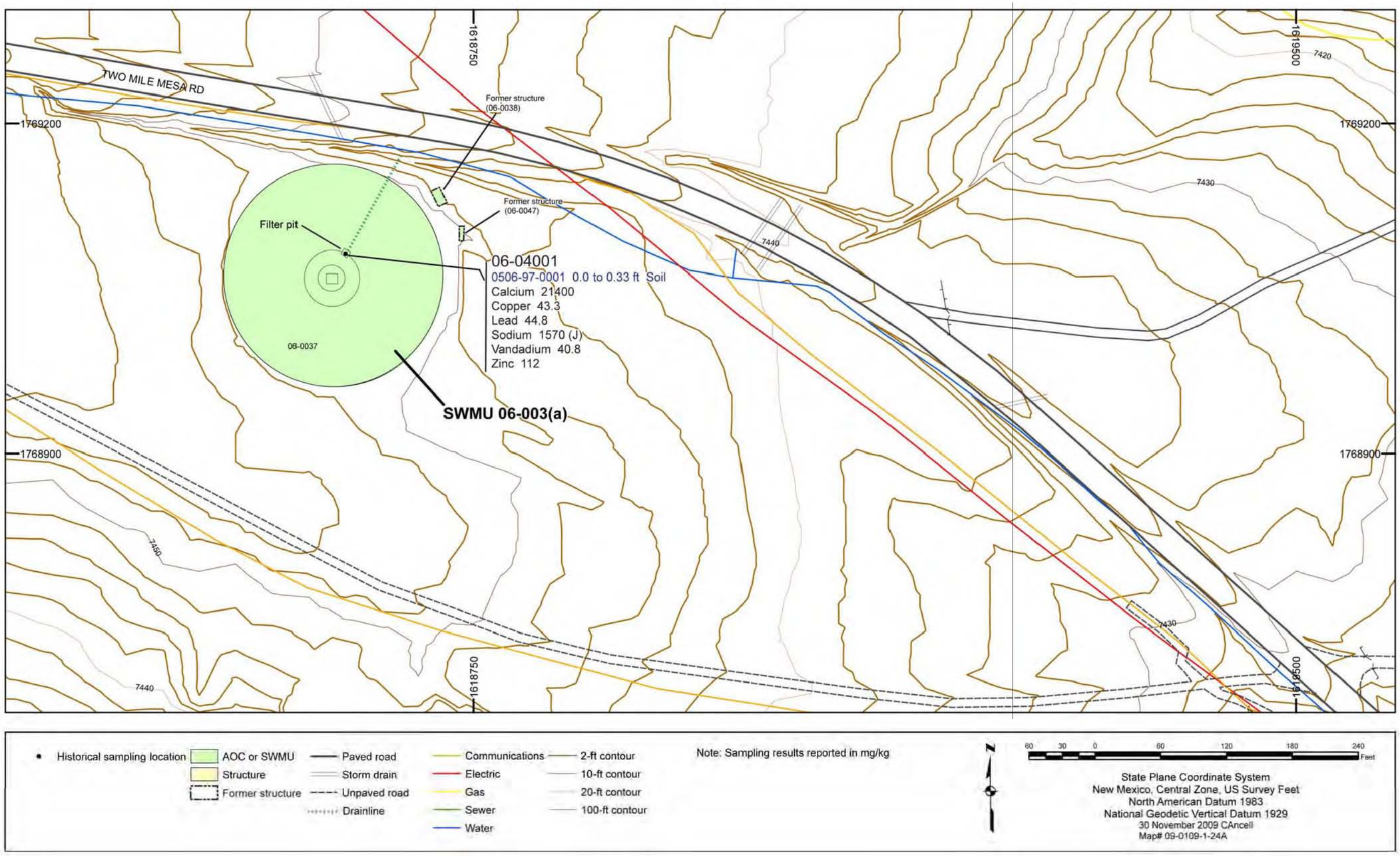

Figure 3.4-2 Inorganic chemicals detected above BVs at SWMU 06-003(a)

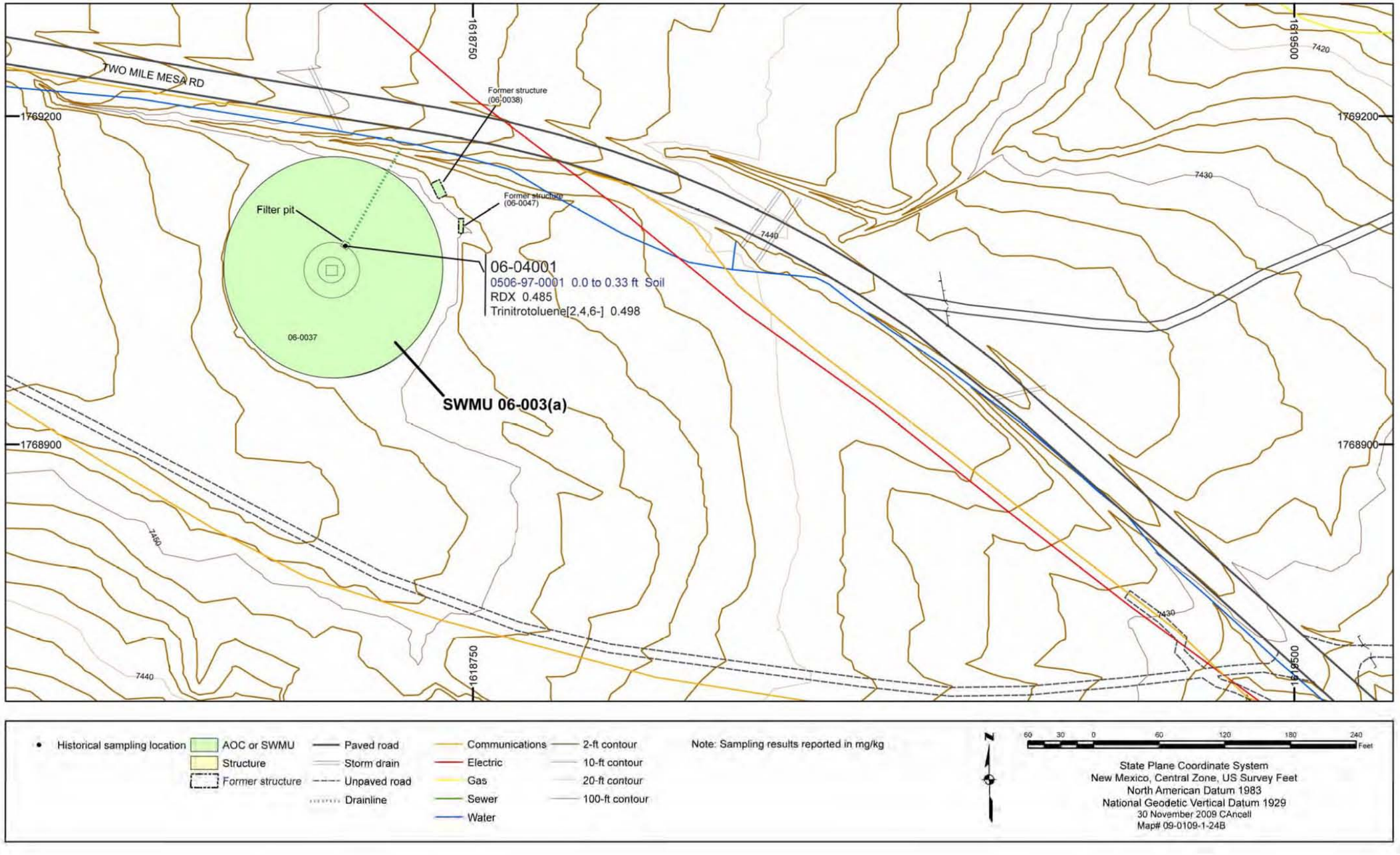

Figure 3.4-3 Organic chemicals detected at SWMU 06-003(a)

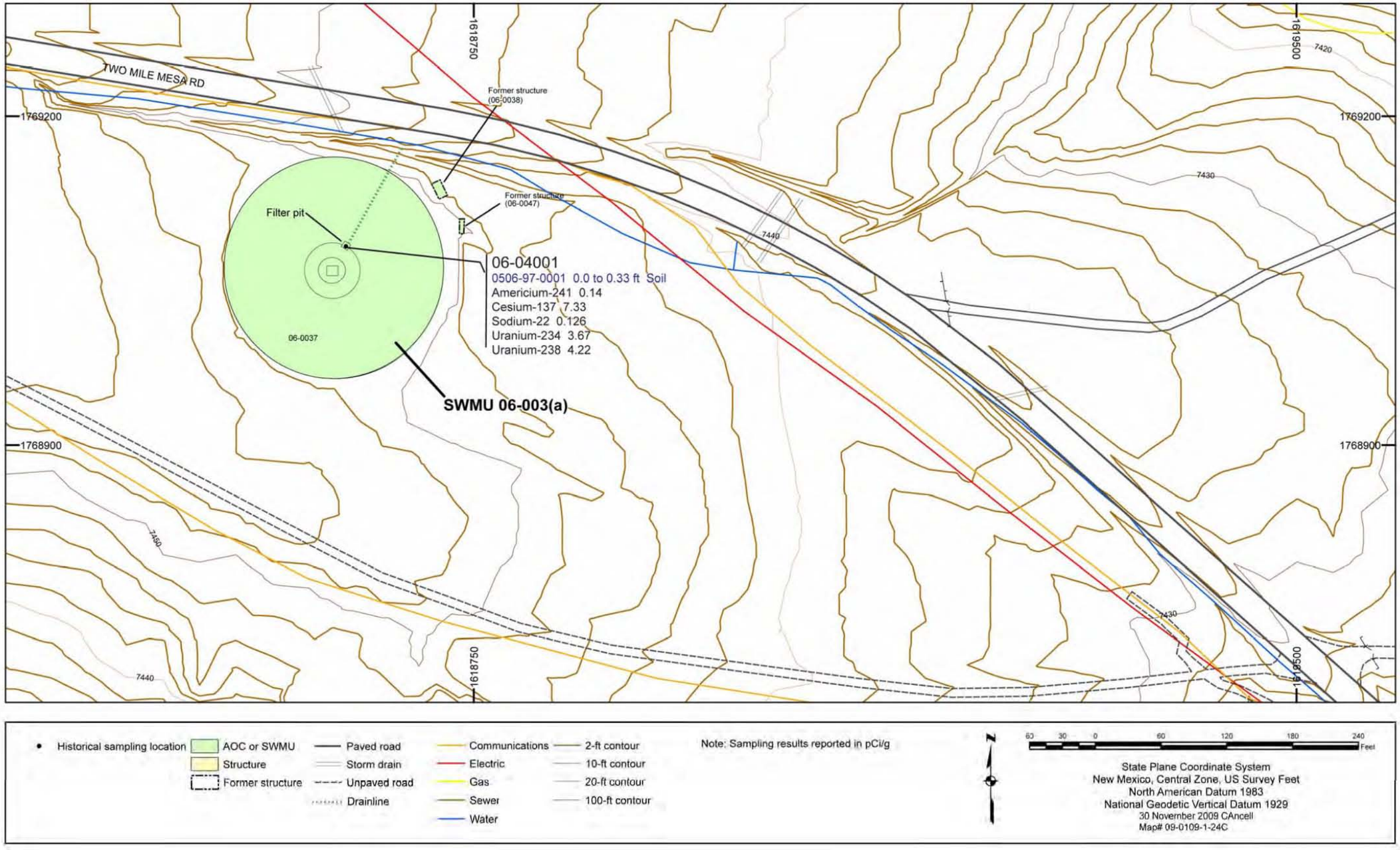

Figure 3.4-4 Radionuclides detected or detected above BVs/FVs at SWMU 06-003(a)

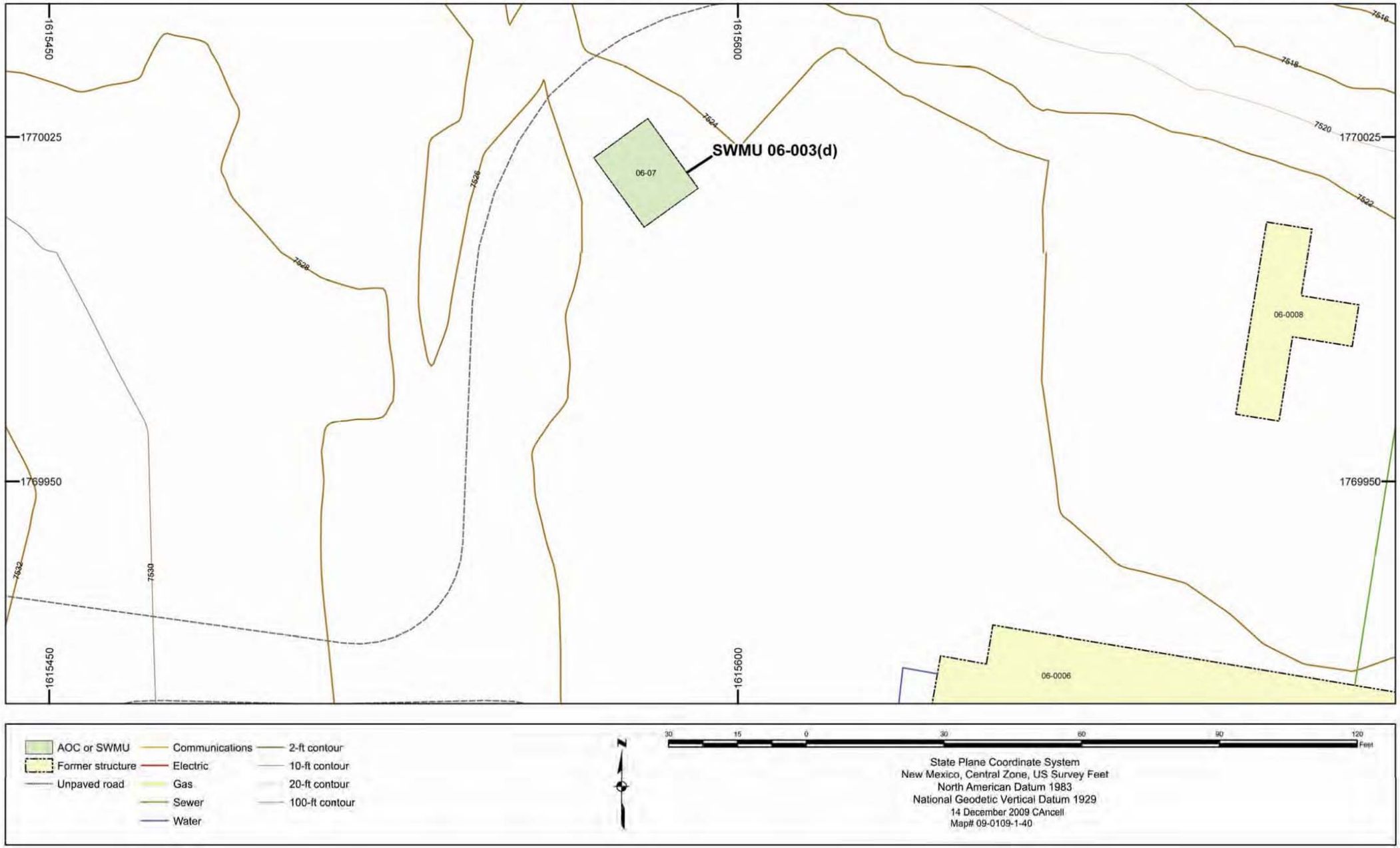

Figure 3.5-1 Site features for SWMU 06-003(d)

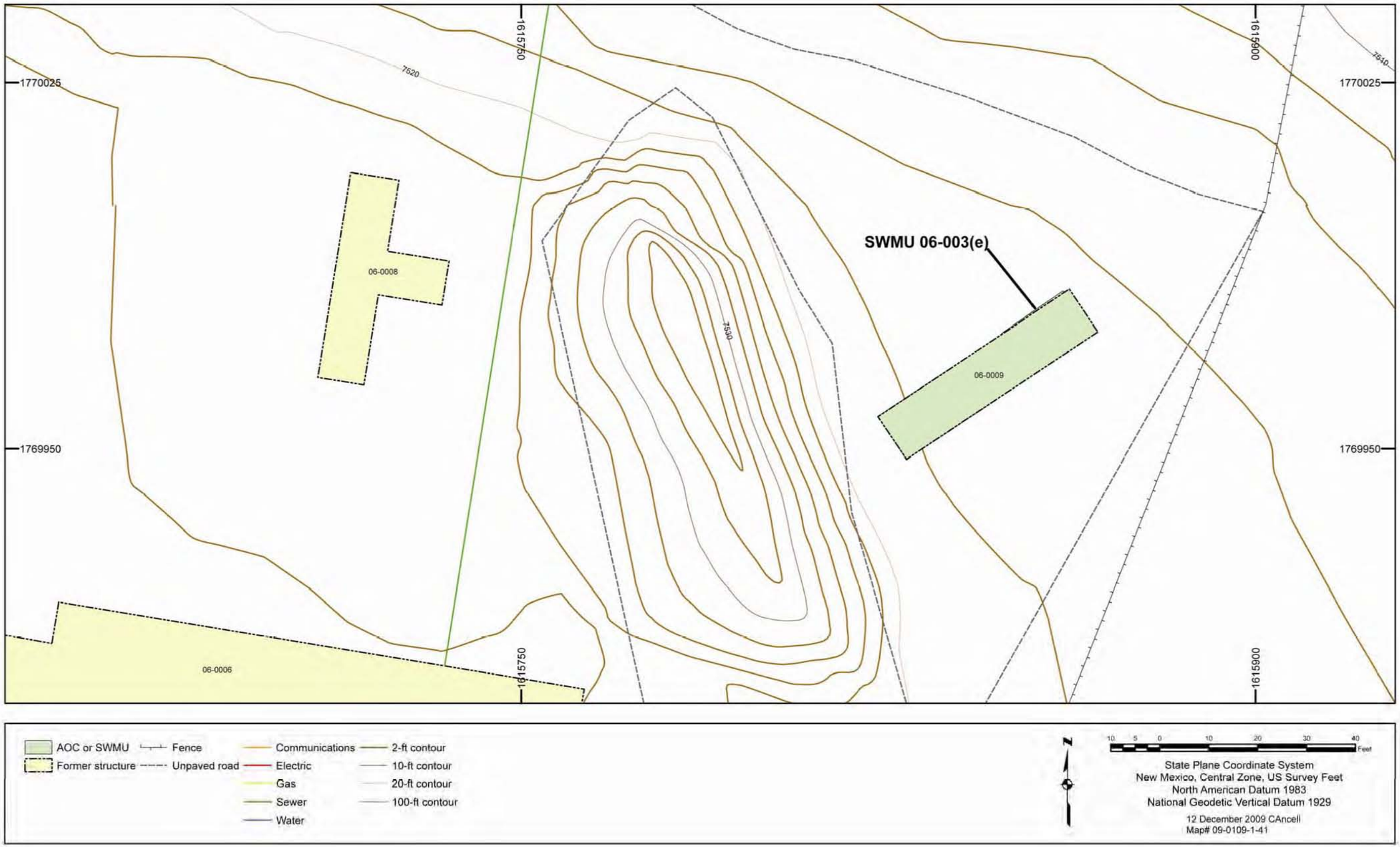

Figure 3.6-1 Site features for SWMU 06-003(e)

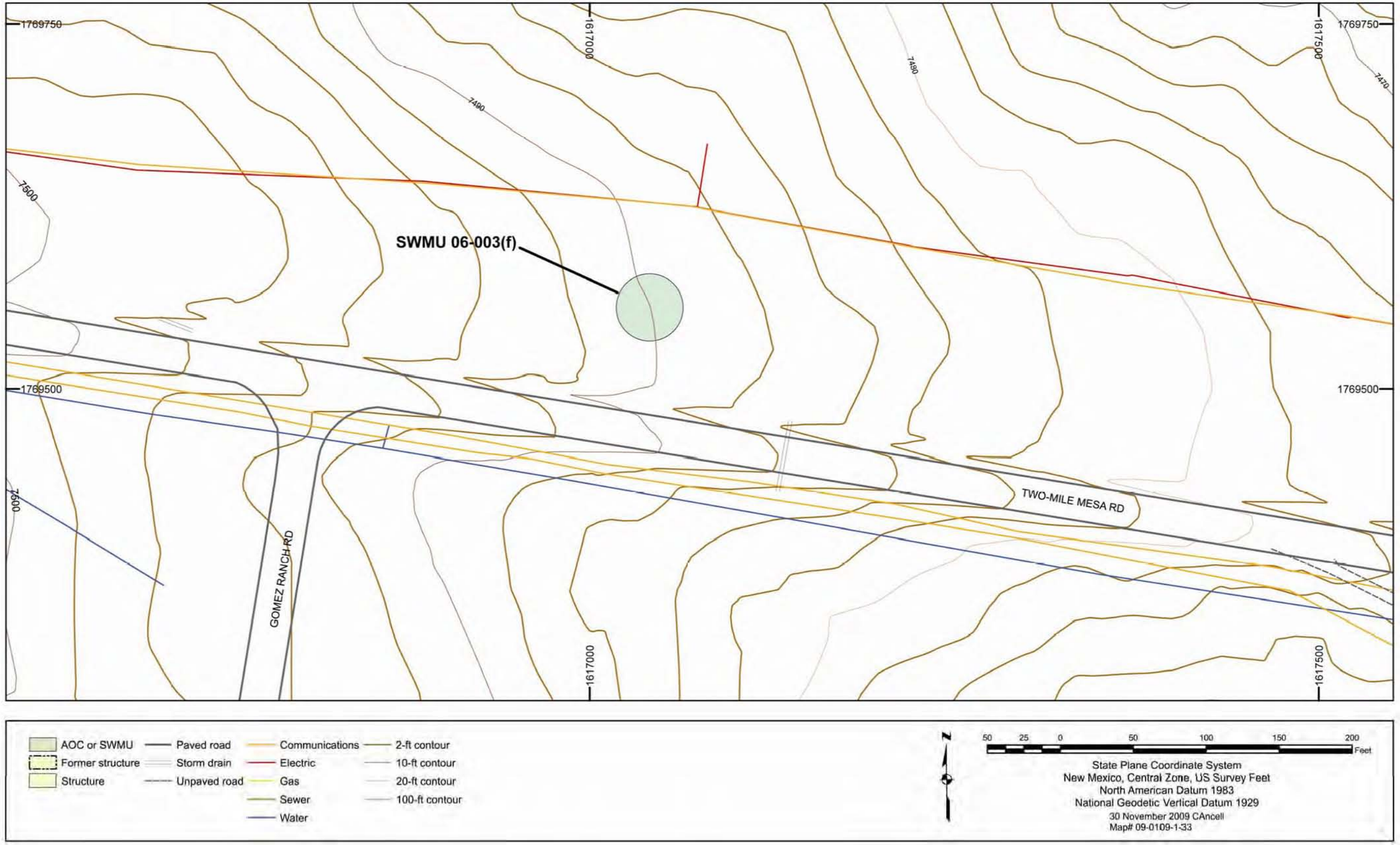

Figure 3.7-1 Site features for SWMU 06-003(f)

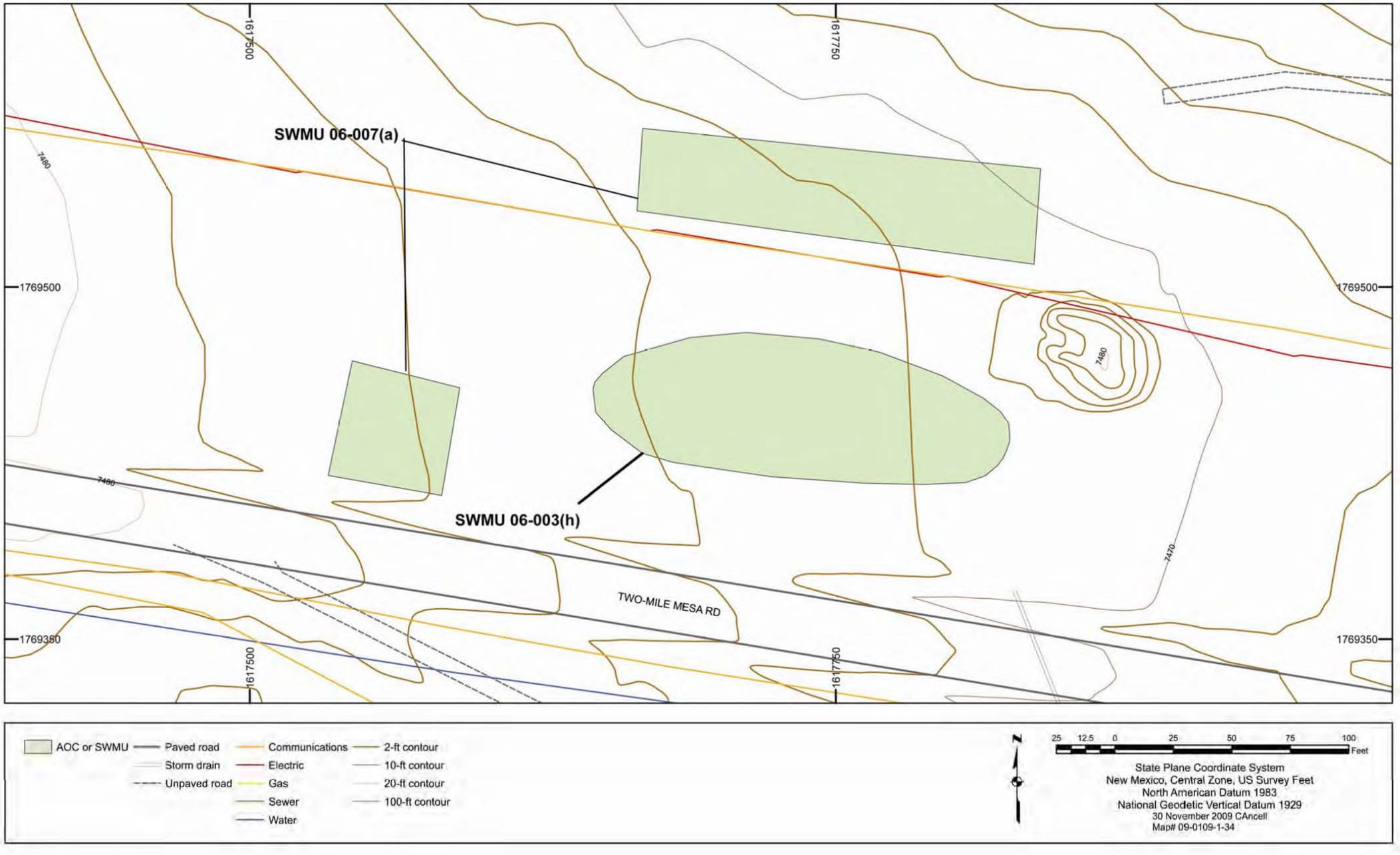

Figure 3.8-1 Site features for SWMU 06-003(h)

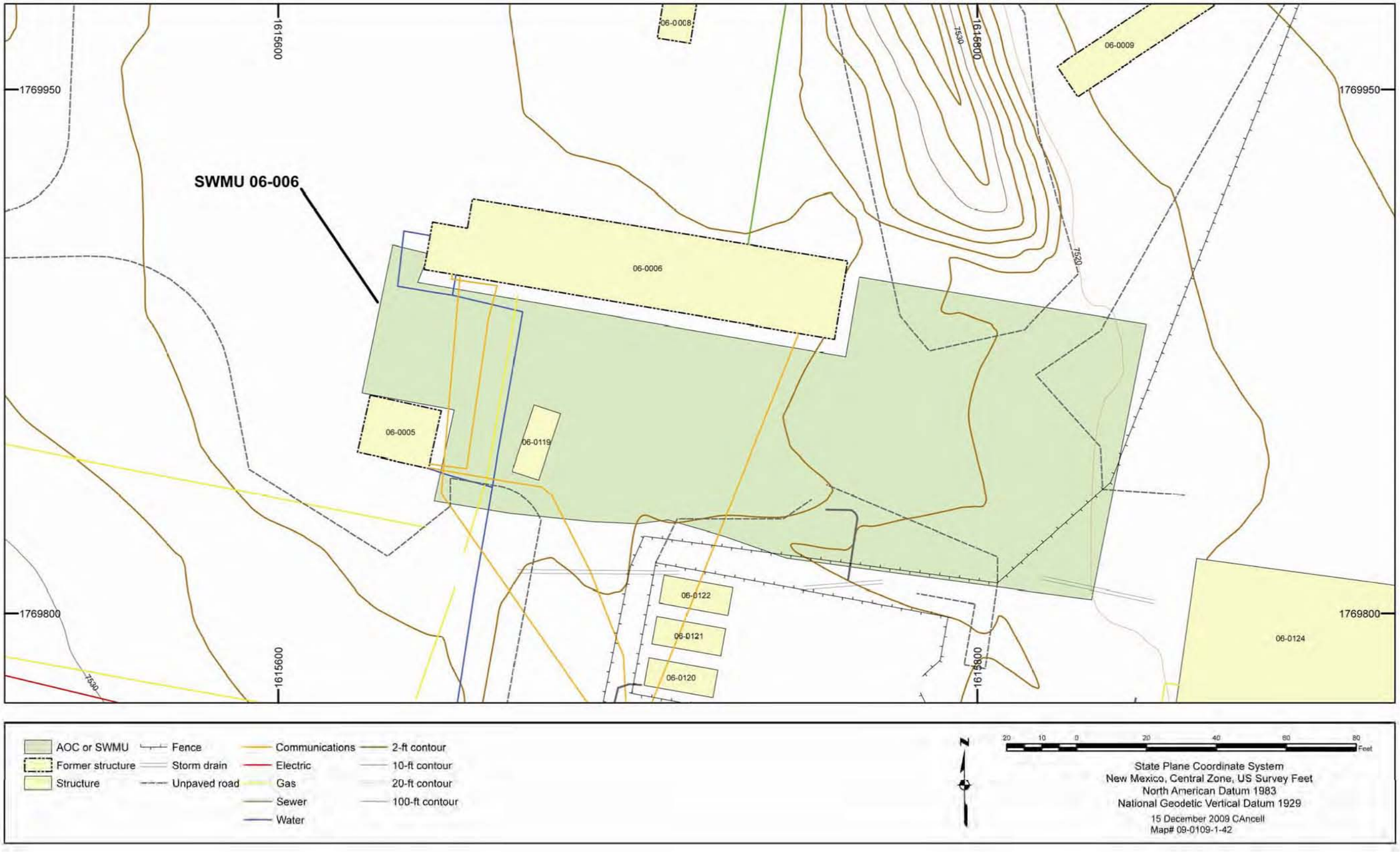

Figure 3.9-1 Site features for SWMU 06-006

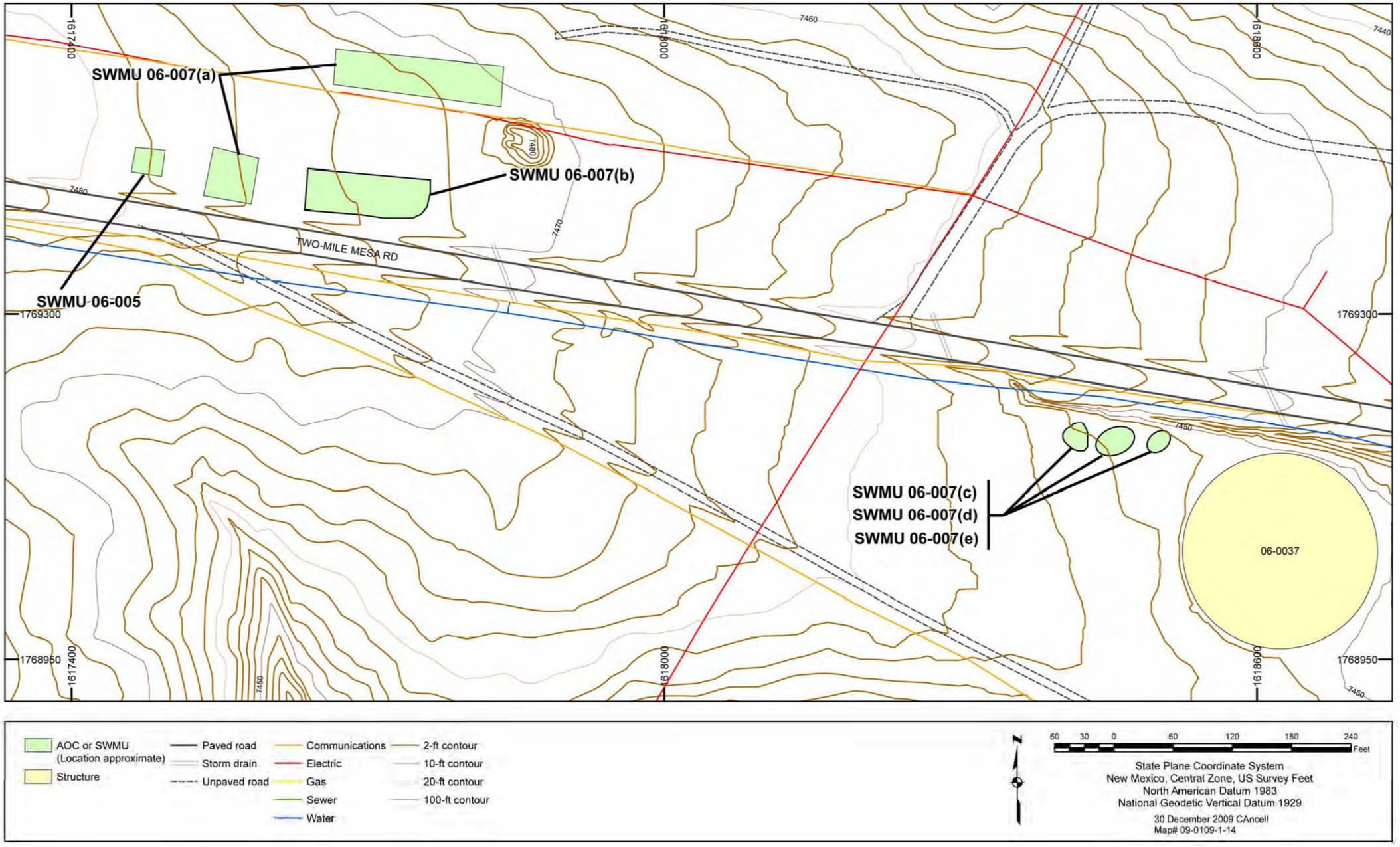

Figure 3.10-1 Site features for Consolidated Unit 06-007(a)-99

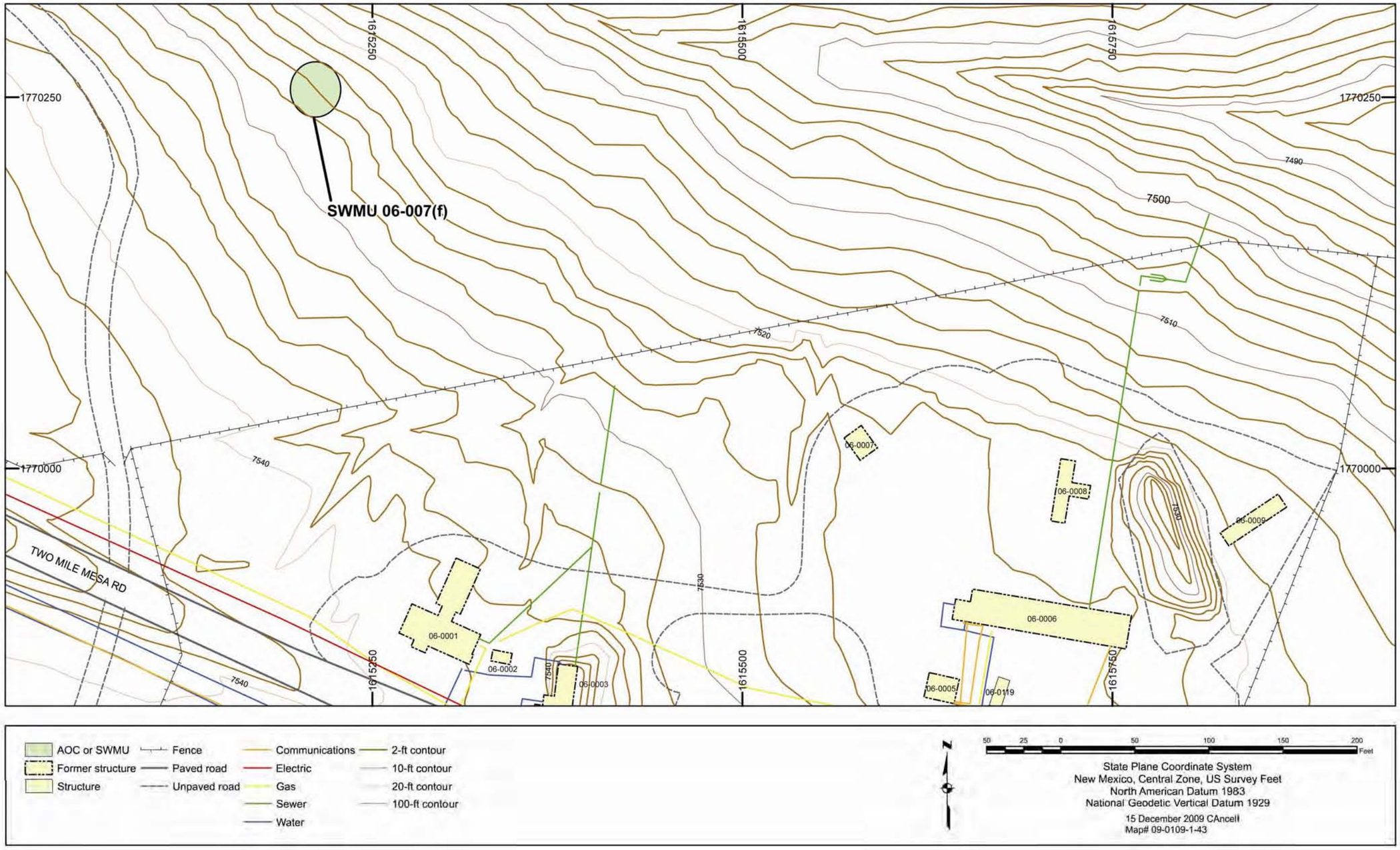

Figure 3.11-1 Site features for SWMU 06-007(f)

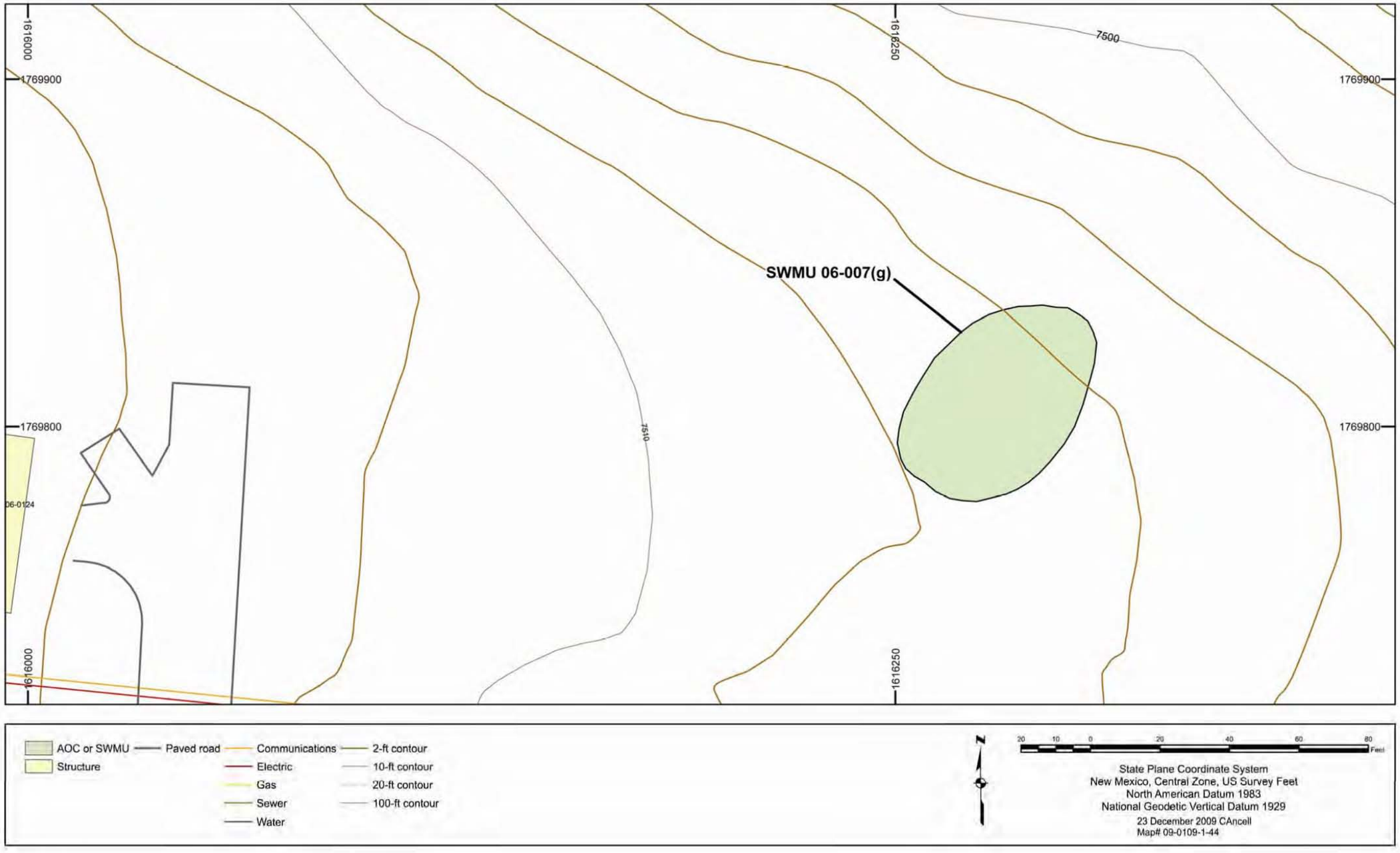

Figure 3.12-1 Site features for SWMU 06-007(g)

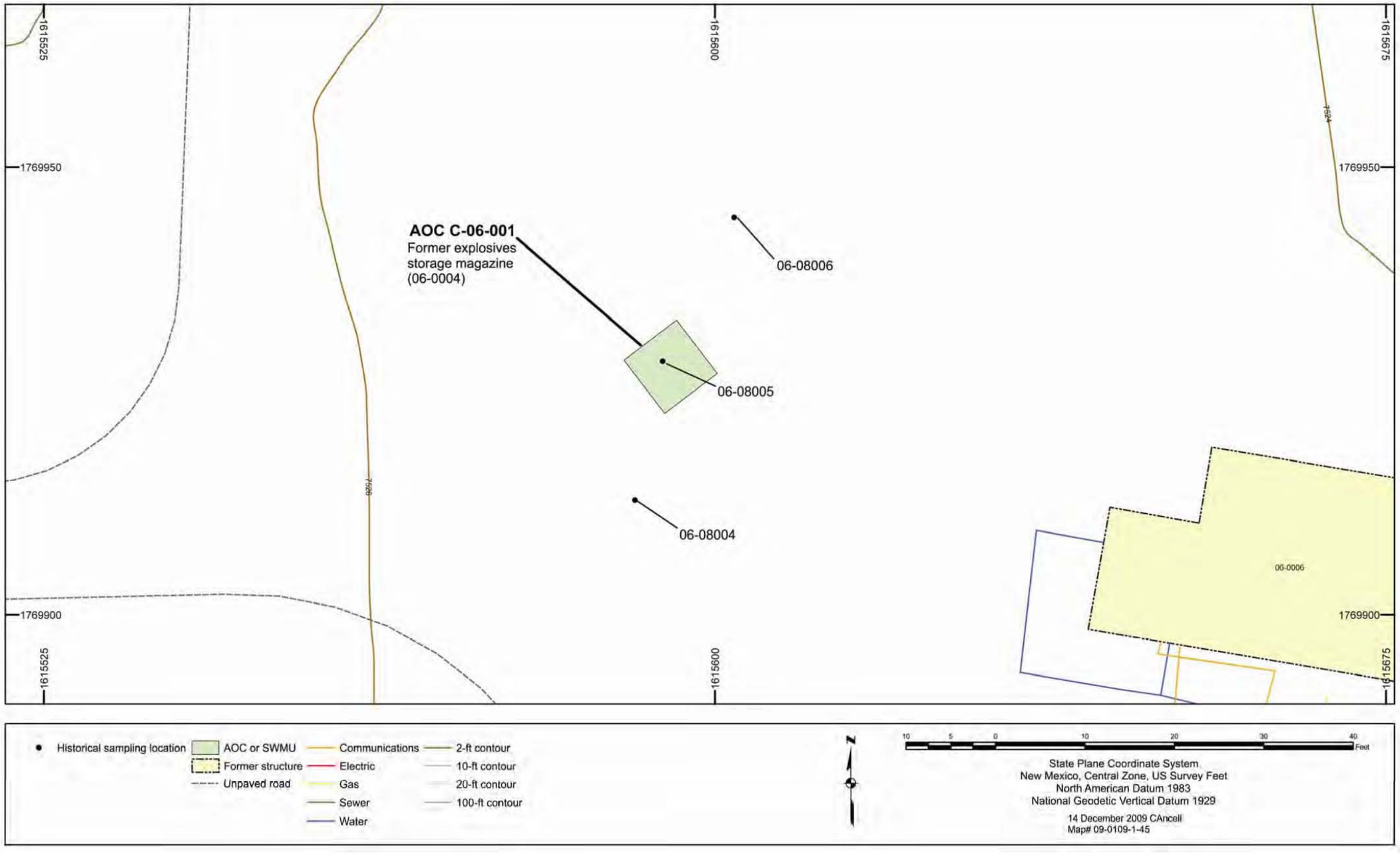

Figure 3.13-1 Site features and historical sampling locations for AOC C-06-001

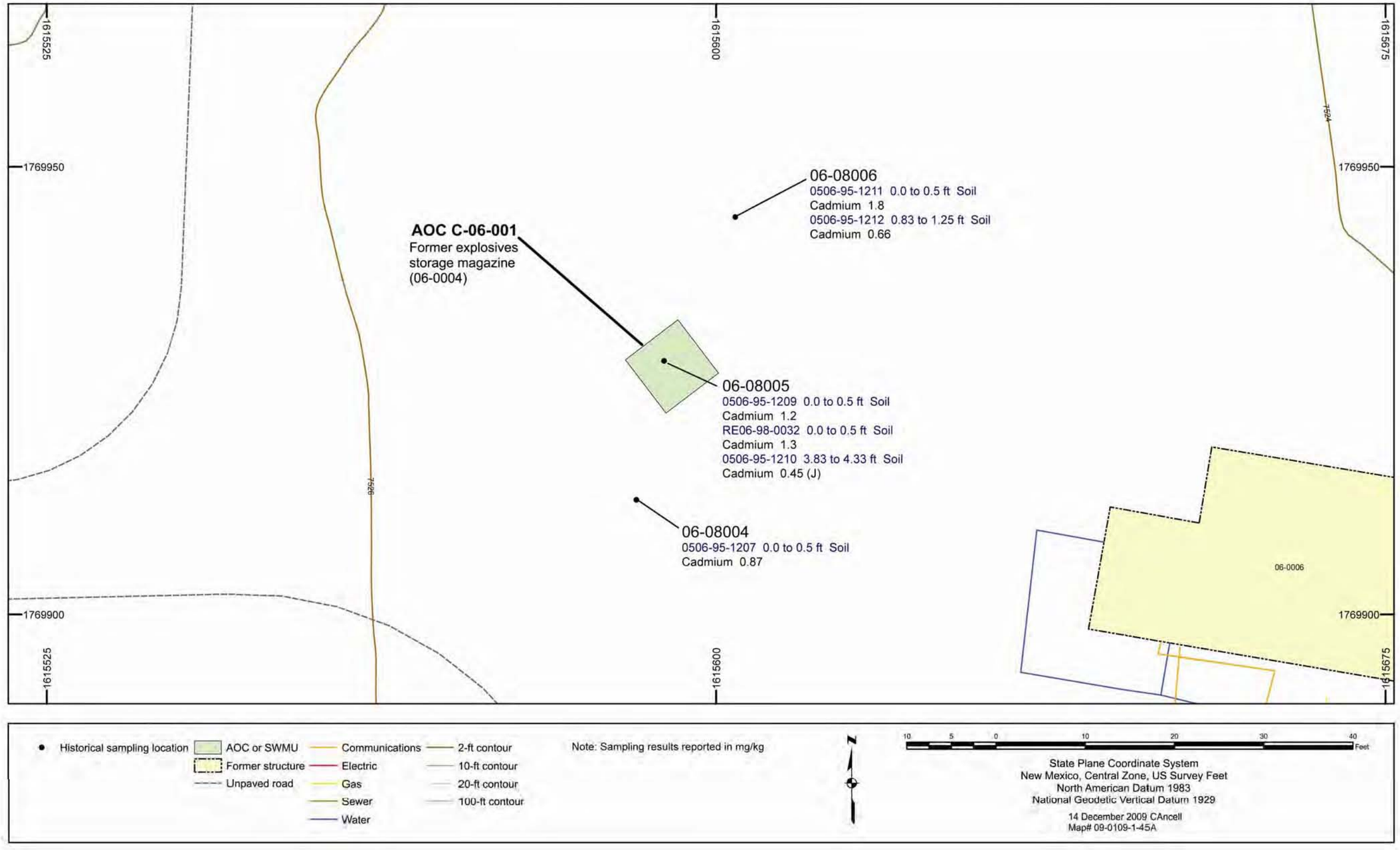

Figure 3.13-2 Inorganic chemicals detected above BVs at AOC C-06-001

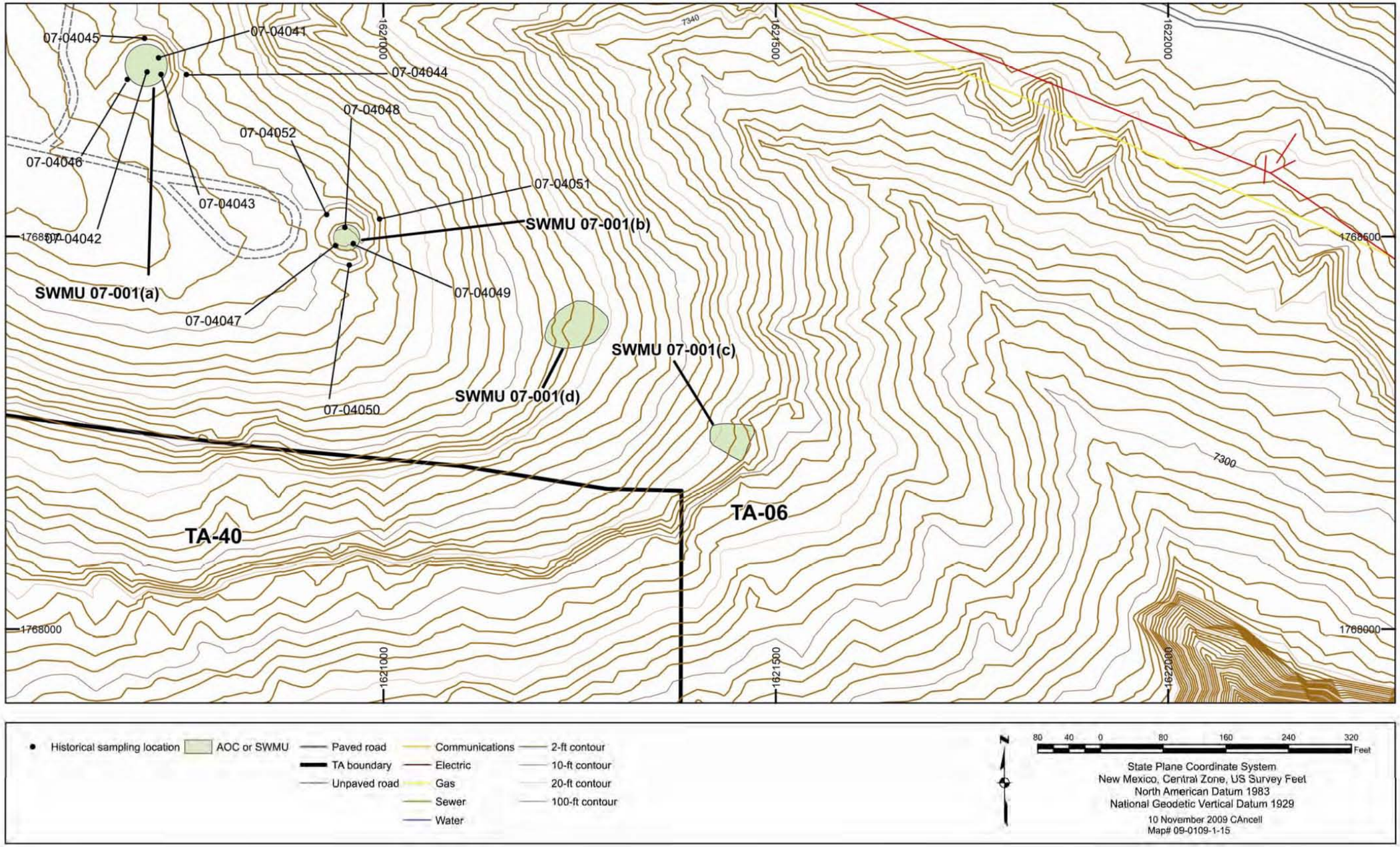

Figure 4.1-1 Site features and historical sampling locations for Consolidated Unit 07-001(a)-99

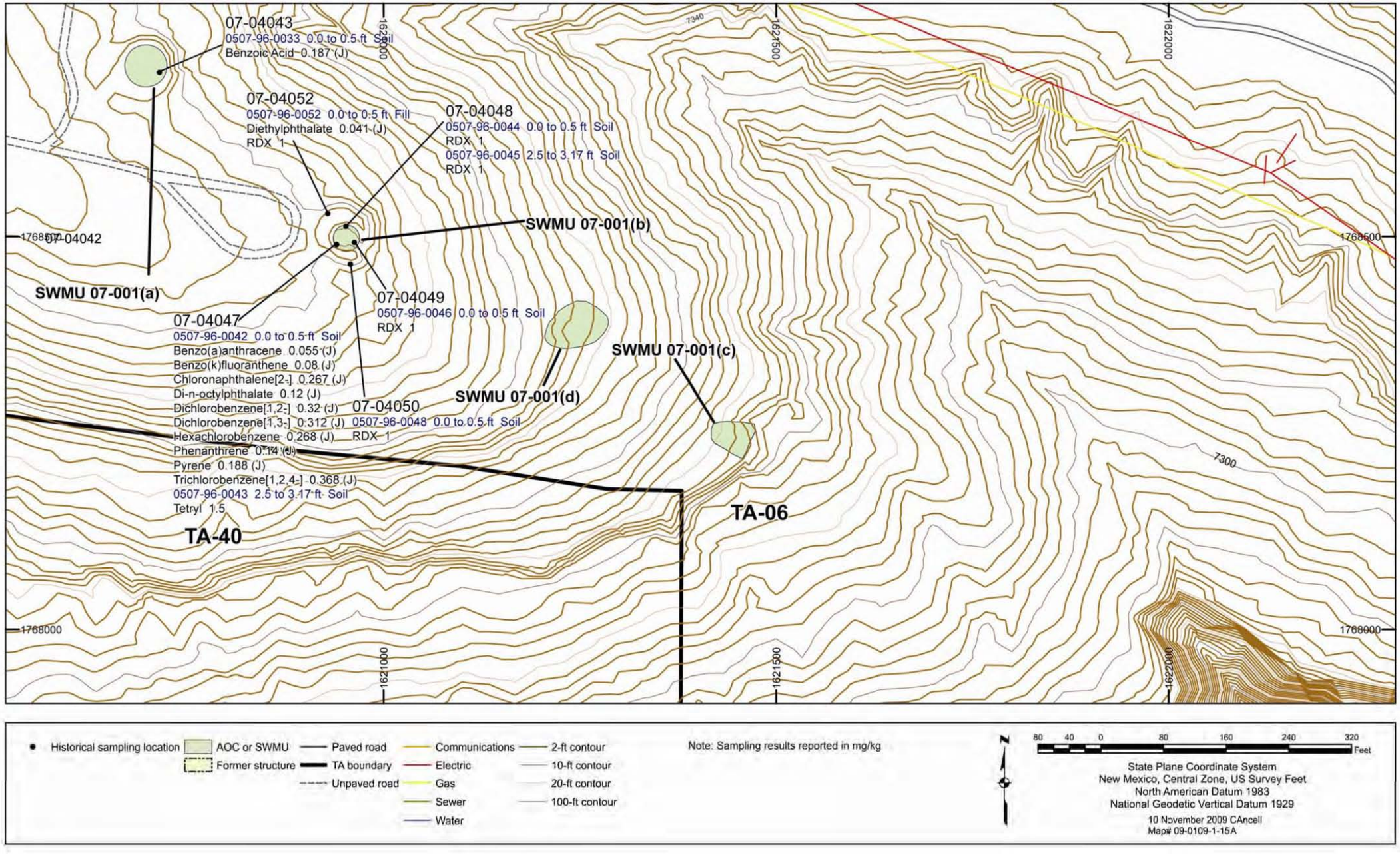

Figure 4.1-2 Organic chemicals detected at SWMUs 07-001(a) and 07-001(b)

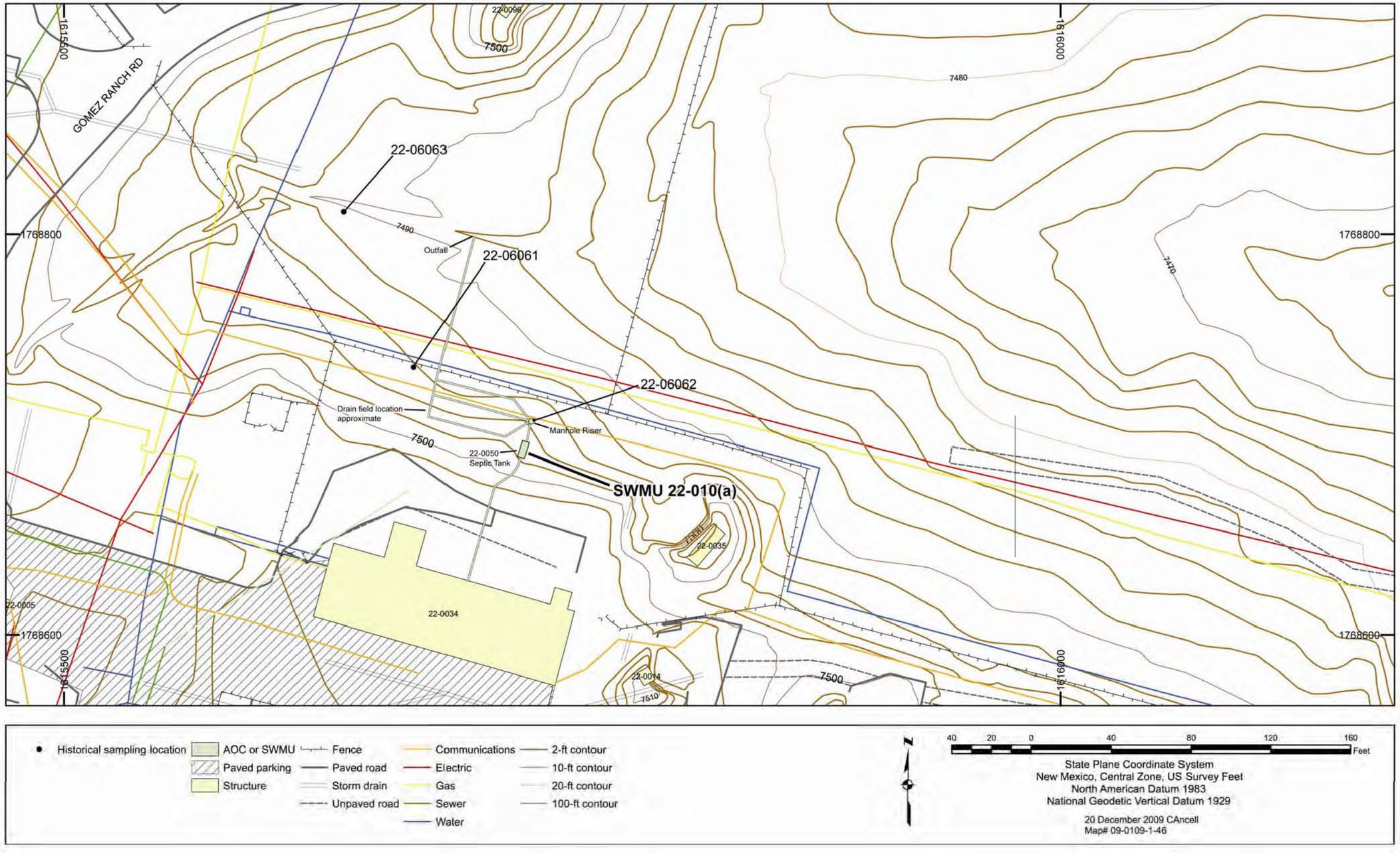

Figure 5.1-1 Site features and historical sampling locations for SWMU 22-010(a)

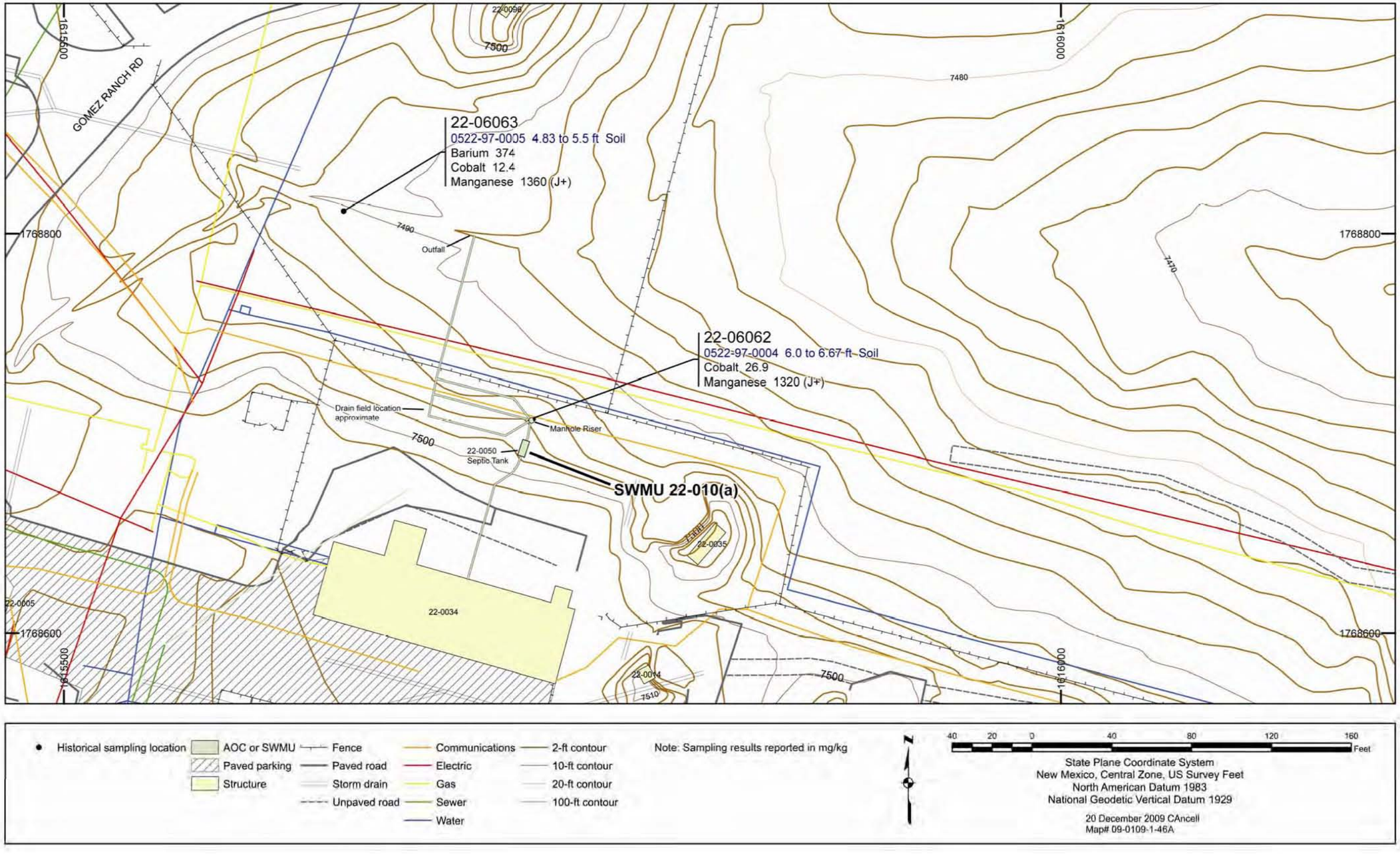

Figure 5.1-2 Inorganic chemicals detected above BVs at SWMU 22-010(a)

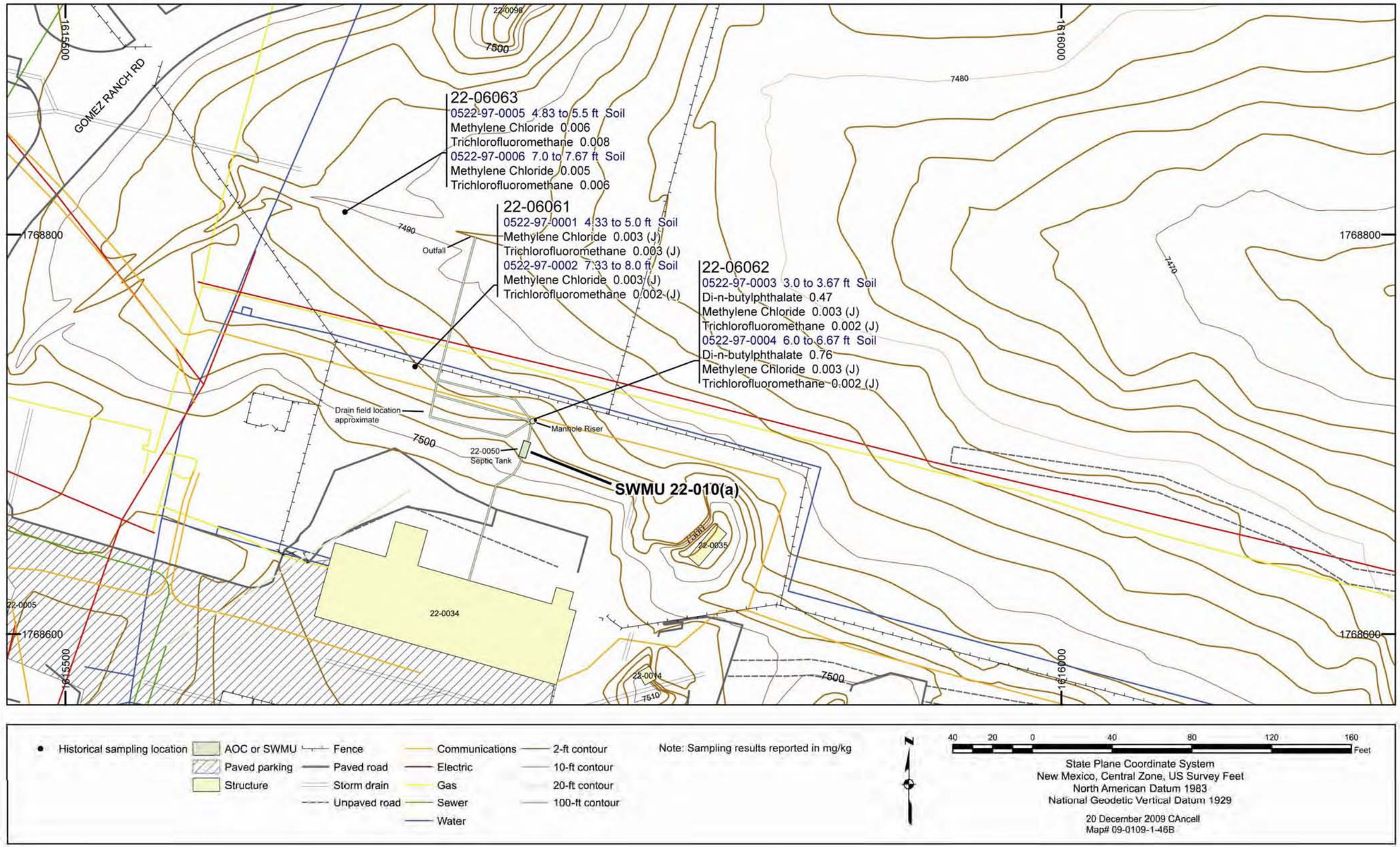

Figure 5.1-3 Organic chemicals detected at SWMU 22-010(a)

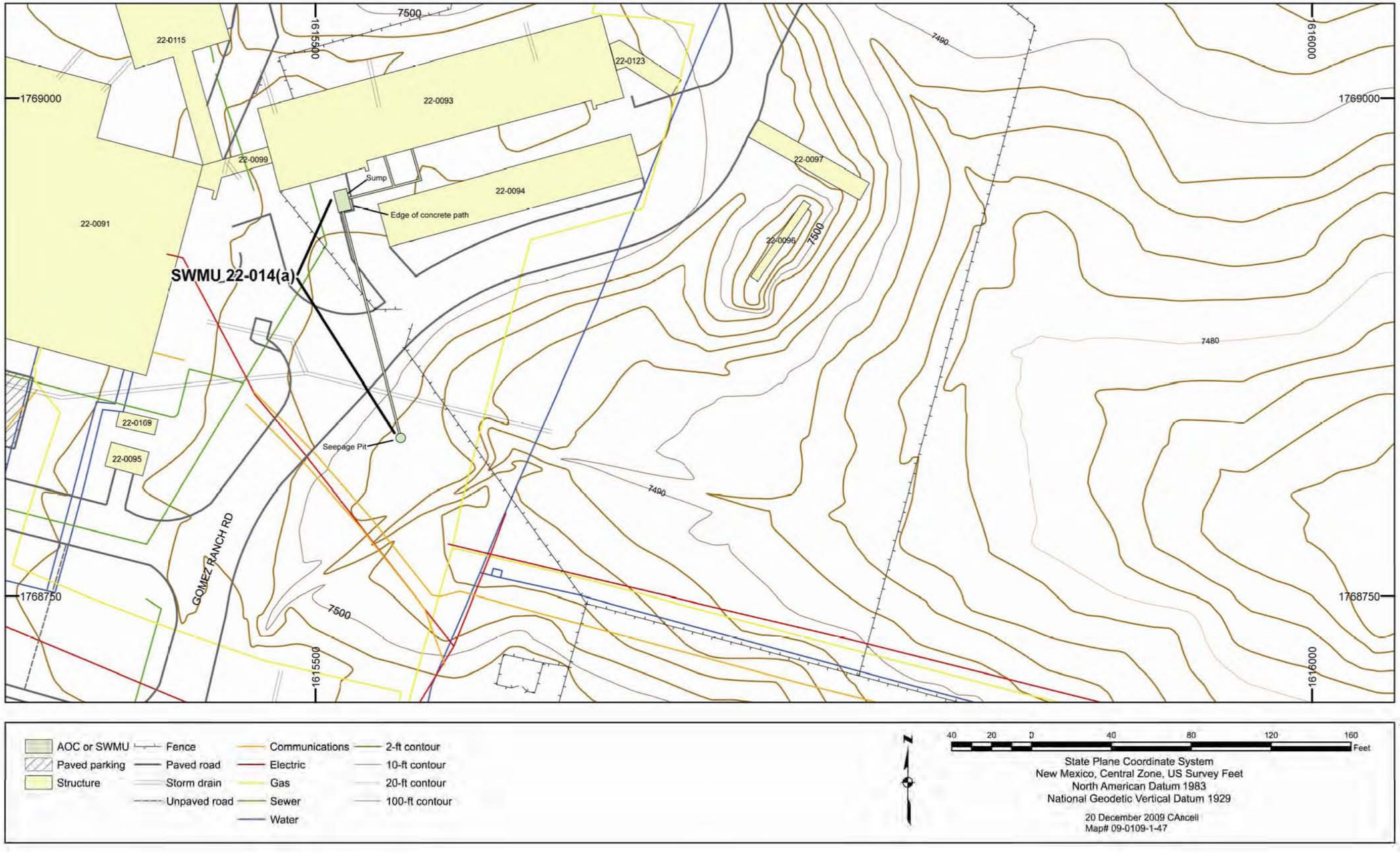

Figure 5.2-1 Site features for SWMU 22-014(a)

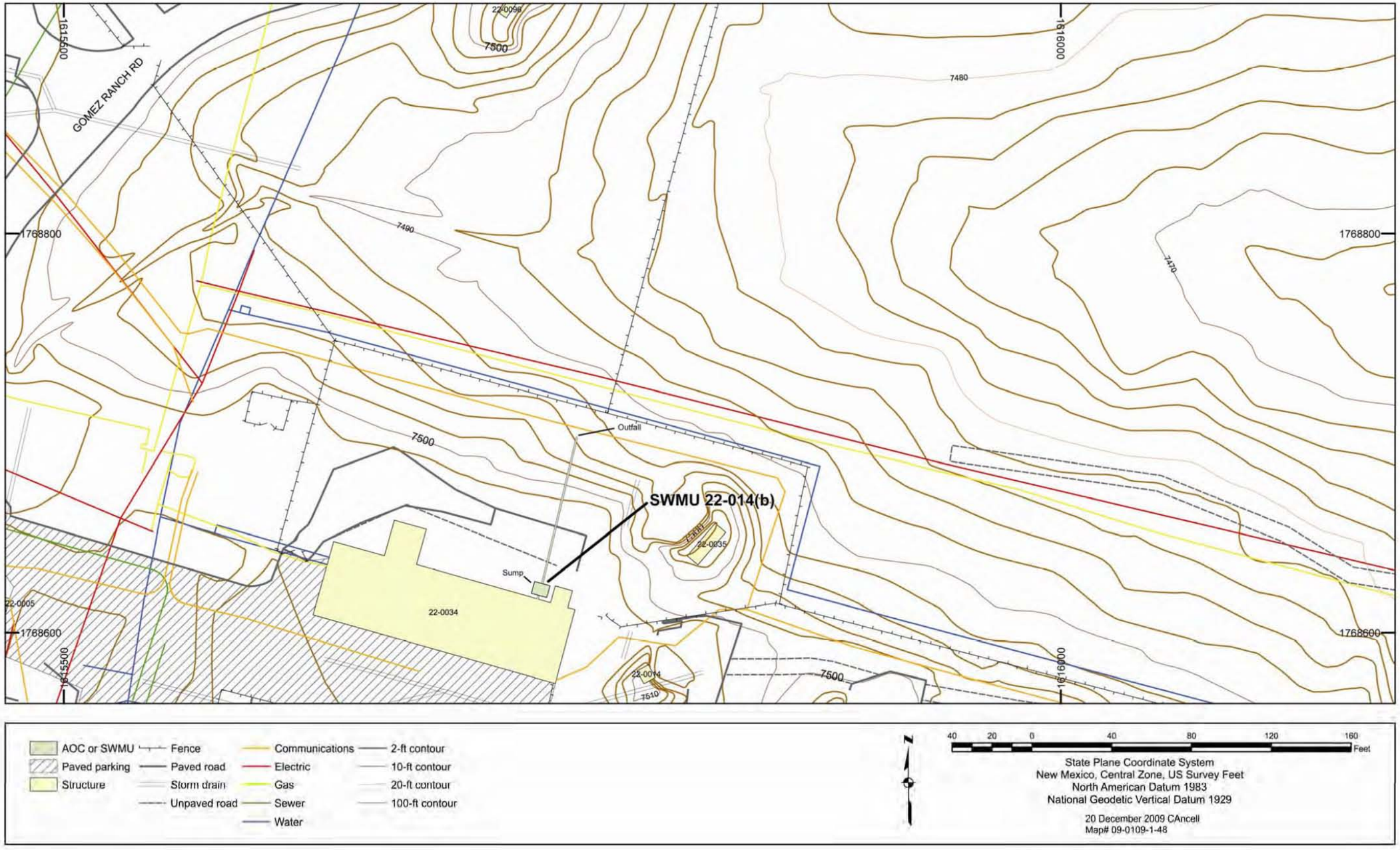

Figure 5.3-1 Site features for SWMU 22-014(b)

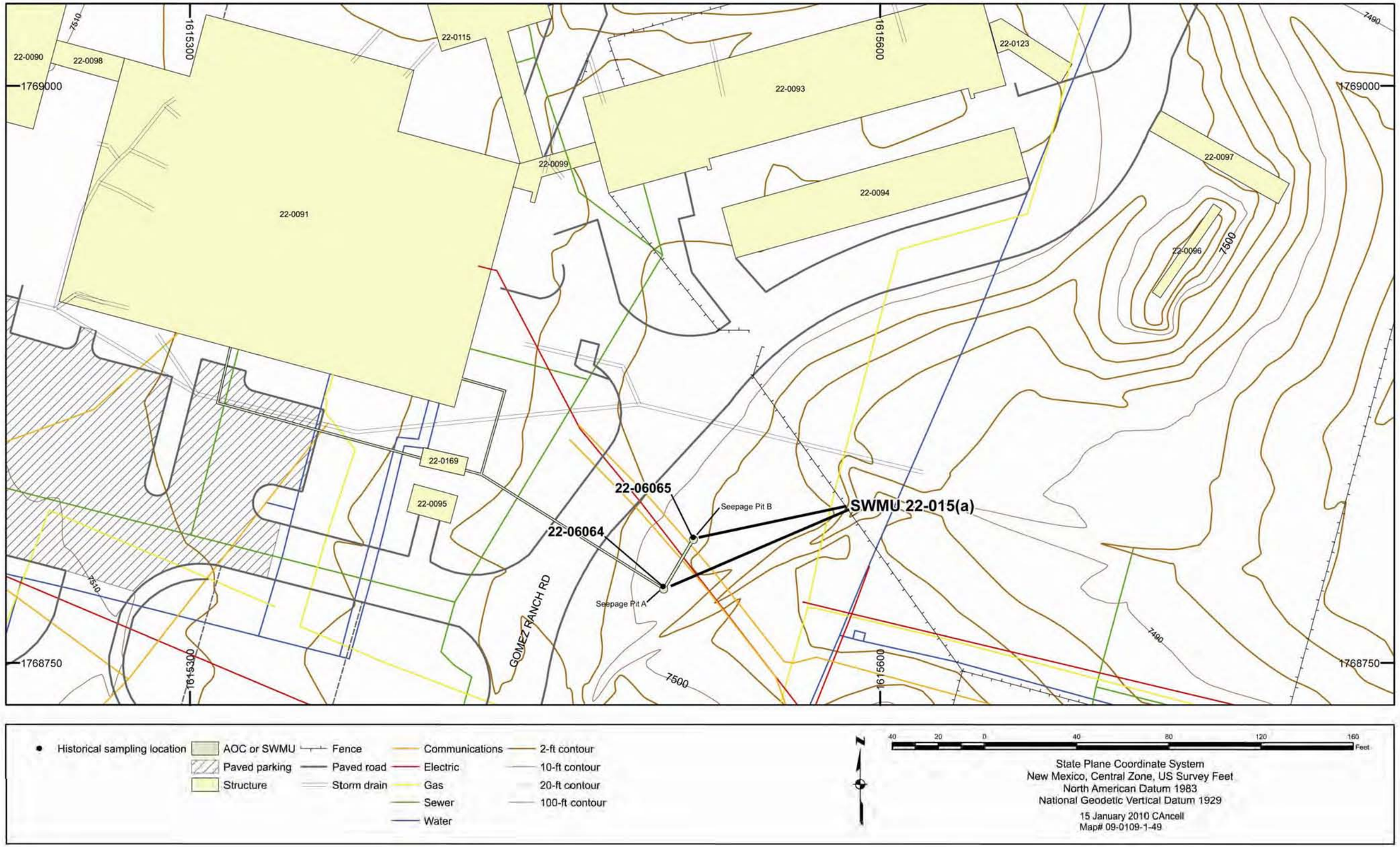

Figure 5.4-1 Site features and historical sampling locations for SWMU 22-015(a)

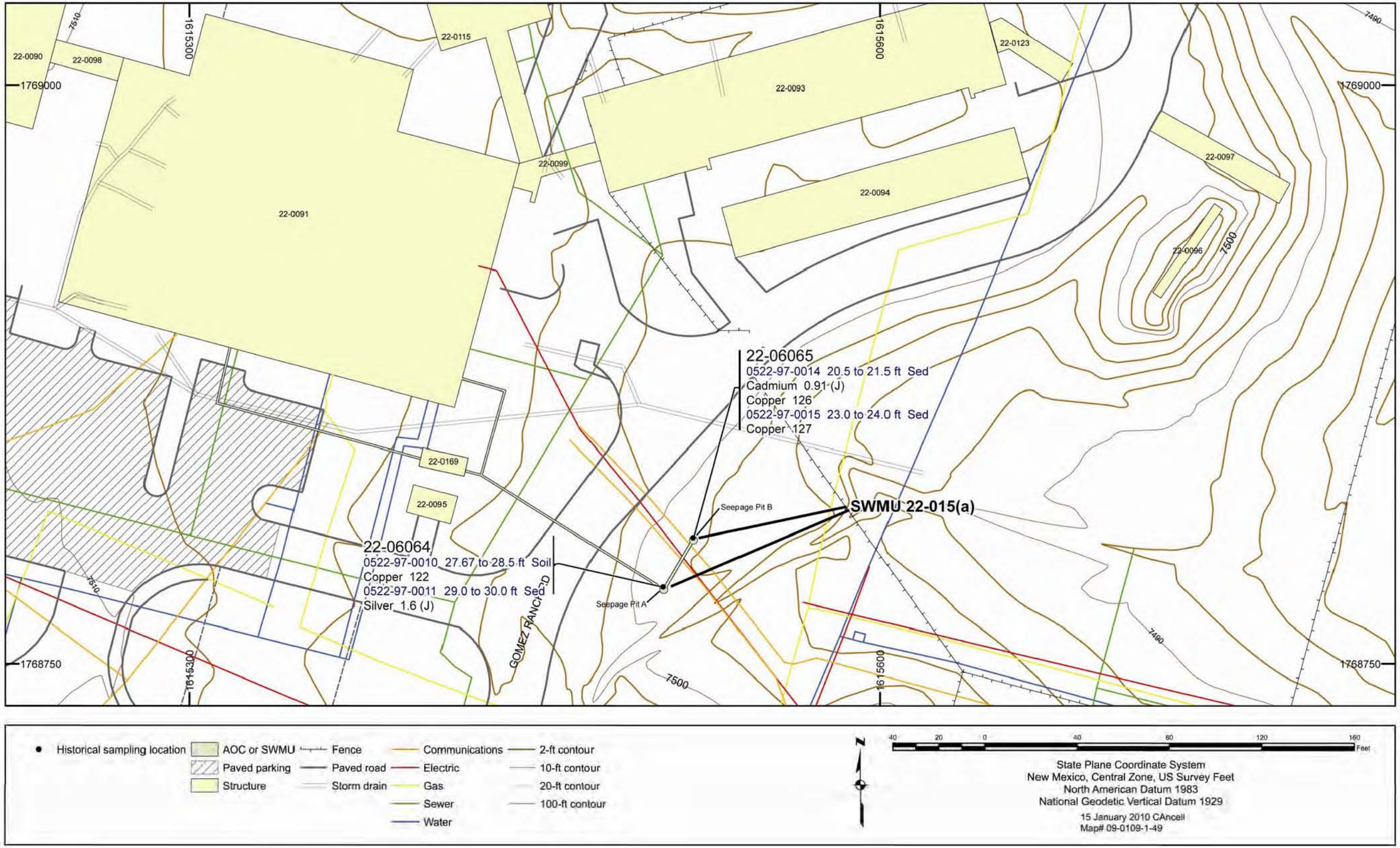

Figure 5.4-2 Inorganic chemicals detected above BVs at SWMU 22-015(a)

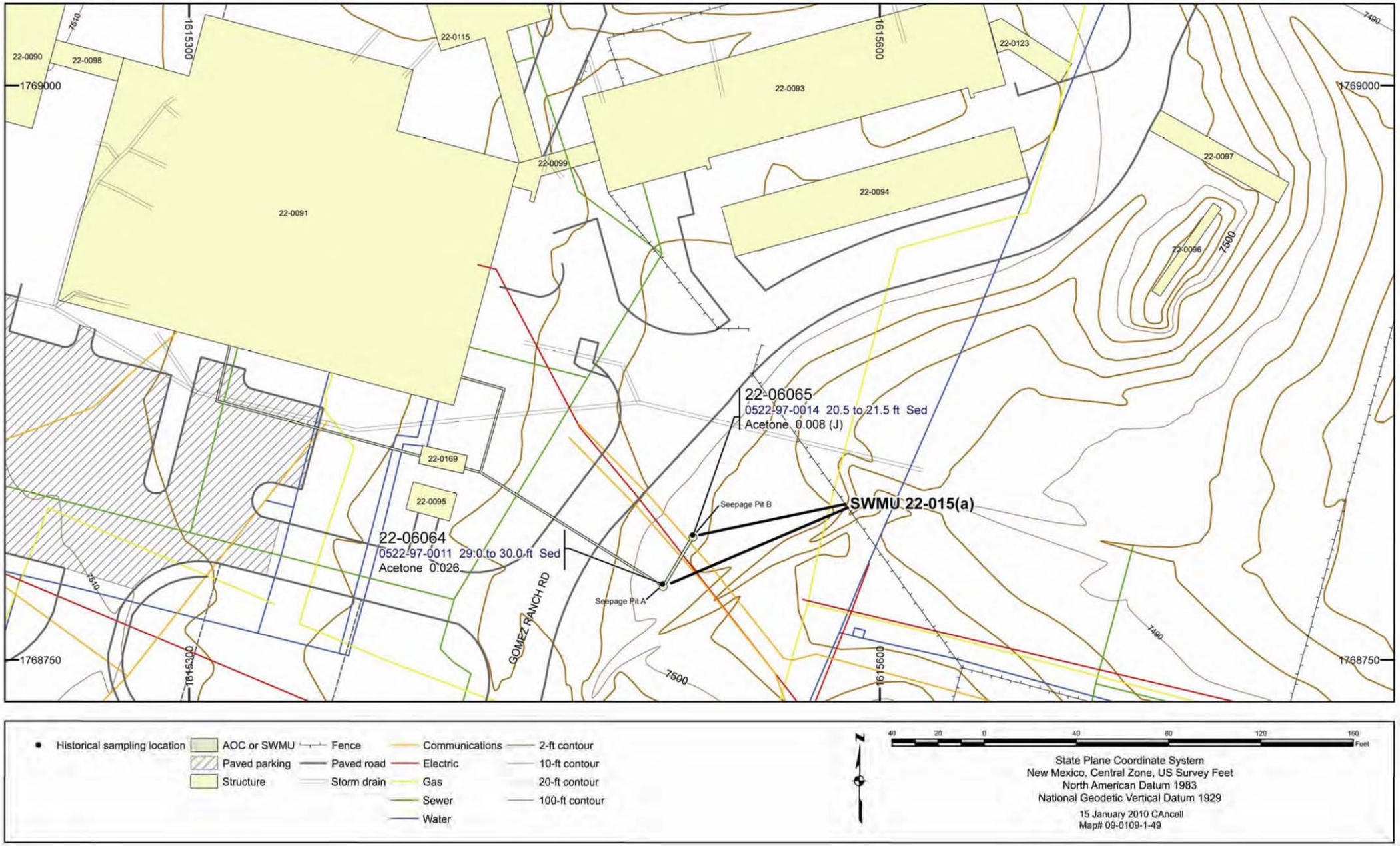

Figure 5.4-3 Organic chemicals detected at SWMU 22-015(a)

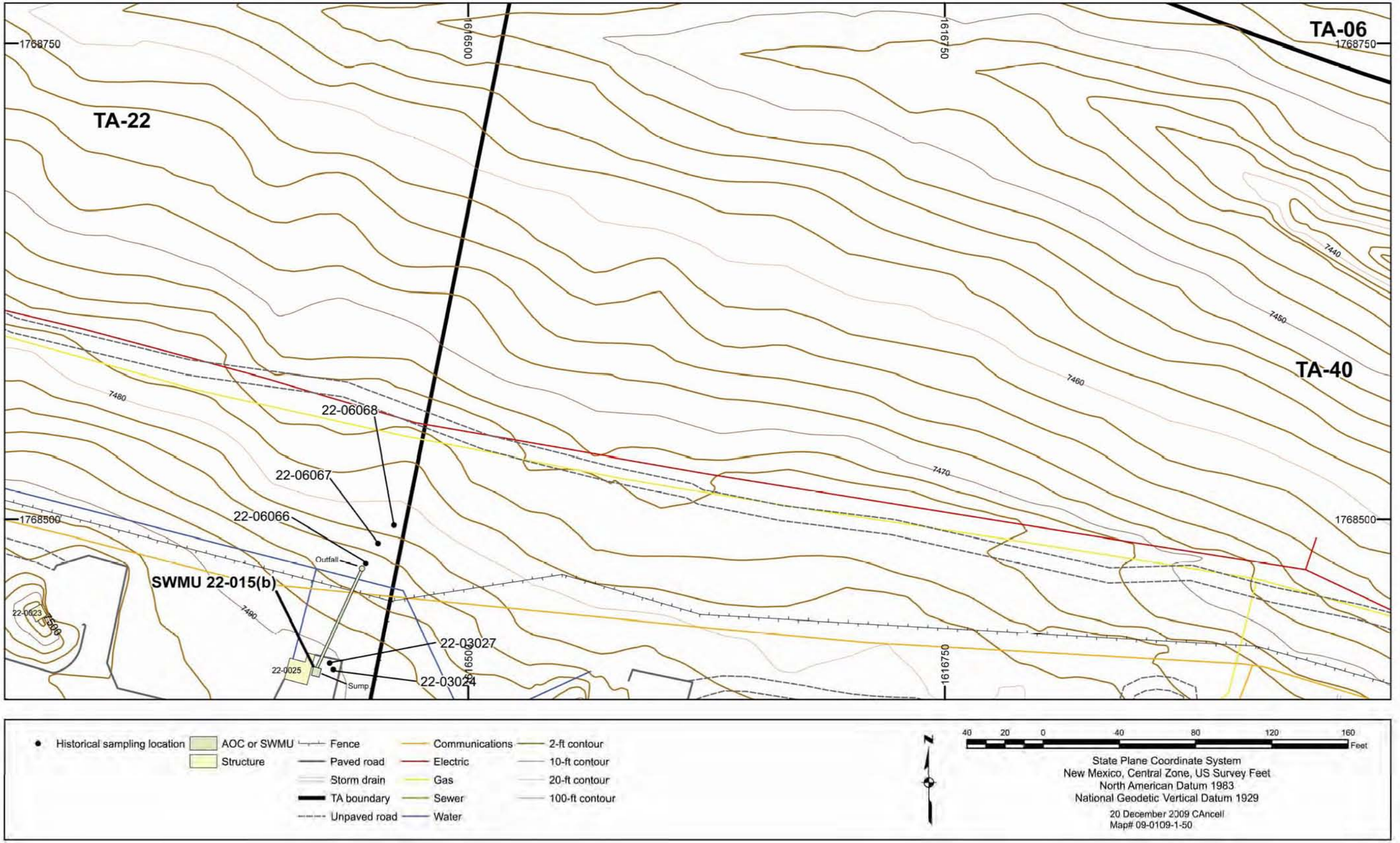

Figure 5.5-1 Site features and historical sampling locations for SWMU 22-015(b)

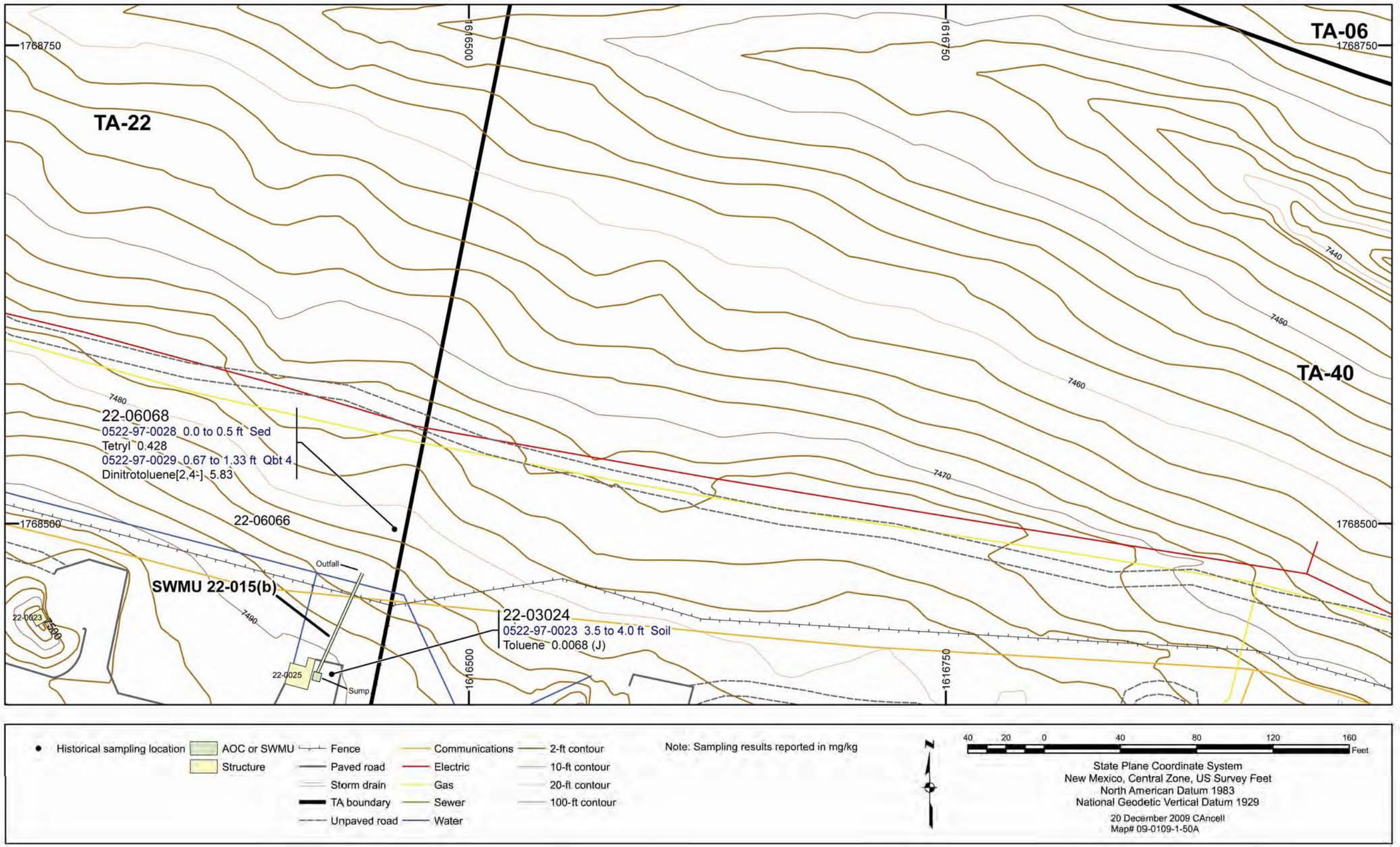

Figure 5.5-2 Organic chemicals detected at SWMU 22-015(b)

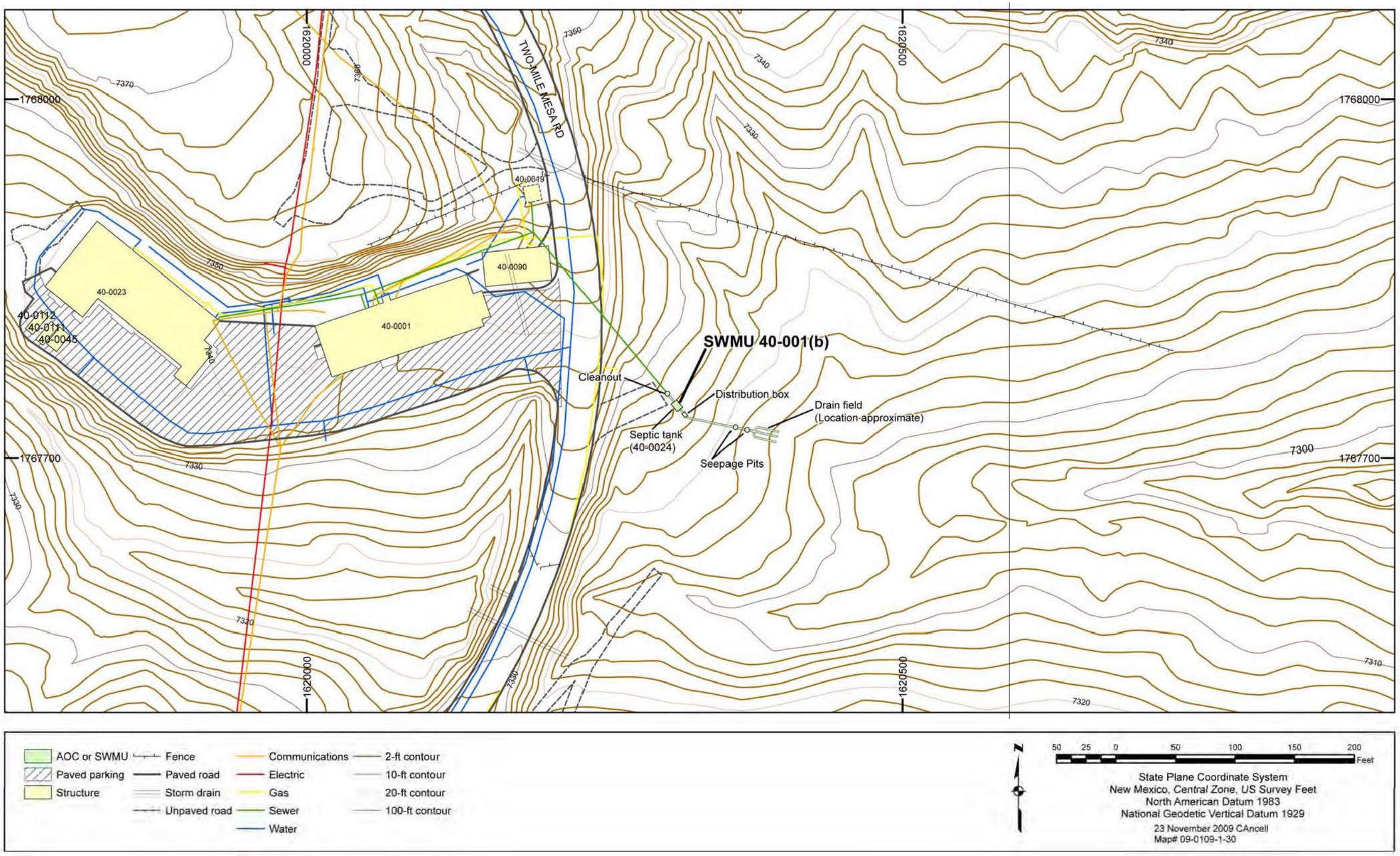

Figure 6.1-1 Site features for SWMU 40-001(b)

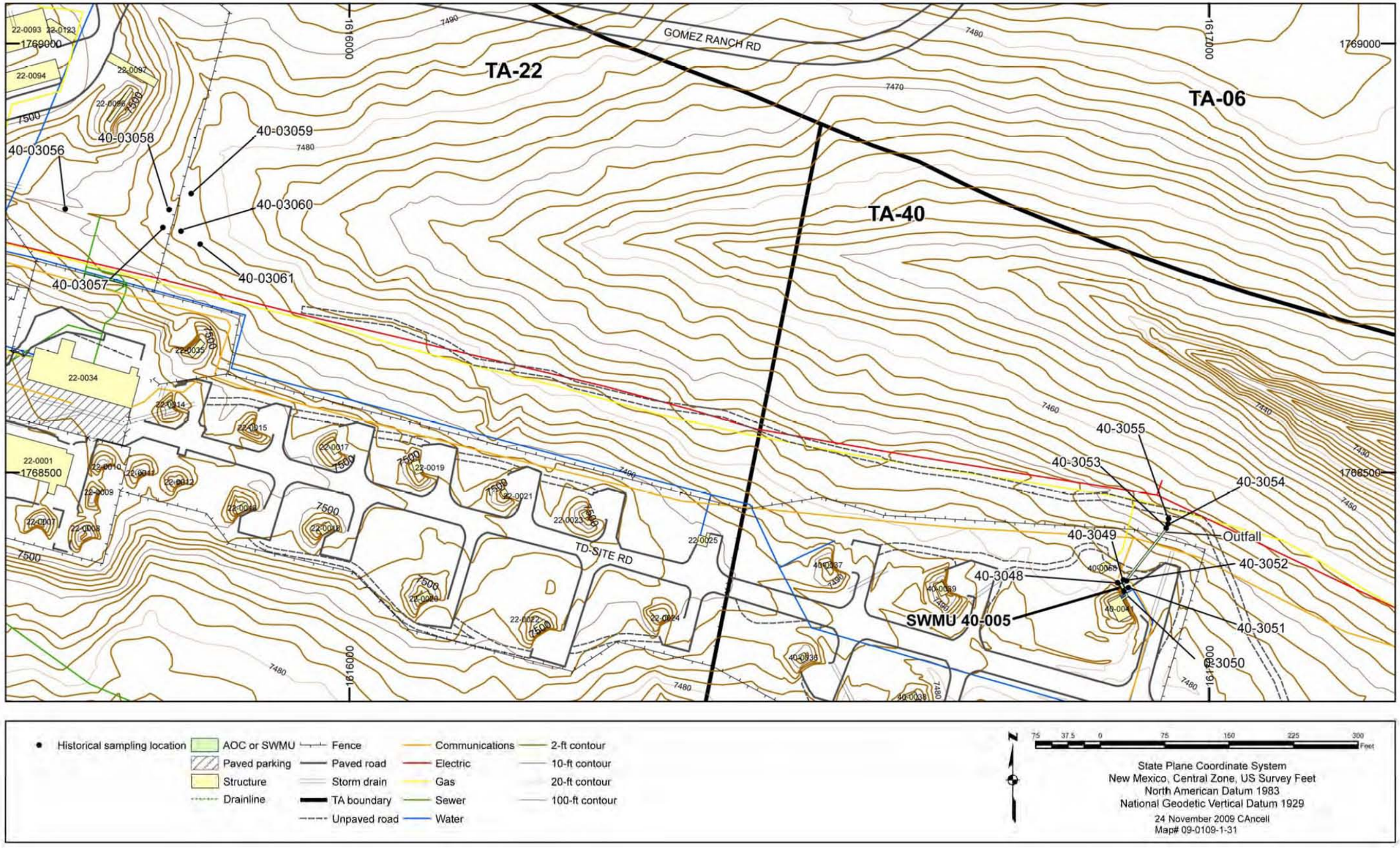

Figure 6.2-1 Site features and historical sampling locations for SWMU 40-005

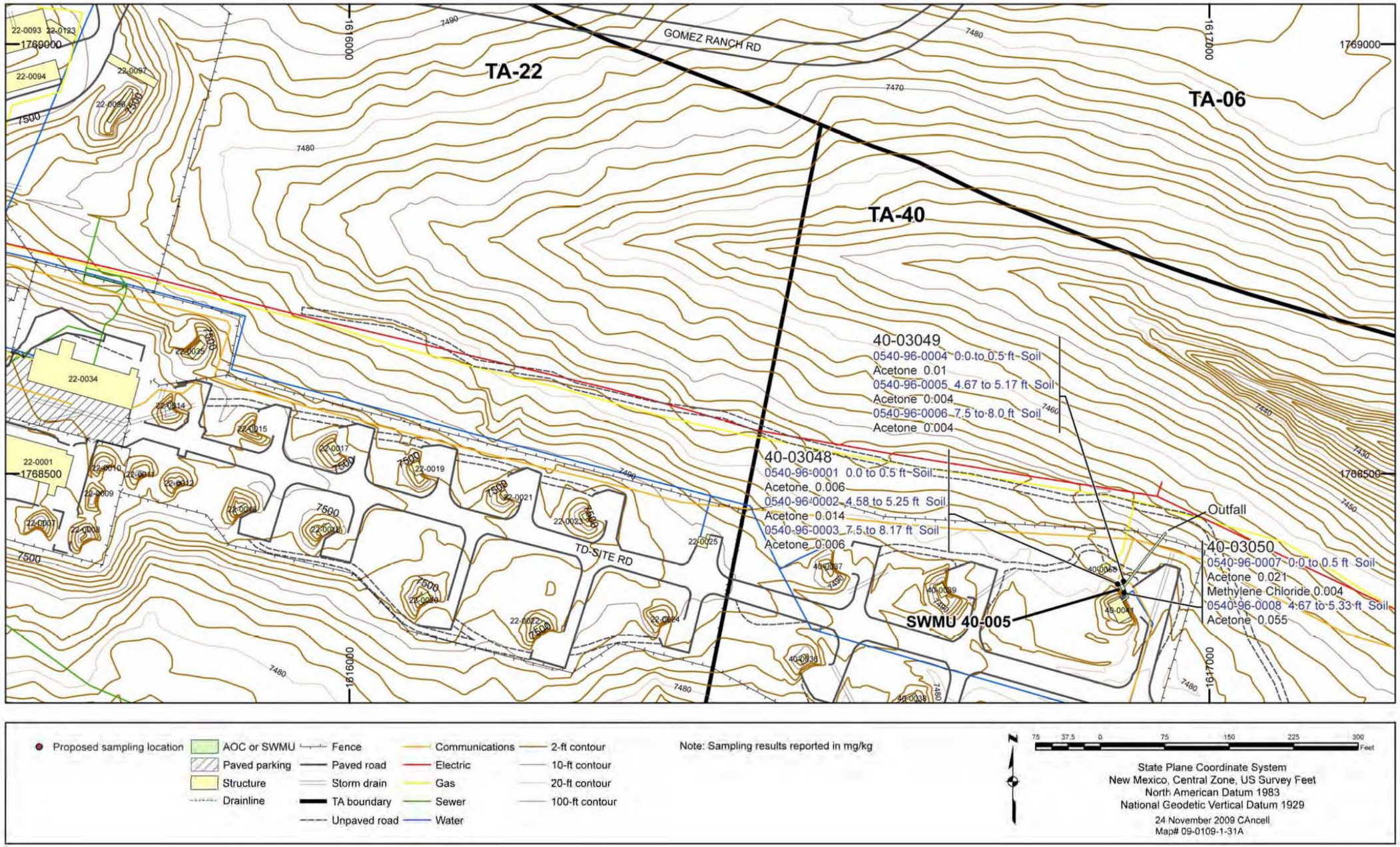

Figure 6.2-2 Organic chemicals detected at SWMU 40-005

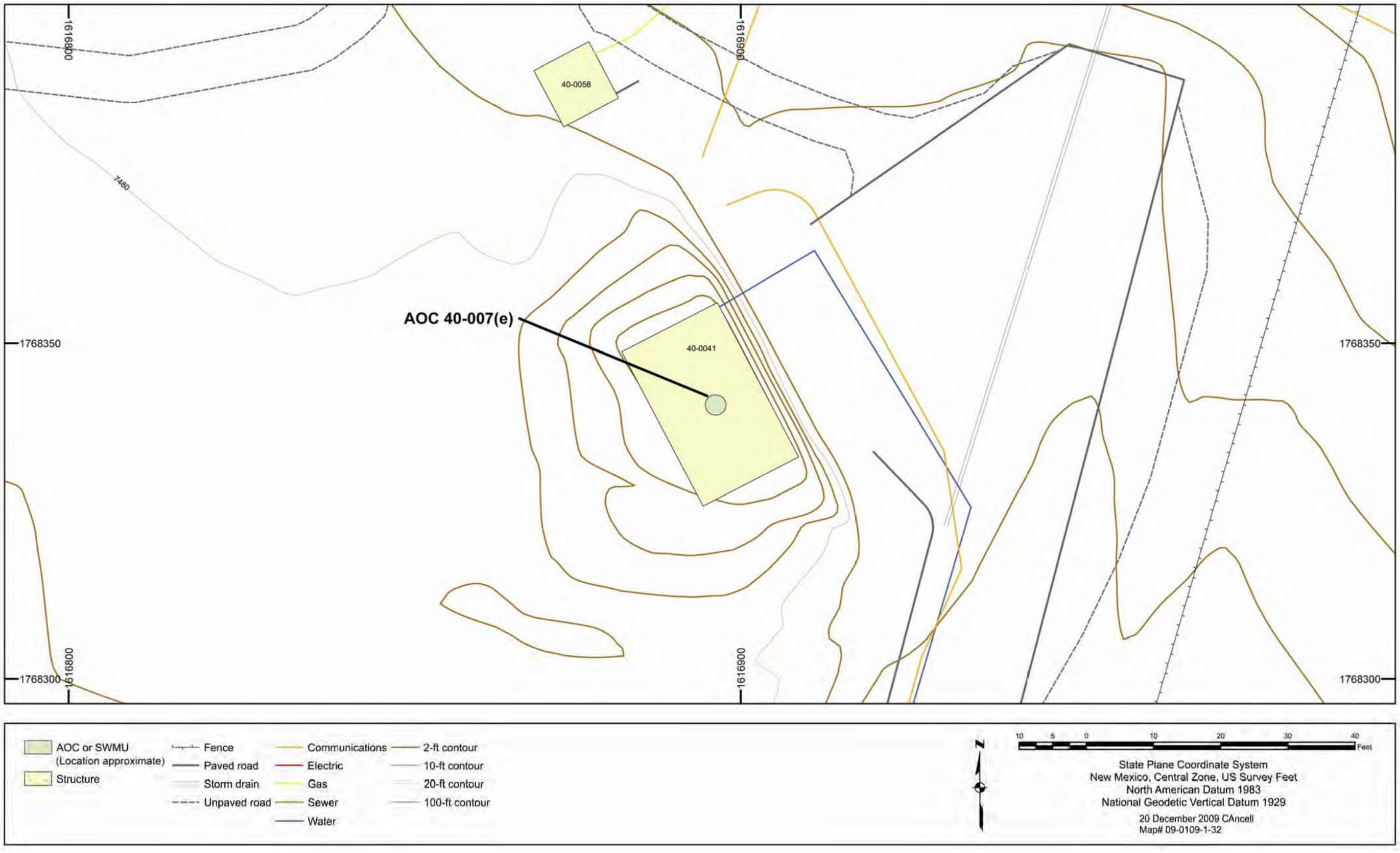

Figure 6.3-1 Site features for AOC 40-007(e)

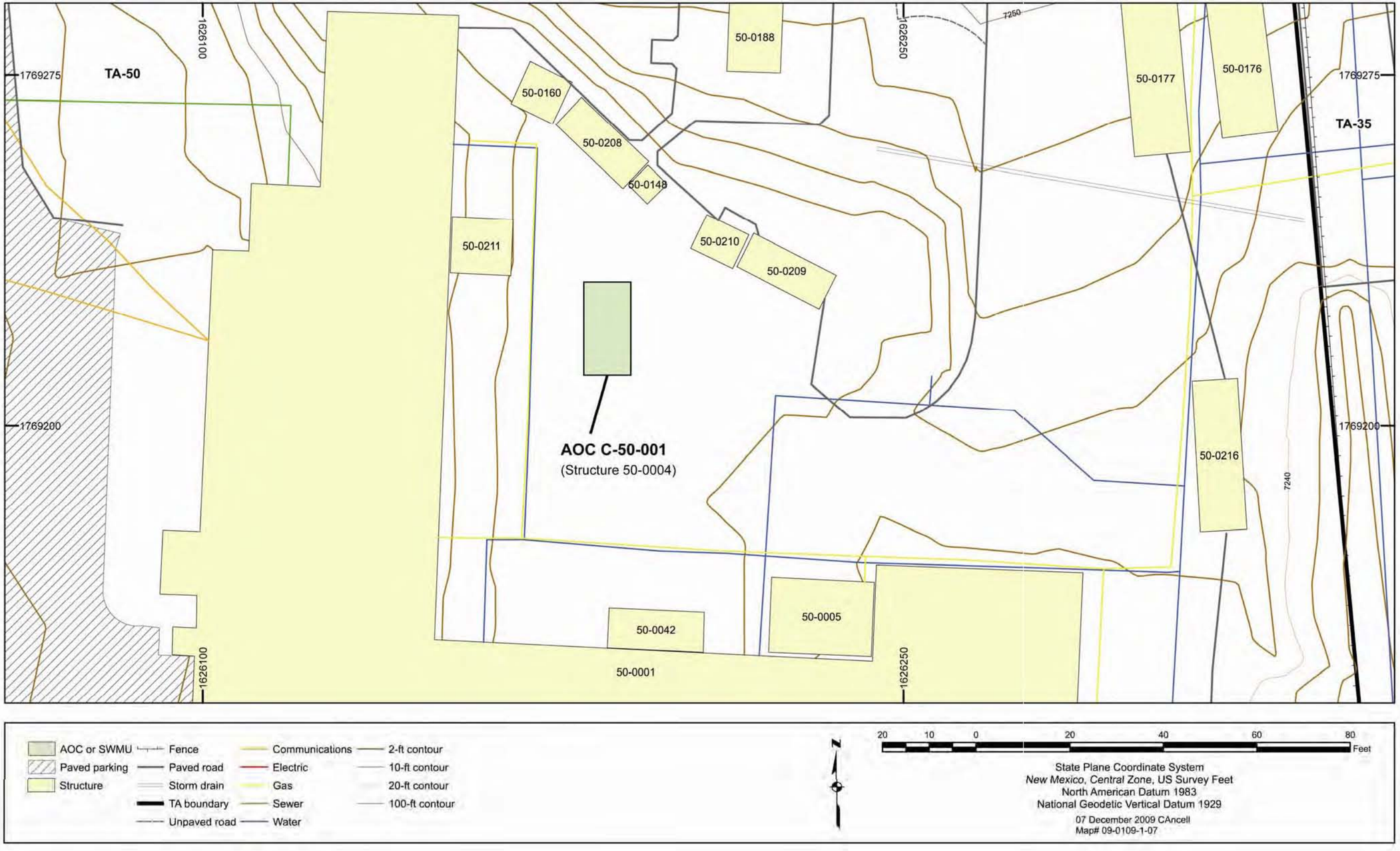

Figure 7.1-1 Site features for AOC C-50-001

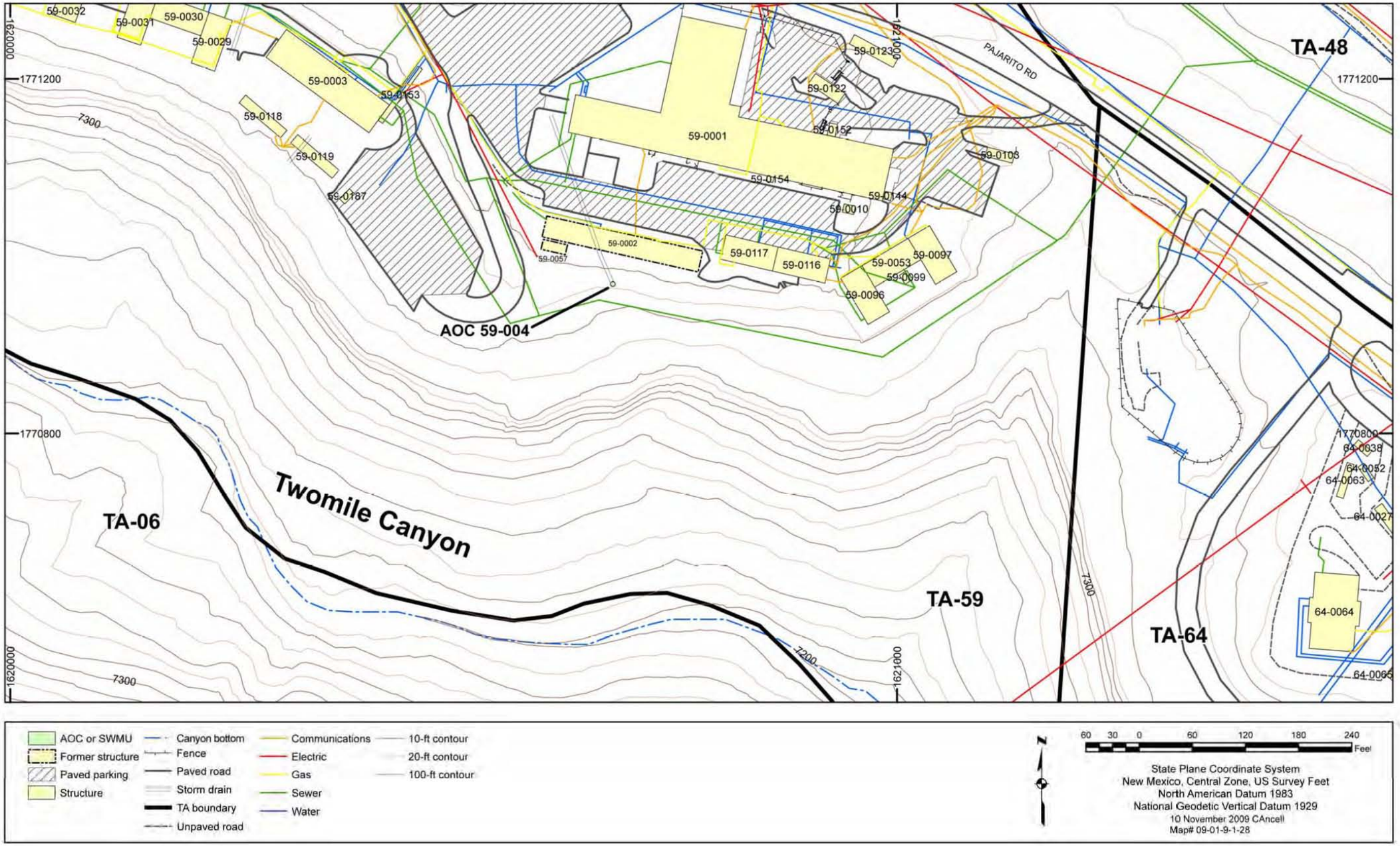

Figure 8.1-1 Site features for AOC 59-004

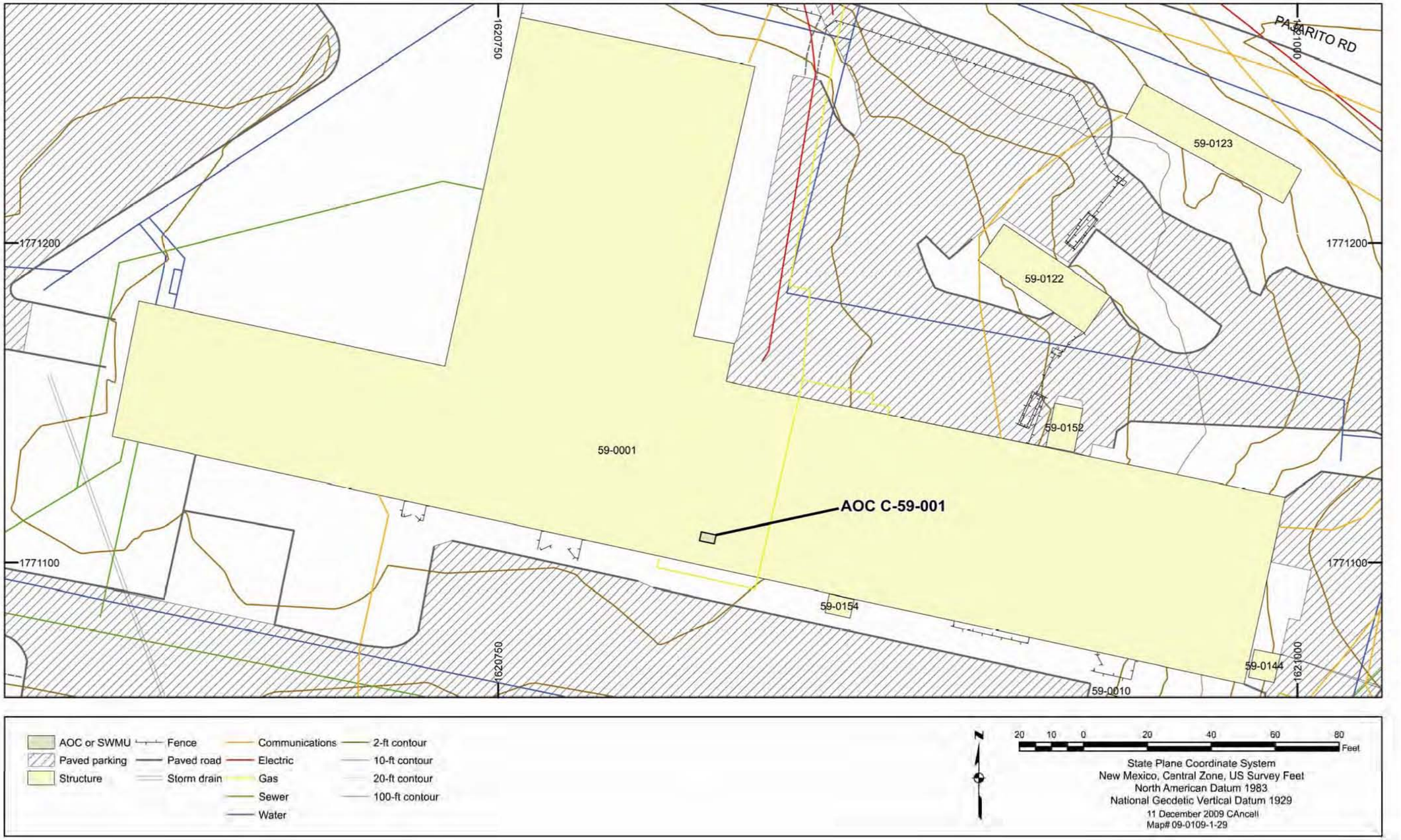

Figure 8.2-1 Site features for AOC C-59-001

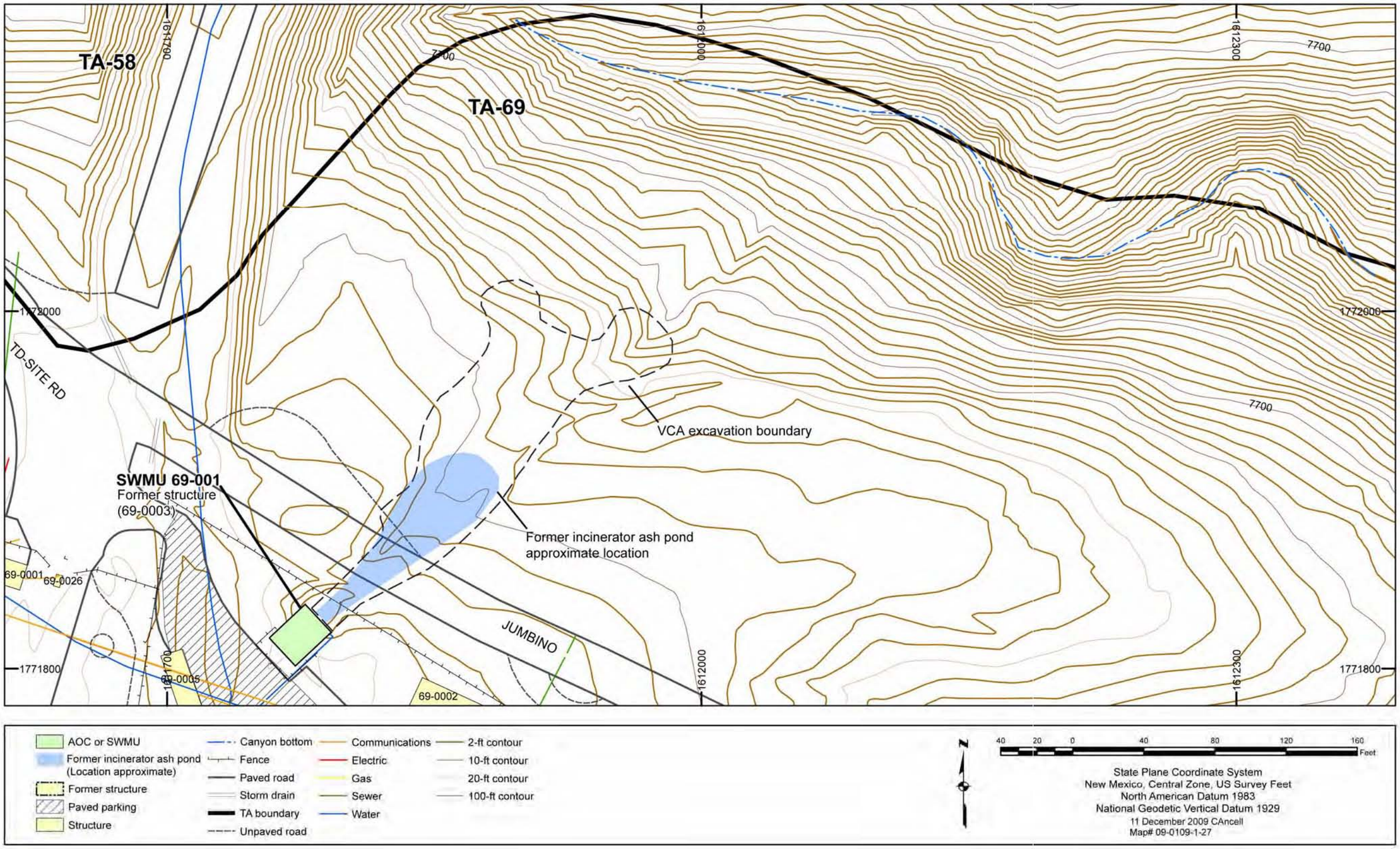

Figure 9.1-1 Site features for SWMU 69-001

Table 1.0-1
Status of SWMUs and AOCs in Twomile Canyon Aggregate Area

Consolidated Unit	Site ID	Brief Description	Site Status	HIR Reference
TA-03				
	SWMU 03-001(a)	Less-than-90-day storage	Removed from the Module VIII of the Laboratory's Hazardous Waste Facility Permit (HWFP), 12/23/98	NMED 1998, 063042
	SWMU 03-001(b)	SAA	Removed from the Module VIII of the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 03-001(c)	Less-than-90-day storage	Removed from the Module VIII of the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	AOC 03-001(e)	Former storage area	Under Investigation	Section 2.1
	AOC 03-001(g)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	SWMU 03-001(k)	Former storage area	Under Investigation	Section 2.2
	AOC 03-001(l)	Less-than-90-day storage	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-001(s)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-001(t)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-001(u)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-001(w)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	SWMU 03-002(d)	Former storage area	Removed from the Module VIII of the Laboratory's HWFP, 05/02/01	NMED 2001, 070010
	SWMU 03-003(a)	Former storage area	Under Investigation	Section 2.3
	SWMU 03-003(b)	Former storage area	Under Investigation	Section 2.4
	AOC 03-003(h)	Transformers	Under Investigation	Section 2.5
	AOC 03-003(j)	Transformers	Under Investigation	Section 2.6
	AOC 03-003(k)	Area of potential soil contamination	Under Investigation	Section 2.7
	AOC 03-003(l)	Transformers	Under Investigation	Section 2.8
	AOC 03-003(p)	Former storage area	Under Investigation	Section 2.9
	SWMU 03-009(d)	Surface disposal site	Removed from Module VIII of the Laboratory's HWFP, 4/22/07	NMED 2007, 095495
	SWMU 03-009(f)	Surface disposal site	Removed from the Module VIII of the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 03-009(g)	Soil fill area	Removed from the Module VIII of the Laboratory's HWFP, 05/02/01	NMED 2001, 070010
	SWMU 03-010(a)	Surface disposal area/drainage	Under Investigation	Section 2.1

Table 1.0-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	HIR Reference
	SWMU 03-011	Operational release	NFA Approved, 01/23/08	NMED 2008, 100116
	AOC 03-013(g)	Operational release	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-013(h)	Operational release	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-014(a2)	Floor drains associated with former WWTP	Under Investigation	Section 2.10
	SWMU 03-014(t)	Lift station associated with former WWTP	Under Investigation	Section 2.11
	AOC 03-014(z)	Former floor drain associated with former WWTP	Under Investigation	Section 2.12
	AOC 03-016(a)	Septic system	NFA Approved, 01/21/05	EPA 2005, 088464
	SWMU 03-018	Septic system	Removed from the Module VIII of the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 03-019	Septic system	Removed from the Module VIII of the Laboratory's HWFP, 05/02/01	NMED 2001, 070010
	AOC 03-022	Former containment sump	Under Investigation	Section 2.13
	SWMU 03-025(b)	Oil/water separator	Under Investigation	Section 2.14
	AOC 03-025(c)	Oil/water separator	Under Investigation	Section 2.15
	SWMU 03-026(d)	Sump/lift station	Under Investigation	Section 2.16
	SWMU 03-033	Former liquid waste collection system	Under Investigation	Section 2.17
	AOC 03-038(e)	Waste lines	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-038(f)	Drainline	Under Investigation	Section 2.18
	AOC 03-039(c)	Silver recovery unit	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-040(a)	Storage area	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-042	Former containment area	Under Investigation	Section 2.3
	SWMU 03-043(c)	Area of potential soil contamination from former manhole	Under Investigation	Section 2.19
	AOC 03-043(i)	Aboveground tank	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-044(b)	Container storage	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-047(j)	Drum storage	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-047(k)	Drum storage	NFA Approved, 01/21/05	EPA 2005, 088464
03-050(a)-00	SWMU 03-050(a)	Area of potential soil contamination from stack emissions	Under Investigation	Section 2.20.1
	SWMU 03-050(d)	Area of potential soil contamination from stack emissions	Under Investigation	Section 2.20.2

Table 1.0-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	HIR Reference
03-050(a)-00, cont.	SWMU 03-050(f)	Area of potential soil contamination from stack emissions	Under Investigation	Section 2.20.3
	SWMU 03-050(g)	Area of potential soil contamination from stack emissions	Under Investigation	Section 2.20.4
	SWMU 03-050(e)	Filter unit (inactive)	Removed from the Module VIII of the Laboratory's HWFP, 05/02/01	NMED 2001, 070010
	AOC 03-051(a)	Area of potential soil contamination	Under Investigation	Section 2.21
	AOC 03-051(b)	Area of potential soil contamination	Under Investigation	Section 2.22
	AOC 03-051(d)	Soil contamination (oil from leaking compressor)	NFA Approved, 01/21/05	EPA 2005, 088464
03-052(a)-00	SWMU 03-052(a)	Storm drain	Under Investigation	Section 2.23.1
	SWMU 03-052(e)	Storm drain	Under Investigation	Section 2.23.2
	SWMU 03-054(b)	Outfall	Under Investigation	Section 2.23.3
03-054(a)-00	SWMU 03-054(a)	Former cooling tower outfall	Under Investigation	Section 2.24.1
	SWMU 03-054(d)	Outfall	Under Investigation	Section 2.24.1
	SWMU 03-055(a)	Outfall	Under Investigation	Section 2.25
	AOC 03-055(b)	Outfall	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-056(f)	Drum storage	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-056(g)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 03-056(j)	Storage area	NFA Approved, 01/21/05	EPA 2005, 088464
	SWMU 03-056(m)	Drum storage area (inactive)	Removed from the Module VIII of the Laboratory's HWFP, 05/02/01	NMED 2001, 070010
	AOC C-03-003	One-time spill, stained asphalt	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC C-03-008	Storage area/radioactively contaminated	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC C-03-010	Outfall	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC C-03-019	Underground storage tank	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC C-03-021	Underground storage tank	NFA Approved, 01/21/05	EPA 2005, 088464
TA-06				
	SWMU 06-001(a)	Septic system	Under Investigation	Section 3.1
	SWMU 06-001(b)	Septic system	Under Investigation	Section 3.2
06-002-00	SWMU 06-002	Septic system	Under Investigation	Section 3.3.1
	SWMU 06-003(c)	Firing site	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-005	Area of potential soil contamination	Under Investigation	Section 3.3.2

Table 1.0-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	HIR Reference
	AOC C-06-006	Soil contamination from former building 06-0014	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-016	Soil contamination from former building 06-0028	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-020	Soil contamination from former building	NFA Approved, 03/14/00	NMED 2000, 066381
06-003(a)-99	SWMU 06-003(a)	Firing site	Under Investigation	Section 3.4.1
	AOC C-06-008	Area of potential soil contamination	Under Investigation	Section 3.4.2
	AOC C-06-019	Area of potential soil contamination	Under Investigation	Section 3.4.3
	SWMU 06-003(b)	Firing site (inactive)	NFA Approved, 01/21/05	EPA 2005, 088464
	SWMU 06-003(d)	Firing site	Under Investigation	Section 3.5
	SWMU 06-003(e)	Firing site	Under Investigation	Section 3.6
	SWMU 06-003(f)	Firing site	Under Investigation	Section 3.7
06-003(g)-00	SWMU 06-003(g)	Firing site and building 06-0010 (inactive)	Removed from the Module VIII of the Laboratory's HWFP, 11/09/01	NMED 2001, 072819
	AOC C-06-003	Building 06-0011, control building for explosive shots	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-007	Building 06-0015, boiler for steam generation	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-008	Building 06-0016, magazine for explosives	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-009	Building 06-0017, magazine	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-010	Building 06-0021, magazines for explosives storage.	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-011	Building 06-0022, magazine	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-012	Building 06-0023, magazine	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-013	Building 06-0024, magazine for explosives storage.	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-014	Building 06-0025, magazine for explosives storage.	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-015	Building 06-0027, magazine for explosives storage.	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-017	Building 06-0029, magazine for explosives storage.	NFA Approved, 03/14/00	NMED 2000, 066381

Table 1.0-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	HIR Reference
06-003(g)-00 (cont.)	AOC C-06-018	Building 06-0030, magazine for explosives storage.	NFA Approved, 03/14/00	NMED 2000, 066381
	AOC C-06-021	Building 06-0026, magazine used for explosives storage.	NFA Approved, 03/14/00	NMED 2000, 066381
	SWMU 06-003(h)	Firing site	Under Investigation	Section 3.8
	AOC 06-004	Sump	NFA Approved, 01/21/05	EPA 2005, 088464
	SWMU 06-006	Storage area	Under Investigation	Section 3.9
06-007(a)-99	SWMU 06-005	Pit	Under Investigation	Section 3.10.1
	SWMU 06-007(a)	MDA F	Under Investigation	Section 3.10.2
	SWMU 06-007(b)	Disposal pit	Under Investigation	Section 3.10.3
	SWMU 06-007(c)	Disposal pit	Under Investigation	Section 3.10.4
	SWMU 06-007(d)	Disposal pit	Under Investigation	Section 3.10.5
	SWMU 06-007(e)	Disposal pit	Under Investigation	Section 3.10.6
	SWMU 06-007(f)	Surface disposal area	Under Investigation	Section 3.11
	SWMU 06-007(g)	Area of potential soil contamination	Under Investigation	Section 3.12
	AOC C-06-001	Area of potential soil contamination	Under Investigation	Section 3.13
TA-07				
07-001(a)-99	SWMU 07-001(a)	Inactive firing pit	Under Investigation	Section 4.1.1
	SWMU 07-001(b)	Inactive firing pit	Under Investigation	Section 4.1.1
	SWMU 07-001(c)	Inactive firing site	Under Investigation	Section 4.1.2
	SWMU 07-001(d)	Inactive firing site	Under Investigation	Section 4.1.3
	SWMU 07-003(c)	Typographical error	Removed from the Module VIII of the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 07-003(d)	Typographical error	Removed from the Module VIII of the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
TA-22				
	AOC 22-003(a)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 22-003(b)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 22-003(c)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 22-003(d)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 22-003(e)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 22-003(f)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 22-003(g)	SAA	NFA Approved, 01/21/05	EPA 2005, 088464

Table 1.0-1 (continued)

Consolidated Unit	Site ID	Brief Description	Site Status	HIR Reference
	SWMU 22-010(a)	Septic system	Under Investigation	Section 5.1
	AOC 22-013	Liquid waste treatment/storage	NFA Approved, 01/21/05	EPA 2005, 088464
	SWMU 22-014(a)	Sump system	Under Investigation	Section 5.2
	SWMU 22-014(b)	Sump system	Under Investigation	Section 5.3
	SWMU 22-015(a)	Seepage pits	Under Investigation	Section 5.4
	SWMU 22-015(b)	Sump and outfall	Under Investigation	Section 5.5
TA-40				
	SWMU 40-001(a)	Septic system	Removed from the Module VIII of the Laboratory's HWFP, 12/23/98	NMED 1998, 063042
	SWMU 40-001(b)	Septic system	Under Investigation	Section 6.1
	AOC 40-002(a)	Container storage area SAA located inside building 40-0023	NFA Approved, 01/21/05	EPA 2005, 088464
	SWMU 40-005	Sump	Under Investigation	Section 6.2
	AOC 40-007(e)	Storage area	Under Investigation	Section 6.3
TA-50				
	AOC C-50-001	Transformer	Under Investigation	Section 7.1
TA-59				
	SWMU 59-001	Decommissioned septic system	NFA Approved, 5/2/01	NMED 2007, 070010
	AOC 59-002	Container storage area	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 59-003	Sump	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 59-004	Outfall	Under Investigation	Section 8.1
	AOC C-59-001	Transformer	Under Investigation	Section 8.2
TA-64				
	AOC 64-001	Storage area	NFA Approved, 01/21/05	EPA 2005, 088464
TA-69				
	SWMU 69-001	Twomile incinerator facility	Under Investigation	Section 9.1
	AOC 69-002(a)	Septic system	NFA Approved, 01/21/05	EPA 2005, 088464
	AOC 69-002(b)	Septic system	NFA Approved, 01/21/05	EPA 2005, 088464

Note: Shading denotes approved for NFA or complete with controls.

Table 2.0-1
Summary of Samples Collected and Analyses Requested at TA-03 Sites

Sample ID	Location ID	Depth (ft)	Media	Metals	VOCs	SVOCs	TPH-DRO
Consolidated Unit 03-052(a)-00							
RE03-02-45102	03-02-19564	0.0–0.17	Soil	734S[a]	—[b]	734S	734S
RE03-02-45093	03-02-19564	0.58–0.75	Soil	734S	—	734S	734S
RE03-02-45103	03-02-19565	0.0–0.17	Soil	734S	—	734S	734S
RE03-02-45094	03-02-19565	0.42–0.58	Soil	734S	—	734S	734S
RE03-02-45104	03-02-19566	0.0–0.17	Soil	734S	—	734S	734S
RE03-02-45095	03-02-19566	0.83–1.08	Soil	734S	734S	734S	734S
RE03-02-45105	03-02-19567	0.0–0.17	Soil	734S	—	734S	734S
RE03-02-45096	03-02-19567	1.0–1.17	Soil	734S	—	734S	734S
RE03-02-45106	03-02-19568	0.0–0.17	Soil	734S	—	734S	734S
RE03-02-45097	03-02-19568	0.83–1.0	Soil	734S	—	734S	734S
RE03-02-45107	03-02-19569	0.0–0.17	Soil	734S	—	734S	734S
RE03-02-45098	03-02-19569	0.67–0.83	Soil	734S	734S	734S	734S
RE03-02-45108	03-02-19570	0.0–0.17	Soil	734S	—	734S	734S
RE03-02-45099	03-02-19570	0.17–0.33	Soil	734S	—	734S	734S
RE03-02-45109	03-02-19571	0.0–0.17	Soil	734S	—	734S	734S
RE03-02-45100	03-02-19571	1.5–1.7	Soil	734S	—	734S	734S
RE03-02-45110	03-02-19572	0.0–0.17	Soil	734S	—	734S	734S
RE03-02-45101	03-02-19572	0.67–0.83	Soil	734S	734S	734S	734S

[a] Request numbers.

[b] — = Analysis not requested.

Table 2.0-2
Inorganic Chemicals above BVs at TA-03

Sample ID	Location ID	Depth (ft)	Media	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Cobalt
Soil BV[a]				**0.83**	**8.17**	**1.83**	**0.4**	**19.3**	**8.64**
Consolidated Unit 03-052(a)-00									
RE03-02-45102	03-02-19564	0.0–0.17	Soil	—[b]	—	—	—	27.7 (J)	—
RE03-02-45093	03-02-19564	0.58–0.75	Soil	1.2	—	—	0.49	19.6 (J)	—
RE03-02-45103	03-02-19565	0.0–0.17	Soil	0.98	—	—	0.72	—	—
RE03-02-45094	03-02-19565	0.42–0.58	Soil	—	—	—	0.69	—	—
RE03-02-45104	03-02-19566	0.0–0.17	Soil	—	—	—	0.51	23.8 (J)	9.4
RE03-02-45095	03-02-19566	0.83–1.08	Soil	0.88	—	—	—	39.6 (J)	—
RE03-02-45105	03-02-19567	0.0–0.17	Soil	—	—	—	0.5	—	—
RE03-02-45096	03-02-19567	1.0–1.17	Soil	—	—	—	0.73	20.5 (J)	—
RE03-02-45106	03-02-19568	0.0–0.17	Soil	—	—	—	—	—	—
RE03-02-45097	03-02-19568	0.83–1.0	Soil	—	—	—	—	20.2 (J)	—
RE03-02-45107	03-02-19569	0.0–0.17	Soil	—	—	—	0.59	—	—
RE03-02-45098	03-02-19569	0.67–0.83	Soil	—	—	—	—	—	—
RE03-02-45108	03-02-19570	0.0–0.17	Soil	0.92	—	—	1.1	32.3 (J)	—
RE03-02-45099	03-02-19570	0.17–0.33	Soil	1.0	—	—	1.0	28.3 (J)	—
RE03-02-45109	03-02-19571	0.0–0.17	Soil	1.1	8.6	—	1.3	—	—
RE03-02-45100	03-02-19571	1.5–1.7	Soil	1.0	—	—	0.59	34.2 (J)	—
RE03-02-45110	03-02-19572	0.0–0.17	Soil	—	—	—	1.2	29.9 (J)	—
RE03-02-45101	03-02-19572	0.67–0.83	Soil	—	—	3.1 (J)	1.6	60.5 (J)	—

Table 2.0-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Copper	Lead	Mercury	Nickel	Silver	Zinc
Soil BV				**14.7**	**22.3**	**0.1**	**15.4**	**1**	**48.8**
Consolidated Unit 03-052(a)-00									
RE03-02-45102	03-02-19564	0.0–0.17	Soil	120	23.6 (J-)	—	44.2 (J)	—	198
RE03-02-45093	03-02-19564	0.58–0.75	Soil	121	62.3 (J-)	—	—	—	246
RE03-02-45103	03-02-19565	0.0–0.17	Soil	67.1	39.7 (J-)	—	—	—	476
RE03-02-45094	03-02-19565	0.47–0.58	Soil	65.1	57.5 (J-)	—	—	3.6	391
RE03-02-45104	03-02-19566	0.0–0.17	Soil	211	80.8 (J-)	—	17.8 (J)	—	307
RE03-02-45095	03-02-19566	0.83–1.08	Soil	108	99.9 (J-)	—	27.6 (J)	—	125
RE03-02-45105	03-02-19567	0.0–0.17	Soil	27.4	27.2 (J-)	—	—	—	330
RE03-02-45096	03-02-19567	1.0–1.17	Soil	71.1	47.2 (J-)	—	—	—	360
RE03-02-45106	03-02-19568	0.0–0.17	Soil	17.8	22.6 (J-)	—	—	—	138
RE03-02-45097	03-02-19568	0.83–1.0	Soil	197	40.6 (J-)	—	—	—	130
RE03-02-45107	03-02-19569	0.0–0.17	Soil	30.3	52.2 (J-)	—	—	—	218
RE03-02-45098	03-02-19569	0.67–0.83	Soil	—	27.7 (J-)	—	—	—	63.2
RE03-02-45108	03-02-19570	0.0–0.17	Soil	67.4	91.8 (J-)	—	16.4 (J)	1.3	400
RE03-02-45099	03-02-19570	0.17–0.33	Soil	60.4	89.5 (J-)	—	15.8 (J)	1.4	284
RE03-02-45109	03-02-19571	0.0–0.17	Soil	135	52.1 (J-)	—	—	1.1	825
RE03-02-45100	03-02-19571	1.5–1.7	Soil	254	97.9 (J-)	—	—	—	265
RE03-02-45110	03-02-19572	0.0–0.17	Soil	71.4	84.1 (J-)	0.11	—	1.7	431
RE03-02-45101	03-02-19572	0.67–0.83	Soil	106	168 (J-)	0.18	20.7 (J)	1.9	497

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL 1998, 059730.

[b] — = Result was not detected or was below the BV.

Table 2.0-3
Organic Chemicals Detected at TA-03

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	Anthracene	Aroclor 1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	Chrysene	Di-n-octylphthalate	Dibenz(a,h)anthracene
Consolidated Unit 03-052(a)-00																		
RE03-02-45102	03-02-19564	0.0–0.17	Soil	17	0.72 (J)	17	NA[a]	38	42 (J)	51 (J)	8.3 (J)	40 (J)	—[b]	1.1 (J)	—	46	—	3.9
RE03-02-45093	03-02-19564	0.58–0.75	Soil	49	1.5 (J)	61	NA	110	110	74	29	56	—	—	—	120	—	17
RE03-02-45103	03-02-19565	0.0–0.17	Soil	30	1.4 (J)	37	NA	100	110	110	25 (J)	100	—	2.4 (J)	—	130	10 (J)	15
RE03-02-45094	03-02-19565	0.42–0.58	Soil	45	3 (J)	52	NA	170	190	160	39 (J)	150	0.98 (J)	4.7	—	220	—	21
RE03-02-45104	03-02-19566	0.0–0.17	Soil	79	4.3	81	NA	220	260	240	57 (J)	190	1.3 (J)	—	—	280	—	31
RE03-02-45095	03-02-19566	0.83–1.08	Soil	24	—	31	NA	50	49	52	23	26	—	—	—	57	—	12
RE03-02-45105	03-02-19567	0.0–0.17	Soil	23	1.3 (J)	23	NA	57	65 (J)	66	14 (J)	54	—	—	—	79	7.8 (J)	6
RE03-02-45096	03-02-19567	1.0–1.17	Soil	52	3 (J)	60	NA	190	200	170	41 (J)	140	1.2 (J)	—	5.8	240	—	24
RE03-02-45106	03-02-19568	0.0–0.17	Soil	13	0.88 (J)	15	NA	45	52 (J)	63	11 (J)	50 (J)	—	—	—	56	—	3.2 (J)
RE03-02-45097	03-02-19568	0.83–1.0	Soil	3.5 (J)	—	4.1	NA	12	14 (J)	15 (J)	3.7 (J)	15 (J)	—	—	—	15	—	1.5 (J)
RE03-02-45107	03-02-19569	0.0–0.17	Soil	4.5	—	5.6	NA	14	17	19	2.7 (J)	20	—	—	—	18	—	1.1 (J)
RE03-02-45098	03-02-19569	0.67–0.83	Soil	—	—	—	NA	1.7 (J)	2.1 (J)	2.1 (J)	—	2.3 (J)	—	—	—	2.3 (J)	—	—
RE03-02-45108	03-02-19570	0.0–0.17	Soil	19	1.1 (J)	23	NA	58	70	63	15 (J)	59	—	—	—	79	—	6.4
RE03-02-45099	03-02-19570	0.17–0.33	Soil	6.1	—	8.8	NA	26	30 (J)	31 (J)	7.9 (J)	30 (J)	—	—	—	31	—	4.2
RE03-02-45109	03-02-19571	0.0–0.17	Soil	6.1	—	6.4	NA	18	22	25	5.2	19	—	—	—	24	—	1.9 (J)
RE03-02-45100	03-02-19571	1.5–1.7	Soil	24	—	30	NA	52	55 (J)	61 (J)	14 (J)	47 (J)	—	—	0.97 (J)	61	—	7.9
RE03-02-45110	03-02-19572	0.0–0.17	Soil	10	—	13	NA	35	42	58	6.4	36	—	—	—	48	—	—
RE03-02-45101	03-02-19572	0.67–0.83	Soil	14	—	18	NA	42	49 (J)	64 (J)	10 (J)	48 (J)	—	1.2 (J)	—	53	—	5.8

Table 2.0-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dibenzofuran	Dimethylphenol[2,4-]	Ethylbenzene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	TPH-DRD	Trichloroethane[1,1,1-]	Trichloroethene	Xylene (Total)
Consolidated Unit 03-052(a)-00																		
RE03-02-45102	03-02-19564	0.0–0.17	Soil	8.5	—	NA	120	15	12 (J)	6	—	18	110	98	580	NA	NA	NA
RE03-02-45093	03-02-19564	0.58–0.75	Soil	24	1 (J)	NA	300	42	38	17	1.9 (J)	50	300	250	2800	NA	NA	NA
RE03-02-45103	03-02-19565	0.0–0.17	Soil	11	—	NA	250	21	34 (J)	4.5 (J)	—	8.3	190	190	1800	NA	NA	NA
RE03-02-45094	03-02-19565	0.42–0.58	Soil	15	—	NA	430	32	54 (J)	11	—	23	330	390	5600	NA	NA	NA
RE03-02-45104	03-02-19566	0.0–0.17	Soil	24	1.1 (J)	NA	560	49	130	20	1.3 (J)	46	420	470	3500	NA	NA	NA
RE03-02-45095	03-02-19566	0.83–1.08	Soil	13	—	—	150	22	29	7.3	—	21	150	110	2300	0.0048 (J)	0.00077 (J)	—
RE03-02-45105	03-02-19567	0.0–0.17	Soil	10	—	NA	150	19	18 (J)	6.3	—	13	130	130	2000	NA	NA	NA
RE03-02-45096	03-02-19567	1.0–1.17	Soil	17	—	NA	440	35	56 (J)	12	—	24	340	400	2300	NA	NA	NA
RE03-02-45106	03-02-19568	0.0–0.17	Soil	4.5	—	NA	110	9.7	14 (J)	3.1 (J)	—	7.4	79	90	340	NA	NA	NA
RE03-02-45097	03-02-19568	0.83–1.0	Soil	1.1 (J)	—	NA	35	2.4 (J)	4.8 (J)	0.92 (J)	—	2.2 (J)	22	27	460	NA	NA	NA
RE03-02-45107	03-02-19569	0.0–0.17	Soil	1.6 (J)	—	NA	38	3.3 (J)	4 (J)	0.89 (J)	—	2.2 (J)	27	27	—	NA	NA	NA
RE03-02-45098	03-02-19569	0.67–0.83	Soil	—	—	0.00096 (J)	5.2	—	—	—	—	—	2.9 (J)	4	—	—	—	0.002 (J)
RE03-02-45108	03-02-19570	0.0–0.17	Soil	7.5	—	NA	160	15	20 (J)	3.5 (J)	—	7.4	120	120	810	NA	NA	NA
RE03-02-45099	03-02-19570	0.17–0.33	Soil	2.1 (J)	—	NA	62	4.7	11 (J)	1 (J)	—	2.4 (J)	43	60	620	NA	NA	NA
RE03-02-45109	03-02-19571	0.0–0.17	Soil	2.2 (J)	—	NA	46	4.4	7.4	1.5 (J)	—	3.9	34	35	—	NA	NA	NA
RE03-02-45100	03-02-19571	1.5–1.7	Soil	12	—	NA	140	20	19 (J)	7.4	—	23	140	110	1600	NA	NA	NA
RE03-02-45110	03-02-19572	0.0–0.17	Soil	3.8 (J)	—	NA	89	7.6	9.7	2.4 (J)	—	6.2	69	83	740	NA	NA	NA
RE03-02-45101	03-02-19572	0.67–0.83	Soil	5.5	—	—	120	11	14 (J)	2.9 (J)	—	7.6	98	100	2000	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] NA = Not analyzed.

[b] — = Result was not detected.

Table 3.0-1
Summary of Samples Collected and Analyses Requested at TA-06

Sample ID	Location ID	Depth (ft)	Media	Metals	VOCs	High Explosives	Gamma Spectroscopy	Isotopic Uranium	Tritium	Strontium-90
SWMU 06-002										
0506-95-1200	06-08001	0.0–0.5	Soil	317[a]	—[b]	315	—	—	316	—
0506-95-1202	06-08001	2.83–3.17	Soil	317	314	315	—	—	—	—
0506-95-1203	06-08002	0.0–0.5	Soil	317	—	315	—	—	—	—
0506-95-1204	06-08002	2.58–3.17	Soil	317	314	315	—	—	—	—
0506-95-1205	06-08003	0.0–0.5	Soil	317	—	315	—	—	—	—
0506-95-1206	06-08003	3.0–3.33	Soil	317	314	315	—	—	—	—
RE06-98-0001	06-08003	5.17–5.67	Soil	4363R	—	4362R[c]	—	—	—	—
RE06-98-0002	06-08003	7.5–8.0	Qbt 3	4363R[d]	—	4362R[c]	—	—	—	—
RE06-98-0003	06-08060	0.0–0.5	Soil	4363R	—	4362R	—	—	—	—
RE06-98-0004	06-08060	4.25–4.5	Soil	4363R	4361R	4362R	—	—	—	—
RE06-98-0006	06-08061	0.0–0.5	Soil	4363R	—	4362R	—	—	—	—
RE06-98-0007	06-08061	4.25–4.5	Soil	4363R	4361R	4362R	—	—	—	—
SWMU 06-003(a)										
0506-97-0001	06-04001	0.0–0.33	Soil	3044R	—	3043R	3045R	3045R	—	3045R
AOC C-06-001										
0506-95-1207	06-08004	0.0–0.5	Soil	317	—	315	—	—	—	—
0506-95-1208	06-08004	2.33–2.5	Soil	317	—	315	—	—	—	—
0506-95-1209	06-08005	0.0–0.5	Soil	317	—	315	—	—	—	—
RE06-98-0032	06-08005	0.0–0.5	Soil	4341R	—	4342R	—	—	—	—
0506-95-1210	06-08005	3.83–4.33	Soil	317	—	315	—	—	—	—
RE06-98-0033	06-08005	4.17–4.83	Soil	4341R	—	—	—	—	—	—

Table 3.0-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Metals	VOCs	High Explosives	Gamma Spectroscopy	Isotopic Uranium	Tritium	Strontium-90
0506-95-1211	06-08006	0.0–0.5	Soil	317	—	315	—	—	—	—
RE06-98-0035	06-08006	0.0–0.5	Soil	4341R	—	4342R	—	—	—	—
0506-95-1212	06-08006	0.83–1.25	Soil	317	—	315	—	—	—	—
RE06-98-0036	06-08006	2.17–2.83	Soil	4341R	—	—	—	—	—	—
AOC C-06-005										
0506-95-1219	06-08010	0.0–0.5	Soil	317	—	315	—	—	316	—
RE06-98-0017	06-08010	0.0–0.5	Soil	4365R[e]	—	—	—	—	—	—
0506-95-1220	06-08010	3.0–3.33	Soil	317	314	315	—	—	—	—
RE06-98-0018	06-08010	10.08–12.58	Soil	4365R[e]	—	—	—	—	—	—
0506-95-1221	06-08011	0.0–0.5	Soil	317	—	315	—	—	—	—
0506-95-1222	06-08011	3.0–3.33	Soil	317	314	315	—	—	—	—
0506-95-1223	06-08012	0.0–0.5	Soil	317	—	315	—	—	—	—
0506-95-1225	06-08012	2.67–3.17	Soil	317	314	315	—	—	—	—

[a] Request numbers.

[b] — = Analysis not requested.

[c] Sample analyzed for PETN only.

[d] Sample analyzed for antimony only.

[e] Sample analyzed for antimony, cadmium, and silver only.

Table 3.0-2
Inorganic Chemicals Detected above BVs at TA-06

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Sodium	Thallium	Vandadium	Zinc
Soil/Fill BV[a]				**29200**	**0.83**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**671**	**0.1**	**15.4**	**1**	**915**	**0.73**	**39.6**	**48.8**
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**482**	**0.1**	**6.58**	**1**	**2770**	**1.1**	**17**	**63.5**
SWMU 06-002																						
0506-95-1200	06-08001	0.0–0.5	Soil	—[b]	—	—	—	1.2	—	—	23.3	—	—	—	4030	—	—	—	—	—	—	—
0506-95-1202	06-08001	2.83–3.17	Soil	—	—	—	—	1.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0506-95-1203	06-08002	0.0–0.5	Soil	—	—	—	—	0.5 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0506-95-1204	06-08002	2.58–3.17	Soil	—	—	—	—	1.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0506-95-1205	06-08003	0.0–0.5	Soil	—	—	—	—	0.81	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0506-95-1206	06-08003	3.0–3.33	Soil	—	—	511	—	1.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE06-98-0001	06-08003	5.17–5.67	Soil	—	—	—	—	—	—	—	—	—	—	—	—	NA	—	—	—	0.8 (J)	—	—
RE06-98-0004	06-08060	4.25–4.5	Soil	—	—	—	—	—	—	—	—	—	—	—	718	—	—	—	—	1.1	—	—
RE06-98-0007	06-08061	4.25–4.5	Soil	—	—	318	—	—	—	—	—	—	—	—	—	—	—	—	—	1.3	—	—
SWMU 06-003(a)																						
0506-97-0001	06-04001	0.0–0.33	Soil	—	28.4 (U)	—	2.27 (U)	2.84 (U)	21400	—	—	43.3	—	44.8	—	0.24 (U)	—	2.84 (U)	1570 (J)	1.14 (U)	40.8	112
AOC C-06-001																						
0506-95-1207	06-08004	0.0–0.5	Soil	—	—	—	—	0.87	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0506-95-1209	06-08005	0.0–0.5	Soil	—	—	—	—	1.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE06-98-0032	06-08005	0.0–0.5	Soil	NA	—	NA	NA	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0506-95-1210	06-08005	3.83–4.33	Soil	—	—	—	—	0.45 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0506-95-1211	06-08006	0.0–0.5	Soil	—	—	—	—	1.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0506-95-1212	06-08006	0.83–1.25	Soil	—	—	—	—	0.66	—	—	—	—	—	—	—	—	—	—	—	—	—	—
AOC C-06-005																						
0506-95-1219	06-08010	0.0–0.5	Soil	—	—	—	—	0.9	—	—	9.2	—	—	23.8 (J+)	—	—	—	—	—	—	—	—
0506-95-1220	06-08010	3.0–3.33	Soil	—	—	—	—	1.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
0506-95-1221	06-08011	0.0–0.5	Soil	—	—	349	—	1.1	—	50.8	—	206	—	786 (J+)	—	—	17.8	—	—	—	—	1260
0506-95-1222	06-08011	3.0–3.33	Soil	43000	—	498	—	1.7	—	—	16	—	24400	39.4 (J+)	1080	—	19.6	—	—	—	—	—
0506-95-1223	06-08012	0.0–0.5	Soil	—	—	—	—	1.1	—	20.9	—	16.8	—	84.7 (J+)	—	—	—	—	—	—	—	191
0506-95-1225	06-08012	2.67–3.17	Soil	41800	—	469	—	—	—	—	—	—	—	—	—	—	15.5	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL 1998, 059730.

[b] — = Result was not detected or was below the BV.

Table 3.0-3
Organic Chemicals Detected at TA-06

Sample ID	Location ID	Depth (ft)	Media	Acetone	RDX	Toluene	Trinitrotoluene[2,4,6-]
SWMU 06-002							
0506-95-1202	06-08001	2.83–3.17	Soil	0.005 (J)	—[a]	0.006 (J)	—
0506-95-1206	06-08003	3.0-3.33	Soil	—	—	0.004 (J)	—
SWMU 06-003(a)							
0506-97-0001	06-04001	0.0–0.33	Soil	NA[b]	0.485	NA	0.498
AOC C-06-005							
0506-95-1220	06-08010	3.0–3.33	Soil	—	—	0.005 (J)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] — = Not detected.

[b] NA = Not analyzed.

Table 3.0-4
Radionuclides Detected or Detected above BVs/FVs at TA-06

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Sodium-22	Uranium-234	Uranium-238
Soil BV/FV[a]				**0.013**	**1.65**	**na[b]**	**2.59**	**2.29**
SWMU 06-003(a)								
0506-97-0001	06-04001	0.0–0.33	Soil	0.14	7.33	0.126	3.67	4.22

Note: Units are pCi/g.

[a] BVs/FVs from LANL 1998, 059730.

[b] na = Not available.

Table 4.0-1
Summary of Samples Collected and Analyses Requested at Former TA-07

Sample ID	Location ID	Depth (ft)	Media	SVOCs	High Explosives
SWMU 07-001(a)					
0507-96-0029	07-04041	0.0–0.5	Soil	1906*	1907
0507-96-0030	07-04041	2.75–3.0	Soil	1906	1907
0507-96-0031	07-04042	0.0–0.50	Soil	1906	1907
0507-96-0032	07-04042	2.33–3.0	Soil	1906	1907
0507-96-0033	07-04043	0.0–0.5	Soil	1906	1907
0507-96-0034	07-04043	2.33–3.0	Soil	1906	1907
0507-96-0035	07-04044	0.0–0.5	Soil	1906	1907
0507-96-0036	07-04044	2.5–3.17	Soil	1906	1907
0507-96-0037	07-04045	0.0–0.5	Soil	1906	1907
0507-96-0038	07-04045	2.5–3.17	Soil	1906	1907
0507-96-0039	07-04046	0.0–0.5	Soil	1906	1907
0507-96-0041	07-04046	2.5–3.17	Soil	1906	1907
SWMU 07-001(b)					
0507-96-0042	07-04047	0.0–0.5	Soil	1906	1907
0507-96-0043	07-04047	2.5–3.17	Soil	1906	1907
0507-96-0044	07-04048	0.0–0.5	Soil	1906	1907
0507-96-0045	07-04048	2.5–3.17	Soil	1906	1907
0507-96-0046	07-04049	0.0–0.5	Soil	1906	1907
0507-96-0047	07-04049	2.5–3.17	Soil	1906	1907
0507-96-0048	07-04050	0.0–0.5	Soil	1906	1907
0507-96-0049	07-04050	2.5–3.17	Soil	1906	1907
0507-96-0050	07-04051	0.0–0.5	Soil	1906	1907
0507-96-0051	07-04051	2.58–3.25	Soil	1906	1907
0507-96-0052	07-04052	0.0–0.5	Fill	1906	1907
0507-96-0053	07-04052	2.58–3.25	Fill	1906	1907

* Request number.

Table 4.0-2
Organic Chemicals Detected at Former TA-07

Sample ID	Location ID	Depth (ft)	Media	Benzo(a)anthracene	Benzo(k)fluoranthene	Benzoic Acid	Chloronaphthalene[2-]	Di-n-octylphthalate	Dichlorobenzene[1,2-]	Dichlorobenzene[1,3-]
SWMU 07-001(a)										
0507-96-0033	07-04043	0.0–0.5	Soil	—*	—	0.187 (J)	—	—	—	—
SWMU 07-001(b)										
0507-96-0042	07-04047	0.0–0.5	Soil	0.055 (J)	0.08 (J)	—	0.267 (J)	0.12 (J)	0.32 (J)	0.312 (J)
0507-96-0043	07-04047	2.5–3.17	Soil	—	—	—	—	—	—	—
0507-96-0044	07-04048	0.0–0.5	Soil	—	—	—	—	—	—	—
0507-96-0045	07-04048	2.5–3.17	Soil	—	—	—	—	—	—	—
0507-96-0046	07-04049	0.0–0.5	Soil	—	—	—	—	—	—	—
0507-96-0048	07-04050	0.0–0.5	Soil	—	—	—	—	—	—	—
0507-96-0052	07-04052	0.0–0.5	Fill	—	—	—	—	—	—	—

Table 4.0-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Diethylphthalate	Hexachlorobenzene	Phenanthrene	Pyrene	RDX	Tetryl	Trichlorobenzene[1,2,4-]
SWMU 07-001(a)										
0507-96-0033	07-04043	0.0–0.5	Soil	—	—	—	—	—	—	—
SWMU 07-001(b)										
0507-96-0042	07-04047	0.0–0.5	Soil	—	0.268 (J)	0.14 (J)	0.188 (J)	—	—	0.368 (J)
0507-96-0043	07-04047	2.5–3.17	Soil	—	—	—	—	—	1.5	—
0507-96-0044	07-04048	0.0–0.5	Soil	—	—	—	—	1.0	—	—
0507-96-0045	07-04048	2.5–3.17	Soil	—	—	—	—	1.0	—	—
0507-96-0046	07-04049	0.0–0.5	Soil	—	—	—	—	1.0	—	—
0507-96-0048	07-04050	0.0–0.5	Soil	—	—	—	—	1.0	—	—
0507-96-0052	07-04052	0.0–0.5	Fill	0.041 (J)	—	—	—	1.0	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

* — = Result was not detected.

Table 5.0-1
Summary of Samples Collected and Analyses Requested at TA-22

Sample ID	Location ID	Depth (ft)	Media	Metals	Cyanide	VOCs	SVOCs	High Explosives
SWMU 22-010(a)								
0522-97-0001	22-06061	4.33–5.0	Soil	3050R[a]	—[b]	3049R	3049R	3051R
0522-97-0002	22-06061	7.33–8.0	Soil	3050R	—	3049R	3049R	3051R
0522-97-0003	22-06062	3.0–3.67	Soil	3050R	—	3049R	3049R	3051R
0522-97-0004	22-06062	6.0–6.67	Soil	3050R	—	3049R	3049R	3051R
0522-97-0005	22-06063	4.83–5.5	Soil	3050R	—	3049R	3049R	3051R
0522-97-0006	22-06063	7.0–7.67	Soil	3050R	—	3049R	3049R	3051R
SWMU 22-015(a)								
0522-97-0010	22-06064	27.67–28.5	Soil	3074R	3074R	3073R	—	3075R
0522-97-0011	22-06064	29.0–30.0	Sed	3074R	3074R	3073R	—	3075R
0522-97-0014	22-06065	20.5–21.5	Sed	3074R	3074R	3073R	—	3075R
0522-97-0015	22-06065	23.0–24.0	Sed	3074R	3074R	3073R	—	3075R
SWMU 22-015(b)								
0522-97-0021	22-03024	0.0–0.5	Soil	—	—	3081R	—	3082R
0522-97-0022	22-03024	3.0–3.5	Soil	—	—	3081R	—	3082R
0522-97-0023	22-03024	3.5–4.0	Soil	—	—	3081R	—	3082R
0522-97-0018	22-03027	0.0–0.5	Soil	—	—	3081R	—	3082R
0522-97-0019	22-03027	3.5–4.5	Soil	—	—	3081R	—	3082R
0522-97-0020	22-03027	7.0–7.5	Qbt 4	—	—	3081R	—	3082R
0522-97-0024	22-06066	0.0–0.5	Sed	—	—	3081R	—	3082R
0522-97-0025	22-06066	1.33–2.0	Soil	—	—	3081R	—	3082R
0522-97-0026	22-06067	0.0–0.5	Sed	—	—	3081R	—	3082R
0522-97-0027	22-06067	2.0–2.67	Soil	—	—	3081R	—	3082R
0522-97-0028	22-06068	0.0–0.5	Sed	—	—	3081R	—	3082R
0522-97-0029	22-06068	0.67–1.33	Qbt 4	—	—	3081R	—	3082R

[a] Request numbers.

[b] — = Analysis not requested.

Table 5.0-2
Inorganic Chemicals above BVs at TA-22

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Cobalt	Copper	Manganese	Selenium	Silver
Soil BV[a]				**0.83**	**295**	**0.4**	**8.64**	**14.7**	**671**	**1.52**	**1**
Sediment BV[a]				**0.83**	**127**	**0.4**	**4.73**	**11.2**	**543**	**0.3**	**1**
SWMU 22-010(a)											
0522-97-0001	22-06061	4.33–5.0	Soil	5.8 (U)	—[b]	0.58 (U)	—	—	—	—	—
0522-97-0002	22-06061	7.33–8.0	Soil	6.49 (U)	—	0.649 (U)	—	—	—	—	—
0522-97-0003	22-06062	3.0–3.67	Soil	6 (U)	—	0.6 (U)	—	—	—	—	—
0522-97-0004	22-06062	6.0–6.67	Soil	5.61 (U)	—	0.561 (U)	26.9	—	1320 (J+)	—	—
0522-97-0005	22-06063	4.83–5.5	Soil	6.92 (U)	374	0.692 (U)	12.4	—	1360 (J+)	—	—
0522-97-0006	22-06063	7.0–7.67	Soil	6.51 (U)	—	0.651 (U)	—	—	—	—	—
SWMU 22-015(a)											
0522-97-0010	22-06064	27.67–28.5	Soil	4.9 (U)	—	0.83 (U)	—	122	—	—	—
0522-97-0011	22-06064	29.0–30.0	Sed	4.9 (U)	—	0.83 (U)	—	—	—	0.88 (U)	1.6 (J)
0522-97-0014	22-06065	20.5–21.5	Sed	5 (U)	—	0.91 (J)	—	126	—	0.89 (U)	—
0522-97-0015	22-06065	23.0–24.0	Sed	4.9 (U)	—	0.82 (U)	—	127	—	0.87 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs from LANL 1998, 059730.

[b] — = Result was not detected or was below the BV.

Table 5.0-3
Organic Chemicals Detected at TA-22

Sample ID	Location ID	Depth (ft)	Media	Acetone	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Methylene Chloride	Tetryl	Toluene	Trichlorofluoromethane
SWMU 22-010(a)										
0522-97-0001	22-06061	4.33–5.0	Soil	—[a]	—	—	0.003 (J)	—	—	0.003 (J)
0522-97-0002	22-06061	7.33–8.0	Soil	—	—	—	0.003 (J)	—	—	0.002 (J)
0522-97-0003	22-06062	3.0–3.67	Soil	—	0.47	—	0.003 (J)	—	—	0.002 (J)
0522-97-0004	22-06062	6.0–6.67	Soil	—	0.76	—	0.003 (J)	—	—	0.002 (J)
0522-97-0005	22-06063	4.83–5.5	Soil	—	—	—	0.006	—	—	0.008
0522-97-0006	22-06063	7.0–7.67	Soil	—	—	—	0.005	—	—	0.006
SWMU 22-015(a)										
0522-97-0011	22-06064	29.0–30.0	Sed	0.026	NA[b]	—	—	—	—	—
0522-97-0014	22-06065	20.5–21.5	Sed	0.008 (J)	NA	—	—	—	—	—
SWMU 22-015(b)										
0522-97-0023	22-03024	3.5–4.0	Soil	—	NA	—	—	—	0.0068 (J)	—
0522-97-0028	22-06068	0.0–0.5	Sed	—	NA	—	—	0.428	—	—
0522-97-0029	22-06068	0.67–1.33	Qbt 4	—	NA	5.83	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] — = Not detected.

[b] NA = Not analyzed.

Table 6.0-1
Summary of Samples Collected and Analyses Requested at TA-40

Sample ID	Location ID	Depth (ft)	Media	VOCs	High Explosives
SWMU 40-005					
0540-96-0001	40-03048	0.0–0.5	Soil	1915[a]	1917
0540-96-0002	40-03048	4.58–5.25	Soil	1915	1917
0540-96-0003	40-03048	7.5–8.17	Soil	1915	1917
0540-96-0004	40-03049	0.0–0.5	Soil	1915	1917
0540-96-0005	40-03049	4.67–5.17	Soil	1915	1917
0540-96-0006	40-03049	7.5–8.0	Soil	1915	1917
0540-96-0007	40-03050	0.0–0.5	Soil	1915	1917
0540-96-0008	40-03050	4.67–5.33	Soil	1915	1917
0540-96-0009	40-03050	7.0–7.5	Soil	1915	1917
0540-96-0010	40-03051	0.0–0.5	Soil	1915	1917
0540-96-0011	40-03051	4.67–5.33	Soil	1915	1917
0540-96-0012	40-03051	7.33–8.0	Soil	1915	1917
0540-96-0013	40-03052	0.0–0.5	Soil	1915	1917
0540-96-0014	40-03052	4.5–5.0	Soil	1915	1917
0540-96-0015	40-03052	7.5–8.0	Soil	1915	1917
0540-96-0017	40-03053	0.0–0.5	Soil	—[b]	1917
0540-96-0018	40-03054	0.0–0.5	Soil	—	1917
0540-96-0019	40-03055	0.0–0.5	Soil	—	1917
0540-96-0021	40-03056	0.0–0.5	Sed	1915	1917
0540-96-0022	40-03057	0.0–0.5	Sed	1915	1917
0540-96-0023	40-03058	0.0–0.5	Sed	1915	1917
0540-96-0024	40-03059	0.0–0.5	Sed	1915	1917
0540-96-0025	40-03060	0.0–0.5	Sed	1915	1917
0540-96-0026	40-03061	0.0–0.5	Sed	1915	1917

[a] Request number.

[b] — = Analysis not requested.

Table 6.0-2
Organic Chemicals Detected at TA-40

Sample ID	Location ID	Depth (ft)	Media	Acetone	Methylene Chloride
SWMU 40-005					
0540-96-0001	40-03048	0.0–0.5	Soil	0.006 (J-)	—*
0540-96-0002	40-03048	4.58–5.25	Soil	0.014 (J+)	—
0540-96-0003	40-03048	7.5–8.17	Soil	0.006 (J)	—
0540-96-0004	40-03049	0.0–0.5	Soil	0.01 (J)	—
0540-96-0005	40-03049	4.67–5.17	Soil	0.004 (J)	—
0540-96-0006	40-03049	7.5–8.0	Soil	0.004 (J-)	—
0540-96-0007	40-03050	0.0–0.5	Soil	0.021 (J)	0.004 (J)
0540-96-0008	40-03050	4.67–5.33	Soil	0.055	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

* — = Not detected.

Appendix A

Acronyms and Abbreviations,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS AND ABBREVIATIONS

AK	acceptable knowledge
AOC	area of concern
bgs	below ground surface
BH	borehole
BTEX	benzene, toluene, ethylbenzene, and xylene
BV	background value
CFR	code of Federal Regulations
CMR	Chemical and Metallurgical Research (building)
COPC	chemical of potential concern
DCA	1,2-dichloroethane
DCE	1,1-dichloroethene
DDE	dichlorophenyltrichloroethylene
DOE	Department of Energy (U.S.)
DRO	diesel range organic
EM	electromagnetic
EP	Environmental Programs Directorate
EPA	Environmental Protection Agency (U.S.)
FV	fallout value
HIR	historical investigation report
LANL	Los Alamos National Laboratory
MDA	material disposal area
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PBX	plastic-bonded explosive
PCB	polychlorinated biphenyl
PETN	pentaerythritol tetranitrate
PPE	personal protective equipment
ppm	part per million
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine

RFI	RCRA facility investigation
RLW	radioactive liquid waste
RLWTF	Radioactive Liquid Waste Treatment Facility
RSI	request for supplemental information
SAA	satellite accumulation area
SOP	standard operating procedure
SVOC	semivolatile organic compound
SWMU	solid waste management unit
SWSC	Sanitary Wastewater Systems Consolidated Plant
TA	technical area
TAL	target analyte list
TCA	trichloroethane
TCE	trichloroethene
TNT	2,4,6-trinitrotoluene
TPH	total petroleum hydrocarbons
UXO	unexploded ordnance
VCA	voluntary corrective action
VOC	volatile organic compound
WAC	waste acceptance criteria
WCSF	waste characterization strategy form
WWTP	wastewater treatment plant

A-2.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.0000394	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

A-3.0 DATA QUALIFIER DEFINITIONS

Data Qualifier	Definition
U	The analyte was analyzed for but not detected.
J	The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control (QA/QC) parameters.

Appendix B

Analytical Suites and Results
(on CD included with this document)