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Date: October 19, 2004
Refer To: ER2004-0598

RECEIVED
OCT 2004
NMED Hazardous
Waste Bureau

Mr. James Bearzi
NMED-Hazardous Waste Bureau
2905 Rodeo Park Drive East
Building 1
Santa Fe, NM 87505-6303

SUBJECT: RESPONSE TO THE NOTICE OF DISAPPROVAL FOR THE INVESTIGATION WORK PLAN FOR SOLID WASTE MANAGEMENT UNIT 21-018(a)-99, MATERIAL DISPOSAL AREA V, AT TECHNICAL AREA 21, LOS ALAMOS NATIONAL LABORATORY, NM8900010515

Dear Mr. Bearzi:

Enclosed please find two copies of the response of the Los Alamos National Laboratory (LANL) and the Department of Energy (DOE) to the New Mexico Environment Department's notice of disapproval of the "Investigation Work Plan for Solid Waste Management Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21," dated September 14, 2004, and received by the Risk Reduction and Environmental Stewardship–Remediation Services (RRES-RS) project office on September 20, 2004. A replacement page for NMED's notice of disapproval, dated September 29, 2004, was received on October 4, 2004. Also enclosed are two copies of replacement figures for the MDA V investigation work plan.

If you have any questions, please contact Becky Coel-Roback at 505-665-5011 or Woody Woodworth at 505-665-5820.

Sincerely,

David McInroy, Deputy Project Director
Remediation Services
Los Alamos National Laboratory

Sincerely,

David Gregory, Federal Project Director
Department of Energy
Los Alamos Site Operations

DM/DG/BCR/dwt

10784

Enclosures: 1. LANL's and DOE's responses to NMED's comments for the notice of disapproval for MDA V (ER2004-7358)
2. Replacement figures for the MDA V investigation work plan (ER2004-0278)

Cy:(w/enc)
A. Dorries, RRES-ECR, MS M992
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IM-9, MS A150
RPF MS M707
S-7, MS F674

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D. McInroy, RRES-RS, MS M992
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Response to the Notice of Disapproval for the Investigation Work Plan for Solid Waste Management Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21

INTRODUCTION

This submittal is the response by Los Alamos National Laboratory (LANL or the Laboratory) to the "Notice of Disapproval for the Investigation Work Plan for Solid Waste Management Unit (SWMU) 21-018(a)-99, Material Disposal Area V, at Technical Area 21," issued by the New Mexico Environment Department (NMED) Hazardous Waste Bureau on September 14, 2004. The *Investigation Work Plan for Solid Waste Management Unit (SWMU) 21-018(a)-99, Material Disposal Area V, at Technical Area 21* (LA-UR-04-3699) (LANL 2004, 87358) was submitted by LANL to NMED in June 2004.

To facilitate review of these responses, NMED's comments are included verbatim. The comments are divided into general and specific categories as presented by NMED. LANL's responses follow each NMED comment.

GENERAL COMMENTS

NMED Comment

1. *All figures must include pertinent features and structures, underground utilities, and existing well and borehole locations. This must include fence-lines and SWMU and AOC boundaries. For example, Figure 1.1-2 (Site map of consolidated SWMU 21-018(a)-99 and adjacent SWMUs/AOCs) does not depict the locations of pipes, drainlines, or the sump at SWMU 21-018(b) (Building 21-20). Figures in this Work Plan only show previous sample locations. All figures must distinguish between previous surface soil sample locations and borehole locations. The Permittees must ensure these changes are also reflected in the Investigation Report.*

LANL Response

1. LANL has added the requested features wherever applicable, and two copies of the replacement figures for the MDA V investigation work plan are included with this response. Figures 1.1-2, 2.5-1, 2.6-1 through -3, 4.2-1, 4.2-3, and 4.2-4 have been modified to include sumps, drainlines, and individual SWMU/area of concern (AOC) boundaries. Existing sample locations are included on all these figures, with the exception of Figure 1.1-2, where the purpose of the figure would be obscured by the additional information. Furthermore, LANL agrees it is important to distinguish between surface soil and borehole locations and has corrected all pertinent figures accordingly.

NMED Comment

2. *During a site visit on July 7, 2004 NMED observed that the best management practices (BMPs) located along the diversion ditch that runs between MDA - V and MDA B are not being properly maintained. According to Section 3.1.1 Surface Water, SWMU 21-013(b) and AOC 21-013(g) were given erosion scores of 67.0 in 1998, indicating a high potential for erosion. The NMED expects that BMPs be properly maintained to prevent stormwater from running onto the SWMU and AOC which could result in the migration of contaminants into BV Canyon.*

LANL Response

2. LANL has conducted an inspection of the best management practices performed in the area of Material Disposal Area (MDA) V and has begun repairs to ensure stormwater does not run onto SWMU 21-013(b) or AOC 21-013(g).

NMED Comment

3. *The proposed sampling plan appears to meet the requirements to determine the lateral and vertical extent of contamination only <u>within</u> the defined SWMU 21-018(a) boundary. The Permittees must determine the extent of contamination that has migrated <u>beyond</u> the SWMU/AOC boundaries, and if necessary, implement corrective action beyond the boundaries (40 CFR 264.101). Based on past and proposed sampling, the extent of contamination outside SWMU/AOC boundaries has not been defined; therefore, the Permittees must drill additional boreholes in the areas specified by the NMED. Three additional boreholes must be drilled within the boundary of MDA V. Additional surface soil samples must also be collected down-slope of SWMU 21-013(b) and AOC 21-013(g) and in the bottom of BV canyon. The attached map depicts the required additional sampling locations within MDA V.*

LANL Response

3. LANL proposes drilling a deep (380 ft) vertical borehole near the center of MDA V (see also the response to specific comment #2). LANL further proposes that the borehole located at the northwest corner of MDA V (formerly the deep-angled borehole) be a shallow (40 ft) vertical borehole. The borehole proposed by NMED at the west end of absorption bed 3 also would be a shallow vertical borehole. LANL further proposes eliminating the borehole between absorption beds 2 and 3, as proposed by NMED, because it is bounded by four existing boreholes (21-02520, 21-02521, 21-02523, and 21-02580) and by numerous proposed trench sample locations. Figure 1 depicts this revised sampling approach, which was discussed with NMED personnel during phone conversations conducted on October 8, and October 13, 2004 (K. Chamberlain, NMED-HWB, personal communication, October 2004).

   Surface soil sampling, as proposed in the MDA V investigation work plan, includes samples from 42 locations, 2 depths each, on the slope leading into BV canyon from the southern edge of MDA V. These proposed sampling locations are on a 50-ft grid covering the entire slope from the mesa edge to the bottom of the drainage in BV Canyon. Per the above-referenced phone conversations with NMED personnel, this proposed sampling approach meets the NMED requirement to sample beyond the SWMU boundary. (K. Chamberlain, NMED-HWB, personal communication, October 2004).

SPECIFIC COMMENTS

NMED Comment

1. *Section 2.4.1 Potential Contaminant Sources, page 5:*

   AOC C-21-015 should be considered as a potential contaminant source for SWMU 21-018(a)-99. In Section 2.3 (Relationship to Other SWMUs and AOCs) on page 4, AOC C-21-015 is listed as a former waste treatment laboratory (Building 21-45), which transferred waste to and from the DP laundry facility via steel piping, eventually discharging to MDA V. The building was removed in 1954. The TA-21 Operable Unit RFI Work Plan for Environmental Restoration, Volume III (LANL 1991,

07680), lists AOC C-21-015 (Building 21-45) as a safety training building. It also states that the building was demolished and underlying soils were removed down to tuff. The VCA Report for C-21-015 states that Building 21-45 was used as both a training facility and a waste treatment laboratory. There is conflicting documentation and there is no discussion as to whether the piping associated with Building 21-45 was removed. The Permittees must provide additional information regarding AOC C-21-015 (Building 21-45), including its use and associated removal activities.

LANL Response

1. As described in the *Voluntary Corrective Action (VCA) Completion Report for Solid Waste Management Unit 21-024(f) and Areas of Concern C-21-015 and 21-030* (LANL 2003, 83093), Building 21-45 was converted from a safety training facility to a waste treatment laboratory in 1949. This information was not available when the Technical Area (TA-) 21 operable unit Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan (LANL 1991, 07680) was written. Also as described in the VCA completion report, the underground piping associated with the former waste treatment laboratory (Building 21-45) was removed during the VCA. The piping that led from the AOCs to the laundry building was routed over DP Road with the overhead steam line, which no longer exists. No piping or any other infrastructure associated with the waste treatment facility remains in place.

   Because of an oversight, the reference to the VCA conducted from 2000 to 2002 at SWMU 21-024(f) and AOCs C-21-015 and 21-030 (LANL 2003, 83093) was omitted from the bullet describing AOC C-21-015 in section 2.3 (Relationship to Other SWMUs and AOCs). AOC C-21-015 was recommended for no further action (NFA) in the VCA completion report, which was approved by NMED.

NMED Comment

2. *Section 4.2.1 Borehole Sampling, page 15:*

   Based on "Earth Science Investigations for Environmental Restoration - Los Alamos National Laboratory, Technical Area 21 " (June 1995, LA-12934-MS), fractures have already been characterized at MDA V in TA-21. The proposed angled borehole may not define the extent of contamination if contamination above background values, fallout values, or detection limits is detected along the length or is still present at the total depth of the borehole. Angled boreholes may be useful in areas where there are several units located close together and access is limited. This is not the case at MDA V; therefore, the Permittees must drill a vertical borehole at the location of the proposed angled borehole and the additional boreholes discussed in general comment #3.

LANL Response

2. LANL will drill a deep (380 ft) vertical borehole instead of a deep angled borehole. However, the better location for a deep vertical borehole is more centrally located within MDA V, as shown in Figure 1 (BH-1). A shallow (40 ft) vertical borehole will be drilled at the location proposed by NMED for the deep vertical borehole (BH-15, Figure 1). See also the response to general comment #3.

NMED Comment

3. *Section 4.2.2 Surface and Shallow Subsurface Sampling, page 16:*

   If contamination is present at 10 feet below ground surface (bgs) (values above background levels or detection limits), samples must be collected at depths greater than 10 feet bgs in order to determine extent of contamination. The Permittees must provide the expected depth of the absorption beds. The diagrams provided indicate that the beds may be deeper than 10 ft bgs.

LANL Response

3. Based on available borehole logs, the depth to the base of the absorption beds ranges from 7.5 to 11.5 ft, with the average depth being less than 10 ft below ground surface (bgs). The proposed trench samples are intended as confirmation samples to be collected after the drainlines within MDA V are removed and, therefore, will be collected from just below the depth of the drainlines (approximately 10 ft bgs). Although LANL agrees that contamination from the absorption beds may exceed 10 ft bgs, collection of samples at depths greater than 10 ft bgs is more efficiently and safely conducted using a drill rig than a backhoe. The fifteen proposed and eight existing boreholes will be used to better define the vertical extent of contamination from MDA V.

NMED Comment

4. *Section 4.3.1 SWMU 21-018(a), page 17:*

   NMED Comment: It is premature to discuss risk assessment in this Work Plan. The Permittees are required to determine extent of residual contamination following remediation and to determine the potential for migration of contamination. A maximum excavation depth of 12 feet is appropriate for calculating risk; however, it may not be appropriate for cleanup should contamination exist below 12 feet. NMED suggests the Permittees adhere to Chapter VIII (Clean-up and Screening Levels) of the proposed Consent Order when proposing clean-up levels. NMED will determine if further action is warranted based on the results of the work contemplated in this Work Plan.

   Clarification is needed as to the depth of the absorption beds and where the removal of contaminated media will begin. It is not clear whether excavation will terminate at a depth 12 feet below the current ground surface or 12 feet below the start of absorption bed materials. The IM Completion Report for the NTISV Hot Demonstration at MDA V (LANL 2003, 80923) reports that several feet of soil and gravel were placed over MDA V during and following the test. Additional information is required regarding the thickness of fill overlying the original absorption beds.

   The Permittees should note that field-screening data cannot be used for compliance purposes or risk assessment. Laboratory analysis must be used for confirmatory samples.

LANL Response

4. Although it is premature to discuss risk assessment at this point, LANL is using the U. S. Environmental Protection Agency (EPA) risk assessment guidance to provide a maximum clean-up depth for planning purposes. LANL also is using the current soil screening levels (SSLs), as presented in the proposed Consent Order dated September 2004, and radiological screening action levels (SALs) as guidance for the proposed actions. Please note that nowhere does LANL propose the remediation activities described in the investigation work plan for MDA V as a final remedy.

Based on borehole logs, the maximum depth to the base of the absorption beds is 11.5 ft below the current ground surface, another reason for the proposed maximum excavation depth of 12 ft bgs. The clean fill placed in the area of the nontraditional in situ vitrification (NTISV) hot demonstration in absorption bed 1 was placed in the subsidence crater resulting from volume reduction during melting. Therefore, the surface in this area is even with the surrounding surface. However, instead of absorption bed materials from 0 to 10 ft bgs, there is clean fill, which will not require removal. From approximately 10 ft to 20 ft bgs, there is glass. See also the response to specific comment #5.

Field-screening data are not proposed for any purposes other than for health and safety screening and for guiding sampling and remediation activities. Confirmatory samples will be sent to a fixed laboratory for analysis.

NMED Comment

5. *Section 4.3.1 SWMU 21-018(a), page 18:*

   NMED Statement: The Permittees must provide additional information regarding the proposed removal of the block of glass from Absorption Bed 1. Pertinent information should include whether the glass will be removed as one piece or broken into smaller pieces; whether sampling or additional remediation will be conducted beneath and adjacent to the glass block following the removal; and how it will be characterized and disposed. The Permittees cannot assume that this glass block is low-level waste (LLW).

LANL Response

5. The glass cannot be removed in one piece and must be broken for removal. The MDA V investigation work plan proposes removing the top of the glass block (i.e., from 10 ft bgs, where it starts, to 12 ft bgs) as a conservative measure. Vitrification is a treatment that locks contamination in a stable glass matrix, and the NTISV hot test demonstration was shown to be successful, as described in the *Interim Measure Completion Report for the NTISV Hot Demonstration at SWMU 21-018(a)-99 (MDA V)* (LANL 2003, 80923). Data collected from beneath the glass block show that the target depth of contamination was effectively treated, and no further remediation is justified.

   LANL is not assuming that the glass block is low-level waste (LLW). Rather, the determination of the regulatory status of wastes that would be generated by removing a portion of the block was made on the basis of a thorough characterization of the glass, including a toxicity characteristic leaching procedure (TCLP) analysis. Abundant data, as presented in the interim measure (IM) completion report (LANL 2003, 80923), show the chemical and mineralogical nature, the predicted disposal behavior, and the homogeneity of the glass.

NMED Comment

6. *Section 4.3.3 SWMU 21-013(b) and AOC 21-013(g), page 18:*

   The Permittees must provide an explanation as to how debris will be determined as 'too large' to remove, and who will make this determination. If debris is left in place and soil underneath the debris can't be sampled, a final site determination cannot be made by NMED. NMED recommends that the Permittees consider breaking up the larger pieces to facilitate removal and sampling.

LANL Response

6. A determination must be made in the field by a qualified project engineer as to the feasibility of removing some of the larger pieces of debris (primarily large blocks of concrete). Breaking up the debris will be evaluated as one method of facilitating removal. However, leaving some large pieces of debris would not hamper efforts to determine the nature and extent of contamination on the slope. Samples may be collected around the edges of the blocks without compromising knowledge of either vertical or lateral extent, much as would be done in the case of sampling around a utility, tree, or other obstacle.

NMED Comment

7. *Section B-1.2, page B-4:*

   There is previous documentation, A History of Liquid Waste Management at Los Alamos (January 1996, LA-UR-96-1283), which contradicts the Permittees' claim that ordinary soap was proven to be effective in decontaminating radioactive clothing. The document states that, "Laundry soaps, such as Ivory Snow, readily available on the market, were used as cleaning agents but were found to have a relatively low efficiency in removing isotopes of plutonium and polonium. Studies were conducted and experiments undertaken to discover agents that might be more effective." Eventually it was determined that "the citric and tartaric acid solutions were the most effective decontaminating agents." Based on this information, the Permittees are required to identify and test for compounds associated with any synthetic detergents that may have been used.

LANL Response

7. The specific text in the cited document refers to the small laundry facility that served the "D Building" at TA-01; the document does not specify the use of citric and tartaric acid solutions at the DP laundry facility at TA-21. Nonetheless, considering the buffering capability of the tuff underlying MDA V, it is unlikely the effects of these compounds (i.e., decreased pH), if used, could still be measured. In addition, although citric and tartaric acids are not contaminants, other chemicals that would have migrated with citric and tartaric acid will be sampled and analyzed to determine the extent of the contamination from MDA V.

NMED Comment

8. *Table 4.2-3 Analytical Suites for Proposed Samples at SWMU 21-018(a)-99, page 49:*

   A minimum of four samples must be selected from each boring for submittal to a laboratory for analysis of VOCs, SVOCs, explosive compounds, pH, PCBs, dioxins, furans, nitrates, perchlorate, TAL metals, and cyanide.

LANL Response

8. In Table 4.2-3 of the MDA V investigation work plan, volatile organic compounds (VOCs) were inadvertently left off of the analytical suite for boreholes BH-5 and -6. Vapor samples will be collected from <u>all</u> boreholes using SUMMA canisters. These vapor samples will be analyzed for VOCs by EPA Method TO-14.

Polychlorinated biphenyls (PCBs) could be present at SWMU 21-018(a)-99, specifically at SWMU 21-013(b) and AOC 21-013(g), and LANL will add PCBs to the analytical suite for grid samples collected from the debris slope. However, there is no technical basis for adding explosives, dioxins, and furans to the analytical suite for SWMU 21-018(a)-99. Explosive compounds were never used at TA-21. Furthermore, there is no documentation or other evidence of historical fires in or around MDA V, and wastewater absorption beds would not be prone to ignition because of their generally saturated conditions.

Tables 1 and 2 of this response to NMED's notice of disapproval provide updated information regarding the proposed sampling and analytical suites. These tables update and correct information based on LANL's response and the proposed Consent Order, dated September 2004. Additional errors, resulting from multiplying the number of sample locations by the number of analytes (rather than the number of depths), were discovered in Table 4.2-2 of the MDA V investigation work plan. These errors are corrected in the attached Table 1.

NMED Comment

9. *Appendix C Management of Investigation Derived Waste, page C-1-C-3:*

NMED requires the Permittees to submit a request for approval of an area of contamination (AOC) designation. The Permittees have not requested approval for the AOC designation. Delineation of an AOC must be reviewed and approved by NMED prior to implementation of this work plan. EPA defines an AOC as certain discrete areas of generally dispersed contamination that can be equated to Resource Conservation and Recovery Act (RCRA) units or landfills. AOCs may be either consolidated or treated in situ within the AOC without triggering RCRA requirements. Neither of these actions is proposed at MDA V. NMED therefore believes the Permittees are not applying the AOC concept properly to this site.

The Permittees must provide brief descriptions of the methods and procedures used to characterize the waste streams. As stated in section IX.A of the September 1, 2004 draft Consent Order, the Permittees cannot substitute a reference to their SOPs and website for a description of procedures.

The Permittees cannot use previous sampling data for the purpose of characterizing newly generated waste streams. The Permittees must collect samples of all newly generated waste streams related to IDW and submit the samples for laboratory analysis.

The Permittees did not provide information on how drill cuttings will be handled during and after the investigation. The Permittees must describe how this waste stream will be managed and characterized, and where it is anticipated to be disposed.

The Permittees assume that most of the waste streams generated will be disposed of as low level waste (LLW) at TA-54 MDA G. Absorption Beds 2 and 3, which the Permittees propose to manage as LLW, received the same effluent as Absorption Bed 1. Excavated fill from Absorption Bed 1 is being managed as mixed LLW. The Permittees must manage soil from Absorption Beds 2 and 3 in a similar manner. Before disposal, the Permittees must characterize the waste. At that point, a determination can be made as to where the waste may be disposed.

It is not clear how the Permittees are going to handle the cast iron pipe and VCP. The text of the Work Plan discusses what has been done historically, but does not discuss what the Permittees propose to do as part of this work. The Permittees must revise the text to discuss how this waste stream will be managed.

LANL Response

9. Per EPA's guidance, the area of contamination (AOC) policy addresses only "management of materials which would otherwise be subject to RCRA (i.e., hazardous wastes, or media and debris contaminated with hazardous waste)" (Shapiro et al. 1996, 82288). EPA's AOC policy is the basis for the Permittee's position that returning environmental media, which would not otherwise be subject to RCRA, to their point of origin does not constitute placement of solid waste. Appendix C of the MDA V investigation work plan states that management of environmental media in this manner is consistent with EPA's AOC policy, not that it is subject to the AOC policy. Because the materials referred to in Appendix C would not otherwise be subject to RCRA, designation and approval of an AOC by NMED is not required, nor is it applicable.

   As indicated in Appendix C, wastes will be characterized in accordance with standard operating procedure (SOP-) 01.10, *Waste Characterization*, and in accordance with the regulatory requirements incorporated by reference in SOP-01.10. LANL plans to characterize wastes through a combination of laboratory analysis and acceptable knowledge (AK). AK will be established through knowledge of the waste materials, the methods of waste generation, and the results of an analysis of the environmental media associated with waste streams. For example, spent personal protective equipment and disposable sampling supplies that come in contact with contaminated media will be characterized according to the analysis results of the media. Similarly, drill cuttings that must be disposed of as waste will be characterized on the basis of analytical results of the core samples from that borehole. If decontamination fluids are to be sent off-site for disposal, they will be sampled to demonstrate compliance with the waste acceptance criteria of the receiving facility. Otherwise, less than six gallons per day of decontamination fluid can be discharged to the ground in accordance with an existing Notice of Intent for discharge to groundwater approved by the NMED Ground Water Quality Bureau. Appendix C will be revised to summarize the technical approach for waste characterization, including the use of AK.

   LANL procedures stipulate that previous sampling data may be used for waste characterization purposes. As required by SOP-01.10, a waste stream characterization strategy must be developed and approved by the LANL's Solid Waste Operations Group before any IDW waste stream can be generated. The SOP allows wastes to be characterized on the basis of AK from existing data/documentation, AK from site characterization, and/or direct sampling and analysis of containerized wastes. In developing the strategies, LANL will evaluate previous sampling data to determine if they constitute AK for the purpose of waste characterization. If this AK is sufficient to characterize the waste, no direct waste sampling will be conducted. If not, wastes will be sampled and analyzed as necessary to determine the proper waste designation. This approach complies with hazardous waste determination requirements contained in 40 CFR 262.11, which allow knowledge of the hazardous characteristics of the waste to be used in lieu of waste testing.

   NMED's comment states that all borehole cuttings must be containerized and characterized and that cuttings must not be returned to the point of origin. Appendix C indicates that all cuttings will be collected and containerized at the point of generation. Following completion of vapor monitoring from all new boreholes, LANL will make a determination, with NMED's approval, of which boreholes will be completed as vapor-monitoring wells. The cuttings from these boreholes will be characterized and disposed of, and the cuttings from the other boreholes will be returned to the point of origin in accordance with EPA's AOC policy. EPA's AOC guidance indicates that placement of hazardous waste from an AOC into a drum followed by replacement in the AOC would not constitute "land disposal" for RCRA purposes (Wehling 1991, 87382). The Permittees intend to return nonhazardous drill cuttings to the point of origin, which also would not constitute "land disposal" under RCRA.

The preliminary determination of waste types presented in Appendix C is based on the evaluation of existing data from previous investigations at the absorption beds. The designation of fill material from absorption bed 1 as suspect mixed LLW is based on the concentrations of TCLP metals detected in samples from this site. The concentrations of TCLP metals detected in samples from absorption beds 2 and 3 were much lower than those from absorption bed 1 and form the basis for identifying fill from these absorption beds as suspect LLW.

The bulleted list on page C-1 of Appendix C describes the waste streams anticipated as a result of the actions proposed in the investigation work plan. Table C-1 on page C-2 describes how each of these waste streams are to be handled. As indicated in Table C-1, LANL anticipates the metal debris (including absorption bed pipes) and the vitrified clay pipe (VCP) outfall pipe to be disposed of as solid LLW at Area G.

REFERENCES

Chamberlain, K., October 2004. Personal communication between B. Coel-Roback and K. Chamberlain, NMED-HWB, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), May 1991. "TA-21 Operable Unit RFI Work Plan for Environmental Restoration, Volume III," Los Alamos National Laboratory document LA-UR-91-962, Los Alamos, New Mexico. (LANL 1991, 07680)

LANL (Los Alamos National Laboratory), September 2003. "Interim Measure Completion Report for the NTISV Hot Demonstration at SWMU 21-018(a)-99 (MDA V)," Los Alamos National Laboratory document LA-UR-03-6494, Los Alamos, New Mexico. (LANL 2003, 80923)

LANL (Los Alamos National Laboratory), September 2003. "Voluntary Corrective Action (VCA) Completion Report for Solid Waste Management Unit 21-024(f) and Areas of Concern C-21-015 and 21-030," Los Alamos National Laboratory document LA-UR-03-5441, Los Alamos, New Mexico. (LANL 2003, 83093)

LANL (Los Alamos National Laboratory), June 2004. "Investigation Work Plan for Solid Waste Management Unit (SWMU) 21-018(a)-99, Material Disposal Area V, at Technical Area 21," Los Alamos National Laboratory document LA-UR-04-3699, Los Alamos, New Mexico. (LANL 2004, 87358)

Shapiro, M., S. D. Luftig, and J. Clifford, March 13, 1996. "Use of the Area of Contamination (AOC) Concept During RCRA Cleanups," Memorandum to RCRA Branch Chiefs and CERCLA Regional Managers, U. S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C. (Shapiro 1996, 82288)

Wehling, C., April 16, 1991. "LDR Applicability for Investigation Derived Waste," U. S. Environmental Protection Agency memorandum to S. Golian, Chief, Remedial Guidance Section, from C. Wehling, Solid Waste and Emergency Response Division, Washington, D.C. (Wehling 1991, 87382)

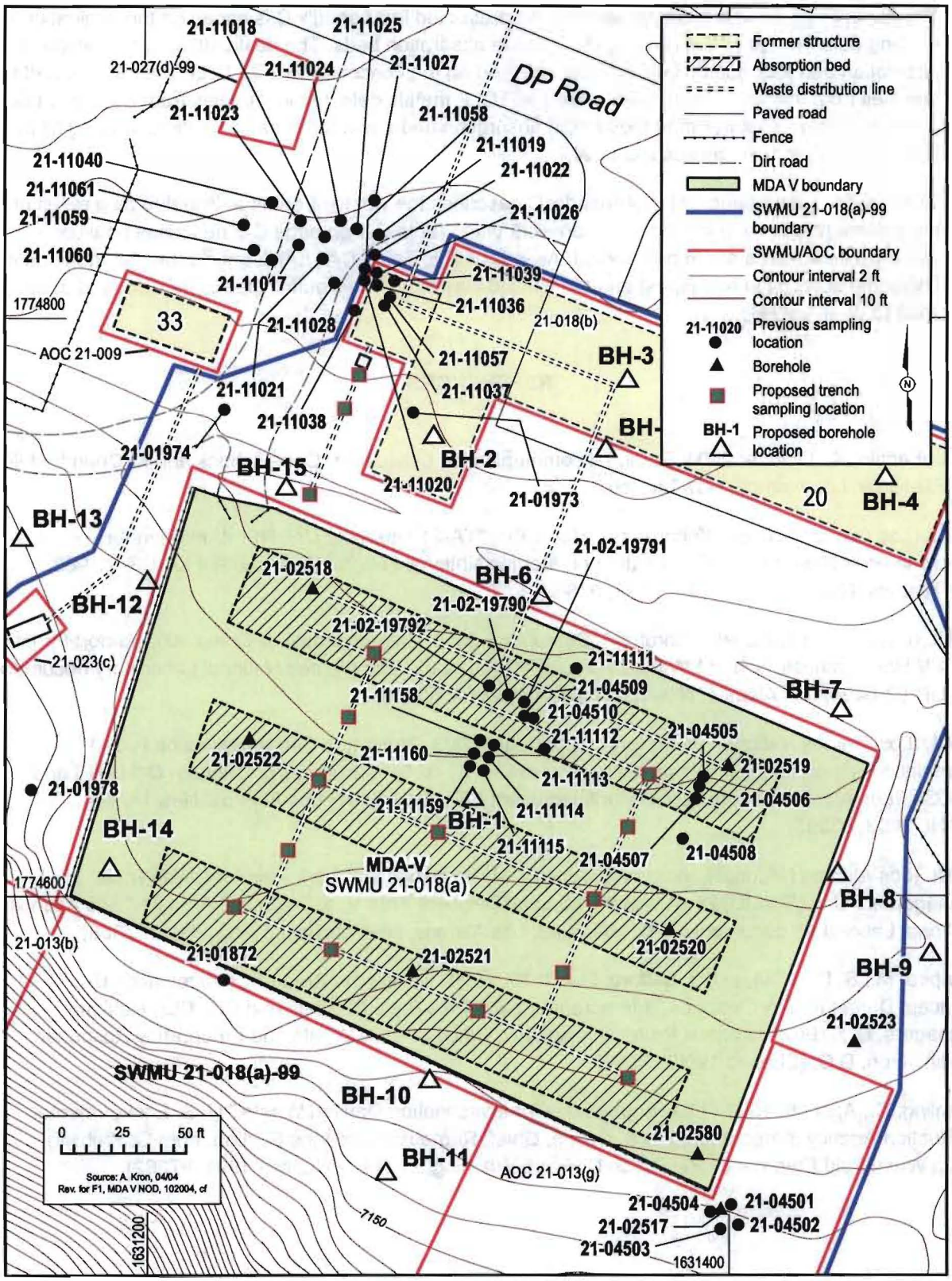


Figure 1. Proposed sample locations and previous sample locations at SWMUs 21-018(a and b)

Table 1
Summary of Proposed Surface and Shallow Subsurface Samples

SWMU/ AOC	Location	Purpose	Planned Sample Depths*	Estimated Number of Samples for Fixed Laboratory Analysis	Field Screening Intervals
Characterization Samples					
21-018(b)	Blowdown sump and drain line; 3 locations	Determination of nature and extent of potential contamination from sump and drainline	One sample at soil/tuff interface and another 1.5 to 2.0 ft deeper	6	Ground surface
21-023(c)	Inlet/outlet line trench	Characterization of potential unintentional releases from inlet and outlet lines	To be determined based on radiation survey and field screening	10	Within excavation trench
21-023(c)	Outfall	Determination of nature and extent sampling downslope from 21-01611	Soil: 0 to 0.5 ft and 1.5 to 2.0 ft; dependent on field screening and previous analytical results	18	Ground surface
Confirmation Samples					
21-018(a)	Absorption bed 1; within drainline excavation trenches	Characterization of absorption bed materials to determine removal status	Deepest sample from base of absorption bed materials	2	Within excavation trench
21-018(a)	Absorption bed 2; within drainline excavation trenches	Characterization of absorption bed materials to determine removal status	Deepest sample from base of absorption bed materials	3	Within excavation trench
21-018(a)	Absorption bed 3; within drainline excavation trenches	Characterization of absorption bed materials to determine removal status	Deepest sample from base of absorption bed materials	4	Within excavation trench
21-018(a)	Overflow pipes between absorption beds	Characterization of potential unintentional releases from overflow pipes	Deepest sample from base of excavation trench	4	Within excavation trench
21-023(c)	Outfall	Confirmation sampling following remediation of outfall soils	Soil: 0 to 0.5 ft and 1.5 to 2.0 ft; dependent on field screening and previous analytical results	20	Excavation footprint
21-013 (b) 21-013(g)	Original surface following debris removal.	Confirmation sample locations from areas of obvious contamination or on 500-m^2 grid	Soil: 0 to 0.5 ft and 1.5 to 2.0 ft deeper	84	Ground surface

* All depths to targets are approximate. The depth to the absorption bed target in borehole number 5 will be determined following the delineation of the absorption bed boundary and final location of the borehole. Shallow soil characterization sample depths are from ground surface. Shallow soil confirmation samples are to be collected from remediated surface.

Table 2
Analytical Suites for Proposed Samples at SWMU 21-018(a)-99

Location/Issue Addressed	Location	Geologic Units Encountered	VOCs	SVOCs	PCBs	pH	Radionuclide Screening for DOT Shipping.	TAL Metals	Anions	Geotechnical Properties	Gamma-Spec	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium
BH-1 SWMU 21-018(a) absorption beds	Center of MDA V	Fill, soil, Qbt 3, Qbt 2, Qct	X*	X	-	X	X	X	X	X	X	X	X	X	X	X
BH-2, -3, and -4 SWMU 21-18(b) DP laundry facility footprint	3 locations within the building footprint	Fill, soil, Qbt 3	X*	X	-	X	X	X	X	-	X	X	X	X	X	X
BH-5 and -6 SWMU 21-018(b) DP laundry drainline	2 locations along drainline to absorption beds	Fill, soil, Qbt 3	X*	X	-	X	X	X	X	-	X	X	X	X	X	X
BH-7 through -15 MDA V perimeter	Perimeter of MDA V fence	Soil, fill, and Qbt 3	X*	X	-	X	X	X	X	-	X	X	X	X	X	X
MDA V absorption bed 1 distribution line excavation trench	2 locations between previous boreholes	Fill/soil/Qbt 3	-	X	-	X	X	X	X	-	X	X	X	X	X	X
MDA V absorption bed 2 distribution line excavation trench	3 locations between previous boreholes	Fill/soil/Qbt 3	-	X	-	X	X	X	X	-	X	X	X	X	X	X
MDA V absorption bed 3 distribution line excavation trench	4 locations between previous boreholes	Fill/soil/Qbt 3	-	X	-	X	X	X	X	-	X	X	X	X	X	X
SWMU 21-018(b) DP laundry blowdown sump and outlet line	3 locations (beneath sump, middle of outlet line and discharge point of line)	Fill/soil/Qbt 3	-	X	-	X	X	X	X	-	X	X	X	X	X	X
SWMU 21-013(b) and AOC 21-013(g) debris slope	42 locations from 500-m^2 grid, 2 depths each (total = 84 samples)	Fill/soil	-	X	X	X	X	X	X	-	X	X	X	X	X	X
SWMU 21-023(c) septic tank outfall area (Pre-removal screening samples)	To be determined based on the results of walkover radiation survey	Fill/soil	-	-	-	-	-	-	-	-	X	-	-	-	-	-
SWMU 21-023(c) Septic tank outfall area (Pre-removal screening samples)	To be determined based on the area of soil removal	Fill/soil	-	X	-	X	X	X	X	-	X	X	X	X	X	X

Notes: 1. For all boreholes, continuous core sampling for curation to 40 ft, every 10 ft subsequently.
2. From each boring, a minimum of four samples for fixed lab analysis: one each of the highest field screen detect; maximum depth of a field screen detect; base depth of pits, tanks, shafts, pipes, or other structures; and total depth (TD) of borehole.
3. Tuff sample for permeability tests just above Qbt2/Qct contact in borings that pass into the Cerro Toledo interval.
4. All boreholes will also supply a surface sample if warranted by walkover radiation survey.
5. Shallow soil sampling will continue to depths greater than 2 ft if indicated by field screening or previous sampling.

*VOCs for pore gas by method TO-14.

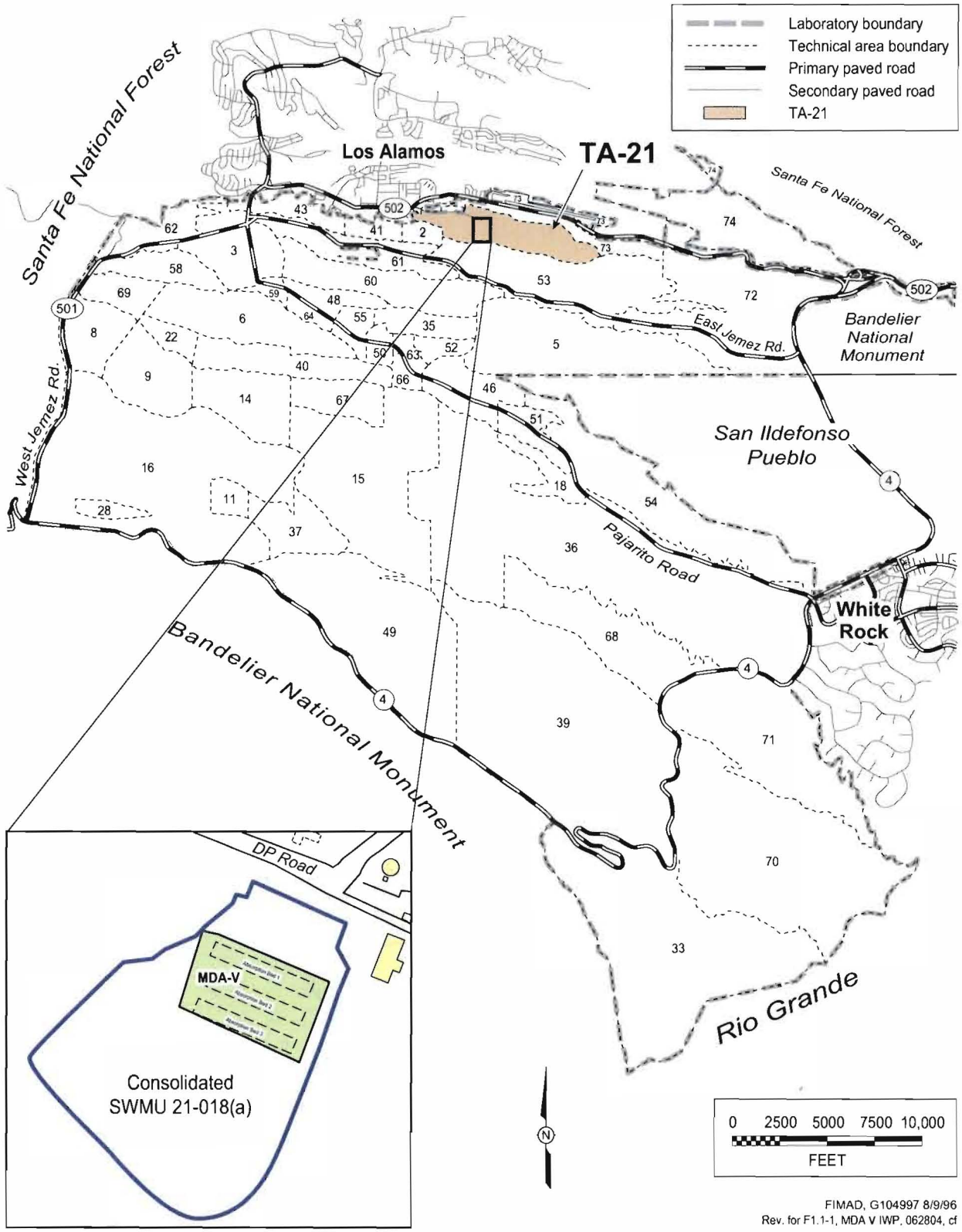
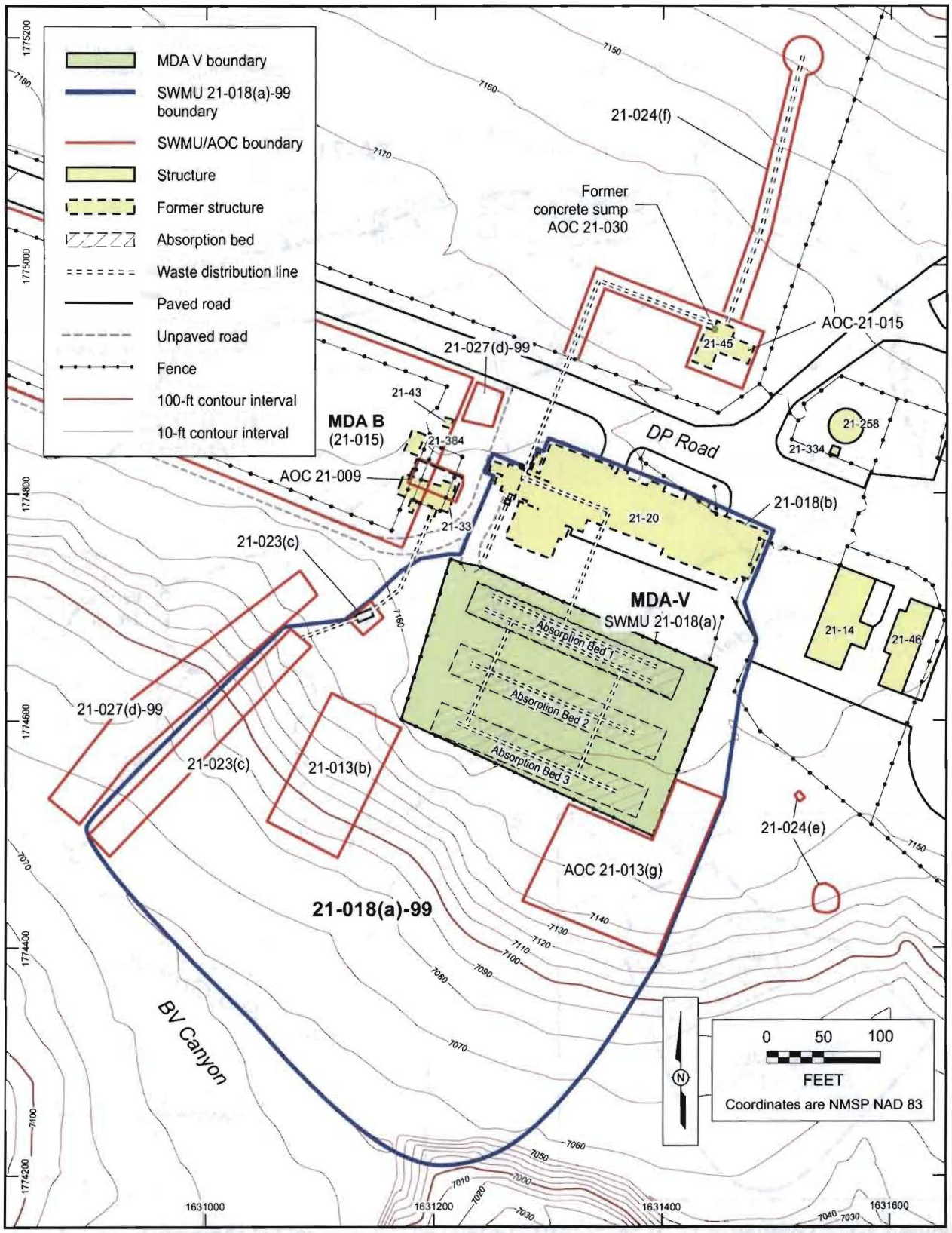


Figure 1.1-1. Location of TA-21 and SWMU 21-018(a)-99 with respect to Laboratory technical areas and surrounding land holdings



Source: GISLab map 201232, 061604, DW
Rev. for F1.1-2, MDA V IWP, 063004, cf

Figure 1.1-2. Site map of consolidated SWMU 21-018(a)-99 and adjacent SWMUs/AOCs

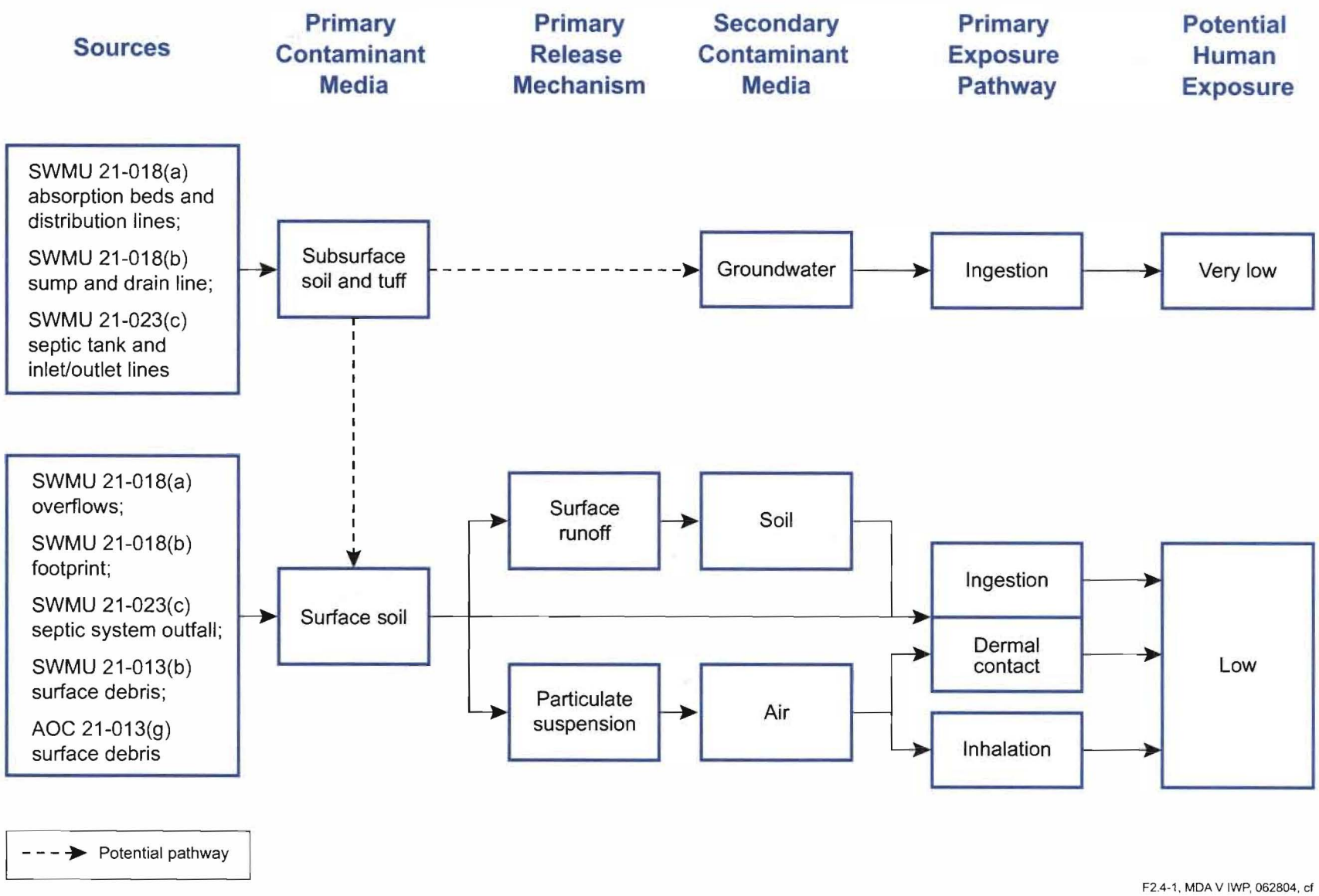


Figure 2.4-1. Conceptual site model for human receptors at SWMU 21-018(a)-99

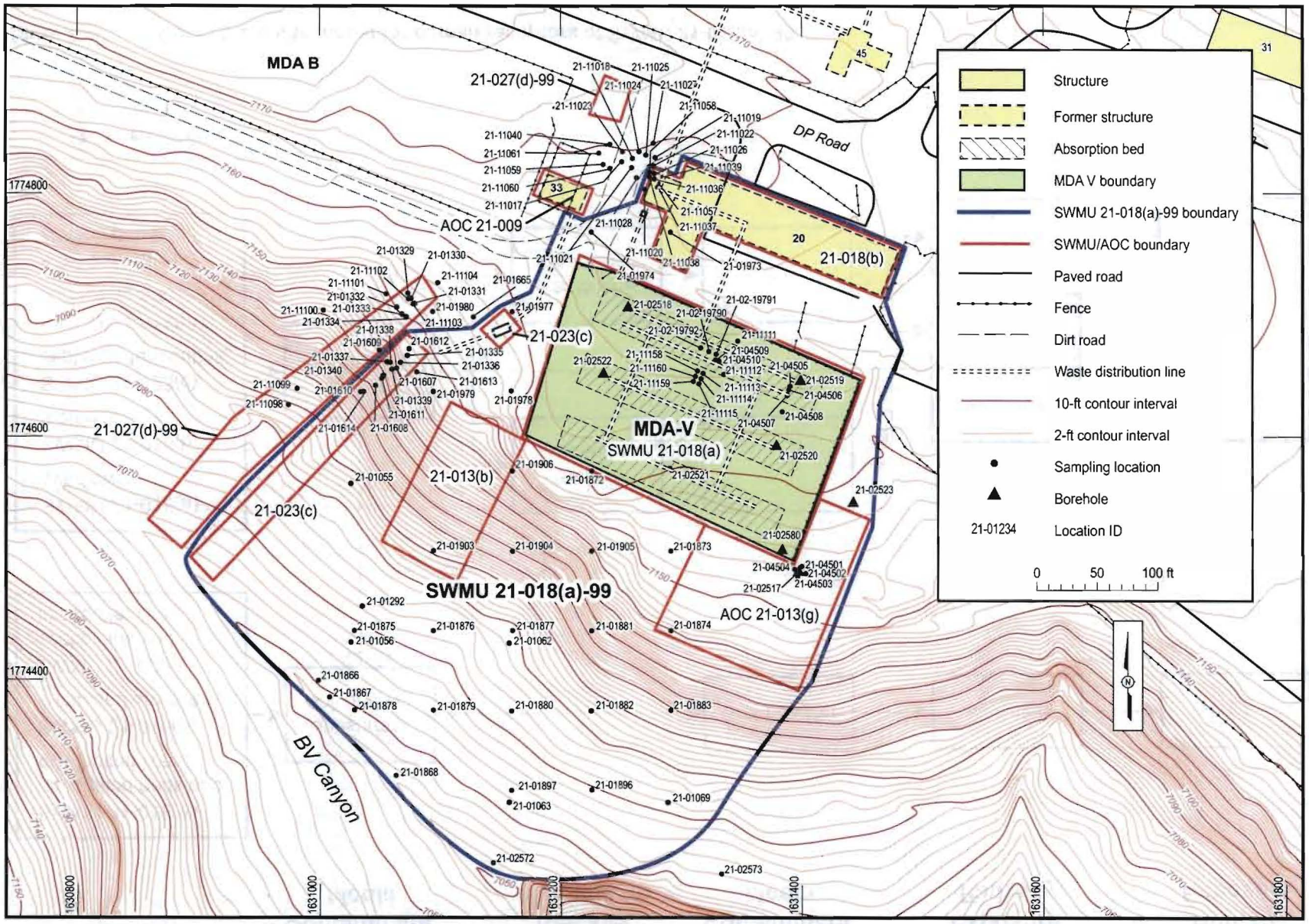
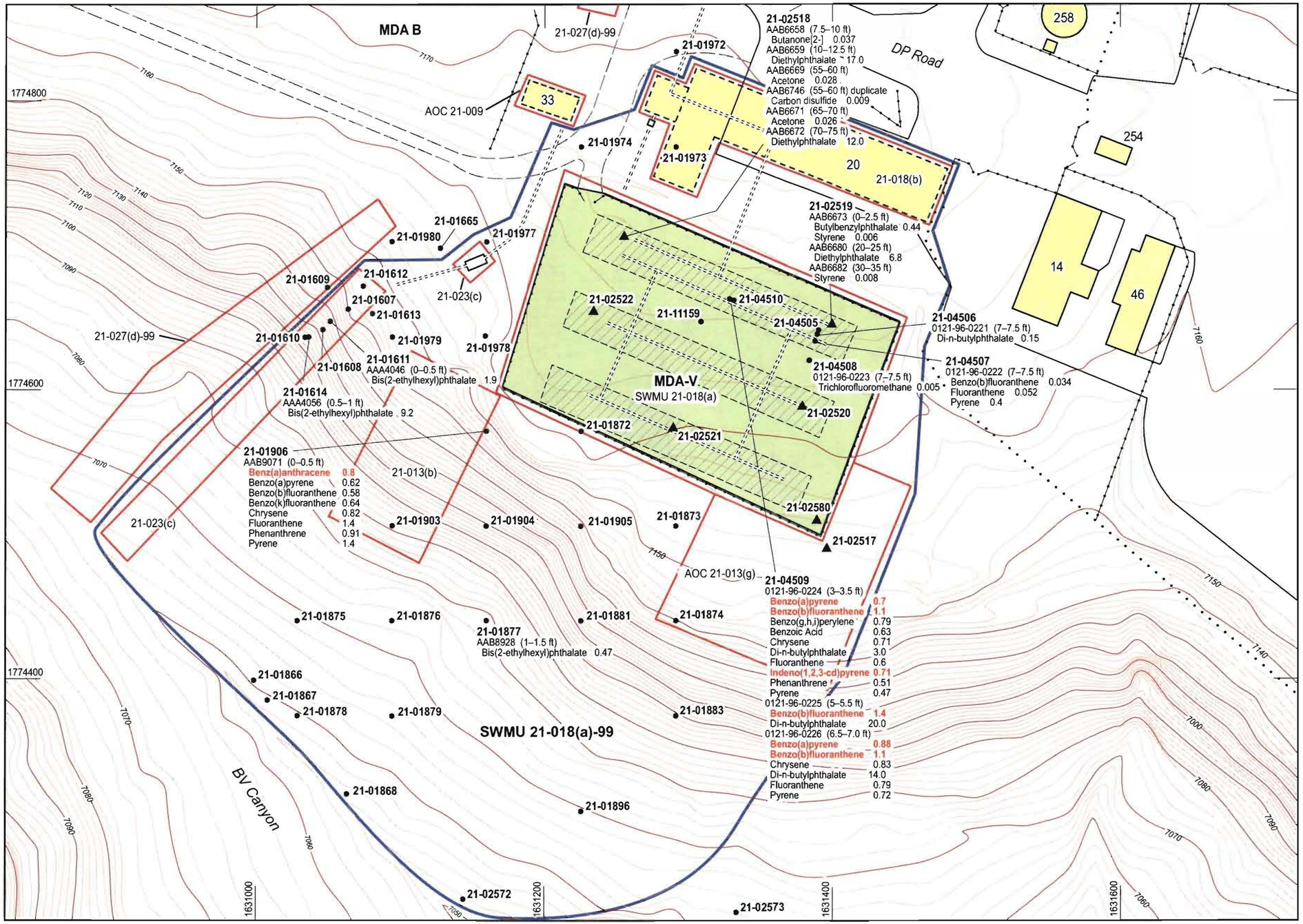


Figure 2.5-1. RFI sample locations at SWMU 21-018(a)-99



Source: GISLab maps 200477, 10/9/02 and 201120, 4/20/04
Rev. by A. Kron 5/4/04
Rev. for F2.6-1, MDA V IWP, 062904, cf

Figure 2.6-1. Organic chemicals detected at SWMU 21-018(a)-99

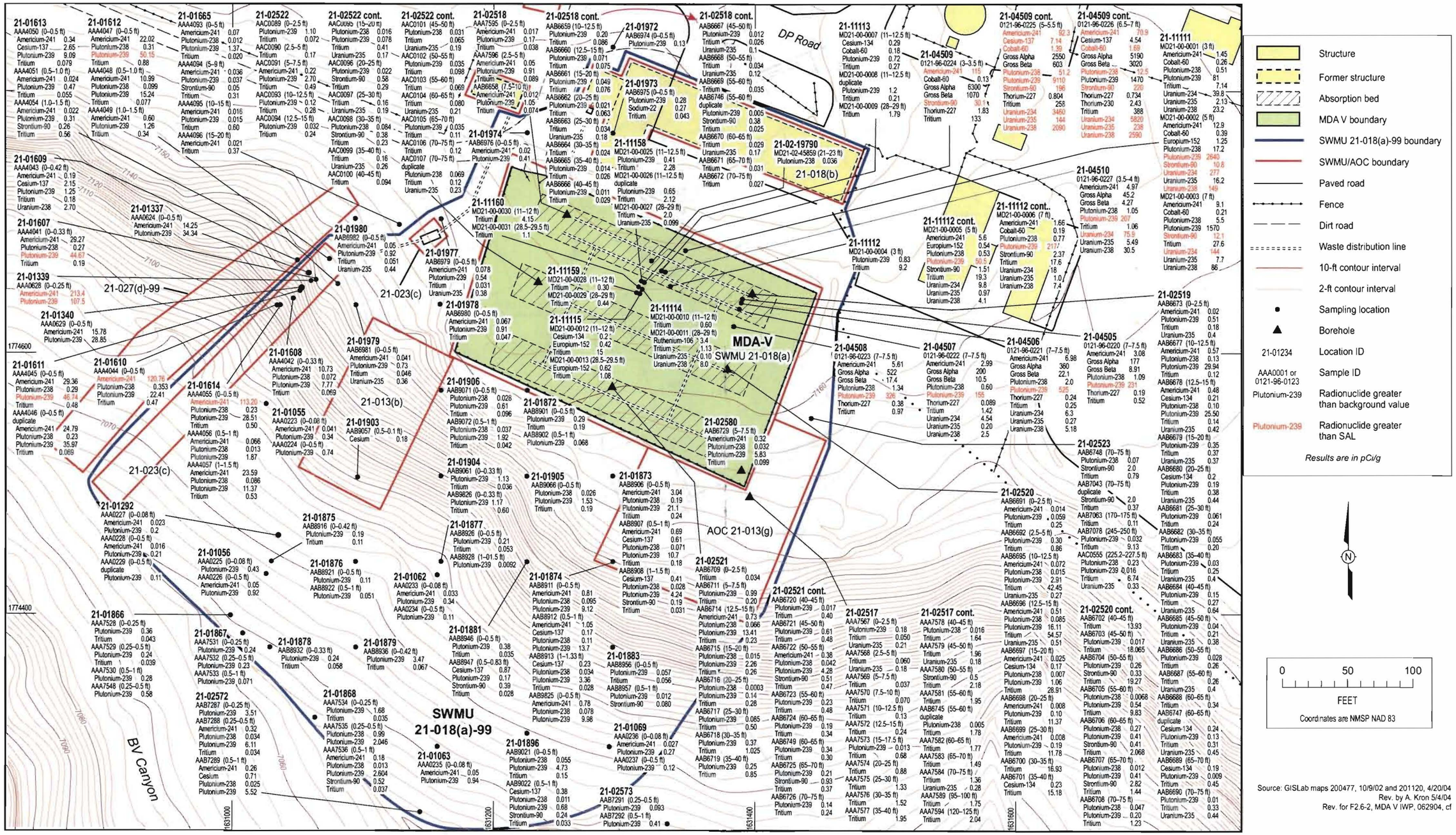


Figure 2.6-2. Radionuclides detected greater than background at SWMU 21-018(a)-99

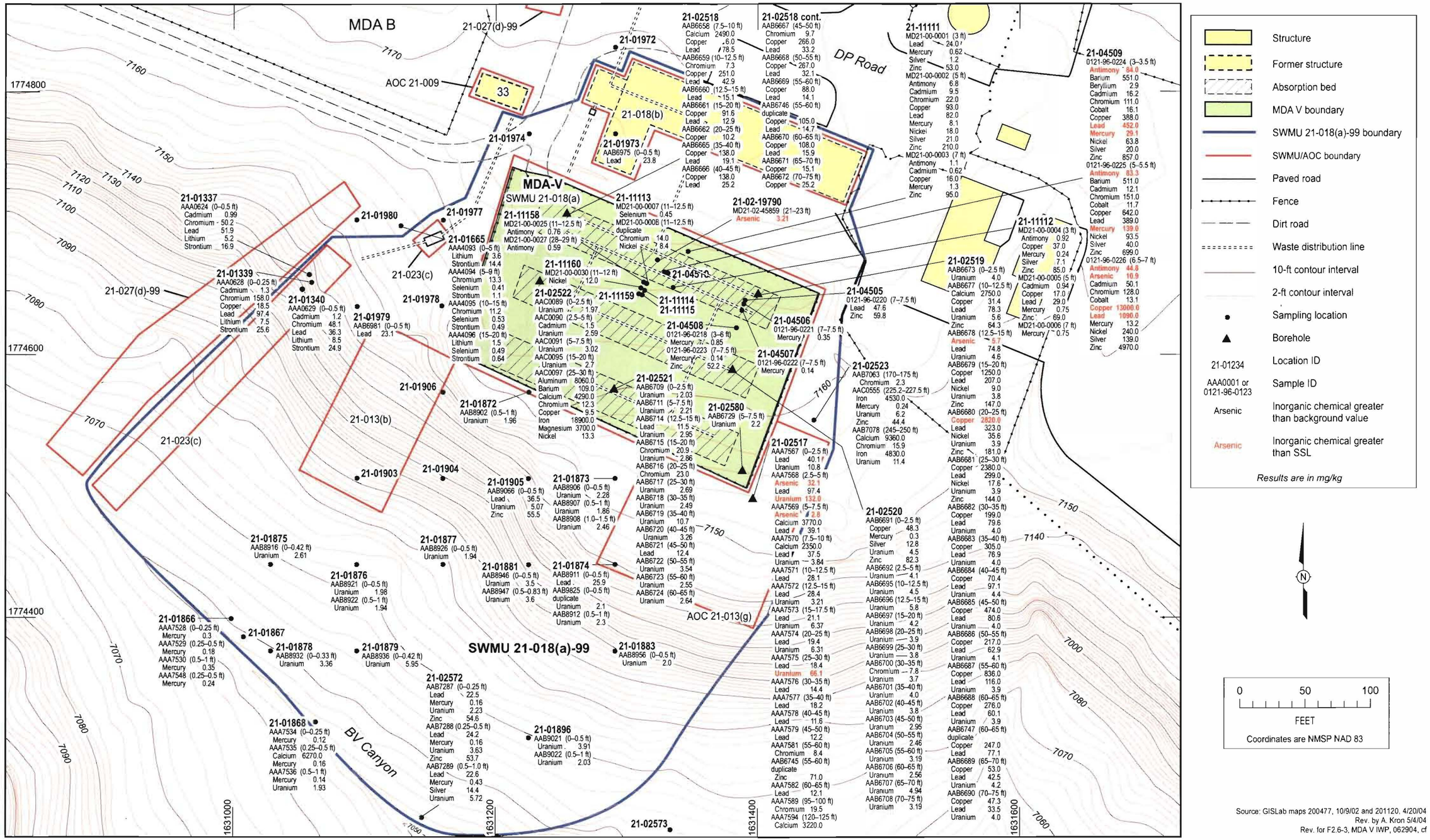


Figure 2.6-3. Inorganic chemicals detected greater than background at SWMU 21-018(a)-99

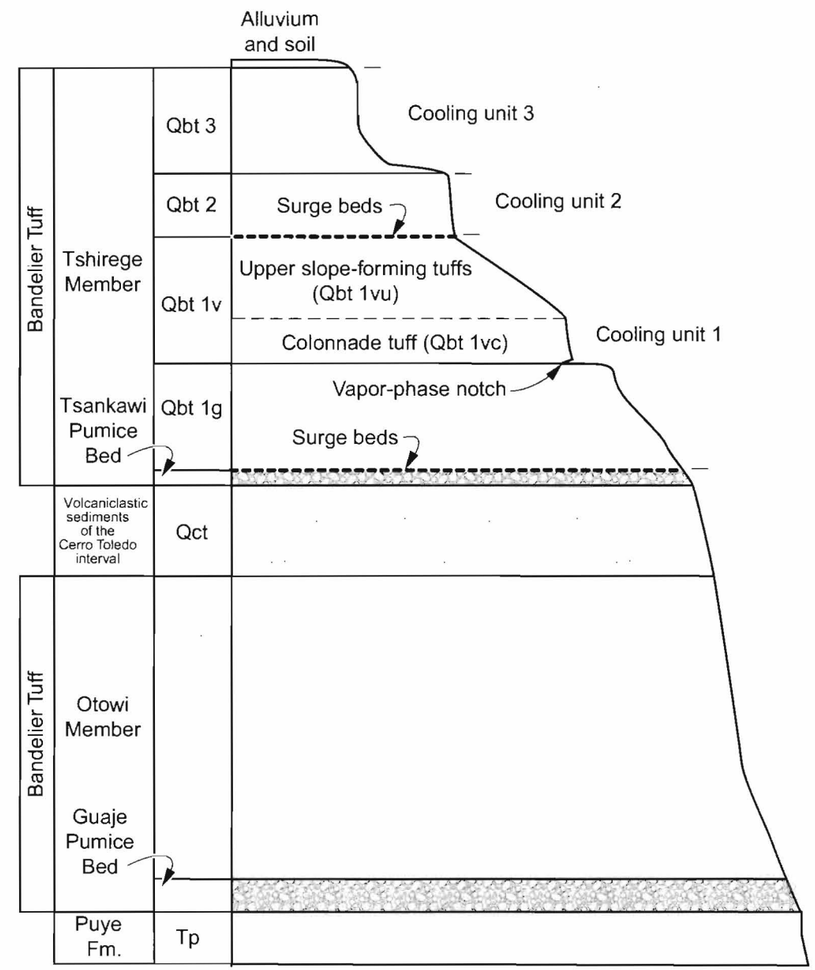
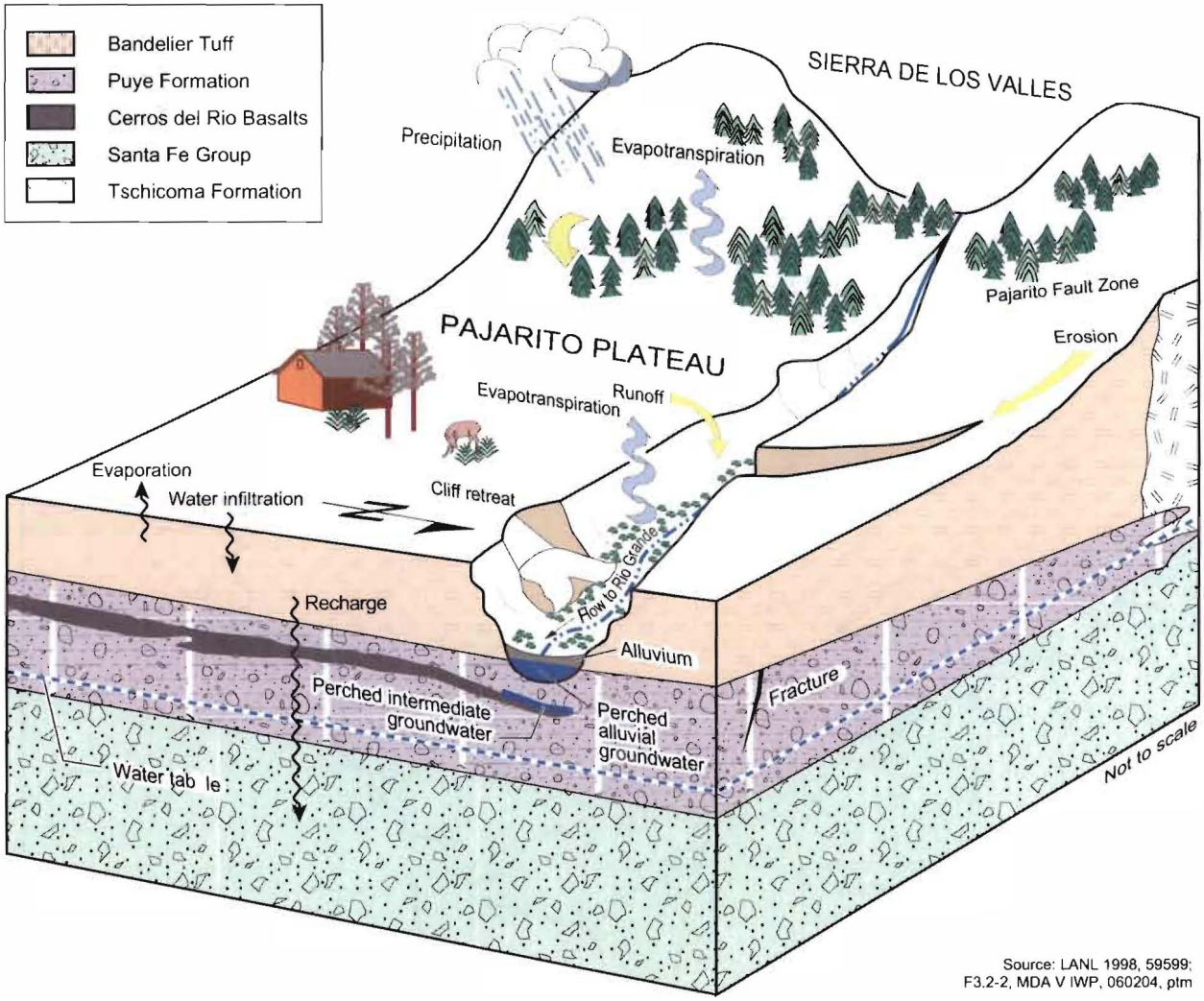


Figure 3.2-1. Generalized stratigraphy under SWMU 21-018(a)-99



Source: LANL 1998, 59599;
F3.2-2, MDA V IWP, 060204, ptm

Figure 3.2-2. Schematic of the hydrogeologic conceptual model for the Pajarito Plateau

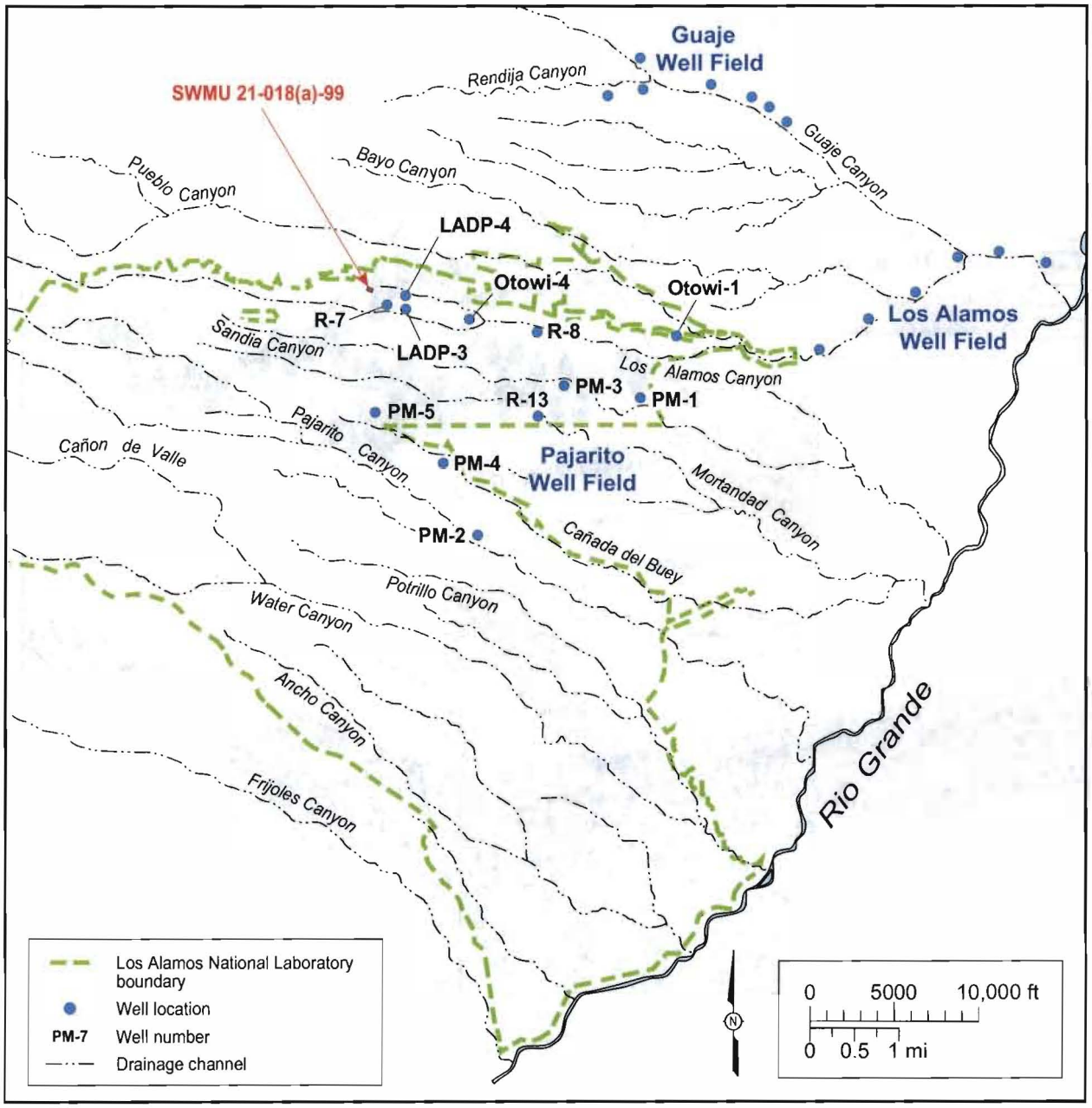


Figure 3.2-3. Locations of wells relative to SWMU 21-018(a)-99

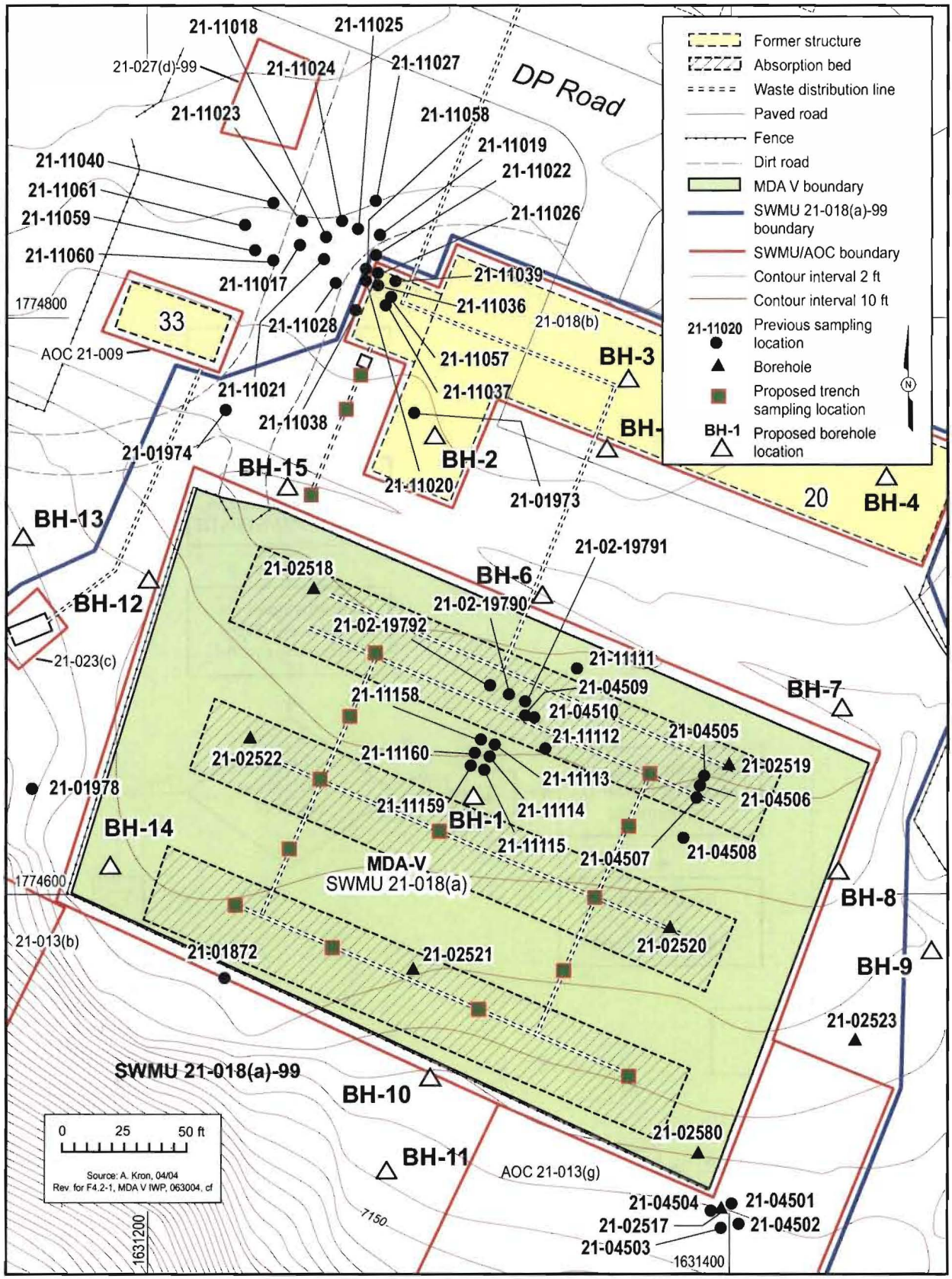


Figure 4.2-1. Proposed and previous sample locations at SWMUs 21-018(a) and 21-018(b)

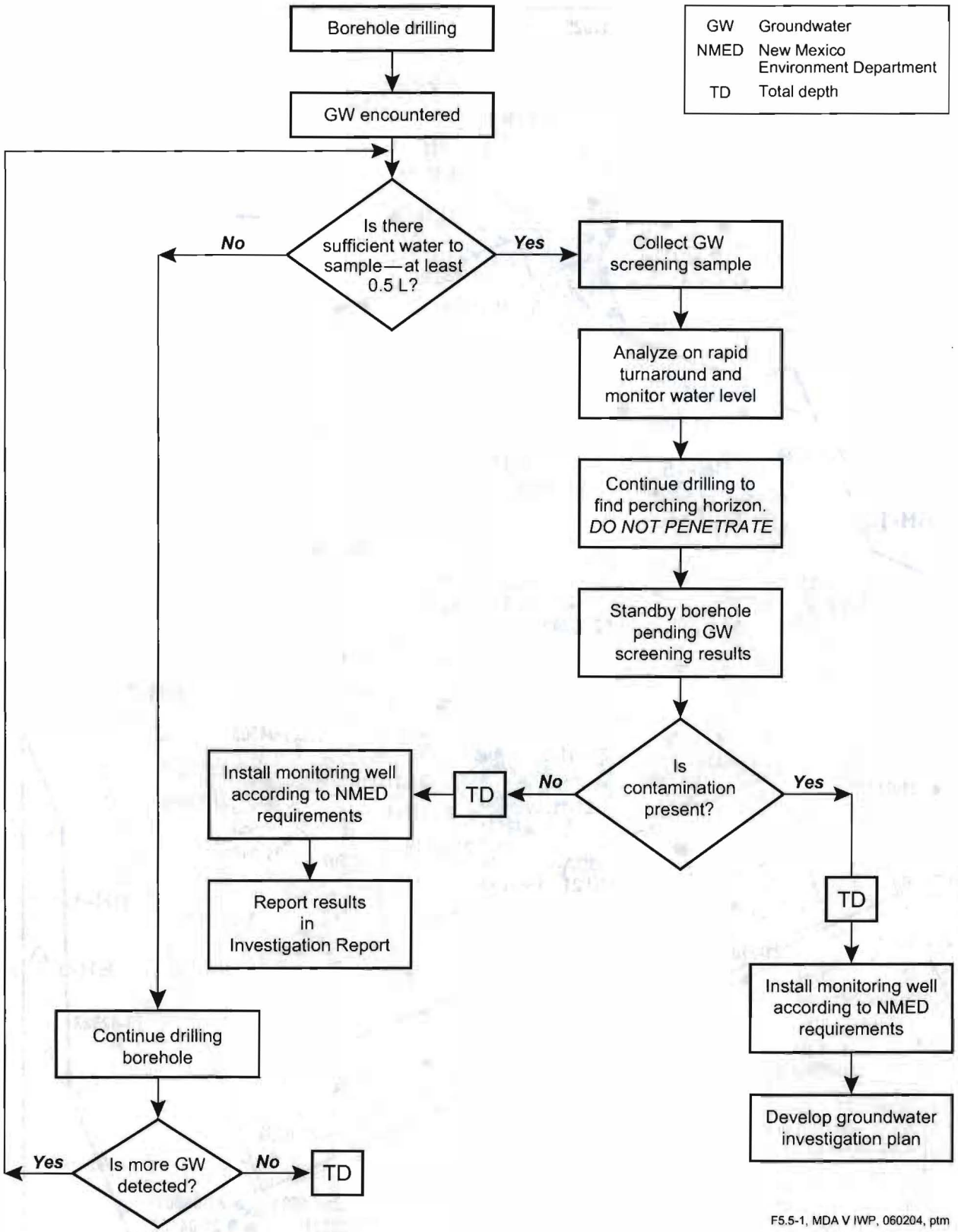
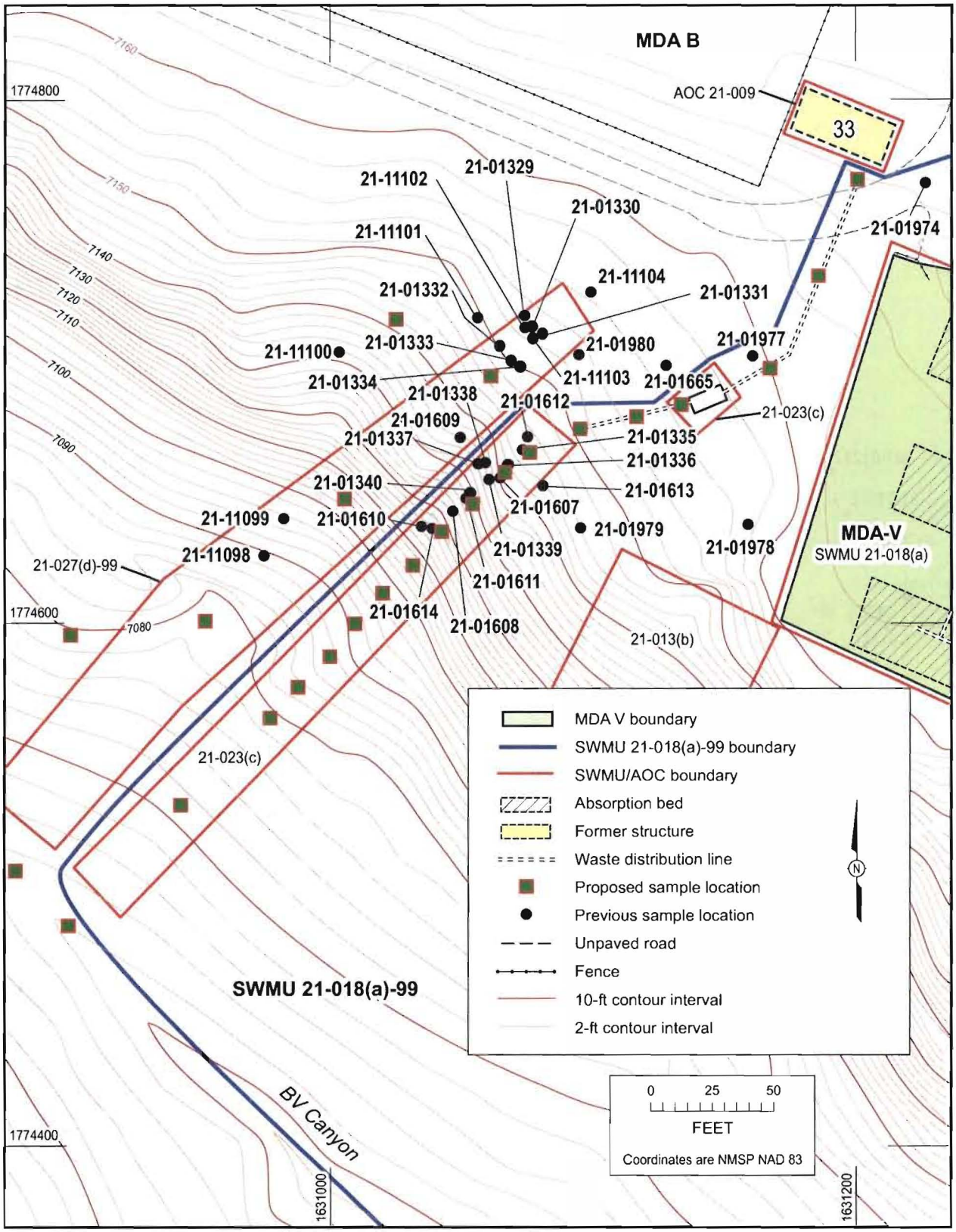
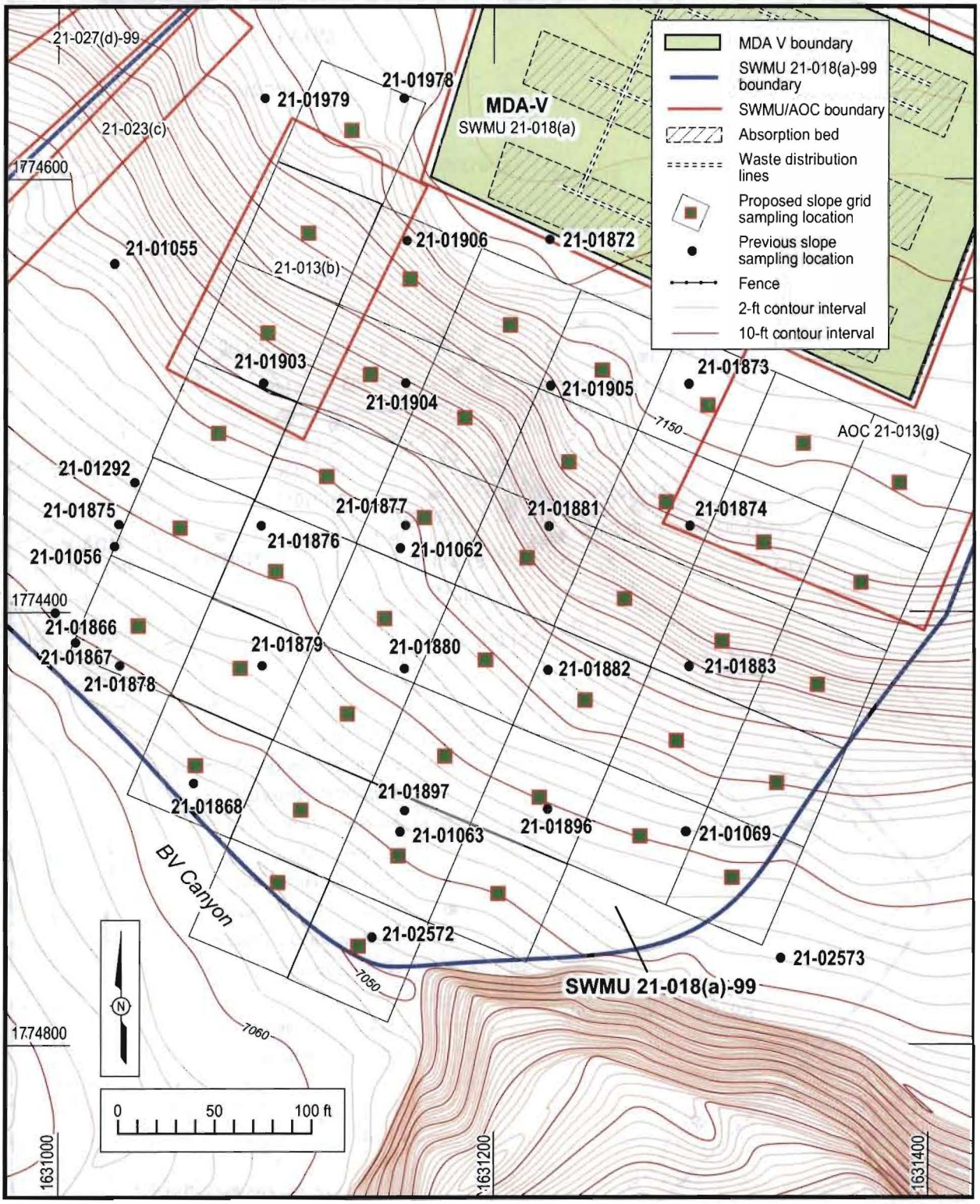


Figure 4.2-2. SWMU 21-018(a)-99 perched groundwater flow chart



Source. A. Kron (GISLab map)_Rev. for F4 2-2, MDA V IWP, 062804, cf

Figure 4.2-3. Proposed and previous outfall sample locations at SWMU 21-023(c)



Source: A. Kron, 04/04
Rev. for F4.2-3, MDA V IWP, 062804, cf

Figure 4.2-4. Proposed and previous slope sample locations at SWMU 21-013(b) and AOC 21-013(g)

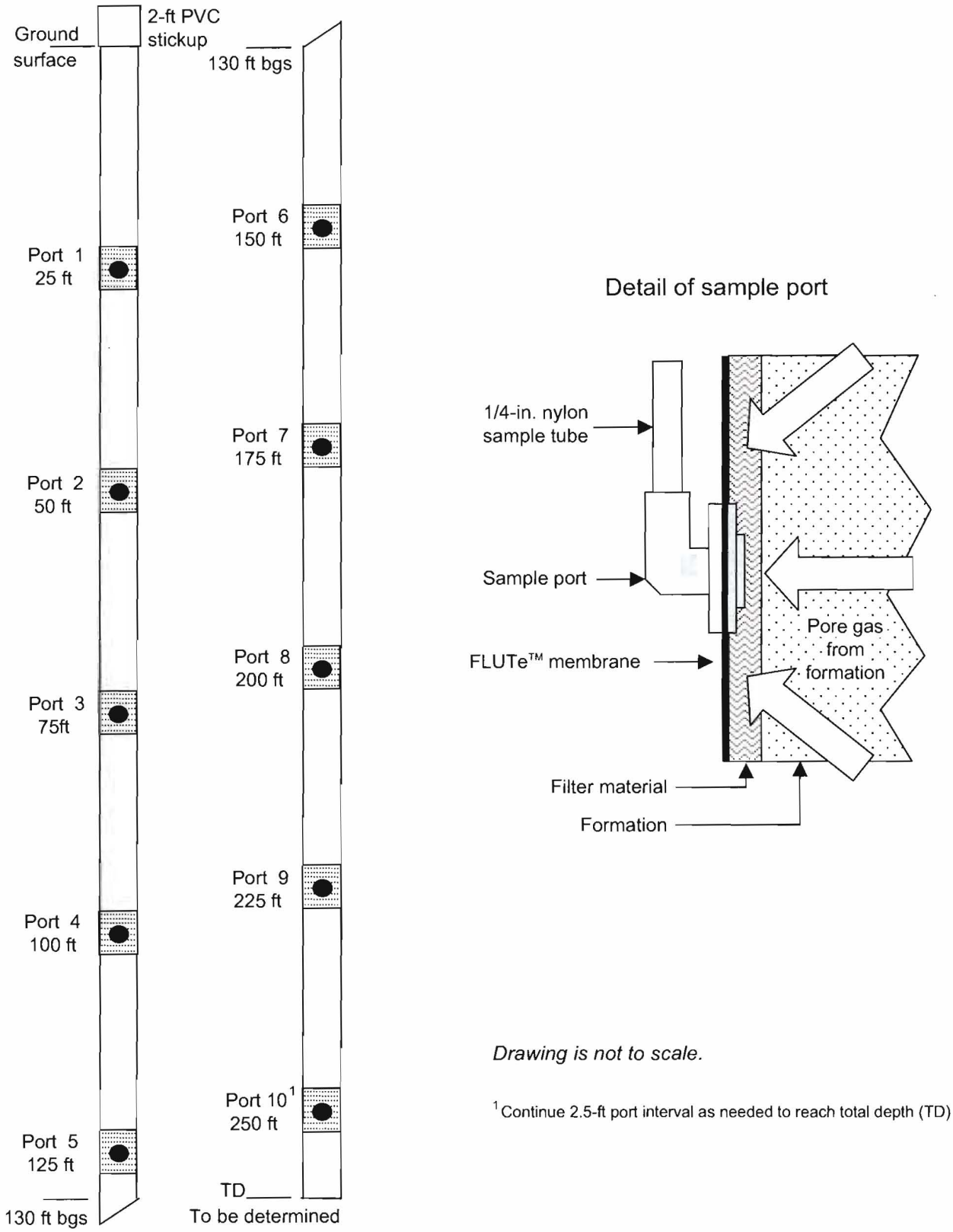


Figure 5.4-1. General diagram for construction of a vapor monitoring borehole

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