Revised

Dynamic Site Investigation and Summary Remedial Investigation Report Lockheed Martin Corporation, Beaumont Site 2 Beaumont, California

Prepared for:

LOCKHEED MARTIN

Prepared by:

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TC# 22289-090301/ April 2010

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LOCKHEED MARTIN

April 15, 2010

Mr. Daniel Zogaib
Southern California Cleanup Operations
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Subject: Submittal of the final *Dynamic Site Investigation Report, Beaumont Site 2*

Dear Mr. Zogaib:

Please find enclosed one (1) hard copy of the body of the final report and two (2) CDs of the report and appendices of the *Dynamic Site Investigation Report, Lockheed Martin Corporation, Beaumont Site 2, Beaumont, California* for your files. This report incorporates changes agreed to in the DTSC-approved *Response to Comments* on the report; a summary of these responses is included as an enclosure to this letter.

If you have any questions regarding this submittal, please contact me at 408.756.9595 or denise.kato@lmco.com.

Sincerely,

Denise Kato

Denise Kato
Remediation Analyst Senior Staff

Enclosures

Copy with Enc:
Gene Matsushita, LMC (1 pdf and 1 hard copy)
Ian Lo, Camp, Dresser, McKee (1 pdf)
Thomas Villeneuve, Tetra Tech, Inc. (1 pdf and 1 hard copy)

BUR077 Beau 2 Final DSI

Responses to Comments on the Dynamic Site Investigation Report, Lockheed Martin Corporation, Beaumont Site 2, Beaumont, California
Tetra Tech, Inc
February 2010

Comments from CY Jeng, DTSC HERD		
Comment	**Response**	**Proposed Action**
Specific Comment 1. Table 5-3: Some of chemicals positively identified as COPCs on Table 5-3 are not supported by the information presented in Appendix H. Specifically, cobalt in Area L (Colluvium/STF) and chromium and cobalt in WDA identified as exceeding their background threshold values (BTVs) on Table 5-3 do not have concentrations listed on Table 13 of Appendix H. This discrepancy should be resolved.	Table 13 of Appendix H was limited to the soil depth intervals applicable to the HHERA, less than 10 feet below ground surface (ft bgs). Appendix H Tables 13 and 14, and the main body Table 5-3 will be revised to include only the background comparison results for soils within 10 ft bgs, to focus the evaluation as the basis for future risk assessments. Additionally, Tables 6 and 8 in Appendix H (i.e., the statistical comparison results for Area L and the WDA) will be modified to show only concentrations for soil within the top 10 ft bgs.	Tables 6, 8, 13, and 14 of Appendix H will be revised to show only metal concentrations in soil at depths of up to 10 ft bgs. Table 5-3 will be revised to match Table 14.
Specific Comment 2. Table 5-4: Please provide rationale and/or references on why BTVs were developed separately for surface (0.5 ft) and subsurface (5-10 ft) layers in the STF background soils for selenium and silver only, and not the other metals. The summary statistics of the subsurface (5-10 ft) background soil data used to determine the BTVs for these two metals should also be included in Table 11 of Appendix H for completeness. It should be noted that UTL (or other upper-tail statistics) calculations are generally not recommended for small data sets (e.g., n < 20) in accordance with DTSC (1997) guidance.	A full explanation of the development of the STF BTVs and evaluation of the background data sets is included in Appendix I of the Site 1 Dynamic Site Investigation Report (Tetra Tech 2009a). This process included a statistical comparison of metal concentrations between six background soil depth intervals (0.5 ft, 5 ft, 10 ft, 0-5 ft, 0-10 ft, and 5-10 ft). For all metals except selenium and silver, no differences were found between the surface and subsurface/deep concentrations. Thus, data for all depths were combined in order to maintain the largest possible data set to compute upper tolerance limits (UTLs), as per DTSC (1997) guidance. Sample sizes used to calculate UTLs for all metals in STF background consisted of at least 20 samples. Specifically, a sample size of n=44 was available for all metals except silver and selenium. For silver, sample sizes of n=20 for	Additional detail will be provided in Section 2.3 of Appendix H to explain the derivation of BTVs for the STF, as well as a complete reference to the Site 1 DSI. Summary statistics for selenium and silver for the 5-10 ft depth interval will be added to Table 11.

Comments from CY Jeng, DTSC HERD		
Comment	**Response**	**Proposed Action**
	surface (0.5 ft) and n=24 for subsurface (5-10 ft) were used, since a significant difference was found between silver concentrations in surface and subsurface depth intervals. Selenium was detected only once among background soils, in the subsurface. Therefore the detected value was used to represent background for that interval, and no value was used for the surface. The summary statistics for selenium and silver in soils 5-10 feet will be added to Table 11.	
Specific Comment 3. Appendix H, Section 2.1.4; In the first paragraph, the reference to Table 8 appears to be incorrect, and the appropriate tables (Tables 10 and 11) should be cited instead.	The text will be corrected.	The table citation will be corrected to Tables 10 and 11.
Specific Comment 4. Appendix H, Section 2.2; Attachment A (graphical comparisons for all metals) is not included in the PDF file for Appendix H, and should be submitted to DTSC for review.	The attachment with the graphical comparisons was inadvertently not included in the report. The attachment will be included in the revised report.	The attachment containing the graphical comparison is also being submitted (in an accompanying CD) for review as part of these RTCs and will be included in the report.
Specific Comment 5. Appendix H, Section 2.3; Please clarify is the comparisons with BTVs were performed only for metals with detections insufficient for the statistical testing. For example, HERD notes that thallium concentrations in the WDA are significantly higher than its BTV, but was not flagged on Table 5-3 as exceeding BTV. In addition, the following statement is confusing: “A value was considered to be equal to the maximum background concentration if the value was within rounding error of one significant decimal of the maximum detected background concentration,” and HERD recommends changing “maximum (detected) background	The purpose of the BTV comparison was both to identify COPCs where statistical comparison could not be applied, as well as to identify possible areas where localized concentrations could indicate possible site contamination. Thus, comparisons between metal concentrations in Site soil and BTVs were conducted where the following occurred: 1. Insufficient sample size or number of detections in either the Site or Background data sets precluded parametric or non-	The text in Section 2.3 of Appendix H will be revised to clarify the intent of the BTV comparisons and describe the data used in the comparisons. Tables 13 and 14 will be updated in accordance with the text. The text in Section 2.3 will be revised to clarify the definition of ‘potentially elevated’ metals

Comments from CY Jeng, DTSC HERD		
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concentration" to "BTV" as some of the comparisons were with UTLs.	parametric statistical comparison, or 2. The data distribution was non-normal and no statistical difference was identified by a lognormal t-test or WRS test. BTV comparisons were not conducted for any metals identified as being statistically greater than background. Table 5-3 will be updated to show only the metals which fit the conditions described above, and the text in Appendix H, Section 2.3 will be revised to clearly explain how the BTV comparisons were applied. The comparison described in the text of Appendix H, Section 2.3 refers to the detailed approach to determining an elevated value. When examining the plots, it is apparent that although some site values exceed the BTV, they lie within the distribution and general range of background. Therefore, a metal was only considered potentially elevated if one or several concentrations exceeded both the BTV and maximum background concentration (if different) by a notable margin. The text will be revised to clarify this point. The sentence referred to in the comment will be revised as follows: "A value was not considered to be elevated if the value was within rounding error of one significant decimal of the BTV or maximum background concentration."	relative to the BTV or maximum background concentration.

Comments from CY Jeng, DTSC HERD		
Comment	**Response**	**Proposed Action**
Specific Comment 6. Appendix H, Section 3.0: Please check the counts of metals potentially elevated above background in Area K and the WDA as they do not match Table 5-3. The text should be updated as appropriate to be consistent with Table 5-3 (and Table 14 of Appendix H). Furthermore, a common list of COPCs for the site (not by area) should be developed for use in the risk assessment since most of the operational areas are contiguous.	The text in Section 3.0 will be updated to be consistent with Table 5-3, including any changes made as a result of these comments. A common list of COPCs can be developed for use in developing toxicity databases and exposure models applied in the HHERA, for the site-wide ERA of wide ranging species, and for DTSC's information. However, as indicated in the HHRA work plan and the SERA (Tetra Tech 2009b, 2009c), risks will be evaluated separately for each area of concern (AOC) and for only the COPCs/COPECs identified in that AOC. The rationale for evaluating the areas separately is that historical operations differed greatly between the AOCs. Area J was used for the final mechanical assembly of rocket motors which were manufactured offsite; Area K was used for test firing rocket motors and for conditioning motors prior to testing; Area L does not appear to have been used for industrial purposes; Area M was used as a garbage disposal area; and the Waste Discharge Area was used for industrial waste disposal, and may have been used as a burn area. Each of these areas has a different set of COPCs/COPECs, and should therefore be evaluated independently. Furthermore, even though the boundaries of the historical operational areas are shown as being contiguous for graphical purposes, the actual areas used for former operations (and the associated contaminants) are not contiguous. Accordingly, exposure to several sets of COPCs/COPECs will only be evaluated in cases	The bullets in Section 3.0 will be updated to be consistent with Table 5-3. A summary table of all COPC/COPECs by AOC and for all of Site 2 will be provided.

Comments from CY Jeng, DTSC HERD		
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	where receptors, such as wide-ranging biota, may be exposed across all of the AOCs.	
Specific Comment 7. As discussed in Section 6.3.4, soil sources have not been identified for the RDX detected in groundwater in the MW2-13 and MW2-24 areas. HERD suggests continuing the groundwater monitoring for RDX at these and immediately downgradient wells, and collecting additional soil data from these areas to investigate possible sources for groundwater impact and to support risk assessment. Pending the results of 1,4-dioxane and NDMA analyses in the next two rounds of groundwater sampling, additional soil and/or groundwater characterization may also be required to identify source and to define the extent of these emerging contaminants.	Comment noted.	A work plan for additional investigation to address several data gaps, including additional soil sampling for RDX, 1,4-dioxane, and NDMA, is currently in preparation. The work plan will be provided to DTSC under separate cover.

REFERENCES

Tetra Tech, Inc. 2009a. Dynamic Site Investigation Report, Lockheed Martin Corporation, Beaumont Site 1, Beaumont, California. Final, October.

Tetra Tech, Inc. 2009b. Final Human Health Risk Assessment Soil Work Plan, Lockheed Beaumont Site 2, Beaumont, California. July.

Tetra Tech, Inc. 2009c. Scoping Ecological Risk Assessment, Lockheed Beaumont Site 2, Beaumont, California. June.

Comments from Dina Kourda, DTSC GSU		
Comment	**Response**	**Proposed Action**
General Comment 1. All comments and requests made, discussed, and agreed upon during the September 16, 2009 meeting and September 17, 2009 field visit pertaining to further investigations should be addressed accordingly.	Comment noted.	A work plan for additional investigation to address several data gaps, including additional soil sampling for RDX, 1,4-dioxane, and NDMA, is currently in preparation. The work plan will be provided to DTSC under separate cover.
General Comment 2. All tables should include appropriate comparison values to background, risk-based screening levels (RBSLs), Maximum Contaminant Levels (MCLs), background threshold values (BTVs), California Human Health Screening Levels (CHHSLs), Drinking Water Notification Levels (DWNLs), etc.	A risk assessment is being planned to evaluate human health and ecological risks at this Site. The risk assessment will follow USEPA and DTSC guidance, and will evaluate all potentially complete exposure pathways. The results of the risk assessment will provide much more detail than a simple screening using the suggested criteria. Consequently, the risk assessment will serve as the basis for risks associated with releases at this site. MCLs, DWNLs will be provided for comparisons to chemicals detected in groundwater as this is consistent with the approach requested by DTSC for evaluating human health risks. Risk-based criteria for soil such as CHHSLs and RSLs will also be presented. As discussed in Appendix H, background comparisons are more detailed than a simple comparison to BTVs and therefore, the results in Table 5-3 will be the primary basis for determining whether metals are elevated above background levels.	Tables will be modified to include comparison values (i.e., CHHSLs, RSLs, MCLs, DWNLs) relevant to each medium and analyte, with the understanding that health and ecological risks will be evaluated during the risk assessments.

Comments from Dina Kourda, DTSC GSU		
Comment	**Response**	**Proposed Action**
Specific Comment 1. Appendix A: The Title of the appendix should be more descriptive of its content. Semiannual Groundwater Monitoring Report" should replace, "Groundwater Monitoring Results."	Comment noted.	Appendix A will be replaced with a comprehensive table summarizing all historical groundwater monitoring results.
Specific Comment 2. Appendix C: The Geophysical Survey Report should be signed and stamped by a California licensed geophysicist.	Comment noted.	A stamped copy of the Geophysical Survey Report will be included as Appendix C of the final report.
Specific Comment 3. Appendix J: All lab reports should be signed including lab report "A9B1227 Tetra Tech Lockheed."	Comment noted.	A signed copy of laboratory report A9B1227 will be included in Appendix J of the final report.
Specific Comment 4. Figure 2-2: The double line perpendicular to Gilman Springs Road transecting the Wolfskill Property should be identified.	The lines in question are parcel boundaries which denote the location of a Southern California Edison transmission line right-of-way.	Figure 2-2 will be revised to label the parcel in question as an SCE transmission line right-of-way.
Specific Comment 5. Section 4.1.7.2, Page 4-13: It should be specified whether or not Summa canister regulators were dedicated or if a single regulator was used. If so, it should be described how it was decontaminated between sampling locations.	A single regulator was used, which was decontaminated between samples by purging ambient air through the regulator for 3 minutes, in accordance with the laboratory's standard operating procedures for soil gas sampling.	The text in Section 4.1.7.2, Page 4-13 will be modified to state that a single regulator was used for soil gas sampling, and to describe the procedure used for decontamination.
Specific Comment 6. Figures 5-9 and 5-10: The typo TT-MW2-29A/B/C and TT-MW2-9A/B/C, respectively, should be corrected	Comment noted.	Figure 5-10 will be revised to correct the typographical error.
Specific Comment 7. Figures 5-19 (A-A') and 5-20 (D-D'): The intersections are not congruent on respective figures and should be corrected.	Comment noted.	Figures 5-19 and 5-20 will be revised so that the cross-sections match at their intersection.

Comments from Dina Kourda, DTSC GSU		
Comment	**Response**	**Proposed Action**
Specific Comment 8. Figures 5-40 (I-I’) and 5-41 (J-J’): The intersections are not congruent on respective figures and should be corrected.	Comment noted.	Figures 5-40 and 5-41 will be revised so that the cross-sections match at their intersection.
Specific Comment 9. Figure 5-47: Soil boring SB-6 should be identified on this figure.	Soil boring SB6 was completed as well TT-MW2-24. TT-MW2-24 is shown on Figure 5-47.	Figure 5-47 will be revised to indicate both boring and well designations where appropriate, including TT-MW2-24/SB6.
Minor Comment 1. Appendix D: The font should be checked on the title of each soil-gas diagram. The word, “Soil” appears as “Soll.”	Comment noted.	The soil gas probe completion diagrams in Appendix D will be revised to clarify the spelling of “Soil.”

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TC 22289-090301

Prepared for
Lockheed Martin Corporation
Burbank, California

Prepared by
Tetra Tech, Inc.

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APPENDICES

1.0 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech) has prepared this Dynamic Site Investigation and Summary Remedial Investigation (DSI) report on behalf of Lockheed Martin Corporation (LMC) for the Beaumont Jack Rabbit Trail facility (LMC Beaumont Site 2), hereinafter referred to as the Site. The Site is located southwest of the City of Beaumont, in Riverside County, California (Figure 1-1).

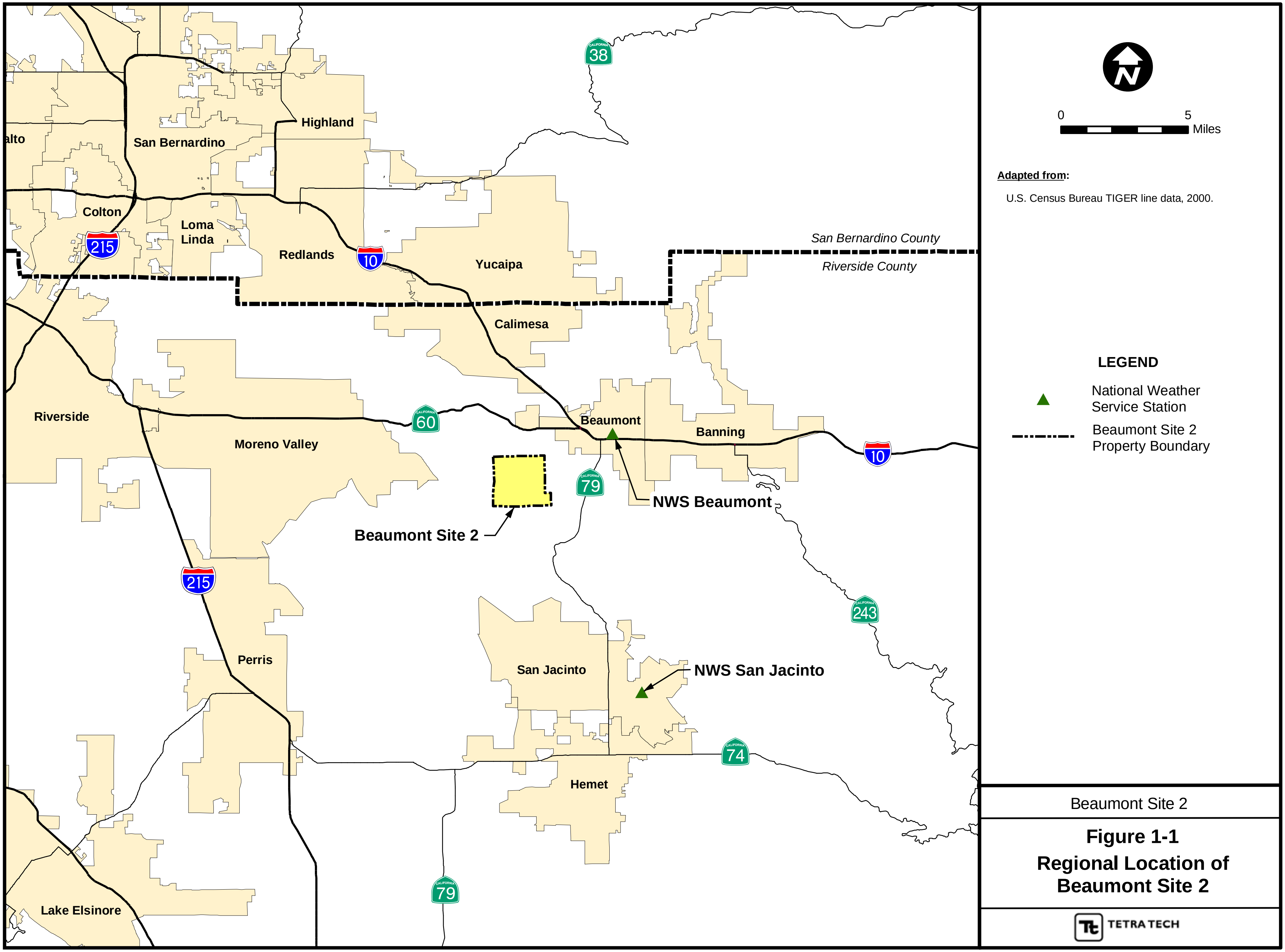
This Report was prepared pursuant to Consent Order HSA 88/89-034 dated June 16, 1998, issued to LMC by the California Department of Health Services, Toxic Substances Control Division (CDHS; CDHS, 1989), and amended in 1991 (CDHS, 1991). The Consent Order required that LMC investigate and appropriately remediate any releases or threatened releases of hazardous substances to the air, soil, surface water, and groundwater at or from the Site.

The overall objective of the DSI was to complete characterization of the Site in order to support the evaluation of remedial alternatives. Work was conducted in accordance with the DSI Work Plan dated September 2008 (Tetra Tech, 2008). Additional site characterization work was also conducted in the former Waste Discharge Area (WDA), in accordance with recommendations provided in the Supplemental Site Investigation Report, Former Liquid Waste Discharge Ponds and Southern Property Boundary, dated February 2009 (Tetra Tech, 2009d).

In addition to the above, this report summarizes the results of previous investigations conducted at the Site since 2003. The analytical data from these historical investigations are included in the data tables provided here, and the historical data are integrated into the interpretations and conclusions presented in this report. Older historical investigations conducted at the Site between 1989 and 1995 are also reviewed in this report, but the data collected as part of these investigations are only used qualitatively.

1.1 SITE BACKGROUND

The Site consists of 2,668 acre of land located southwest of Beaumont, California (Figure 1-1). Prior to 1958, the parcels that comprise the Site were owned by individuals and the United States (U.S.) government, and were used for agricultural purposes. Between 1958 and 1960, portions of the Site were purchased by Grand Central Rocket Company (GCR) for use as a remote rocket motor test facility (Radian, 1986a). In 1960, Lockheed Aircraft Corporation (LAC) purchased one half interest in GCR. In 1961, GCR became a wholly owned subsidiary of LAC. The remaining parcels of land that comprise the Site were purchased from the U.S. government between 1961 and 1964. In 1963, Lockheed Propulsion Company (LPC) became an operating division of LAC, and was responsible for the operation of the Site until its closure in 1974. In 2006, the Site was sold to the County of Riverside.



Beaumont Site 2

Figure 1-1
Regional Location of Beaumont Site 2

From 1958 to 1974, the Site was utilized by GCR and LPC for small rocket motor assembly, rocket motor testing operations, propellant incineration, and minor disposal activities (Radian, 1986a). Ogden Technology Laboratories, Inc. (Ogden) is known to have leased portions of the Site in the 1970s (Radian, 1986a). According to interviews with LPC personnel familiar with the Site, a portion of the Site was also used by General Dynamics for testing remote sensing devices in the late 1980s (Tetra Tech, 2009a). Figure 1-2 shows the locations of historical operational areas and features of the Site.

In 1989, CDHS issued Consent Order 88/89-034 requiring LMC to cleanup contamination at the Site related to past testing activities (CDHS, 1989; 1991). Based on site characterization and cleanup activities performed by LMC from 1990 to 1993, the California Department of Toxic Substances Control (DTSC) issued a Report of Completion of Removal Action dated April 30, 1993 stating that no further action was necessary (DTSC, 1993).

Based on regulatory interest in perchlorate and 1,4-dioxane, a groundwater sample was collected from an inactive groundwater production well (well W2-3) at the Site in January 2003. The sample was analyzed for volatile organic compounds (VOCs), perchlorate, and 1,4-dioxane. VOCs and 1,4-dioxane were not detected in the groundwater sample, but perchlorate was detected at a concentration of 4,080 micrograms per liter (µg/L), which exceeded the then-current State of California Drinking Water Notification Level (DWNL) of 4 µg/L. The perchlorate DWNL has since been upgraded to a Maximum Contaminant Level (MCL) and revised to 6 µg/L. Based on the detection of perchlorate in groundwater, the DTSC reopened the Site for further assessment.

Four primary historical operational areas were identified at the Site by Tetra Tech (2003). Based on new information obtained since 2003, a fifth area (the WDA) has been identified at the Site as a potential source area (Tetra Tech, 2007b). Each area was responsible for various activities associated with rocket motor assembly, testing, and propellant incineration. The locations of the 4 historical operational areas and the WDA are shown on Figure 1-2. A brief description of each operational area follows.

1.1.1 Historical Operational Area J – Final Assembly

Area J consists of a former building (Building 250) and related facilities which were used for the final assembly and shipment of rocket motors for the Short Range Attack Missile program from 1970 to 1974. Rocket motor casings containing solid propellant were manufactured off-Site and transported to Building 250, where final hardware assembly was conducted (Radian, 1986a). Assembly operations reportedly included installation of the motor nozzle and headcap, pressure check of the motor, installation of electrical systems, and preparation of the assembled motor for shipment (Radian, 1986a). During facility

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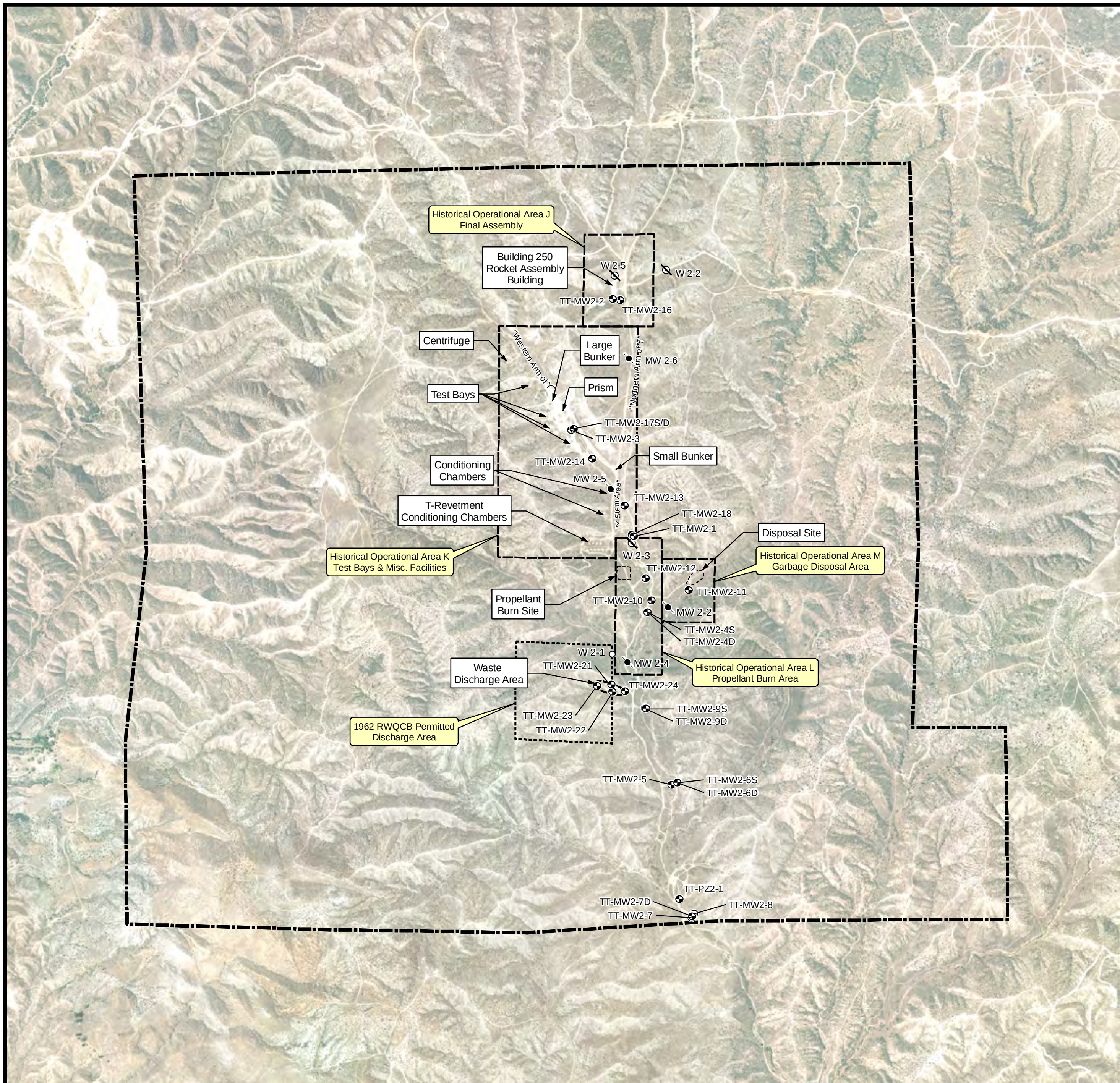

N

0 1,000 2,000
Feet

Adapted from: March 2007 aerial photograph.

LEGEND

- Groundwater Monitoring Well Location
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Beaumont Site 2 Property Boundary
- Historical Operational Area Boundary
- RWQCB Permitted Discharge Area
- Liquid Waste Disposal Area

Note: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

Disposal and Propellent Burn Site perimeters are estimated (Radian, 1986a).

Beaumont Site 2

Figure 1-2
Historical Operational Areas and Site Features

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closure in 1974, all usable parts of this facility were dismantled, taken off Site and sold. Building 250 was demolished in 1991 (Radian, 1993). At present, only the building foundation remains.

Two groundwater production wells (W2-2 and W2-5) were formerly located in Area J. Well W2-5 was installed by LMC and was used to supply water for Site operations. Quimby (1975) refers to a homestead ("Lonesome Valley Ranch") with a windmill formerly located in the vicinity of Well W2-2. It is probable that Well W2-2 was a domestic or agricultural well associated with the former homestead. Wells W2-2 and W2-5 were destroyed in accordance with California well standards and permits issued by the Riverside County Department of Environmental Health (RCDEH) in December 2007 (Tetra Tech, 2009c).

1.1.2 Historical Operational Area K – Test Bays and Miscellaneous Facilities

Area K is divided into 2 subareas. Subarea K-54 is located in Test Bay Canyon, and includes a test centrifuge, 4 rocket motor test bays, 2 bunkers, and a large earthen structure referred to as the "Prism." Subarea K-55 is located in Laborde Canyon immediately south of Test Bay Canyon, and includes 3 groups of conditioning chambers.

The centrifuge was located in a small side canyon on the western side of the northern portion of Test Bay Canyon. Rocket motors were attached parallel to the centrifuge arm and test fired to evaluate whether the solid propellant would separate from the motor casing under increased gravitational forces. Structures remaining at this location include the centrifuge mounting pedestal, and an earthen berm separating the centrifuge area from the main portion of Test Bay Canyon. A second bermed area, which contains the remains of an electrical control panel, is located to the north of the centrifuge.

The test bays were located in box canyons on the western side of the central portion of Test Bay Canyon. Initially, only 3 test bays (Test Bays 1, 2, and 3) were recognized; a fourth test bay (Test Bay 4) was subsequently identified based on interviews with former LPC employees. The test bays were used for test firing rocket motors. Historic photographs included in Radian (1986a) and Tetra Tech (2009a) show that rocket motors were mounted horizontally in the test bays so that the exhaust plume extended into Test Bay Canyon. Features remaining at Test Bays 1, 2, and 3 include the concrete test bay structures and concrete pads which extend eastward from the test bays. The test bays were filled with soil in 2003 to reduce potential safety hazards. Structures remaining at Test Bay 4 include a metal-faced concrete feature, which appears to be a thrust block, and a concrete pad extending to the east of the thrust block.

The bunkers include a small bunker located near the junction of Test Bay Canyon and Laborde Canyon, and a large bunker located between Test Bays 1 and 4. The small bunker was used as a control bunker during early operations at the Site. The large bunker, which is partitioned into several rooms, was used as a control bunker during later testing operations. By 2003, the roof of the small bunker had collapsed. This structure was filled with soil in 2003 to reduce potential safety hazards. The large bunker is largely intact.

The Prism is a large earthen structure located in the central portion of Test Bay Canyon. The Prism was reportedly constructed by General Dynamics for testing remote sensing equipment (Tetra Tech, 2009a). It is not known exactly when the Prism was constructed. However, the Prism was not observed in 1984 aerial photos and was not noted in the Radian historical report (Radian, 1986a), but was observed in 1990 aerial photos (Tetra Tech, 2009a). Field observations suggest that up to 10 feet of soil may have been excavated from the surrounding area and used for construction the Prism. The Prism is largely intact, although evidence of erosional failure is apparent on the southern face of the structure.

The conditioning chambers were located in 3 box canyons on the western side of Laborde Canyon, to the south of Test Bay Canyon. The conditioning chambers were reportedly used to examine the effects of extreme temperatures on rocket motors and to meet specification requirements (Radian, 1986a). Concrete slabs are present at the former locations of the 2 northern conditioning chambers. A T-shaped earthen berm and revetments (referred to as the “T-Revetment”) is present further to the south. Nine conditioning chambers were reportedly present in the T-Revetment area (Radian, 1986a; Tetra Tech, 2009a). The berms, revetments, and concrete pads within the revetted areas remain intact.

One possible well was formerly located in Area K. Unknown #2 consisted of an 8-inch steel casing extending to at least 61 feet below ground surface (bgs), where it was obstructed by dirt and rocks (Tetra Tech, 2009c). No additional information was found regarding this well. Unknown #2 was destroyed in accordance with California well standards and permits issued by the RCDEH in November 2007 (Tetra Tech, 2009c).

1.1.3 Historical Operational Area L – Propellant Burn Area

Area L is located immediately south of Area K. According to Radian (1986a), large slabs of solid propellant were reportedly transported to Area L and placed on the ground surface for incineration. Diesel fuel was reportedly used to initiate combustion, and once ignited, the propellant would burn rapidly. Reportedly, no pits or trenches were dug as part of the burning process.

No obvious man-made structures, such as concrete pads, regularly-shaped depressions, berms, or other features which may indicate where propellant incineration could have taken place are present within Area L, and historical aerial photographs reviewed by Tetra Tech (2009a) showed no evidence of brush clearing or other activities consistent with propellant incineration within Area L. Furthermore, site investigation work conducted by Tetra Tech (Tetra Tech, 2005a and this report) has not found evidence of burning or significant contamination in Area L. It is possible that propellant incineration activities at the Site may have been conducted in the WDA (Section 1.1.5 below) rather than Area L.

Two former groundwater production wells (W2-1 and W2-3) and one possible well (Unknown #1) were associated with Area L. Well W2-1 was reportedly located in a side canyon off of Laborde Canyon, near the former Maynard Ranch homestead (Quimby, 1975), but was not found during Site investigations. Based on its reported proximity to the former homestead, W2-1 was likely used for domestic or agricultural purposes. Well W2-3 and an apparently associated water tank are shown on the USGS 7.5 minute El Casco topographic quadrangle map. Quimby (1975) notes that a windmill was formerly present in this area. W2-3 appears to have been used for domestic or agricultural purposes by one of the former homesteads. Unknown #1 consisted of a 12-inch diameter steel casing extending to at least 18 feet bgs, where it was obstructed by soil and rocks (Tetra Tech, 2009c). Soil sampling conducted during destruction of Unknown #1 suggests that native materials were present at depths of 45 to 55 feet bgs (Tetra Tech, 2009c). Wells W2-3 and Unknown #1 were destroyed in accordance with California well standards and permits issued by the RCDEH in December and November 2007, respectively (Tetra Tech, 2009c).

1.1.4 Historical Operational Area M – Garbage Disposal Area

Area M is located in Disposal Site Canyon, a major side canyon located south of Area L on the eastern side of Laborde Canyon. Materials disposed in Area M by LPC reportedly included scrap metal, paper, wood, and concrete. According to Radian (1986a), hazardous materials, including explosives and propellants, were never disposed of at the disposal site by LPC. The Area M disposal site was also used by Ogden Labs, a company that that tested valves and explosive items. Reportedly, Ogden Labs disposed of hazardous materials at the disposal site. In 1972, a Lockheed Safety Technician was exposed to unsymmetrical dimethylhydrazine (UDMH) vapors from a pressurized gas container located within the disposal site. Based on potential exposure risks to site personnel, LPC's safety group required Ogden Labs to take measures to remove any potentially hazardous materials from the disposal site. Shortly thereafter, a disposal company was reportedly contracted by Ogden to clean up the disposal site (Radian, 1986a). Radian (1986a; 1993) reported that surficial debris at the Area M disposal site included concrete debris, scrap wood, metal pipes, several junked cars, and metal drums labeled "non-contaminated."

In 1993, a removal action was conducted at the Area M disposal site with oversight from DTSC (Radian, 1993). As part of the removal action, the surficial debris was removed and a total of 816.45 tons of non-hazardous waste materials were excavated and disposed off-site. A Report of Completion of Removal Action for the disposal site was subsequently issued by the DTSC on April 30, 1993 (DTSC, 1993).

Features remaining at Area M include 2 mounds of soil referred to by Radian (1993) as the "North Mound" and "South Mound." The mounds mark the approximate northeastern and southwestern limits of the former disposal area, and according to Radian (1993), consist of soil excavated from the original disposal trench.

1.1.5 Waste Discharge Area

In 2007, LMC discovered the existence of Santa Ana River Basin Regional Water Pollution Control Board (SARWPCB) Resolution 62-24, issued to LPC on September 14, 1962 (SARWPCB, 1962). Resolution 62-24 prescribed requirements for the "discharge of industrial wastes (rocket fuel residuum) to excavated pits." The discharge area was described as 2 shallow basins protected by 2-foot berms, located in a small canyon on the western side of Laborde Canyon, in the SW ¼ of the NW ¼ of Section 19, Township 3 South, Range 1 West, San Bernardino Baseline and Meridian. Resolution 62-24 further described the wastes to be discharged as "residue remaining after the manufacturing refuse is burned," and indicated that amount of material to be discharged was "approximately 5,000 gallons per year."

The exact nature of the waste proposed for discharge is not clear from the language of Resolution 62-24. The description of the waste material suggests that the area may have been used for propellant incineration; but the use of volume units to describe the quantity of material to be discharged suggests that the waste may have been liquid rather than solid. A 1961 aerial photograph shows the WDA as a large cleared area with roads leading to 2 circular structures, suggesting that the WDA was in use by 1961 (Tetra Tech, 2009a). The brush clearing is consistent with use of the area for propellant incineration rather than disposal of liquids. Investigation of this area (Tetra Tech, 2007b; 2009d) found perchlorate and chlorinated solvent impacts in both soil and groundwater.

Features remaining at the WDA include 2 roughly circular depressions surrounded by earthen berms, at the approximate locations of the circular structures identified in the 1961 aerial photograph (Tetra Tech, 2009a).

1.2 INVESTIGATION OBJECTIVES

The overall objective of the DSI was to complete characterization of the Site in order to support the evaluation of remedial alternatives. More specifically, the objectives include the following:

- to characterize the nature and extent of perchlorate source areas in soil;

- to characterize the nature and extent of groundwater impacted by perchlorate and other chemicals of concern at the Site;
- to characterize areas of the Site with potentially elevated metals concentrations in soil; and
- to characterize potential soil gas impacts and further characterize groundwater impacts in the WDA.

1.3 TECHNICAL APPROACH

The field investigation followed the general guidelines of the United States Environmental Protection Agency's (USEPA) Triad Approach, which consists of systematic planning, a flexible work strategy, and accelerated data acquisition and real-time data evaluation. This strategy was used to organize what was already known about each area being investigated and to identify information gaps to guide project decisions. The overall Conceptual Site Model (CSM) for the Site was the primary planning tool used to organize the existing Site information, identify the data gaps addressed by the DSI, and guide project decisions during implementation of the investigation.

The investigation consisted of collecting additional field and analytical data to fill data gaps in areas where impacted soil and/or groundwater were identified during previous investigations, but not completely characterized with respect to magnitude and spatial extent. Soil gas data were also collected at the WDA, the only area of the Site where significant VOC concentrations have been detected in soil and groundwater. The investigation utilized a variety of techniques, including hand auger, direct-push, hollow stem auger (HSA), and sonic, for drilling soil borings, conducting grab groundwater sampling, and installing soil gas probes. Groundwater monitoring wells were installed in HSA or sonic boreholes based on subsurface lithology and well completion depth. Soil and groundwater samples were submitted to E.S. Babcock and Sons, Inc. for analysis on a rush-turnaround time (TAT) basis to obtain near real-time data for decision making purposes. Soil gas samples were collected and analyzed by American Environmental Testing Laboratories, Inc. (AETL) on a standard TAT basis.

1.4 REPORT ORGANIZATION

This Report is organized into the following sections:

- Section 1 – Introduction: This section provides a brief overview of the Report and a summary of historical operations at the Site.
- Section 2 – Previous Environmental Investigations: This section summarizes the major environmental investigations previously conducted at the Site.
- Section 3 – Physical Setting: This section provides a description of the physical, geologic, and hydrogeologic setting along with the distribution of affected groundwater based on historical information and data collected during previous investigations.
- Section 4 – Field Methodology: This section provides a description of the field activities performed during the installation of soil borings, soil vapor probes, and groundwater monitoring wells as part of the DSI. The information presented includes a summary of the sampling and

analytical work performed in each area during the DSI. Any deviations from the DWP are also included in this section.

- Section 5 –Investigation Results and Discussion: This section provides an overview of the results of the DSI, a detailed discussion of the results of this and previous investigations organized by area, and a discussion of the nature and extent of environmental impacts resulting from previous operations at the Site.
- Section 6 – Updated Conceptual Site Model: This section presents an updated CSM for the Site based on the results of the DSI. The updated CSM focuses on the site wide distribution of soil and groundwater impacts for the purpose of identifying appropriate mitigation measures and remedial alternatives.
- Section 7 – Conclusions: This section summarizes the conclusions drawn from the results of the DSI.
- Section 8 – References: This section provides a list of documents, sources, and publications referenced in this Report.

2.0 PREVIOUS INVESTIGATIONS

Previous work at the Site can generally be divided into two time periods: initial work leading up to a removal action in Historical Operational Area M and subsequent closure of the Site by the DTSC in 1993; and later work related to the discovery of perchlorate-impacted groundwater and reopening of the Site by the DTSC in 2003.

To simplify discussion of the previous reports, a brief sampling and analysis summary for each investigation is provided in Table 2-1. Analytical data for the investigations conducted after 2003 are summarized in tables included in Section 5 of this report. Soil boring, monitoring well, and soil gas sampling locations referenced below and in Table 2-1 are shown in Figure 2-1.

2.1 INITIAL WORK

2.1.1 Historical Report (Radian, 1986a)

The Historical Report summarized historical operations at the Site and at the former LMC Potrero Creek facility (Beaumont Site 1) based on review of LMC files, inspection of the Site, interviews with past employees, and a review of an aerial photograph dated 1980. The aerial photograph is poorly reproduced in the copy of the report available to Tetra Tech, and many of the annotations are illegible.

Features associated with former LPC operations indentified in the Historical Report include the Final Assembly Building (Area J); 4 test bays, the centrifuge, the small bunker, the 2 northern conditioning chambers, and the T-revetment conditioning chambers (Area K); the reported propellant burn area (Area L), and the garbage disposal site (Area M). It is not clear whether the site operations discussed in the Historical Report include early operations predating the acquisition of GCR by LPC.

Several minor inconsistencies were noted in the historical report. For example, 4 test bays are mentioned in the report text, but only 3 are shown on Figure 3-43 of Radian (1986a). Many of the features shown on Figure 3-43 are not accurately located, and there is no mention of the large bunker located in Test Bay Canyon. In addition, the information sources used to reconstruct past activities at the Site are not clearly indicated in the report.

2.1.2 Preliminary Remedial Investigation (Radian, 1986b)

The Preliminary Remedial Investigation consisted of collecting and analyzing groundwater samples from 9 existing wells at Beaumont Site 1, and collecting and analyzing 1 groundwater sample from an existing groundwater production well at the Site. The well sampled at the Site was W2-3, located in Laborde Canyon south of Test Bay Canyon (Figure 2-1). The groundwater sample was analyzed for VOCs using

TABLE 2-1
SAMPLING AND ANALYSIS SUMMARY
PREVIOUS INVESTIGATIONS

				Soil									Groundwater										Soil Gas	
					No. Soil Samples Analyzed									No. Groundwater Samples Analyzed										
Boring Designation	Well Designation	Drilling Method	Boring Depth (feet bgs)	No. Soil Samples Collected	Perchlorate	T22 Metals	TPH (gasoline)	TPH (Diesel)	VOCs	1,4-Dioxane	SVOCs	PCBs	No. Monitoring Wells Installed	Perchlorate	T 22 Metals	Hexavalent Chromium	VOCs	SVOCs	1,4-Dioxane	NDMA	Explosives	Nitrate	No. Soil Gas Probes Installed	No. Samples Analyzed for VOCs
Preliminary Remedial Investigation (Radian, 1986b)																								
-	W2-3	-	Unk	-	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	-	-	-	-
Hydrogeologic Investigation and Landfill Investigation Work Plan (Radian, 1992)																								
BH2-1	-	HSA	40	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2-2	-	HSA	40	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2-5	-	HSA	46	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2-6	-	HSA	46	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2-7	-	HSA	50	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW2-2	MW2-2	ARCH	140	-	-	-	-	-	-	-	-	-	1	1	1	-	1	1	-	-	-	-	-	-
MW2-4	MW2-4	ARCH	62	-	-	-	-	-	-	-	-	-	1	1	1	-	1	1	-	-	-	-	-	-
MW2-5	MW2-5	ARCH	100	-	-	-	-	-	-	-	-	-	1	2	2	-	2	2	-	-	-	-	-	-
MW2-6	MW2-6	ARCH	95	-	-	-	-	-	-	-	-	-	1	1	1	-	1	1	-	-	-	-	-	-
-	W2-3	-	Unk	-	-	-	-	-	-	-	-	-	0	1	1	-	1	1	-	-	-	-	-	-
-	W2-4	-	Unk	-	-	-	-	-	-	-	-	-	0	1	1	-	1	1	-	-	-	-	-	-
-	W2-5	-	Unk	-	-	-	-	-	-	-	-	-	0	1	1	-	1	1	-	-	-	-	-	-
Disposal Area Removal Action (Radian, 1993)																								
Trench T1	-	-	-	1	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Trench T2	-	-	-	1	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Trench T3	-	-	-	1	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Excavation	-	-	-	3	-	3	-	-	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
-	MW2-2	-	Unk	-	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	-	1	-	-
-	MW2-5	-	Unk	-	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	-	1	-	-
-	MW2-6	-	Unk	-	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	-	1	-	-
Monitoring Well Abandonment (LMC, 1995)																								
-	MW2-2	-	Unk	-	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	-	-	-	-
-	MW2-4	-	Unk	-	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	-	-	-	-
-	MW2-5	-	Unk	-	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	-	-	-	-
-	MW2-6	-	Unk	-	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	-	-	-	-	-
Groundwater Monitoring Well Installation (Tetra Tech, 2004)																								
Tt-MW2-1	Tt-MW2-1	HSA	81.0	-	-	-	-	-	-	-	-	-	1	1	1	-	1	1	1	1	-	-	-	-
Tt-MW2-2	Tt-MW2-2	HSA	121	-	-	-	-	-	-	-	-	-	1	1	1	-	1	1	1	1	-	-	-	-
Tt-MW2-3	Tt-MW2-3	HSA	115	-	-	-	-	-	-	-	-	-	1	1	1	-	1	1	1	1	-	-	-	-
Tt-MW2-4	Tt-MW2-4S/D	HSA	106	-	-	-	-	-	-	-	-	-	2	2	2	-	2	2	2	2	-	-	-	-
Soil Investigation (Tetra Tech, 2005a)																								
Area J																								
J-53-DP1	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1
J-53-DP2	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1
J-53-DP3	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1
J-53-DP4	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1
J-53-DP6	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1
J-53-DP7	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1
J-53-DP8	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1
J-53-DP9	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1
J-53-DP10	-	HSA	21.5	4	4	2	4	4	4	3	3	3	-	-	-	-	-	-	-	-	-	-	1	1

TABLE 2-1
SAMPLING AND ANALYSIS SUMMARY
PREVIOUS INVESTIGATIONS

				Soil									Groundwater										Soil Gas	
					No. Soil Samples Analyzed									No. Groundwater Samples Analyzed										
Boring Designation	Well Designation	Drilling Method	Boring Depth (feet bgs)	No. Soil Samples Collected	Perchlorate	T22 Metals	TPH (gasoline)	TPH (Diesel)	VOCs	1,4-Dioxane	SVOCs	PCBs	No. Monitoring Wells Installed	Perchlorate	T 22 Metals	Hexavalent Chromium	VOCs	SVOCs	1,4-Dioxane	NDMA	Explosives	Nitrate	No. Soil Gas Probes Installed	No. Samples Analyzed for VOCs
J-52-HA1	-	HA	5.0	2	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
J-53-HA2	-	HA	5.0	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
Area K																								
K-54-DP1	-	HSA	21.5	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP2	-	HSA	21.5	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP3	-	HSA	21.0	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP5	-	HSA	21.0	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP6	-	HSA	21.0	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP8	-	HSA	21.5	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP10	-	HSA	21.0	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP11	-	HSA	21.0	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP12	-	HSA	20.5	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP14	-	HSA	21.0	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP15	-	HSA	21.5	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP16	-	HSA	21.0	4	4	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP17	-	HSA	21.5	4	4	-	-	-	4	3	3	-											1	1
K-54-DP18	-	HSA	21.0	4	-	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP19	-	HSA	21.5	4	-	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-DP20	-	HSA	21.5	4	-	2	-	-	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-54-HA1	-	HA	5.0	2	2	2	-	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-HA3	-	HA	5.0	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-DP21	-	HSA	21.5	4	4	2	4	4	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-55-DP22	-	HSA	20.5	4	4	2	4	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
K-55-DP23	-	HSA	21.5	4	4	2	4	4	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-55-DP24	-	HSA	21.5	4	4	2	4	4	4	3	3	-	-	-	-	-	-	-	-	-	-	-	1	1
K-55-HA2	-	HA	5.0	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
K-56-HA4	-	HA	5.0	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Area L																								
L-56-DP1	-	HSA	41.5	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP2	-	HSA	41.0	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP3	-	HSA	41.5	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP4	-	HSA	41.5	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP6	-	HSA	41.5	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP7	-	HSA	41.5	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP8	-	HSA	41.5	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP9	-	HSA	41.5	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP10	-	HSA	41.5	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP11	-	HSA	41.0	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-DP12	-	HSA	41.0	6	6	2	6	6	6	2	3	-	-	-	-	-	-	-	-	-	-	-	2	2
L-56-HA2	-	HA	5.0	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-HA3	-	HA	5.0	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
L-57-HA1	-	HA	5.0	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
Area M																								
M-58-DP1	-	HSA	21.5	4	4	2	4	4	4	2	3	-	-	-	-	-	-	-	-	-	-	-	1	1
M-58-DP2	-	HSA	20.5	4	4	2	4	4	4	2	3	-	-	-	-	-	-	-	-	-	-	-	1	1

TABLE 2-1
SAMPLING AND ANALYSIS SUMMARY
PREVIOUS INVESTIGATIONS

Boring Designation	Well Designation	Drilling Method	Boring Depth (feet bgs)	Soil									Groundwater										Soil Gas	
					No. Soil Samples Analyzed									No. Groundwater Samples Analyzed										
				No. Soil Samples Collected	Perchlorate	T22 Metals	TPH (gasoline)	TPH (Diesel)	VOCs	1,4-Dioxane	SVOCs	PCBs	No. Monitoring Wells Installed	Perchlorate	T 22 Metals	Hexavalent Chromium	VOCs	SVOCs	1,4-Dioxane	NDMA	Explosives	Nitrate	No. Soil Gas Probes Installed	No. Samples Analyzed for VOCs
M-58-DP3	-	HSA	21.0	4	4	2	4	4	4	2	3	-	-	-	-	-	-	-	-	-	-	-	1	1
Onsite Downgradient Monitoring Well Installation (Tetra Tech, 2006a)																								
TT-MW2-5	TT-MW2-5	HSA	40	0	-	-	-	-	-	-	-	-	3	3	1	-	1	-	-	-	-	-	-	-
TT-MW2-6	TT-MW2-6S	HSA	80	0	-	-	-	-	-	-	-	-	3	3	1	-	1	-	-	-	-	-	-	-
	TT-MW2-6D												3	3	1	-	1	-	-	-	-	-		
Groundwater Monitoring Well Installation and Sampling (Tetra Tech, 2009g)																								
TT-MW2-7	TT-MW2-7	HSA	29	3	3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	1	1	-	-
TT-MW2-8	TT-MW2-8	HSA	31.5	2	2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	1	1	-	-
TT-MW2-9S	TT-MW2-9S	HSA	46	0	-	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
TT-MW2-9D	TT-MW2-9D	HSA	70.5	2	2	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
TT-MW2-10	TT-MW2-10	HSA	61.5	3	3	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
TT-MW2-11	TT-MW2-11	HSA	55	3	3	-	-	-	-	-	-	-	1	1	1	-	1	1	1	-	1	1	-	-
TT-MW2-12	TT-MW2-12	HSA	60	3	3	-	-	-	-	-	-	-	1	1	1	-	1	1	1	-	1	1	-	-
TT-MW2-13	TT-MW2-13	HSA	72	0	-	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
TT-SB2-14	-	HSA	66	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TT-MW2-14	TT-MW2-14	SON	77.2	3	3	-	-	-	-	-	-	-	1	1	1	-	1	1	1	-	1	1	-	-
TT-SB2-15	-	HSA	54	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TT-MW2-16	TT-MW2-16	HSA	71	3	3	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
TT-MW2-17S/D	TT-MW2-17S	SON	105	4	4	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
	TT-MW2-17D												1	1	-	-	1	-	-	-	-	-	-	-
TT-MW2-18	TT-MW2-18	SON	102	3	3	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-
TT-PZ2-1	TT-PZ2-1	HSA	40.5	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Site Investigation at Earthen Prism Shaped Structure and Possible Liquid Waste Discharge Ponds (Tetra Tech, 2007b)																								
PRISM 1	-	HA	5	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
PRISM 2	-	HA	5	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
PRISM 3	-	HA	5	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
PRISM 4	-	HA	5	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
PRISM 5	-	HA	5	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
PRISM 6	-	HA	5	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
PRISM 7	-	HA	5	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
PRISM 8	-	HA	5	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
POND 1	-	HSA	30.5	4	4	4	-	-	4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
POND 2	-	HSA	31	4	4	4	-	-	4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
POND 3	-	HSA	30.5	4	4	4	-	-	4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
POND 4	-	HSA	30	4	4	4	-	-	4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
POND 5	-	HSA	33	4	4	4	-	-	4	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Groundwater Investigation at Wolfskill Property (Tetra Tech, 2009i)																								
TT-SB2-19	-	HSA	71	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TT-MW2-19S/D	TT-MW2-19S	HSA	200	0	-	-	-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-
	TT-MW2-19D	HSA		0	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-
TT-MW2-20S	TT-MW2-20S	ARCH	41	0	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-
TT-MW2-20D	TT-MW2-20D	ARCH	81.5	0	-	-	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-

TABLE 2-1
SAMPLING AND ANALYSIS SUMMARY
PREVIOUS INVESTIGATIONS

				Soil									Groundwater										Soil Gas	
					No. Soil Samples Analyzed									No. Groundwater Samples Analyzed										
Boring Designation	Well Designation	Drilling Method	Boring Depth (feet bgs)	No. Soil Samples Collected	Perchlorate	T22 Metals	TPH (gasoline)	TPH (Diesel)	VOCs	1,4-Dioxane	SVOCs	PCBs	No. Monitoring Wells Installed	Perchlorate	T 22 Metals	Hexavalent Chromium	VOCs	SVOCs	1,4-Dioxane	NDMA	Explosives	Nitrate	No. Soil Gas Probes Installed	No. Samples Analyzed for VOCs
Supplemental Site Characterization, Former Liquid Waste Discharge Ponds and Southern Property Boundary (Tetra Tech, 2009d)																								
SB1	TT-MW2-21	HSA	80	10	10	10	-	-	10	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-
SB2	TT-MW2-22	HSA	80	11	11	11	-	-	11	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-
SB3	TT-MW2-23	HSA	100	19	19	19	-	-	19	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-
SB4	-	HSA	70	15	15	15	-	-	15	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-
SB5	-	HSA	60.5	13	13	13	-	-	13	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-
SB6	TT-MW2-24	HSA	67.5	8	8	8	-	-	8	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-
Technical Memo for Laboratory Microcosm and Column Studies (Tetra Tech, 2009b)																								
TT-SB2-7	-	HSA	32	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-DP15B	-	HSA	80	13	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

ARCH Air Rotary Casing Hammer
DP - Direct Push
HA - Hand Auger
HSA - Hollow Stem Auger
SON - Sonic
P -Primary boring
S - Secondary boring
bgs - Below ground surface
Unk - Unknown
"-" - Not analyzed or not applicable

T22 Metals - California Title 22 (CAM) metals list
TPH (gasoline) - Total petroleum hydrocarbons as gasoline
TPH (diesel) - Total petroleum hydrocarbons as diesel
VOCs - Volatile organic compounds
SVOCs - Semivolatile organic compounds
PCBs - Polychlorinated biphenyls
NDMA - N-Nitrosodimethylamine

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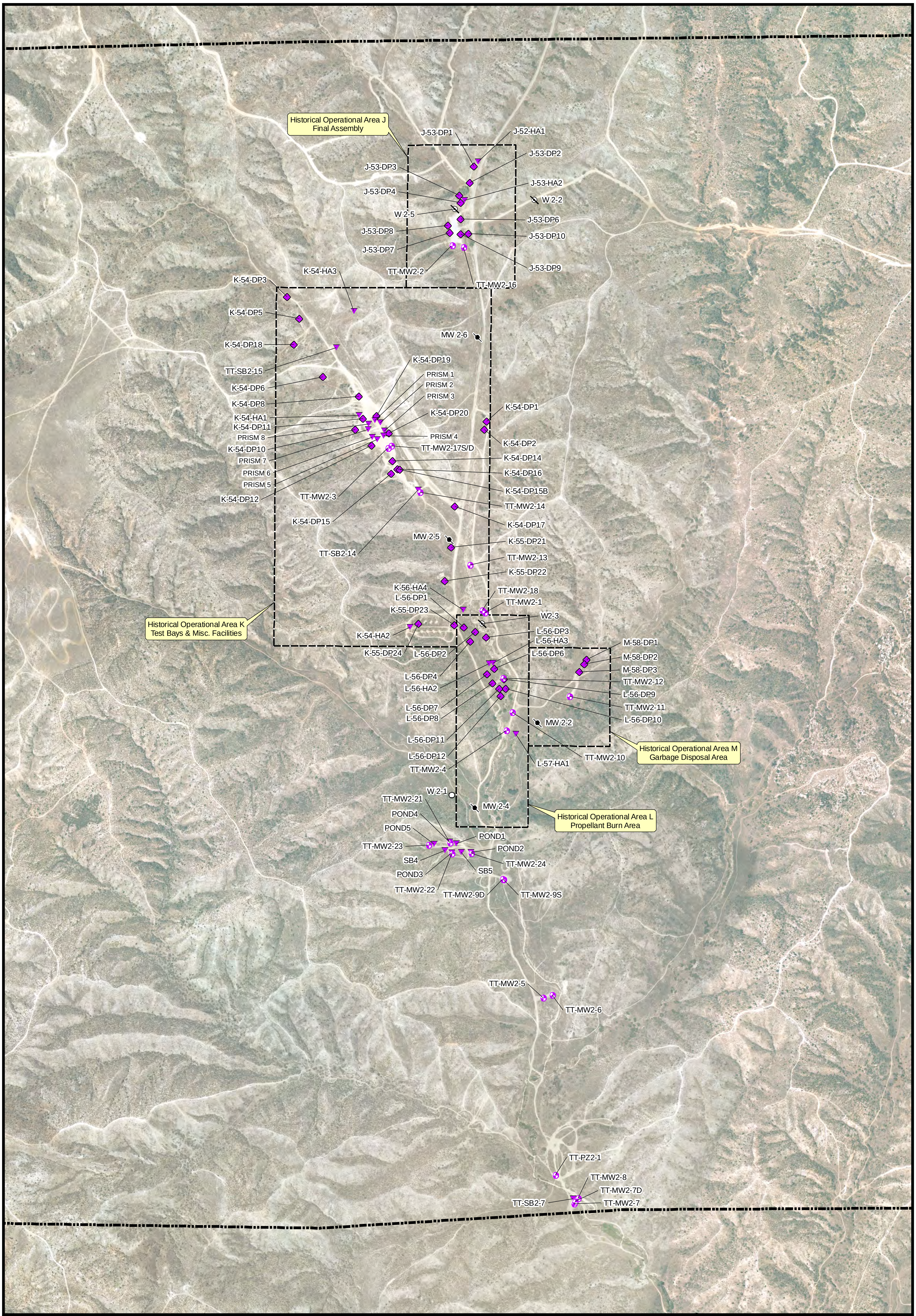

LEGEND

- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Abandoned Monitoring Well Location
- Abandoned Production Well Location
- Reported Production Well Location
- Historic Operational Area Boundary
- Beaumont Site 2 Property Boundary

N

0 400 800
Feet

Beaumont Site 2

Figure 2-1

Previous Boring and Well Locations

TETRA TECH

USEPA Method 601; trichloroethene (TCE) was detected at a concentration of 4.2 µg/L in the groundwater sample.

2.1.3 Hydrogeologic Investigation (Radian, 1992)

The Radian hydrogeologic investigation consisted of videologging 3 existing groundwater production wells (W2-3, W2-4, and W2-5); drilling 5 HSA soil borings to refusal at depths ranging from 40 to 50 feet, drilling 4 air rotary soil borings and installing groundwater monitoring wells MW2-2, MW2-3, MW2-5, and MW2-6 in the borings, collecting and analyzing groundwater samples from the 4 new monitoring wells and 3 existing production wells, and collecting soil gas samples at 42 locations throughout the Site.

VOCs were not detected in any of the groundwater samples. Metals were not detected in the groundwater samples, with the exception of zinc. Perchlorate was detected in a groundwater sample collected from production well W2-3, at a concentration of 3,300 µg/L.

The soil gas samples were analyzed on-Site by Radian personnel using a field gas chromatograph. Numerous data quality issues were noted by Radian (1992), including results below the calibration range of the instrument; blank contamination from the sampling equipment; and failure to calibrate the instrument for all of the compounds analyzed during 5 days of the survey. Furthermore, Radian reported detection limits for individual compounds that were less than 1 part per billion by volume (ppbv), which equate to less than 5.5 and 6.9 µg/m^3, respectively, for TCE and tetrachloroethene (PCE). These detection limits are much lower than those typically obtained by other laboratories during the early 1990s. The Radian (1992) soil gas data are not of known quality, and are therefore not considered further in this report.

2.1.4 Disposal Area Removal Action (Radian, 1993)

The disposal area removal action included characterization and excavation of the Area M disposal area. Work was conducted with oversight from the DTSC. Investigation activities included an electromagnetic (EM) survey to assess the extent of debris in the subsurface, drilling 12 hand auger borings to visually confirm the presence of debris in the geophysical survey area, and excavating 3 trenches to assess the extent of debris in the subsurface. A total of 3 soil samples were collected from the trenches and analyzed for VOCs, semivolatile organic compounds (SVOCs), and metals. VOCs and SVOCs were not detected in the soil samples; metals concentrations were less than the 10 times the Soluble Threshold Limit Concentration (STLC) values. Following the investigation, approximately 816 tons of debris were excavated and disposed off-Site. The location of the excavation is shown in Figure 2-1. The excavation was backfilled with soil borrowed from the immediate area. Three perimeter confirmation soil samples were collected and analyzed for VOCs, SVOCs, and metals. Low concentrations of acetone (11 micrograms per kilogram [μg/kg], ethylbenzene (0.40 μg/kg), methyl ethyl ketone (MEK [2-butanone]; 14 μg/kg), methylene chloride (1.1 μg/kg), toluene (0.53 μg/kg), TCE (0.32 μg/kg), xylenes (0.97 μg/kg), and bis-2-ethylhexyl phthalate (36 μg/kg) were detected in one or more of the confirmation samples. Metals concentrations were comparable to those detected during subsequent investigations in Area M (Tetra Tech, 2005a).

The DTSC issued a Report of Completion of Removal Action on April 30, 1993 (DTSC, 1993). Based on the information known at the time of the letter, the DTSC stated that appropriate response actions had been completed, that all acceptable engineering practices were implemented, and that no further removal/remedial action was necessary.

2.1.5 Monitoring Well Destruction Report (LMC, 1995)

Monitoring wells MW2-2, MW2-4, MW2-5, and MW2-6 were destroyed in accordance with State well standards on September 19 and 20, 1995 (LMC, 1995). Prior to destruction, groundwater samples were collected from each well and analyzed for VOCs. VOCs were not detected in any of the wells. Well destruction was conducted in accordance with a work plan approved by the California Regional Water Quality Control Board, Santa Ana Region (SARWQCB), and in compliance with permits issued by the RCDEH.

2.2 LATER WORK

2.2.1 Groundwater Sampling Results From Former Production Well W2-3

In January 2003, Tetra Tech collected a groundwater sample to confirm the historical detection of perchlorate in the groundwater sample collected from the Site (Tetra Tech, 2003a). Field activities included the location and identification of existing production wells, recording the physical condition of each well, and groundwater sampling and analysis. Two of the 4 production wells, W2-3 and W2-5, were visually identified at the Site. Visual inspection indicated that well W2-5 was obstructed; therefore, only well W2-3 was sampled. The groundwater sample was analyzed for VOCs, perchlorate and 1,4-dioxane. Perchlorate was detected at a concentration of 4,080 μg/L; VOCs and 1,4-dioxane were not detected in the groundwater sample.

2.2.2 2004 Monitoring Well Installation (Tetra Tech, 2004)

Five groundwater monitoring wells (TT-MW2-1, TT-MW2-2, TT-MW2-3, TT-MW2-4S, and TT-MW2-4D were installed at the Site in August and September 2004. The well locations are shown on Figure 2-1; sampling and analysis conducted as part of the investigation is summarized in Table 2-1.

Groundwater elevation data indicated that groundwater flow was generally to the south. Compounds detected at concentrations exceeding their respective California MCLs or DWNLs include perchlorate (wells TT-MW2-1 and TT-MW2-3); TCE (well TT-MW2-3); bis-(2-ethylhexyl) phthalate (well TT-MW2-3), and arsenic (wells TT-MW2-4S and TT-MW2-4D).

2.2.3 2004 Soil Investigation (Tetra Tech, 2005a)

The 2004 soil investigation included advancing 52 soil borings to depths of up to 40 feet bgs, and installing 54 soil gas probes in 43 of the soil borings. The soil boring locations are shown in Figure 2-1; sampling and analysis conducted as part of the investigation is summarized in Table 2-1. Results by historical operational area were as follows:

- Area J: Perchlorate, SVOCs, 1,4-dioxane, and polychlorinated biphenyls (PCBs) were not detected in any of the soil samples analyzed. With the exception of arsenic, metals concentrations did not exceed USEPA Region 9 PRGs for residential land use. VOCs detected include benzene, toluene, ethylbenzene, and total xylenes, at concentrations of up to 4.0 µg/kg, 9.3 µg/kg, 2.4 µg/kg, and 4.8 µg/kg, respectively. Total petroleum hydrocarbons as diesel (TPHd) were detected at concentrations of up to 77 milligrams per kilogram (mg/kg). VOCs were not detected in any of the soil gas samples.
- Area K: Perchlorate was detected in 10 of the 23 borings drilled within Area K, at concentrations of up to 4,510 µg/kg. The highest concentrations were primarily in the 10- and 20-foot bgs samples near the prism and test bays. SVOCs, 1,4-dioxane, total petroleum hydrocarbons as gasoline (TPHg), and PCBs were not detected in any of the soil samples analyzed. With the exception of arsenic, metals concentrations did not exceed USEPA Region 9 PRGs for residential land use. VOCs detected included 1,1-DCE, acetone, benzene, and toluene, at concentrations of up to 1.5 µg/kg, 95 µg/kg, 5.2 µg/kg, and 4.1 µg/kg, respectively. TPHd was detected at concentrations of up to 300 mg/kg. VOCs were not detected in any of the soil gas samples, petroleum hydrocarbons were detected in one soil gas sample at a concentration of 11 µg/kg.
- Area L: Perchlorate was detected in 3 of the 14 borings drilled within Area L, at concentrations of up to 357 µg/kg. The perchlorate detections were all at depths of 30 and 40 feet bgs. SVOCs, 1,4-dioxane, and PCBs were not detected in any of the soil samples analyzed. With the exception of arsenic, metals concentrations did not exceed USEPA Region 9 PRGs for residential land use. VOCs detected include 1,1-DCE, acetone, benzene, and toluene, at concentrations of up to 1.2 µg/kg, 76 µg/kg, 4.3 µg/kg, and 3.3 µg/kg, respectively. TPH (diesel) was detected at a concentration of 30 mg/kg. VOCs were not detected in any of the soil gas samples.
- Area M: Perchlorate was detected in 2 of the 3 borings drilled within Area M, at concentrations of up to 2,220 µg/kg. SVOCs, 1,4-dioxane, and TPH were not detected in any of the soil samples analyzed. With the exception of arsenic, metals concentrations did not exceed USEPA Region 9 PRGs for residential land use. Benzene, toluene, ethylbenzene, and total xylenes were detected at

concentrations of up to 6.3 µg/kg, 7.5 µg/kg, 2.0 µg/kg, and 2.3 µg/kg, respectively. VOCs were not detected in any of the soil gas samples.

2.2.4 2005 Onsite Downgradient Monitoring Well Installation (Tetra Tech, 2006a)

Three additional groundwater monitoring wells (TT-MW2-5, TT-MW2-6S and TT-MW2-6D) were installed at the Site in December 2005 (Tetra Tech, 2006a). The well locations are shown on Figure 2-1; sampling and analysis conducted as part of the investigation is summarized in Table 2-1.

Perchlorate was detected at concentrations of 810 µg/L and 160 µg/L, in shallow wells TT-MW2-5 and TT-MW2-6S, and was not detected in deep well TT-MW2-6D. VOCs were not detected in any of the wells.

2.2.5 2006 Monitoring Well Installation (Tetra Tech, 2009g)

Thirteen monitoring wells (TT-MW2-7, TT-MW2-8, TT-MW2-9S, TT-MW2-9D, TT-MW2-10, TT-MW2-11, TT-MW2-12, TT-MW2-13, TT-MW2-14, TT-MW2-16, TT-MW2-17S, TT-MW2-17D, and TT-MW2-18), 1 piezometer (TT-PZ2-1), and 2 soil borings (TT-SB2-14 and TT-SB2-15) were installed at the Site between August and December, 2006 (Tetra Tech, 2009g). The well, piezometer, and boring locations are shown on Figure 2-1; sampling and analysis conducted as part of the investigation is summarized in Table 2-1.

Perchlorate was detected in groundwater samples collected from 12 of the 13 newly installed monitoring wells, at concentrations ranging from 28.8 to 79,300 µg/L. The highest perchlorate concentrations were found in monitoring wells TT-MW2-14 and TT-MW2-17D, both of which are located in Test Bay Canyon. TCE was detected at a concentration of 7.1 µg/L, above the MCL of 5 µg/L, in well TT-MW2-11, located in Area M.

2.2.6 Offsite Production Well and Spring Sampling (LMC, 2007a)

Between January and February 2007, in coordination with the DTSC, water quality samples were collected from 4 off-Site properties for perchlorate testing. Water samples were collected from 4 irrigation wells and 1 domestic well. Water samples were also collected from 2 springs, including a spring that is currently being used for domestic water supply and an isolated and unused but flowing spring. Soil samples were collected from a dry spring that is used for domestic purposes when it flows, and a water sample was collected from a storage tank that reportedly still held water from that spring. All of the samples were analyzed for perchlorate. Based on proximity to LMC Beaumont Site 1, one of the water samples was also analyzed for VOCs. None of the samples contained detectable concentrations of perchlorate or VOCs.

2.2.7 Soil Investigation at Earthen Prism and Waste Discharge Area (Tetra Tech, 2007b)

Eight soil borings (Prism 1 to Prism 8) were drilled at the Prism, and five soil borings (Pond 1 to Pond 5) were drilled at the WDA in July 2007 (Tetra Tech, 2007b). In addition, a geophysical survey was conducted at the Prism in August 2007. The boring locations are shown on Figure 2-1; sampling and analysis conducted as part of the investigation is summarized in Table 2-1.

Perchlorate was detected in all eight of the borings at the Prism, and in four of the five borings drilled at the WDA. The highest detected perchlorate concentrations at the Prism and WDA were 2,950 µg/kg and 13,400 µg/kg, respectively. Low concentrations of acetone, benzene, 2-butanone, and toluene were detected in soil samples from the Prism; low concentrations of acetone, benzene, bromomethane, 2–butanone, carbon disulfide, chloromethane, methylene chloride, toluene, TCE, and total xylenes were detected in soil samples collected at the WDA. One SVOC (bis-2-ethylhexyl phthalate) was detected at the WDA. One shallow soil sample from the WDA contained cadmium (5.37 mg/kg) and lead (236 mg/kg) above USEPA Region 9 PRGs for residential land use; other metals (with the exception of arsenic) were detected at concentrations below USEPA Region 9 PRGs for residential land use. The geophysical work included ground penetrating radar and EM surveys at the Prism to evaluate whether buried objects could be present; no buried objects were identified.

2.2.8 Abandonment of Former Production Wells (Tetra Tech, 2009c)

Three former production wells (W2-2, W2-3, and W2-5) and 2 unknown well-like structures (Unknown #1 and Unknown #2) were destroyed in November and December, 2007 (Tetra Tech, 2009c). Prior to destruction, geophysical logging (dual induction-gamma ray, spectral gamma ray, acoustic televiewer, impellor and flow vision well flow, caliper, temperature and fluid conductivity) was conducted in wells W2-3 and W2-5. The wells and unknown well-like structures were destroyed in accordance with California well standards, and in accordance with a DTSC-approved work plan and permits issued by the RCDEH.

2.2.9 Site Investigation Report, Wolfskill Property (Tetra Tech, 2009i)

Four groundwater monitoring wells (TT-MW2-19S, TT-MW2-19D, TT-MW2-20S, and TT-MW2-20D) and one soil boring (TT-SB2-19) were installed on the downgradient Wolfskill property, located to the south of the Site, between September 2007 and August 2008 (Tetra Tech, 2009i). Monitoring wells TT-MW2-19S and TT-MW2-19D were installed approximately 4,200 feet south of the southern Site boundary; monitoring wells TT-MW2-20S and TT-MW2-20D were installed approximately 8,100 feet south of the Site boundary. The well locations are shown on Figure 2-2; sampling and analysis conducted as part of the investigation are summarized in Table 2-1.

Perchlorate was detected in the initial groundwater sample collected from well TT-MW2-19D, but was not detected during the second sampling event. A sample collected from a spring located between wells TT-MW2-19S/D and TT-MW2-20S/D was also analyzed for perchlorate. Perchlorate was detected in the initial sample, but was not detected in two subsequent samples.

2.2.10 Supplemental Site Characterization, Waste Discharge Area and South Boundary Area (Tetra Tech, 2009d)

Six soil borings (SB1 to SB6) and four groundwater monitoring wells (TT-MW2-21 to TT-MW2-24 were installed at the WDA, and one groundwater monitoring well (TT-MW2-7D) was installed near the southern boundary of the Site to evaluate whether impacted groundwater was migrating beyond the Site boundary. The boring locations are shown on Figure 2-1; sampling and analysis conducted as part of the investigation is summarized in Table 2-1.

A total of 76 soil samples were collected during this phase of the investigation. Perchlorate was detected in soil at concentrations of up to 114,000 µg/kg; the highest detected concentrations were in boring SB1 (TT-MW2-21). VOCs detected in soil samples included acetone, benzene, 2–butanone, chloroform, 1,1–dichloroethane, 1,2–dichloroethane, 1,1–DCE, MIBK, methylene chloride, toluene, and TCE. Methylene chloride and TCE were detected at maximum concentrations of 21,000 µg/kg and 680 µg/kg, respectively, in soil boring SB2 (TT-MW2-22).

Perchlorate was detected in groundwater at concentrations of up to 109,000 µg/L; the highest detected concentration was in well TT-MW2-24. Methylene chloride was detected at a maximum concentration of 560 µg/L in well TT-MW2-22; TCE was detected at a maximum concentration of 61 µg/L in well TT-MW2-24.

2.3 GEOPHYSICAL SURVEYS

Based on observations made during installation of monitoring wells TT-MW2-1, TT-MW2-2, TT-MW2-3, TT-MW2-4S and TT-MW2-4D and the groundwater sampling results, it was decided that determining the boundary between unconsolidated quaternary alluvium and underlying bedrock was important to identify areas where unconfined groundwater is likely to be present and to evaluate possible contaminant flow pathways. While unconsolidated alluvium and underlying materials at the Site are similar in color and grain size, differences in density should exist. Seismic geophysical surveys have proven to be a useful tool for imaging boundaries between materials with different densities.

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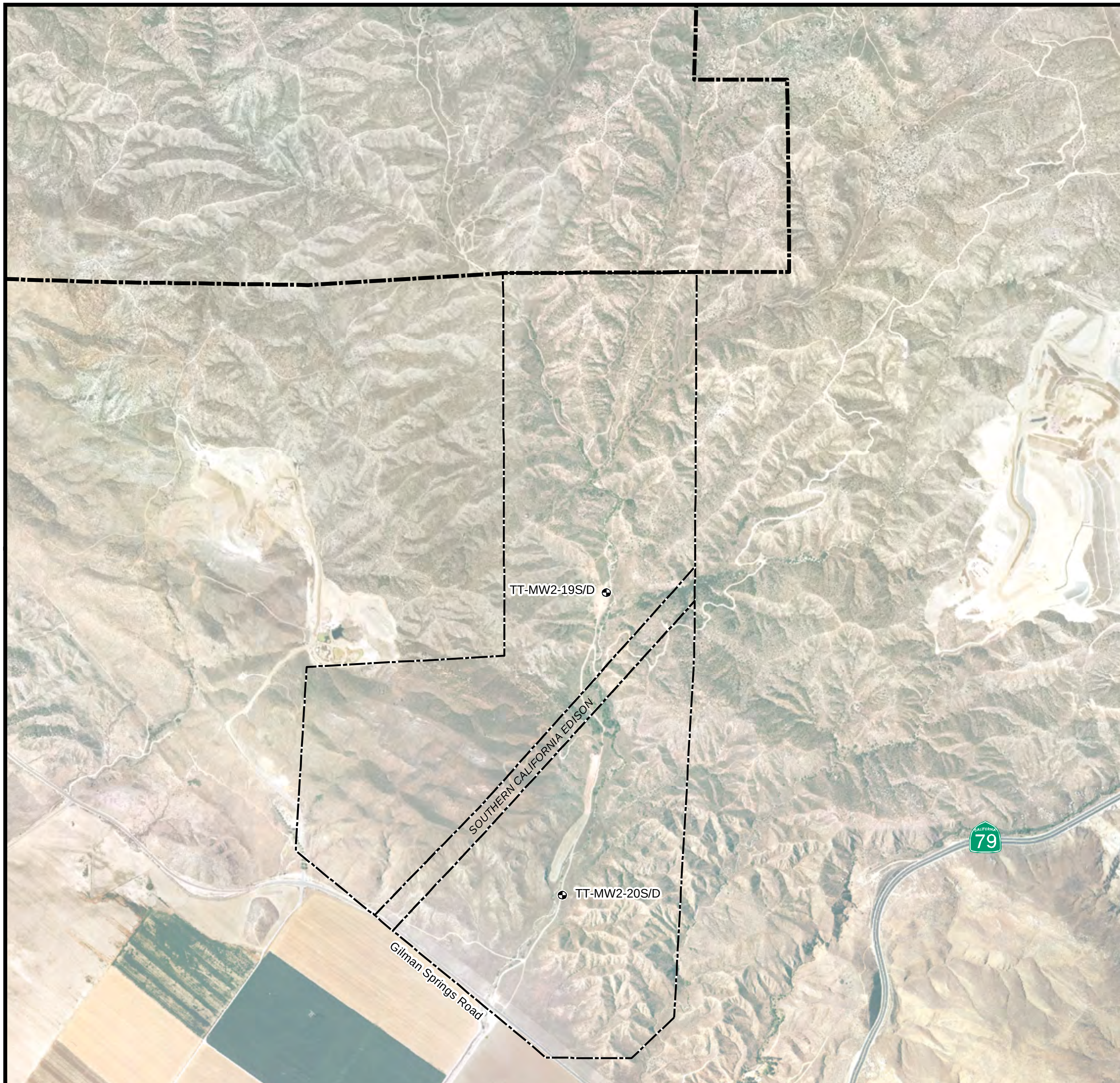

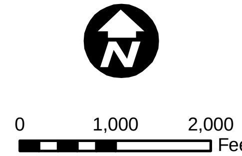

Adapted from: March 2007 aerial photograph.

LEGEND

Monitoring Well Location

Beaumont Site 2 Property Boundary

RCA (Wolfskill) Property Boundary

Note: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

Beaumont Site 2

Figure 2-2

Offsite Well Locations

TETRA TECH

Between April and September 2005, geophysical pilot testing was performed at the Site to assess optimum groundwater monitoring well placement (Terra Physics, 2005). Based on the results of the pilot test, depths to boundaries between different velocity zones were estimated, and stratigraphic correlations were assigned. Two full-scale geophysical surveys were subsequently performed (Terra Physics, 2006; 2008). The full-scale geophysical survey consisted of 1 vertical seismic profile and 14 horizontal seismic surveys, 11 of the profiles were oriented across the valley floor and 3 profiles were oriented approximately parallel to the valley floor (Figure 2-3). The data were used to help select subsequent monitoring well locations (Tetra Tech, 2009g).

2.4 GROUNDWATER MONITORING PROGRAM

Quarterly water level measurements and water quality monitoring have been conducted at the Site since the first quarter of 2005. The current groundwater monitoring program (GMP) includes quarterly water level measurements in 34 wells and one piezometer, and sampling of 33 monitoring wells during the second quarter of each year. A reduced sampling program is conducted during the first, third, and fourth quarters. Groundwater monitoring activities are performed in accordance with procedures described in the Groundwater Monitoring Sampling and Analysis Plan (SAP; Tetra Tech, 2007a) and subsequent correspondences (LMC, 2007b). Groundwater samples are analyzed for perchlorate, VOCs, and California Title 22 metals. Selected testing for other constituents is also performed on an occasional basis.

A summary of the groundwater monitoring results for the second quarter of 2008 (Tetra Tech, 2009f), the most recent monitoring event for which complete data is available, is provided in Appendix A.

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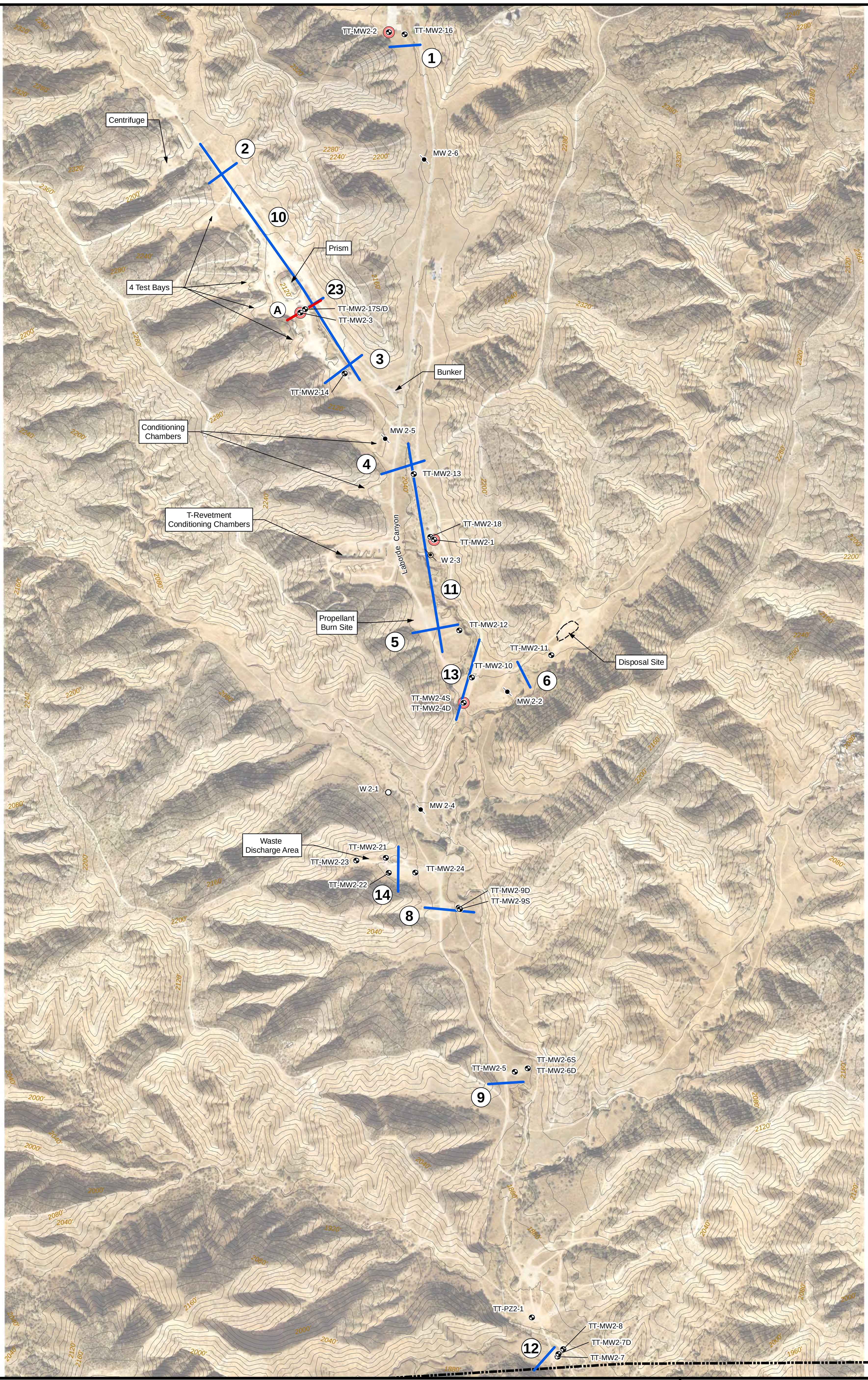

LEGEND

- Destroyed Monitoring Well Location
- Destroyed Production Well Location
- Reported Production Well Location
- Groundwater Monitoring Well Location
- (1) Geophysical Survey Location
- (A) Pilot Test Location- Geophysical Survey Location
- Geophysical Survey Downhole Survey Location
- Beaumont Site 2 Property Boundary
- Ground Surface Elevation Contour (20-ft interval, elevation msl)

Note:

Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

0 300 600 Feet

Beaumont Site 2

Figure 2-3

Seismic Survey Locations

TETRA TECH

3.0 PHYSICAL SETTING

3.1 TOPOGRAPHY

The Site is located within the San Timoteo Badlands, an area of badlands topography characterized by steep slopes, sparse vegetation, and complex drainage patterns developed primarily in poorly-indurated Pliocene- and Pleistocene-age non-marine sedimentary rocks of the San Timoteo Formation (STF). Mass wasting processes are of particular importance in the evolution of the San Timoteo Badlands landscape. Manson et al (2002) documented approximately 8,500 landslides along the Highway 60 corridor between Jack Rabbit Trail (located to the east of the Site) and Gilman Springs Road, where Highway 60 emerges from the Badlands. Manson et al (2002) noted that virtually all of the slopes in the Badlands are debris slide slopes, formed by the coalesced scars of numerous small debris flows and debris slides.

The topography of the Site and surrounding area is shown in Figure 3-1. The principal topographic feature of the Site is Laborde Canyon, a major north-south oriented canyon which extends from a drainage divide roughly 2,000 feet south of Highway 60 to the San Jacinto Valley, a distance of approximately 4.5 miles. The elevation at the head of Laborde Canyon is at roughly 2,380 feet above mean sea level (msl), dropping to approximately 1,550 feet msl where Laborde Canyon enters the San Jacinto Valley, a gradient of approximately 0.035 feet per foot (ft/ft). Elevations within the on-Site portion of Laborde Canyon range from approximately 2,190 feet msl at the northern site boundary to 1,816 feet msl at the southern site boundary. Overall, elevations at the Site range from 2,496 feet msl along ridgelines near the northeastern corner of the Site to 1,816 feet msl in Laborde Canyon at the southern property boundary.

Most of the hillsides at the Site are relatively steep, with slopes often approaching 100%. As a result, most site characterization work is limited to the relatively flat bottoms of the main canyons and smaller side canyons, the only areas of the Site which are accessible to drill rigs. Historical operations at the Site also appear to have been limited to the canyon bottoms, due to the same topographic constraints. Operations that may have resulted in contaminant releases, such as washing out spent rocket motor casings or propellant incineration, are therefore expected to have occurred in relatively flat areas accessible to vehicles or other equipment. Because the same factors which limit drill rig access at the Site are expected to have limited operations which may have resulted in releases, Site topography is considered to provide a reasonable constraint on the extent of contamination in areas which cannot be readily investigated.

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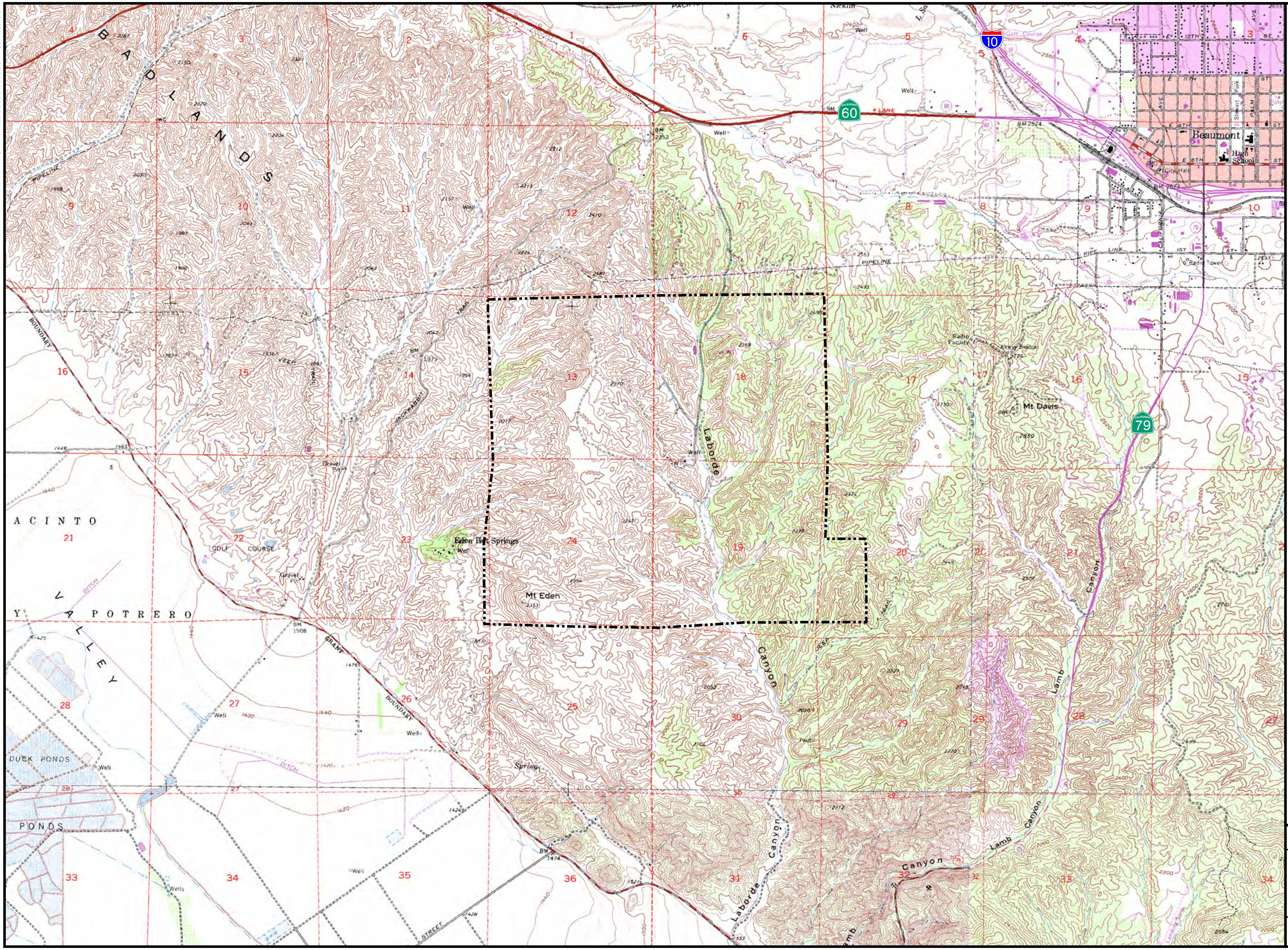


0 1,500 3,000 Feet

Adapted from:

USGS 7.5' topographic quadrangle, El Casco, CA 1979.
USGS 7.5' topographic quadrangle, Lakeview, CA 1979.
USGS 7.5' topographic quadrangle, San Jacinto, CA 1979.
USGS 7.5' topographic quadrangle, Beaumont, CA 1988.

LEGEND

Beaumont Site 2 Property Boundary

Note: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

Beaumont Site 2

Figure 3-1
Site Topography

TETRA TECH

3.2 CLIMATE AND PRECIPITATION

The Site has a transitional climate characterized by arid Colorado Desert influences from the east and lesser marine influences from the west. Summers are typically hot and dry, and winters are mild and wet. December through March are the months with greatest rainfall. The Riverside County Flood Control and Water Conservation District maintains 2 weather stations in the general area of the Site: the Beaumont National Weather Service (NWS) station and the San Jacinto NWS station. The locations of the stations are shown on Figure 1-1. Figure 3-2 shows annual precipitation for the Beaumont station by rainfall year (July to June) from 1888 to 2008.

An important feature of Figure 3-2 is the extended dry period that occurred in the area of the Site from approximately 1940 to 1976, which includes the entire operational history of the Site. At the Beaumont station, annual precipitation exceeded the mean value of 14.87 inches only twice during this period. A likely consequence of this long-term period of low rainfall is that groundwater levels may have been significantly lower during the time when the Site was active than currently observed.

3.3 SURFACE WATER

There are no perennial streams, ponds, springs, or other permanent surface water bodies within the boundaries of the Site. An unnamed spring is present in the lower portion of Laborde Canyon, approximately 5,900 feet south of the southern boundary of the Site and 3,800 feet northeast of the San Jacinto Valley (Figure 2-2).

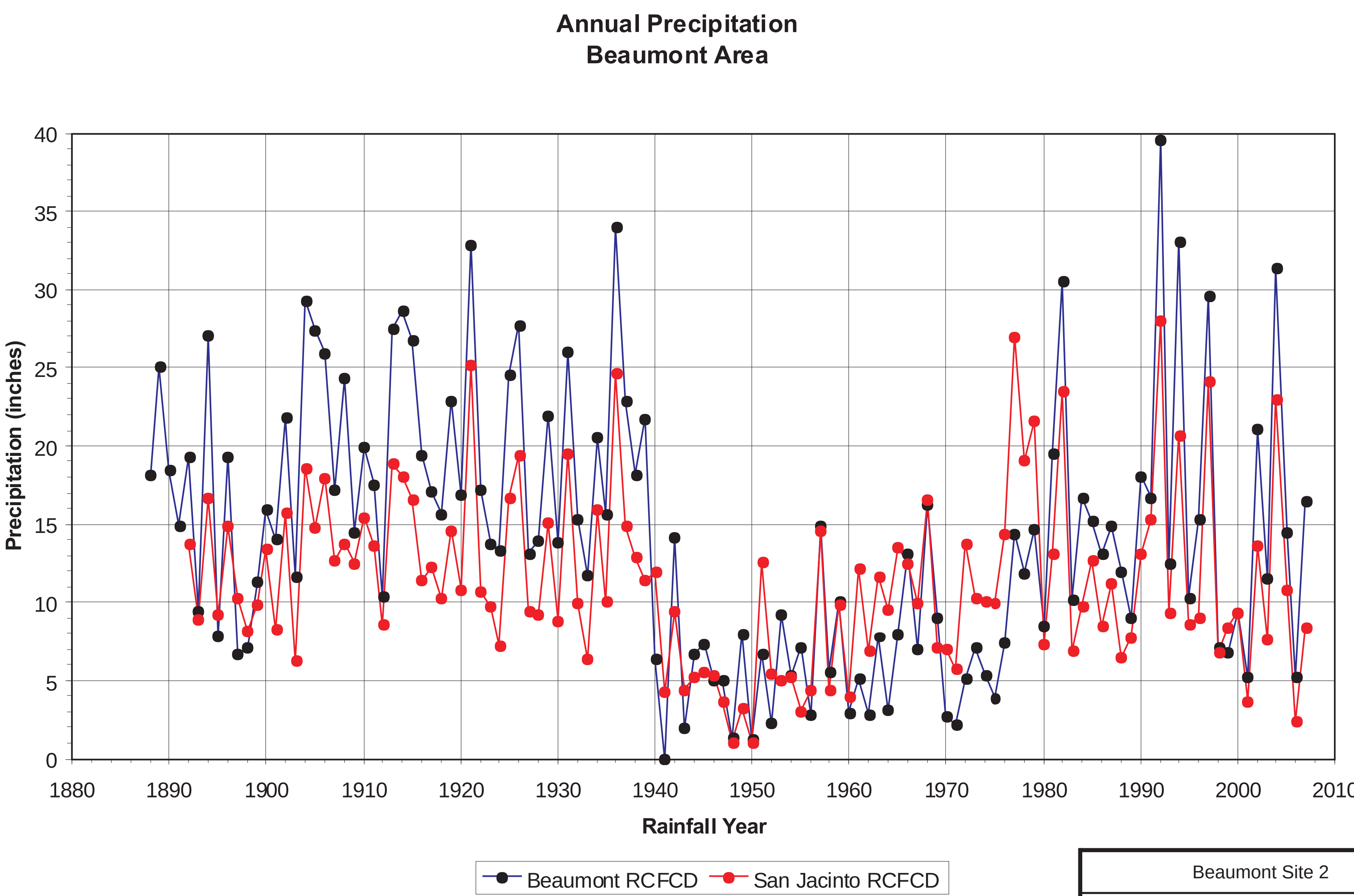
Laborde Canyon, which drains generally southward toward the San Jacinto Valley, is the principal drainage course for the Site. All of the known operational areas at the Site are located within Laborde Canyon and tributary canyons, including Test Bay Canyon and Disposal Site Canyon. Surface water flow through Laborde Canyon and tributaries is only observed during larger storm events.

3.4 GEOLOGY

3.4.1 Regional Geology

Regional Setting

The Site is located at the northern end of the Peninsular Ranges geologic province of California (e.g., Norris and Webb, 1990). The northern Peninsular Ranges consist of 3 major structural blocks defined by right-lateral strike-slip faults (Morton, 2004). From west to east, these include the Santa Ana Mountains, the Perris block, and the San Jacinto Mountains. The Santa Ana Mountains and Perris block are separated by the Elsinore Fault Zone, and the Perris block and San Jacinto Mountains are separated by the San Jacinto Fault Zone. The Site is located near the northern tip of the San Jacinto Mountains block. This area



Beaumont Site 2

Figure 3-2

Annual Precipitation

TETRA TECH

of the Peninsular ranges is underlain by a thick sequence of Miocene to Pleistocene non-marine sedimentary rocks, which are in turn underlain by crystalline basement consisting of Jurassic to Cretaceous-age tonalitic and granodioritic plutonic rocks of the Southern California Batholith and metamorphic rocks (primarily marbles and gneisses) of inferred Paleozoic age (Morton, 2004)

The structure of the area is dominated by the San Andreas Fault (SAF) system, which has a restraining bend near San Gorgonio Pass (Dair and Cooke, 2009). On either side of the pass, deformation along the SAF is limited to relatively narrow band along the San Bernardino and Coachella valley strands. Within the San Gorgonio Pass area, the SAF disaggregates into a complex network of active and inactive right-lateral, reverse, thrust, and oblique normal faults, including the Mill Creek, Mission Creek, and Garnet Hill strands of the SAF, the Banning fault, the San Gorgonio thrust, the Beaumont fault zone; and the Pinto Mountain fault to the north of the Site area; and the San Jacinto, Claremont, Hot Springs, and Casa Loma faults to the south of the Site (e.g., Yule, 2009; Matti et al., 1992; Morton and Matti, 1993).

Geologic Units

A portion of the geologic map of the Santa Ana 30’ x 60’ quadrangle (Morton, 2004) is shown in Figure 3-3. Geologic units mapped within the Site by Morton (2004) are discussed below.

<u>Crystalline Basement</u>: Crystalline basement rocks in the area of the Site include Cretaceous-age plutonic rocks of the Peninsular Ranges batholith (Tonolite of Lamb Canyon and Mount Eden Granite; Morton, 2004), which are exposed in the eastern portion of the Site (east of the former operational areas) and to the southwest of the Site, respectively. Undifferentiated metasedimentary rocks and marbles of inferred Paleozoic age, exposed in the southeastern corner and to the south of the Site, are also part of the basement complex.

<u>San Timoteo Formation (STF)</u>: The STF (Frick, 1921) is comprised of approximately 2,000 feet of non-marine arkosic sandstones, mudstones, and conglomerates of Pliocene to lower Pleistocene age (Morton, 2004). Clasts within the STF appear to be entirely derived from San Gabriel-type basement rocks exposed to the north, in the San Bernardino-Yucaipa area (Matti et al., 1992). The STF contains numerous paleosol horizons which host a well-known, unusually rich vertebrate faunal assemblage (e.g., Frick, 1921).

Morton (2004) has informally subdivided the STF into upper, middle, and lower members. The upper member, which is exposed mainly to the north of San Timoteo Canyon, consists of coarse-grained, moderately indurated sandstones and conglomerates of earliest Pleistocene age. The Middle and Lower members of the STF are of upper Pliocene age. The middle member consists mainly of light gray, pebbly

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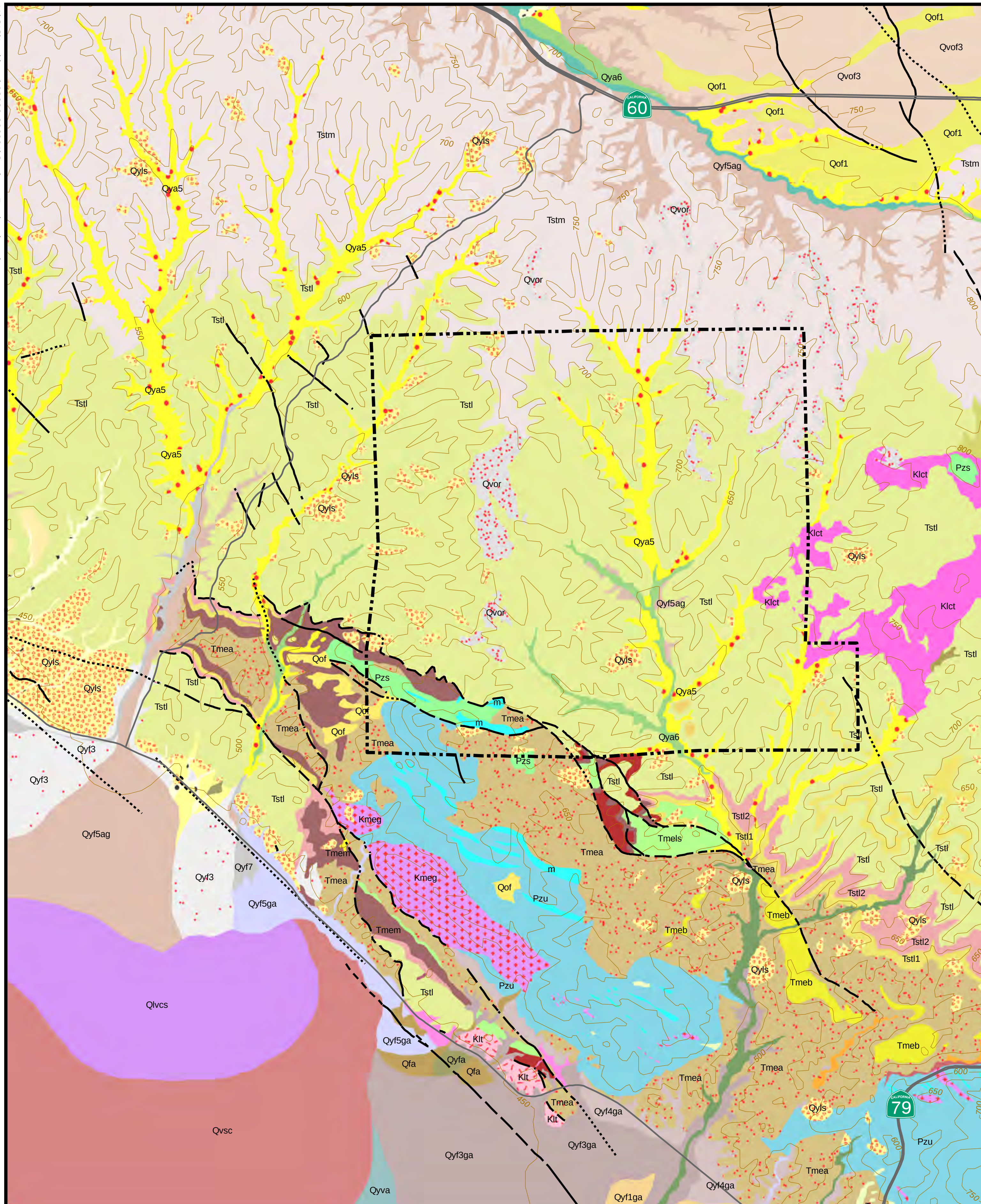

LEGEND

Faults

- Fault-accurately located
- Fault-approximately located
- Fault-concealed
- Fault-inferred

Roads

- Road - primary
- Road - secondary

Ground Surface Elevation Contour (50-meter interval msl)

Beaumont Site 2 Property Boundary

GEOLOGY

Qf1	Alluvial fan deposits, Unit 1
Qfa	Alluvial fan deposits, arenaceous
Qfga	Alluvial fan deposits, gravelly sand
Qlvcs	Lacustrine and fluvial deposits, clayey silt
Qoa	Old axial channel deposits
Qoc	Old colluvial deposits
Qof	Old alluvial fan deposits
Qof1	Old alluvial fan deposits, Unit 1
Qof3	Old alluvial fan deposits, Unit 3
Qos	Old surficial deposits, undivided
Qvoa	Very old axial channel deposits
Qvof3	Very old alluvial fan deposits, Unit 3
Qvofa	Very old alluvial fan deposits, arenaceous
Qvor	Very old regolith
Qvsc	Alluvial valley deposits, silty clay
Qwa	Wash deposits, arenaceous
Qwag	Wash deposits, arenaceous gravel
Qya3	Young axial channel deposits, Unit 3
Qya5	Young axial channel deposits, Unit 5
Qya6	Young axial channel deposits, Unit 6
Qyaag	Young axial channel deposits, arenaceous gravel
Qyf	Young alluvial fan deposits
Qyf1	Young alluvial fan deposits, Unit 1
Qyf1ga	Young alluvial fan deposits, Unit 1, gravelly sand
Qyf3	Young alluvial fan deposits, Unit 3
Qyf3ga	Young alluvial fan deposits, Unit 3, gravelly sand
Qyf4ga	Young alluvial fan deposits, Unit 4, gravelly sand
Qyf5ag	Young alluvial fan deposits, Unit 5, arenaceous gravel
Qyf5ga	Young alluvial fan deposits, Unit 5, gravelly sand
Qyf7	Young alluvial fan deposits, Unit 7
Qyfa	Young alluvial fan deposits, arenaceous
Qyfga	Young alluvial fan deposits, gravelly sand
Qyls	Young landslide deposits
Qyva	Young alluvial valley deposits, arenaceous
Qywa	Young wash deposits, arenaceous
Tme	Mount Eden Formation of Fraser (1931)
Tmeus	Mount Eden Formation of Fraser (1931), upper sandstone member
Tmem	Mount Eden Formation of Fraser (1931), mudrock member
Tmels	Mount Eden Formation of Fraser (1931), lower sandstone member
Tmea	Mount Eden Formation of Fraser (1931), arkosic sandstone member
Tmeb	Mount Eden Formation of Fraser (1931), arkosic sandstone member, tongues of monolithic tonalite boulder breccia
Tmec	Mount Eden Formation of Fraser (1931), conglomeratic sandstone member
Tstl	San Timoteo beds of Frick (1921), middle member
Tstl1	San Timoteo beds of Frick (1921), lower member
Tstl2	San Timoteo beds of Frick (1921), lower member, arkosic sandstone
Tstm	San Timoteo beds of Frick (1921), lower member, claystone, siltstone, and sandstone
m	Paleozoic (?) rocks, undifferentiated, marble bodies
Klct	Tonalite of Lamb Canyon, Peninsular Ranges batholith
Klt	Tonalite near mouth of Laborde Canyon, Peninsular Ranges batholith
Kmeg	Granite of Mount Eden, Peninsular Ranges batholith
Pzs	Biotite schist
Pzu	Paleozoic(?) rocks, undifferentiated

Source: Preliminary Digital Geologic Map of the Santa Ana 30' x 60' Quadrangle, Southern California, version 2.0. USGS 2004.

0 1,500 3,000 Feet

Beaumont Site 2

Figure 3-3

Regional Geology

TETRA TECH

to cobbley, medium to coarse grained sandstones which contain conglomerate beds up to thirty feet thick, with subordinate fine grained sandstones and pebbly sandstones. Conglomerates comprise approximately 30% of the total thickness of the middle member, and are more common in the upper portion. The Middle member is exposed only in the northern portion of the Site, to the north of the historical operational areas of the Site.

The lower member of the STF is the geologic unit exposed over most of the Site, including all of the historical operational areas. The lower member is described by Morton (2004) as consisting of gray, moderately well indurated, well-sorted fine-grained sandstone containing subordinate pebble lenses, with occasional medium-grained sandstone beds. Albright (2000) interpreted the depositional environment of the lower member as a braided stream complex. The basal portion of the lower member has been further subdivided into a buff to reddish-brown, fine- to thick-bedded coarse-grained arkosic sandstone, which is overlain by a unit consisting of distinctive greenish-gray mudstones and ripple-laminated fine-grained sandstones.

<u>Mount Eden Formation (MEF)</u>: The MEF consists of early Pliocene and Miocene sandstones, mudstones, conglomeritic sandstones, and sedimentary breccia which are exposed in the southwestern corner and to the south of the Site. Clasts within the MEF are derived primarily from local Peninsular Range sources (Morton, 2004). The MEF has been subdivided by Morton (2004) into five informal members, which include, from youngest to oldest, the upper sandstone member, mudrock member, lower sandstone member, arkosic sandstone member, and conglomeratic sandstone member. The arkosic sandstone member has a characteristic red color and includes a boulder breccia containing granitic clasts up to 20 feet in diameter, which is exposed in Lamb Canyon and the lower portion of Laborde Canyon.

<u>Quaternary Deposits</u>: Quaternary deposits mapped within the Site area by Morton (2004; Figure 3-3) include axial channel deposits (units Qoa, Qya5, Qya6, and Qyaag), consisting of unconsolidated gravel, sand, silt, and clay alluvium; and younger landslide deposits (unit Qyls). Morton (2004) also mapped very old regolith (unit Qvor), which consists of deeply weathered soil and rock regolith restricted to ridgetops. This unit is found primarily in the area west of the historical operational areas of the Site.

Geologic Structure

No faults are shown within the former operational areas of the Site on published geologic maps by Dibblee (2003) and Morton (2004). The most prominent faults in the area of the Site are the San Jacinto and Claremont faults, both of which are active right-lateral strike-slip faults related to the SAF system. The San Jacinto fault is located approximately 2 miles south of Site. Morton (2004) has mapped several west-northwest trending faults in the southwestern corner of the Site, which cross Laborde Canyon approximately 3,000 feet south of the Site. According to Morton (personal communication, 2009), these faults appear to be related to brittle deformation during development of the San Timoteo anticline.

The San Timoteo anticline, a northwest-plunging fold that roughly parallels the San Jacinto Fault Zone, extends along much of the southern portion of the San Timoteo Badlands. The anticline is asymmetric, with a steeply dipping southwestern limb and a gently dipping northeastern limb. The axis of the anticline is located approximately 8,000 feet south of the Site.

3.4.2 Site Geology

Geologic units exposed in the areas investigated include Quaternary surficial deposits and the STF. For the purpose of this report, the Quaternary units are divided into materials deposited primarily by mass wasting processes (colluvium) and materials deposited primarily by flowing water (alluvium). The rationale for distinguishing between dominantly colluvial and dominantly alluvial deposits is that the major, minor, and trace element chemistry of water-transported sediments are altered with respect to their source rocks by basic, well-understood sedimentary processes, such as particle size sorting and abrasion; whereas mass wasting processes, which mainly involve downslope mass-movement of material, result in little or no chemical change with respect to the source rock. The distinction between colluvium and alluvium is of particular value in understanding background metals concentrations at the Site.

Geologic units encountered at the Site include the following:

San Timoteo Formation: The STF characteristically forms steep-sloped ridges and hillsides throughout the Site. These slopes are typically mantled by a thin regolith veneer; the STF is poorly exposed except in localized areas with near-vertical slopes and in recently-formed gullies.

In outcrop, the STF consists of grayish-brown, massive to thickly-bedded, fine-grained, poorly-indurated sandstones and mudstones, with localized gravel conglomerate lenses and rare, relatively thin beds of well-cemented sandstone. No distinctive marker beds have been noted in the STF at the Site, and individual beds cannot be traced between outcrops with any degree of confidence.

In the subsurface, the STF consists primarily of grayish-brown fine-grained sandstones and mudstones, with localized conglomerate lenses. Well-indurated beds of carbonate-cemented, medium- to coarse-grained sandstone are occasionally encountered at depth. The degree of induration of the STF generally tends to increase with depth, although poorly-indurated beds are encountered throughout the section to a depth of at least 250 feet. The STF also appears more indurated at shallow depths in borings drilled in side canyons compared with those drilled near the midline of the major canyons. These observations suggest that the STF is most deeply weathered near the center of the major canyons, and becomes less deeply weathered toward the canyon margins.

Alluvium: Alluvium consists of stratified gravel, sand, silty sand, and silt deposits flooring the major canyons throughout the Site. Alluvium is restricted to the larger canyons at the Site, where it characteristically forms shallower slopes than colluvium. Where well-exposed in the sides of incised active drainage channels within the larger canyons, bedding in the alluvium is observed to be horizontal, as opposed to north-dipping in the STF.

Colluvium: Colluvial deposits consist mainly of poorly- to well-graded sand and silty sand with minor gravel. Colluvium characteristically forms steeper slopes than alluvial deposits, and typically occurs as aprons at the base of steep hillsides and flooring minor side canyons with small catchment areas. Colluvial deposits likely interfinger laterally with alluvium along the margins of the main canyons.

As previously noted, no faults or folds have been mapped by others in the area under investigation. Mapping by Dibblee (2003) shows bedding near Laborde Canyon dipping generally to the north-northeast, at angles ranging from horizontal to 5°; whereas Morton (2004) shows dips ranging from 12° to 25°, toward both the northeast and northwest. Field measurements by Tetra Tech support the steeper dip angles indicated by Morton (2004).

3.5 HYDROGEOLOGY

3.5.1 Regional Hydrogeology

The Site is located within the San Jacinto River watershed. The drainage divide defining the San Jacinto River watershed lies to the north of the Site, roughly 2,000 feet south of Highway 60 and 3,200 feet north of the northern site boundary. The Santa Ana River watershed lies to the north of the drainage divide.

The San Jacinto groundwater basin (Eastern Municipal Water District [EMWD], 2005; Figure 3-4) lies to the south (downgradient) of the Site. The San Jacinto groundwater basin consists of alluvium-filled valleys bounded by relatively impermeable plutonic and metamorphic rocks of the Southern California Batholith and barrier fault zones. The basin is internally subdivided into several subbasins by bedrock restrictions, barrier faults, groundwater divides, and flow system boundaries. The San Jacinto Upper subbasin, which lies directly downgradient from the Site, is bounded by the San Jacinto fault zone to the northeast, by the Casa Loma and Bautista Creek faults to the southwest, and by a flow system boundary with the San Jacinto Lower subbasin to the northwest (EMWD, 2005). The San Jacinto Upper subbasin lies within a deep alluvium-filled graben formed between the San Jacinto and Casa Loma faults. Surface water recharge occurs primarily in the forebay area located in the southeastern portion of the subbasin;

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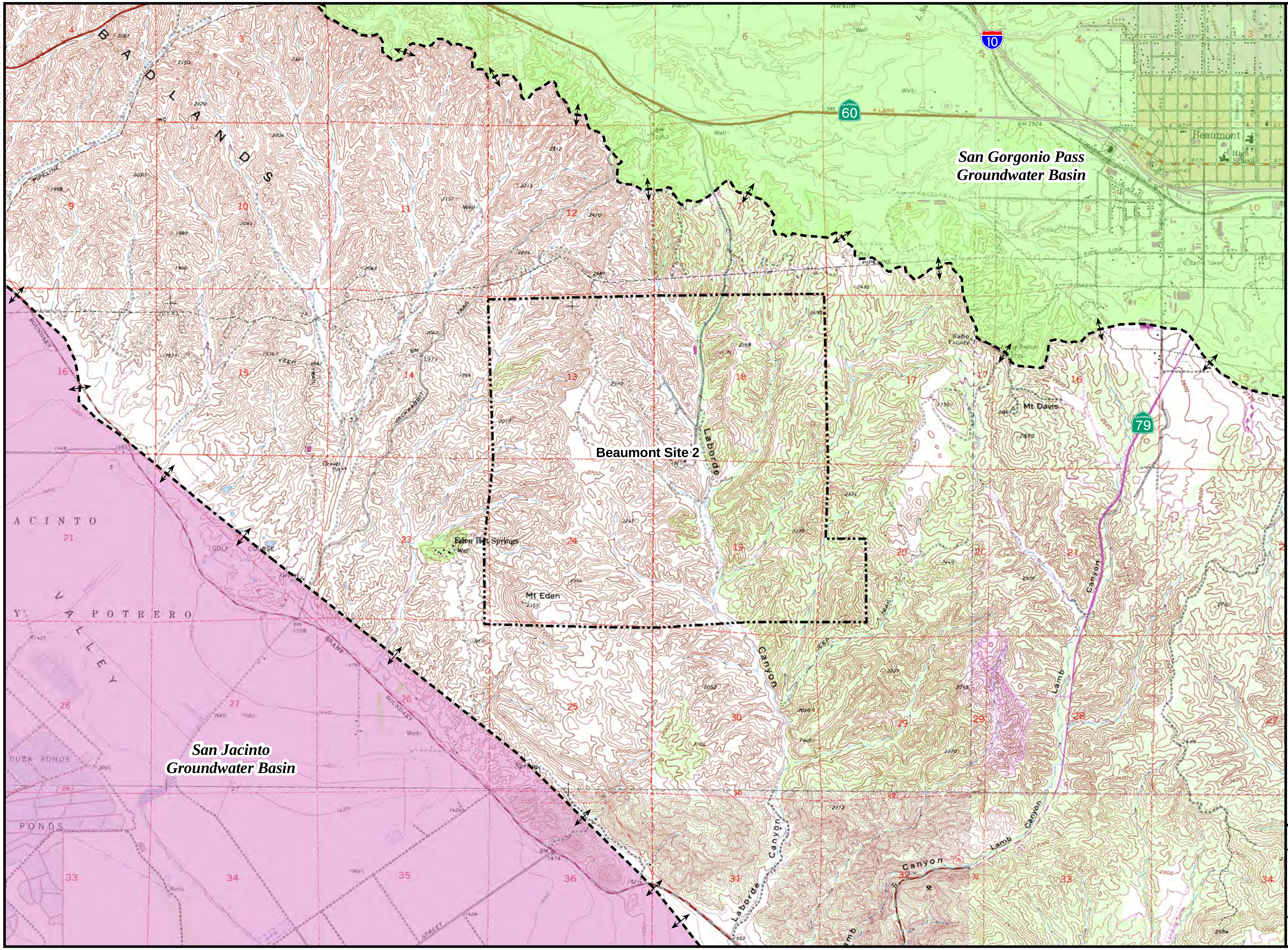

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Feet

Adapted from:
USGS 7.5' topographic quadrangle, El Casco, CA 1979.
USGS 7.5' topographic quadrangle, Lakeview, CA 1979.
USGS 7.5' topographic quadrangle, San Jacinto, CA 1979.
USGS 7.5' topographic quadrangle, Beaumont, CA 1988.

LEGEND

Groundwater Basin Boundary
San Gorgonio Pass Groundwater Basin
San Jacinto Groundwater Basin
Beaumont Site 2 Property Boundary

Note: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

Beaumont Site 2

Figure 3-4
Regional Hydrogeologic Setting

TETRA TECH

confined conditions exist in the pressure area in the northwestern portion of the subbasin. The pressure area is located downgradient from the Site. Based on a groundwater contour map presented by EMWD (2005), groundwater flow within the northern portion of the San Jacinto Upper subbasin is generally to the southwest.

The San Gorgonio Pass groundwater basin (Bloyd, 1971; Rewis et al., 2006; Figure 3-4) lies to the north (upgradient) of the Site. The San Gorgonio Pass groundwater basin has been subdivided into 13 storage units separated by barrier faults (Rewis, 2006). The San Timoteo storage unit (Bloyd, 1971) lies to the north of the Site area. Based on a groundwater contour map prepared by Bloyd (1971), groundwater flow within the San Timoteo storage unit is generally toward the northwest.

Several thermal springs are located in the general vicinity of the Site. The closest thermal spring is Eden Hot Springs, which is located approximately 1,000 feet from the southwestern corner of the Site, at the contact between the crystalline basement complex and the overlying MEF. Other hot springs in the area include Gilman Hot Springs and Soboba Hot Springs, both of which are located further to the southeast, along the San Jacinto fault zone. The thermal springs represent very deep groundwater which has migrated to the surface along highly localized, geologically-controlled pathways.

3.5.2 Site Hydrogeology

3.5.2.1 Occurrence of Groundwater

Groundwater at the Site occurs mainly in sandstones and mudstones of the STF. The STF is deeply weathered within the major canyons, and first groundwater in the canyons is mainly unconfined and found within the weathered section of the STF. Exceptions do exist, however: shallow groundwater appears to be locally confined in the area of TT-MW2-4S and D, and the water table may locally occur in alluvium in the south boundary area (SBA) of the Site, where groundwater may be encountered at depths as shallow as 15 feet.

Groundwater conditions appear to be more variable in smaller side canyons. In soil borings drilled in small side canyons off of Test Bay Canyon, first groundwater was frequently encountered at depths greater than the water table in the main canyon, suggesting that groundwater may be confined in these areas. Perched groundwater may be present in the centrifuge area in the northern portion of Test Bay Canyon, where groundwater was encountered in two soil borings at elevations much higher than in nearby wells.

Deeper groundwater at the Site is most commonly found in relatively unweathered but very poorly indurated fine-to medium-grained sandstone lenses within the STF. Groundwater also appears to be present in fine-grained mudstones. Fracture or bedding plane-related permeability may play a role in the occurrence of groundwater in fine-grained rocks.

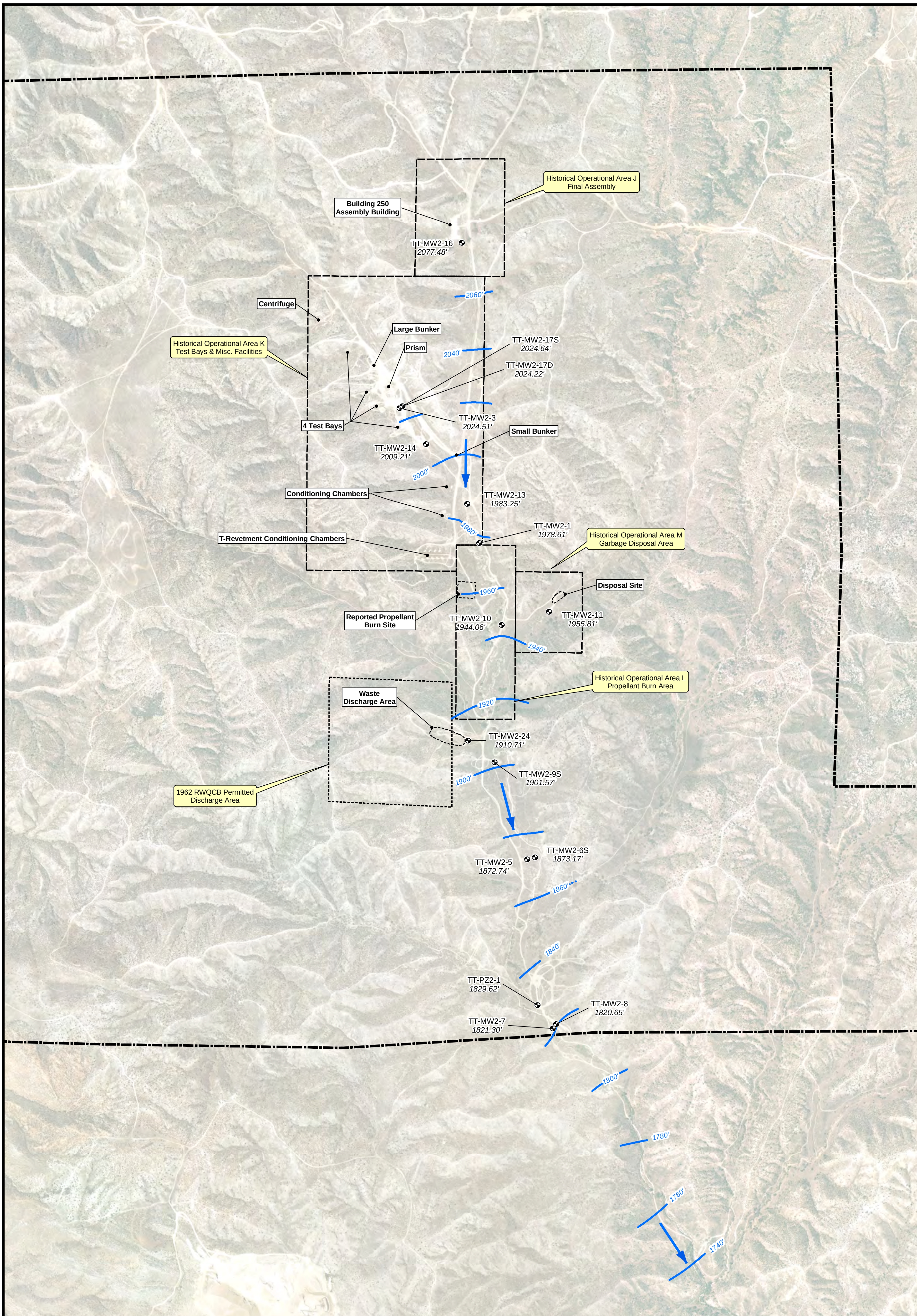
3.5.2.2 Groundwater Flow Direction and Gradient

Depths to groundwater at the Site ranges from approximately 70 feet bgs in well TT-MW2-17S, located in Test Bay Canyon, to approximately 14.5 feet bgs in well TT-MW2-8, located near in the SBA. Groundwater elevations for wells screened across or near the water table in May 2008 are shown in Figure 3-5. Groundwater generally flows down the major tributary canyons to Laborde Canyon, and then to the south, consistent with the direction of surface water flow and topography. The overall groundwater gradient across the Site is roughly 0.030 ft/ft, slightly less than the local ground surface slope of approximately 0.035 ft/ft, and consistent with the decreasing depth to water noted from north to south.

Little seasonal variation in groundwater levels is observed. Longer-term groundwater level variations are typically only 1 to 3 feet over the limited period of record. There is generally a downward vertical gradient of 0.1 to 0.2 ft/ft in most locations, although a weak upward gradient is observed at TT-MW2-1 and TT-MW2-18.

3.5.2.3 Hydraulic Conductivity

Hydraulic conductivity values estimated from slug tests conducted in 5 wells (TT-MW2-1, TT-MW2-3, TT-MW2-4S, TT-MW2-5, and TT-MW2-6D) ranged from approximately 0.017 to 10 feet per day (ft/day; Tetra Tech, 2009g). Hydraulic conductivity values were also estimated from modified specific capacity tests (e.g., Driscoll, 1986) conducted during development or purging of 21 wells; these values ranged from <0.4 to approximately 18 ft/day (Tetra Tech, 2009g).



LEGEND

- Groundwater Monitoring Well Location with Elevation (feet msl)
- Groundwater Elevation Contour
- Groundwater Flow Direction
- RWQCB Permitted Discharge Area
- Historical Operational Area Boundary
- Beaumont Site 2 Property Boundary

N

0 500 1,000 Feet

Adapted from: April 2007 aerial photograph.

Note: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

20-foot groundwater contour interval.

Groundwater elevations in feet MSL.

Beaumont Site 2

Figure 3-5

First Groundwater Contours Second Quarter (May) 2008

TETRA TECH

4.0 METHODOLOGY

4.1 FIELD INVESTIGATION PROGRAM

This investigation is one of a series of ongoing investigations that have been conducted at the Site starting in 2003. Field procedures followed in conducting the previous soil and groundwater investigations, as well as this investigation, have been previously presented in various work plans which were approved by the DTSC. Field activities and the corresponding DTSC-approved plans include the following:

- Drilling and soil sampling: Lockheed Martin Beaumont Site 1 and 2 Soil Investigation Work Plan (Tetra Tech, 2003b)
- Groundwater monitoring well installation and development: Groundwater Monitoring Well Installation Work Plan Lockheed Martin Corporation, Beaumont Site 2 (Tetra Tech, 2006b).
- Groundwater monitoring well sampling: Groundwater Sampling and Analysis Plan Lockheed Martin Corporation, Beaumont Site 2 (Tetra Tech, 2007a).

Field procedures which were not included in the previous plans are described in detail in the following sections.

4.1.1 Site Preparation Activities

Site preparation activities included obtaining permits for the proposed monitoring wells, underground utility clearance, biological monitoring, and consideration of appropriate health and safety measures.

Well Installation Permits

Prior to commencing field activities, well permit applications for each groundwater monitoring well were submitted to the RCDEH. Copies of the approved permits are provided in Appendix B.

Underground Utility Clearance

Prior to the commencement of intrusive activities, the proposed drilling locations were marked in the field with wooden stakes, and Underground Service Alert was contacted to locate and mark any underground utility or service lines. In addition, each boring location was hand augered to 5 feet bgs to prevent damage to unmarked utility lines or drilling equipment from unidentified shallow subsurface obstructions. No obstructions were encountered during hand augering and drilling operations proceeded as planned at all locations

Biological Monitoring

Prior to initiating field sampling activities, biological surveys were conducted in the areas surrounding proposed drilling locations, equipment lay-down areas, and roll-off bins. The surveys were conducted to evaluate the potential for impacts to sensitive species/habitats, including the Stephen’s Kangaroo Rat (SKR), during field activities. The surveys were performed by a Section 10A-permitted or sub-permitted biologist. The biologist identified and marked potential or suspected SKR burrows located in the vicinity to avoid the potential "take" (i.e., harm, harassment, and/or death) of SKR. Where necessary, the biologist also marked ingress and egress routes to each location in an effort to minimize the overall footprint of field activities and impacts to SKR habitat. After surveying the work areas, the biologist remained on Site during field activities to implement requirements of the approved Habitat Conservation Plan (United States Fish and Wildlife Service [USFWS], 2005) and subsequent clarifications (LMC, 2006a and 2006b).

Health and Safety

Selection of personal protective equipment (PPE) was made prior to the commencement of field work. Based on previous field activities at the Site and the site specific Health and Safety Plan, modified Level D was utilized at the start of field activities. The PPE level was reevaluated on an on-going basis as fieldwork progressed. Based on Site conditions and the field activities being conducted, the PPE level was unchanged throughout the field program.

4.1.2 Seismic Reflection Survey

Seismic reflection data were collected along 2 profiles to detect potential faults along Test Bay and Laborde Canyons. Seismic refraction data were also collected along one of the profiles to evaluate alluvium thickness and depth to competent STF. The seismic data were collected and interpreted by Terra Physics of Highland, California, under the direct supervision of a California-registered Professional Geophysicist.

The seismic survey used a 20-pound hammer striking a 1 foot square steel plate as a seismic wave source. To improve the signal-to-noise-ratio, 10 to 12 individual hammer blows were stacked together to form a final data record. Individual records with obvious noise were not included in the final data stack. Mark Products Model L-40 geophones spaced 8 feet apart were used to sense the seismic waves. The geophone signals were input to a Geometrics model R-48 seismograph. Data were recorded electronically on the seismograph hard disk for later processing and interpretation. As needed, hard copy records were used in the field to evaluate data quality and adjust measurement parameters.

Additional information pertaining to survey design, field methodology, and data reduction and interpretation is provided in the Terra Physics report (Appendix C).

4.1.3 Soil Borings

A total of 115 soil borings were drilled at the Site between September 12, 2008 and April 30, 2009, including 44 hand auger borings, 8 direct-push borings, 51 HSA borings, and 12 sonic borings.

4.1.3.1 Drilling Procedures

Hand Auger Borings

Shallow (total depth less than 5 feet bgs) hand auger borings were drilled by Tetra Tech personnel. Hand auger drilling procedures are described in Tetra Tech (2003b).

Direct-Push Borings

Direct-push soil borings were drilled by WDC Exploration and Wells (WDC), a California C-57 licensed drilling contractor, using a Geoprobe 6600 rig. Direct-push drilling procedures are described in Tetra Tech, 2003b)

Hollow-Stem Auger Borings

HSA borings were drilled by WDC using truck-mounted CME 75, CME 85, and CME 95 HSA rigs. HSA drilling procedures are described in Tetra Tech (2003b).

Sonic Borings

Sonic borings were drilled by Boart-Longyear E&I Drilling Services, a California C-57 licensed drilling contractor using Prosonic track- and truck-mounted drill rigs. The sonic drilling method uses a combination of rotation and high-frequency vibrations generated at the drill head to effect a cutting action at the drill bit face. Initially, a 7-inch diameter, 20-foot long core barrel was advanced approximately 10 feet into the subsurface. The core barrel was then retrieved to the surface and vibrated to expel the soil or rock sample into a plastic sheath in approximate 2-foot sections. The ends of the sheath were knotted to form a sample bag. After the entire core sample was expelled, the core barrel was returned to the borehole, advanced another 10 feet, and retrieved to the surface. Once the core barrel had been advanced to approximately 20 feet bgs, 8-inch diameter flush-threaded steel casing was advanced to a depth of approximately 10 feet bgs. Slough generated by advancing the 8-inch casing was removed by performing a cleanout run with the core barrel. Drilling then proceeded by advancing the core barrel 10 additional feet, advancing the casing 10 additional feet, and performing a cleanout run. Approximately 10 feet of open hole was maintained during drilling to avoid bridging the core barrel inside the 8-inch casing. Once the boring was cored to total depth, the casing was advanced to the bottom of the boring.

In general, drilling was conducted without adding water to the borehole. In some instances, however, it was necessary to introduce small amounts of potable water to cool and lubricate the drill bit when difficult conditions were encountered. Water added to the borehole was typically contained within the core barrel and removed with the core. Any excess water noted in the borehole was removed by bailing.

Prior to installing monitoring wells in the sonic borings, the 8-inch cased boreholes were "overwashed" with 10-inch casing. This step was necessary to maintain minimum 2-inch spacing between the well casings and the borehole wall during well construction. Initially, a 12-inch diameter surface casing was advanced to a depth of approximately 10 to 20 feet. The 10-inch casing was then advanced over the 8-inch casing. Cuttings between the 8- and 10-inch casings were flushed out of the annular space with potable water. Water added during the overwashing process was contained in a plastic tub placed over the drill string, and was stored in 20,000-gallon portable tanks pending waste profiling and disposal.

4.1.3.2 Lithologic Logging

Soil borings were logged during drilling by a geologist or soil scientist working under the direct supervision of a California-registered Professional Geologist. Unconsolidated materials (i.e., alluvium) were described in general accordance with the Unified Soil Classification System (USCS; American Society for Testing and Materials [ASTM] Standard D2487) using the visual-manual procedure (ASTM Standard D2488). Bedrock materials (i.e., STF) were classified in accordance with standard geologic nomenclature (e.g., Compton, 1985), and were described using USCS conventions.

Copies of the boring logs are provided in Appendix D.

4.1.3.3 Borehole Abandonment

Soil borings which were not completed as groundwater monitoring wells or soil gas probes were abandoned after sampling. Boreholes less than 20 feet deep were abandoned by backfilling with hydrated bentonite chips. Boreholes greater than 20 feet deep were abandoned by backfilling with cement/bentonite grout placed with a tremie pipe. Borings backfilled with grout were checked for settlement 2 to 3 days after abandonment, and were topped off to the surface with additional grout or hydrated bentonite chips as needed.

4.1.3.4 Drilling Equipment Decontamination

Drilling equipment (i.e., hand augers, direct push drill rods, hollow-stem augers, and sonic core barrels and casing) was decontaminated prior to first use, between each borehole, and prior to leaving the Site by pressure washing or by washing with a phosphate-free detergent solution, rinsing twice with potable water, and rinsing with distilled water. Water used for equipment decontamination was contained and stored on-Site in 20,000-gallon portable tanks, pending waste profiling and disposal.

4.1.4 Soil Sampling

A total of 815 soil samples were collected during the field investigation, including 71 samples collected from hand auger borings, 5 samples collected from direct-push borings, 680 samples collected from HSA borings, and 59 samples collected from sonic borings.

4.1.4.1 Soil Sampling Methodologies

Hand Auger Borings

Hand auger soil sampling is described in Tetra Tech (2003b). Hand auger borings were used to collect samples for analysis of non-volatile constituents only (i.e., perchlorate, metals, or explosives). The soil samples were collected directly from the hand auger bucket and transferred to 4-ounce glass jars with Teflon-lined screw caps.

Direct-Push Borings

Direct-push soil sampling is described in Tetra Tech (2003b). Soil samples for analysis of metals were collected using a 4-foot long, piston-type solid barrel sampler lined with an acetate sleeve. Upon retrieval from the borehole, a 6-inch portion of the sleeve corresponding to the desired sampling depth was cut and removed. The ends of the cut portion of the sleeve were covered with Teflon sheets and capped with plastic caps.

Hollow-Stem Auger Borings

HSA soil sampling is described in Tetra Tech (2003b). Soil samples collected for analysis of volatile constituents (i.e., TPHg and VOCs) were collected using a split-barrel sampler lined with 2-inch diameter stainless steel sleeves. Upon retrieval from the borehole, the sampler was opened and 3 subsamples of soil were collected from the lowermost sleeve using EnCore sampling devices. The EnCore devices were immediately capped and placed in labeled recloseable bags.

The remainder of the lowermost sleeve was retained for analysis of non-volatile constituents (i.e., perchlorate, metals, TPHd, and SVOCs). The ends of the sleeve were covered with Teflon sheets and capped with plastic caps.

Soil samples collected for analysis of non-volatile constituents (i.e., perchlorate and/or metals) only were collected using an unlined split-barrel sampler. Upon retrieval from the borehole, a portion of the soil sample was transferred to a 4-ounce glass jar with a Teflon-lined screw cap.

Sonic Borings

Soil samples for analysis of perchlorate were collected from bagged samples extruded from the sonic core barrel. A portion of the soil sample was collected from the center of the bag and transferred to a 4-ounce glass jar with a Teflon-lined screw cap.

4.1.4.2 Sample Handling

All soil samples were immediately labeled, placed in recloseable plastic bags, and stored in an ice chest with water ice, pending delivery to the laboratory under chain-of-custody procedures. All soil analyses were performed by E.S. Babcock & Sons, Inc., a California state-certified environmental laboratory.

4.1.4.3 Soil Sampling Equipment Decontamination

Equipment used for soil sampling (solid-barrel samplers, split-barrel samplers, and reusable sample liners) was decontaminated prior to first use, between each sample, and prior to demobilization from the Site by washing with a phosphate-free detergent solution, rinsing twice with potable water, rinsing with distilled water, and air-drying. Water used for equipment decontamination was contained and stored on-Site in 20,000-gallon portable tanks, pending profiling and disposal.

4.1.5 Grab Groundwater Sampling

To provide additional information on contaminant distributions in shallow groundwater, grab groundwater samples were collected whenever possible from soil borings that were drilled to groundwater. Samples of first-encountered groundwater were collected by lowering a disposable polyethylene bailer through the hollow-stem augers or sonic drill casing. Groundwater samples collected for VOC analysis were immediately transferred from the bailer to 40-milliliter (ml) glass volatile organic analysis vials containing hydrochloric acid preservative using a bottom-emptying device. Samples collected for perchlorate analysis were transferred to 250-ml polyethylene bottles. The containers were immediately labeled, placed in recloseable plastic bags, and stored in an ice chest pending delivery to the laboratory under chain-of-custody procedures.

Grab groundwater samples were also collected below the water table from the sonic borings using the "case-and-bail" method. When the presence of groundwater was noted in soil samples, drilling was temporarily halted and groundwater was allowed to accumulate in the sonic casing. The accumulated groundwater was then purged from the borehole by bailing or pumping. A groundwater sample was then collected with a disposable bailer and handled as described above.

During drilling of the first sonic boring (TT-MW2-30), it was noted that perchlorate concentrations in the case-and-bail grab samples were not significantly attenuating with depth, suggesting that the samples collected at depth may have been cross-contaminated with shallow, highly-impacted groundwater during drilling or sampling. Cross-contamination was later confirmed by comparing the grab sample results with samples collected from monitoring well installed at the same depth interval. Several possible mechanisms for cross-contamination mechanisms were considered to be possible, including carrydown of impacted groundwater inside the sonic casing, or leakage between zones through an annulus on the outside of the sonic casing.

To further evaluate the sampling procedure, multiple samples were collected from a single water-bearing zone in the TT-MW2-30 borehole, at a depth of approximately 225 to 230 feet bgs. Grab samples were collected prior to purging the 8-inch drill casing (K-54-W102-GW-227-Grab), after partially purging the casing (K-54-W102-GW-227-Grab1, collected after removing 45 gallons of groundwater), and after purging the casing dry (K-54-W102-GW-227-Grab2, collected after removing 145 gallons of groundwater). The water-bearing zone was then isolated by installing a temporary monitoring well with a filter pack and bentonite seal in the open portion of the borehole. Three casing volumes (approximately 85 gallons) of groundwater were purged from the temporary well prior to collecting sample K-54-W102-227-Temp Well. Monitoring well TT-MW2-30C was then installed across same water-bearing zone for comparison.

Analytical results for these samples are included in Table 5-9. The results show that the grab sample collected prior to purging (K-54-W102-GW-227-Grab) had a much higher perchlorate concentration (40,000 µg/L) than the grab samples collected after purging the casing (samples K-54-W102-GW-227-Grab1, 3,200 µg/L; and K-54-W102-GW-227-Grab2, 1,200 µg/L). The perchlorate concentration in the temporary well sample (sample K-54-W102-227-Temp Well, 2,100 µg/L) was not clearly different from the grab samples collected by the case-and-bail method. Analytical results for samples collected from monitoring well TT-MW2-30C were 9.9 µg/L and <0.35 µg/L during the first and second DSI sampling rounds, significantly lower than the case-and-bail and temporary well samples.

The primary conclusions drawn from this study include the following:

- Analytical results for the grab sample collected prior to purging the sonic casing indicate that cross-contamination between shallow, highly-contaminated groundwater and deeper, less contaminated groundwater occurs during the sonic drilling process. The mechanism by which cross-contamination occurs is not fully understood, but may be related to the presence of an annular space between the formation and the sonic casing, and/or vibration-related disturbance to the formation during drilling.

- Case-and-bail grab sampling appears to be as effective as installing and sampling temporary monitoring wells for reducing the effects of cross contamination. However, neither sampling methodology appears to provide representative groundwater samples. Grab samples appear to be useful primarily as a qualitative indicator of concentration changes with depth, not as quantitative indicators of contaminant concentrations.

Based on these conclusions, the groundwater analytical results for grab samples collected below the water table from sonic borings are not quantitatively considered in the data evaluation sections of this report.

4.1.6 Monitoring Well Installation and Sampling

A total of 33 groundwater monitoring wells, including six 4-inch diameter single completion wells constructed in HSA boreholes, and 27 2-inch diameter dual or triple-nested wells constructed in sonic boreholes, were installed during the field program. Well construction details are summarized in Table 4-1. Copies of well construction diagrams are provided in Appendix D.

4.1.6.1 Well Installation

Hollow-Stem Auger Borings

Procedures for installing monitoring wells in HSA boreholes are described in Tetra Tech (2006b). All of the wells were constructed inside the augers, using the augers as a tremie pipe.

Sonic Borings

Dual- or triple-nested wells were completed inside the sonic drill casing. Prior to installing the monitoring wells, the 8-inch drill casing was overwashed with 10-inch casing to a depth corresponding to approximately two feet below the bottom second well screen, to allow for a minimum 2-inch clearance between the well screens and casings and the borehole wall in the portion of the borehole where more than one casing was present. The wells were completed by assembling and suspending the deepest well screen and blank casing in the borehole. All well screens consisted of 2-inch diameter 0.020-inch slot stainless steel wire wrap screen, and all blank casing consisted of schedule 80 polyvinyl chloride blank casing. Centralizers were placed at the top and bottom of the well screen to maintain clearance from the borehole walls. A filter pack consisting of #2/16 sand was then placed to a depth of approximately 2 feet above the top of the well screen. Due to the large water column (up to nearly 200 feet in the deepest wells) present during well construction, the filter pack was placed using a 2-inch tremie pipe with a side discharge. Potable water was used to flush all dry materials through the tremie pipe. The well was then surged to settle the filter pack, and additional #2/16 sand was added through the tremie pipe as needed to maintain an approximate 2-foot overpack. Approximately 1 foot of #0/30 transition sand was placed above the filter pack using the tremie pipe. A seal consisting of hydrated bentonite chips was then placed above the transition sand using the tremie pipe. The hydrated bentonite seal was placed to a depth

TABLE 4-1
MONITORING WELL CONSTRUCTION SUMMARY

Well No.	Date Installed	Date Destroyed	Well Type[1]	Northing Coordinate	Easting Coordinate	Ground Surface Elevation (feet msl)	TOC Elevation (feet msl)	Riser Height (feet)	Drilling Method[2]	Borehole Diameter (inches)	Borehole Depth (feet bgs)	Well Depth (feet TOC)	Casing Diameter (inches)	Depth to Top of Screen (feet bgs)	Depth to Bottom of Screen (feet bgs)	Screen Length (feet)	Screen Material[3] and Slot Size (inches)	Filter Pack Sand
W2-1	Unk.	Unk.	P	2271823.25	6325081.02	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.
W2-2	Unk.	12/13/07	P	2272462.34	6325839.69	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.	Unk.
W2-3	Unk.	12/13/07	P	2273334.11	6325349.92	Unk.	2028.83	Unk.	Unk.	Unk.	Unk.	Unk.	8	Unk.	Unk.	Unk.	Unk.	Unk.
W2-5	Unk.	12/10/07	P	2276981.24	6325110.52	Unk.	2140.95	Unk.	Unk.	Unk.	Unk.	Unk.	6	161	467	306	Unk.	Unk.
MW2-2	11/28/90	09/19/95	M	2272462.34	6325839.69	Unk.	1996.41	Unk.	ARCH	10	140.0	135.5	4	115	135	20	SS 0.020	#3
MW2-4	11/30/90	09/19/95	M	2271712.28	6325287.77	Unk.	1956.36	Unk.	ARCH	10	62.0	60.0	4	40	60	20	SS 0.020	#3
MW2-5	12/01/90	09/20/95	M	2274073.76	6325061.16	Unk.	2058.82	Unk.	ARCH	10	100.0	98.0	4	78	98	20	SS 0.020	#3
MW2-6	12/04/90	09/20/95	M	2275852.57	6325309.81	Unk.	2111.95	Unk.	ARCH	10	95.0	90.0	4	70	90	20	SS 0.020	#3
TT-MW2-1	09/01/04	NA	M	2273430.33	6325373.78	2032.90	2035.21	2.31	HSA	12	81.0	73.2	4	50	70	20	PVC 0.020	#3
TT-MW2-2	08/30/04	NA	M	2276662.64	6325085.92	2135.73	2137.75	2.02	HSA	12	121.0	120.0	4	103.50	118.5	15	PVC 0.020	#3
TT-MW2-3	08/31/04	NA	M	2274876.52	6324520.74	2092.10	2094.66	2.56	HSA	12	115.0	100.9	4	78	98	20	PVC 0.020	#3
TT-MW2-4S	09/07/04	NA	M	2272392.82	6325561.45	1984.56	1986.94	2.38	HSA	12	106.0	73.2	4	60	70	10	PVC 0.020	#3
TT-MW2-4D	09/07/04	NA	M	2272392.82	6325561.45	1984.56	1987.17	2.61	HSA	12	106.0	97.8	4	85	95	10	PVC 0.020	#3
TT-MW2-5	12/01/05	NA	M	2270041.50	6325886.55	1908.50	1911.31	2.81	HSA	10	40.0	43.0	4	29	39	10	PVC 0.020	#3
TT-MW2-6S	12/01/05	NA	M	2270063.95	6325968.58	1904.99	1908.00	3.01	HSA	10	80.0	38.1	2	28	38	10	PVC 0.020	#3
TT-MW2-6D	12/01/05	NA	M	2270064.04	6325968.44	1904.99	1908.07	3.08	HSA	10	80.0	56.4	2	52	57	5	PVC 0.020	#3
TT-MW2-7	08/21/06	NA	M	2268227.74	6326158.83	1836.99	1839.25	2.26	HSA	10	29.0	27.4	4	11.5	26.5	15	PVC 0.020	#2/12
TT-MW2-7D	10/24/07	NA	M	2268244.03	6326165.05	1837.20	1838.96	1.76	HSA	10	70.0	70.6	4	59.0	69.0	10	PVC 0.020	#2/16
TT-MW2-8	08/22/06	NA	M	2268277.35	6326195.41	1833.43	1836.32	2.89	HSA	10	31.5	27.2	4	13.5	23.5	10	PVC 0.020	#2/12
TT-MW2-9S	08/29/06	NA	M	2271079.03	6325536.53	1935.46	1938.38	2.92	HSA	10	46.0	47.1	4	29.0	44.0	15	PVC 0.020	#2/16
TT-MW2-9D	08/28/06	NA	M	2271087.05	6325529.52	1936.00	1938.78	2.78	HSA	10	70.5	72.4	4	64.6	69.6	5	PVC 0.020	#2/16
TT-MW2-10	09/13/06	NA	M	2272551.89	6325612.71	1999.04	2001.57	2.53	HSA	10	61.5	62.6	4	42.1	57.1	15	PVC 0.020	#2/16
TT-MW2-11	08/31/06	NA	M	2272694.04	6326119.79	2001.82	2004.51	2.69	HSA	10	55.0	57.4	4	44.2	54.2	10	PVC 0.020	#2/16
TT-MW2-12	09/05/06	NA	M	2272851.92	6325533.11	2013.12	2016.26	3.14	HSA	10	60.0	62.4	4	49.0	59.0	10	PVC 0.020	#2/16
TT-MW2-13	09/12/06	NA	M	2273848.43	6325243.90	2045.89	2049.39	3.50	HSA	10	72.0	72.7	4	60.0	70.0	10	PVC 0.020	#2/16
TT-MW2-14	11/07/06	NA	M	2274484.91	6324807.33	2072.12	2074.78	2.66	SON	8	77.2	74.5	4	66.0	71.0	5	PVC 0.020	#2/16
TT-MW2-16	08/25/06	NA	M	2276648.22	6325185.27	2135.19	2137.20	2.01	HSA	10	71.0	70.3	4	56.5	66.5	10	PVC 0.020	#2/12
TT-MW2-17S	11/03/06	NA	M	2274898.05	6324549.63	2092.10	2095.55	3.45	SON	8	105.0	76.8	2	65.0	75.0	10	PVC 0.020	#2/16
TT-MW2-17D	11/03/06	NA	M	2274898.22	6324549.79	2092.10	2095.33	3.23	SON	8	105.0	96.3	2	94.0	99.0	5	PVC 0.020	#2/16
TT-MW2-18	09/13/06	NA	M	2273448.87	6325348.60	2032.52	2035.32	2.80	SON	8	102.0	101.5	4	93.1	98.1	5	PVC 0.020	#2/16
TT-MW2-19S	07/02/08	NA	M	2263830.43	6327984.55	1695.40	1698.34	2.94	ARCH	12	200.0	58.0	4	30	50	20	PVC 0.020	#2/12
TT-MW2-19D	07/03/08	NA	M	2263830.59	6327984.92	1695.43	1698.37	2.94	ARCH	12	200.0	173.7	4	145	170	25	PVC 0.020	#2/12
TT-MW2-20S	05/06/08	NA	M	2259713.50	6327376.18	1584.70	1587.44	2.74	HSA	10	41.0	42.6	4	20	40	20	PVC 0.020	#2/12
TT-MW2-20D	05/07/08	NA	M	2259717.98	6327376.18	1583.88	1587.48	3.60	HSA	10	80.0	81.3	4	74	79	5	PVC 0.020	#2/12
TT-MW2-21	10/31/07	NA	M	2271404.52	6325064.44	1975.50	1978.45	2.95	HSA	10	80.0	82.0	4	59.0	79.0	20	PVC 0.020	#2/16
TT-MW2-22	10/31/07	NA	M	2271386.44	6324876.34	1973.05	1975.86	2.81	HSA	10	80.0	81.9	4	59.0	79.0	20	PVC 0.020	#2/16
TT-MW2-23	11/02/07	NA	M	2271308.80	6325082.50	1993.05	1995.17	2.12	HSA	10	100.0	101.0	4	78.5	98.5	20	PVC 0.020	#2/16
TT-MW2-24	10/29/07	NA	M	2271311.56	6325253.34	1961.81	1964.26	2.45	HSA	10	67.5	69.5	4	47.0	67.0	20	PVC 0.020	#2/16
TT-MW2-25	10/09/08	NA	M	2271045.04	6325276.72	1964.47	1966.96	2.49	HSA	10	75.0	77.4	4	54.5	74.5	20	SS 0.020	#2/16
TT-MW2-26	10/10/08	NA	M	2271395.06	6325508.51	1942.07	1944.43	2.36	HSA	10	80.0	67.4	4	44.0	64.0	20	SS 0.020	#2/16
TT-MW2-27	10/10/08	NA	M	2271091.70	6325457.05	1945.75	1948.27	2.52	HSA	10	80.0	56.1	4	32.5	52.5	20	SS 0.020	#2/16
TT-MW2-28	11/04/08	NA	M	2272406.00	6325800.05	1994.14	1995.65	1.51	HSA	10	120.0	68.2	4	45.3	65.3	20	SS 0.020	#2/16
TT-MW2-29A	10/31/08	NA	M	2276213.93	6323642.46	2145.07	2147.77	2.70	SON	8/10	201.0	115.0	2	85.0	115.0	30	SS 0.020	#2/16
TT-MW2-29B	10/23/08	NA	M	2276213.82	6323642.35	2145.07	2147.90	2.83	SON	8/10	201.0	157.7	2	132.5	157.5	25	SS 0.020	#2/16
TT-MW2-29C	10/28/08	NA	M	2276213.80	6323642.34	2145.07	2147.83	2.76	SON	8/10	201.0	202.1	2	190.0	200.0	10	SS 0.020	#2/16
TT-MW2-30A	11/18/08	NA	M	2274491.29	6324821.80	2071.63	2074.37	2.74	SON	8/10	230.1	128.9	2	116.0	126.0	10	SS 0.020	#2/16
TT-MW2-30B	11/14/08	NA	M	2274491.44	6324821.60	2071.63	2074.41	2.78	SON	8/10	230.1	156.8	2	144.0	154.0	10	SS 0.020	#2/16
TT-MW2-30C	11/12/08	NA	M	2274491.59	6324821.79	2071.63	2074.35	2.72	SON	8/10	230.1	233.8	2	225.0	230.0	5	SS 0.020	#2/16

TABLE 4-1
MONITORING WELL CONSTRUCTION SUMMARY

Well No.	Date Installed	Date Destroyed	Well Type[1]	Northing Coordinate	Easting Coordinate	Ground Surface Elevation (feet msl)	TOC Elevation (feet msl)	Riser Height (feet)	Drilling Method[2]	Borehole Diameter (inches)	Borehole Depth (feet bgs)	Well Depth (feet TOC)	Casing Diameter (inches)	Depth to Top of Screen (feet bgs)	Depth to Bottom of Screen (feet bgs)	Screen Length (feet)	Screen Material[3] and Slot Size (inches)	Filter Pack Sand
TT-MW2-31A	11/22/08	NA	M	2273460.48	6325360.94	2033.06	2036.11	3.05	SON	8/10	206.0	137.6	2	123.0	133.0	10	SS 0.020	#2/16
TT-MW2-31B	11/21/08	NA	M	2273460.32	6325360.68	2033.06	2036.15	3.09	SON	8/10	206.0	200.7	2	186.0	196.0	10	SS 0.020	#2/16
TT-MW2-32	12/04/08	NA	M	2272700.94	6326121.91	2002.31	2004.87	2.56	HSA	10	175.0	90.2	4	77.0	87.0	10	SS 0.020	#2/16
TT-MW2-33A	12/09/08	NA	M	2274625.27	6325252.78	2067.78	2070.54	2.76	SON	8/10	201.0	72.2	2	54.0	69.0	15	SS 0.020	#2/16
TT-MW2-33B	12/08/08	NA	M	2274625.42	6325252.67	2067.78	2070.54	2.76	SON	8/10	201.0	139.7	2	127.0	137.0	10	SS 0.020	#2/16
TT-MW2-33C	12/08/08	NA	M	2274625.41	6325252.93	2067.78	2070.54	2.76	SON	8/10	201.0	184.1	2	176.0	181.0	5	SS 0.020	#2/16
TT-MW2-34A	12/19/09	NA	M	2274077.27	6324917.72	2064.20	2066.84	2.64	SON	8/10	195.0	93.4	2	70.0	90.0	20	SS 0.020	#2/16
TT-MW2-34B	12/18/09	NA	M	2274077.33	6324917.90	2064.20	2066.85	2.65	SON	8/10	195.0	146.6	2	137.0	147.0	10	SS 0.020	#2/16
TT-MW2-34C	12/16/09	NA	M	2274077.50	6324917.72	2064.20	2066.84	2.64	SON	8/10	195.0	194.2	2	180.0	190.0	10	SS 0.020	#2/16
TT-MW2-35A	12/30/09	NA	M	2272564.09	6325592.88	2000.15	2003.20	3.05	SON	8/10	201.0	147.9	2	135.0	145.0	10	SS 0.020	#2/16
TT-MW2-35B	12/29/09	NA	M	2272564.08	6325592.61	2000.15	2003.20	3.05	SON	8/10	201.0	201.9	2	190.0	200.0	10	SS 0.020	#2/16
TT-MW2-36A	01/14/09	NA	M	2275328.74	6324320.77	2098.83	2100.99	2.16	SON	8/10	200.0	100.2	2	98.0	108.0	10	SS 0.020	#2/16
TT-MW2-36B	01/13/19	NA	M	2275328.57	6324320.91	2098.83	2101.04	2.21	SON	8/10	200.0	157.5	2	150.0	155.0	5	SS 0.020	#2/16
TT-MW2-36C	01/12/09	NA	M	2275328.63	6324320.99	2098.83	2100.88	2.05	SON	8/10	200.0	182.2	2	173.0	178.0	5	SS 0.020	#2/16
TT-MW2-37A	01/17/09	NA	M	2271301.91	6325262.27	1960.95	1963.62	2.67	SON	8/10	186.0	117.0	2	112.0	117.0	5	SS 0.020	#2/16
TT-MW2-37B	01/16/09	NA	M	2271301.67	6325262.24	1960.95	1963.67	2.72	SON	8/10	186.0	185.0	2	180.0	185.0	5	SS 0.020	#2/16
TT-MW2-38A	03/09/09	NA	M	2274657.56	6324651.07	2081.99	2084.56	2.57	SON	8/10	228.0	79.2	2	57.0	77.0	20	SS 0.020	#2/16
TT-MW2-38B	03/05/09	NA	M	2274657.36	6324651.22	2081.99	2084.42	2.43	SON	8/10	228.0	179.6	2	173.0	178.0	5	SS 0.020	#2/16
TT-MW2-38C	03/05/09	NA	M	2274657.55	6324651.43	2081.99	2084.63	2.64	SON	8/10	228.0	229.4	2	217.0	227.0	10	SS 0.020	#2/16
TT-MW2-39	02/19/09	NA	M	2274648.12	6324862.96	2076.94	2079.53	2.59	HSA	10	75.0	76.2	4	61.2	76.2	15	SS 0.020	#2/16
TT-MW2-40A	03/30/09	NA	M	2275009.86	6324622.71	2094.06	2096.28	2.22	SON	8/10	106.0	108.0	2	101.0	106.0	5	SS 0.020	#2/16
TT-MW2-40B	03/27/09	NA	M	2275010.03	6324622.74	2094.06	2096.24	2.18	SON	8/10	178.0	180.0	2	168.0	178.0	10	SS 0.020	#2/16
TT-MW2-40C	03/25/09	NA	M	2275009.86	6324622.92	2094.06	2096.28	2.22	SON	8/10	229.0	230.9	2	224.0	229.0	5	SS 0.020	#2/16
TT-PZ2-1	08/23/06	NA	M	2268479.29	6325996.01	1844.00	1847.06	3.06	HSA	10	40.5	34.7	2	14.3	34.3	20	PVC 0.020	#2/16

Notes:

Unk. - Unknown
NA - Not applicable
msl - Mean sea level
bgs - Below ground surface
TOC - Top of casing
1. - P = production well; M = monitoring well
2. - ARCH = air rotary/casing hammer; HSA = hollow stem auger; SON = sonic
3. - PVC = polyvinyl chloride; SS = stainless steel

corresponding to approximately one foot below the bottom of the second well screen. The second well screen and casing was then suspended in the borehole. Rubber donut spacers were placed at 20-foot intervals along the blank casing to maintain clearance between well casings. The procedures described above were used to place the filter pack, transition sand, and bentonite seal around the second casing string. If a triple-nested well was being installed, a third well screen and casing with donut spacers was suspended in the borehole, and the a filter pack, transition sand, and bentonite seal was installed as described above. A 10-foot bentonite seal was placed above the uppermost completion and hydrated with potable water. The remainder of the annular space was then backfilled with cement-5% bentonite grout to a depth of approximately 1 foot bgs. The wells were completed at the surface with above-grade steel monuments with hinged, locking steel lids, set in 2-foot by 2-foot concrete pads.

4.1.6.2 Well Development

The groundwater monitoring wells were developed at least 72 hours following well construction, using a combination of the surge-and-bail and pumping methods. Well development procedures are described in Tetra Tech (2006b).

Due to a machining fault which resulted in a slight narrowing of the flush-threaded PVC well casing, standard surge blocks, bailers, and submersible pumps could not be used to develop wells TT-MW2-31A, and TT-MW2-31B. These wells were developed with an airlift system, consisting of a vertical discharge (eductor) pipe and an air line. A compressor is used to introduce air into the eductor pipe below the groundwater level in the well, which causes groundwater to be lifted through the eductor to the surface.

Groundwater purged from the wells during development was temporarily stored in a portable tank mounted on the development rig. The groundwater was then pumped into 20,000-gallon portable tanks pending profiling and disposal.

Copies of the well development field sheets are provided in Appendix E.

4.1.6.3 Groundwater Sampling

The newly-installed groundwater monitoring wells were sampled twice as part of the DSI. The first sampling event for each well occurred no sooner than 72 hours following well development. Well purging and sampling were conducted in accordance with protocols described in the RCRA Ground Water Monitoring: Draft Technical Guidance (USEPA, 1992). Groundwater purging and sampling was conducted using low-flow techniques, with either portable or dedicated submersible sampling pumps. Sampling procedures are described in detail in the Groundwater SAP for the Site (Tetra Tech, 2007a). The groundwater samples were submitted to E.S Babcock and Sons, Inc. for analysis.

Copies of the groundwater sampling field data sheets are provided in Appendix E.

In light of the evidence for groundwater cross-contamination in sonic borings discussed in Section 4.1.5 above, the analytical data for three sets of deep groundwater monitoring wells installed in areas with high perchlorate concentrations in shallow groundwater were reviewed for evidence of residual cross-contamination. The well nests installed in highly-impacted areas include TT-MW2-30A, B, and C (Table 5-9); TT-MW2-31A and B (Table 5-11); TT-MW2-37A and B (Table 5-17); and TT-MW2-38A, B, and C (Table 5-9). Comparison of the data for the first and second DSI sampling rounds shows relatively large concentration changes in wells TT-MW2-30B and C, TT-MW2-31A, TT-MW2-37A, and TT-MW2-38A, B, and C. The concentration shifts were toward both higher and lower concentrations, suggesting that cross-contamination may have involved both high-concentration shallow groundwater and potable water introduced into the boreholes while overwashing with 10-inch casing prior to well construction. Based on these findings, the groundwater analytical results for wells TT-MW2-30A, B, C, TT-MW2-37A and B, and TT-MW2-38A, B, and C are regarded as preliminary in the data interpretation sections of this report.

4.1.7 Soil Gas Probe Installation and Sampling

A total of 8 soil gas probes were installed in 4 soil borings located in the WDA. Each boring was completed with two nested probes, screened at depths of approximately 5 and 15 feet bgs.

4.1.7.1 Probe Installation

The nested soil gas probes were installed in 2.2-inch diameter direct-push soil borings drilled to a depth of approximately 16 feet bgs. The soil gas probes consisted of 6-inch long stainless steel mesh screens attached to length of 0.25-inch diameter Nylaflow tubing. The probes were constructed by suspending the deep screen in the borehole so that the bottom of the screen was at a depth of approximately 15 feet, and then placing a 2-foot thick filter pack consisting of #3 sand around the probe screen. A hydrated granular bentonite seal was then placed from the top of the filter pack to a depth of approximately 6 feet bgs. The second probe was then suspended in the borehole so that the bottom of the screen was at a depth of approximately 5 feet bgs, and a second filter pack consisting of approximately 2 feet of #3 sand was placed around the probe screen. The remainder of the borehole was then backfilled with hydrated granular bentonite. The probes were completed at the surface by attaching plastic valves to the tubing. The soil gas probes were then allowed to equilibrate for at least 2 weeks prior to sampling.

4.1.7.2 Soil Gas Sampling

Soil gas sampling was conducted by AETL. A sampling manifold was attached to the probe tubing, and each probe was purged of 3 probe volumes of air at a rate of approximately 200 milliliters per minute (ml/min). After purging was completed, a soil gas samples was collected in a pre-evacuated 6-liter Summa canister at a flow rate of approximately 200 ml/min. A single flow regulator was used during sampling, which was decontaminated between samples by purging ambient air through the regulator for 3 minutes, in accordance with the laboratory's standard operating procedures for soil gas sampling. The soil gas samples were analyzed by AETL.

Field quality control/quality assurance included the following:

- Collection and analysis of one duplicate sample per day.
- Collection and analysis of one field blank sample per day.
- Use of a leak test compound during probe purging and sampling. Shaving cream, a source of isobutane, was placed around the probe tubing at the ground surface during purging and sampling to test for surface leakage. All of the soil gas samples were monitored for the presence of isobutane during analysis.

4.1.8 Investigation-Derived Waste

Investigation derived waste (IDW) generated from the field activities included soil cuttings from drilling, water recovered after use during sonic drilling operations, water used for equipment decontamination, and purge water from well development and sampling activities. Soil cuttings were temporarily stored on-site in 20 cubic yard roll-off bins pending characterization, profiling and off-site disposal. Copies of the non-hazardous waste manifests are provided in Appendix F.

Water generated during field activities was initially placed in watertight roll-off bins to allow suspended solids to settle, and then pumped into two 20,000-gallon portable tanks for storage. Subsequent waste characterization analyses indicated that the water had high concentrations (>1,000 µg/L) of perchlorate. After reviewing several disposal options for the water, including off-Site treatment with granular activated carbon and disposal of the treated water to the sanitary sewer system, off-site stabilization and disposal at a non-RCRA landfill, and on-Site biotreatment and disposal, on-Site biotreatment and disposal was identified as the most feasible option.

A pilot bioremediation test was conducted using 55-gallons of water amended with food-grade glycerin and dibasic ammonium phosphate. The results of the pilot test indicated that perchlorate concentrations were reduced to below the laboratory method detection limit (MDL) within two to three weeks. The SARWQCB was forwarded a copy of pilot test data for review with a request to treat the water in the

20,000-gallon tanks and discharge the treated water to the incised drainage channel in Laborde Canyon. The SARWQCB expressed no objections to the treatment plan, pending their review and approval of the post-treatment laboratory results.

The 20,000-gallon tanks were biotreated in May and June 2009. The treated water was analyzed for perchlorate, TPHg, TPHd, VOCs, California Title 22 metals, total organic carbon, phosphate, and 1,2,3-trichloropropane, and the results forwarded to the SARWQCB. The SARWQCB approved discharge of the treated water on May 29, 2009.

Copies of correspondence with the SARWQCB, including the biotreatment pilot test results, the confirmation sampling results, and an email from the SARWQCB approving discharge of the treated water, is provided in Appendix G.

4.2 HABITAT CONSERVATION

Consistent with the USFWS-approved Low-Effect Habitat Conservation Plan (Tetra Tech, 2005b) describing low effect activities for environmental remediation at the Site, biological surveys were conducted in the areas surrounding proposed drilling locations, equipment lay-down areas, and roll-off bins prior to initiating field activities. The surveys were conducted to evaluate the potential for impacts to sensitive species/habitats, including SKR, during field activities. The surveys were performed by a Section 10A-permitted or sub-permitted biologist.

As part of the biological surveys, the biologist identified and marked potential or suspected SKR burrows that were located in the vicinity of proposed drilling locations to avoid the "take" (i.e., harm, harassment, death, and/or disturbance of habitat) of SKR. The biologist clearly marked ingress and egress routes to each drilling location in an effort to minimize the overall footprint of field activities and impacts to SKR habitat. As needed, the biologist remained on Site during field activities to implement the requirements of the Low Effect Habitat Conservation Plan. A Dulzura kangaroo rat (DKR) take did occur during field work. Although DKR is not a sensitive species, corrective actions were implemented in accordance with the permit (USFWS, 2005) to avoid further take.

4.3 BACKGROUND COMPARISONS FOR METALS

A statistical comparison of metals concentrations at the Site with background metals concentrations in alluvium from the Site was previously conducted as part of the Scoping Ecological Risk Assessment (SERA; Tetra Tech, 2009h). Based on the background comparison results provided in the SERA, the DSI Work Plan (Tetra Tech, 2008) included additional characterization of metals in several areas identified as having potentially elevated concentrations. During the DSI, it was noted that a disproportionate number of areas being investigated for metals were located in small side canyons off of the major canyons. As data evaluation progressed, it became apparent that two soil types (alluvium and colluvium) rather than one soil type (alluvium) were present at the Site, and that metals concentrations in the alluvium and colluvium were significantly different. Many of the metals detections initially identified as potentially elevated based on the SERA background comparisons, which compared metals concentrations with alluvium background concentrations, were found to have been collected in colluvium (or STF) rather than alluvium. These observations were brought to the DTSC's attention during a meeting held on December 2, 2008. It was agreed during that meeting that background metals data collected from the lower member of the STF at Beaumont Site 1 (Tetra Tech, 2009j) would be an appropriate proxy for colluvium and the STF at the Site for the purpose of conducting background comparisons.

Based on the above, a second set of background comparisons for metals was conducted as part of the DSI. The DSI background comparisons subdivided the metals data into groups by area, and into subgroups (alluvium and colluvium/STF) based on soil type. The background comparisons evaluated all of the metals data collected at depths of 0.5 and 5 feet bgs (for alluvium samples) or 0.5 to 10 feet bgs (for colluvium/STF samples in Areas K, L, and the WDA).

The comparisons were based primarily on statistical guidance issued by DTSC (1997) and the USEPA (2002, 2006) for frequently detected metals. As previously noted, the comparisons were dependent on soil type: soils classified as alluvium were compared with the background data for alluvium at the Site (Tetra Tech, 2009h); soils classified as colluvium or STF were compared with a dataset for the lower member of the STF collected at Beaumont Site 1 (Tetra Tech, 2009j). Soils at Historical Operational Areas J and M, were classified as alluvium, and were compared with the alluvium background data. Soils at the WDA were classified as colluvium or STF, and were compared with the STF background data. Soils at Historical Operational Areas K and L were classified as alluvium, colluvium, or STF; these data were subdivided and analyzed separately for each soil type.

Two statistical tests were used to compare background and Site-related metal concentrations: the Student's t-test and the Wilcoxon rank sum (WRS) test. The statistical test used for each of the comparisons was selected based on the results of distribution testing, in accordance with USEPA (2002, 2006) and DTSC (1997) guidance. The t-test and WRS test were conducted using the Statistica software application. A two-tailed null hypothesis was tested, meaning that the test could detect whether the Site concentrations differed from the background concentrations. A significance level of $\alpha = 0.05$ was used to evaluate all of the test results. When the t-test and WRS test results indicated that background and Site concentrations differed, the direction of the difference (i.e., were Site concentrations greater or less than background?) was determined by comparing the means or medians, as appropriate. The statistical tests were conducted only for metals that were detected in at least 5 samples in both the Site and background datasets. In cases where the statistical testing indicated that Site concentrations of a metal were higher than background concentrations, that metal is referred to as being “statistically elevated” with respect to background.

To support the statistical comparisons of the means and medians, the data for each metal detected in both Site and in background soils were compared using histograms showing both the background and Site data set on the same plot, which allows a visual comparison of the data.

An additional statistically-based analysis was conducted to address the observation of some individual elevated values observed in the graphical data presentations, and to evaluate metals detected with insufficient frequency for statistical comparisons. This approach consisted of comparing site concentrations with background threshold values (BTVs) for each metal detected in the two background datasets. The BTV is defined as the lesser of the 95% upper tolerance limit (UTL95) or the maximum detected concentration of each metal for the appropriate depth interval in the background data. Each UTL95 was calculated using the USEPA (2007a, b) ProUCL v4 software. In cases where a metal was present at a concentration exceeding the appropriate BTV, the sample is referred to as having a “potentially elevated” concentration of that metal.

A more detailed description of the methodology used to conduct the background comparison is provided in Appendix H.

5.0 INVESTIGATION RESULTS AND DISCUSSION

This section presents the results of the DSI conducted at Historical Operational Areas J, K, L, and M, the WDA, the SBA, and drainage channels between September 2008 and May 2009. Sections 5.1 to 5.3 provide a broad overview of the DSI results. The detailed investigation results and discussion of the data is organized by historical operational area or site feature, and is presented in Section 5.4.

Data are presented in Section 5.4 through tabulated data summaries and sample location maps. Lithologic information is presented through surface geologic maps and geologic cross-sections. The distribution of contaminants in the subsurface is presented by means of 3-dimensional (3-D) renderings of the extent of impacted soil, isoconcentration contour maps, and vertical contaminant profiles. All of the data tables and figures include both the DSI results and the results of previous investigations. The lowest concentration used for contouring perchlorate concentrations in soil is 100 µg/kg, well below the investigation goal (IG) of 780 µg/kg stated in the DSI Work Plan (Tetra Tech, 2008).

The discussions make extensive use of 3-D contaminant distribution models generated using Mining Visualization System (MVS) software developed by C Tech Development Corporation. MVS is a geostatistical data modeling and visualization tool that utilizes kriging to interpolate concentration data between sampled locations. Mathematically, kriging computes the “best linear unbiased estimator” of a spatially regionalized variable, and has been recognized by USEPA as the best means for interpolation of measured data.

5.1 GEOLOGY

A total of 114 soil borings were drilled during the DSI. Of this total, 63 borings extended to depths greater than 15 feet bgs, and 53 borings were drilled to the depth of first groundwater or deeper. A summary of borings drilled during the DSI is provided in Table 5-1; the soil boring and monitoring well locations are shown in Figure 5-1.

5.1.1 Lithology

Geologic units encountered during drilling include Quaternary alluvium and colluvium, and the STF. Lithologies encountered in the DSI borings are briefly described below. More detailed discussions of geologic conditions at each operational area are provided in Section 5.4.

San Timoteo Formation: The STF consists primarily of grayish-brown fine-grained sandstones and mudstones, with localized conglomerate lenses. Well-indurated beds of carbonate-cemented, medium- to

TABLE 5-1
SAMPLING AND ANALYSIS SUMMARY
DYNAMIC SITE INVESTIGATION

Boring/Well Designation					Soil Sampling and Analysis														Groundwater Sampling and Analysis							Soil Gas Sampling and Analysis	
						No. Soil Samples Analyzed														No. Grab Samples Analyzed			No. Well Samples Analyzed				
Boring/Well No.	Workplan Reference	Drilling Method	Primary/ Stepout	Boring Depth (feet bgs)	No. Soil Samples Collected	Perchlorate	T22 Metals	Barium	Cadmium	Lead	Molybdenum	Vanadium	Zinc	TPH (gasoline)	TPH (Diesel)	VOCs	SVOCs	Explosives	No. Grab Groundwater Samples Collected	Perchlorate	VOCs	No. Monitoring Wells Installed	Perchlorate	VOCs	Explosives	No. Soil Gas Samples Collected	No. Samples Analyzed for VOCs
AREA J																											
J-53-SB101	J-53-PSSL-1	DP	P	10	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-SB102	J-53-PSSL-2	HA	P	0.5	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-SB102A	-	HA	S	2	2				1										-	-	-	-	-	-	-	-	-
J-53-SB103	J-53-PSSL-3	HA	P	0.5	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-SB104	-	HA	S	2	2	-	-	-	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-SB105	-	HA	S	2	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-SB106	-	HA	S	2	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AREA K																											
K-54-SB101	K-54-PSSL-1	HSA	P	135	28	28	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB102	K-54-PSSL-2	HSA	P	110	21	21	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB103	K-54-PSSL-3	HSA	P	149	29	29	-	1	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB104	K-54-PSSL-4	HSA	P	135	26	26	-	1	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB105	K-54-PSSL-5	DP	P	10	1	-	-	1	-	-	-	-	-	-	-	-	-	-	0	1	1	-	-	-	-	-	-
K-54-SB106	K-54-PSSL-6	HSA	P	135	25	25	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB107	K-54-PSSL-7	HSA	P	100	20	20	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB108	K-54-PSSL-8	HSA	P	100	20	20	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB109	K-54-PSSL-9	DP	P	10	1	-	-	1	-	-	-	-	-	-	-	-	-	-	0	1	1	-	-	-	-	-	-
K-54-SB110	K-54-PSSL-10	DP	P	10	2	-	-	1	-	-	-	-	1	-	-	-	-	-	0	1	1	-	-	-	-	-	-
K-54-SB111	K-54-PSSL-11	SON	P	118	24	24	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB112	K-54-PSSL-12	HSA	P	100	21	21	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB113	K-54-PSSL-13	SON	P	105	22	22	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB114	K-54-PSSL-14	HSA	P	80	15	15	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB115	K-54-PSSL-15	HSA	P	80	16	16	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB116	K-54-PSSL-16	HSA	P	100	21	21	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB117	K-54-PSSL-17	HSA	P	75	16	16	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB118	K-54-PSSL-18	HSA	P	75	14	14	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB119	-	HSA	S	80	16	16	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB120	-	HSA	S	70	14	14	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB121	-	HSA	S	72	15	15	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB122	-	HSA	S	85	17	17	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB123	-	HSA	S	75	16	16	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB124	-	HSA	S	75	15	15	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB125	-	HSA	S	74	15	15	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB126	-	HSA	S	85	17	17	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB127	-	HSA	S	95	20	20	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB128	-	HSA	S	85	17	17	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB129	-	HSA	S	75	16	16	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB130	-	HSA	S	75	14	14	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB131	-	HSA	S	72	15	15	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB132	-	HSA	S	65	13	13	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB133	-	HSA	S	68	14	14	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
K-54-SB134	-	HA	S	5	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
K-54-SB135	-	HA	S	5	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-

TABLE 5-1
SAMPLING AND ANALYSIS SUMMARY
DYNAMIC SITE INVESTIGATION

Boring/Well Designation					Soil Sampling and Analysis														Groundwater Sampling and Analysis							Soil Gas Sampling and Analysis	
						No. Soil Samples Analyzed														No. Grab Samples Analyzed			No. Well Samples Analyzed				
Boring/Well No.	Workplan Reference	Drilling Method	Primary/ Stepout	Boring Depth (feet bgs)	No. Soil Samples Collected	Perchlorate	T22 Metals	Barium	Cadmium	Lead	Molybdenum	Vanadium	Zinc	TPH (gasoline)	TPH (Diesel)	VOCs	SVOCs	Explosives	No. Grab Groundwater Samples Collected	Perchlorate	VOCs	No. Monitoring Wells Installed	Perchlorate	VOCs	Explosives	No. Soil Gas Samples Collected	No. Samples Analyzed for VOCs
K-54-SB136	-	HA	S	5	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
K-54-SB137	-	HA	S	5	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
K-54-SB138	-	HA	S	5	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
K-54-SB139	-	HA	S	5	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
TT-MW2-29A/B/C	K-54-PWL-1	SON	P	187	0	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	4	4	-	-	-
TT-MW2-30A/B/C	K-54-PWL-2	SON	P	230	0	-	-	-	-	-	-	-	-	-	-	-	-	-	13	13	9	3	6	6	-	-	-
TT-MW2-31A/B/C	K-54-PWL-5	SON	P	206	0	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	2	4	4	-	-	-
TT-MW2-33A/B/C	K-54-PWL-3	SON	P	206	0	-	-	-	-	-	-	-	-	-	-	-	-	-	6	6	6	3	6	6	-	-	-
TT-MW2-34A/B/C	K-54-PWL-4	SON	P	195	0	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	4	3	6	6	-	-	-
TT-MW2-36A/B/C	-	SON	S	200	0	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	6	6	-	-	-
TT-MW2-38A/B/C	-	SON	S	228	13	13	-	-	-	-	-	-	-	-	-	-	-	-	6	6	4	3	6	6	-	-	-
TT-MW2-39	-	HSA	S	75	14	14	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	2	2	-	-	-
TT-MW2-40A/B/C	-	SON	S	253	0	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5	5	3	6	6	-	-	-
K-55-SB101	K-55-PSSL-1	HA	P	0.5	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB102	K-55-PSSL-2	HA	P	0.5	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB103	K-55-PSSL-3	HA	P	0.5	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB104	K-55-PSSL-4	HA	P	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
K-55-SB105	K-55-PSSL-5	HA	P	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
K-55-SB106	K-55-PSSL-6	HA	P	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
K-55-SB107	K-55-PSSL-7	HA	P	0.5	1	-	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
K-55-SB107A	-	HA	S	2	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB108	K-55-PSSL-8	HA	P	0.5	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB109	K-55-PSSL-9	HA	P	0.5	1	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
K-55-SB109A	-	HA	S	2	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB110	K-55-PSSL-10	HA	P	0.5	1	-	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
K-55-SB110A	-	HA	S	2	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AREA L																											
L-56-SB101	L-56-PSSL-1	HSA	P	40	9	9	9	-	-	-	-	-	-	9	9	9	9	-	-	-	-	-	-	-	-	-	-
L-56-SB102	L-56-PSSL-2	HSA	P	40	9	9	9	-	-	-	-	-	-	9	9	9	9	-	-	-	-	-	-	-	-	-	-
L-56-SB103	L-56-PSSL-3	HSA	P	40	9	9	9	-	-	-	-	-	-	9	9	9	9	-	-	-	-	-	-	-	-	-	-
l-56-SB103A	-	HA	S	0.5	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-SB104	L-56-PSSL-4	HSA	P	40	9	9	9	-	-	-	-	-	-	9	9	9	9	-	-	-	-	-	-	-	-	-	-
L-56-SB105	L-56-PSSL-5	HSA	P	40	9	9	9	-	-	-	-	-	-	9	9	9	9	-	-	-	-	-	-	-	-	-	-
L-56-SB106	-	HA	S	2	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TT-MW2-35A/B	L-56-PWL-1	SON	P	201	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	4	2	4	4	-	-	-
L-56-W102	L-56-PWL-2	HSA	P	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AREA M																											
M-58-SB101	M-58-PSSL-1	HSA	P	80	17	17	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
M-58-SB102	M-58-PSSL-2	HSA	P	75	15	15	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
M-58-SB103	M-58-PSSL-3	HSA	P	65	14	14	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
M-58-SB104	M-58-PSSL-4	HSA	P	50	10	10	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
M-58-SB105	-	HSA	S	45	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB106	-	HSA	S	45	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB107	-	HSA	S	45	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-1
SAMPLING AND ANALYSIS SUMMARY
DYNAMIC SITE INVESTIGATION

Boring/Well Designation					Soil Sampling and Analysis														Groundwater Sampling and Analysis							Soil Gas Sampling and Analysis	
						No. Soil Samples Analyzed														No. Grab Samples Analyzed			No. Well Samples Analyzed				
Boring/Well No.	Workplan Reference	Drilling Method	Primary/ Stepout	Boring Depth (feet bgs)	No. Soil Samples Collected	Perchlorate	T22 Metals	Barium	Cadmium	Lead	Molybdenum	Vanadium	Zinc	TPH (gasoline)	TPH (Diesel)	VOCs	SVOCs	Explosives	No. Grab Groundwater Samples Collected	Perchlorate	VOCs	No. Monitoring Wells Installed	Perchlorate	VOCs	Explosives	No. Soil Gas Samples Collected	No. Samples Analyzed for VOCs
M-58-SB108	-	HSA	S	70	14	14	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
TT-MW2-28	M-58-PWL-1	HSA	P	120	0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-
TT-MW2-32	M-58-PWL-2	HSA	P	175	0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-
WASTE DISCHARGE AREA																											
TT-MW2-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	1	-	-
TT-MW2-25	Well C	HSA	P	75	0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	2	2	-	-	-
TT-MW2-26	Well B	HSA	P	80	0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	2	2	-	-	-
TT-MW2-27	Well D	HSA	P	80	0	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	2	2	-	-	-
TT-MW2-37A/B	Well A	SON	P		0	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	4	4	-	-	-
WDP-SG101	-	DP	P	15	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
WDP-SG102	-	DP	P	15	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
WDP-SG103	-	DP	P	15	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
WDP-SG104	-	DP	P	15	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
SOUTH BOUNDARY AREA																											
SBA-SB101	SBA-PSSL-1	HSA	P	25	6	6	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
SBA-SB102	SBA-PSSL-2	HSA	P	30	7	7	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
SBA-SB103	SBA-PSSL-3	HSA	P	20	5	5	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-
TT-PZ2-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	-	-	-
DRAINAGE CHANNELS																											
J-DCS-SB101	J-DCS-PSSL-1	HA	P	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB101	K-DCS-PSSL-1	HA	P	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB102	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB103	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB104	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB105	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB106	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB107	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB108	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB109	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-DCS-SB111	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-DCS-SB101	L-DCS-PSSL-1	HA	P	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-DCS-SB102	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-DCS-SB103	-	HA	S	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-DCS-SB101	M-DCS-PSSL-1	HA	P	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WDP-DCS-SB101	WDP-DCS-PSSL-1	HA	P	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SBA-DCS-SB101	SBA-DCS-PSSL-1	HA	P	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes

DP - Direct Push
HA - Hand Auger
HSA - Hollow Stem Auger
SON - Sonic
P -Primary boring
S - Secondary boring
bgs - Below ground surface
"-" - Not analyzed or not applicable

T22 Metals - California Title 22 (CAM) metals list
TPH (gasoline) - Total petroleum hydrocarbons as gasoline
TPH (diesel) - Total petroleum hydrocarbons as diesel
VOCs - Volatile organic compounds
SVOCs - Semivolatile organic compounds

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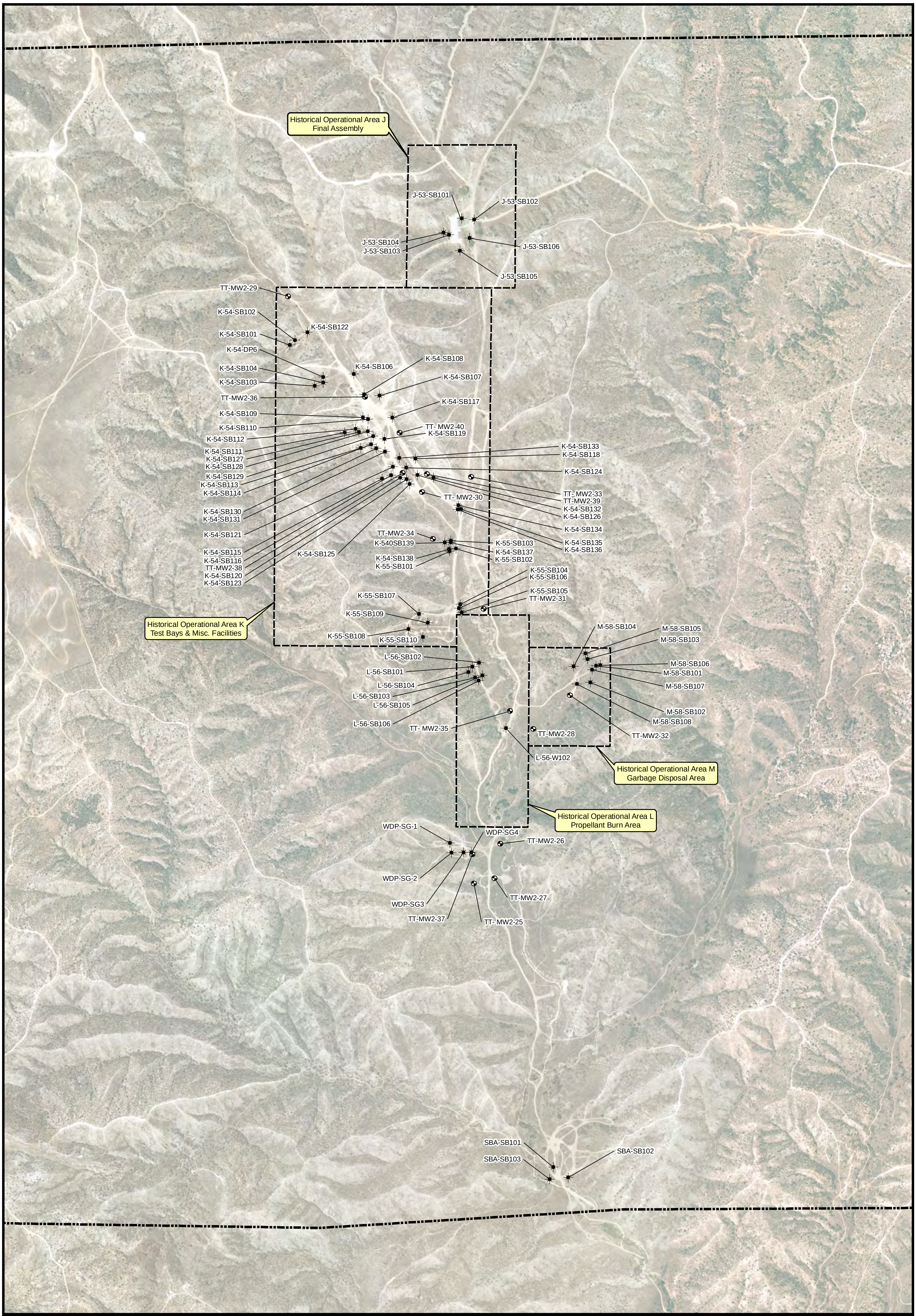

LEGEND

DSI Sample Location

DSI Sample Location/Well

Historic Operational Area Boundary

Beaumont Site 2 Property Boundary

0 400 800 Feet

Beaumont Site 2

Figure 5-1

DSI Soil Boring and Monitoring Well Locations

TETRA TECH

coarse-grained sandstone up to approximately two to three feet thick were occasionally encountered at depth.

The degree of induration of the STF was found to generally increase with depth in the soil borings, although individual well-indurated beds were occasionally found at depths as shallow as 45 feet, and individual poorly-indurated beds are found to a depth of at least 250 feet. The STF also appears more indurated at shallow depths in borings drilled in side canyons compared with those drilled near the center of the major canyons. These observations suggest that the STF is more deeply weathered within the major canyons, and less deeply weathered near the margins of the major canyons and in smaller side canyons.

Alluvium: Alluvium consists of stratified gravel, sand, silty sand, and silt found within the major canyons throughout the Site. Alluvium is restricted to the larger canyons at the Site, where it characteristically forms shallower slopes than colluvium.

Colluvium: Colluvial deposits consist mainly of poorly- to well-graded sand, silty sand, and silt, all of which may contain minor gravel. Colluvium is restricted to small side canyons and aprons at the base of steep hillsides, and characteristically forms steeper slopes than alluvial deposits.

5.1.2 Seismic Reflection and Refraction Survey

Two seismic reflection profiles (Profiles 17 and 18) and one seismic refraction profile (Profile 18) were conducted as part of the DSI. The profile locations are shown in Figure 5-2. The seismic reflection data were collected to detect potential faults along Test Bay and Laborde Canyons; seismic refraction data were also collected along Profile 18 to evaluate alluvium thickness and depth to competent STF. The seismic data were collected and interpreted by Terra Physics of Highland, California, under the direct supervision of a California-registered Professional Geophysicist. A copy of the Terra Physics report is provided in Appendix C.

Briefly, both seismic reflection profiles show small reflector offsets that were interpreted as possible faults or fold inflections. The possible faults or folds trend generally to the north-northwest, and extend from near the confluence of Disposal Site Canyon and Laborde Canyon north into Test Bay Canyon and the ridge separating Test Bay Canyon from Laborde Canyon.

Refraction Profile 17 extends across Laborde Canyon into the T-Revetment area. The profile shows a dramatic thinning of the upper low-velocity layer where it enters the T-Revetment side canyon, consistent with the presence of a relatively thick alluvium section within Laborde Canyon, and a thin section of colluvial material within the side canyon. The depth to the high-velocity layer also becomes progressively

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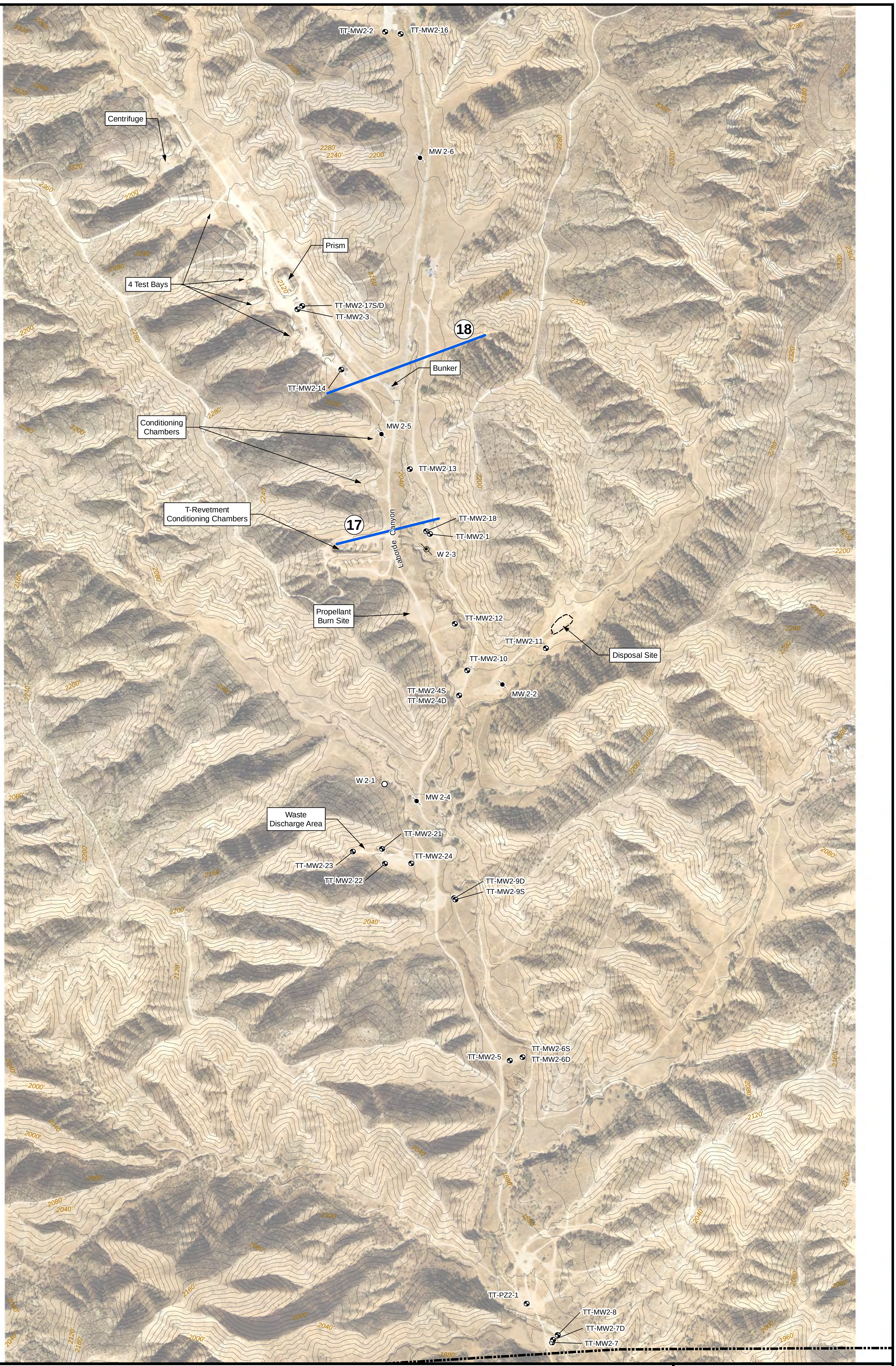

LEGEND

- Destroyed Monitoring Well Location
- Destroyed Production Well Location
- Reported Production Well Location
- Groundwater Monitoring Well Location
- 1
- Geophysical Survey Location
- Beaumont Site 2 Property Boundary
- Ground Surface Elevation Contour (20-ft interval, elevation msl)

Note: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

0 300 600 Feet

Beaumont Site 2

Figure 5-2

Seismic Reflection Profile Locations

TETRA TECH

shallower across T-Revetment side canyon, consistent with the STF being more deeply weathered within Laborde Canyon, and less deeply weathered in the side canyons and hillsides.

5.2 HYDROGEOLOGY

Depth to groundwater and groundwater elevation data collected in May 2009 are summarized in Table 5-2. The data in Table 5-2 were collected as part of the second quarter 2009 groundwater monitoring event. Depth to groundwater generally ranges from approximately 118.7 feet bgs in monitoring well TT-MW2-29B, located in the northern portion of Test Bay Canyon, to approximately 14.5 feet bgs in well TT-MW2-8, located in the SBA.

Groundwater elevations for shallow groundwater are plotted and contoured in Figure 5-3. Groundwater generally flows down the major tributary canyons to Laborde Canyon, and then to the south, consistent with the direction of surface water flow and topography. The overall groundwater gradient across the Site is roughly 0.030 ft/ft, similar to gradients observed in the past. Vertical gradients are consistent with previous data. There is generally a downward vertical gradient of -0.1 to -0.2 ft/ft at most well pair locations, although a weak upward gradient is observed at TT-MW2-1 and TT-MW2-18. A strong upward vertical gradient (+0.11) is present between wells TT-MW2-10 and TT-MW2-35A. A thick siltstone layer is present at depth in this area; the upward vertical gradient may be due to the presence of confined conditions within and beneath the siltstone.

5.3 ANALYTICAL RESULTS

5.3.1 Data Quality Review

The quality control samples were reviewed as described in the Groundwater Sampling and Analysis Plan (Tetra Tech, 2007a). The DSI data were contained in data packages generated by E. S. Babcock and Sons, Inc., AETL, and EMAX Laboratories Inc. These data were reviewed using the National Functional Guidelines for Organic and Inorganic Data Review documents from the USEPA (USEPA, 1999 and 2004).

Holding times, field blanks, laboratory control samples, method blanks, duplicate environmental samples, spiked samples, and spike recovery data were reviewed. For each environmental sample, the sample-specific quality control spike recoveries were examined. These data examinations include comparing statistically calculated control limits to percent recoveries of all spiked analytes and duplicate spiked analytes. Relative percent difference (RPD) control limits were compared to actual spiked matrix spike and matrix spike duplicate (MS/MSD) RPD results. Surrogate recoveries were examined for all organic compound analyses and compared to their control limits.

TABLE 5-2
SUMMARY OF GROUNDWATER ELEVATIONS, MAY 2009

Well ID	Date Measured	Measuring Point Elevation (feet MSL)	May 2009 Depth to Water (feet)	May 2009 Groundwater Elevation (feet MSL)
TT-MW2-1	05/14/09	2035.21	57.41	1977.80
TT-MW2-2	05/13/09	2137.75	69.99	2067.76
TT-MW2-3	05/13/09	2094.66	70.31	2024.35
TT-MW2-4S	05/14/09	1986.94	50.57	1936.37
TT-MW2-4D	05/14/09	1987.17	57.58	1929.59
TT-MW2-5	05/14/09	1911.31	39.84	1871.47
TT-MW2-6S	05/14/09	1908.00	36.29	1871.71
TT-MW2-6D	05/14/09	1908.07	37.25	1870.82
TT-MW2-7	05/14/09	1839.25	19.35	1819.90
TT-MW2-7D	05/14/09	1838.96	18.00	1820.96
TT-MW2-8	05/14/09	1836.32	17.41	1818.91
TT-MW2-9S	05/14/09	1938.38	37.87	1900.51
TT-MW2-9D	05/14/09	1938.78	42.58	1896.20
TT-MW2-10	05/14/09	2001.57	57.63	1943.94
TT-MW2-11	05/14/09	2004.51	49.53	1954.98
TT-MW2-12	05/14/09	2016.26	50.45	1965.81
TT-MW2-13	05/14/09	2049.39	66.43	1982.96
TT-MW2-14	05/13/09	2074.78	66.10	2008.68
TT-MW2-16	05/13/09	2137.20	61.23	2075.97
TT-MW2-17S	05/13/09	2095.55	71.11	2024.44
TT-MW2-17D	05/13/09	2095.33	71.20	2024.13
TT-MW2-18	05/14/09	2035.32	57.32	1978.00
TT-MW2-19S	05/13/09	1698.34	45.37	1652.97
TT-MW2-19D	05/13/09	1698.37	24.29	1674.08
TT-MW2-20S	05/13/09	1587.77	34.07	1553.70
TT-MW2-20D	05/13/09	1587.48	33.29	1554.19
TT-MW2-21	05/14/09	1978.45	66.10	1912.35
TT-MW2-22	05/14/09	1975.86	65.05	1910.81
TT-MW2-23	05/14/09	1995.17	82.72	1912.45
TT-MW2-24	05/14/09	1964.26	53.73	1910.53
TT-MW2-25	05/14/09	1966.96	63.85	1903.11
TT-MW2-26	05/14/09	1944.43	36.24	1908.19
TT-MW2-27	05/14/09	1948.27	48.87	1899.40
TT-MW2-28	05/14/09	1995.65	60.78	1934.87
TT-MW2-29A	05/13/09	2147.77	Dry	Dry
TT-MW2-29B	05/13/09	2147.90	121.55	2026.35
TT-MW2-29C	05/13/09	2147.83	127.62	2020.21
TT-MW2-30A	05/13/09	2074.37	73.06	2001.31
TT-MW2-30B	05/13/09	2074.41	75.36	1999.05
TT-MW2-30C	05/13/09	2074.35	77.59	1996.76
TT-MW2-31A	05/14/09	2036.11	58.40	1977.71
TT-MW2-31B	05/14/09	2036.15	66.17	1969.98
TT-MW2-32	05/14/09	2004.87	53.38	1951.49
TT-MW2-33A	05/13/09	2070.54	61.14	2009.40
TT-MW2-33B	05/13/09	2070.54	65.87	2004.67
TT-MW2-33C	05/13/09	2070.54	64.01	2006.53
TT-MW2-34A	05/13/09	2066.84	65.65	2001.19
TT-MW2-34B	05/13/09	2066.85	72.91	1993.94
TT-MW2-34C	05/13/09	2066.84	74.56	1992.28

TABLE 5-2
SUMMARY OF GROUNDWATER ELEVATIONS, MAY 2009

Well ID	Date Measured	Measuring Point Elevation (feet MSL)	May 2009 Depth to Water (feet)	May 2009 Groundwater Elevation (feet MSL)
TT-MW2-35A	05/14/09	2003.20	49.88	1953.32
TT-MW2-35B	05/14/09	2003.20	54.81	1948.39
TT-MW2-36A	05/13/09	2100.99	78.83	2022.16
TT-MW2-36B	05/13/09	2101.04	79.60	2021.44
TT-MW2-36C	05/13/09	2100.88	79.60	2021.28
TT-MW2-37A	05/14/09	1963.62	62.76	1900.86
TT-MW2-37B	05/14/09	1963.67	70.56	1893.11
TT-MW2-38A	05/13/09	2084.56	58.86	2025.70
TT-MW2-38B	05/13/09	2084.42	81.50	2002.92
TT-MW2-38C	05/13/09	2084.63	88.99	1995.64
TT-MW2-39	05/13/09	2079.53	60.91	2018.62
TT-MW2-40A	05/13/09	2096.28	72.17	2024.11
TT-MW2-40B	05/13/09	2096.24	83.78	2012.46
TT-MW2-40C	05/13/09	2096.28	88.82	2007.46
TT-MW2-PZ1	05/14/09	1847.06	18.81	1828.25

Notes

MSL - Mean sea level

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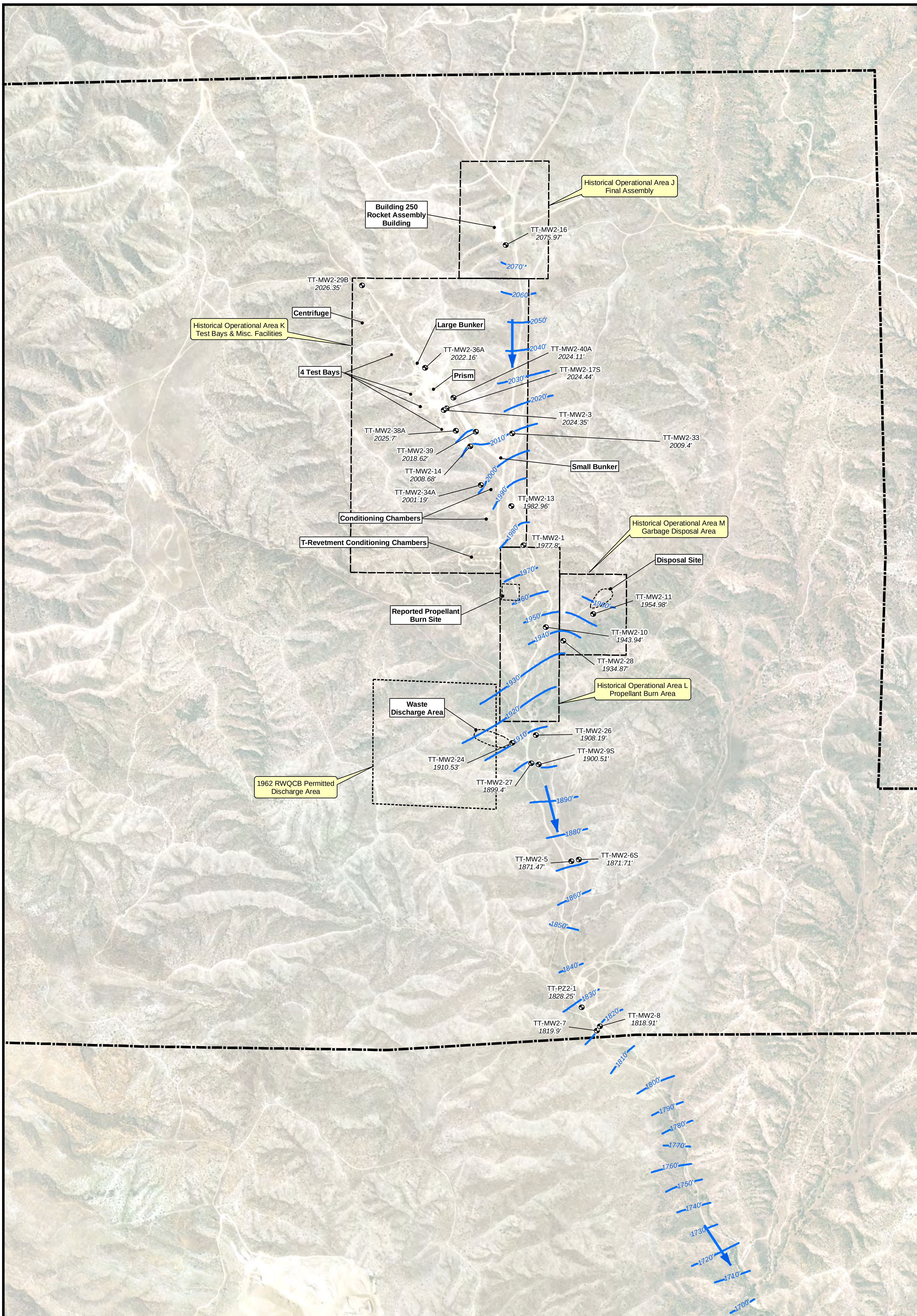

LEGEND

- Groundwater Monitoring Well Location with Elevation (feet msl)
- Groundwater Elevation Contour
- Groundwater Flow Direction
- RWQCB Permitted Discharge Area
- Historical Operational Area Boundary
- Beaumont Site 2 Property Boundary

0 500 1,000 Feet

Adapted from: April 2007 aerial photograph.

Note: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

10-foot groundwater contour interval.

Groundwater elevations in feet MSL.

Beaumont Site 2

Figure 5-3

Groundwater Contour Map
Second Quarter (May) 2009

TETRA TECH

Environmental samples were analyzed by the following methods: Method E332.0 for perchlorate, Method SW7471A for mercury, Method SW8015B for TPHg and TPHd, Method E529.1 and SW8330 for explosives, Method SW7196A for hexavalent chromium, Method TO-15 for VOCs in soil gas, Method SW8270C for SVOCs, Method SW8270C SIM for polyaromatic hydrocarbons (PAHs) and N-nitrosodimethylamine (NDMA), Method SW6020 for metals, and Method SW8260B for VOCs. Unless discussed below, all data results met required criteria, are of known precision and accuracy, did not require any qualification, and may be used as reported.

Method E332.0 had field duplicate RPD errors and spike recovery errors that qualified as estimated 4.1 percent of the total E332.0 data. Method SW6020 had field duplicate RPD errors and spike recovery errors that qualified as estimated 12.1 percent of the total SW6020 data. Method E529.1 had surrogate spike recovery errors that qualified as estimated 4.3 percent of the total E529.1 data. Method SW8015B TPHd had surrogate spike recovery errors and RPD errors that qualified as estimated 4.2 percent of the total SW8015B THPd data. Method SW8260B had surrogate spike recovery errors and RPD errors that qualified as estimated 0.1 percent of the total SW8260B data. Method SW7196A had minor holding time errors that caused three samples to qualified as estimated.

All data qualified as estimated are usable for the intended purpose.

Method blank contamination caused 1.3 percent of the total SW8270C SIM data to be qualified for blank contamination. Method blank contamination caused 2.4 percent of the total E332.0 data to be qualified for blank contamination. Method blank contamination caused 18.8 percent of the total SW8015B TPHd data to be qualified for blank contamination. Method blank contamination caused 62.5 percent of the total SW8015B TPHg data to be qualified for blank contamination. Method blank contamination caused 0.4 percent of the total SW8260B data to be qualified for blank contamination.

Analyte detections in the method or field blank indicate detections not native to the environmental sample. Similar detections between the blank and associated environmental samples are qualified with a "B" qualifier. Because the "B" qualified detections were likely caused by laboratory or field contamination, the detected numerical results are considered an artifact of the analytical process and the result for the sample analyses should be considered "not detected."

Laboratory control sample recovery below the control limit caused 0.7 percent of the total SW6020 data to be qualified as rejected, and these data are not usable for any purpose.

5.3.2 Soil Results

A summary of the DSI soil sampling and analysis program is provided in Table 5-1. A total of 814 soil samples were collected during the DSI and analyzed for one or more of the following constituents:

- Perchlorate (773 samples)
- California Title 22 Metals list (45 samples)
- Individual metals (15 samples)
- Hexavalent chromium (3 samples)
- TPHg and TPHd (45 samples)
- VOCs (45 samples)
- SVOCs (including PAHs and NDMA; 45 samples)
- Explosives (12 samples)

Validated analytical results for all analytes are provided in consolidated tabular format in Appendix I. Copies of the original laboratory reports are provided in Appendix J. Summary tables of the validated analytical data, showing only compounds which were detected in the environmental samples, are provided by operational area in Sections 5.4.1 to 5.4.7.

5.3.3 Soil Gas Results

A total of 8 soil gas samples were analyzed for VOCs using USEPA Method TO-15. Validated analytical results for all analyzed constituents are provided in a consolidated tabular format in Appendix I. A copy of the original laboratory report is provided in Appendix J. A summary table showing only compounds which were detected are provided in Section 5.4.5 below.

5.3.4 Groundwater Results

A summary of the DSI groundwater sampling and analysis program is provided in Table 5-1. Groundwater sampling included both grab sampling conducted during drilling activities, sampling of the newly-installed monitoring wells, and limited sampling of existing monitoring wells.

Grab Groundwater Samples

A total of 94 grab groundwater samples were collected during drilling activities, and were analyzed for one or more of the following constituents:

- Perchlorate (91 samples)
- VOCs (85 samples)

Validated analytical results for the grab groundwater samples are provided in the consolidated data tables in Appendix I. Copies of the original laboratory reports are provided in Appendix J. Summary tables of the validated analytical data, which include only those compounds which were positively detected in each operational area, are provided in Section 5.4.1 to 5.4.7.

Monitoring Well Samples

A total of 75 groundwater samples were collected from the newly-installed monitoring wells as part of the DSI, and were analyzed for one or more of the following constituents:

- Perchlorate (63 samples)
- VOCs (63 samples)
- Explosives (12 samples)

Validated analytical results for the monitoring well samples are provided in consolidated tabular format in Appendix I. Copies of the original laboratory reports are provided in Appendix J. Summary tables of the validated analytical data, which include only those compounds which were positively detected in each operational area or feature in Section 5.4.1 to 5.4.7.

5.3.5 Background Comparison Results

An overview of the results of the metals background comparisons is provided in Table 5-3. Detailed results are provided in Appendix H. BTVs used in the background comparisons are summarized in Table 5-4.

Review of Table 5-3 shows that a number of metals were identified as being present at statistically elevated or potentially elevated concentrations (i.e., concentrations exceeding BTVs; Table 5-4). To put these results in perspective, metals concentrations (with the exception of arsenic) exceeded human-health based screening levels (i.e., California Human Health Screening Levels [CHHSLs] for residential land use; California Environmental Protection Agency [Cal/EPA], 2005 and 2006) in only three soil samples, and arsenic concentrations did not exceed background in any of the soil samples analyzed.

Metals detected at concentrations exceeding residential land use CHHSLs include cadmium and lead in sample Pond3-0.5’ and cadmium in sample Pond3@5’, all located in the WDA; and cadmium in sample K-55-DP24-0.5’, located at the T-Revetment conditioning chambers in Area K. Sample Pond3-0.5’ had cadmium and lead concentrations of 5.37 mg/kg and 236 mg/kg, respectively. Sample Pond3-0.5’ also had a zinc concentration 1,720 mg/kg.. These concentrations exceed the colluvium/STF BTVs of 0.381 mg/kg for cadmium, 12.8 mg/kg for lead, and 162 mg/kg for zinc by more than a factor of 10. A similar association of potentially elevated cadmium, lead, and zinc concentrations was also noted in boring K-55-DP24, and in samples from Area J. In all of these cases, cadmium, lead, and zinc concentrations appear to attenuate with depth, suggestive of a surface release. Based on the apparent association of

TABLE 5-3
SUMMARY OF BACKGROUND COMPARISONS FOR METALS

Area:	Area J			Area K						Area L						Area M			WDA			Prism		
Soil Type:	**Alluvium**			**Alluvium**			**Colluvium/STF**			**Alluvium**			**Colluvium/STF**			**Alluvium**			**Colluvium/STF**			**Alluvium**		
Compound	**Statistically elevated**	**Exceeds BTV, not considered within background**	**Detected in samples, not in background**	**Statistically elevated**	**Exceeds BTV, not considered within background**	**Detected in samples, not in background**	**Statistically elevated**	**Exceeds BTV, not considered within background**	**Detected in samples, not in background**	**Statistically elevated**	**Exceeds BTV, not considered within background**	**Detected in samples, not in background**	**Statistically elevated**	**Exceeds BTV, not considered within background**	**Detected in samples, not in background**	**Statistically elevated**	**Exceeds BTV, not considered within background**	**Detected in samples, not in background**	**Statistically elevated**	**Exceeds BTV, not considered within background**	**Detected in samples, not in background**	**Statistically elevated**	**Exceeds BTV, not considered within background**	**Detected in samples, not in background**
Antimony						●		●	●				●	●	●									
Arsenic																								
Barium																				●		●		
Beryllium		●			●						●		●						●			●		
Cadmium			●					●												●				
Chromium (Total)													●									●		
Cobalt		●			●						●													
Copper																								
Lead		●						●			●			●						●		●		
Mercury														●										
Molybdenum												●												
Nickel																						●	●	
Selenium			●											●	●					●	●			●
Silver			●			●		●																
Thallium																			●					●
Vanadium		●																				●		
Zinc		●			●			●											●	●				

TABLE 5-4
SUMMARY OF BACKGROUND THRESHOLD VALUES FOR METALS

Compound	Background Threshold Values for Metals					
	Alluvium (0-5 feet bgs)			Colluvium/STF (0-10 feet bgs)		
	Maximum	$UTL_{95,95}$	BTV	Maximum	$UTL_{95,95}$	BTV
Antimony	-	-	-	0.264	0.238	0.238
Arsenic	6.06	6.52	6.06	299	121.1	121.1
Barium	174	165.1	165.1	1550	904	904
Beryllium	0.512	0.687	0.512	0.859	0.904	0.859
Cadmium	-	-	-	0.528	0.381	0.381
Chromium	26.7	27.5	26.7	72.3	54.76	54.76
Cobalt	12.4	13.3	12.4	19.5	21.15	19.5
Copper	106	106	106	101	101	101
Lead	11.3	13.7	11.3	12.8	12.8	12.8
Mercury	-	-	-	0.0436	0.062	0.0436
Molybdenum	-	-	-	14.3	21.26	14.3
Nickel	21.8	24.2	21.8	53.3	45.73	45.73
Selenium	-	-	-	-[a], 0.481[b]	-	-[a], 0.481[b]
Silver	-	-	-	0.176[a], 0.608[b]	0.189[a], 0.343[b]	0.176[a], 0.343[b]
Thallium	-	-	-	0.511	0.378	0.378
Vanadium	42.6	42.6	42.6	136	122	122
Zinc	76	78.6	76	162	162	162

Notes:

All concentrations are in mg/kg.
- indicates value not available due to lack of detection in background soils.
Maximum is the maximum concentration detected in background data set.
BTV - Background Threshold Value.
$UTL_{95,95}$ - 95% Upper Tolerance Limit
bgs - below ground surface
a - Value for surface soil (0.5 ft bgs)
b - Value for subsurface and deep soil (5-10 ft bgs)

cadmium, lead, and zinc at multiple locations at the Site, and qualitative characteristics which suggest that a release may have occurred, additional characterization of cadmium, lead, and zinc at the WDA, the T-Revetment in Area K, and Area J was conducted as part of the DSI. Additional metals characterization was also conducted in Area L, to evaluate an elevated molybdenum concentration detected at 0.5 feet bgs in boring L-56-SB103 (170 mg/kg, compared with a BTV of 14.3 mg/kg).

It should be noted that the background comparison study was intended primarily for the selection of metals as chemicals of potential concern (COPCs) for the Predictive Ecological Risk Assessment (PERA) and Human Health Risk Assessment (HRA) for the Site. These studies are currently planned to be completed in 2010. All metals concentrations identified as statistically elevated or potentially elevated in the background comparisons will be evaluated as COPCs in future risk assessments for the Site.

The results of the additional metals characterization are discussed by operational area in Section 5.4. Detailed results of the background comparisons are provided in Appendix H.

5.4 SUMMARY BY OPERATIONAL AREA

The following sections provide a comprehensive discussion of the data collected during the DSI and previous investigations at the Site. The data summary tables for soil include all of the results from the previous investigations, as well as the new data obtained during the DSI. Data summary tables for groundwater are limited to the DSI results. For reference, copies of data summary tables from the second and third quarter 2008 groundwater monitoring report (Tetra Tech, 2009f) are included in Appendix A. All monitoring wells at the Site are currently sampled only during the second quarter of each year; the second quarter 2008 data represents the most recent comprehensive sampling event.

5.4.1 Historical Operational Area J – Final Assembly

5.4.1.1 Previous Work

Previous work at Area J included the following:

- Drilling and sampling 11 soil borings (J-53-DP1 to J-53-DP4, J-53-DP6 to J-53-DP10, J-52-HA1 and J-53-HA2) to depths ranging from 5 to 20 feet bgs, and installing soil gas probes at a depth of 10 feet bgs in 9 of the 11 soil borings (Tetra Tech, 2005a).
- Installing 1 shallow monitoring well (TT-MW2-16; Tetra Tech, 2009g) and 1 deep monitoring well (TT-MW2-2; Tetra Tech, 2004).
- Collecting 3 soil samples from the borehole for monitoring well TT-MW2-16 (Tetra Tech, 2009g).

Sampling locations are shown in Figure 5-4. Analytical results for soil and groundwater samples are summarized in Tables 5-5 and Appendix A, respectively.

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LEGEND

- DSI Sample Location
- DSI Sample Location/Well
- Previous Sample Location
- Previous Sample Location/Well
- Culvert
- Ground Surface Elevation Contour (2-foot interval - feet msl)

0 50 100 Feet

Beaumont Site 2

Figure 5-4

Sample Locations Historical Operational Area J

TETRA TECH

TABLE 5-5
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area J (Former Assembly Building)

					Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)			
Boring No.	**Sample No.**	**Depth (feet bgs)**	**Date Sampled**	**Perchlorate (µg/kg)**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**	**Gasoline Range**	**Diesel Range**	**Toluene**	**1,4-Dioxane (mg/kg)**	**SVOCs (mg/kg)**	**PCBs (µg/kg)**
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	18	-	89
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	64	-	300
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	5.0E+06	44	-	140
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	4.5E+07	160	-	540
J-53-SB101	J-53-SB101-10'	10	09/15/08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31	-	-	-	-	-	-	-
J-53-SB102	J-53-SB102-0.5'	0.5	09/12/08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43	-	-	-	-	-	-
J-53-SB102A	J-53-SB102A-0.5'	0.5	04/30/09	-	-	-	-	-	0.042 Jq	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-SB103	J-53-SB103-0.5'	0.5	09/12/08	-	-	-	-	-	-	-	-	-	6.9 Jq	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-SB104	J-53-SB104-0.5'	0.5	04/30/09	-	-	-	-	-	0.037 Jq	-	-	-	5.9 Jq	-	-	-	-	-	-	-	52	-	-	-	-	-	-
J-53-SB105	J-53-SB105-0.5'	0.5	04/30/09	-	-	-	-	-	0.050 Jq	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-SB106	J-53-SB106-0.5'	0.5	04/30/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48	-	-	-	-	-	-
Tt-MW2-16	MW-16-5-6.5	6.5	08/23/06	<11.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-16-25-26.5	26.5	08/23/06	<10.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-16-45-46.5	46.5	08/23/06	<10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
J-53-DP1	J-53-DP1-0.5	0.5	09/17/04	<5.94	<0.191	<0.130	104	0.487	<0.00988	20.6	11.5	17.8	4.4	<0.0130	<0.0206	17	<0.175	<0.0209	<0.0987	40.2	48.7	<0.13	<4.8	1.8 Bp	<0.031	All ND	All ND
	J-53-DP1-5	5	09/17/04	<5.94	<0.191	<0.130	90.6	0.445	<0.00988	18.6	9.98	15.7	4.27	<0.0130	<0.0206	14.7	<0.175	<0.0209	<0.0987	36.4	43	<0.13	<4.8	1.9 Bp	<0.031	All ND	All ND
	J-53-DP1-10	10	09/17/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.24	<0.031	All ND	All ND
	J-53-DP1-20	20	09/17/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.19	-	-	-
J-53-DP2	J-53-DP2-0.5	0.5	09/16/04	<5.94	<0.191	0.831	77.7	0.376	<0.00988	15.2	7.61	13.5	4.59	<0.0130	<0.0206	11.5	<0.175	<0.0209	<0.0987	28.3	32.7	<0.13	<4.8	<0.21	<0.031	All ND	All ND
	J-53-DP2-5	5	09/16/04	<5.94	<0.191	1.01	92.5	0.449	<0.00988	20.4	10.6	16	4.8	<0.0130	<0.0206	15.3	<0.175	<0.0209	<0.0987	41.4	42.6	<0.13	<4.8	<0.20	<0.031	All ND	All ND
	J-53-DP2-10	10	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.27	<0.031	All ND	All ND
	J-53-DP2-20	20	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	1.1 Bp	-	-	-
J-53-DP3	J-53-DP3-0.5	0.5	09/16/04	<5.94	<0.191	1.42	94.4	0.426	<0.00988	19.4	9.74	18.8	5.24	<0.0130	<0.0206	15.2	<0.175	<0.0209	<0.0987	37.1	42.6	<0.13	<4.8	1.3 Bp	<0.031	All ND	All ND
	J-53-DP3-5	5	09/16/04	<5.94	<0.191	<0.130	53	<0.00368	<0.00988	10.9	5.89	7.68	3.06	<0.0130	<0.0206	7.57	<0.175	<0.0209	<0.0987	27.3	21.5	<0.13	<4.8	**5.6**	<0.031	All ND	All ND
	J-53-DP3-10	10	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.21	<0.031	All ND	All ND
	J-53-DP3-20	20	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.22	-	-	-
J-53-DP4	J-53-DP4-0.5	0.5	09/16/04	<5.94	<0.191	1.38	96	0.525	<0.00988	25.9	12.1	20.3	4.7	<0.0130	<0.0206	21.4	<0.175	<0.0209	<0.0987	42.9	56	<0.13	**5.3**	1.4 Bp	<0.031	All ND	All ND
	J-53-DP4-5	5	09/16/04	<5.94	<0.191	1.26	119	0.537	<0.00988	24.4	12.2	23.1	5.63	<0.0130	<0.0206	18.8	<0.175	<0.0209	<0.0987	45.5	56	<0.13	<4.8	<0.20	<0.031	All ND	All ND
	J-53-DP4-10	10	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	1.4 Bp	<0.031	All ND	All ND
	J-53-DP4-20	20	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.19	-	-	-
J-53-DP6 (Note 1)	J-53-DP6-0.5	0.5	09/16/04	<5.94	<0.191	2.33	114	0.584	1.09	26.9	13.1	31.7	6.53	<0.0130	<0.0206	21.7	<0.175	<0.0209	<0.0987	48.1	215	<0.13	**77**	1.4 Bp	<0.031	All ND	All ND
	J-53-DP6-5	5	09/16/04	<5.94	<0.191	3.66	144	0.653	0.6	26.9	15.2	33.3	6.24	<0.0130	<0.0206	24.4	<0.175	<0.0209	<0.0987	56.7	74.3	<0.13	<4.8	<0.18	<0.031	All ND	All ND
	J-53-DP6-10	10	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.18	<0.031	All ND	All ND
	J-53-DP6-20	20	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	1.2 Bp	-	-	-
J-53-DP7	J-53-DP7-0.5	0.5	09/16/04	<5.94	<0.191	1.02	107	0.495	<0.00988	21.1	10.8	19.3	4.88	<0.0130	<0.0206	17.2	<0.175	<0.0209	<0.0987	38.1	50.4	<0.13	<4.8	0.91 Bp	<0.031	All ND	All ND
	J-53-DP7-5	5	09/16/04	<5.94	<0.191	1.24	114	0.518	<0.00988	24.3	11.9	23.1	6.26	<0.0130	<0.0206	18.5	<0.175	<0.0209	<0.0987	44.1	55.5	<0.13	<4.8	<0.20	<0.031	All ND	All ND
	J-53-DP7-10	10	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.17	<0.031	All ND	All ND
	J-53-DP7-20	20	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.21	-	-	-
J-53-DP8 (Note 1)	J-53-DP8-0.5	0.5	09/16/04	<5.94	<0.191	1.73	85.8	0.394	0.571	23.1	10.6	22.7	15.8	<0.0130	<0.0206	18.3	<0.175	<0.0209	<0.0987	38	91.8	<0.13	<4.8	1.5 Bp	<0.031	All ND	All ND
	J-53-DP8-5	5	09/16/04	<5.94	<0.191	<0.130	66.8	0.312	<0.00988	13.1	6.94	11	3.51	<0.0130	<0.0206	10.4	<0.175	<0.0209	<0.0987	25	30.8	<0.13	<4.8	1.5 Bp	<0.031	All ND	All ND
	J-53-DP8-10	10	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.21	<0.031	All ND	All ND
	J-53-DP8-20	20	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.19	-	-	-

TABLE 5-5
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area J (Former Assembly Building)

Boring No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)	PCBs (µg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range	Toluene			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	18	-	89
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	64	-	300
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	5.0E+06	44	-	140
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	4.5E+07	160	-	540
J-53-DP9	J-53-DP9-0.5	0.5	09/16/04	<5.94	<0.191	2.9	98.8	0.585	0.502	27.4	12.7	24.9	5.81	<0.0130	<0.0206	22.3	0.82	<0.0209	<0.0987	48	58.7	<0.13	<4.8	1.2 Bp	<0.031	All ND	All ND
	J-53-DP9-5	5	09/16/04	<5.94	<0.191	2.02	101	0.498	0.51	23	11	21.2	5.33	<0.0130	<0.0206	18.2	<0.175	0.263	<0.0987	42.3	52.2	<0.13	<4.8	<0.19	<0.031	All ND	All ND
	J-53-DP9-10	10	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	**11**	<0.26	<0.031	All ND	All ND
	J-53-DP9-20	20	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	**9.6**	1.1 Bp	-	-	-
J-53-DP10	J-53-DP10-0.5	0.5	09/16/04	<5.94	<0.191	<0.130	118	0.59	<0.00988	24	12.1	21.8	6.2	<0.0130	<0.0206	18.7	<0.175	<0.0209	<0.0987	44.5	83.5	<0.13	**5.2**	1.2 Bp	<0.031	All ND	All ND
	J-53-DP10-5	5	09/16/04	<5.94	<0.191	<0.130	47.9	0.253	<0.00988	11.9	5.84	7.58	2.54	<0.0130	<0.0206	8.08	<0.175	<0.0209	<0.0987	23.8	23.3	<0.13	<4.8	1.6 Bp	<0.031	All ND	All ND
	J-53-DP10-10	10	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.20	<0.031	All ND	All ND
	J-53-DP10-20	20	09/16/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	1.1 Bp	-	-	-
J-52-HA1	J-52-HA1-0.5	0.5	09/17/04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
	J-52-HA1-5	5	09/17/04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
J-53-HA2	J-53-HA2-0.5	0.5	09/20/04	<5.94	<0.191	<0.130	61.7	0.274	<0.00988	12.3	6.37	10.9	5.31	<0.0130	<0.0206	9.76	<0.175	<0.0209	<0.0987	24	29.9	<0.13	<4.8	**9.3**	<0.031	All ND	All ND
	J-53-HA2-5	5	09/20/04	<5.94	<0.191	1.06	46.3	<0.00368	<0.00988	9.83	5.22	7.97	2.41	<0.0130	<0.0206	7.51	<0.175	<0.0209	<0.0987	21.7	22.5	<0.13	<4.8	<0.19	<0.031	All ND	All ND

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
mg/kg - Concentration in milligrams per kilogram.
Metals - California Title 22 Metals.
TPH - Total petroleum hydrocarbons.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
PCBs - Polychlorinated biphenyls.
"<" - Indicates concentration below indicated method detection limit.
"-" - Sample not analyzed for analyte.
Note 1 - Boring and sample numbers for J-53-DP6 and J-53-DP8 were interchanged in Tetra Tech (2005) data tables. Corrected boring and sample numbers are used above.

"B" - The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination. The result is considered not to have originated from the environmental sample, because cross-contamination is suspected.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"p" - Professional judgment determined the data should be qualified.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).
"ND" - Concentration of analyte(s) was not detected above the MDL.

Analytical results for soil include the following:

- Perchlorate was not detected in any of the 41 analyzed samples.
- The initial metals background comparison (Tetra Tech, 2009h) found no metals with concentrations that were statistically elevated above background. However, a potentially elevated vanadium concentration (74.3 mg/kg) was found in boring J-53-DP6 at a depth of 5 feet bgs, and potentially elevated lead (15.8 mg/kg) and zinc (91.8 mg/kg) concentrations were found in boring J-53-DP8 at a depth of 0.5 feet bgs).
- TPHg was not detected in any of the 38 analyzed samples. TPHd was detected in 5 of the 38 analyzed samples, at concentrations ranging from 5.2 to 77 mg/kg. VOCs and SVOCs were not detected in any of the samples with detected TPHd.
- Toluene was detected in 2 of the 38 analyzed samples, at concentrations of 5.6 and 9.3 µg/kg. No other VOCs were detected in the analyzed samples.
- 1,4-dioxane was not detected in any of the 29 analyzed samples.
- SVOCs were not detected in any of the 29 analyzed samples.
- PCBs were not detected in any of the 31 analyzed samples.

Analytical results for soil gas include the following:

- VOCs were not detected in any of the 9 analyzed soil gas samples.

Analytical results for groundwater include the following:

- Perchlorate has been consistently detected at low concentrations (less than the California MCL of 6 µg/L) in shallow monitoring well TT-MW2-16. Perchlorate has not been detected in deep monitoring well TT-MW2-2.

5.4.1.2 DSI Activities

Based on the previous results, no further assessment of perchlorate, TPHg, TPHd,, VOCs, SVOCs, 1,4-dioxane, or PCBs in soil or groundwater was conducted as part of the DSI. Additional investigation proposed in the DSI work plan was limited to assessment of potentially elevated concentrations of vanadium at a depth of 5 feet bgs in boring J-53-DP6, and lead and zinc at a depth of 0.5 feet in boring J-53-DP8. Initial field activities included the following:

- Drilling one direct-push boring (J-53-SB101) assess the vertical extent of potentially elevated vanadium concentrations detected in boring J-53-DP6.
- Drilling two hand auger borings (J-53-SB102 and J-53-SB103) to assess the lateral extent of potentially elevated lead and zinc concentrations in boring J-53-DP8.

Based on further review of the metals data, potentially elevated concentrations of cadmium were also identified in Area J, as discussed in Section 5.3.5. Four additional hand auger borings (J-53-SB102A, and J-53-SB104 to J-53-SB106) were drilled to further characterize the extent of potentially elevated cadmium, lead, and zinc concentrations in Area J.

5.4.1.3 Geology and Hydrogeology

The surface geology of Area J is shown on Figure 5-5. Area J lies within Laborde Canyon, immediately south of the confluence of Laborde Canyon and a smaller alluvium-floored canyon. An incised drainage channel flows into Area J from the north, crosses beneath the area through an underground culvert, and emerges on the east side of former Building 250, south of a former driveway. Alluvium underlies most of the area. Colluvium blankets the floor of two small side canyons to the east and west of former Building 250, and forms aprons at the base of steep hillsides. The hillsides consist of STF. Artificial fill, which was used to backfill the incised drainage and construct the culvert and the pad for former Building 250, underlies a portion of the area. Based on the topography of the area, the fill appears to have been obtained from the immediate area during construction activities.

In May 2009, the depth to groundwater in shallow well TT-MW2-16 was approximately 59.2 feet bgs. The depth to groundwater in deep well TT-MW2-2 was approximately 68.0 feet bgs. Groundwater flow is inferred to be generally to the south, down Laborde Canyon. The vertical hydraulic gradient calculated between shallow well TT-MW2-16 and deep well TT-MW2-2 was downward, at approximately -0.16 ft/ft.

5.4.1.4 Soil Sampling Results

Analytical results for the DSI soil borings are summarized in Table 5-5. The maximum detected concentration of cadmium was 0.050 mg/kg in boring J-53-SB105 at a depth of 0.5 feet. The maximum detected concentration of lead was 6.9 mg/kg in boring J-53-SB103 at a depth of 0.5 feet. The maximum detected concentration of vanadium was 31 mg/kg in boring J-53-SB101 at a depth of 0.5 feet. The maximum detected concentration of zinc was 52 mg/kg in boring J-53-SB104 at a depth of 0.5 feet.

5.4.1.5 Discussion

The background comparisons for metals conducted as part of the DSI found that no metals in Area J had concentrations which were statistically elevated above background. However, several metals had concentrations that were considered to be statistically elevated or potentially elevated (i.e., concentrations exceeding the alluvium BTVs), including beryllium, cadmium, cobalt, lead, selenium, silver, vanadium, and zinc. The maximum detected concentrations of beryllium, selenium, and silver were very low (0.653 mg/kg, 0.82 mg/kg, and 0.263 mg/kg, respectively), and the maximum detected concentrations of chromium, cobalt, and nickel (27.4 mg/kg, 15.2 mg/kg, and 24.4 mg/kg, respectively) only slightly exceed the BTVs of 26.7 mg/kg, 12.4 mg/kg, 21.8 mg/kg, respectively. Based on the above, X:\GIS\Lockheed 22289-090301\Geology_area_J.mxd

Beaumont Site 2

Figure 5-5

Surface Geology Historical Operational Area J

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no further investigation of beryllium, cobalt, selenium, and silver was conducted as part of the DSI. These metals will be evaluated as COPCs in future risk assessments for the Site.

The maximum cadmium, lead, vanadium and zinc concentrations in Area J also exceed the BTVs by a relatively small amount. However, cadmium, lead, and zinc were detected together in two other areas of the Site (the WDA and T-Revetment area). Along with vanadium, cadmium, lead, and zinc were therefore selected for further characterization as part of the DSI.

Analytical results for cadmium, lead, vanadium, and zinc are plotted on drawings in Figure 5-6. Figure 5-6 also shows the approximate lateral extent of potentially elevated metals concentrations. Figure 5-6 shows that the approximate lateral extents of potentially elevated cadmium, lead, and zinc in soil are defined by the previous and DSI borings. The vertical extent of potentially elevated vanadium in boring J-53-DP6 is defined by the 10-foot bgs result for boring J-53-SB103. Cadmium, lead, vanadium, and zinc will be evaluated as COPCs in future risk assessments for the Site.

5.4.2 Historical Operational Area K – Test Bays and Miscellaneous Facilities

Area K is the largest and most complex of the four historical operational areas at the Site. To simplify the presentation of results for this area, it has been subdivided into three subareas: northern Test Bay Canyon, southern Test Bay Canyon, and Laborde Canyon. A drawing showing Area K in entirety is provided in Figure 5-7.

5.4.2.1 Northern Test Bay Canyon

Former facilities in the northern Test Bay Canyon portion of Area K include the centrifuge, Test Bay 4, and the large bunker (Figure 5-8).

5.4.2.1.1 Previous Work

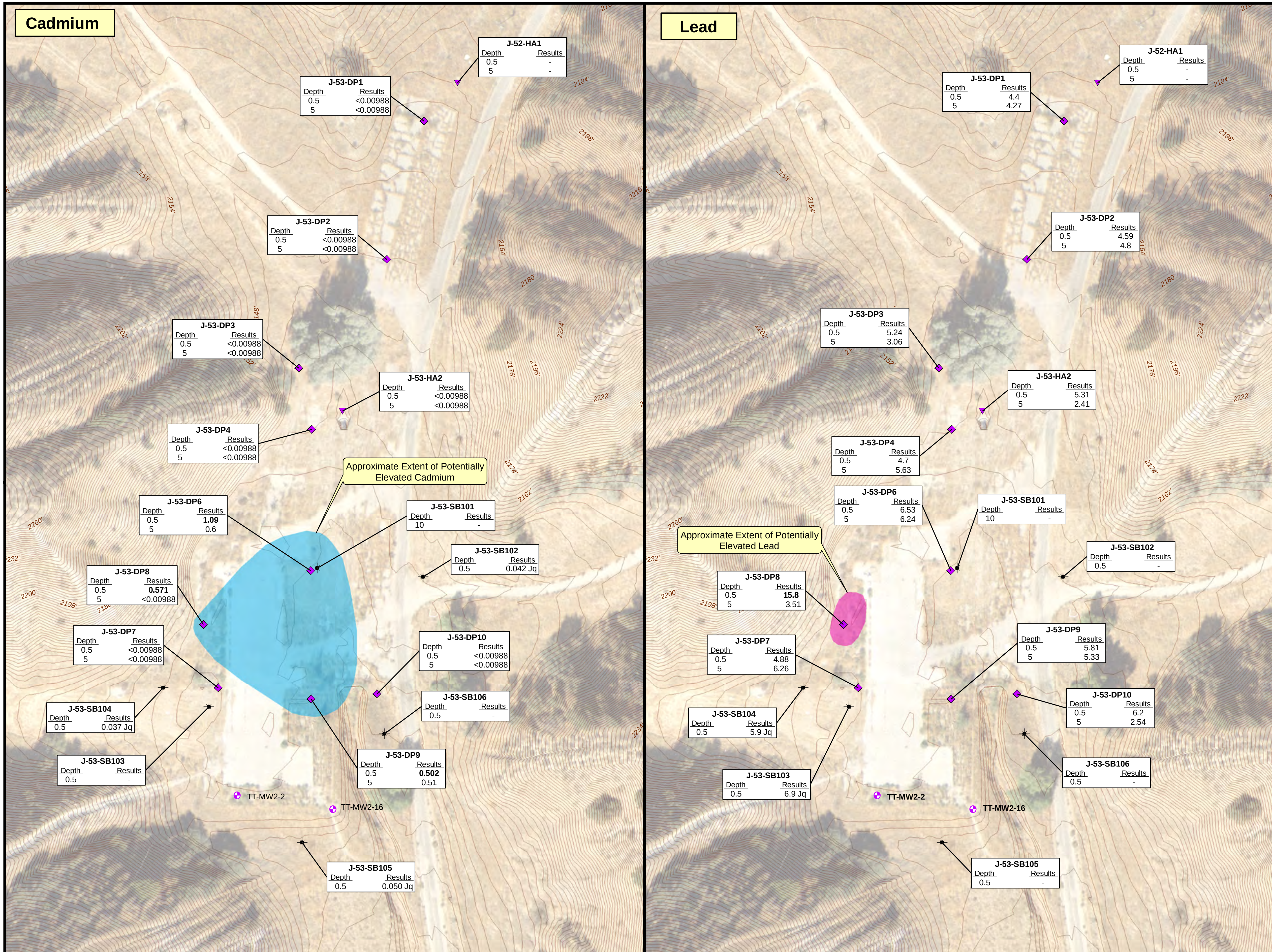
Previous work in northern Test Bay Canyon has included the following:

- Drilling and sampling 6 soil borings (K-54-DP3, K-54-DP5, K-54-DP6, K-54-DP-8, K-54-DP18, and K-54-HA3) to depths ranging from 5 to 20 feet bgs, and installing soil gas probes at a depth of 10 feet bgs in 5 of the 6 borings (Tetra Tech, 2005a)
- Collecting 3 soil samples from soil boring TT-SB2-15 (Tetra Tech, 2009g)

Sampling locations are shown in Figure 5-8. Analytical results for soil are summarized in Table 5-6. Soil results include the following:

- Perchlorate was detected in 7 of the 25 samples analyzed, at concentrations ranging from 33.7 to 368 µg/kg. The highest perchlorate concentrations were found in borings K-54-DP8 (324 µg/kg)

X:\GIS\Lockheed 22289-090301\Cadmiun-Lead Area J.mxd



0 50 100 Feet

LEGEND

- DSI Soil Sample Location
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Topographic Contour
- Extent of Potentially Elevated Cadmium
- Extent of Potentially Elevated Lead

Notes:

Results are in mg/kg
Bold indicates concentrations exceeding BTV

Beaumont Site 2

Figure 5-6

Approximate Extent of Potentially Elevated Metals - Historical Operational Area J

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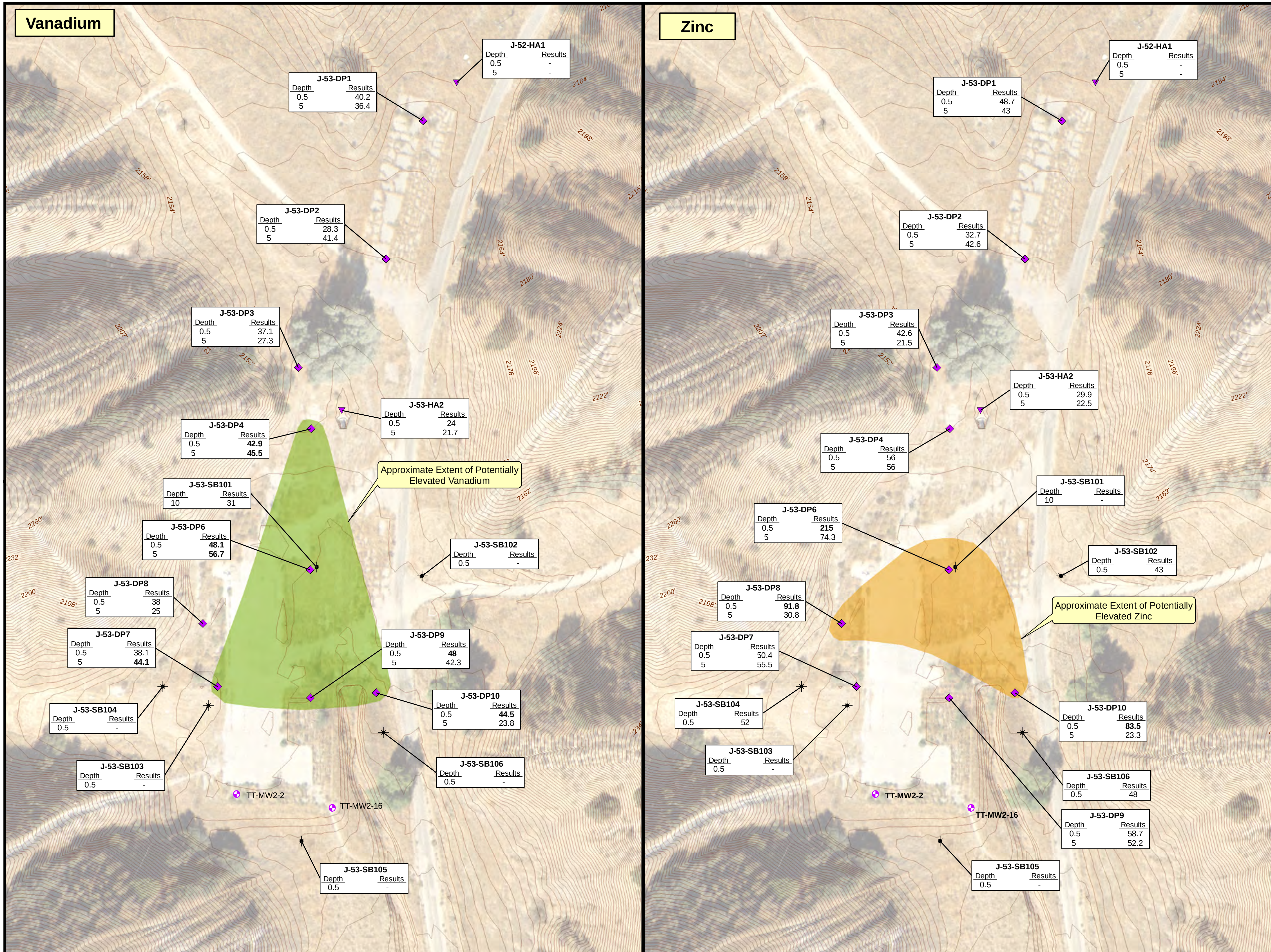
X:\GIS\Lockheed 22289-090301\Vanadium-Zinc J.mxd



0 50 100 Feet

LEGEND

- DSI Soil Sample Location
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Topographic Contour
- Extent of Potentially Elevated Vanadium
- Extent of Potentially Elevated Zinc

Notes:
Results in mg/kg
Bold indicates concentrations exceeding BTV

Beaumont Site 2

Figure 5-6 (cont.)
Approximate Extent of Potentially Elevated Metals - Historical Operational Area J

TETRA TECH

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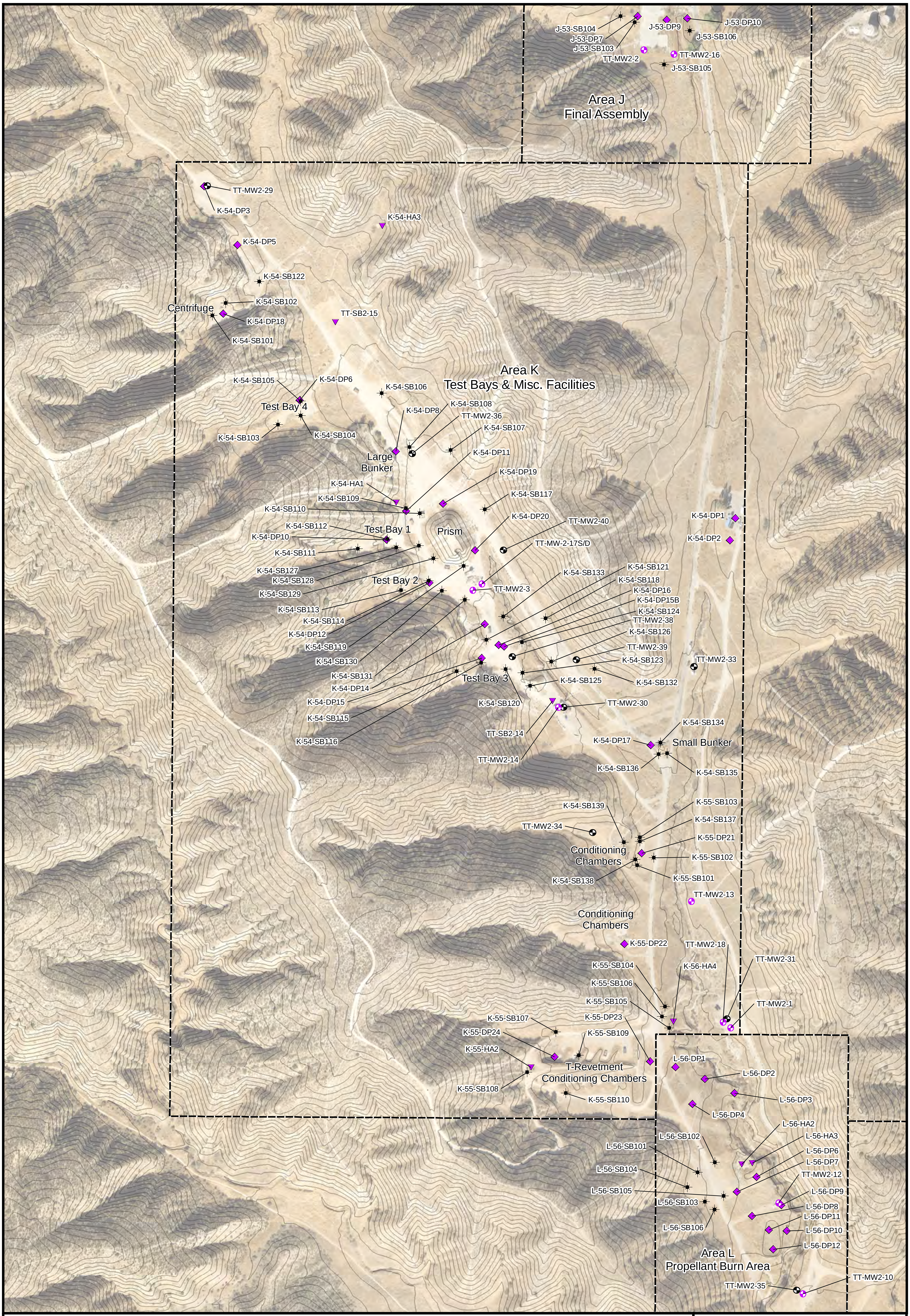

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Historic Operational Area Boundary
- Ground Surface Elevation Contour (10-foot interval - feet msl)

0 150 300 Feet

Beaumont Site 2

Figure 5-7

Overview Map
Historical Operational Area K

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LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Ground Surface Elevation Contour (2-foot interval - feet msl)

0 50 100 Feet

Beaumont Site 2

Figure 5-8
Sample Locations
Northern Test Bay Canyon
Historical Operational Area K

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TABLE 5-6
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Northern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	TPH (mg/kg) Gasoline Range	Diesel Range	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	-	160	-
K-54-SB101	K-54-SB101-0.5'	0.5	09/29/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-5'	5	09/29/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-10'	10	09/29/08	**8.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-15'	15	09/29/08	**38**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-20'	20	09/29/08	<4.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-25'	25	09/29/08	**14**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-30'	30	09/29/08	**8.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-35'	35	09/29/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-40'	40	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-45'	45	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-50'	50	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-55'	55	09/29/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-60'	60	09/29/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-65'	65	09/29/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-70'	70	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-75'	75	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-80'	80	09/29/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-85'	85	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-90'	90	09/29/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-95'	95	09/29/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-100'	100	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-105'	105	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-110'	110	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-115'	115	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-120'	120	09/29/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-125'	125	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-130'	130	09/29/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB101-135'	135	09/29/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB102	K-54-SB102-0.5'	0.5	09/26/08	**15**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-5'	5	09/26/08	**8.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-10'	10	09/26/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-15'	15	09/26/08	**6.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-20'	20	09/26/08	**7.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-25'	25	09/26/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-30'	30	09/26/08	<5.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-35'	35	09/26/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-40'	40	09/26/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-45'	45	09/26/08	**5.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-50'	50	09/26/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-55'	55	09/26/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-60'	60	09/26/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-65'	65	09/26/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-6
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Northern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	-	160	-
K-54-SB102	K-54-SB102-70'	70	09/26/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-75'	75	09/26/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-80'	80	09/26/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-85'	85	09/26/08	**13**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-90'	90	09/26/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-95'	95	09/26/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB102-100'	100	09/26/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB103	K-54-SB103-0.5'	0.5	09/24/08	<4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-5'	5	09/24/08	<4.4	-	-	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-10'	10	09/24/08	**6.0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-15'	15	09/24/08	**13**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-20'	20	09/24/08	**8.0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-25'	25	09/24/08	**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-30'	30	09/24/08	**180**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-35'	35	09/24/08	**170**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-40'	40	09/24/08	**330**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-45'	45	09/24/08	**6.0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-50'	50	09/24/08	**190**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-55'	55	09/24/08	**280**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-60'	60	09/24/08	**440**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-65'	65	09/24/08	**8.0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-70'	70	09/24/08	**67**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-75'	75	09/24/08	**28**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-80'	80	09/24/08	**5.9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-85'	85	09/24/08	**9.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-90'	90	09/24/08	**10**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-95'	95	09/25/08	**44**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-100'	100	09/25/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-105'	105	09/25/08	**27**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-110'	110	09/25/08	**9.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-115'	115	09/25/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-120'	120	09/25/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-125'	125	09/25/08	**54**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-130'	130	09/25/08	**7.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-135'	135	09/25/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB103-140'	140	09/25/08	**14**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB104	K-54-SB104-0.5'	0.5	09/23/08	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-5'	5	09/23/08	**47**	-	-	140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-10'	10	09/23/08	**5.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-15'	15	09/23/08	**100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-20'	20	09/23/08	**140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-25'	25	09/23/08	**460**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-6
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Northern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	-	160	-
K-54-SB104	K-54-SB104-30'	30	09/23/08	**690**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-35'	35	09/23/08	**330**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-40'	40	09/23/08	**53**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-45'	45	09/23/08	**60**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-50'	50	09/23/08	**26 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-55'	55	09/23/08	**8.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-60'	60	09/23/08	**55**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-65'	65	09/23/08	**6.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-70'	70	09/23/08	**14**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-75'	75	09/23/08	**130**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-80'	80	09/23/08	**150**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-85'	85	09/23/08	**130**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-90'	90	09/23/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-95'	95	09/23/08	**20**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-100'	100	09/24/08	**17**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-105'	105	09/24/08	**6.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-110'	110	09/24/08	**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-115'	115	09/24/08	**10**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-120'	120	09/24/08	<4.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB104-125'	125	09/24/08	**7.8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB105	K-54-SB105-10'	10	09/15/08	-	-	-	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB106	K-54-SB106-0.5'	0.5	09/29/08	**5.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-5'	5	09/29/08	**69**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-10'	10	09/29/08	**300**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-15'	15	09/30/08	**24**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-20'	20	09/30/08	**130**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-25'	25	09/30/08	**56**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-30'	30	09/30/08	**19**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-35'	35	09/30/08	**19**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-40'	40	09/30/08	**16**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-45'	45	09/30/08	**8.9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-50'	50	09/30/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-55'	55	09/30/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-60'	60	09/30/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-65'	65	09/30/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-70'	70	09/30/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-75'	75	09/30/08	**11**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-80'	80	09/30/08	**13**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-85'	85	09/30/08	**4.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-90'	90	09/30/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-95'	95	09/30/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-100'	100	09/30/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-6
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Northern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	-	160	-
K-54-SB106	K-54-SB106-105'	105	09/30/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-110'	110	09/30/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-115'	115	09/30/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB106-120'	120	09/30/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB107	K-54-SB107-0.5'	0.5	10/01/08	**8.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-5'	5	10/01/08	**8.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-10'	10	10/01/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-15'	15	10/01/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-20'	20	10/01/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-25'	25	10/01/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-30'	30	10/01/08	**4.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-35'	35	10/01/08	<5.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-40'	40	10/01/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-45'	45	10/01/08	**4.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-50'	50	10/01/08	**4.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-55'	55	10/01/08	**10**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-60'	60	10/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-65'	65	10/01/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-70'	70	10/01/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-75'	75	10/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-80'	80	10/01/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-85'	85	10/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-90'	90	10/01/08	<4.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB107-95'	95	10/01/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB108	K-54-SB108-0.5'	0.5	10/02/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-5'	5	10/02/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-10'	10	10/02/08	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-15'	15	10/02/08	**8.9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-20'	20	10/02/08	**21**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-25'	25	10/02/08	**13**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-30'	30	10/02/08	**20**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-35'	35	10/02/08	**28**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-40'	40	10/02/08	**18**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-45'	45	10/02/08	**19**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-50'	50	10/02/08	**59**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-55'	55	10/02/08	**44**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-60'	60	10/02/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-65'	65	10/02/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-70'	70	10/02/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-75'	75	10/02/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-80'	80	10/02/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-85'	85	10/02/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-6
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Northern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	TPH (mg/kg) Gasoline Range	Diesel Range	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	-	160	-
K-54-SB108	K-54-SB108-90'	90	10/02/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB108-95'	95	10/02/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB122	K-54-SB122-0.5'	0.5	10/20/08	**13**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-5'	5	10/20/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-10'	10	10/20/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-15'	15	10/20/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-20'	20	10/20/08	**5.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-25'	25	10/20/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-30'	30	10/20/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-35'	35	10/20/08	**17**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-40'	40	10/20/08	**17**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-45'	45	10/20/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-50'	50	10/20/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-55'	55	10/20/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-60'	60	10/20/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-65'	65	10/20/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-70'	70	10/20/08	**5.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-75'	75	10/21/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB122-80'	80	10/21/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TT-SB2-15	MW-15-5-6.5	6.5	08/29/06	<10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-15-20-21.5	21.5	08/29/06	<10.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-15-40-41.5	41.5	08/29/06	<10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-DP3	K-54-DP3-0.5	0.5	09/15/04	<5.94	<0.191	1.36	88	0.435	<0.00988	19.5	9.66	18.2	6.33	<0.0130	<0.0206	14.9	<0.0209	<0.175	<0.0987	36.7	46.2	-	-	All ND	<0.11	All ND
	K-54-DP3-5	5	09/15/04	<5.94	<0.191	1.63	69	0.309	<0.00988	13.7	6.66	12	3.39	<0.0130	<0.0206	10.5	<0.0209	<0.175	<0.0987	26.7	30.2	-	-	All ND	<0.11	All ND
	K-54-DP3-10	10	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP3-20	20	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP5	K-54-DP5-0.5	0.5	09/15/04	<5.94	<0.191	<0.130	73.6	0.265	<0.00988	12.1	7.47	12.9	3.32	<0.0130	<0.0206	11.4	<0.0209	<0.175	<0.0987	23.2	33.1	-	-	All ND	<0.11	All ND
	K-54-DP5-5	5	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP5-10	10	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP5-20	20	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP6	K-54-DP6-0.5	0.5	09/15/04	**33.7**	<0.191	3.36	167	0.596	<0.00988	28.4	13.6	32.5	7.11	<0.0130	<0.0206	21.9	<0.0209	<0.175	<0.0987	49.9	67.9	-	-	All ND	<0.11	All ND
	K-54-DP6-5	5	09/15/04	<5.94	1.03	0.889	473	<0.00368	<0.00988	9.92	7.25	10.2	2.79	<0.0130	0.448	9.22	0.545	<0.175	<0.0987	24.2	24.2	-	-	All ND	<0.11	All ND
	K-54-DP6-10	10	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP6-20	20	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP8	K-54-DP8-0.5	0.5	09/15/04	**48.9**	<0.191	3.32	167	0.503	<0.00988	26.6	12.7	23.1	5.5	<0.0130	<0.0206	21.4	0.279	<0.175	<0.0987	46.3	57.5	-	-	All ND	<0.11	All ND
	K-54-DP8-5	5	09/15/04	**85.5**	0.918	3.08	99.7	0.307	<0.00988	14.4	8.72	16.3	3.04	<0.0130	<0.0206	13.5	<0.0209	<0.175	<0.0987	35.5	40.2	-	-	All ND	<0.11	All ND
	K-54-DP8-10	10	09/15/04	**324**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP8-20	20	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP18	K-54-DP18-0.5	0.5	09/15/04	**96.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP18-5	5	09/15/04	**368**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP18-10	10	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP18-20	20	09/15/04	**35.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-

TABLE 5-6
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Northern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	-	160	-
K-54-HA3	K-54-HA3-0.5	0.5	09/20/04	<5.94	<0.191	1.73	86.3	0.44	<0.00988	18.1	9.44	17.4	5.35	<0.0130	<0.0206	15.2	<0.0209	<0.175	<0.0987	34.5	44.8	<0.13	<4.8	All ND	<0.11	All ND
	K-54-HA3-5	5	09/20/04	<5.94	<0.191	1.36	94.8	0.464	<0.00988	21	10.4	19.1	4.62	<0.0130	<0.0206	17.8	<0.0209	<0.175	<0.0987	34.9	47.2	<0.13	<4.8	All ND	<0.11	All ND

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
mg/kg - Concentration in milligrams per kilogram.
Metals - California Title 22 Metals.
TPH - Total petroleum hydrocarbons.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
PCBs - Polychlorinated biphenyls.
"<" - Indicates concentration below indicated method detection limit.
"-" - Sample not analyzed for analyte.

"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"f" - The duplicate/replicate sample’s relative percent difference (RPD) was outside the control limit.
"ND" - Concentration of analyte(s) was not detected above the MDL.

and K-54-DP18 (368 µg/kg), at depths of 10 and 5 feet bgs, respectively. Boring K-54-DP8 is located adjacent to the large bunker; boring K-54-DP18 is located in the Centrifuge area.

- The initial metals background comparison (Tetra Tech, 2009h) found no metals with concentrations that were statistically elevated above background. However, a potentially elevated barium concentration (473 mg/kg) was found in boring K-54-DP6 at a depth of 5 feet bgs.
- TPHg and TPHd were not detected in either of the 2 samples analyzed.
- VOCs were not positively detected in any of the 22 samples analyzed.
- 1,4-Dioxane was not detected in any of the 17 samples analyzed.
- SVOCs were not detected in any of the 17 samples analyzed.

Analytical results for soil gas include the following:

- VOCs were not detected in any of the analyzed soil gas samples.

5.4.2.1.2 DSI Activities

Based on the previous results discussed above, no further assessment of TPHg, TPHd, VOCs, 1,4-dioxane, or SVOCs in soil was conducted as part of the DSI. Additional work proposed in the DSI work plan focused on characterization of perchlorate in soil and groundwater at the Centrifuge, Test Bay 4, and within Test Bay Canyon, and characterization of barium concentrations in the area of boring K-54-DP6. Initial field activities included the following:

- Drilling and sampling 7 primary soil borings (K-54-SB101 to K-54-SB104, and K-54-SB106 to K-54-SB108) to further characterize perchlorate impacts in soil.
- Collecting grab groundwater samples from the 7 primary soil borings, and installing 3 upgradient monitoring wells (TT-MW2-29A, B, and C) to assess potential perchlorate impacts in groundwater.
- Drilling one primary soil boring (K-54-SB105) and collecting supplemental samples from borings K-54-SB103 and K-54-SB104 to assess potentially elevated barium concentrations in soil at Test Bay 4.

Based upon results from the primary borings and wells described above, one additional soil boring (K-54-SB122) and three additional monitoring wells (TT-MW2-36A, B, and C) were installed in northern Test Bay Canyon.

5.4.2.1.3 Geology and Hydrogeology

The surface geology of northern Test Bay Canyon is shown on Figure 5-9. At the northern end of the area, Test Bay Canyon bifurcates into two smaller alluvium-filled drainages. Alluvium underlies most of the canyon floor. Colluvium underlies three small side canyons, including the Centrifuge area and Test Bay 4, and forms aprons at the base of some hillsides. The hillsides consist of STF. Artificial fill was used to construct two berms in the Centrifuge area, and in construction of the Large Bunker. The centrifuge

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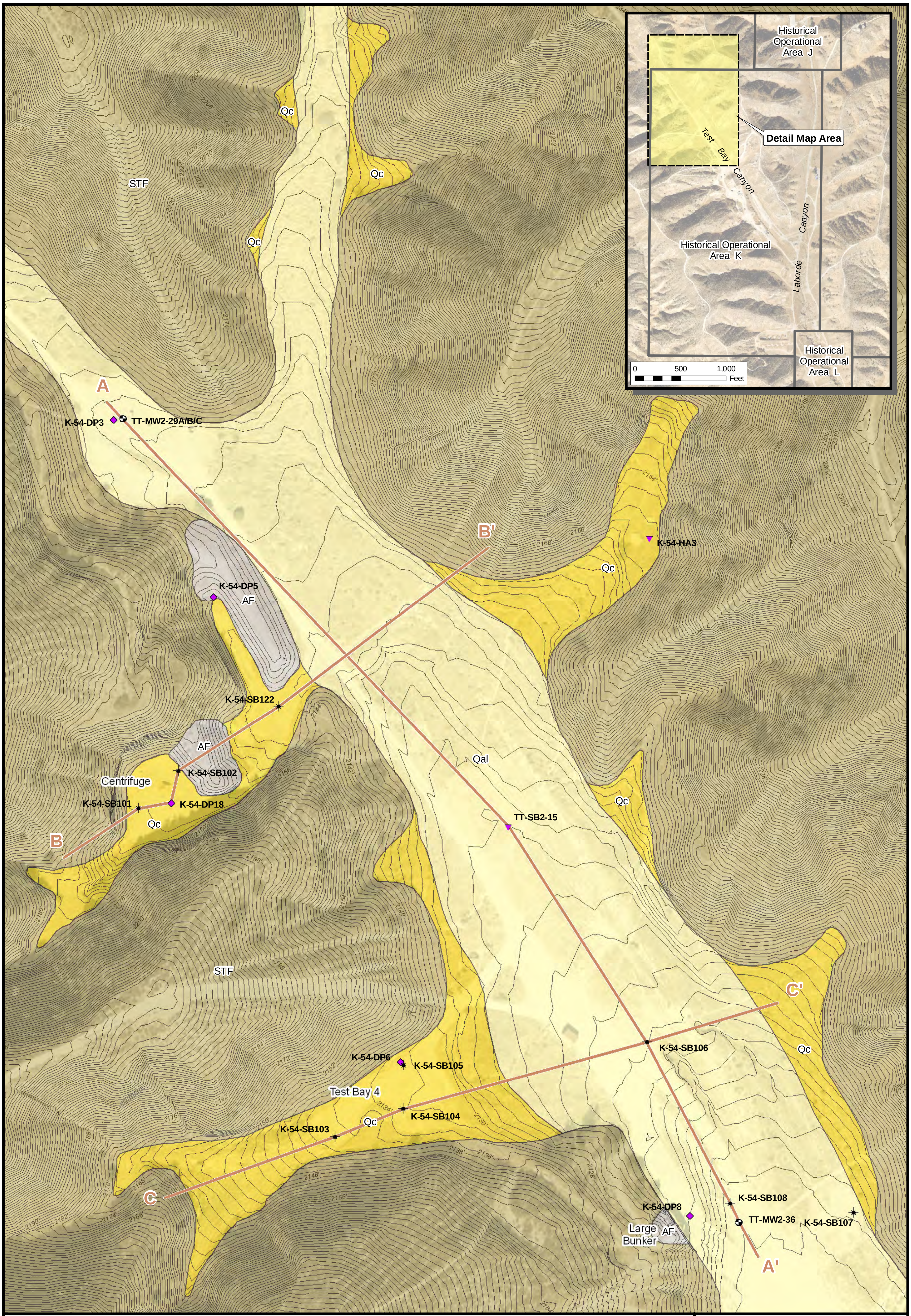

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Geologic Cross Section Location
- Contact (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)

AF	Artificial Fill
Qal	Alluvium
Qc	Colluvium
STF	San Timoteo Formation

0 50 100 Feet

Beaumont Site 2

Figure 5-9

Surface Geology Northern Test Bay Canyon Historical Operational Area K

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area appears to have been extensively regraded, and the fill used to construct the berms in this area appears to have been obtained locally during construction.

Figure 5-10 (cross-section A-A’) shows the subsurface geology along the length of Test Bay Canyon; Figures 5-11 and 5-12 (cross-sections B-B’ and C-C’) show the subsurface geology across the Centrifuge area and Test Bay 4, respectively. The STF consists of north-dipping, interfingering beds of sandstone and mudstone to a depth of 201’, the maximum depth explored. Cross-section B-B’ shows that these interfingering relationships are particularly complex beneath the Centrifuge area.

Depths to groundwater in wells TT-MW2-29B and TT-MW2-36A were 118.7 feet bgs and 76.7 feet bgs, respectively, in May 2009. The groundwater gradient between these wells is 0.004 ft/ft, which is low compared with the overall average of 0.030 ft/ft for the Site. The vertical gradient between wells TT-MW2-29B and TT-MW2-29C is downward at -0.12 ft/ft. The vertical gradient between wells TT-MW-MW2-36A and TT-MW2-36B is also downward, at -0.01 ft/ft.

Cross-section B-B’ (Figure 5-11) shows that groundwater depths in Centrifuge area borings K-54-SB102 and K-54-SB122 are substantially higher than the water table elevation in the canyon, suggesting that these borings may have encountered isolated areas of perched groundwater. The presence of perched groundwater is consistent with the unusually complex geological relationships in the Centrifuge area.

5.4.2.1.4 Soil Sampling Results

Analytical results for soil are summarized in Table 5-6. A total of 211 soil samples have been analyzed for perchlorate, including 186 samples analyzed as part of the DSI and 25 samples analyzed during previous investigations. Perchlorate was detected in 98 of the 211 total samples, at concentrations ranging from 4.4 to 690 µg/kg. The highest perchlorate concentrations were detected in boring K-54-SB104, located in Test Bay 4.

5.4.2.1.5 Groundwater Sampling Results

Analytical results for groundwater are summarized in Table 5-7. A total of 24 groundwater samples, including 14 grab samples and 10 monitoring well samples, were collected in northern Test Bay Canyon during the DSI. Perchlorate concentrations exceeding the MCL of 6 µg/L were found only in the Centrifuge area, in grab samples from borings K-54-SB102 (230 µg/L) and K-54-SB122 (70 µg/L). Benzene was detected at a concentration of 1.3 µg/L, above the MCL of 1 µg/L, in a grab sample collected from the TT-MW2-36 borehole at a depth of approximately 175 feet bgs. This detection was not confirmed in the groundwater sample collected from well TT-MW2-36C.

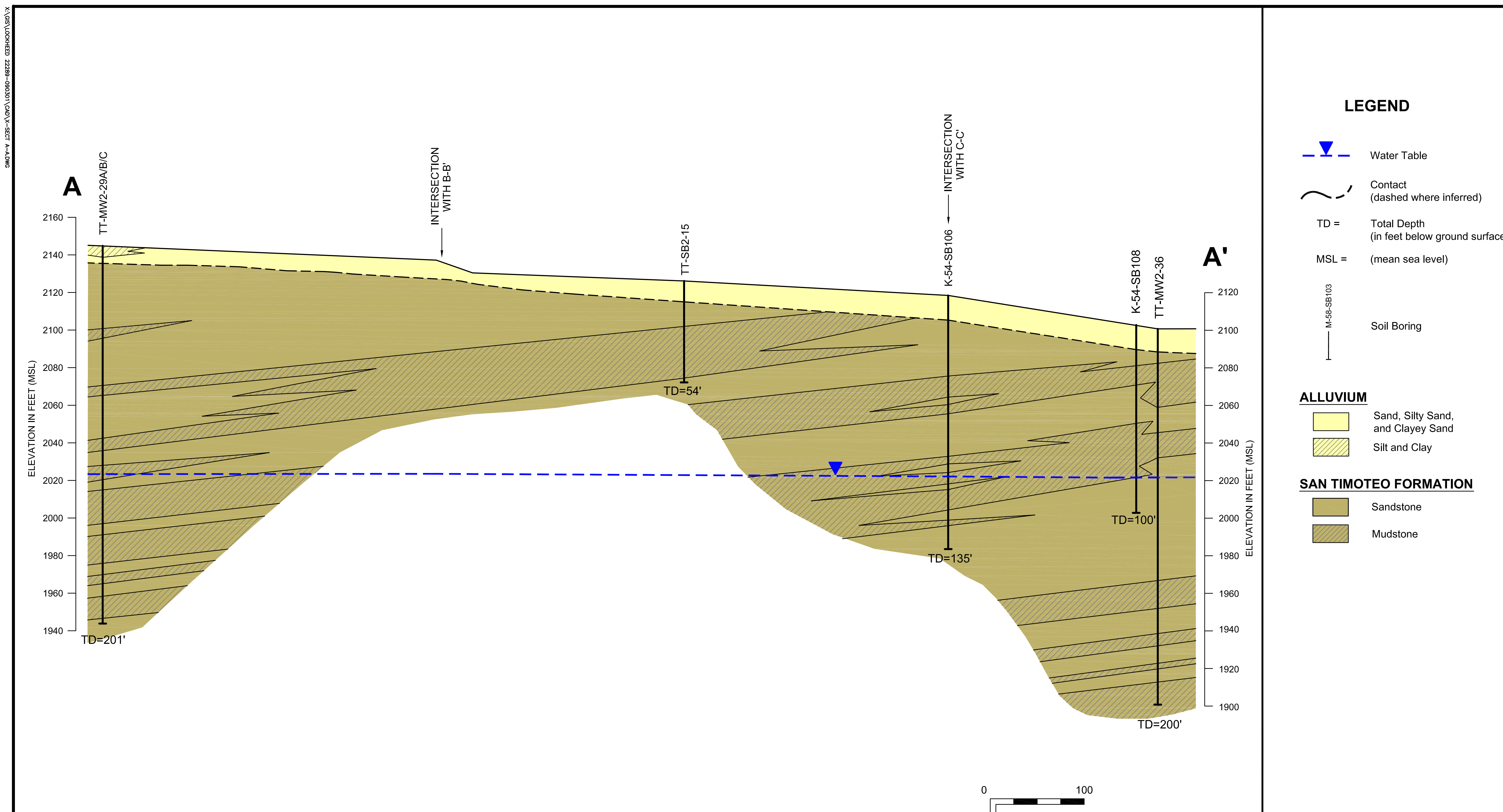

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Figure 5-10
Cross Section A-A'
Northern Test Bay Canyon
Historical Operational Area K

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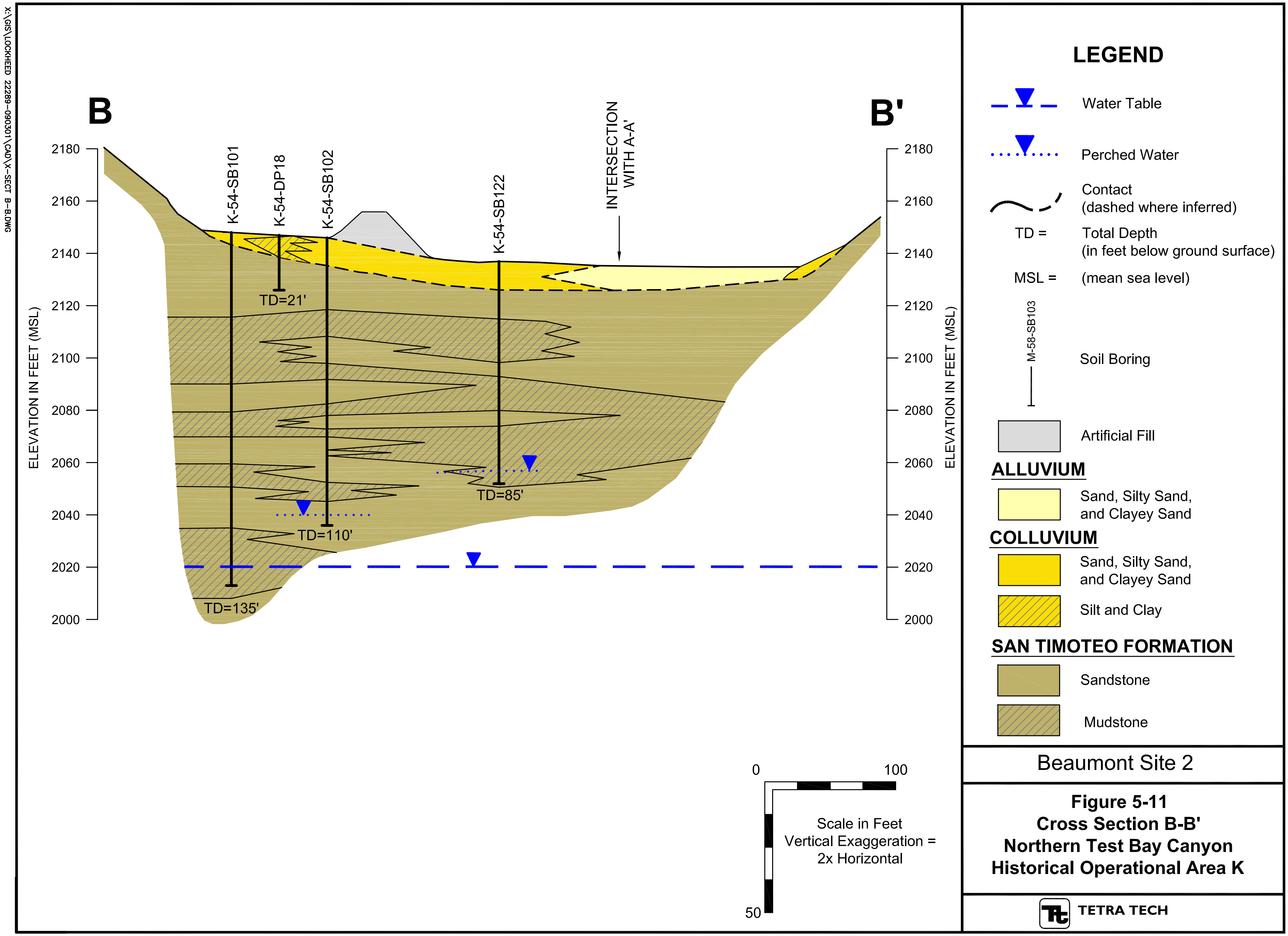

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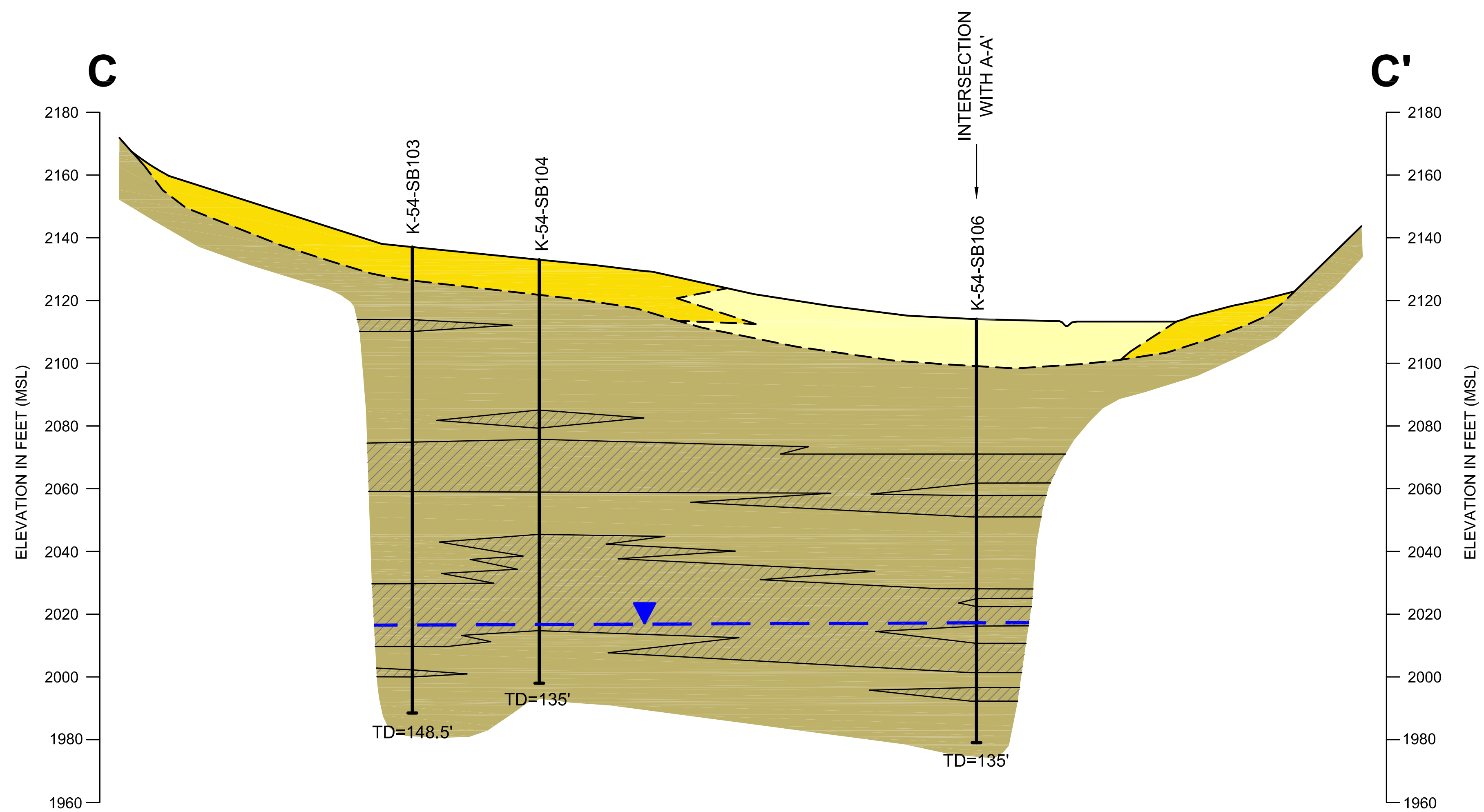
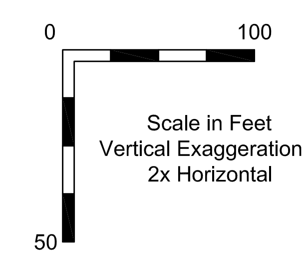
Figure 5-11
Cross Section B-B'
Northern Test Bay Canyon
Historical Operational Area K





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Water Table

Contact (dashed where inferred)

TD = Total Depth (in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

COLLUVIUM

Sand, Silty Sand, and Clayey Sand

SAN TIMOTEO FORMATION

Sandstone

Mudstone

Beaumont Site 2

Figure 5-12
Cross Section C-C'
Northern Test Bay Canyon
Historical Operational Area K

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TABLE 5-7
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Area K (Northern Test Bay Canyon)

Boring/Well No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/L)	VOCs (µg/L) Acetone	2-Butanone (MEK)	Benzene	Carbon Disulfide	Chloromethane	Chloroform	1,1-Dichloroethene	2-Hexanone	Methylene Chloride	Toluene
California MCL:				6	-	-	1	-	-	80	6	-	5	150
California DWNL:					-	-	-	160	-	-	-	-	-	-
GRAB SAMPLES														
K-54-SB101	K-54-SB101-GW129'	129	09/30/08	**2.2**	**11**	**2.1 Jq**	**0.20 Jq**	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	**0.26 Jq**
K-54-SB102	K-54-SB102-GW108'	108	09/26/08	**230**	**8.3**	**1.4 Jq**	**0.17 Jq**	<0.36	<0.36	<0.17	<0.12	<1.2	**0.18 Jq**	<0.22
K-54-SB103	K-54-SB103-GW126'	126	09/25/08	**4.3**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
K-54-SB104	K-54-SB104-GW-128'	128	09/24/08	**2.3**	<5.0	<1.2	**0.23 Jq**	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
K-54-SB106	K-54-SB106-GW125'	125	09/30/08	**0.29**	<10	<2.4	<0.28	<0.71	<0.72	<0.33	<0.23	<2.4	<0.31	<0.45
K-54-SB107	K-54-SB107-GW-96'	96	10/01/08	<0.071	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
K-54-SB108	K-54-SB108-GW-88'	88	10/02/08	**0.11**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
K-54-SB122	K-54-SB122-GW-83.5	83.5	10/23/08	**70**	**5.7**	<1.2	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
TT-MW2-29	K-54-W101-GW-136'	136	09/30/08	**2.1**	**13**	**2.5 Jq**	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
	K-54-W101-GW-148'	148	09/30/08	**0.87**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
	K-54-W101-GW-190'	190	10/10/08	**0.52**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	**1.1**
TT-MW2-36A/B/C	K-54-W106-GW-94'	94	01/01/09	<0.071	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
	K-54-W106-GW-154'	154	01/01/09	<0.071	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.12	<1.2	<0.15	<0.22
	K-54-W106-GW-175'	175	01/02/09	**2.6**	**11**	**3.4**	**1.3**	<0.36	**0.65**	<0.17	<0.12	**2.4 Jq**	<0.15	**0.35 Jq**
MONITORING WELL SAMPLES														
TT-MW2-29A/B/C	TT-MW2-29B	132.5 - 157.5	02/09/09	<0.071	<5.0	**3.2**	<0.14	**0.71**	<0.36	**0.84**	<0.12	<1.2	<0.15	**0.31 Jq**
	TT-MW2-29B		03/18/09	<0.35	<5.0	<1.2	<0.14	**2.3**	<0.36	**0.63**	<0.12	<1.2	<0.15	<0.22
	TT-MW2-29C	190 - 200	02/09/09	<0.071	<5.0	**2.7 Jq**	<0.14	**2.5**	<0.36	**0.92**	<0.12	<1.2	0.18 BJkq	**2.3**
	TT-MW2-29C		03/19/09	<0.071	<5.0	<1.2	<0.14	**7.0**	<0.36	**0.50**	<0.12	<1.2	<0.15	**0.92**
TT-MW2-36A/B/C	TT-MW2-36A	98 - 108	02/12/09	**0.19**	<5.0	<1.2	**0.62**	**1.4**	<0.36	**0.17 Jq**	<0.12	<1.2	<0.15	**11**
	TT-MW2-36A		03/19/09	**0.14**	<5.0	<1.2	**0.56**	**30 Jf**	**0.55**	<0.17	<0.12	<1.2	**0.16 Jq**	**14**
	TT-MW2-36B	150 - 155	02/12/09	<0.071	<5.0	<1.2	**0.21 Jq**	**2.1**	<0.36	<0.17	**0.17 Jq**	<1.2	<0.15	**2.3**
	TT-MW2-36B		03/19/09	**1.7**	<5.0	<1.2	<0.14	**2.0**	<0.36	<0.17	<0.12	<1.2	<0.15	**0.41 Jq**
	TT-MW2-36C	173 - 178	02/13/09	0.28 Bk	8.9 Bk	**2.1 Jq**	**0.18 Jq**	**2.0**	<0.36	<0.17	<0.12	<1.2	<0.15	**1.2**
	TT-MW2-36C		03/19/09	<0.71	**27**	**4.9**	**0.23 Jq**	**26**	<0.36	<0.17	<0.12	<1.2	<0.15	**1.2**

Notes:

Bold - Indicates concentrations detected above the method detection limit.
MCL - California Maximum Contaminant Level (February 4, 2010).
DWNL - California Drinking Water Notification Level (December 14, 2007).
VOCs - Volatile organic compounds.
µg/L - Micrograms per liter.
bgs - Below ground surface.
"<" - Indicates concentration below indicated method detection limit.
"-" - not available or not available.

"B" - The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination. The result is considered not to have originated from the environmental sample, because cross-contamination is suspected
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"k" - The analyte was found in a field blank.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).
"f" - The duplicate/replicate sample's relative percent difference (RPD) was outside the control limit.

5.4.2.1.6 Discussion

Perchlorate in Soil

A 3-D geostatistical model of the perchlorate distribution in soil in northern Test Bay Canyon was generated using MVS. All of the previous and DSI data were used in the 3-D model. Figure 5-13 provides 3-D renderings of the extent of perchlorate concentrations in soil greater than 100 µg/kg. The model results show the perchlorate-impacted soil in Test Bay 4 as consisting of several disconnected segments. This is an artifact choosing 100 µg/kg as the cutoff concentration for defining the perchlorate-impacted soil. The segments become connected when lower cutoff concentrations are used. Significant features of Figure 5-13 include the following:

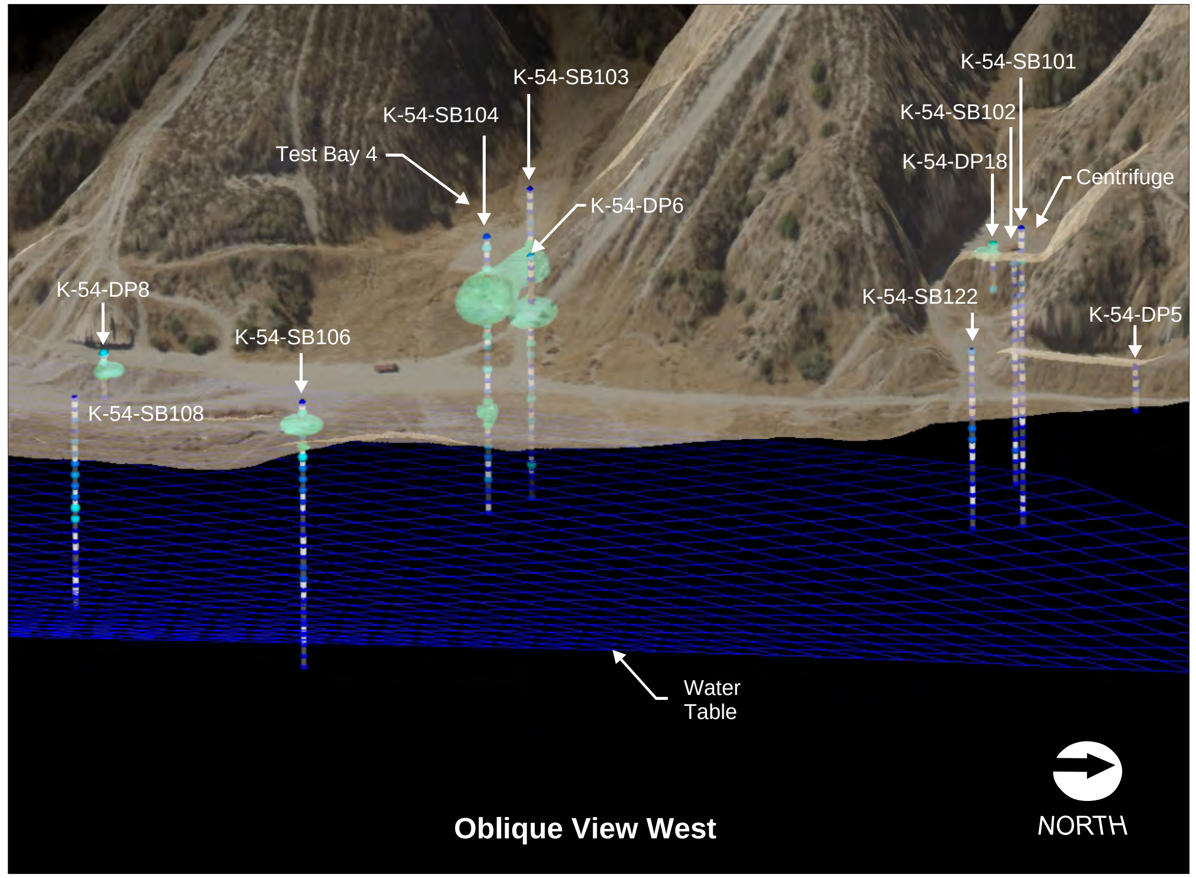
- Four relatively small areas of perchlorate-impacted soil are present in northern Test Bay Canyon. The largest of these is located in Test Bay 4; smaller impacted areas are also present in the Centrifuge area, in Test Bay Canyon near Test Bay 4, and in Test Bay Canyon near the large bunker.
- The perchlorate-impacted soil in the Centrifuge area, in Test Bay Canyon near Test Bay 4, and near the large bunker appears to be restricted to depths of 20 feet or less. The perchlorate-impacted soil at Test Bay 4 extends to a depth of approximately 85 feet bgs.

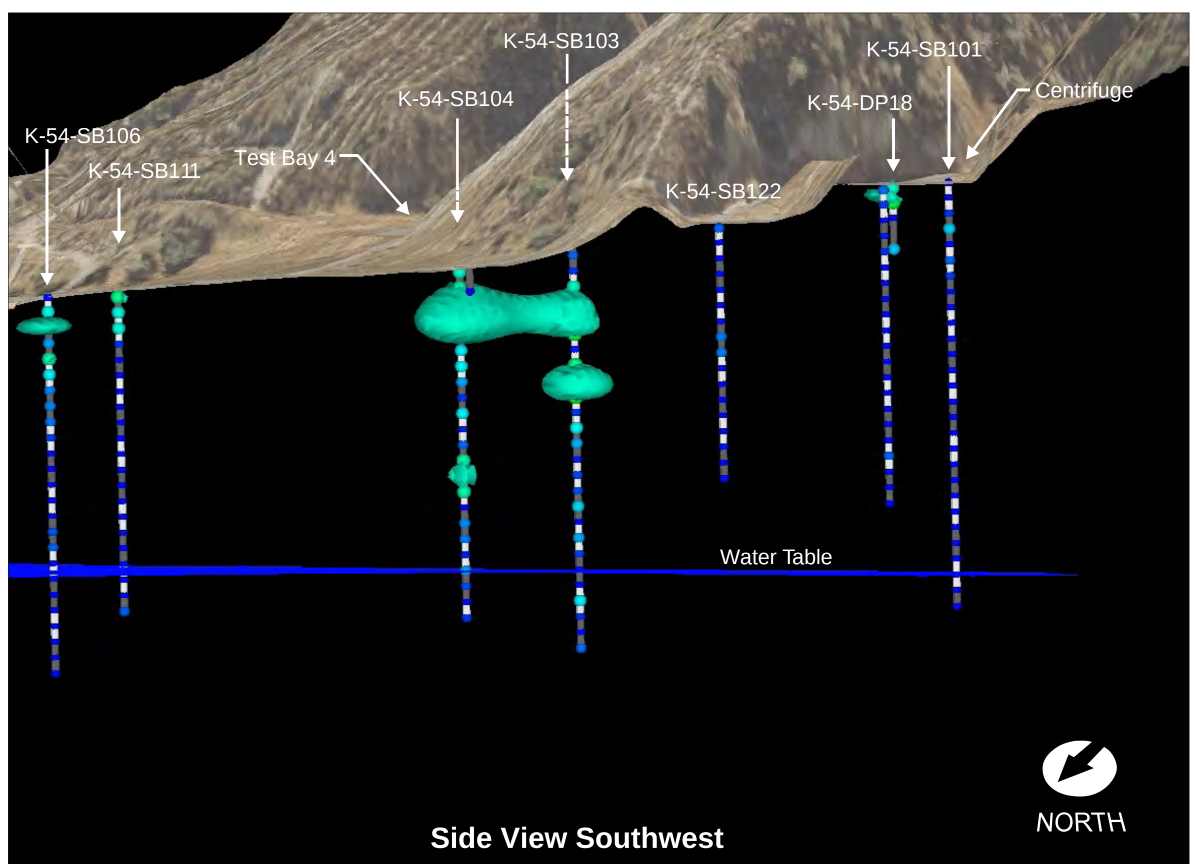
The areal extent of perchlorate exceeding 100 µg/kg, based on the MVS 3-D geostatistical model, is shown in plan view in Figure 5-14. The approximate area of perchlorate-impacted soil in Test Bay 4 shown in Figure 5-14 is 4,700 square feet, or 0.1 acres.

Perchlorate concentration contours at depths of 5, 10, 30, and 40 feet bgs, based on the MVS 3-D geostatistical model, are shown in Figures 5-15. The extent of the perchlorate-impacted soil in the Centrifuge area is fairly well constrained by the data for borings K-54-SB101, K54-SB102, and K54-SB122, and the topography of the area. The Test Bay 4 perchlorate-impacted soil is constrained mainly by the topography of the side canyon; the eastern extent of the impacted area is constrained by the data for borings K-54-SB106, K-54-SB108, and K-54-DP8.

Perchlorate in Groundwater

Perchlorate concentrations in groundwater are plotted and contoured in Figure 5-16. Perchlorate concentrations greater than the California MCL of 6 µg/L were found only in grab samples from borings K-54-SB102 and K-54-SB122 in the Centrifuge area. As previously noted, the groundwater encountered in both of these borings may represent isolated perched zones. The perchlorate concentration in the grab sample from K-54-SB101, which was collected at a depth consistent with the water table in the adjacent canyon, was less than the MCL. The extent of the groundwater plume is constrained primarily by the topography of the Centrifuge area, and is presumed to be relatively small based on the limited occurrence of perched groundwater.





Sample Location

10'

Perchlorate Concentration

>100,000 µg/kg
30,000 µg/kg
10,000 µg/kg
3,000 µg/kg
1,000 µg/kg
300 µg/kg
100 µg/kg
30 µg/kg
10 µg/kg
<5 µg/kg

Note:

µg/kg - micrograms per kilogram.
Diagrams not to scale.
2X vertical exaggeration.

Beaumont Site 2

Figure 5-13

3-D Renderings of Perchlorate in Soil Above 100 µg/kg - Northern Test Bay Canyon Historical Operational Area K

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LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Perchlorate Concentration

- >100,000 µg/kg
- 30,000 µg/kg
- 10,000 µg/kg
- 3,000 µg/kg
- 1,000 µg/kg
- 300 µg/kg
- 100 µg/kg
- 30 µg/kg
- 10 µg/kg

0 50 100 Feet

Beaumont Site 2

Figure 5-14
Extent of Perchlorate in Soil Above 100 µg/kg - Northern Test Bay Canyon Historical Operational Area K

TETRA TECH

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N

0 100 200 Feet

Adapted from: March 2007 aerial photograph.

LEGEND

- DSI Soil Sample Location
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Perchlorate Concentration Contour (dashed where inferred)
- Ground Surface Elevation Contour

Note:

[#] Perchlorate results in μg/kg.

[ND] Non-Detect.

Beaumont Site 2

Figure 5-15

Perchlorate Concentrations in Soil Northern Test Bay Canyon Historical Operational Area K

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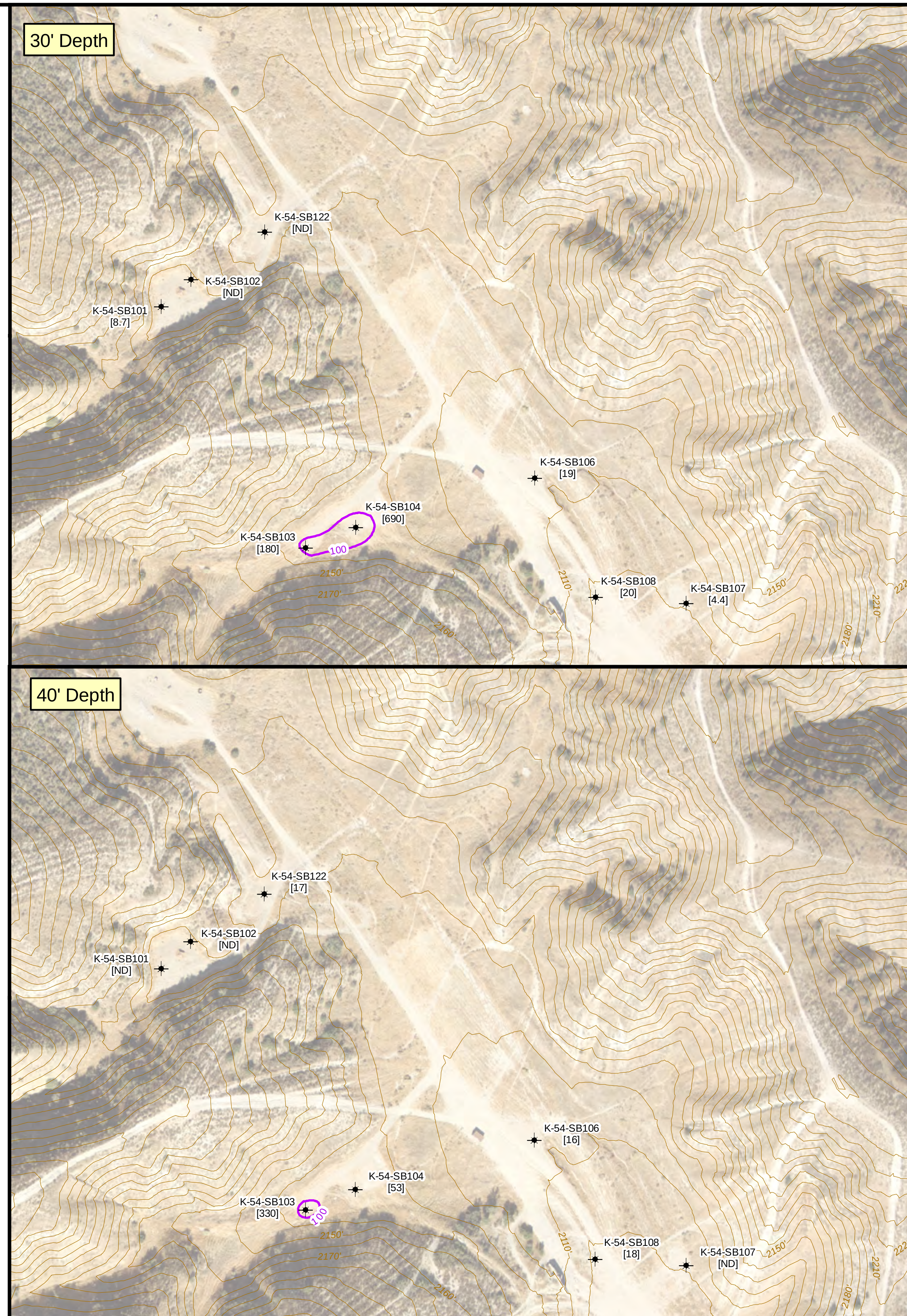

Adapted from: March 2007 aerial photograph.

LEGEND

DSI Soil Sample Location

Perchlorate Concentration Contour (dashed where inferred)

Ground Surface Elevation Contour

Note:

[#] Perchlorate results in μg/kg.

[ND] Non-Detect.

Beaumont Site 2

Figure 5-15 (cont.)

Perchlorate Concentrations in Soil Northern Test Bay Canyon Historical Operational Area K

TETRA TECH

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LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Note:
[#] - Perchlorate in groundwater (µg/L).
[ND] - Non-detect.
µg/L - Micrograms per liter.

0 50 100 Feet

Beaumont Site 2

Figure 5-16

Perchlorate Concentrations in Groundwater Above 6 µg/L - Northern Test Bay Canyon Historical Operational Area K

TETRA TECH

Data for the grab samples collected from borings K-54-SB106 to K-54-SB108 and from wells TT-MW2-36A, B, and C all indicate that groundwater impacts in northern Test Bay Canyon do not extend into the southern Test Bay Canyon area.

Metals in Soil

The DSI work plan (Tetra Tech, 2008) included additional sampling to assess barium found at a concentration of 473 mg/kg in boring K-54-DP6 at a depth of 5 feet bgs. This barium concentration was considered to be potentially elevated based on the initial metals background comparisons, which assumed all soils at the Site to be alluvium. Figure 5-9 shows that boring K-54-DP6 was actually drilled in colluvium rather than alluvium. The metals background comparison conducted as part of the DSI (Appendix H), which subdivided soils into alluvium and colluvium/STF groups, found that barium concentrations in Area K are not statistically elevated relative to background, and that barium concentrations in K-54-DP6 and in samples from step-out borings K-54-SB103 to K-54-SB105 do not exceed the colluvium/STF BTV of 904 mg/kg for barium.

Antimony and silver concentrations in boring K-54-DP6 at a depth of 5 feet bgs were 1.03 and 0.545 mg/kg, respectively. These concentrations slightly exceed the colluvium/STF BTVs of 0.238 mg/kg for antimony and 0.343 mg/kg for silver. Based on the low detected concentrations, no further characterization of antimony and silver was conducted during the DSI. Both antimony and silver will be evaluated as COPCs in future risk assessments for the Site.

5.4.2.2 Southern Test Bay Canyon

Former facilities in the southern Test Bay Canyon portion of Area K include Test Bay 1, Test Bay 2, Test Bay 3, and the Prism.

5.4.2.2.1 Previous Work

Previous work in southern Test Bay Canyon included the following:

- Drilling and sampling 9 soil borings (K-54-DP10 to K-54-DP12, K-54-DP14 to K-54-DP16, K-54-DP19 to K-54-DP20, and K-54-HA1 to depths ranging from 5 to 20 feet bgs, and installing soil gas probes at a depth of 10 feet bgs in 8 of the 9 soil borings (Tetra Tech, 2005a).
- Installing 4 groundwater monitoring wells, including shallow wells TT-MW2-3, TT-MW2-14, and TT-MW2-17S, and deep well TT-MW2-17D (Tetra Tech, 2004; 2009g).
- Collecting 3 soil samples from the borehole for monitoring well TT-MW2-14, and 4 soil samples from the borehole for monitoring well TT-MW2-17 (Tetra Tech, 2009g).
- Drilling and sampling 1 soil boring (K-54-DP15B) to a depth of 80 feet, and collecting a grab groundwater sample from the borehole (Tetra Tech, 2009b).

Sampling locations are shown in Figure 5-17. Analytical results for soil and groundwater are summarized in Tables 5-8 and 5-9, respectively.

Analytical results for soil include the following:

- Perchlorate was detected in 31 of the 53 samples analyzed, at concentrations ranging from 20.2 to 18,000 µg/kg. The highest perchlorate concentrations were detected in borings K-54-DP15B at depths of 60 and 70 feet; in boring TT-MW2-14, at a depth of 66 feet; and in boring K-54-DP15, at a depths of 10 and 20 feet. Boring K-54-DP15 is located in front of Test Bay 3. The high perchlorate concentrations in borings K-54-DP15B and TT-MW2-14 were found in samples collected near the water table, and may in part be due to the presence groundwater with high perchlorate concentrations in the pore space of the samples.
- The initial metals background comparison (Tetra Tech, 2009h) found no metals with concentrations that were statistically elevated above background. However potentially elevated barium and zinc concentrations were found in boring K-54-DP11 (227 mg/kg of barium at 5 feet bgs, and 159 mg/kg of zinc at 0.5 feet bgs).
- VOCs were not positively detected in any of the 33 samples analyzed.
- 1,4-Dioxane was not detected in any of the 25 samples analyzed.
- SVOCs were not detected in any of the 25 samples analyzed.

Analytical results for soil gas include the following:

- VOCs were not detected in any of the analyzed soil gas samples. Volatile petroleum hydrocarbons were detected at a concentration of 11 µg/L in the soil gas sample collected from boring K-54-DP12.

Analytical results for groundwater include the following:

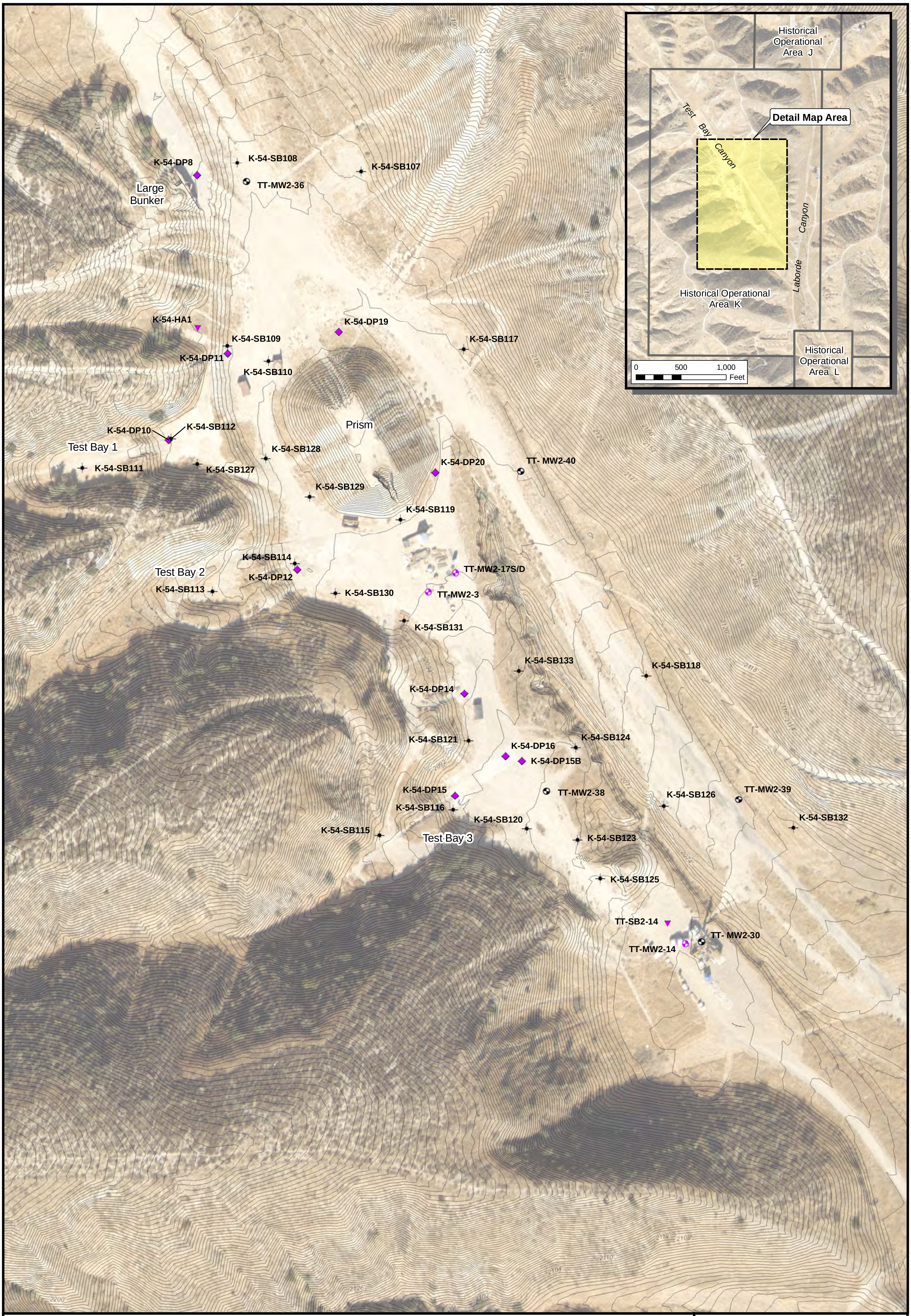
- In May 2008, perchlorate was detected at concentrations of 1,900 and 45,100 µg/L in wells TT-MW2-17S and D, respectively; and at a concentration of 46,500 µg/L in well TT-MW2-14. Perchlorate was detected at a concentration of 157,000 µg/L in the grab sample collected from boring K-54-DP15B. Well TT-MW2-3 was replaced by TT-MW2-17S and D, and was not sampled in May 2008.
- Perchlorate concentrations in deep well TT-MW2-17D are consistently higher than in collocated shallow well TT-MW2-17S.

5.4.2.2.2 DSI Activities

Based on the previous results discussed above, no further assessment of VOCs, 1,4-dioxane, or SVOCs in soil was conducted as part of the DSI. Additional work proposed in the DSI work plan focused on characterization of perchlorate in soil and groundwater, and characterization of zinc and barium concentrations in the area of boring K-54-HA1. Initial field activities included the following:

- Drilling and sampling 8 primary soil borings (K-54-SB111 to K-54-SB118) to further characterize perchlorate impacts in soil.

X:\GIS\Lockheed 22280-090301\Area K Samples Central.mxd



LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

0 50 100 Feet

Beaumont Site 2

Figure 5-17
Sample Locations
Southern Test Bay Canyon
Historical Operational Area K

TETRA TECH

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB109	K-54-SB109-10'	10	09/15/08	-	-	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB110	K-54-SB110-0.5'	0.5	09/15/08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	85	-	-	-
	K-54-SB110-5'	5	09/15/08	-	-	-	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB111	K-54-SB111-0.5'	0.5	10/21/08	**7.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-5'	5	10/21/08	**66**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-10'	10	10/21/08	**49**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-15'	15	10/21/08	**180**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-20'	20	10/21/08	**81**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-25'	25	10/21/08	**82**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-30'	30	10/21/08	**7.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-35'	35	10/21/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-40'	40	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-45'	45	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-50'	50	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-55'	55	10/21/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-60'	60	10/21/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-65'	65	10/21/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-70'	70	10/21/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-75'	75	10/21/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-80'	80	10/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-85'	85	10/22/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-90'	90	10/22/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-95'	95	10/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-100'	100	10/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-105'	105	10/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-110'	110	10/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB111-115'	115	10/22/08	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB112	K-54-SB112-0.5'	0.5	09/17/08	**75 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-5'	5	09/17/08	**460**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-10'	10	09/17/08	**370**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-15'	15	09/17/08	**400**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-20'	20	09/17/08	**58**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-25'	25	09/17/08	**83**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-30'	30	09/17/08	**33**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-35'	35	09/17/08	**29**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-40'	40	09/17/08	**51**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-45'	45	09/17/08	**24**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-50'	50	09/17/08	1.4 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-55'	55	09/17/08	**75**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-60'	60	09/17/08	**57**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-65'	65	09/17/08	1.3 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-70'	70	09/17/08	2.3 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-75'	75	09/17/08	**94**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-80'	80	09/17/08	**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-85'	85	09/17/08	**80**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg)																	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB112	K-54-SB112-90'	90	09/18/08	**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-95'	95	09/18/08	**46**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB112-100'	100	09/18/08	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB113	K-54-SB113-0.5'	0.5	11/24/08	**850**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-5'	5	11/24/08	**71**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-10'	10	11/24/08	**1,700**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-15'	15	11/24/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-20'	20	11/24/08	**460**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-25'	25	11/24/08	**640**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-30'	30	11/24/08	**1,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-35'	35	11/24/08	**1,300**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-40'	40	11/24/08	**460**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-45'	45	11/24/08	**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-50'	50	11/24/08	**120**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-55'	55	11/24/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-60'	60	11/24/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-65'	65	11/24/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-70'	70	11/25/08	<4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-75'	75	11/25/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-80'	80	11/25/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-85'	85	11/25/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-90'	90	11/25/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-95'	95	11/25/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-100'	100	11/25/08	**54**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB113-105'	105	11/25/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB114	K-54-SB114B-0.5'	0.5	09/18/08	**150**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-10'	10	09/18/08	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-15'	15	09/18/08	**51**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-20'	20	09/18/08	**500**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-25'	25	09/18/08	**330**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-30'	30	09/18/08	**210**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-35'	35	09/18/08	**150**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-40'	40	09/18/08	**21**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-45'	45	09/18/08	**230**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-50'	50	09/18/08	**200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-55'	55	09/18/08	**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-60'	60	09/18/08	**170**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-65'	65	09/18/08	**100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-70'	70	09/18/08	**85**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB114B-75'	75	09/18/08	**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB115	K-54-SB115-0.5'	0.5	09/22/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-5'	5	09/22/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-10'	10	09/22/08	13 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-15'	15	09/22/08	8.6 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg)																	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB115	K-54-SB115-20'	20	09/22/08	7.4 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-25'	25	09/22/08	**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-30'	30	09/22/08	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-35'	35	09/22/08	14 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-40'	40	09/22/08	5.8 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-45'	45	09/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-50'	50	09/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-55'	55	09/22/08	5.5 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-60'	60	09/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-65'	65	09/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-70'	70	09/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB115-75'	75	09/22/08	4.6 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB116	K-54-SB116-0.5'	0.5	09/18/08	**4,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-5'	5	09/18/08	**11,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-10'	10	09/18/08	**7,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-15'	15	09/18/08	**110,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-20'	20	09/18/08	**130,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-25'	25	09/19/08	**18,000 Jc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-30'	30	09/19/08	**5,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-35'	35	09/19/08	**20,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-40'	40	09/19/08	**14,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-45'	45	09/19/08	**14,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-50'	50	09/19/08	**37,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-55'	55	09/19/08	**5,500**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-60'	60	09/19/08	**740**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-65'	65	09/19/08	**1,400**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-70'	70	09/19/08	**1,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-75'	75	09/19/08	**120**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-80'	80	09/19/08	**160**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-85'	85	09/22/08	**180 Jc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-90'	90	09/22/08	**33**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-95'	95	09/22/08	7.4 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB116-100'	100	09/22/08	<4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB117	K-54-SB117-0.5'	0.5	10/01/08	**27**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-5'	5	10/01/08	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-10'	10	10/01/08	**5.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-15'	15	10/01/08	**15**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-20'	20	10/01/08	**6.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-25'	25	10/01/08	**7.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-30'	30	10/01/08	**31**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-35'	35	10/01/08	**7.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-40'	40	10/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-45'	45	10/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-50'	50	10/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg)																	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB117	K-54-SB117-55'	55	10/01/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-60'	60	10/01/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-65'	65	10/01/08	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-70'	70	10/01/08	**14**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB117-75'	75	10/01/08	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB118	K-54-SB118-0.5'	0.5	10/03/08	**10**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-5'	5	10/03/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-10'	10	10/03/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-15'	15	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-20'	20	10/03/08	<4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-25'	25	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-30'	30	10/03/08	<5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-35'	35	10/03/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-40'	40	10/03/08	<5.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-45'	45	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-50'	50	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-55'	55	10/03/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-60'	60	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB118-65'	65	10/03/08	**57 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB119	K-54-SB119-0.5'	0.5	10/15/08	**51**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-5'	5	10/15/08	**1,300**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-10'	10	10/15/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-15'	15	10/15/08	**480 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-20'	20	10/15/08	**4.8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-25'	25	10/15/08	**13**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-30'	30	10/15/08	**15**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-35'	35	10/15/08	**16**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-40'	40	10/15/08	**100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-45'	45	10/15/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-50'	50	10/15/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-55'	55	10/15/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-60'	60	10/15/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-65'	65	10/15/08	**14 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-70'	70	10/15/08	**31**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB119-75'	75	10/15/08	**48**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB120	K-54-SB120-0.5	0.5	10/17/08	**3,800**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-5'	5	10/17/08	**27,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-10'	10	10/17/08	**490**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-15'	15	10/17/08	**1,500**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-20'	20	10/17/08	**1,400**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-25'	25	10/17/08	**2,800**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-30'	30	10/17/08	**1,900**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-35'	35	10/17/08	**1,700**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-40'	40	10/17/08	**2,800**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-45'	45	10/17/08	**3,900**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB120	K-54-SB120-50'	50	10/17/08	**3,600**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-55'	55	10/17/08	**2,500**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-60'	60	10/17/08	**9,900**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB120-65'	65	10/17/08	**760**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB121	K-54-SB121-0.5'	0.5	10/20/08	**46**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-5'	5	10/20/08	**46**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-10'	10	10/20/08	**230**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-15'	15	10/20/08	**320**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-20'	20	10/20/08	**340**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-25'	25	10/20/08	**51**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-30'	30	10/20/08	**6.9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-35'	35	10/20/08	**4.5 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-40'	40	10/20/08	**4.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-45'	45	10/20/08	**9.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-50'	50	10/20/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-55'	55	10/20/08	**95**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-60'	60	10/20/08	**180**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-65'	65	10/20/08	**94**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB121-70'	70	10/20/08	**94**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB123	K-54-SB123-0.5'	0.5	10/24/08	**19,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-5'	5	10/24/08	**3,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-10'	10	10/24/08	**880**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-15'	15	10/24/08	**59**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-20'	20	10/24/08	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-25'	25	10/24/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-30'	30	10/24/08	**20**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-35'	35	10/24/08	**17 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-40'	40	10/24/08	**29**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-45'	45	10/24/08	**50,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-50'	50	10/24/08	**15,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-55'	55	10/24/08	**14,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-60'	60	10/24/08	**4,400**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-65'	65	10/24/08	**16,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-70'	70	10/24/08	**20,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB123-75'	75	10/24/08	**190**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB124	K-54-SB124-0.5'	0.5	11/12/08	**10**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-5'	5	11/12/08	**56**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-10'	10	11/12/08	**120**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-15'	15	11/12/08	**1,300**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-20'	20	11/12/08	**400**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-25'	25	11/12/08	**16**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-30'	30	11/12/08	**21**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-35'	35	11/12/08	**22**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-40'	40	11/12/08	**100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg)																	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc			
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB124	K-54-SB124-45'	45	11/12/08	4.8 Bk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-50'	50	11/12/08	**10**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-55'	55	11/12/08	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-60'	60	11/12/08	**1,600**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-65'	65	11/12/08	**36,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB124-70'	70	11/12/08	**44,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB125	K-54-SB125-0.5'	0.5	11/10/08	**250**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-5'	5	11/10/08	**46**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-10'	10	11/10/08	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-15'	15	11/10/08	**4.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-20'	20	11/10/08	**18**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-25'	25	11/10/08	**180**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-30'	30	11/10/08	**37**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-35'	35	11/10/08	**9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-40'	40	11/10/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-45'	45	11/11/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-50'	50	11/11/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-55'	55	11/11/08	**43**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-60'	60	11/11/08	**4,100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-65'	65	11/11/08	**3,100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB125-70'	70	11/11/08	**6,300**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB126	K-54-SB126-0.5'	0.5	11/18/08	**8.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-5'	5	11/18/08	**82**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-10'	10	11/18/08	**38**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-15'	15	11/18/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-20'	20	11/18/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-25'	25	11/18/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-30'	30	11/18/08	**45**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-35'	35	11/18/08	**15**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-40'	40	11/18/08	**43**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-45'	45	11/18/08	**49**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-50'	50	11/18/08	**40**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-55'	55	11/18/08	**1,400**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-60'	60	12/01/08	**7,400**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-65'	65	12/01/08	**12,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-70'	70	12/01/08	**24**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-75'	75	12/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB126-80'	80	12/01/08	**140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB127	K-54-SB127-0.5'	0.5	12/01/08	**84**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-5'	5	12/01/08	**15**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-10'	10	12/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-15'	15	12/01/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-20'	20	12/01/08	**43**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-25'	25	12/01/08	**15**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB127	K-54-SB127-30'	30	12/01/08	**39**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-35'	35	12/01/08	**20**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-40'	40	12/01/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-45'	45	12/01/08	**26**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-50'	50	12/01/08	**26**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-55'	55	12/01/08	**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-60'	60	12/01/08	**24**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-65'	65	12/01/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-70'	70	12/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-75'	75	12/01/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-80'	80	12/01/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-85'	85	12/01/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-90'	90	12/01/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB127-95'	95	12/01/08	<4.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB128	K-54-SB128-0.5'	0.5	11/14/08	**650**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-5'	5	11/14/08	**430**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-10'	10	11/14/08	**100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-15'	15	11/14/08	**16**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-20'	20	11/14/08	**610**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-25'	25	11/14/08	**130**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-30'	30	11/14/08	**70**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-35'	35	11/14/08	**140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-40'	40	11/14/08	**180**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-45'	45	11/14/08	**220**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-50'	50	11/14/08	**130**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-55'	55	11/14/08	**60**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-60'	60	11/14/08	**18**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-65'	65	11/14/08	**22**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-70'	70	11/14/08	**5.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-75'	75	11/14/08	**7.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB128-80'	80	11/14/08	**28**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB129	K-54-SB129-0.5'	0.5	11/13/08	**1,300**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-5'	5	11/13/08	**130**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-10'	10	11/13/08	**330**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-15'	15	11/13/08	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-20'	20	11/13/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-25'	25	11/13/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-30'	30	11/13/08	**11**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-35'	35	11/13/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-40'	40	11/13/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-45'	45	11/13/08	**5.9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-50'	50	11/13/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-55'	55	11/13/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-60'	60	11/13/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB129	K-54-SB129-65'	65	11/13/08	**71**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-70'	70	11/13/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB129-75'	75	11/13/08	**15**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB130	K-54-SB130-0.5'	0.5	11/13/08	**140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-5'	5	11/13/08	**290**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-10'	10	11/13/08	**240**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-15'	15	11/13/08	**67**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-20'	20	11/13/08	**290**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-25'	25	11/13/08	**26**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-30'	30	11/13/08	**96 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-35'	35	11/13/08	**14**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-40'	40	11/13/08	**100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-50'	50	11/13/08	**44**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-55'	55	11/13/08	**79**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-60'	60	11/13/08	**72**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-65'	65	11/13/08	**38**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB130-70'	70	11/13/08	**72**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB131	K-54-SB131-0.5'	0.5	11/12/08	**22**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-5'	5	11/12/08	**83**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-10'	10	11/12/08	**550**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-15'	15	11/12/08	**170**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-20'	20	11/12/08	**27**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-25'	25	11/12/08	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-30'	30	11/12/08	**130**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-35'	35	11/12/08	**32**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-40'	40	11/12/08	**24**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-45'	45	11/12/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-50'	50	11/12/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-55'	55	11/12/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-60'	60	11/12/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-65'	65	11/12/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB131-70'	70	11/12/08	**24 Jc**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB132	K-54-SB132-0.5'	0.5	12/09/08	**8.1 Jd**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-5'	5	12/09/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-10'	10	12/09/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-15'	15	12/09/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-20'	20	12/09/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-25'	25	12/09/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-30'	30	12/09/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-35'	35	12/09/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-40'	40	12/09/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-45'	45	12/09/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-50'	50	12/09/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-55'	55	12/09/08	**500 Jd**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB132-60'	60	12/09/08	**8,200 Jd**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-SB133	K-54-SB133-0.5'	0.5	12/08/08	**18**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-5'	5	12/08/08	**8.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-10'	10	12/08/08	**28**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-15'	15	12/08/08	**100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-20'	20	12/08/08	**80**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-25'	25	12/08/08	**100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-30'	30	12/08/08	**76**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-35'	35	12/08/08	**25**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-40'	40	12/08/08	**19**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-45'	45	12/08/08	**77**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-50'	50	12/08/08	**45**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-55'	55	12/08/08	**8.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-60'	60	12/08/08	**24**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-SB133-65'	65	12/08/08	**53**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TT-MW2-38A/B/C	K-54-W109-5'	5	02/23/09	**31**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-10'	10	02/23/09	**170**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-15'	15	02/23/09	**65**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-20'	20	02/23/09	**190**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-25'	25	02/23/09	**78**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-30'	30	02/23/09	**56**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-35'	35	02/23/09	**49**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-40'	40	02/23/09	**51**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-45'	45	02/24/09	**57**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-50'	50	02/24/09	**7.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-55'	55	02/24/09	**8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-60'	60	02/24/09	**24,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-65'	65	02/24/09	**67,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TT-MW2-39	K-54-W108-0.5	0.5	02/19/09	**330**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-5	5	02/19/09	**9.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-10	10	02/19/09	**8.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-15	15	02/19/09	<5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-20	20	02/19/09	<4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-25	25	02/19/09	**4.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-30	30	02/19/09	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-35	35	02/19/09	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-40	40	02/19/09	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-45	45	02/19/09	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-50	50	02/19/09	**8.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-55	55	02/19/09	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-60	60	02/19/09	**40,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W108-65	65	02/19/09	**200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-DP15B	15B-5'	5	05/05/08	<10.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-10'	10	05/05/08	<10.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-15'	15	05/05/08	<10.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-DP15B	15B-20'	20	05/05/08	<10.7	-	<4.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-25'	25	05/05/08	<10.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-30'	30	05/05/08	<10.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-35'	35	05/05/08	<10.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-40'	40	05/05/08	<10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-45'	45	05/05/08	**62.9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-50'	50	05/05/08	**73.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-55'	55	05/05/08	**78.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-60'	60	05/05/08	**15,700 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15B-70'	70	05/05/08	**18,000**	-	<4.63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tt-MW2-14	MW14-5-6.5'	6.5	09/06/06	<10.4																	-	-	-	-
	MW14-35-36.5'	36.5	09/06/06	<10.5																	-	-	-	-
	MW14-64.5-66'	66	09/06/06	**1,860**																	-	-	-	-
Tt-MW2-17	MW-17A/B-5'	5	09/14/06	**259**																	-	-	-	-
	MW-17A/B-30'	30	09/14/06	**32.1**																	-	-	-	-
	MW-17A/B-55'	55	09/14/06	**59.6**																	-	-	-	-
	TT-MW2-17A/B-61'	61	11/01/06	**189**																	-	-	-	-
K-54-DP10	K-54-DP10-5	5	09/14/04	**680**	<0.191 UJc	2.7	116	0.455	<0.00988	22.4	11	20.2	5.06	<0.0130	<0.0206	17.5	<0.0209	<0.175	<0.0987	36.7	51.1	All ND	<0.11	All ND
	K-54-DP10-10	10	09/14/04	**256**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP10-20	20	09/14/04	**110**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP11	K-54-DP11-0.5	0.5	09/14/04	<5.94	<0.191	4.5	177	0.655	<0.00988	28.8	14.4	37.5	7.77	<0.0130	<0.0206	23.1	0.397	<0.175	<0.0987	41.9	159	All ND	<0.11	All ND
	K-54-DP11-5	5	09/14/04	**48.4**	<0.191	6.52	227	0.47	<0.00988	17	10.1	31	3.01	<0.0130	<0.0206	13.3	0.911	<0.175	<0.0987	22.9	70.3	All ND	<0.11	All ND
	K-54-DP11-10	10	09/14/04	**28.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP11-20	20	09/14/04	**36.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP12	K-54-DP12-0.5	0.5	09/14/04	<5.94	<0.191	2.53	103	0.488	<0.00988	22.6	10.8	20.3	5.11	<0.0130	<0.0206	17.4	<0.0209	<0.175	<0.0987	36.7	51.5	All ND	<0.11	All ND
	K-54-DP12-5	5	09/14/04	<5.94	<0.191	2.97	109	0.511	<0.00988	23.8	11.4	21.2	5.67	<0.0130	<0.0206	18.8	<0.0209	<0.175	<0.0987	39.6	60.3	All ND	<0.11	All ND
	K-54-DP12-10	10	09/14/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP12-20	20	09/14/04	**66.9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP14	K-54-DP14-0.5	0.5	09/14/04	**129**	<0.191	3.08	122	0.535	<0.00988	26.5	11.8	22.8	6.27	<0.0130	<0.0206	20.3	<0.0209	<0.175	<0.0987	41.8	58.7	All ND	<0.11	All ND
	K-54-DP14-5	5	09/14/04	**64.9**	<0.191	2.95	120	0.527	<0.00988	24.2	11.3	22.4	5.13	<0.0130	<0.0206	19	<0.0209	<0.175	<0.0987	39.9	54.6	All ND	<0.11	All ND
	K-54-DP14-10	10	09/14/04	**310**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP14-20	20	09/14/04	**462**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP15	K-54-DP15-0.5	0.5	09/13/04	**347**	<0.191	2.93	108	0.525	<0.00988	21.7	11	21.9	5.22	<0.0130	<0.0206	17.7	<0.0209	<0.175	<0.0987	37.9	54.9	All ND	<0.11	All ND
	K-54-DP15-5	5	09/13/04	**357**	<0.191	4.95	126	0.591	<0.00988	25	12.6	26.3	5.89	<0.0130	<0.0206	20.9	0.26	<0.175	<0.0987	44.7	62.5	All ND	<0.11	All ND
	K-54-DP15-10	10	09/13/04	**3,760**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP15-20	20	09/13/04	**4,510**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP16	K-54-DP16-0.5	0.5	09/13/04	<5.94	<0.191	4.74	108	0.544	<0.00988	24.1	14.1	25.2	6.17	<0.0130	<0.0206	20.5	<0.0209	<0.175	<0.0987	42.3	59.6	All ND	<0.11	All ND
	K-54-DP16-5	5	09/13/04	<5.94	<0.191	2.31	97	0.457	<0.00988	19.1	9.92	19	4.67	<0.0130	<0.0206	15.8	<0.0209	<0.175	<0.0987	34.2	46.9	All ND	<0.11	All ND
	K-54-DP16-10	10	09/13/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP16-20	20	09/13/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-DP19	K-54-DP19-0.5	0.5	09/14/04	**40.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP19-5	5	09/14/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP19-10	10	09/14/04	**67.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP19-20	20	09/14/04	**49.8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-

TABLE 5-8
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	VOCs (µg/kg)	1,4-Dioxane (mg/kg)	SVOCs(mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	160	-
K-54-DP20	K-54-DP20-0.5	0.5	09/14/04	**20.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP20-5	5	09/14/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP20-10	10	09/14/04	**504**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	<0.11	All ND
	K-54-DP20-20	20	09/14/04	**161**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND	-	-
K-54-HA1	K-54-HA1-0.5	0.5	09/20/04	<5.94	<0.191	1.55	117	0.469	<0.00988	22.7	11.1	23.8	14.3	<0.0130	<0.0206	17.3	<0.0209	<0.175	<0.0987	38.4	70.7	All ND	<0.11	All ND
	K-54-HA1-5	5	09/20/04	<5.94	<0.191	1.81	105	0.437	<0.00988	19.8	9.89	19	4.51	<0.0130	<0.0206	15.6	<0.0209	<0.175	<0.0987	35.6	46.7	All ND	<0.11	All ND

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
mg/kg - Concentration in milligrams per kilogram.
Metals - California Title 22 Metals.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
"<" - Indicates concentration below indicated method detection limit.
"-" - Sample not analyzed for analyte.

"B" - The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination. The result is considered not to have originated from the environmental sample, because cross-contamination is suspected.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"U" - The analyte was not detected above the method detection limit (MDL).
"UJ" - The analyte was not detected above the MDL. However, the MDL may be elevated above the reported detection limit.
"c" -The MS and/or MSD recoveries were outside control limits.
"f" - The duplicate/replicate sample's relative percent difference (RPD) was outside the control limit.
"d" - The laboratory control sample recovery was outside control limits.
"k" - The analyte was found in a field blank.
"ND" - Concentration of analyte(s) was not detected above the MDL.

TABLE 5-9
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring/ Well No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/L)	VOCs (µg/L)														
					Acetone	2-Butanone (MEK)	Benzene	Carbon Disulfide	Chloromethane	Chloroform	Ethylbenzene	2-Hexanone	Methylene Chloride	Styrene	Toluene	Trichloroethene	Tetrachloroethene	m,p-Xylene	o-Xylene
California MCL:				6	-	-	1	-	-	80	300	-	5	100	150	5	5	1,750	
California DWNL:					-	-	-	160	-	-	-	-	-	-	-	-	-	-	-
GRAB SAMPLES																			
K-54-SB111	K-54-GW111-118	118	10/23/08	**350**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	**1.4**	<0.17	<0.36	<0.41
K-54-SB113	K-54-SB113-GW-105'	105	11/25/08	**460**	<5.0	<1.2	**0.20 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.24 Jq**	**8.2**	<0.17	<0.36	<0.41
K-54-SB114	K-54-SB114B-72-GW	72	09/18/08	**870 Jf**	<5.0	<1.2	**0.16 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.22 Jq**	<0.17	<0.17	<0.36	<0.41
K-54-SB116	K-54-SB116-GW-96'	96	09/24/08	**610**	**52**	**12**	**0.20 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
K-54-SB117	K-54-SB117-GW-74'	74	10/02/08	**290**	**13**	**2.5 Jq**	**0.44 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.43 Jq**	<0.17	<0.17	<0.36	<0.41
K-54-SB118	K-54-SB118-GW62'	62	10/03/08	**6,700**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
K-54-SB119	K-54-SB119-GW-78'	78	10/15/08	**390**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
K-54-SB120	K-54-SB120-GW-68'	68	10/17/08	**59,000**	**6.9**	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	**0.20 Jq**	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
K-54-SB121	K-54-SB121-GW-66'	66	10/20/08	**780**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	**16**	<0.17	<0.36	<0.41
K-54-SB123	K-54-SB123-GW-60.6'	60.6	10/27/08	**110,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
K-54-SB124	K-54-SB124-GW-72.2	72.2	11/12/08	**720,000**	<5.0	<1.2	**0.50**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.63**	<0.17	**0.21 Jq**	<0.36	<0.41
K-54-SB125	K-54-SB125-GW-64.21'	64.21	11/12/08	**86,000**	**21**	**4.5**	**0.29 Jq**	<0.36	<0.36	<0.17	**0.74**	<1.2	<0.15	<0.22	**1.0**	<0.17	**3.2**	**4.2**	**2.9**
K-54-SB126	K-54-SB126-GW-78.35'	78.35	12/01/08	**38**	**6.3**	<1.2	**0.26 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**1.1**	<0.17	<0.17	**0.61**	<0.41
K-54-SB127	K-54SB127-GW-90.84'	90.84	12/01/08	<0.071	**26**	<6.1	<0.71	<1.8	<1.8	<0.84	<1.3	<6.0	<0.77	<1.1	<1.1	<0.83	<0.84	<1.8	<2.0
K-54-SB128	K-54-SB128-GW-83.62	83.62	11/14/08	**440**	<5.0	<1.2	**0.35 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.37 Jq**	<0.17	<0.17	<0.36	<0.41
K-54-SB129	K-54-SB129-GW-74.6	74.6	11/13/08	**190**	<5.0	<1.2	**0.25 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.27 Jq**	<0.17	<0.17	<0.36	<0.41
K-54-SB130	K-54-SB130-GW-72.2'	72.2	11/13/08	**29**	<5.0	<1.2	**0.37 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.53**	<0.17	<0.17	<0.36	<0.41
K-54-SB131	K-54-SB131-GW-69.31'	69.31	11/13/08	**230**	<5.0	<1.2	**0.15 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	**1.7**	**0.37 Jq**	<0.36	<0.41
K-54-SB132	K-54-SB132-GW-61.15'	61.15	12/09/08	**54,000**	**8.1**	<1.2	**0.41 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.55**	<0.17	<0.17	<0.36	<0.41
K-54-SB133	K-54-SB133-GW-66.6'	66.6	12/08/08	**6,500**	<5.0	<1.2	**0.44 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.65**	**3.5**	<0.17	<0.36	<0.41
TT-MW2-30A/B/C	K-54-W102GW67	67	09/17/08	**170,000**	**11**	**2.8 Jq**	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
	K-54-W102GW81	81	09/17/08	**230,000**	**10**	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**8.5**	<0.17	<0.17	<0.36	<0.41
	K-54-W102-GW101	101	09/18/08	**30,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
	K-54-W102-GW116	116	09/19/08	**24,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**2.8**	<0.17	<0.17	<0.36	<0.41
	K-54-PWL-2-GW-139	139	09/22/08	**34,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	**0.22 Jq**	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
	K-54-W102-GW-157	157	09/23/08	**11,000**	**8.0**	**1.8 Jq**	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.83**	<0.17	<0.17	<0.36	<0.41
	K-54-W102-GW-175	175	09/24/08	**26,000**	**28**	<2.4	<0.28	<0.71	<0.72	<0.33	<0.53	<2.4	0.35 BJkq	<0.45	**0.50 Jq**	<0.33	**1.2**	<0.72	<0.82
	K-54-W102-GW-195	195	09/24/08	**33,000**	**12**	**2.4 Jq**	**0.17 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	0.22 BJkq	<0.22	**0.60**	<0.17	**0.17 Jq**	<0.36	<0.41
	K-54-W102-GW200	200	10/14/08	**920 Jf**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W102-GW-227-GRAB	227	10/15/08	**40,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W102-GW-227-GRAB1	227	10/16/08	**3,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W102-GW-227-GRAB2	227	10/16/08	**1,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W102-TEMPWELL	227	10/17/08	**2,100**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**2.3**	<0.17	<0.17	<0.36	<0.41
TT-MW2-38A/B/C	K-54-W109-GW-70'	70	02/24/09	**130,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-GW-94'	94	02/24/09	**6,800**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K-54-W109-GW-125'	125	02/26/09	**11,000**	<5.0	**1.3 Jq**	**0.23 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
	K-54-W109-GW170'	170	02/27/09	**20,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
	K-54-W109-GW192'	192	03/02/09	**9,300**	<5.0	<1.2	**0.40 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.39 Jq**	<0.17	<0.17	<0.36	<0.41
	K-54-W109-GW220'	220	03/02/09	**270**	**5.2**	**2.9 Jq**	**1.7**	<0.36	**2.5**	<0.17	**0.37 Jq**	**2.6 Jq**	<0.15	<0.22	**1.3**	<0.17	<0.17	0.69	**0.43 Jq**
TT-MW2-39	K-54-W108-GW-63	63	02/19/09	**100,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41

TABLE 5-9
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Area K (Southern Test Bay Canyon)

Boring/ Well No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/L)	VOCs (µg/L) Acetone	2-Butanone (MEK)	Benzene	Carbon Disulfide	Chloromethane	Chloroform	Ethylbenzene	2-Hexanone	Methylene Chloride	Styrene	Toluene	Trichloroethene	Tetrachloroethene	m,p-Xylene	o-Xylene
California MCL:				6	-	-	1	-	-	80	300	-	5	100	150	5	5	1,750	
California DWNL:					-	-	-	160	-	-	-	-	-	-	-	-	-	-	-
TT-MW2-40A/B/C	K-54-W107-GW78'	78	02/18/09	**230**	**17**	**5.0**	**0.24 Jq**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.41 Jq**	<0.17	<0.17	<0.36	<0.41
	K-54-W107-GW106'	106	02/19/09	**150**	<5.0	<1.2	**0.6**	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**1.2**	<0.17	<0.17	<0.36	<0.41
	K-54-W107-GW175	175	02/20/09	**200**	**20**	**5.3**	**0.25 Jq**	<0.36	<0.36	<0.17	<0.26	**1.7 Jq**	<0.15	<0.22	0.28 BJkq	<0.17	<0.17	<0.36	<0.41
	K-54-W107-GW210	210	03/03/09	**210**	**13**	**5.4**	**6.5**	<0.36	<0.36	<0.17	**0.57**	**1.7 Jq**	<0.15	**0.32 Jq**	**5.0**	<0.17	<0.17	**0.89**	**0.53**
	K-54-W107-GW226	226	03/10/09	**0.86**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
MONITORING WELL SAMPLES																			
TT-MW2-30A	TT-MW2-30A	116 - 126	02/13/09	**28,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
	TT-MW2-30A		03/20/09	**31,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
TT-MW2-30B	TT-MW2-30B	144 - 154	02/13/09	**14,000**	<5.0	<1.2	<0.14	<0.36	<0.36	**0.27 Jq**	<0.26	<1.2	<0.15	<0.22	**0.34 Jq**	<0.17	<0.17	<0.36	<0.41
	TT-MW2-30B		03/20/09	**7,400**	<5.0	<1.2	<0.14	**0.97**	<0.36	**0.33 Jq**	<0.26	<1.2	<0.15	<0.22	**0.29 Jq**	<0.17	<0.17	<0.36	<0.41
TT-MW2-30C	TT-MW2-30C	225 - 230	02/13/09	**9.9**	<5.0	<1.2	<0.14	**0.94**	**0.37 Jq**	<0.17	<0.26	<1.2	<0.15	<0.22	**8.0**	<0.17	<0.17	<0.36	<0.41
	TT-MW2-30C		03/19/09	<0.35	**7.5**	**1.5 Jq**	**0.14 Jq**	**2.8**	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**7.3**	<0.17	<0.17	<0.36	<0.41
TT-MW2-38A	TT-MW2-38A	57 - 77	03/26/09	**5,500**	<5.0	<1.2	<0.14	<0.36	<0.36	**0.37 Jq**	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
	TT-MW2-38A		04/29/09	**76,000**	<5.0	<1.2	<0.14	<0.36	<0.36	**0.18 Jq**	<0.26	<1.2	<0.15	<0.22	**0.26 Jq**	<0.17	<0.17	<0.36	<0.41
TT-MW2-38B	TT-MW2-38B	173 - 178	03/26/09	**32,000**	8.4 Bk	**2.2 Jq**	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.45 Jq**	<0.17	<0.17	<0.36	<0.41
	TT-MW2-38B		04/29/09	**22,000**	**11**	**2.2 Jq**	**0.15 Jq**	**0.99**	**0.36 Jq**	<0.17	<0.26	<1.2	<0.15	<0.22	**0.8**	<0.17	<0.17	<0.36	<0.41
TT-MW2-38C	TT-MW2-38C	217 - 227	03/26/09	**4,200**	7.8 Bk	**2.1 Jq**	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	**0.32 Jq**	<0.17	<0.17	<0.36	<0.41
	TT-MW2-38C		04/29/09	**37**	**7.3**	**1.2 Jq**	<0.14	**1.9**	<0.36	<0.17	<0.26	<1.2	0.16 BJaq	<0.22	**0.85**	<0.17	<0.17	<0.36	<0.41
TT-MW2-39	TT-MW2-39	61.2 - 76.2	03/20/09	**110,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
	TT-MW2-39		04/29/09	**110,000**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
TT-MW2-40A	TT-MW2-40A	101 - 106	04/28/09	<0.071	**7.0**	<1.2	**0.14 Jq**	<0.36	<0.36	**0.50**	<0.26	<1.2	0.15 BJaq	<0.22	**0.45 Jq**	<0.17	<0.17	<0.36	<0.41
	TT-MW2-40A		05/04/09	<0.071	**7.2**	<1.2	<0.14	<0.36	<0.36	**0.29 Jq**	<0.26	<1.2	<0.15	<0.22	<0.22	<0.17	<0.17	<0.36	<0.41
TT-MW2-40B	TT-MW2-40B	168 - 178	04/28/09	<0.071	**26**	6.4 Bk	**22**	<0.36	**0.79**	<0.17	**1.3**	**2.0 Jq**	<0.15	**0.84**	**12**	<0.17	<0.17	**1.8**	**1.3**
	TT-MW2-40B		05/04/09	<0.071	**30**	**7.4**	**8.0**	<0.36	**0.61**	<0.17	<0.26	**1.6 Jq**	<0.15	<0.22	**1.7**	<0.17	<0.17	<0.36	<0.41
TT-MW2-40C	TT-MW2-40C	224 - 229	04/27/09	**8.1**	6.3 Bk	<1.2	**0.68**	**0.80**	<0.36	**1.4**	<0.26	<1.2	0.18 BJaq	<0.22	**0.48 Jq**	<0.17	<0.17	<0.36	<0.41
	TT-MW2-40C		05/04/09	**12**	**5.1**	**1.4 Jq**	**0.43 Jq**	**0.66**	<0.36	**0.90**	<0.26	<1.2	<0.15	<0.22	**0.31 Jq**	<0.17	<0.17	<0.36	<0.41

Notes:

Bold - Indicates concentrations detected above the method detection limit.
MCL - California Maximum Contaminant Level (February 4, 2010).
DWNL - California Drinking Water Notification Level (December 14, 2007).
VOCs - Volatile organic compounds.
µg/L - Micrograms per liter.
bgs - Below ground surface.
"<" - Indicates concentration below indicated method detection limit.
"-" - not analyzed or not available.

"B" - The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination. The result is considered not to have originated from the environmental sample, because cross-contamination is suspected
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"a" - The analyte was found in the method blank.
"f" - The duplicate/replicate sample's relative percent difference (RPD) was outside the control limit
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).

- Collecting grab groundwater samples from the primary soil borings, and installing three additional groundwater monitoring wells adjacent to TT-MW2-14 to further characterize perchlorate impacts in groundwater
- Drilling 2 primary soil borings (K-54-SB109 and K-54-SB110) assess potentially elevated barium and zinc concentrations in the area of boring K-54-DP11.

Based on the results from the primary borings and wells, 14 additional soil borings (K-54-SB119 to K-54-SB121 and K-54-SB123 to K-54-SB133) and 7 additional groundwater monitoring wells (TT-MW2-38A, B, and C; TT-MW2-39; and TT-MW2-40A, B, and C) were installed in southern Test Bay Canyon. Soil samples were also collected from the boreholes for wells TT-MW2-39 and TT-MW2-40A, B, and C.

5.4.2.2.3 Geology and Hydrogeology

The surface geology of southern Test Bay Canyon is shown in Figure 5-18. An incised drainage extends along the midline of the canyon from a point southeast of the Prism to Laborde Canyon. Alluvium underlies most of the canyon floor. Colluvium underlies the three small side canyons where Test Bay 1, Test Bay 2, and Test Bay 3 are located, and forms aprons at the base of some hillsides. The hillsides consist of STF. Two areas of artificial fill are present: the Prism, and a berm located southeast of Test Bay 3. The berm was partially removed in 2003 and the soil was used to backfill Test Bays 1, 2, 3, and the Small Bunker.

The southern portion of Test Bay Canyon has been extensively reshaped by grading, much of which appears to have been related to construction of the Prism. The ground surface surrounding the Prism has an anomalously shallow slope, and a cut slope up to ten feet high truncates the front of Test Bay 1 and an asphalt-paved area in front of the Large Bunker to the north. Test Bay 1 and the Large Bunker were no longer in use by the time that the Prism was constructed in the late 1980s. In addition, the incised drainage running through the canyon center rapidly shallows and then surfaces south of the Prism, also consistent with grading in this area. The northern limit of the borrow area for the Prism appears to extend to the north of wells TT-MW2-36A, B, and C. It is likely that grading was also conducted during original construction of the test bays, but evidence of earlier grading, if any, been obscured by subsequent grading for construction of the Prism.

Figure 5-19 (cross-section A’-A’’) shows the subsurface geology along the length of Test Bay Canyon; Figures 5-20, 5-21, and 5-22 (cross-sections D-D’, E-E’, and F-F’) show the subsurface geology across Test Bay 1, Test Bay 2, and Test Bay 3, respectively. The STF consists of north-dipping, interfingering beds of sandstone and mudstone to a depth of 253 feet bgs, the maximum depth explored.

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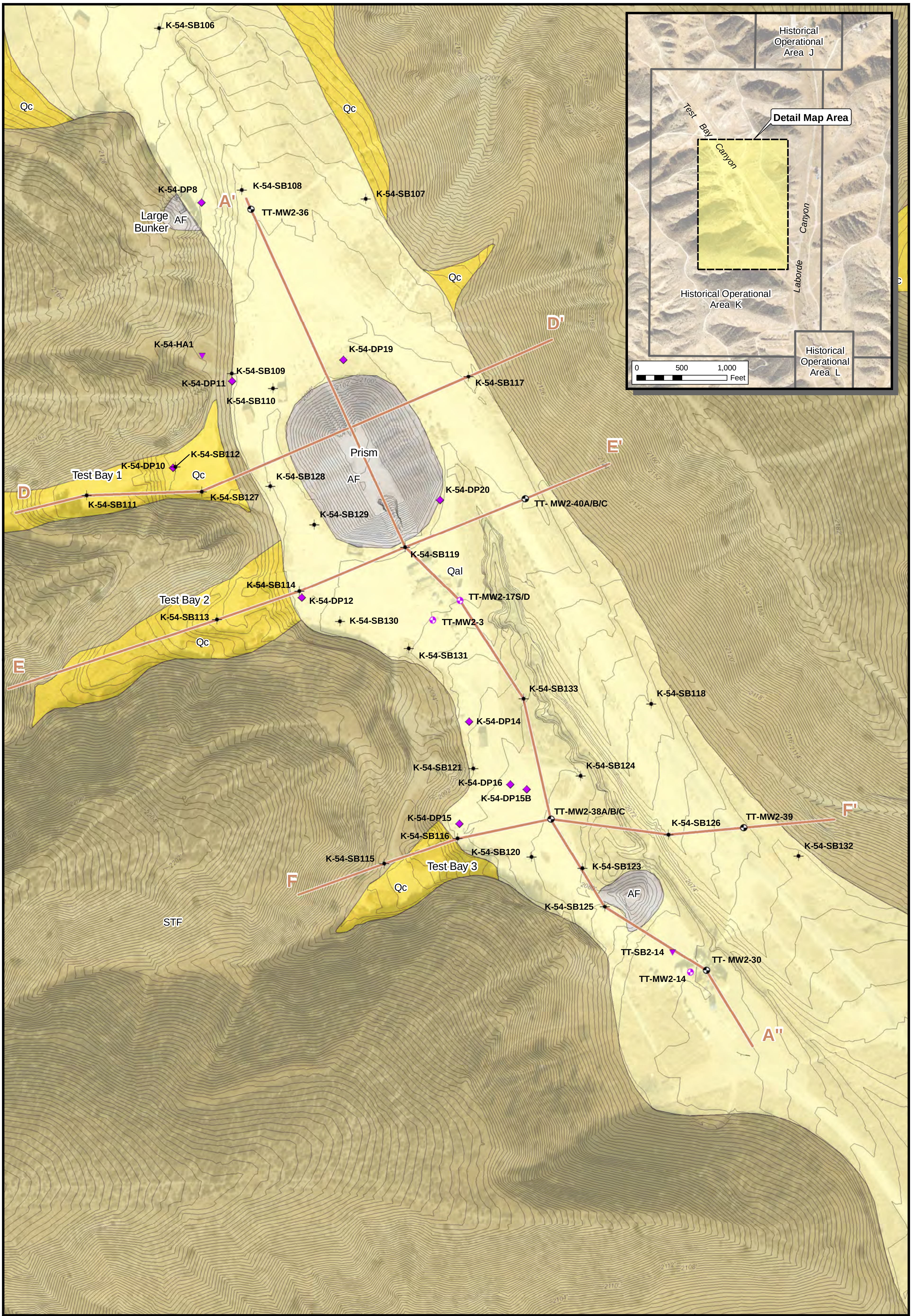

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DSI Soil Sample Location	Geologic Cross Section Location	AF	Artificial Fill
DSI Sample Location/Well	Contact (dashed where inferred)	Qal	Alluvium
Previous Soil Sample Location	Ground Surface Elevation Contour (2-foot interval - feet msl)	Qc	Colluvium
Previous Soil/Soil Gas Sample Location		STF	San Timoteo Formation
Previous Sample Location/Well			

N

0 50 100 Feet

Beaumont Site 2

Figure 5-18
Surface Geology
Southern Test Bay Canyon
Historical Operational Area K

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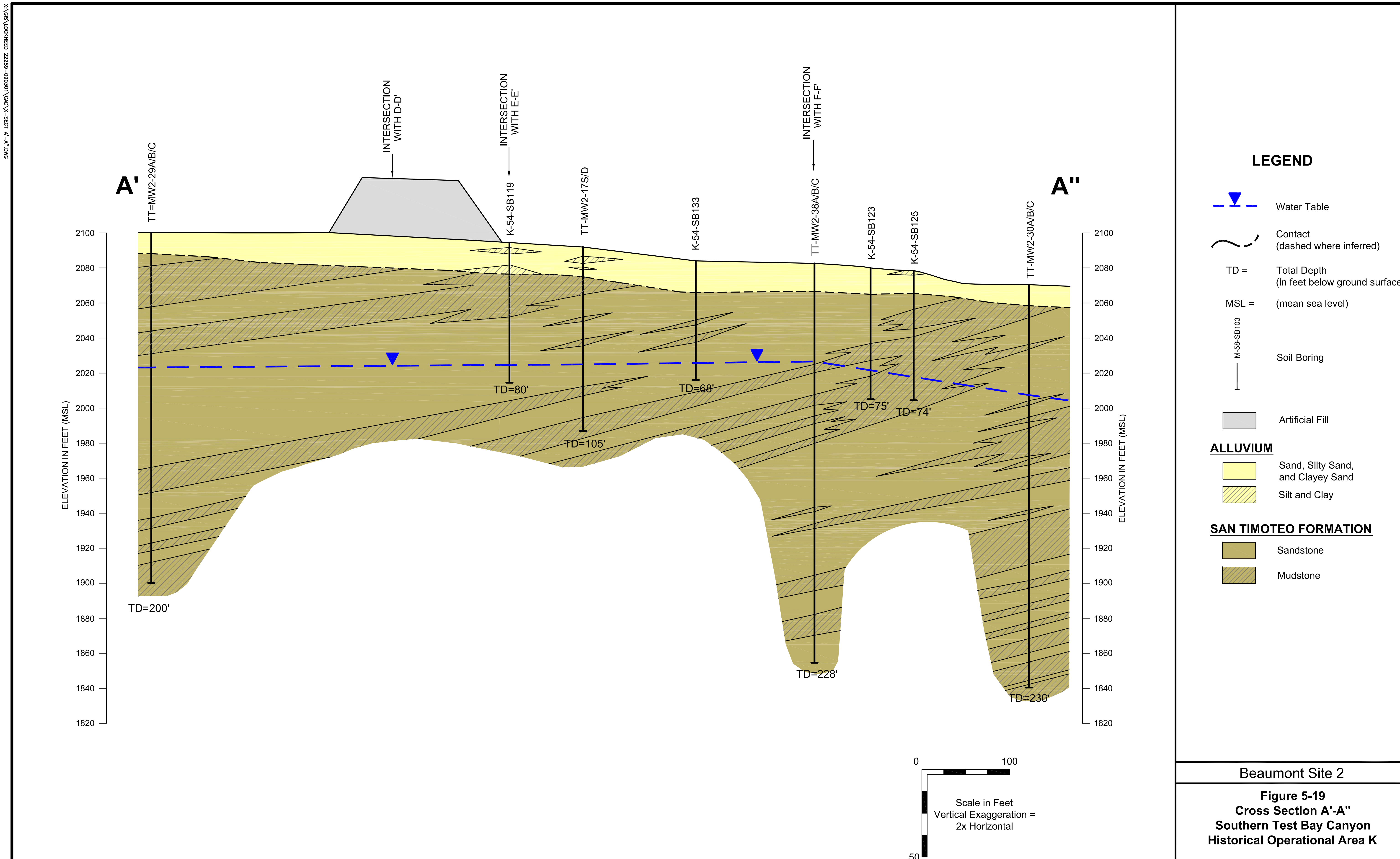

Beaumont Site 2

Figure 5-19
Cross Section A'-A"
Southern Test Bay Canyon
Historical Operational Area K

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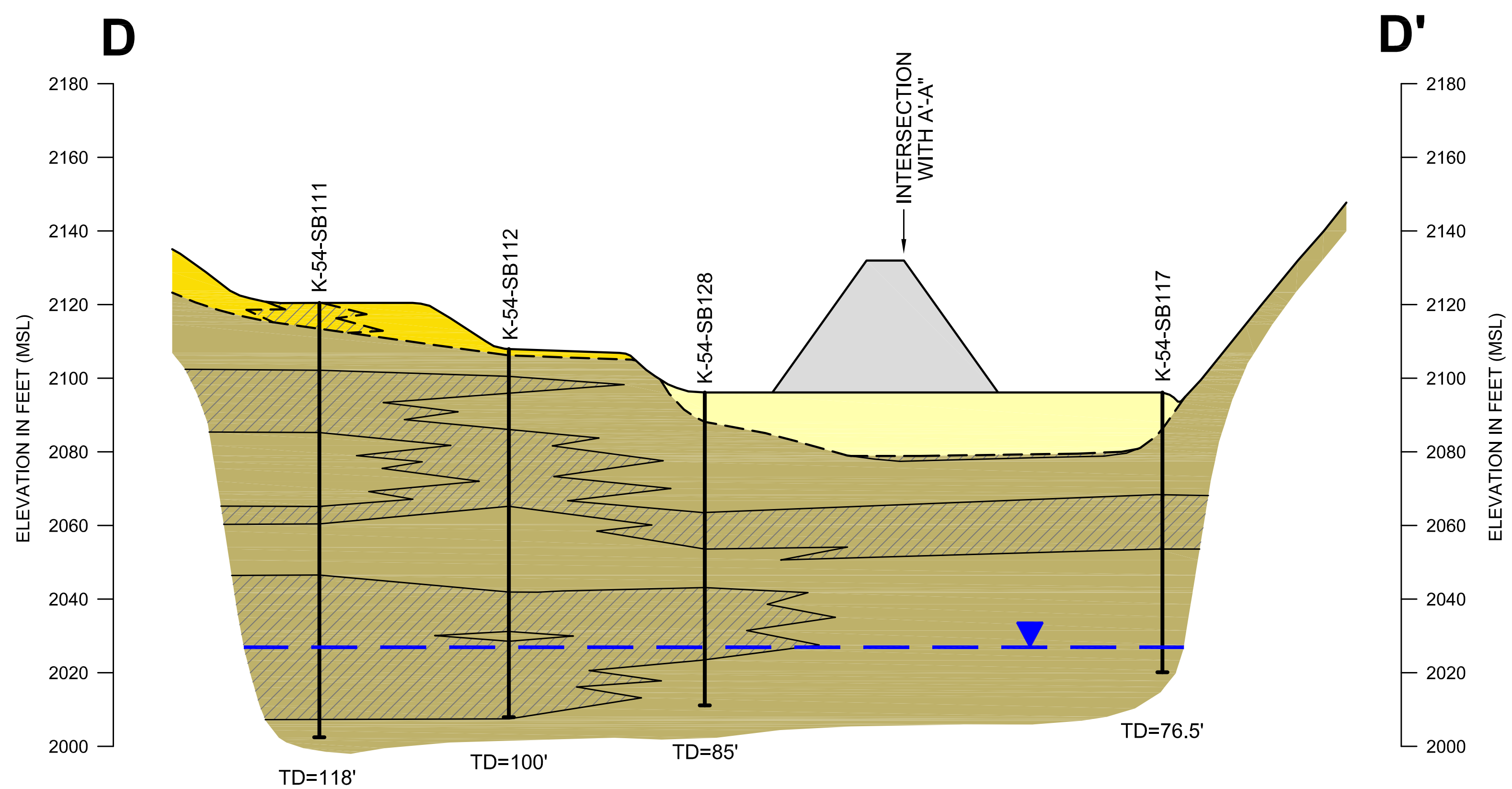

LEGEND

Water Table

Contact (dashed where inferred)

TD = Total Depth (in feet below ground surface)

MSL = (mean sea level)

Soil Boring (M-58-SB103)

Artificial Fill

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

COLLUVIUM

Sand, Silty Sand, and Clayey Sand

Silt and Clay

SAN TIMOTEO FORMATION

Sandstone

Mudstone

0 100 50

Scale in Feet
Vertical Exaggeration = 2x Horizontal

Beaumont Site 2

Figure 5-20
Cross Section D-D'
Southern Test Bay Canyon
Historical Operational Area K

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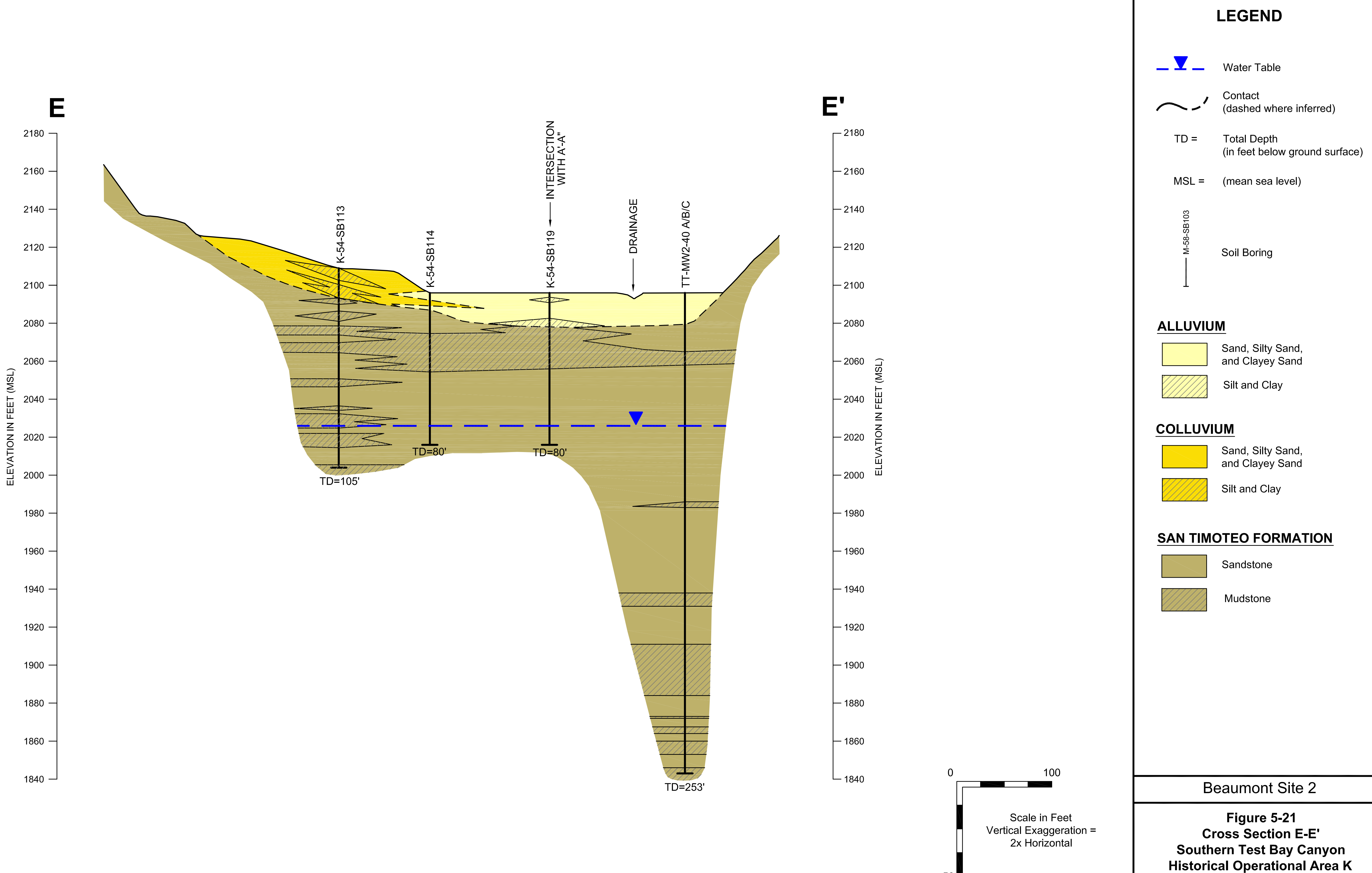

Beaumont Site 2

Figure 5-21
Cross Section E-E'
Southern Test Bay Canyon
Historical Operational Area K

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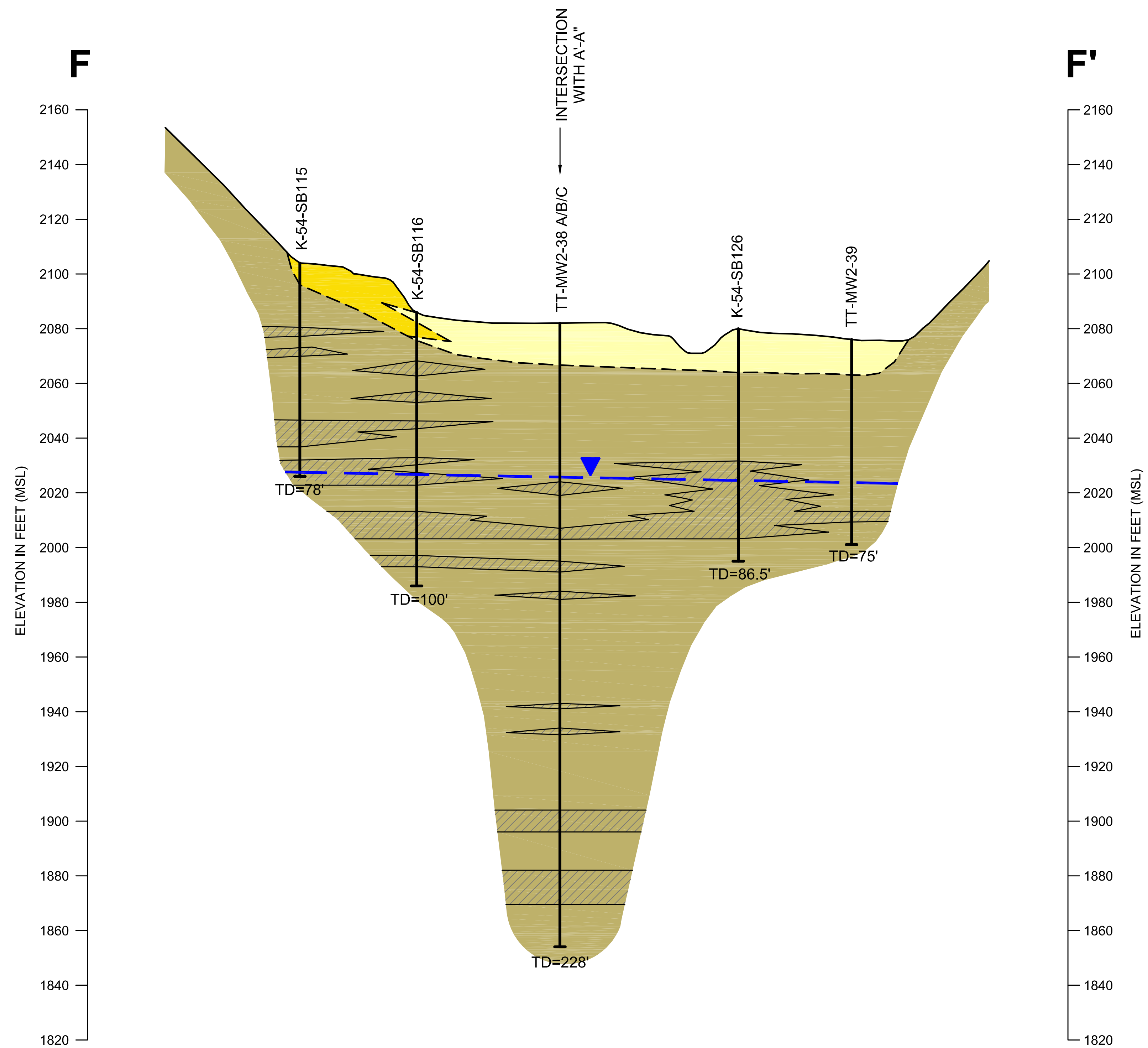


LEGEND

Water Table

Contact (dashed where inferred)

TD = Total Depth (in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

COLLUVIUM

Sand, Silty Sand, and Clayey Sand

SAN TIMOTEO FORMATION

Sandstone

Mudstone

Beaumont Site 2

Figure 5-22
Cross Section F-F'
Southern Test Bay Canyon
Historical Operational Area K

TETRA TECH

Depths to groundwater in shallow wells TT-MW2-14, TT-MW2-17S, TT-MW2-38A, and TT-MW2-39 were 63.4 feet bgs, 67.7 feet bgs, 56.3 feet bgs, and 58.3 feet bgs in May 2009. Cross-section A'-A'' (Figure 5-19) shows that the groundwater gradient to the north of TT-MW2-38A is very shallow, and becomes significantly steeper to the south. Vertical gradients between adjacent or nested wells are downward, ranging from -0.01 ft/ft between TT-MW2-17S and D, to -0.19 ft/ft between wells TT-MW2-38A and B.

5.4.2.2.4 Soil Sampling Results

Analytical results for perchlorate in soil are summarized in Table 5-8. A total of 446 soil samples have been analyzed for perchlorate in southern Test Bay Canyon, including 393 samples analyzed as part of the DSI and the 53 samples analyzed during previous investigations. Perchlorate was detected in 306 of the 393 samples analyzed as part of the DSI, at concentrations ranging from 4.2 to 130,000 µg/kg. The highest perchlorate concentrations were detected in boring K-54-SB116, located at Test Bay 3.

5.4.2.2.5 Groundwater Sampling Results

Analytical results for perchlorate in groundwater are summarized in Table 5-9. A total of 46 grab groundwater samples have been analyzed for perchlorate in southern Test Bay Canyon, including 45 samples analyzed as part of the DSI, and 1 sample analyzed during previous investigations. A total of 20 groundwater samples collected from the new monitoring wells were also analyzed for perchlorate as part of the DSI. Perchlorate was detected at concentrations exceeding the California MCL of 6 µg/L in 59 of the 66 groundwater samples analyzed. The detected perchlorate concentrations ranged from 0.86 to 720,000 µg/L. The highest perchlorate concentrations were found in a grab sample collected from boring K-54-SB124, located in the vicinity of Test Bay 3.

Benzene was detected at concentrations exceeding the California MCL of 1 µg/L in grab samples collected from the boreholes for wells TT-MW2-38A, B, and C, and TT-MW2-40A, B, and C. The benzene detections in the TT-MW2-38 grab samples were not confirmed in samples collected from wells TT-MW2-38A, B, or C. However, benzene was detected at concentrations of 22 and 8.0 µg/L in well TT-MW2-40B during the first and second DSI monitoring events, respectively. TCE was detected at concentrations of 8.2 and 16 µg/L in the grab samples collected from borings K-54-SB113 and K-54-SB121, respectively.

5.4.2.2.6 Discussion

Perchlorate in Soil

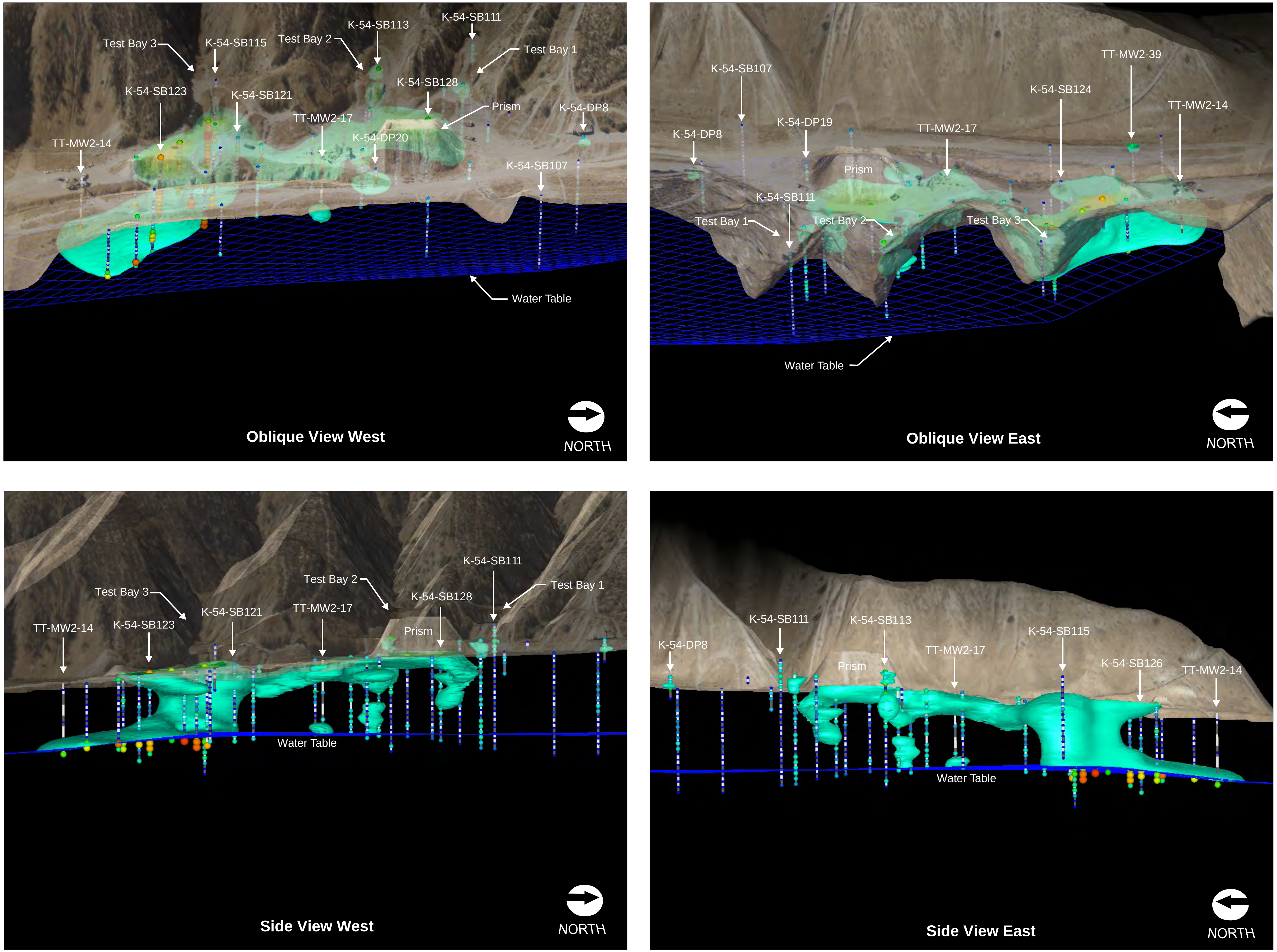
A 3-D geostatistical model of the perchlorate distribution in soil in southern Test Bay Canyon was generated using MVS. All of the previous and DSI data were used in the 3-D model. Figure 5-23 provides 3-D renderings showing the extent of perchlorate concentrations in soil greater than 100 µg/kg. In some areas, the model results show the perchlorate-impacted soil as consisting of disconnected segments. This is considered to be an artifact of the choice of 100 µg/kg as the cutoff concentration for defining the perchlorate-impacted soil; the segments become connected when lower cutoff concentrations are used.

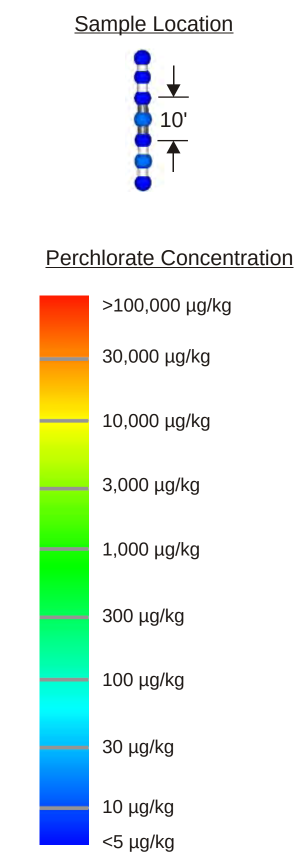
Significant features of the perchlorate-impacted soil illustrated in Figures 5-23 include the following:

- Perchlorate source areas appear to be present at Test Bays 1, 2, and 3. Table 5-8 shows that perchlorate concentrations in soil at Test Bays 1 and 2 are relatively low (maximum concentration of 1,700 µg/kg) compared with Test Bay 3 (maximum concentration of 130,000 µg/kg). Test Bay 3 is therefore considered to represent the primary perchlorate source area in southern Test Bay Canyon.
- The perchlorate source area consists of a broad area of near-surface impacts, which is largely restricted to depths of 15 feet bgs or less, and more limited areas of deep impacts near the three test bays. At Test Bay 3, the deep impacts extend across Test Bay Canyon at depth and then spread laterally near the water table to form a broad “tongue” extending down-canyon.
- The “tongue” area of the deep impacted soil at Test Bay 3 is only present near the water table. Perchlorate concentrations in groundwater in this area are in the range of 50,000 to 100,000 µg/L. Mass balance calculations indicate that the presence of perchlorate-impacted groundwater in the pore space of the soil can readily account for the perchlorate concentrations detected in soil samples collected near the water table. The “tongue” portion of the perchlorate-impacted soil may therefore be an artifact of proximity to the water table.

The areal extent of the shallow perchlorate-impacted soil is shown in Figure 5-24. Figure 5-24 was modeled with MVS using data collected at depths of 15 feet bgs or less. The shallow perchlorate impacts generally extend from the test bay areas on the western side of the canyon east to the incised drainage channel located near the midline of the canyon. To the south, the shallow impacts extend to the former berm located southeast of Test Bay 3. Both of these topographic features control surface water runoff. The shallow nature of the perchlorate impacts, and the apparent control of the surface impact geometry by topographic features which control surface water runoff, suggests that the shallow impacts may be a result of surface flooding by perchlorate-impacted water. Possible activities that could have resulted in surface flooding include rocket motor washout. The approximate area of shallow perchlorate impacts above 100 µg/kg is 87,600 square feet, or 2.0 acres.

The areal extent of the deep perchlorate-impacted soil is shown in Figure 5-25. Figure 5-25 was modeled with MVS, using data collected at depths greater than 15 feet bgs only. The largest area of deep impacted





Note:

µg/kg - micrograms per kilogram.
Diagrams not to scale.
2X vertical exaggeration.

Beaumont Site 2

Figure 5-23
3-D Renderings of Perchlorate in Soil Above 100 µg/kg - Southern Test Bay Canyon Historical Operational Area K

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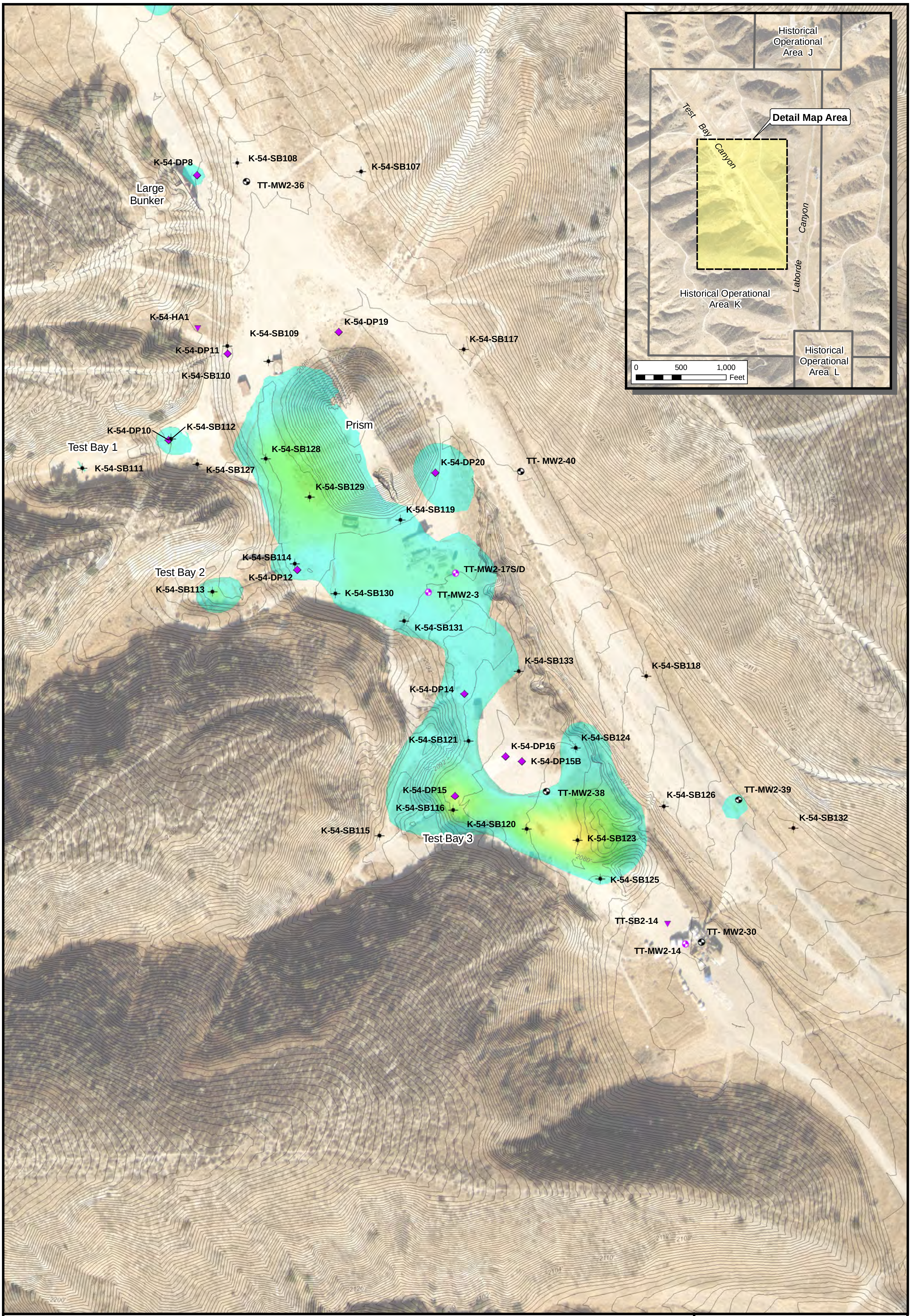
X:\GIS\Lockheed 22289-090301\Extent_K_South_Shallow.mxd



LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Perchlorate Concentration
>100,000 µg/kg
30,000 µg/kg
10,000 µg/kg
3,000 µg/kg
1,000 µg/kg
300 µg/kg
100 µg/kg
30 µg/kg
10 µg/kg

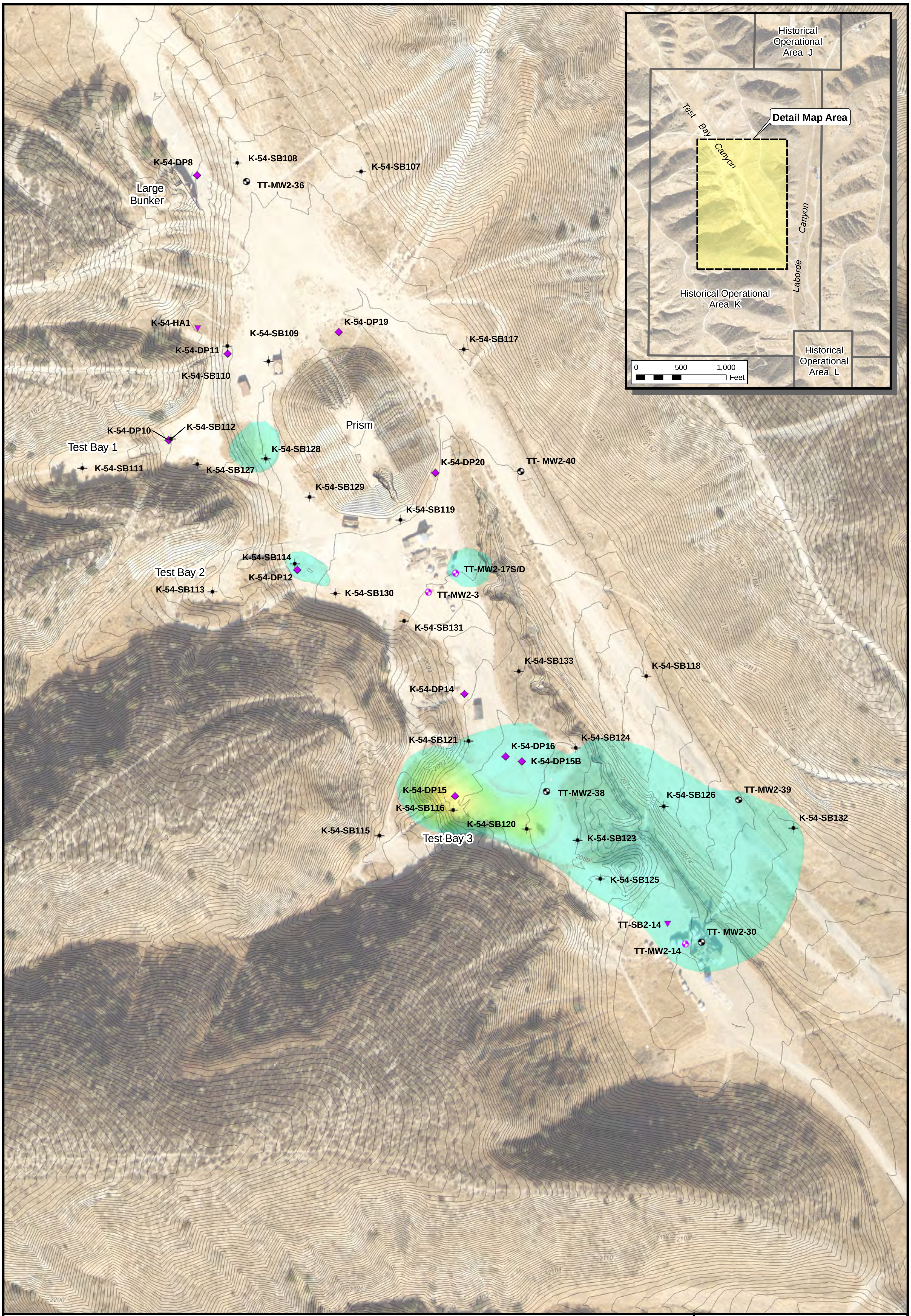
0 50 100 Feet

Beaumont Site 2

Figure 5-24
Extent of Perchlorate in Shallow Soil Above 100 µg/kg - Southern Test Bay Canyon Historical Operational Area K

TETRA TECH

X:\GIS\Lockheed 22289-090301\Extent_K_South_Deep.mxd



LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Perchlorate Concentration

- >100,000 µg/kg
- 30,000 µg/kg
- 10,000 µg/kg
- 3,000 µg/kg
- 1,000 µg/kg
- 300 µg/kg
- 100 µg/kg
- 30 µg/kg
- 10 µg/kg

0 50 100 Feet

Beaumont Site 2

Figure 5-25
Extent of Perchlorate in Deep Soil Above 100 µg/kg - Southern Test Bay Canyon Historical Operational Area K

TETRA TECH

soil is located near Test Bay 3, smaller impacted areas are also located near Test Bays 1 and 2. The area of deep perchlorate impacts above 100 µg/kg is approximately 71,800 square feet, or 1.6 acres. The “tongue” area noted above constitutes most of the impacted area.

Perchlorate concentration contours for soil at depths of 0.5, 10, 20, 40, and 60 feet bgs are shown in Figure 5-26. The extent of perchlorate concentrations greater than 100 µg/kg is largest at depths of 20 feet bgs and shallower, and at the 60 foot depth interval, which is just above the water table in this area of the Site. As previously mentioned, the “tongue” area is located at or immediately above the water table. The presence of groundwater with relatively high perchlorate concentrations in soil samples at or near water saturation can account for the perchlorate concentrations in the “tongue” area. Figure 5-26 shows that the extent of perchlorate in soil is well-constrained by the available data and the topography of the canyon at depths less than 60 feet bgs.

Perchlorate in Groundwater

Several strategies were used to model the distribution of perchlorate in groundwater in southern Test Bay Canyon. Initially, MVS was used to generate a 3-D geostatistical model, similar to the modeling done for the perchlorate impacted soil. Sections through the 3-D model were then generated, including a section which corresponded to the water table within Test Bay Canyon, and compared with the data. The fit between the available data for first groundwater and the concentration contours generated from the model at the plane of the water table was found to be good near the center of the canyon, but unacceptable near the plume margins. A reduced data set consisting only of samples considered to represent first groundwater was then modeled in a 2-dimensional (2-D) environment and compared with the available data. The fit between the 2-dimensional model and the data was considered to be good. The 2-D model, with slight modifications to more accurately depict concentrations in samples collected slightly below first water, is presented in Figure 5-27. A vertical profile through the 3-D groundwater model along a portion of cross-section A’-A’’, where the fit between the model and the data was considered to be good, is provided in Figure 5-28. Figure 5-28 also shows a vertical profile through the MVS 3-D impacted soil model, to display the spatial relationship between the perchlorate impacted soil and the perchlorate plume in groundwater. It should be noted that the soil and groundwater models were generated independently, so some amount of spatial mismatch between the soil and groundwater models is to be expected.

Figure 5-27 shows that the northern extent of the southern Test Bay Canyon groundwater plume is constrained by data for wells TT-MW2-36A, B, and C, and borings K-54-SB106 and K-54-SB107. The remainder of the plume is constrained primarily by the topography of Test Bay Canyon.

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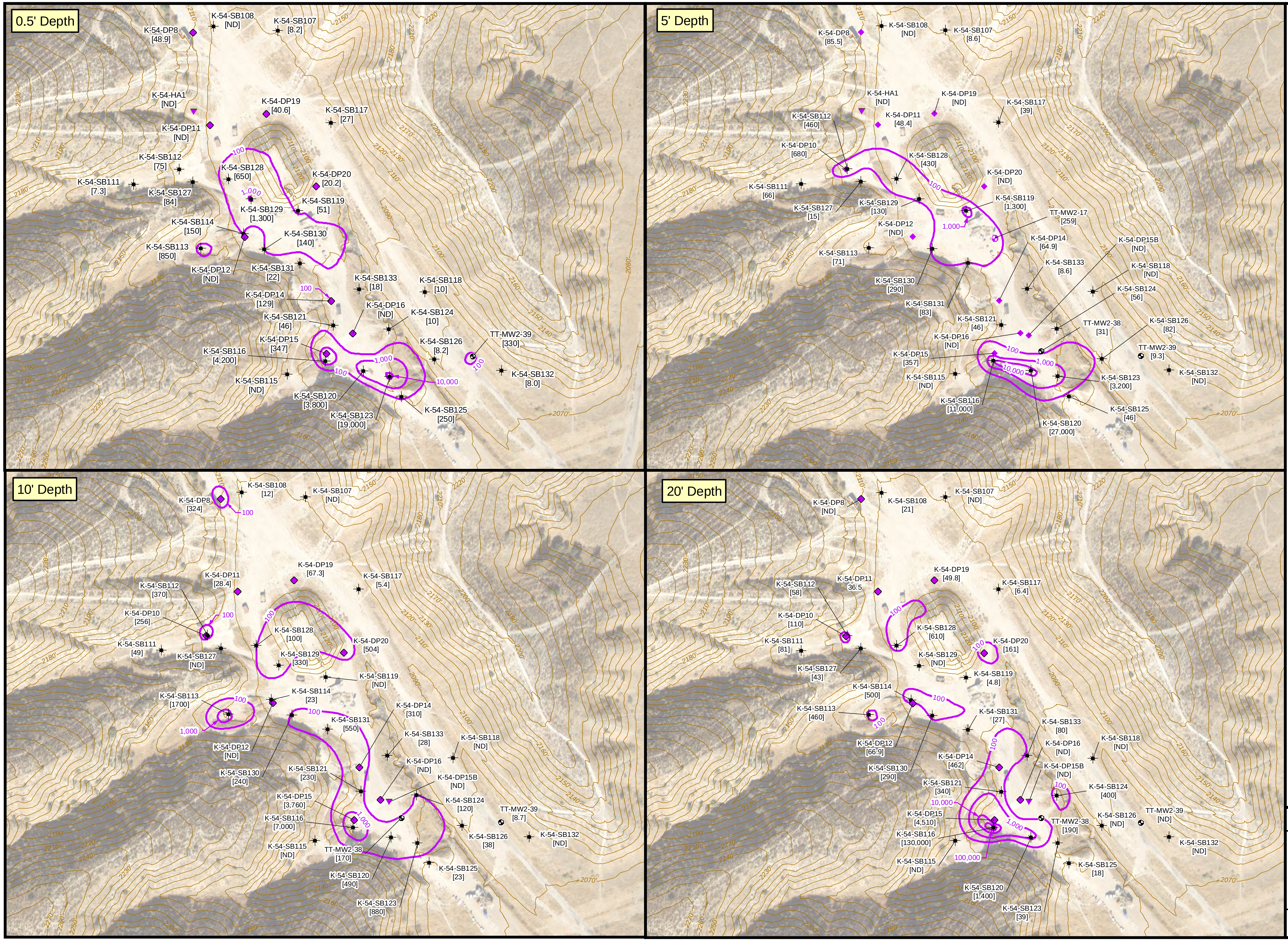


0 100 200 Feet

Adapted from: March 2007 aerial photograph.

LEGEND

- DSI Soil Sample Loaction
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour

Note:

[#] Perchlorate results in µg/kg.

[ND] Non-Detect.

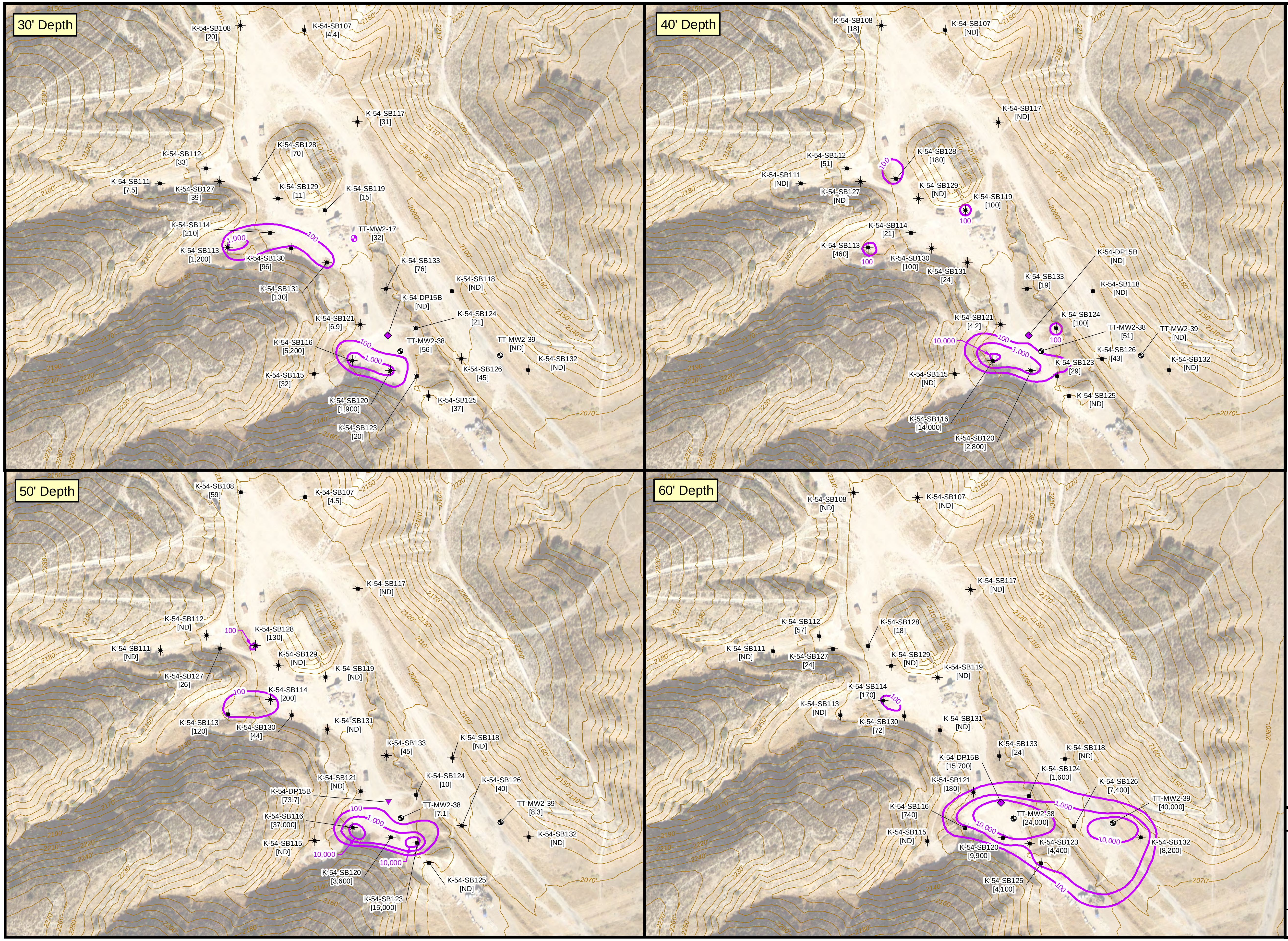
Beaumont Site 2

Figure 5-26

Perchlorate Concentrations in Soil Southern Test Bay Canyon Historical Operational Area K

TETRA TECH

X:\GIS\Lockheed 22289-090301\Isopleths_Test_Bay_South_2.mxd



Adapted from: March 2007 aerial photograph.

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil/Soil Gas Sample Location
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour

Note:

[#] Perchlorate results in µg/kg.

[ND] Non-Detect.

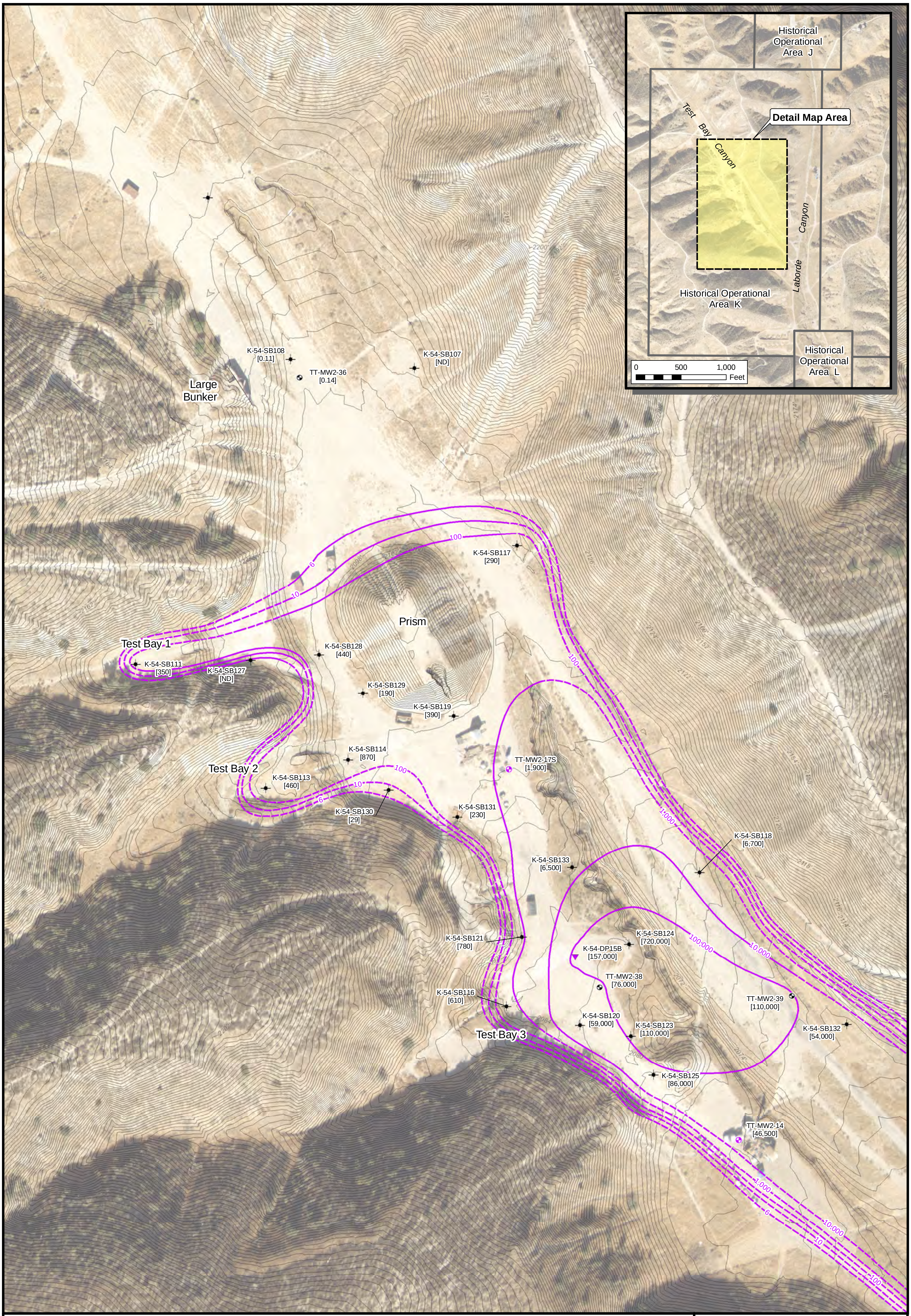
Beaumont Site 2

Figure 5-26 (cont.)

Perchlorate Concentrations in Soil Southern Test Bay Canyon Historical Operational Area K

TETRA TECH

X:\GIS\Lockheed 22289-09030\Extent_K_South_GW.mxd



LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Sample Location/Well
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Note:
[#] - Perchlorate in groundwater (µg/L).
[ND] - Non-detect.
µg/L - Micrograms per liter.

0 50 100 Feet

Beaumont Site 2

Figure 5-27
Perchlorate Concentrations in Groundwater Above 6 µg/L - Southern Test Bay Canyon Historical Operational Area K

TETRA TECH

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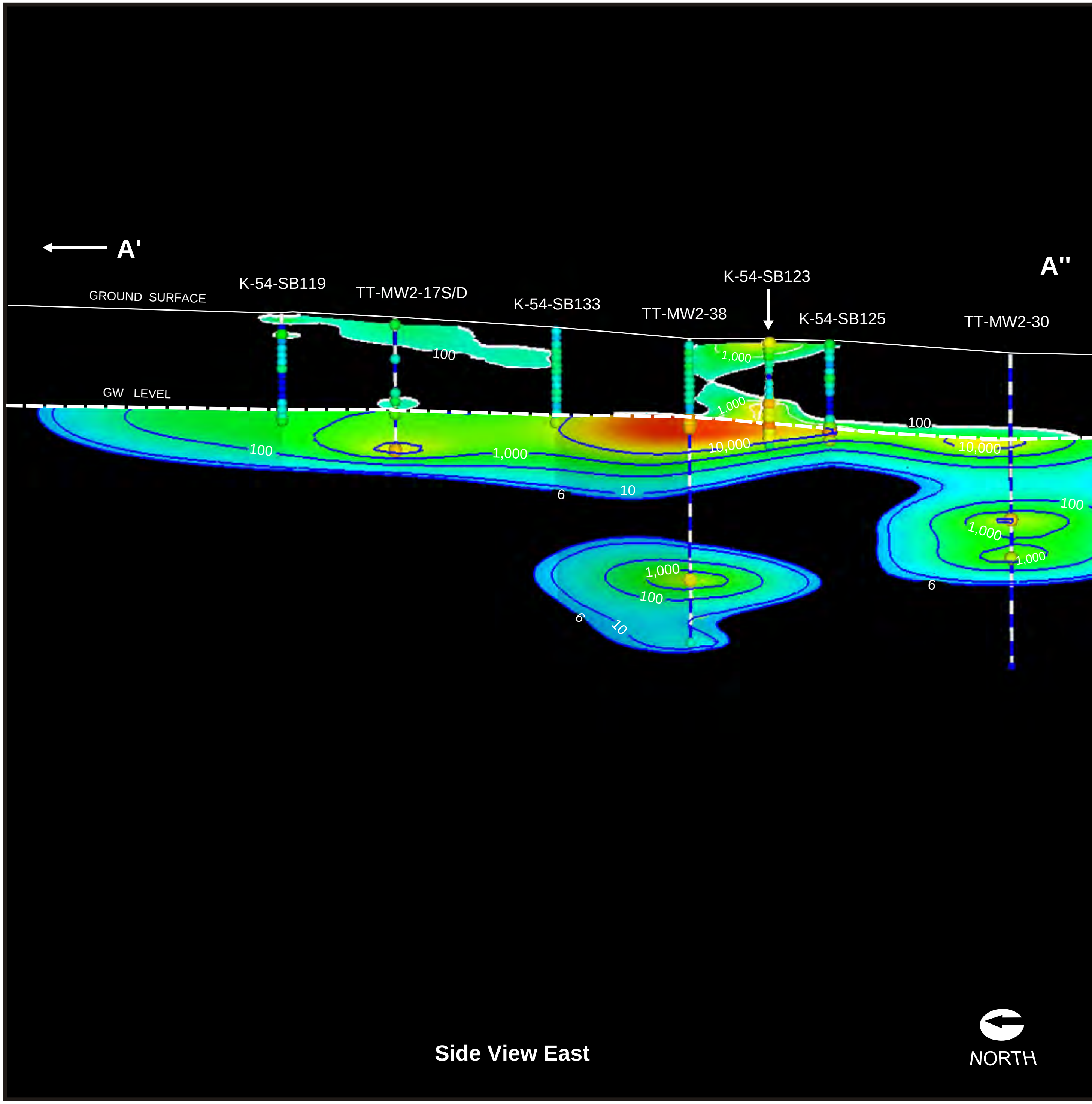


Perchlorate Concentration
(values in µg/kg and µg/L)

>100,000
30,000
10,000
3,000
1,000
300
100
30
10
6

Note:

µg/kg - micrograms per kilogram.
µg/L - micrograms per liter.
Diagrams not to scale.
No vertical exaggeration.

Beaumont Site 2

Figure 5-28
Vertical Profile of Perchlorate in Soil and Groundwater Cross Section A'-A'' - Southern Test Bay Canyon Historical Operational Area K

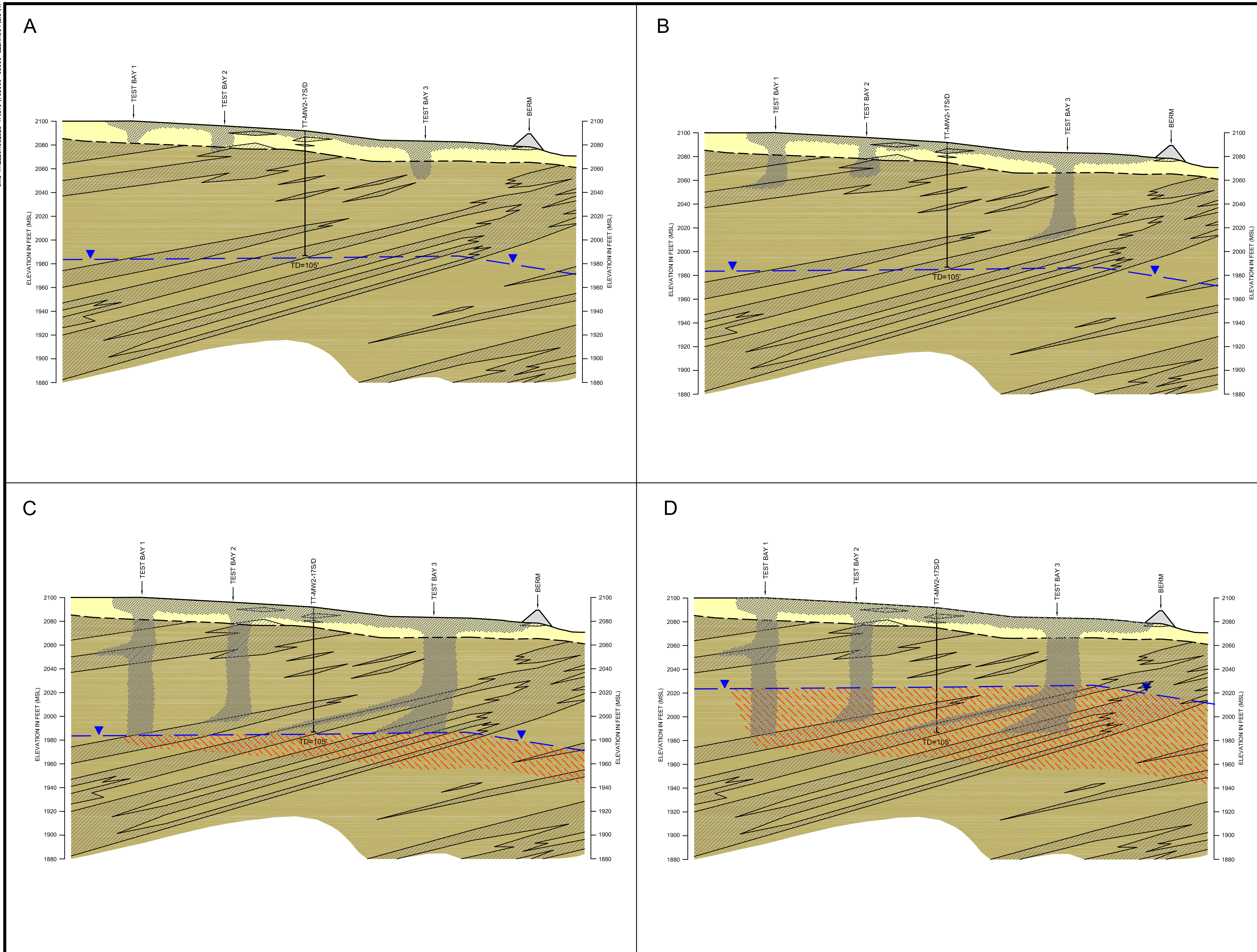
TETRA TECH

The vertical extent of perchlorate in groundwater in southern Test Bay Canyon is constrained by data for wells TT-MW2-30B and C, located downgradient from Test Bay 3; and wells TT-MW2-38B and C, located near the Test Bay 3 source area. During the second DSI sampling event, perchlorate was detected in well TT-MW2-30B (screened interval 144 to 154 feet bgs) at 7,400 µg/L, and attenuated to non-detectable concentrations in well TT-MW2-30C (screened interval 225 to 230 feet bgs). Perchlorate was also detected in well TT-MW2-38B (screened interval 173 to 178 feet bgs) at 22,000 µg/L, attenuating to 37 µg/L in well TT-MW2-38C (screened interval 217 to 227 feet bgs). The data for these wells effectively bounds the vertical extent of perchlorate in groundwater. It should be noted that these wells were installed in areas with high perchlorate concentrations in shallow groundwater, and may have been affected by cross-contamination during drilling. All showed significant concentration reductions between the first and second DSI sampling events, and further declines in perchlorate concentration may occur in the future.

Figures 5-27 and 5-28 show several anomalies in the distribution of perchlorate in groundwater. For example, Figure 5-28 also shows that high perchlorate concentrations were detected in deep groundwater in well TT-MW2-17D, but not in collocated shallow well TT-MW2-17S. The high concentrations detected in well TT-MW2-17D are likely continuous with the central, high-concentration portion of the groundwater plume shown in Figure 5-28. The concentration inversion observed in wells TT-MW2-17S and D does not appear to be consistent with a surface release in the test bay area under present groundwater conditions. In addition, Figures 5-27 and 5-28 show that the highest perchlorate concentrations observed in groundwater are near or downgradient from Test Bay 3, consistent with the soil results showing that Test Bay 3 is the primary perchlorate source area in southern Test Bay Canyon. However, the 1,000 µg/L and 10,000 µg/L perchlorate concentration contours in Figure 5-27 appear to extend upgradient from the primary source area at Test Bay 3, which does not appear to be consistent with the direction of groundwater flow in Test Bay Canyon.

The anomalies noted above could be partially explained by the presence of one or more perchlorate source areas upgradient from Test Bay 3. However, the available data indicate that impacts at Test Bays 1 and 2 are relatively minor in comparison with Test Bay 3, and no evidence for other major source areas has been found. Furthermore, the concentration inversion previously noted in wells TT-MW2-17S and D is not consistent with a surface perchlorate release upgradient of Test Bay 3. These observations suggest that Test Bay 3 is the primary perchlorate source in southern Test Bay Canyon.

A conceptual model explaining the distribution of perchlorate in soil and groundwater in southern Test Bay Canyon is illustrated in Figure 5-29. The primary assumptions of the conceptual model are that



LEGEND

Water Table

Contact (dashed where inferred)

TD = Total Depth (in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

Artificial Fill

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

Silt and Clay

SAN TIMOTEO FORMATION

Sandstone

Mudstone

Perchlorate-Impacted Soil

Perchlorate-Impacted Groundwater

MAP NOT TO SCALE

Beaumont Site 2

Figure 5-29
Conceptual Model of Southern Test Bay Canyon Perchlorate Realease, Historical Operational Area K

TETRA TECH

X:\GIS\LOCKHEED 22289-090301\CAD\X-SECTCONCEPTUAL.DWG groundwater levels during the operational period of the Site were significantly lower than presently observed, and that bedding in the STF controlled the migration of perchlorate in the vadose zone. These assumption are consistent with historic rainfall records for the Beaumont and San Jacinto areas (Figure 3-2), which document a period of low rainfall from approximately 1940 to the late 1970s; and with the geological relationships shown in cross-section A'-A'' (Figure 5-19), which show several north-dipping mudstone layers below the current water table in the general area of Test Bay 3.

Figure 5-29A shows hypothetical conditions shortly after operations began at the Site. Periodic surface releases of perchlorate-impacted water result in the development of near-surface soil impacts in the area generally bounded by the incised surface drainage channel and the berm located southeast of Test Bay 3. Perchlorate-impacted water locally percolates to greater depths at Test Bays 1, 2, and 3, resulting in the development of deeper soil impacts. In Figure 5-29B, the percolating perchlorate-impacted water encounters mudstone beds at depth in the STF, and starts to migrate down-dip to the north, toward well TT-MW2-17D, as well as to the east, across Test Bay Canyon. In Figure 5-29C, the percolating water encounters the water table, and an incipient groundwater plume forms. In Figure 5-29D, groundwater rises in response to increased rainfall in the late 1970s, partially inundating the area of perchlorate-impacted soil. The impacted soil near TT-MW2-17D is now below the water table, resulting in high perchlorate concentrations at TT-MW2-17D. Perchlorate concentrations remain lower at TT-MW2-17S, which is located above the perchlorate migration pathway.

Metals in Soil

The DSI work plan (Tetra Tech, 2008) included additional sampling to further assess potentially elevated metals concentrations in boring K-54-DP11, including 227 mg/kg of barium at a depth of 5 feet bgs and 159 mg/kg of zinc at a depth of 0.5 feet bgs. The barium and zinc concentrations in K-54-DP11 were considered to be potentially elevated based on the initial metals background comparisons (Tetra Tech, 2009h), which assumed all soils at the Site to be alluvium. Figure 5-18 shows that boring K-54-DP11 was drilled at the base of a cut slope which exposes the STF; the samples collected from K-54-DP11 are therefore considered to be STF rather than alluvium. The metals background comparison conducted as part of the DSI (Appendix H) found that barium and zinc concentrations in Area K are not statistically elevated relative to background, and that barium and zinc concentrations in boring K-54-DP11 do not exceed the STF BTVs of 904 mg/kg for barium and 162 mg/kg for zinc.

Step-out boring K-54-SB-110, which was drilled in alluvium approximately 45 feet east of K-54-DP11, had a zinc concentration of 85 mg/kg of at a depth of 0.5 feet. This concentration slightly exceeds the alluvium BTV of 76 mg/kg. This small exceedance of the BTV is not considered to be of significant concern from a characterization perspective, and will be addressed in future risk assessments for the Site.

Beryllium, cobalt, and silver concentrations slightly exceeding BTVs were identified in the DSI background comparisons (Appendix H). The maximum concentrations of these metals were 0.655 mg/kg (beryllium), 14.4 mg/kg (cobalt), and 0.911 mg/kg (silver). Based on the low detected concentrations, no further characterization of these metals was conducted during the DSI. Beryllium, cobalt, and silver will be evaluated as COPCs in future risk assessments for the Site.

5.4.2.3 Laborde Canyon

Facilities located in the Laborde Canyon portion of Area K include the Small Bunker located at the confluence of Test Bay Canyon and Laborde Canyon, and 2 individual conditioning chambers and the T-Revetment conditioning chambers, all of which are located on the western side of Laborde Canyon.

5.4.2.3.1 Previous Work

Previous work in the Laborde Canyon portion of Area K includes the following:

- Drilling and sampling 9 soil borings (K-54-DP1, K-54-DP2, K-54-DP17, K-55-DP21 to K-55-DP24, K-55-HA2, and K-55-HA4) to depths ranging from 5 to 20 feet bgs, and installing soil gas probes to a depth of 10 feet in 7 of the 9 borings (Tetra Tech, 2005a)
- Installing 3 groundwater monitoring wells, including shallow wells TT-MW2-1 and TT-MW2-13, and deep well TT-MW2-18 (Tetra Tech, 2004; 2009g).
- Collecting 3 soil samples from the borehole for monitoring well TT-MW2-13, and 3 soil samples from the borehole for monitoring well TT-MW2-18 (Tetra Tech, 2009g).

Sampling locations are shown in Figure 5-30. Analytical results for soil and groundwater samples are summarized in Tables 5-10 and 5-11, respectively.

Analytical results for soil include the following:

- Perchlorate was detected in 2 of the 38 soil samples analyzed, at concentrations of 45.2 and 640 µg/kg. The perchlorate detections were in the 60-foot bgs sample from boring TT-MW2-13, and the 41.5-foot bgs samples from boring TT-MW2-18. Both of these samples were collected at or near the water table, and the detections may in part be due to the presence of high perchlorate concentrations in groundwater in the area. Perchlorate was not detected in any of soil samples collected at shallow depths.
- The initial metals background comparisons (Tetra Tech, 2009h) found potentially elevated metals concentrations in several borings, including K-55-DP21 (630 mg/kg of barium at a depth of 0.5 feet bgs), K-56-HA4 (308 mg/kg of zinc at a depth of 0.5 feet bgs), K-55-HA2 (245 mg/kg of barium at a depth of 0.5 feet), and K-55-DP24 (42.2 mg/kg of lead and 203 mg/kg of zinc at a depth of 0.5 feet).

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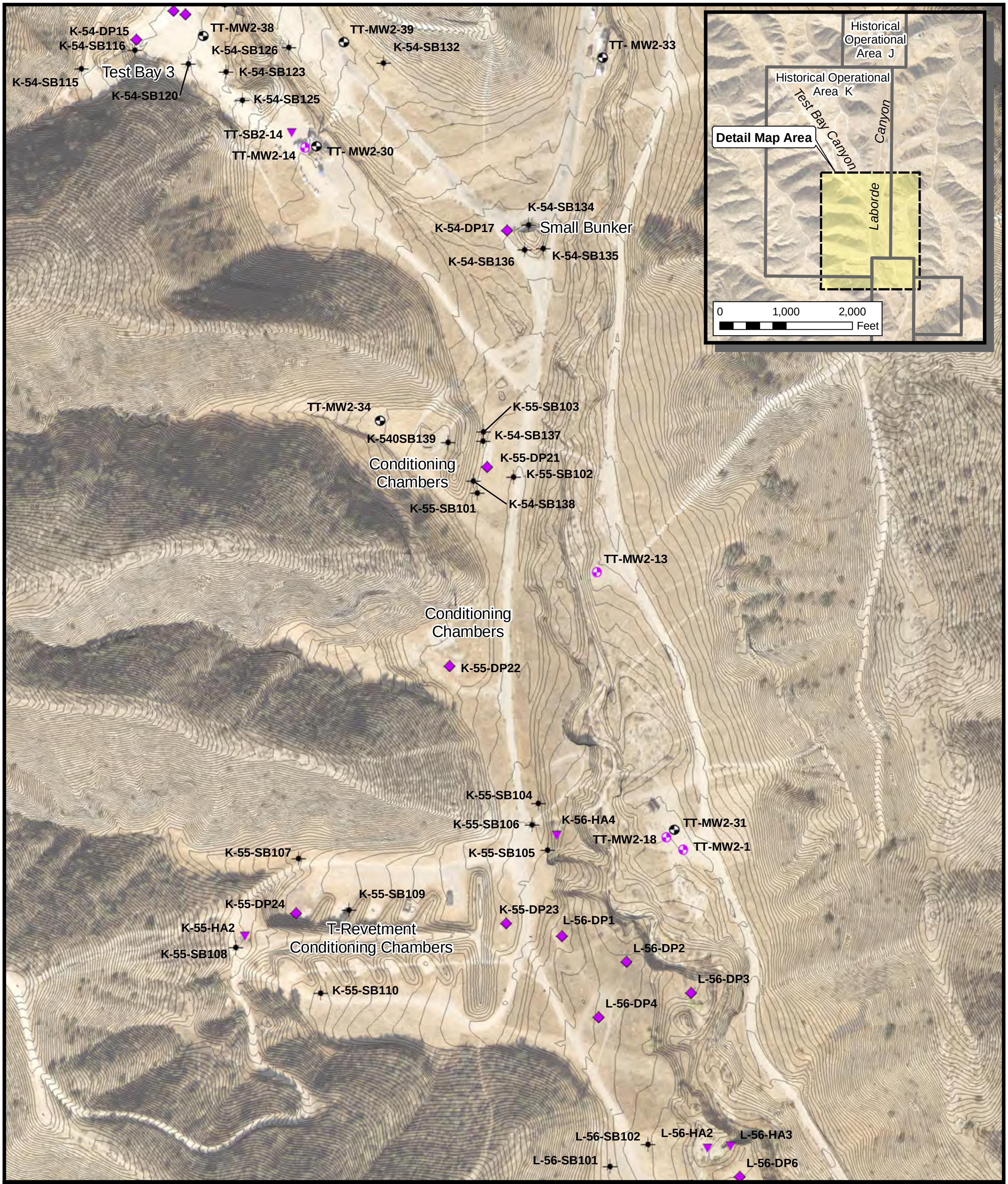

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

0 100 200 Feet

Beaumont Site 2

Figure 5-30
Sample Locations
Laborde Canyon
Historical Operational Area K

TETRA TECH

TABLE 5-10
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Laborde Canyon)

Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	TPH (mg/kg) Gasoline Range	Diesel Range	VOCs (µg/kg) Benzene	1,1-Dichloroethene	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)	PCBs (µg/kg)	Explosives (µg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	-	18	-	89	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	-	64	-	300	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	1,100	2.4E+05	44	-	140	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	5,400	1.1E+06	160	-	540	-
K-55-SB101	K-55-SB101-0.5	0.5	09/12/08	-	-	-	130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB102	K-55-SB102-0.5	0.5	09/12/08	-	-	-	77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB103	K-55-SB103-0.5	0.5	09/12/08	-	-	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB104	K-55-SB104-0.5	0.5	09/12/08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-
K-55-SB105	K-55-SB105-0.5	0.5	09/12/08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71	-	-	-	-	-	-	-	-
K-55-SB106	K-55-SB106-0.5	0.5	09/12/08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57	-	-	-	-	-	-	-	-
K-55-SB107	K-55-SB107-0.5	0.5	09/12/08	-	-	-	210	-	-	-	-	-	5.5 Jq	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-
K-55-SB107A	K-55-SB107A-0.5	0.5	04/30/08	-	-	-	-	-	0.046 Jq	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB108	K-55-SB108-0.5	0.5	09/12/08	-	-	-	210	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB109	K-55-SB109-0.5	0.5	09/12/08	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	72	-	-	-	-	-	-	-	-
K-55-SB109A	K-55-SB109A-0.5	0.5	04/30/08	-	-	-	-	-	0.038 Jq	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-55-SB110	K-55-SB110-0.5	0.5	09/12/08	-	-	-	150	-		-	-	-	5.9 Jq	-	-	-	-	-	-	-	48	-	-	-	-	-	-	-	-
K-55-SB110A	K-55-SB110A-0.5	0.5	04/30/08	-	-	-	-	-	0.040 Jq	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-SB134	K-54-SB134-0.5'	0.5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
	K-54-SB134-5.0'	5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
K-54-SB135	K-54-SB135-0.5'	0.5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
	K-54-SB135-5.0'	5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
K-54-SB136	K-54-SB136-0.5'	0.5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
	K-54-SB136-5.0'	5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
K-54-SB137	K-54-SB137-0.5'	0.5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
	K-54-SB137-5.0'	5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
K-54-SB138	K-54-SB138-0.5'	0.5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
	K-54-SB138-5.0'	5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
K-54-SB139	K-54-SB139-0.5'	0.5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
	K-54-SB139-5.0'	5	04/01/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	All ND
Tt-MW2-13	MW13-5-6.5'	6.5	09/11/06	<10.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW13-35-36.5'	36.5	09/11/06	<11.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW13-58.5-60'	60	09/11/06	**640**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tt-MW2-18	MW18-5-6.5'	6.5	09/12/06	<10.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW18-25-26.5'	26.5	09/12/06	<11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW18-40-41.5'	41.5	09/12/06	**45.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K-54-DP1	K-54-DP1-0.5	0.5	09/15/04	<5.94	<0.191	1.4	99.9	0.361	<0.00988	17	8.36	15.9	4.03	<0.0130	<0.0206	13.5	<0.0209	<0.175	<0.0987	30.1	39.5	-	-	1.7 Bp	<0.52	<0.11	All ND	-	-
	K-54-DP1-5	5	09/15/04	<5.94	<0.191	<0.130	64.1	0.321	<0.00988	14.5	7.31	11.7	3.29	<0.0130	<0.0206	11.1	<0.0209	<0.175	<0.0987	27.4	32.4	-	-	3.4 Bp	<0.48	<0.11	All ND	-	-
	K-54-DP1-10	10	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3 Bp	**1.5**	<0.11	All ND	-	-
	K-54-DP1-20	20	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.11	<0.51	-	-	-	-
K-54-DP2	K-54-DP2-0.5	0.5	09/15/04	<5.94	<0.191	1.34	111	0.477	<0.00988	23.5	11.5	21.9	5.12	<0.0130	<0.0206	17.7	<0.0209	<0.175	<0.0987	42.7	52.2	-	-	2.2 Bp	<0.55	<0.11	All ND	-	-
	K-54-DP2-5	5	09/15/04	<5.94	<0.191	2.35	120	0.474	<0.00988	23.3	11.2	21.2	4.94	<0.0130	<0.0206	17.7	<0.0209	<0.175	<0.0987	41.1	51.8	-	-	**5.2**	<0.52	<0.11	All ND	-	-
	K-54-DP2-10	10	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5 Bp	<0.52	<0.11	All ND	-	-
	K-54-DP2-20	20	09/15/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.11	<0.48	-	-	-	-
K-54-DP17	K-54-DP17-0.5	0.5	09/14/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.7 Bp	<0.54	<0.11	All ND	-	-
	K-54-DP17-5	5	09/14/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.19	<0.86	<0.11	All ND	-	-
	K-54-DP17-10	10	09/14/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.12	<0.54	<0.11	All ND	-	-
	K-54-DP17-20	20	09/14/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.11	<0.51	-	-	-	-

TABLE 5-10
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area K (Laborde Canyon)

					Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)					
Boring No.	Sample No.	Depth (feet bgs)	Sample Date	Perchlorate (µg/kg)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range	Benzene	1,1-Dichloroethene	1,4-Dioxane (mg/kg)	SVOCs (mg/kg)	PCBs (µg/kg)	Explosives (µg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	-	18	-	89	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	-	64	-	300	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	1,100	2.4E+05	44	-	140	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	5,400	1.1E+06	160	-	540	-
K-55-DP21	K-55-DP21-0.5	0.5	09/13/04	<5.94	<0.191	1.3	630	0.449	<0.00988	18.3	9.25	20.1	8.51	<0.0130	<0.0206	15.6	<0.0209	<0.175	<0.0987	33	55.4	<0.13	**96**	1.6 Bp	<0.60	<0.11	All ND	-	-
	K-55-DP21-5	5	09/13/04	<5.94	<0.191	1.77	108	0.505	<0.00988	19.8	11	20.9	5.14	<0.0130	<0.0206	16.8	<0.0209	<0.175	<0.0987	37	52.7	<0.13	<4.8	1.3 Bp	<0.52	<0.11	All ND	-	-
	K-55-DP21-10	10	09/13/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.12	<0.54	<0.11	All ND	-	-
	K-55-DP21-20	20	09/13/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.098	<0.45		-	-	-
K-55-DP22	K-55-DP22-0.5	0.5	09/13/04	<5.94	<0.191	1.43	136	0.433	<0.00988	16.4	9.02	18.4	4.56	<0.0130	<0.0206	14.4	<0.0209	<0.175	<0.0987	33	44.1	<0.13	<4.8	1.7 Bp	<0.61	-	-	-	-
	K-55-DP22-5	5	09/13/04	<5.94	<0.191	1.22	149	0.461	<0.00988	18.8	9.46	19.7	5.02	<0.0130	<0.0206	15.1	<0.0209	<0.175	<0.0987	35.3	45.1	<0.13	<4.8	2.6 Bp	<0.48	-	-	-	-
	K-55-DP22-10	10	09/13/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	1.4 Bp	<0.53	-	-	-	-
	K-55-DP22-20	20	09/13/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	1.8 Bp	<0.51	-	-	-	-
K-55-DP23	K-55-DP23-0.5	0.5	09/10/04	<5.94	<0.191	1.3	151	0.458	<0.00988	18.1	9.35	20.4	13.1	<0.0130	<0.0206	15.3	<0.0209	<0.175	<0.0987	37	77.9	<0.13	**300**	<0.15	<0.68	<0.11	All ND	-	-
	K-55-DP23-5	5	09/10/04	<5.94	<0.191	1.91	147	0.483	<0.00988	18.2	9.51	20.2	5.13	<0.0130	<0.0206	15.4	<0.0209	<0.175	<0.0987	37.5	44.6	<0.13	**27**	<0.13	<0.60	<0.11	All ND	-	-
	K-55-DP23-10	10	09/10/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	**44**	2.0 Bp	<0.56	<0.11	All ND	-	-
	K-55-DP23-20	20	09/10/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.11	<0.49		-	-	-
K-55-DP24	K-55-DP24-0.5	0.5	09/13/04	<5.94	<0.191	1.66	140	0.464	2.42	20.9	9.54	45.7	42.4	<0.0130	<0.0206	15.9	<0.0209	<0.175	<0.0987	35.3	203	<0.13	**120**	<0.11	<0.51	<0.11	All ND	-	-
	K-55-DP24-5	5	09/13/04	<5.94	<0.191	1.36	114	0.379	0.605	16.8	7.71	23.6	20.9	<0.0130	<0.0206	12.2	<0.0209	<0.175	<0.0987	29.5	82.9	<0.13	**19**	<0.11	<0.50	<0.11	All ND	-	-
	K-55-DP24-10	10	09/13/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.13	<0.57	<0.11	All ND	-	-
	K-55-DP24-20	20	09/13/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.11	<0.53		-	-	-
K-55-HA2	K-55-HA2-0.5	0.5	09/20/04	<5.94	<0.191	<0.130	245	0.497	<0.00988	21.6	9.89	21.4	7.26	<0.0130	<0.0206	15.3	0.297	<0.175	<0.0987	40.5	58.5	<0.13	**5.3**	<0.12	<0.53	<0.11	All ND	-	-
	K-55-HA2-5	5	09/20/04	<5.94	<0.191	<0.130	164	0.499	<0.00988	20.1	10	21.6	5.08	<0.0130	<0.0206	15.5	<0.0209	<0.175	<0.0987	39.9	48.7	<0.13	<4.8	<0.11	<0.50	<0.11	All ND	-	-
K-56-HA4	K-56-HA4-0.5	0.5	09/20/04	<5.94	<0.191	0.989	164	0.441	<0.00988	18.6	9.25	20	11.6	<0.0130	<0.0206	14.5	0.258	<0.175	<0.0987	37	308	<0.13	**89**	<0.14	<0.64	<0.11	All ND	-	-
	K-56-HA4-5	5	09/20/04	<5.94	<0.191	0.776	91	0.394	<0.00988	16	8.47	15	3.74	<0.0130	<0.0206	13.1	<0.0209	<0.175	<0.0987	31.1	40.4	<0.13	<4.8	1.7 Bp	<0.46	<0.11	All ND	-	-

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
mg/kg - Concentration in milligrams per kilogram.
Perchlorate - Perchlorate, analyzed by EPA Method.
Metals - California Title 22 Metals.
TPH - Total petroleum hydrocarbons.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
PCBs - Polychlorinated biphenyls.
"-" - Sample not analyzed for analyte.
"<" - Indicates concentration below indicated method detection limit.

"B" - The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination. The result is considered not to have originated from the environmental sample, because cross-contamination is suspected.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"p" - Professional judgment determined the data should be qualified.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).
"ND" - Concentration of analyte(s) was not detected above the MDL.

TABLE 5-11
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Area K (Laborde Canyon)

Boring/ Well No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/L)	VOCs (µg/L) Acetone	2-Butanone (MEK)	Benzene	Carbon Disulfide	Chloromethane	Chloroform	2-Hexanone	4-Methyl-2-Pentanone	Toluene	RDX (µg/L)
California MCL:				**6**	-	-	**1**	-	-	**80**	-	-	**150**	-
California DWNL:				-	-	-	-	**160**	-	-	-	**120**	-	**0.3**
GRAB SAMPLES														
TT-MW2-33A/B/C	K-54-W103-GW-62'	62	11/17/08	**0.71**	<5.0	<1.2	**1.6**	<0.36	**1.8**	<0.17	<1.2	<0.95	**0.89**	-
	K-54-W103-GW-76'	76	11/17/08	**0.86**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
	K-54-W103-GW-90'	90	11/17/08	**1.0**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
	K-54-W103-GW-126'	126	11/18/08	**0.92**	<5.0	<1.2	**0.19 Jq**	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
	K-54-W103-GW-156'	156	11/19/08	**2.3**	**10**	<1.2	**0.85**	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
	K-54-W103-GW-176'	176	11/19/08	**0.52**	<5.0	<1.2	**0.39 Jq**	<0.36	<0.36	<0.17	<1.2	<0.95	**0.25 Jq**	-
TT-MW2-34A/B/C	K-54-W104-GW-79	79	11/19/08	**0.52**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
	K-54-W104-GW84	84	11/20/08	**0.12**	<5.0	<1.2	**0.18 Jq**	<0.36	<0.36	<0.17	<1.2	<0.95	**0.36 Jq**	-
	K-54-W104-147	147	11/20/08	**2.4**	**7.8**	**1.7 Jq**	**0.15 Jq**	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
	K-54-W104-187	187	11/21/08	**0.25**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
TT-MW2-31A/B	K-54-W105-123.5'	123.5	11/12/08	**2,500**	<5.0	<1.2	**0.47 Jq**	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
	K-54-W105-132'	132	11/12/08	**1,800**	**12**	**1.5 Jq**	**0.32 Jq**	<0.36	<0.36	<0.17	<1.2	<0.95	<0.22	-
	K-54-W105-190'	190	11/13/08	**54**	**67**	**9.5**	**1.8**	<0.36	**0.55**	<0.17	**3.1 Jq**	**1.2 Jq**	**0.27 Jq**	-
MONITORING WELL SAMPLES														
TT-MW2-13	TT-MW2-13	60 - 70	03/11/09	-	-	-	-	-	-	-	-	-	-	0.80 Je
TT-MW2-31A	TT-MW2-31A	123 - 133	02/13/09	**9.6**	<5.0	<1.2	<0.14	<0.36	<0.36	<0.17	<1.2	<0.95	**0.36 Jq**	-
	TT-MW2-31A		03/16/09	<0.35	<5.0	<1.2	<0.14	**4.3**	<0.36	<0.17	<1.2	<0.95	**0.50**	-
TT-MW2-31B	TT-MW2-31B	186 - 196	02/13/09	<0.071	<5.0	**2.3 Jq**	**0.31 Jq**	**4.6**	<0.36	<0.17	<1.2	<0.95	**3.5**	-
	TT-MW2-31B		03/16/09	<0.35	<5.0	**1.4 Jq**	**0.32 Jq**	**6.3**	<0.36	<0.17	<1.2	<0.95	**3.5**	-
TT-MW2-33A	TT-MW2-33A	54 - 69	02/03/09	**0.13**	<5.0	<1.2	<0.14	<0.36	<0.36	**0.43 Jq**	<1.2	<0.95	<0.22	-
	TT-MW2-33A		02/10/09	-	-	-	-	-	-	-	-	-	-	<0.50 UJb
	TT-MW2-33A		02/24/09	-	-	-	-	-	-	-	-	-	-	<1.0
	TT-MW2-33A		03/11/09	<0.071	<5.0	<1.2	<0.14	**2.2**	<0.36	**0.24 Jq**	<1.2	<0.95	<0.22	-
TT-MW2-33B	TT-MW2-33B	127 -137	02/03/09	<0.071	<5.0	<1.2	<0.14	<0.36	<0.36	**0.22 Jq**	<1.2	<0.95	<0.22	-
	TT-MW2-33B		02/10/09	-	-	-	-	-	-	-	-	-	-	<0.50
	TT-MW2-33B		02/24/09	-	-	-	-	-	-	-	-	-	-	<1.0
	TT-MW2-33B		03/16/09	<0.071	<5.0	<1.2	<0.14	**5.9**	<0.36	<0.17	<1.2	<0.95	**0.25 Jq**	-

TABLE 5-11
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Area K (Laborde Canyon)

Boring/ Well No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/L)	VOCs (µg/L)										RDX (µg/L)
					Acetone	2-Butanone (MEK)	Benzene	Carbon Disulfide	Chloromethane	Chloroform	2-Hexanone	4-Methyl-2-Pentanone	Toluene		
California MCL:				**6**	-	-	**1**	-	-	**80**	-	-	**150**		-
California DWNL:				-	-	-	-	**160**	-	-	-	**120**	-		**0.3**
TT-MW2-33C	TT-MW2-33C	176 - 181	02/03/09	<0.071	<5.0	<1.2	**0.22 Jbq**	**3.0 Jb**	<0.36	<0.17	<1.2	<0.95	**2.4 Jb**		-
	TT-MW2-33C		02/10/09	-	-	-	-	-	-	-	-	-	-		<0.50
	TT-MW2-33C		02/24/09	-	-	-	-	-	-	-	-	-	-		<1.0
	TT-MW2-33C		03/16/09	<0.071	<5.0	<1.2	**0.26 Jq**	**3.7**	<0.36	<0.17	<1.2	<0.95	**5.0**		-
TT-MW2-34A	TT-MW2-34A	70 - 90	02/03/09	**0.39**	<5.0	<1.2	<0.14	<0.36	<0.36	**0.48 Jq**	<1.2	<0.95	<0.22		-
	TT-MW2-34A		02/10/09	-	-	-	-	-	-	-	-	-	-		<0.50
	TT-MW2-34A		02/24/09	-	-	-	-	-	-	-	-	-	-		<1.0
	TT-MW2-34A		03/11/09	**0.30**	<5.0	<1.2	<0.14	**0.44 Jq**	<0.36	**0.25 Jq**	<1.2	<0.95	<0.22		-
TT-MW2-34B	TT-MW2-34B	137 - 147	02/10/09	-	-	-	-	-	-	-	-	-	-		<0.50 UJb
	TT-MW2-34B		02/11/09	<0.071	<5.0	<1.2	<0.14	**0.66**	<0.36	<0.17	<1.2	<0.95	<0.22		-
	TT-MW2-34B		02/25/09	-	-	-	-	-	-	-	-	-	-		<1.0
	TT-MW2-34B		03/18/09	<0.35	<5.0	<1.2	<0.14	**2.2**	<0.36	<0.17	<1.2	<0.95	<0.22		-
TT-MW2-34C	TT-MW2-34C	180 - 190	02/11/09	**0.21**	<5.0	<1.2	**0.25 Jq**	**0.38 Jq**	<0.36	<0.17	<1.2	<0.95	**1.6**		-
	TT-MW2-34C		02/25/09	-	-	-	-	-	-	-	-	-	-		<1.0
	TT-MW2-34C		03/18/09	<0.35	<5.0	<1.2	<0.14	**1.7**	<0.36	<0.17	<1.2	<0.95	**0.66**		-

Notes:

Bold - Indicates concentrations detected above the method detection limit.
MCL - California Maximum Contaminant Level (February 4, 2010).
DWNL - California Drinking Water Notification Level (December 14, 2007).
VOCs - Volatile organic compounds.
µg/L - Micrograms per liter.
bgs - Below ground surface.
"-" - not applicable or not available.
"<" - Indicates concentration below indicated method detection limit.

"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"U" - The analyte was not detected above the method detection limit (MDL).
"UJ" - The analyte was not detected above the MDL. However, the MDL may be elevated above the reported detection limit.
"b" - The surrogate spike recovery was outside quality control criteria.
"e" - A holding time violation occurred
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).

- TPHg was not detected in any of the 20 analyzed samples. TPHd was detected in 8 of the 20 analyzed samples, at concentrations ranging from 5.3 to 300 mg/kg. VOCs and SVOCs were not detected in any of the samples with detectable TPHd.
- Benzene was detected at a concentration of 5.2 µg/kg in the 5-foot bgs sample from boring K-54-DP2, and toluene was detected at a concentration of 1.2 µg/kg in the 10-foot bgs sample from K-54-DP1. VOCs were not detected in any of the 30 remaining samples analyzed.
- 1,4-Dioxane was not detected in any of the 22 samples analyzed.
- SVOCs were not detected in any of the 22 samples analyzed.

Analytical results for soil gas include the following:

- VOCs were not detected in any of the analyzed soil gas samples.

Analytical results for groundwater include the following:

- In May 2008, perchlorate was detected in shallow monitoring wells TT-MW2-1 and TT-MW2-13 at concentrations of 11,600 and 2,890 µg/L, respectively. The perchlorate concentration in deep well TT-MW2-18 (which is collocated with TT-MW2-1) was 13,000 µg/L.
- In May 2008, hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) was detected at a concentration of 0.57 µg/L in shallow well TT-MW2-13. This concentration exceeds the DWNL of 0.3 µg/L.

5.4.2.3.2 DSI Activities

Based on the previous results discussed above, no further assessment of perchlorate, TPHg, TPHd, VOCs, 1,4-dioxane, or SVOCs soil was conducted as part of the DSI. Additional soil investigation proposed in the DSI work plan (Tetra Tech, 2008) was focused on characterization of potentially elevated metals concentrations detected in borings K-55-DP21, K-56-HA4, K-55-HA2, and K-55-DP24 noted above. Additional groundwater investigation proposed in the DSI work plan (Tetra Tech, 2008) included the installation of three sets of nested groundwater monitoring wells to further characterize the extent of perchlorate and RDX in groundwater. Initial field activities included the following:

- Drilling and sampling 10 hand auger soil borings (K-55-SB101 to K-55-SB110) to characterize the extent of potentially elevated lead, zinc, and barium concentrations in soil.
- Installing eight groundwater monitoring wells (TT-MW2-31A and B; TT-MW2-33A, B, and C; and TT-MW2-34A, B, and C) to characterize the lateral and vertical extent of perchlorate in groundwater, the lateral extent of RDX in groundwater, and to test various aspects of the conceptual model for the Site.

Upon further review of the previous data, it was noted that cadmium was detected in boring K-55-DP24 at concentrations which qualitatively appeared to be potentially elevated. Three additional borings (K-55-SB107A, K-55-SB109A, and K-55-SB110A) were drilled immediately adjacent to borings K-55-SB107, K-55-SB109, and K-55-SB110 to assess the lateral extent of cadmium.

RDX has been detected at concentrations slightly exceeding the California DWNL of 0.3 µg/L in existing monitoring wells TT-MW2-1 and TT-MW2-13. During the DSI, groundwater samples were collected from the existing and new wells to further characterize the extent of RDX in groundwater, and to constrain, to the extent possible, the location of the source of RDX in soil. Based on the groundwater sampling results, 3 hand auger borings (K-54-SB134 to K-54-SB136) were drilled at the Small Bunker and 3 hand auger borings (K-54-SB137 to K-54-SB139) were drilled near the northern Conditioning Chamber to assess whether an RDX source could be present in soil at either of these features.

5.4.2.3.3 Geology and Hydrogeology

The surface geology of the Laborde Canyon portion of Area K is shown on Figure 5-31. An incised active drainage channel is present on the floor of Laborde Canyon. Alluvium underlies the central portion of Laborde Canyon. Colluvium underlies three small side canyons, where the two individual conditioning chambers and the T-Revetment conditioning chambers were formerly located, and forms broad aprons along the canyon margins. The STF is exposed on hillsides, and along the eastern side of a portion of the incised drainage channel. Three areas of artificial fill are present: at the small bunker, a berm behind the northern conditioning chamber, and the T-Revetment. The side canyon where the T-Revetment is located appears to have been extensively reshaped by grading, and it is likely the fill used to construct the T-Revetment was locally derived.

The depths to groundwater in shallow wells TT-MW2-1 and TT-MW2-13 were approximately 58.1 and 62.9 feet, respectively, in May 2009. The depth to groundwater in deep well TT-MW2-18 was approximately 54.5 feet bgs in May 2009. Groundwater flow is inferred to be generally southward, down Laborde Canyon.

5.4.2.3.4 Soil Results

Analytical results for the DSI soil borings are summarized in Table 5-10. A total of 29 soil samples have been analyzed for metals, including 16 samples collected during previous investigations and 13 samples collected during the DSI. Samples from the DSI borings were analyzed for barium, cadmium, lead, and/or zinc. The maximum detected barium concentration in the DSI borings was 210 mg/kg in the 0.5 foot bgs samples from borings K-55-SB107 and K-55-SB108. The maximum detected cadmium concentration in the DSI borings was 0.046 mg/kg in the 0.5 foot bgs samples from borings K-55-SB107A. The maximum detected lead concentration in the DSI borings was 11 mg/kg in the 0.5 foot bgs samples from borings K-55-SB109. The maximum detected zinc concentration in the DSI borings was 72 mg/kg in the 0.5 foot bgs samples from borings K-55-SB109.

A total of 12 soil samples from borings K-54-SB134 to K-54-SB139 were analyzed for explosives, including RDX. RDX was not detected in any of the soil samples.

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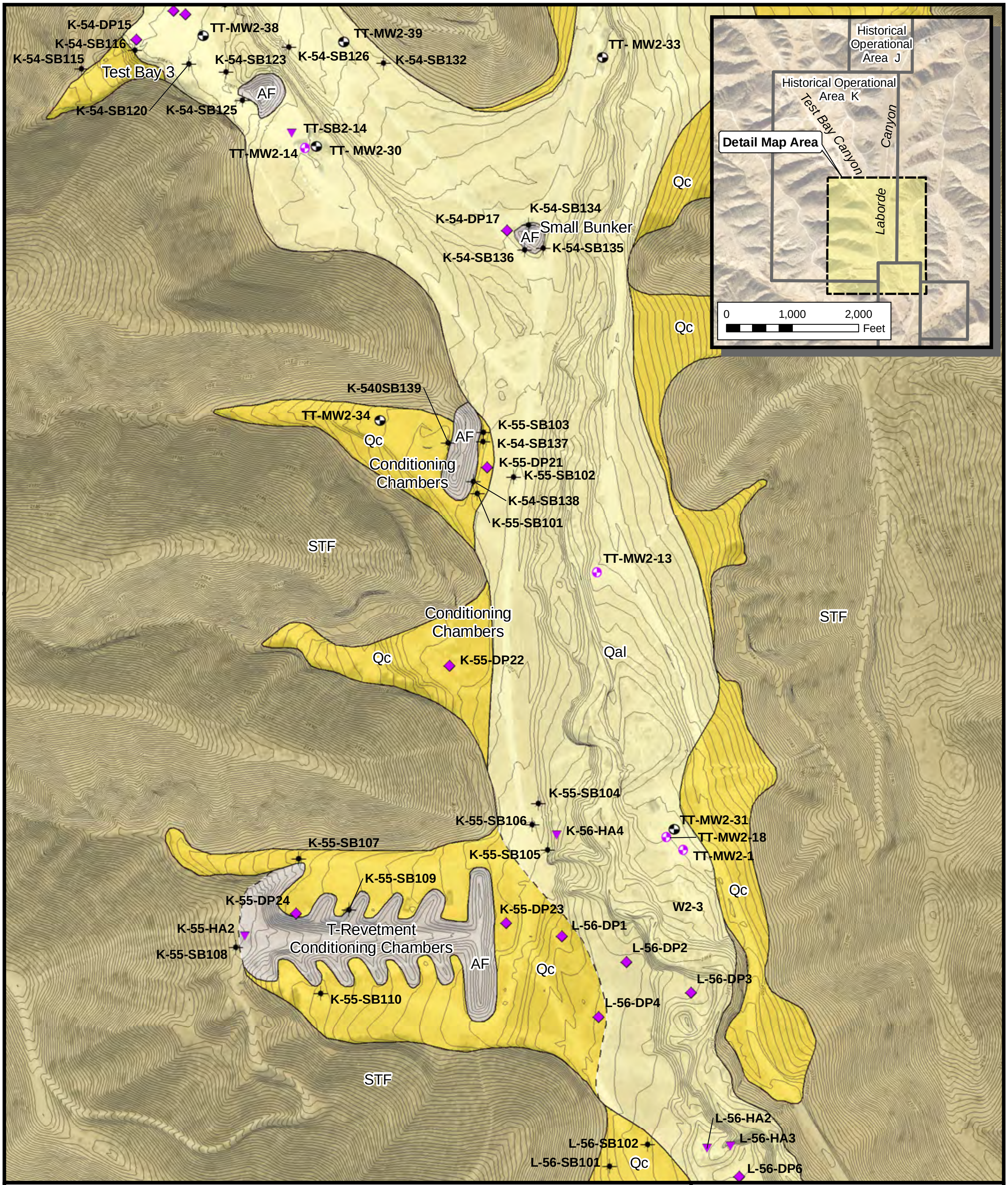

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Contact (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- AF Artificial Fill
- Qal Alluvium
- Qc Colluvium
- STF San Timoteo Formation

0 100 200 Feet

Beaumont Site 2

Figure 5-31
Surface Geology
Laborde Canyon
Historical Operational Area K

TETRA TECH

5.4.2.3.5 Groundwater Results

Analytical results for perchlorate, VOCs, and RDX in groundwater are summarized in Table 5-11. A total of 41 groundwater samples, including 13 grab samples and 28 monitoring well samples, were analyzed as part of the DSI. Perchlorate was detected in the monitoring well samples at a maximum concentration of 9.6 µg/L in a sample collected from well TT-MW2-31A, which exceeds the California MCL of 6 µg/L. The perchlorate detection in TT-MW2-31A was not replicated during subsequent sampling. Benzene was detected at concentrations exceeding the California MCL of 1 µg/L in grab samples collected while drilling monitoring wells TT-MW2-31 and TT-MW2-33. Neither of the benzene detections were replicated in groundwater samples collected from the monitoring wells.

A total of 12 monitoring well samples were analyzed for explosives. RDX was detected at a concentration of 0.8 µg/L in well TT-MW2-13. RDX was not detected in samples collected from wells TT-MW2-33A, TT-MW2-33B, TT-MW2-33C, TT-MW2-34A, TT-MW2-34B, or TT-MW2-34C.

5.4.2.3.6 Discussion

Metals in Soil

The DSI work plan (Tetra Tech, 2008) included additional sampling to further assess metals detected in borings K-55-DP21, K-56-HA4, K-55-HA2, and K-55-DP24, as previously noted. These concentrations were considered to be potentially elevated based on the initial metals background comparisons (Tetra Tech, 2009h), which assumed all soils at the Site to be alluvium. However, Figure 5-31 shows that borings K-55-DP21, K-55-HA2, and K-55-DP24 were drilled in colluvium rather than alluvium. The metals background comparison conducted as part of the DSI (Appendix H) found that barium concentrations in Area K are not statistically elevated above background, and that barium concentrations in previous borings K-55-DP21 and K-55-HA2 and DSI step-out borings K-55-SB101 to K-55-SB103, K-55-SB107, K-55-SB108, and K-55-SB110 do not exceed the colluvium BTV of 904 mg/kg. Based on these results, no further assessment of barium in the Laborde Canyon portion of Area K is warranted at this time.

The initial metals background comparison (Tetra Tech, 2009h), as well as the metals background comparison conducted as part of the DSI (Appendix H), found that zinc concentrations in Area K were not statistically elevated above background. However, the zinc concentration of 308 mg/kg detected in boring K-56-HA4 at a depth of 0.5 feet bgs exceeds the alluvium BTV of 76 mg/kg. The zinc concentration at a depth of 5 feet bgs in K-56-HA4 was 40.4 mg/kg, below the BTV. Three step-out borings (K-55-SB104 to K-55-SB106 were drilled around K-56-HA4 to assess the lateral extent of potentially elevated zinc. Analytical results are shown on a drawing of the area in Figure 5-32. Based on these results, the lateral and vertical extent of zinc in the area of K-56-HA4 is considered to be defined to below the BTV.

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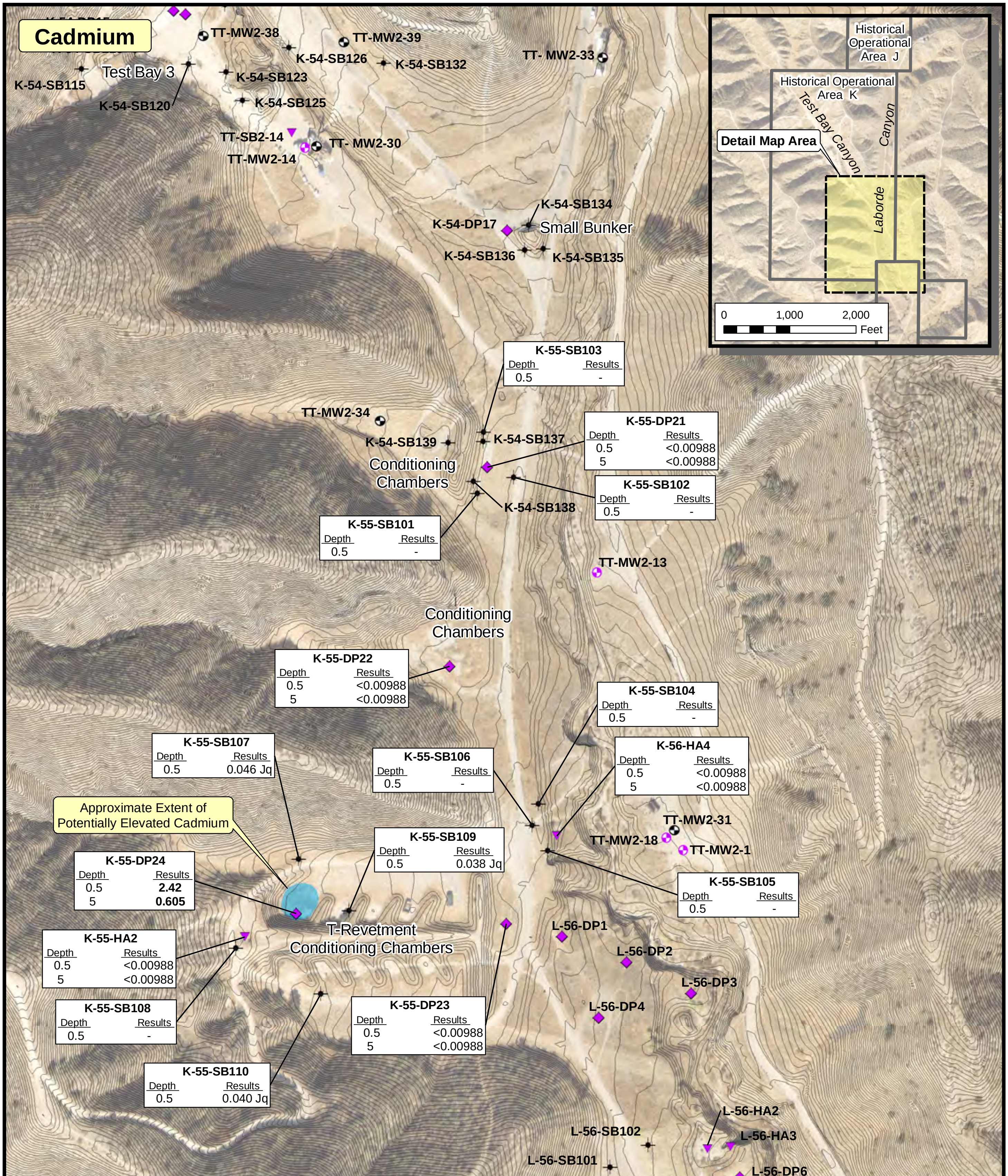

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Extent of Potentially Elevated Cadmium

Notes:
Results in mg/kg.
Bold indicates concentrations exceeding BTV.

0 100 200 Feet

Beaumont Site 2

Figure 5-32
Approximate Extent of Potentially Elevated Metals Laborde Canyon Historic Operational Area K

TETRA TECH

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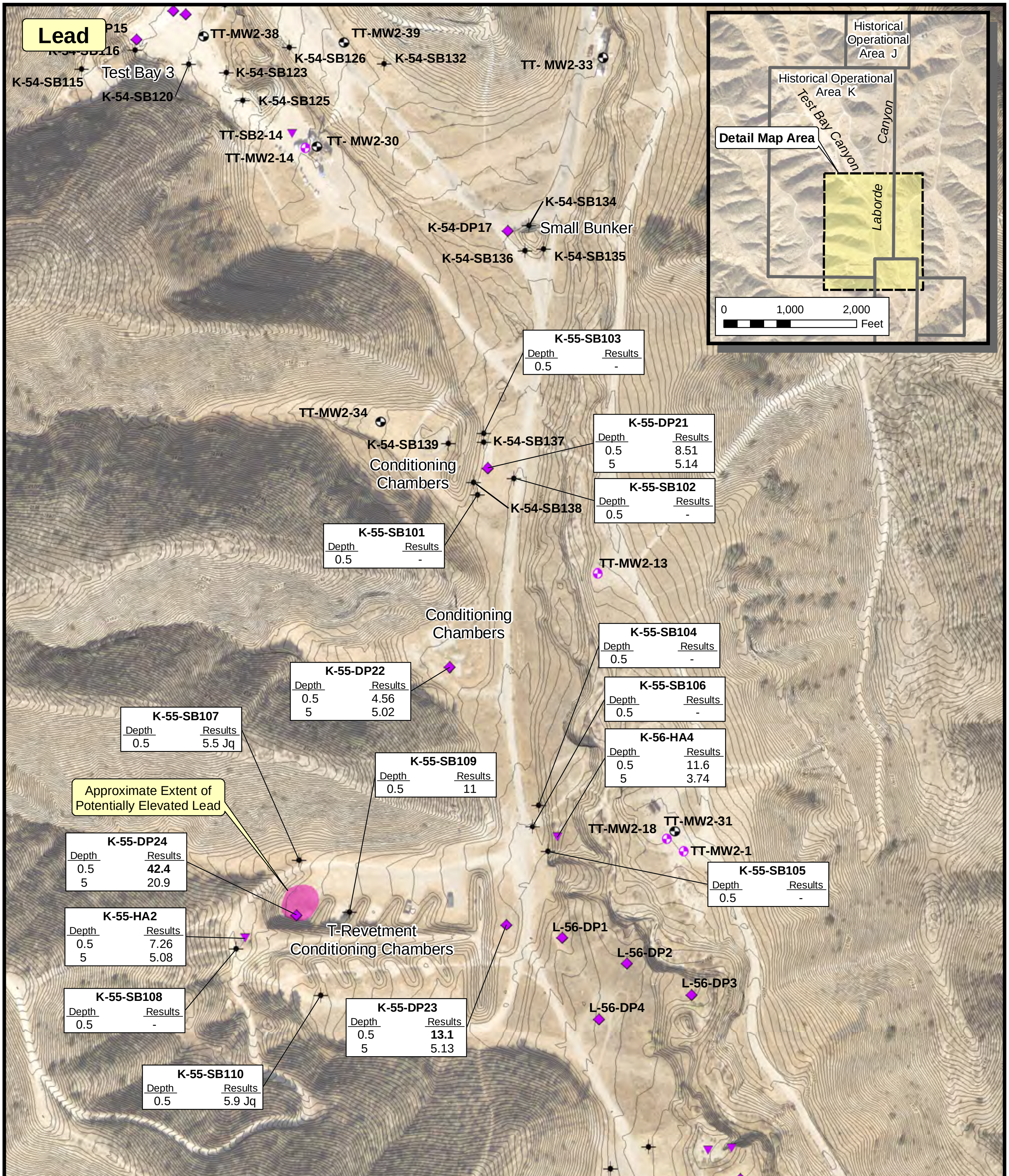

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Extent of Potentially Elevated Lead

Notes:
Results in mg/kg.
Bold indicates concentrations exceeding BTV.

0 100 200 Feet

N

Beaumont Site 2

Figure 5-32 (cont.)
Approximate Extent of Potentially Elevated Metals
Laborde Canyon
Historic Operational Area K

TETRA TECH

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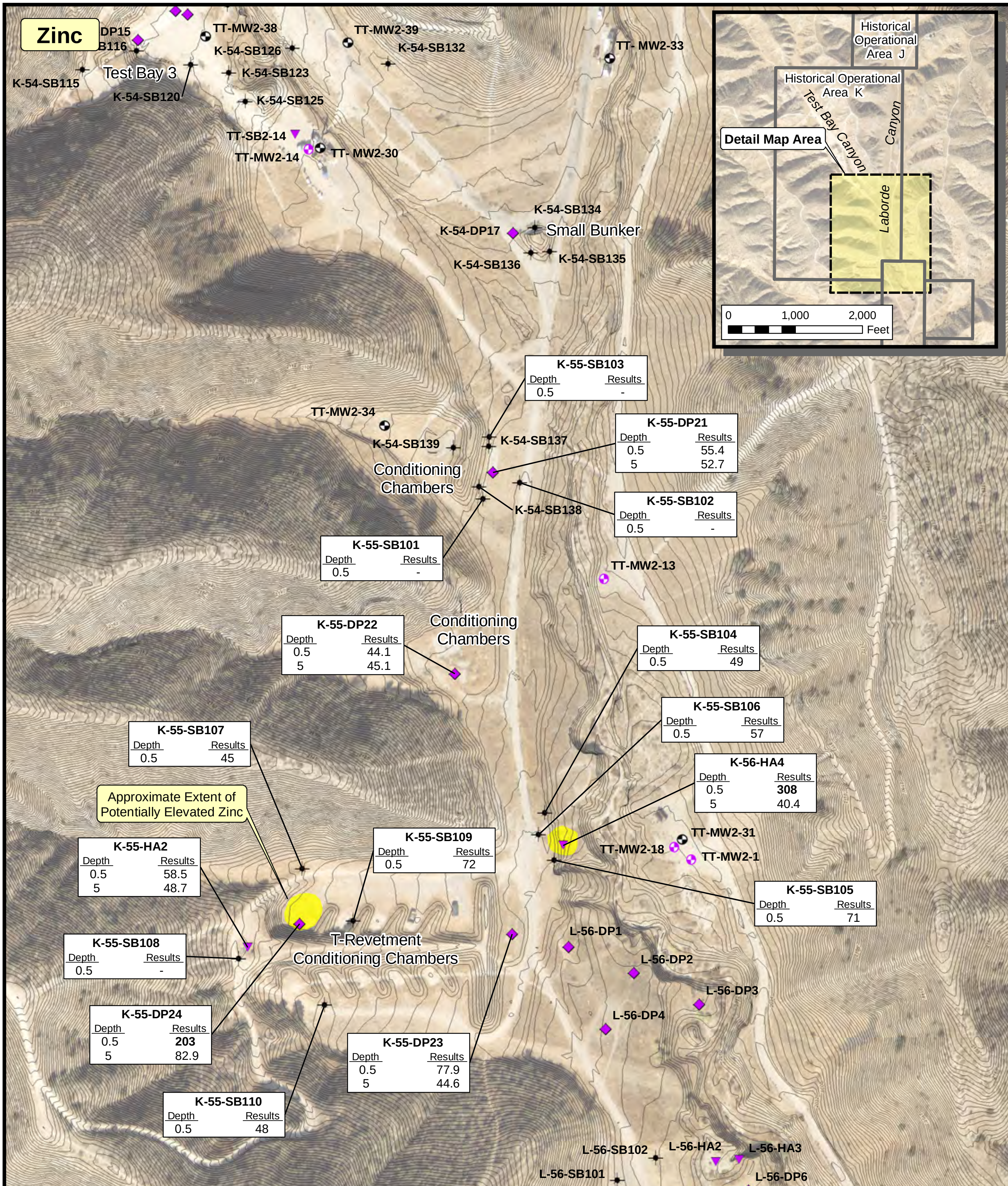

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Extent of Potentially Elevated Zinc

Notes:
Results in mg/kg.
Bold indicates concentrations exceeding BTV.

0 100 200 Feet

Beaumont Site 2

Figure 5-32 (cont.)
Approximate Extent of Potentially Elevated Metals Laborde Canyon Historic Operational Area K

TETRA TECH

The metals background comparison conducted as part of the DSI (Appendix H) found that lead and zinc are not statistically elevated above background in Area K. However, lead concentrations at depths of 0.5 and 5 feet bgs and the zinc concentration at a depth of 0.5 feet bgs in boring K-55-DP24 exceed the colluvium BTVs of 12.8 and 122 mg/kg, respectively. In addition, cadmium concentrations in boring K-55-DP24 qualitatively appeared to be elevated with respect to background at depths of 0.5 and 5 feet bgs, and the cadmium concentration in samples K-55-DP24-0.5 (2.42 mg/kg) exceeded the CHHSL for residential land use. Six step-out borings (K-55-SB107, K-55-SB109, and K-55-SB110, and collocated borings K-55-SB107A, K-55-SB109A, and K-55-SB110A) were drilled to assess the lateral extent of lead, zinc, and cadmium detected in boring K-55-DP24. Analytical results are shown on a drawing of the area in Figure 5-32. Based on these results, the lateral extent of potentially elevated lead, zinc, and cadmium concentrations at boring K-55-DP24 are considered to be defined to below the BTVs.

Other metals considered to be present at potentially elevated concentrations based on the DSI background comparisons (Appendix H) include lead in boring K-55-DP23 (13.1 mg/kg at a depth of 0.5 feet), and silver in boring K-55-HA2 (0.297 mg/kg at a depth of 0.5 feet). These concentrations slightly exceed the BTVs of 12.8 mg/kg and 0.176 mg/kg for lead and silver, respectively. Based on the low detected concentrations, no further characterization of lead and silver at these locations was conducted as part of the DSI. Both lead and silver will be evaluated as COPCs in future risk assessments for the Site.

Perchlorate in Groundwater

Previous monitoring wells TT-MW2-1 and TT-MW2-18 are located in Laborde Canyon, to the east of the T-Revetment area (Figure 5-30). Perchlorate concentrations in shallow well MW2-1 (screened from 50 to 70 feet bgs) have been consistently lower than in deep well TT-MW2-18 (screened from 93 to 98 feet bgs). Monitoring wells TT-MW2-31A and B were installed adjacent to TT-MW2-1 and TT-MW2-18 to define the vertical extent of perchlorate in groundwater in this area. TT-MW2-31A was screened from 123 to 133 feet bgs, and TT-MW2-31B was screened from 186 to 196 feet bgs. Table 5-11 shows that perchlorate was not detected in either well during the second DSI sampling round, indicating that the vertical extent of perchlorate in this area has been adequately defined.

Monitoring wells TT-MW2-33A, B, and C were installed in Laborde canyon, downgradient from Area J and immediately upgradient from the confluence of Laborde Canyon and Test Bay Canyon (Figure 5-30), to assess whether a potential perchlorate source area could be present in Laborde Canyon between Area J and Test Bay Canyon. Perchlorate was not detected in any of these wells during the second DSI sampling round (Table 5-11), indicating that a significant perchlorate source area is not present in Laborde Canyon to the north of Test Bay Canyon.

Monitoring wells TT-MW2-34A, B, and C were installed in a small side canyon off of Laborde Canyon, generally to the south (downgradient) of the Test Bay Canyon groundwater plume (Figure 5-30). A ridge of STF is present between TT-MW2-34A, B, and C and Test Bay Canyon (Figure 30); these wells were installed to evaluate whether relatively unweathered STF acts as a barrier to the migration of perchlorate in groundwater, as proposed in the CSM, or whether preferred pathways are present within the STF that allow perchlorate to migrate outside of the confines of the main canyons. Perchlorate was detected at a concentration of 0.30 µg/L in shallow well TT-MW2-34A, and was not detected in deep wells TT-MW2-34B and C, during the second DSI sampling round (Table 5-11). These results suggest that relatively unweathered STF acts as a barrier to perchlorate migration in groundwater, confirming the CSM.

RDX in Groundwater and Soil

Analytical results for RDX in groundwater are summarized in Figure 5-33. RDX was detected in monitoring well TT-MW2-13 at a concentration of 0.8 µg/L, and was not detected in wells TT-MW2-33A, B, and C, or TT-MW2-34A, B, and C. In addition, RDX was not detected in well TT-MW2-14 during previous sampling conducted in May 2008 (Appendix A). These results suggest that a shallow RDX source, if present, must be located downgradient of TT-MW2-14 and TT-MW2-33, crossgradient from TT-MW2-34, and upgradient from TT-MW2-13. Former operational features within this area include the Small Bunker and the northern Conditioning Chamber. Soil borings K-54-SB134 to K-54-SB136 were drilled to investigate potential RDX impacts at the small bunker, and borings K-54-SB137 to K-54-SB139 were drilled to investigate potential RDX impacts at the northern conditioning chamber.

RDX results for soil borings K-54-SB134 to K-54-SB139 are summarized on Figure 5-33. RDX was not detected in any of the soil samples analyzed, suggesting that the small bunker and northern conditioning chamber are not source areas for RDX.

5.4.3 Historical Operational Area L – Propellant Burn Area

5.4.3.1 Previous Work

Previous work in Area L included the following:

- Drilling and sampling 14 soil borings (L-56-DP1 to L-56-DP4, L-56-DP6 to L-56-DP12, L-56-HA2, L-56-HA3, and L-57-HA1) to depths ranging from 5 to 40 feet bgs, and installing soil gas probes at depths of 10 and 20 feet bgs in 11 of the 14 soil borings (Tetra Tech, 2005a).
- Installing 4 groundwater monitoring wells, including shallow wells TT-MW2-12, TT-MW2-10 and TT-MW2-4S, and deep well TT-MW2-4D (Tetra Tech, 2004; 2009g).

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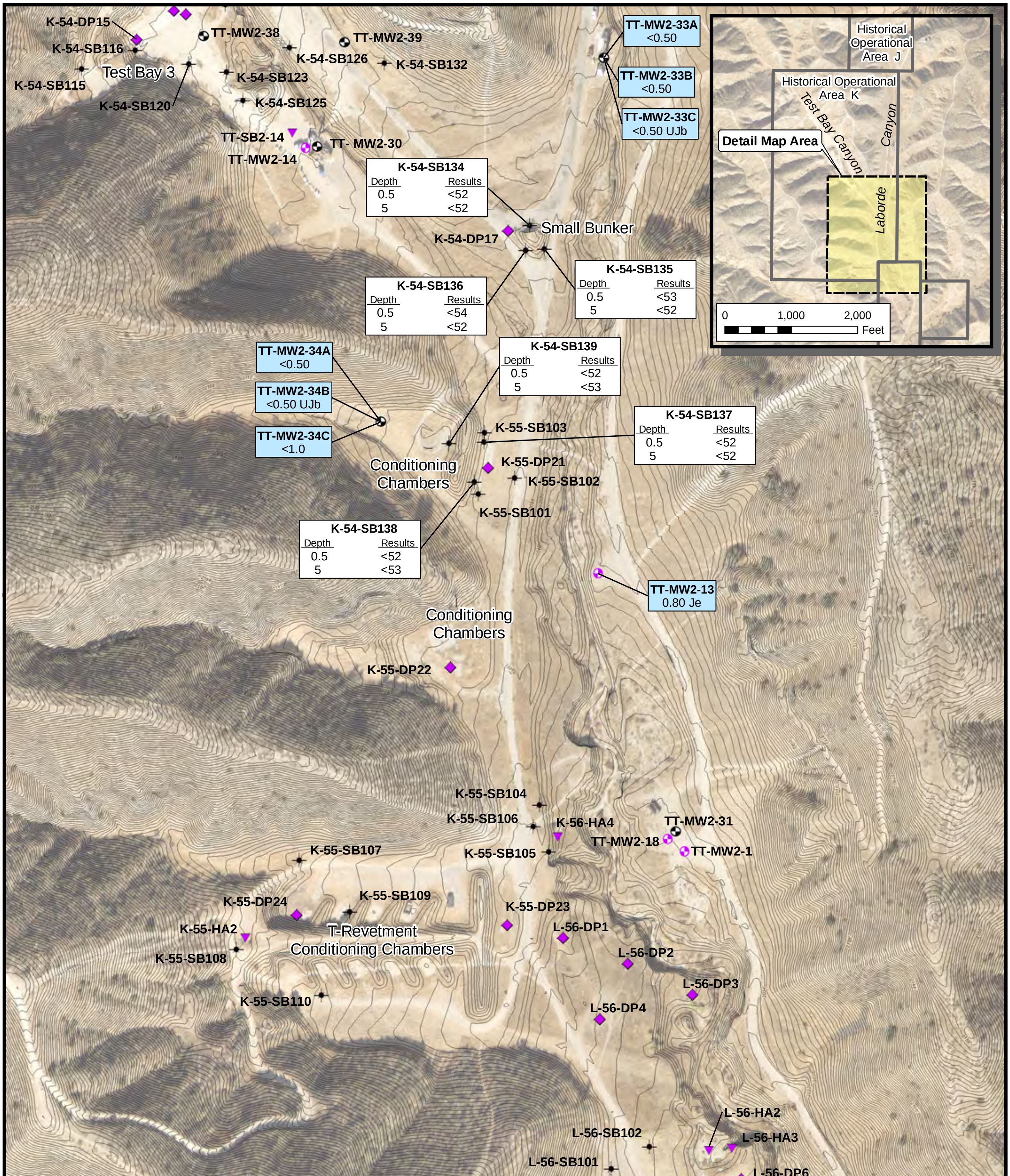

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Note:

#	Soil results in µg/kg.
#	Groundwater results in µg/L.

N

0 100 200 Feet

Beaumont Site 2

Figure 5-33
RDX Concentrations in Soil and Groundwater - Laborde Canyon Historical Operational Area K

TETRA TECH

- Collecting 3 soil samples from the borehole for well TT-MW2-10 and three soil samples from the borehole for well TT-MW2-12 (Tetra Tech, 2009g).

Sampling locations are shown in Figure 5-34. Analytical results for soil and groundwater samples are summarized in Tables 5-12 and Appendix A, respectively.

Analytical results for soil include the following:

- Perchlorate was detected in 5 of the 78 samples analyzed, at concentrations ranging from 22.3 to 357 µg/kg. All of the perchlorate detections were in samples collected at depths of 30 or 40 feet bgs; perchlorate was not detected in soil samples collected at shallower depths.
- The initial metals background comparisons (Tetra Tech, 2009h) found that no metals has concentrations that were statistically elevated above background, and that no metals had potentially elevated concentrations (i.e., concentrations above alluvium BTVs).
- TPHg was not detected in any of the 72 samples analyzed. TPHd was detected in 1 of the 72 soil samples analyzed, at a concentration of 30 mg/kg. VOCs and SVOCs were not detected in the sample with detectable TPHd.
- 1,1-dichloroethene (1,1-DCE) was detected at a concentration of 1.2 µg/kg in the 40-foot bgs samples from boring L-56-DP9. VOCs were not positively detected in any of the 71 remaining samples.
- 1,4-dioxane was not detected in any of the 28 samples analyzed.
- SVOCs were not detected in any of the 39 samples analyzed.
- PCBs were not detected in either of the 2 samples analyzed.

Analytical results for soil gas include the following:

- VOCs were not detected in any of the 22 soil gas samples analyzed.

Analytical results for groundwater include the following:

- In May 2008, perchlorate was not detected in shallow monitoring wells TT-MW2-4S, TT-MW2-10, or TT-MW2-12. Deep well TT-MW2-4D is no longer sampled at part of the GWMP; however, perchlorate was not detected in this well during prior groundwater monitoring events.

5.4.3.2 DSI Activities

Based on the results discussed above, no further assessment of perchlorate, metals, TPHg, TPHd, VOCs, 1,4-dioxane, or SVOCs in soil was proposed in the areas previously investigated. However, the previous characterization activities focused on a disturbed area and a topographic depression, which were considered by Tetra Tech (2005a) to be the areas where industrial activities were most likely to have been conducted within Area L. No sampling was conducted within the area specifically designated as the propellant burn area on Figure 3-43 of the Radian (1986a) historical report. The DSI work plan included additional soil sampling to address this potential data gap.

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Beaumont Site 2

Figure 5-34
Sample Locations
Historical Operational Area L

TETRA TECH

TABLE 5-12
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area L (Propellant Burn Area)

Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg)																	
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium (Total)	Chromium (Hexavalent)	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	17	660	3,000	80	18	380	1,600	380	380	5	530	23,000
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	37	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	0.29	23	3,100	400	23	390	1,500	390	390	-	390	23,000
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	5.6	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000
L-56-SB101	L-56-SB101-0.5	0.5	09/15/08	<1.0	0.20 Jq	3.2 Jq	170	0.62 Jq	0.072 Jdq	33	-	11	25	7.4 Jq	<0.025	0.33 Jq	19 Jd	<0.35	<0.70	<0.24	59	52
	L-56-SB101-5	5	09/15/08	<1.1	0.22 Jq	3.1 Jq	180	0.67 Jq	0.052 Jdq	34	-	12	25	7.0 Jq	<0.026	0.61 Jq	21 Jd	<0.36	<0.71	<0.25	60	56
	L-56-SB101-10	10	09/15/08	**2.4**	0.23 Jq	3.1 Jq	120	0.66 Jq	0.046 Jdq	31	-	11	23	7.0 Jq	<0.026	0.29 Jq	19 Jd	<0.36	<0.72	<0.25	61	52
	L-56-SB101-15	15	09/15/08	**1.5**	<0.21	2.2 Jq	120	0.47 Jq	<0.039 Rd	26	-	8.2 Jq	20	5.3 Jq	<0.026	0.50 Jq	15 Jd	<0.36	<0.71	<0.25	47	41
	L-56-SB101-20	20	09/15/08	**1.9**	<0.22	3.1 Jq	140	0.61 Jq	0.054 Jdq	29	-	<0.022	23	6.9 Jq	<0.027	0.40 Jq	20 Jd	<0.38	<0.76	<0.26	56	53
	L-56-SB101-25	25	09/15/08	**2.2**	<0.22	5.2 Jq	180	0.85 Jq	0.17 Jdq	32	-	14	26	8.7 Jq	<0.028	0.56 Jq	25 Jd	<0.39	<0.77	<0.27	67	66
	L-56-SB101-30	30	09/15/08	**1.3**	<0.21	3.1 Jq	250	1.1 Jq	0.095 Jdq	54	<0.71 UJe	18	40	7.3 Jq	<0.026	<0.27	32 Jd	<0.36	<0.73	<0.25	70	93
	L-56-SB101-35	35	09/15/08	<1.1	<0.21	3.4 Jq	170	0.75 Jq	0.042 Jdq	47	-	15	31	7.7 Jq	<0.026	<0.28	23 Jd	<0.37	<0.74	<0.26	62	60
	L-56-SB101-40	40	09/15/08	<1.1	<0.21	4.6 Jq	200	0.78 Jq	0.11 Jdq	41	-	13	31	7.8 Jq	<0.026	<0.27	24 Jd	<0.37	<0.73	<0.25	60	60
L-56-SB102	L-56-SB102-0.5	0.5	09/15/08	**1.2**	<0.20	3.9 Jq	200	0.74 Jq	0.12 Jdq	43	-	12	37	16	0.030 Jq	0.50 Jq	22 Jd	0.43 Jq	<0.70	<0.24	66	68
	L-56-SB102-5	5	09/15/08	<1.1	<0.21	3.2 Jq	140	0.58 Jq	0.042 Jdq	39	-	10 Jq	28	5.8 Jq	<0.026	1.1 Jq	18 Jd	<0.36	<0.71	<0.25	55	53
	L-56-SB102-10	10	09/15/08	**2.3**	<0.21	3.4 Jq	190	0.72 Jq	0.060 Jdq	44	-	13	40	6.9 Jq	<0.026	0.42 Jq	23 Jd	0.38 Jq	<0.71	<0.25	64	62
	L-56-SB102-15	15	09/15/08	<1.1	<0.21	3.8 Jq	150	0.59 Jq	<0.039 Rd	39	-	11	22	5.9 Jq	<0.026	0.36 Jq	20 Jd	<0.36	<0.72	<0.25	53	54
	L-56-SB102-20	20	09/15/08	**1.3**	<0.22	2.7 Jq	170	0.67 Jq	<0.041 Rd	38	-	15	31	6.9 Jq	<0.027	<0.29	25 Jd	<0.38	<0.76	<0.26	56	74
	L-56-SB102-25	25	09/15/08	**1.8**	<0.20	1.1 Jq	93	0.46 Jq	<0.038 Rd	25	-	9.5 Jq	19	5.1 Jq	<0.025	<0.27	16 Jd	<0.35	<0.71	<0.25	38	44
	L-56-SB102-30	30	09/15/08	<1.1	<0.21	0.92 Jq	64	0.32 Jq	<0.039 Rd	17	-	7.1 Jq	14	4.0 Jq	<0.026	<0.27	11 Jd	<0.36	<0.72	<0.25	33	31
	L-56-SB102-35	35	09/15/08	**1.1**	<0.20	0.80 Jq	58	0.24 Jq	0.075 Jdq	23	-	4.7 Jq	17	3.0 Jq	<0.025	0.36 Jq	11 Jd	<0.35	<0.71	<0.25	22	23
	L-56-SB102-40	40	09/15/08	<1.1	<0.20	0.58 Jq	56	0.24 Jq	<0.038 Rd	13	-	4.7 Jq	12	3.0 Jq	<0.025	<0.26	8.4 Jdq	<0.35	<0.70	<0.24	18	22
L-56-SB103	L-56-SB103-0.5'	0.5	09/16/08	**<1.0 UJf**	0.47 Jq	4.3 Jq	150 Jd	0.61 Jdq	0.098 Jq	30 Jd	-	11	32	7.9 Jq	0.050 Jq	170	19	<0.35	<0.70	<0.24	65 Jd	130 Jd
	L-56-SB103-5'	5	09/16/08	3.4 Bk	0.40 Jq	3.7 Jq	150 Jd	0.64 Jdq	<0.038	33 Jd	-	11	35	8.2 Jq	<0.025	0.58 Jq	19	<0.35	<0.70	<0.24	67 Jd	55 Jd
	L-56-SB103-10'	10	09/16/08	<1.1	0.38 Jq	3.9 Jq	190 Jd	0.72 Jdq	<0.039	32 Jd	-	12	39	7.2 Jq	<0.026	0.33 Jq	19	1.5 Jq	<0.71	<0.25	68 Jd	57 Jd
	L-56-SB103-15'	15	09/16/08	2.5 Bk	0.39 Jq	3.3 Jq	210 Jd	0.75 Jdq	<0.040	31 Jd	-	11	25	7.2 Jq	<0.027	1.1 Jq	20	<0.37	<0.74	<0.26	68 Jd	52 Jd
	L-56-SB103-20'	20	09/16/08	<1.1	0.23 Jq	3.9 Jq	140 Jd	0.94 Jdq	0.099 Jq	33 Jd	-	12	31	7.4 Jq	0.044 Jq	0.50 Jq	24	<0.38	<0.75	<0.26	62 Jd	62 Jd
	L-56-SB103-25'	25	09/16/08	<1.1	0.52 Jq	4.1 Jq	300 Jd	1.7 Jdq	<0.040	55 Jd	<1.4 UJe	22	53	16	0.028 Jq	0.56 Jq	35	2.1 Jq	<0.75	0.28 Jdq	96 Jd	97 Jd
	L-56-SB103-30'	30	09/16/08	1.8 Bk	0.70 Jq	6.5 Jq	170 Jd	1.1 Jdq	<0.041	44 Jd	-	17	35	10 Jq	<0.027	0.53 Jq	30	<0.38	<0.75	<0.26	86 Jd	81 Jd
	L-56-SB103-35'	35	09/16/08	1.4 Bk	0.45 Jq	4.7 Jq	260 Jd	1.1 Jdq	0.20 Jq	44 Jd	-	16	39	<0.17	<0.027	0.54 Jq	30	2.2 Jq	<0.75	<0.26	82 Jd	75 Jd
	L-56-SB103-40'	40	09/16/08	1.9 Bk	0.27 Jq	2.9 Jq	130 Jd	0.54 Jdq	<0.040	72 Jd	<0.71 UJe	<0.021	19	5.1 Jq	<0.027	<0.28	18	<0.37	<0.74	<0.26	61 Jd	52 Jd
L-56-SB103A	L-56-SB103A-0.5	0.5	04/30/09	-	-	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	-	-	-	-
L-56-SB104	L-56-SB104-0.5'	0.5	09/16/08	1.2 Bk	<0.20	3.2 Jq	170	0.75 Jq	0.094 Jq	31	-	11	25	12	<0.025	<0.26	19	0.37 Jq	<0.68	<0.24	65	53
	L-56-SB104-5'	5	09/16/08	<1.1	0.31 Jq	4.3 Jq	170 Jd	0.65 Jdq	<0.039	31 Jd	-	11	25	7.0 Jq	<0.026	0.30 Jq	19	<0.36	<0.71	<0.25	70 Jd	51 Jd
	L-56-SB104-10'	10	09/16/08	<1.1	0.30 Jq	4.4 Jq	180 Jd	0.71 Jdq	<0.039	32 Jd	-	12	27	7.5 Jq	<0.026	0.34 Jq	20	<0.36	<0.71	<0.25	74 Jd	56 Jd
	L-56-SB104-15'	15	09/16/08	<1.1	0.34 Jq	4.8 Jq	190 Jd	0.78 Jdq	<0.040	36 Jd	-	13	27	7.9 Jq	<0.027	0.34 Jq	23	<0.37	<0.74	<0.26	80 Jd	61 Jd
	L-56-SB104-20'	20	09/16/08	<1.1	0.32 Jq	3.6 Jq	130 Jd	0.67 Jdq	0.046 Jq	28 Jd	-	11	22	6.8 Jq	<0.026	0.32 Jq	19	<0.37	<0.73	<0.26	65 Jd	51 Jd
	L-56-SB104-25'	25	09/16/08	<1.1	<0.22	3.3 Jq	160	0.83 Jq	0.21 Jq	32	-	13	29	7.2 Jq	<0.027	0.41 Jq	27	<0.38	<0.76	<0.26	58	57
	L-56-SB104-30'	30	09/16/08	<1.1	<0.22	1.3 Jq	130 Jf	1.0 Jq	<0.041	40	-	15	50 Jf	7.3 Jq	<0.027	<0.28	27	<0.37	<0.75	<0.26	68	80
	L-56-SB104-35'	35	09/16/08	<1.1	<0.21	2.5 Jq	180	1.0 Jq	0.062 Jq	40	-	14	47	9.8 Jq	<0.027	<0.28	25	5.0 Jq	<0.74	<0.26	71	79
	L-56-SB104-40'	40	09/16/08	<1.1	<0.21	4.0 Jq	200	0.94 Jq	0.086 Jq	47	-	15	53	9.3 Jq	<0.026	0.85 Jq	29	0.62 Jq	<0.73	<0.25	79	73

TABLE 5-12
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area L (Propellant Burn Area)

				TPH (mg/kg)		VOCs (µg/kg)									SVOCs (mg/kg)			
Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Gasoline Range	Diesel Range	Acetone	2-Butanone (MEK)	Carbon Disulfide	Chloromethane	1,1-Dichloroethene	Methyl-tert-Butyl Ether (MTBE)	Methylene Chloride	Toluene	Vinyl Acetate	bis(2-Ethylhexyl)phthalate	N-Nitrosodimethylamine	1,4-Dioxane (mg/kg)	PCBs (µg/kg)
Residential CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	18	89
Commercial/Industrial CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	64	300
Residential RSL:				-	-	6.1E+07	2.8E+07	8.2E+05	1.2E+05	3,300	430	11,000	5.0E+06	9.7E+05	35	0.0023	44	140
Commercial/Industrial RSL:				-	-	6.3E+08	2.0E+08	3.7E+06	5.0E+05	17,000	2,200	53,000	4.5E+07	4.1E+06	120	0.034	160	540
L-56-SB101	L-56-SB101-0.5	0.5	09/15/08	1.1 BJaq	3.1 Ba	<4.1	<8.4	1.7 BJaq	<0.91	<1.2	<1.6	<0.99	**4.2 Jq**	<2.4	**60 Jq**	0.0002 BJakq	-	-
	L-56-SB101-5	5	09/15/08	0.81 BJaq	4.8 Ba	<4.6	<9.5	2.3 BJaq	**1.5 Jq**	<1.3	**2.9 Jq**	**4.3 Jq**	7.1	<2.8	<38	0.0002 BJakq	-	-
	L-56-SB101-10	10	09/15/08	1.1 BJaq	1.2 BJaq	<4.4	<9.2	1.9 BJaq	<0.99	<1.3	<1.8	<1.1	**4.7 Jq**	**10 Jq**	<39	0.0002 BJakq	-	-
	L-56-SB101-15	15	09/15/08	0.83 BJaq	1.2 BJaq	<4.3	<8.9	1.8 BJaq	<0.97	<1.2	<1.7	1.5 BJkq	**2.5 Jq**	<2.6	<38	<0.0002	-	-
	L-56-SB101-20	20	09/15/08	0.62 BJaq	1.2 BJaq	<5.0	<10	2.3 BJaq	<1.1	<1.4	<2.0	<1.2	**4.9 Jq**	<3.0	<41	0.0002 BJakq	-	-
	L-56-SB101-25	25	09/15/08	<0.56	1.6 BJaq	<5.3	<11	2.4 BJaq	<1.2	<1.5	<2.1	<1.3	<2.6	<3.2	<42	<0.0006	-	-
	L-56-SB101-30	30	09/15/08	0.65 BJaq	1.9 BJaq	<9.4	<19	<2.6	<2.1	<2.7	<3.7	<2.3	<4.5	<5.6	<39	0.0003 BJaq	-	-
	L-56-SB101-35	35	09/15/08	<0.53	1.7 BJaq	<5.0	<10	2.3 BJaq	<1.1	<1.4	<2.0	<1.2	<2.4	<3.0	<40	<0.0002	-	-
	L-56-SB101-40	40	09/15/08	<0.52	2.3 Ba	<3.6	<7.4	1.2 BJaq	<0.80	<1.0	<1.4	<0.86	<1.7	<2.1	<39	0.0003 BJaq	-	-
L-56-SB102	L-56-SB102-0.5	0.5	09/15/08	2.6 BJaq	**43 Jb**	39 BJkq	**13 Jq**	2.8 BJaq	<1.1	<1.4	<2.0	<1.2	11	<3.0	**180 Jq**	<0.0002	-	-
	L-56-SB102-5	5	09/15/08	1.2 BJaq	**1.3 Jfq**	<3.7	<7.7	1.3 BJaq	<0.84	<1.1	<1.5	<0.91	**3.4 Jq**	**7.1 Jq**	<38	0.0002 BJakq	-	-
	L-56-SB102-10	10	09/15/08	1.8 BJaq	**2.3**	<4.4	<9.1	2.3 BJaq	<0.99	<1.3	<1.8	<1.1	**5.1 Jq**	<2.7	<39	<0.0002	-	-
	L-56-SB102-15	15	09/15/08	1.3 BJaq	<0.79	<3.9	<8.0	1.4 BJaq	<0.87	<1.1	<1.5	<0.94	**3.3 Jq**	<2.3	**41 Jq**	0.0002 BJakq	-	-
	L-56-SB102-20	20	09/15/08	0.89 BJaq	**1.5 Jq**	<4.2	<8.6	1.6 BJaq	<0.93	<1.2	<1.7	<1.0	**2.4 Jq**	<2.5	<41	<0.0002	-	-
	L-56-SB102-25	25	09/15/08	0.90 BJaq	**0.77 Jq**	<4.0	<8.2	1.7 BJaq	<0.89	<1.1	<1.6	<0.96	**2.7 Jq**	<2.4	<38	0.0002 BJakq	-	-
	L-56-SB102-30	30	09/15/08	<0.52	**0.86 Jq**	<4.1	<8.4	1.6 BJaq	<0.91	<1.2	<1.6	<0.99	<2.0	<2.4	<39	0.0002 BJakq	-	-
	L-56-SB102-35	35	09/15/08	0.79 BJaq	**1.3 Jq**	<4.7	<9.8	2.3 BJaq	<1.1	<1.4	<1.9	<1.1	<2.3	<2.8	<38	<0.0002	-	-
	L-56-SB102-40	40	09/15/08	0.54 BJaq	<0.77	<4.0	<8.2	1.5 BJaq	<0.89	<1.1	<1.6	<0.96	**3.6 Jq**	<2.4	<38	0.0002 BJakq	-	-
L-56-SB103	L-56-SB103-0.5'	0.5	09/16/08	<0.50	**2.1**	<8.4	<17	<2.4	<1.9	<2.4	<3.3	<2.0	**4.8 Jq**	<5.0	<37	<0.0005	-	-
	L-56-SB103-5'	5	09/16/08	<0.50	**4.2**	<8.2	<17	<2.3	<1.8	<2.4	<3.3	<2.0	**5.6**	<4.9	<38	<0.0005	-	-
	L-56-SB103-10'	10	09/16/08	<0.51	**1.2 Jq**	<8.2	<17	<2.3	<1.8	<2.3	<3.3	<2.0	**4.0 Jq**	<4.9	<38	<0.0005	-	-
	L-56-SB103-15'	15	09/16/08	<0.53	<0.81	<7.2	<15	<2.0	<1.6	<2.1	<2.9	**4.0 Jq**	<3.5	<4.3	<40	<0.0006	-	-
	L-56-SB103-20'	20	09/16/08	0.61 BJaq	**1.3 Jq**	<9.8	<20	<2.7	<2.2	<2.8	<3.9	<2.4	**5.3 Jq**	<5.8	<41	<0.0006	-	-
	L-56-SB103-25'	25	09/16/08	<0.54	<0.82	<7.6	<16	<2.1	<1.7	<2.2	<3.0	<1.9	<3.7	<4.6	<40	<0.0006	-	-
	L-56-SB103-30'	30	09/16/08	<0.54	<0.82	<7.3	<15	<2.1	<1.6	<2.1	<2.9	1.8 BJkq	<3.5	<4.4	<40	<0.0006	-	-
	L-56-SB103-35'	35	09/16/08	<0.54	**1.1 Jq**	<9.0	<19	<2.5	<2.0	<2.6	<3.6	<2.2	<4.3	<5.4	<40	<0.0006	-	-
	L-56-SB103-40'	40	09/16/08	<0.53	<0.81	<7.2	<15	<2.0	<1.6	<2.1	<2.8	<1.7	<3.4	<4.3	<40	<0.0006	-	-
L-56-SB103A	L-56-SB103A-0.5	0.5	04/30/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-SB104	L-56-SB104-0.5'	0.5	09/16/08	<0.49	**3.6**	<8.2	<17	<2.3	<1.8	<2.4	<3.3	<2.0	<4.0	<4.9	<37	<0.0005	-	-
	L-56-SB104-5'	5	09/16/08	0.66 BJaq	**1.3 Jq**	**31 Jq**	<20	**3.0 Jq**	<2.2	<2.8	<3.9	<2.4	**5.4 Jq**	<5.9	<38	<0.0005	-	-
	L-56-SB104-10'	10	09/16/08	0.57 BJaq	**1.2 Jq**	<8.4	<17	<2.4	<1.9	<2.4	<3.3	<2.0	**4.2 Jq**	<5.0	<38	<0.0005	-	-
	L-56-SB104-15'	15	09/16/08	<0.53	<0.81	<8.3	<17	<2.3	<1.9	<2.4	<3.3	<2.0	<4.0	<5.0	<40	<0.0006	-	-
	L-56-SB104-20'	20	09/16/08	1.0 BJaq	<0.80	<7.9	<16	<2.2	<1.8	<2.3	<3.2	<1.9	<3.8	<4.8	<40	<0.0005	-	-
	L-56-SB104-25'	25	09/16/08	0.66 BJaq	**0.87 Jq**	<7.1	<15	<2.0	<1.6	<2.0	<2.8	<1.7	<3.4	<4.3	<41	<0.0006	-	-
	L-56-SB104-30'	30	09/16/08	<0.54	**1.1 Jq**	<7.5	<16	<2.1	<1.7	<2.2	<3.0	<1.8	<3.6	<4.5	<40	<0.0006	-	-
	L-56-SB104-35'	35	09/16/08	<0.53	**1.9 Jq**	<8.2	<17	<2.3	<1.8	<2.4	<3.3	<2.0	<3.9	<4.9	<40	<0.0006	-	-
	L-56-SB104-40'	40	09/16/08	<0.52	**2.1 Jq**	<8.7	<18	<2.5	<2.0	<2.5	<3.5	<2.1	<4.2	<5.2	<39	<0.0005	-	-

TABLE 5-12
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area L (Propellant Burn Area)

Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg) Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium (Total)	Chromium (Hexavalent)	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	17	660	3,000	80	18	380	1,600	380	380	5	530	23,000
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	37	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	0.29	23	3,100	400	23	390	1,500	390	390	-	390	23,000
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	5.6	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000
L-56-SB105	L-56-SB105-0.5'	0.5	09/16/08	1.6 Bk	<0.19	3.0 Jq	140	0.66 Jq	0.081 Jq	29	-	11	24	10	<0.024	<0.25	18	0.42 Jq	<0.67	<0.23	62	50
	L-56-SB105-5'	5	09/16/08	<1.1	<0.20	3.3 Jq	170	0.77 Jq	0.068 Jq	33	-	12	28	7.5 Jq	<0.025	<0.27	20	2.8 Jq	<0.71	<0.25	67	55
	L-56-SB105-10'	10	09/16/08	5.4 Bk	<0.21	2.6 Jq	130	0.96 Jq	<0.040	43	-	15	30	8.6 Jq	<0.026	0.76 Jq	27	<0.37	<0.73	<0.25	84	64
	L-56-SB105-15'	15	09/16/08	<1.1	0.23 Jq	5.2 Jq	350	1.1 Jq	0.077 Jq	50	-	19	38	10 Jq	<0.027	0.72 Jq	34	<0.37	<0.75	<0.26	100	78
	L-56-SB105-20'	20	09/16/08	<1.2	<0.23	3.2 Jq	52	0.51 Jq	0.055 Jq	21	-	9.2 Jq	16	8.7 Jq	<0.028	<0.30	15	<0.39	<0.79	<0.27	57	40
	L-56-SB105-25'	25	09/16/08	6.2 Bk	<0.24	12 Jq	190	0.99 Jq	0.048 Jq	46	-	17	35	9.8 Jq	<0.031	<0.32	30	0.45 Jq	<0.85	<0.30	84	74
	L-56-SB105-30'	30	09/16/08	**17 Jf**	<0.23	2.1 Jq	150	0.73 Jq	<0.043	34	-	13	26	7.3 Jq	<0.028	<0.29	24	0.49 Jq	<0.78	<0.27	56	58
	L-56-SB105-35'	35	09/16/08	**13**	<0.20	0.91 Jq	69	0.34 Jq	0.077 Jq	17	-	5.1 Jq	11	4.1 Jq	<0.025	<0.26	<0.13	<0.35	<0.69	<0.24	28	24
	L-56-SB105-40'	40	09/16/08	**69**	<0.22	2.6 Jq	140	0.64 Jq	0.062 Jq	28 Jf	-	11	22 Jf	6.4 Jq	<0.027	<0.29	20 Jf	<0.38	<0.76	<0.26	68	52
L-56-SB106	L-56-SB106	0.5	04/30/08	-	-	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	-	-	-	-
Tt-MW2-10	MW10-5-6.5'	6.5	09/05/06	<10.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW10-20-21.5'	21.5	09/05/06	<10.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW10-45-46.5'	46.5	09/05/06	<10.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tt-MW2-12	MW-12-5-6.5	6.5	09/01/06	<10.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-12-25-26.5	26.5	09/01/06	<11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-12-40-41.5	41.5	09/01/06	<11.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP1	L-56-DP1-0.5	0.5	09/10/04	<5.94	<0.191 UJc	1.86	160	0.495	<0.00988	20.3	-	10.3	24.9	5.43	<0.0130	<0.0206	16	<0.175	<0.0209	<0.0987	38.7	50.6
	L-56-DP1-5	5	09/10/04	<5.94	<0.191	1.49	135	0.508	<0.00988	17.4	-	8.63	18.7	9.4	<0.0130	<0.0206	14.6	<0.175	<0.0209	<0.0987	32.2	46.6
	L-56-DP1-10	10	09/10/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP1-20	20	09/10/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP1-30	30	09/10/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP1-40	40	09/10/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP2	L-56-DP2-0.5	0.5	09/09/04	<5.94	<0.191	0.775	121	0.466	<0.00988	20.5	-	10.5	19.7	11.6	<0.0130	<0.0206	16.8	<0.175	<0.0209	<0.0987	35.1	50.7
	L-56-DP2-5	5	09/09/04	<5.94	<0.191 UJc	0.973	94.4	0.397	<0.00988	17.1	-	9.09	16.2	4.08	<0.0130	<0.0206	13.7	<0.175	<0.0209	<0.0987	31	39.9
	L-56-DP2-10	10	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP2-20	20	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP2-30	30	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP2-40	40	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP3	L-56-DP3-0.5	0.5	09/17/04	<5.94	<0.191	0.95	85.2	0.349	<0.00988	15.1	-	7.77	13.7	4.73	<0.0130	<0.0206	12.2	<0.175	<0.0209	<0.0987	29.3	36.9
	L-56-DP3-5	5	09/17/04	<5.94	<0.191	<0.130	120	0.456	<0.00988	19.3	-	10.1	17	4.46	<0.0130	<0.0206	15.9	<0.175	<0.0209	<0.0987	38	46.2
	L-56-DP3-10	10	09/17/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP3-20	20	09/17/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP3-30	30	09/17/04	**23.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP3-40	40	09/17/04	**357**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-12
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area L (Propellant Burn Area)

				TPH (mg/kg)		VOCs (µg/kg)									SVOCs (mg/kg)			
Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Gasoline Range	Diesel Range	Acetone	2-Butanone (MEK)	Carbon Disulfide	Chloromethane	1,1-Dichloroethene	Methyl-tert-Butyl Ether (MTBE)	Methylene Chloride	Toluene	Vinyl Acetate	bis(2-Ethylhexyl)phthalate	N-Nitrosodimethylamine	1,4-Dioxane (mg/kg)	PCBs (µg/kg)
Residential CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	18	89
Commercial/Industrial CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	64	300
Residential RSL:				-	-	6.1E+07	2.8E+07	8.2E+05	1.2E+05	3,300	430	11,000	5.0E+06	9.7E+05	35	0.0023	44	140
Commercial/Industrial RSL:				-	-	6.3E+08	2.0E+08	3.7E+06	5.0E+05	17,000	2,200	53,000	4.5E+07	4.1E+06	120	0.034	160	540
L-56-SB105	L-56-SB105-0.5'	0.5	09/16/08	<0.48	**1.5 Jq**	**20 Jq**	<19	**2.7 Jq**	<2.1	<2.7	<3.8	**4.4 Jq**	<4.5	<5.7	<36	<0.0005	-	-
	L-56-SB105-5'	5	09/16/08	1.5 BJaq	**0.90 Jq**	<8.9	<18	<2.5	<2.0	<2.6	<3.6	<2.2	<4.3	<5.4	67 BJaq	<0.0005	-	-
	L-56-SB105-10'	10	09/16/08	1.2 BJaq	<0.80	<8.4	<17	<2.4	<1.9	<2.4	<3.3	<2.0	<4.0	<5.0	<39	**0.0005 Jq**	-	-
	L-56-SB105-15'	15	09/16/08	0.89 BJaq	**1.5 Jq**	<8.1	<17	<2.3	<1.8	<2.3	<3.2	<2.0	<3.9	<4.8	<40	<0.0006	-	-
	L-56-SB105-20'	20	09/16/08	1.9 BJaq	**0.93 Jq**	<9.7	<20	<2.7	<2.2	<2.8	<3.9	<2.4	<4.7	<5.8	<42	<0.0006	-	-
	L-56-SB105-25'	25	09/16/08	1.4 BJaq	<0.93	<8.6	<18	<2.4	<1.9	<2.5	<3.4	2.5 BJkq	<4.2	<5.2	<46	<0.0006	-	-
	L-56-SB105-30'	30	09/16/08	1.3 BJaq	**0.87 Jq**	<11	<23	<3.1	<2.5	<3.2	<4.4	<2.7	7.5	<6.7	<42	<0.0006	-	-
	L-56-SB105-35'	35	09/16/08	1.3 BJaq	<0.76	<8.0	<17	<2.3	<1.8	<2.3	<3.2	<1.9	<3.9	<4.8	<37	<0.0005	-	-
	L-56-SB105-40'	40	09/16/08	1.1 BJaq	<0.83	<8.3	<17	<2.3	<1.9	<2.4	<3.3	<2.0	<4.0	<5.0	<41	<0.0006	-	-
L-56-SB106	L-56-SB106	0.5	04/30/08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tt-MW2-10	MW10-5-6.5'	6.5	09/05/06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW10-20-21.5'	21.5	09/05/06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW10-45-46.5'	46.5	09/05/06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tt-MW2-12	MW-12-5-6.5	6.5	09/01/06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-12-25-26.5	26.5	09/01/06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-12-40-41.5	41.5	09/01/06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP1	L-56-DP1-0.5	0.5	09/10/04	<0.13	<4.8	<7.2	<2.7	<0.32	<1.7	<0.63	<0.36	<1.5	1.2 Bp	<3.9	<0.13	<0.099	<0.031	-
	L-56-DP1-5	5	09/10/04	<0.13	<4.8	<8.1	<3.0	<0.36	<1.9	<0.71	<0.40	<1.7	<0.27	<4.4	<0.13	<0.099	<0.031	-
	L-56-DP1-10	10	09/10/04	<0.13	<4.8	<5.9	<2.2	<0.26	<1.4	<0.52	<0.29	<1.2	<0.20	<3.2	<0.13	<0.099	-	-
	L-56-DP1-20	20	09/10/04	<0.13	<4.8	<6.5	<2.4	<0.28	<1.5	<0.57	<0.32	<1.4	<0.22	<3.5			-	-
	L-56-DP1-30	30	09/10/04	<0.13	<4.8	<5.9	<2.2	<0.26	<1.4	<0.52	<0.30	<1.2	<0.20	<3.2			-	-
	L-56-DP1-40	40	09/10/04	<0.13	<4.8	<5.7	<2.1	<0.25	<1.3	<0.50	<0.29	<1.2	<0.19	<3.1			-	-
L-56-DP2	L-56-DP2-0.5	0.5	09/09/04	<0.13	<4.8	76 Bp	<3.5	<0.41	<2.1	<0.82	<0.46	<2.0	<0.31	<5.0	<0.13	<0.099	<0.031	-
	L-56-DP2-5	5	09/09/04	<0.13	<4.8	26 Bp	<2.3	<0.27	<1.4	<0.53	<0.30	<1.3	1.3 Bp	<3.3	<0.13	<0.099	<0.031	-
	L-56-DP2-10	10	09/09/04	<0.13	<4.8	<6.3	<2.3	<0.28	<1.5	<0.55	<0.31	<1.3	<0.21	<3.4	<0.13	<0.099	-	-
	L-56-DP2-20	20	09/09/04	<0.13	<4.8	<5.9	<2.2	<0.26	<1.4	<0.51	<0.29	<1.2	<0.20	<3.2			-	-
	L-56-DP2-30	30	09/09/04	<0.13	<4.8	<6.3	<2.3	<0.27	<1.4	<0.55	<0.31	<1.3	<0.21	<3.4			-	-
	L-56-DP2-40	40	09/09/04	<0.13	**30**	26 Bp	<2.4	<0.28	<1.5	<0.57	<0.32	<1.4	1.8 Bp	<3.5			-	-
L-56-DP3	L-56-DP3-0.5	0.5	09/17/04	<0.13	<4.8	<6.8	<2.5	<0.30	<1.6	<0.59	<0.34	<1.4	1.2 Bp	<3.7	<0.13	<0.099	<0.031	-
	L-56-DP3-5	5	09/17/04	<0.13	<4.8	<5.5	<2.0	<0.24	<1.3	<0.48	<0.27	<1.1	1.5 Bp	<2.9	<0.13	<0.099	<0.031	-
	L-56-DP3-10	10	09/17/04	<0.13	<4.8	<5.2	<1.9	<0.23	<1.2	<0.46	<0.26	<1.1	1.0 Bp	<2.8	<0.13	<0.099	-	-
	L-56-DP3-20	20	09/17/04	<0.13	<4.8	<6.2	<2.3	<0.27	<1.4	<0.54	<0.31	<1.3	1.7 Bp	<3.3	-	-	-	-
	L-56-DP3-30	30	09/17/04	<0.13	<4.8	<5.2	<1.9	<0.23	<1.2	<0.45	<0.26	<1.1	0.98 Bp	<2.8	-	-	-	-
	L-56-DP3-40	40	09/17/04	<0.13	<4.8	<5.5	<2.0	<0.24	<1.3	<0.48	<0.27	<1.1	<0.18	<2.9	-	-	-	-

TABLE 5-12
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area L (Propellant Burn Area)

Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg)																	
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium (Total)	Chromium (Hexavalent)	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	17	660	3,000	80	18	380	1,600	380	380	5	530	23,000
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	37	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	0.29	23	3,100	400	23	390	1,500	390	390	-	390	23,000
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	5.6	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000
L-56-DP4	L-56-DP4-0.5	0.5	09/09/04	<5.94	<0.191	1.15	145	0.481	<0.00988	19.6	-	10.2	19.9	5.07	<0.0130	<0.0206	15.8	<0.175	<0.0209	<0.0987	34.8	47.7
	L-56-DP4-5	5	09/09/04	<5.94	<0.191	<0.130	146	0.462	<0.00988	19.3	-	9.51	20.2	8.09	<0.0130	<0.0206	15.1	<0.175	<0.0209	<0.0987	33.5	48.4
	L-56-DP4-10	10	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP4-20	20	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP4-30	30	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP4-40	40	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP6	L-56-DP6-0.5	0.5	09/09/04	<5.94	<0.191	1.58	72.5	0.254	<0.00988	19.3	-	9.02	11.6	5.17	<0.0130	1.15	14.6	<0.175	<0.0209	<0.0987	27.5	45
	L-56-DP6-5	5	09/09/04	<5.94	<0.191	2.23	109	0.447	<0.00988	22.9	-	11.2	19.7	15.1	<0.0130	1.41	18	<0.175	<0.0209	<0.0987	35.2	69
	L-56-DP6-10	10	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP6-20	20	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP6-30	30	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP6-40	40	09/09/04	**111**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP7	L-56-DP7-0.5	0.5	09/09/04	<5.94	<0.191	1.36	150	0.551	<0.00988	21.9	-	10.9	23.4	12.3	<0.0130	<0.0206	17.6	<0.175	<0.0209	<0.0987	38.8	60.7
	L-56-DP7-5	5	09/09/04	<5.94	<0.191	1.18	147	0.554	<0.00988	22.6	-	11.1	22.4	10.7	<0.0130	<0.0206	18	<0.175	<0.0209	<0.0987	37.5	61
	L-56-DP7-10	10	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP7-20	20	09/09/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP7-30	30	09/09/04	**22.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP7-40	40	09/09/04	**37.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP8	L-56-DP8-0.5	0.5	09/08/04	<5.94	<0.191	2.77	136	0.512	<0.00988	26.1	-	13.1	17.7	6.41	<0.0130	0.774	20.2	<0.175	<0.0209	<0.0987	35.1	66.7
	L-56-DP8-5	5	09/08/04	<5.94	<0.191	1.32	73	0.325	<0.00988	20	-	10.4	13.9	5.07	<0.0130	<0.0206	15.6	<0.175	<0.0209	<0.0987	29.8	46.8
	L-56-DP8-10	10	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP8-20	20	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP8-30	30	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP8-40	40	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP9	L-56-DP9-0.5	0.5	09/08/04	<5.94	<0.191	1.73	101	0.462	<0.00988	19.6	-	10.8	18.7	4.66	<0.0130	<0.0206	16.5	<0.175	<0.0209	<0.0987	33.7	50.1
	L-56-DP9-5	5	09/08/04	<5.94	<0.191	2.09	123	0.676	<0.00988	27.8	-	15.7	21	6.3	<0.0130	0.457	21.6	<0.175	<0.0209	<0.0987	48.7	60.6
	L-56-DP9-10	10	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP9-20	20	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP9-30	30	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP9-40	40	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP10	L-56-DP10-0.5	0.5	09/08/04	<5.94	<0.191	1.35	92.5	0.526	<0.00988	22.2	-	11.8	17.2	5.54	<0.0130	<0.0206	16.1	<0.175	<0.0209	<0.0987	39.9	48.1
	L-56-DP10-5	5	09/08/04	<5.94	<0.191	4.06	130	0.688	<0.00988	29.8	-	15.5	31	6.79	<0.0130	<0.0206	25.4	<0.175	<0.0209	<0.0987	49.8	71.9
	L-56-DP10-10	10	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP10-20	20	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP10-30	30	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP10-40	40	09/08/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-12
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area L (Propellant Burn Area)

Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	TPH (mg/kg) Gasoline Range	TPH (mg/kg) Diesel Range	VOCs (µg/kg) Acetone	VOCs (µg/kg) 2-Butanone (MEK)	VOCs (µg/kg) Carbon Disulfide	VOCs (µg/kg) Chloromethane	VOCs (µg/kg) 1,1-Dichloroethene	VOCs (µg/kg) Methyl-tert-Butyl Ether (MTBE)	VOCs (µg/kg) Methylene Chloride	VOCs (µg/kg) Toluene	VOCs (µg/kg) Vinyl Acetate	SVOCs (mg/kg) bis(2-Ethylhexyl)phthalate	SVOCs (mg/kg) N-Nitrosodimethylamine	1,4-Dioxane (mg/kg)	PCBs (µg/kg)
Residential CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	18	89
Commercial/Industrial CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	64	300
Residential RSL:				-	-	6.1E+07	2.8E+07	8.2E+05	1.2E+05	3,300	430	11,000	5.0E+06	9.7E+05	35	0.0023	44	140
Commercial/Industrial RSL:				-	-	6.3E+08	2.0E+08	3.7E+06	5.0E+05	17,000	2,200	53,000	4.5E+07	4.1E+06	120	0.034	160	540
L-56-DP4	L-56-DP4-0.5	0.5	09/09/04	<0.13	<4.8	31 Bp	<3.4	<0.40	<2.1	<0.79	<0.45	<1.9	3.0 Bp	<4.9	<0.13	<0.099	<0.031	-
	L-56-DP4-5	5	09/09/04	<0.13	<4.8	32 Bp	<2.3	<0.28	<1.5	<0.55	<0.31	<1.3	1.3 Bp	<3.4	<0.13	<0.099	<0.031	-
	L-56-DP4-10	10	09/09/04	<0.13	<4.8	<6.0	<2.2	<0.26	<1.4	<0.52	<0.30	<1.2	1.3 Bp	<3.2	<0.13	<0.099	-	-
	L-56-DP4-20	20	09/09/04	<0.13	<4.8	<5.4	<2.0	<0.24	<1.2	<0.47	<0.27	<1.1	<0.18	<2.9	-	-	-	-
	L-56-DP4-30	30	09/09/04	<0.13	<4.8	<5.3	<2.0	<0.23	<1.2	<0.47	<0.27	<1.1	1.3 Bp	<2.9	-	-	-	-
	L-56-DP4-40	40	09/09/04	<0.13	<4.8	<5.8	<2.2	<0.25	<1.3	<0.51	<0.29	<1.2	<0.20	<3.1	-	-	-	-
L-56-DP6	L-56-DP6-0.5	0.5	09/09/04	<0.13	<4.8	<6.1	<2.3	<0.27	<1.4	<0.53	<0.30	<1.3	<0.20	<3.3	<0.13	<0.099	<0.031	-
	L-56-DP6-5	5	09/09/04	<0.13	<4.8	<6.6	<2.4	<0.29	<1.5	<0.57	<0.33	<1.4	<0.22	<3.5	<0.13	<0.099	<0.031	-
	L-56-DP6-10	10	09/09/04	<0.13	<4.8	<7.3	<2.7	<0.32	<1.7	<0.64	<0.36	<1.5	<0.24	<3.9	<0.13	<0.099	-	-
	L-56-DP6-20	20	09/09/04	<0.13	<4.8	<5.3	<2.0	<0.23	<1.2	<0.47	<0.27	<1.1	<0.18	<2.9	-	-	-	-
	L-56-DP6-30	30	09/09/04	<0.13	<4.8	<5.5	<2.0	<0.24	<1.3	<0.48	<0.27	<1.1	1.1 Bp	<2.9	-	-	-	-
	L-56-DP6-40	40	09/09/04	<0.13	<4.8	<5.1	<1.9	<0.22	<1.2	<0.44	<0.25	<1.1	3.3 Bp	<2.7	-	-	-	-
L-56-DP7	L-56-DP7-0.5	0.5	09/09/04	<0.13	<4.8	<5.7	<2.1	<0.25	<1.3	<0.50	<0.29	<1.2	<0.19	<3.1	<0.13	<0.099	<0.031	-
	L-56-DP7-5	5	09/09/04	<0.13	<4.8	<6.3	<2.3	<0.27	<1.4	<0.55	<0.31	<1.3	<0.21	<3.4	<0.13	<0.099	<0.031	-
	L-56-DP7-10	10	09/09/04	<0.13	<4.8	<6.2	<2.3	<0.27	<1.4	<0.54	<0.31	<1.3	<0.21	<3.3	<0.13	<0.099	-	-
	L-56-DP7-20	20	09/09/04	<0.13	<4.8	<6.3	<2.3	<0.28	<1.5	<0.55	<0.31	<1.3	<0.21	<3.4	-	-	-	-
	L-56-DP7-30	30	09/09/04	<0.13	<4.8	<5.8	<2.1	<0.25	<1.3	<0.51	<0.29	<1.2	1.7 Bp	<3.1	-	-	-	-
	L-56-DP7-40	40	09/09/04	<0.13	<4.8	<5.9	<2.2	<0.26	<1.4	<0.52	<0.30	<1.2	<0.20	<3.2	-	-	-	-
L-56-DP8	L-56-DP8-0.5	0.5	09/08/04	<0.13	<4.8	75 Bp	<3.1	<0.37	<1.9	<0.74	<0.42	<1.8	<0.28	<4.5	<0.13	<0.099	<0.031	-
	L-56-DP8-5	5	09/08/04	<0.13	<4.8	29 Bp	<2.3	<0.27	<1.4	<0.54	<0.31	<1.3	<0.21	<3.3	<0.13	<0.099	<0.031	-
	L-56-DP8-10	10	09/08/04	<0.13	<4.8	<5.5	<2.0	<0.24	<1.3	<0.48	<0.27	<1.2	<0.19	<3.0	<0.13	<0.099	-	-
	L-56-DP8-20	20	09/08/04	<0.13	<4.8	<5.5	<2.0	<0.24	<1.3	<0.48	<0.27	<1.2	<0.18	<3.0	-	-	-	-
	L-56-DP8-30	30	09/08/04	<0.13	<4.8	<6.1	<2.3	<0.27	<1.4	<0.54	<0.31	<1.3	<0.21	<3.3	-	-	-	-
	L-56-DP8-40	40	09/08/04	<0.13	<4.8	<5.3	<2.0	<0.23	<1.2	<0.46	<0.26	<1.1	<0.18	<2.8	-	-	-	-
L-56-DP9	L-56-DP9-0.5	0.5	09/08/04	<0.13	<4.8	<6.4	<2.4	<0.28	<1.5	<0.56	<0.32	<1.3	<0.21	<3.4	<0.13	<0.099	<0.031	-
	L-56-DP9-5	5	09/08/04	<0.13	<4.8	<5.6	<2.1	<0.25	<1.3	<0.49	<0.28	<1.2	<0.19	<3.0	<0.13	<0.099	<0.031	-
	L-56-DP9-10	10	09/08/04	<0.13	<4.8	30 Bp	<2.4	<0.28	<1.5	<0.56	<0.32	<1.3	<0.21	<3.4	<0.13	<0.099	-	-
	L-56-DP9-20	20	09/08/04	<0.13	<4.8	<6.1	<2.3	<0.27	<1.4	<0.54	<0.31	<1.3	<0.21	<3.3	-	-	-	-
	L-56-DP9-30	30	09/08/04	<0.13	<4.8	<7.4	<2.7	<0.32	<1.7	<0.64	<0.37	<1.5	<0.25	<3.9	-	-	-	-
	L-56-DP9-40	40	09/08/04	<0.13	<4.8	<5.9	<2.2	<0.26	<1.4	**1.2**	<0.29	<1.2	<0.20	<3.2	-	-	-	-
L-56-DP10	L-56-DP10-0.5	0.5	09/08/04	<0.13	<4.8	<12	<4.4	<0.52	<2.7	<1.0	<0.59	<2.5	<0.40	<6.4	<0.13	<0.099	<0.031	-
	L-56-DP10-5	5	09/08/04	<0.13	<4.8	<6.4	<2.4	<0.28	<1.5	<0.56	<0.32	<1.4	<0.22	<3.5	<0.13	<0.099	<0.031	-
	L-56-DP10-10	10	09/08/04	<0.13	<4.8	<6.9	<2.5	<0.30	<1.6	<0.60	<0.34	<1.4	<0.23	<3.7	<0.13	<0.099	-	-
	L-56-DP10-20	20	09/08/04	<0.13	<4.8	<5.7	<2.1	<0.25	<1.3	<0.50	<0.28	<1.2	<0.19	<3.1	-	-	-	-
	L-56-DP10-30	30	09/08/04	<0.13	<4.8	<7.1	<2.6	<0.31	<1.6	<0.62	<0.35	<1.5	2.4 Bp	<3.8	-	-	-	-
	L-56-DP10-40	40	09/08/04	<0.13	<4.8	<5.5	<2.0	<0.24	<1.3	<0.48	<0.27	<1.1	<0.18	<2.9	-	-	-	-

TABLE 5-12
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area L (Propellant Burn Area)

Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg)																	
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium (Total)	Chromium (Hexavalent)	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	17	660	3,000	80	18	380	1,600	380	380	5	530	23,000
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	37	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	0.29	23	3,100	400	23	390	1,500	390	390	-	390	23,000
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	5.6	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000
L-56-DP11	L-56-DP11-0.5	0.5	09/06/04	<5.94	<0.191	1.09	113	0.592	<0.00988	26.6	-	14.5	22.7	6.42	<0.0130	<0.0206	20.9	<0.175	<0.0209	<0.0987	46.3	60.6
	L-56-DP11-5	5	09/06/04	<5.94	<0.191	0.903	88.8	0.525	<0.00988	21.3	-	12	20.4	5.65	<0.0130	<0.0206	16.7	<0.175	<0.0209	<0.0987	49.8	47.1
	L-56-DP11-10	10	09/06/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP11-20	20	09/06/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP11-30	30	09/06/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP11-40	40	09/06/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-DP12	L-56-DP12-0.5	0.5	09/06/04	<5.94	<0.191	2.82	83.3	0.433	<0.00988	22.2	-	10.9	16.6	5.33	<0.0130	<0.0206	16.1	<0.175	<0.0209	<0.0987	36.6	46.5
	L-56-DP12-5	5	09/06/04	<5.94	<0.191	5.04	74.2	0.439	<0.00988	20.6	-	14.1	16.3	6.31	<0.0130	<0.0206	15.9	<0.175	<0.0209	<0.0987	38.1	44.7
	L-56-DP12-10	10	09/06/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP12-20	20	09/06/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP12-30	30	09/06/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L-56-DP12-40	40	09/06/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-56-HA2	L-56-HA2-0.5	0.5	09/20/04	<5.94	<0.191	1.3	91.2	0.385	<0.00988	18.7	-	11.3	16.9	4.86	<0.0130	<0.0206	16.6	<0.175	<0.0209	<0.0987	29.8	49.6
	L-56-HA2-5	5	09/20/04	<5.94	<0.191	<0.130	37.2	<0.00368	<0.00988	10.5	-	6.53	8.21	1.8	<0.0130	<0.0206	9.57	<0.175	<0.0209	<0.0987	16.1	27
L-56-HA3	L-56-HA3-0.5	0.5	09/20/04	<5.94	<0.191	2.13	98.4	0.455	<0.00988	21.1	-	11.4	19.5	6.75	<0.0130	<0.0206	17.1	<0.175	<0.0209	<0.0987	35.8	55.3
	L-56-HA3-5	5	09/20/04	<5.94	<0.191	0.917	33	<0.00368	<0.00988	8.99	-	5.11	6.74	1.98	<0.0130	<0.0206	7.65	<0.175	<0.0209	<0.0987	14.4	21.6
L-57-HA1	L-57-HA1-0.5	0.5	09/17/04	<5.94	<0.191	0.825	99.6	0.451	<0.00988	19.7	-	10.5	19.6	7.94	<0.0130	<0.0206	16.6	<0.175	<0.0209	<0.0987	35.4	53.5
	L-57-HA1-5	5	09/17/04	<5.94	<0.191	0.867	76.3	0.389	<0.00988	17.7	-	8.64	14.8	4.44	<0.0130	<0.0206	14.4	<0.175	<0.0209	<0.0987	32.2	41.4

TABLE 5-12
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area L (Propellant Burn Area)

Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	TPH (mg/kg)		VOCs (µg/kg)									SVOCs (mg/kg)		1,4-Dioxane (mg/kg)	PCBs (µg/kg)
				Gasoline Range	Diesel Range	Acetone	2-Butanone (MEK)	Carbon Disulfide	Chloromethane	1,1-Dichloroethene	Methyl-tert-Butyl Ether (MTBE)	Methylene Chloride	Toluene	Vinyl Acetate	bis(2-Ethylhexyl)phthalate	N-Nitrosodimethylamine		
Residential CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	18	89
Commercial/Industrial CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	64	300
Residential RSL:				-	-	6.1E+07	2.8E+07	8.2E+05	1.2E+05	3,300	430	11,000	5.0E+06	9.7E+05	35	0.0023	44	140
Commercial/Industrial RSL:				-	-	6.3E+08	2.0E+08	3.7E+06	5.0E+05	17,000	2,200	53,000	4.5E+07	4.1E+06	120	0.034	160	540
L-56-DP11	L-56-DP11-0.5	0.5	09/06/04	<0.13	<4.8	<6.4	<2.4	<0.28	<1.5	<0.56	<0.32	<1.3	<0.21	<3.4	<0.13	<0.099	<0.031	-
	L-56-DP11-5	5	09/06/04	<0.13	<4.8	<6.3	<2.3	<0.27	<1.4	<0.55	<0.31	<1.3	<0.21	<3.4	<0.13	<0.099	<0.031	-
	L-56-DP11-10	10	09/06/04	<0.13	<4.8	<6.1	<2.3	<0.27	<1.4	<0.53	<0.30	<1.3	<0.20	<3.3	<0.13	<0.099	-	-
	L-56-DP11-20	20	09/06/04	<0.13	<4.8	<6.0	<2.2	<0.26	<1.4	<0.53	<0.30	<1.3	<0.20	<3.2	-	-	-	-
	L-56-DP11-30	30	09/06/04	<0.13	<4.8	<5.5	<2.0	<0.24	<1.3	<0.48	<0.27	<1.2	<0.18	<2.9	-	-	-	-
	L-56-DP11-40	40	09/06/04	<0.13	<4.8	<6.3	<2.3	<0.27	<1.4	<0.55	<0.31	<1.3	<0.21	<3.4	-	-	-	-
L-56-DP12	L-56-DP12-0.5	0.5	09/06/04	<0.13	<4.8	<5.8	<2.1	<0.25	<1.3	<0.50	<0.29	<1.2	<0.19	<3.1	<0.13	<0.099	<0.031	-
	L-56-DP12-5	5	09/06/04	<0.13	<4.8	<6.1	<2.3	<0.27	<1.4	<0.54	<0.31	<1.3	<0.21	<3.3	<0.13	<0.099	<0.031	-
	L-56-DP12-10	10	09/06/04	<0.13	<4.8	<5.4	<2.0	<0.24	<1.2	<0.47	<0.27	<1.1	<0.18	<2.9	<0.13	<0.099	-	-
	L-56-DP12-20	20	09/06/04	<0.13	<4.8	<5.6	<2.1	<0.25	<1.3	<0.49	<0.28	<1.2	<0.19	<3.0	-	-	-	-
	L-56-DP12-30	30	09/06/04	<0.13	<4.8	<5.1	<1.9	<0.22	<1.2	<0.44	<0.25	<1.1	<0.17	<2.7	-	-	-	-
	L-56-DP12-40	40	09/06/04	<0.13	<4.8	<5.5	<2.0	<0.24	<1.3	<0.48	<0.27	<1.2	<0.18	<3.0	-	-	-	-
L-56-HA2	L-56-HA2-0.5	0.5	09/20/04	<0.13	<4.8	<8.2	<3.0	<0.36	<1.9	<0.72	<0.41	<1.7	<0.27	<4.4	<0.13	<0.099	<0.031	-
	L-56-HA2-5	5	09/20/04	<0.13	<4.8	<8.2	<3.0	<0.36	<1.9	<0.72	<0.41	<1.7	<0.27	<4.4	<0.13	<0.099	<0.031	-
L-56-HA3	L-56-HA3-0.5	0.5	09/20/04	<0.13	<4.8	<7.4	<2.7	<0.32	<1.7	<0.64	<0.37	<1.5	<0.25	<3.9	<0.13	<0.099	<0.031	-
	L-56-HA3-5	5	09/20/04	<0.13	<4.8	<6.9	<2.5	<0.30	<1.6	<0.60	<0.34	<1.4	<0.23	<3.7	<0.13	<0.099	<0.031	-
L-57-HA1	L-57-HA1-0.5	0.5	09/17/04	<0.13	<4.8	<8.7	<3.2	<0.38	<2.0	<0.76	<0.43	<1.8	<0.29	<4.7	<0.13	<0.099	<0.031	All ND
	L-57-HA1-5	5	09/17/04	<0.13	<4.8	<6.3	<2.3	<0.27	<1.4	<0.55	<0.31	<1.3	<0.21	<3.4	<0.13	<0.099	<0.031	All ND

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
mg/kg - Concentration in milligrams per kilogram.
Metals - California Title 22 Metals.
TPH - Total petroleum hydrocarbons.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
PCBs - Polychlorinated biphenyls.
"<" - Indicates concentration below indicated method detection limit.
"-" - Sample not analyzed for analyte.

"B" - The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination. The result is considered not to have originated from the environmental sample, because cross-contamination is suspected.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"R" - The sample result is rejected and not usable for any purpose. The presence or absence of the analyte cannot be verified.
"U" - The analyte was not detected above the method detection limit (MDL).
"UJ" - The analyte was not detected above the MDL. However, the MDL may be elevated above the reported detection limit.
"a" - The analyte was found in the method blank.
"b" - The surrogate spike recovery was outside quality control criteria.
"c" - The MS and/or MSD recoveries were outside control limits.
"d" - The laboratory control sample recovery was outside control limits.
"e" - A holding time violation occurred.
"f" - The duplicate/replicate sample's relative percent difference (RPD) was outside the control limit.
"p" - Professional judgment determined the data should be qualified.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).
"ND" - Concentration of analyte(s) was not detected above the MDL.

Perchlorate-impacted groundwater originating in Test Bay Canyon migrates down Laborde Canyon to well TT-MW2-18, which had a perchlorate concentration of 13,000 µg/L in May 2008. Perchlorate was not detected in well TT-MW2-12, located approximately 625 feet downgradient of TT-MW2-18, in May 2008. These results suggest that the Test Bay Canyon groundwater plume attenuates to non-detectable concentrations between TT-MW2-18 and TT-MW2-12. However, an alternate hypothesis is that perchlorate-impacted groundwater is migrating through Area L along a preferential pathway at greater depth. To evaluate this alternative hypothesis, the DSI work plan included installation of two deep monitoring wells in Area L, adjacent to TT-MW2-10.

Existing monitoring well TT-MW2-4S is screened between 60 and 70 feet bgs, approximately 10 feet below the water table, and is therefore not usable for the detection and monitoring of perchlorate-impacted groundwater at the water table. An additional well adjacent to TT-MW2-4S was proposed in the DSI to address this potential data gap.

Initial DSI characterization activities included the following:

- Drilling and sampling 5 primary soil borings (L-56-SB101 to L-56-SB105) to a depth of 40 feet bgs in the area specifically designated as the propellant burn area in the Radian (1986a) historical report.
- Installing 2 groundwater monitoring wells (TT-MW2-35A and B) adjacent to TT-MW2-10 to characterize the vertical extent of perchlorate-impacted groundwater and whether a preferred pathway for perchlorate migration could be present at depth.
- Drilling 1 soil boring (L-56-W102) to the water table adjacent to TT-MW2-4S, and completing the boring as a water table monitoring well.

Based on the initial results, 2 additional hand auger borings (L-56-SB103A and L-56-SB106) were drilled to further characterize potential metals impacts in soil. Based on the field observations made while drilling soil boring L-56-W102, a new well was not installed adjacent to TT-MW2-4S.

5.4.3.3 Geology and Hydrogeology

The surface geology of Area L is shown on Figure 5-35. An incised active drainage channel is present on the floor of Laborde Canyon. Alluvium underlies the central portion of Laborde Canyon. Colluvium forms broad aprons along a portion of the canyon margins. The STF is exposed on hillsides, and on the eastern side of the incised drainage channel. No evidence of artificial fill or grading activity was noted.

Figure 5-36 (cross-section G-G') shows the subsurface geology of Area L along the length of Laborde Canyon; Figure 5-37 (cross-sections H-H') shows the subsurface geology across Laborde Canyon. The STF consists of north-dipping, interfingering beds of sandstone and mudstone to a depth of 206 feet, the

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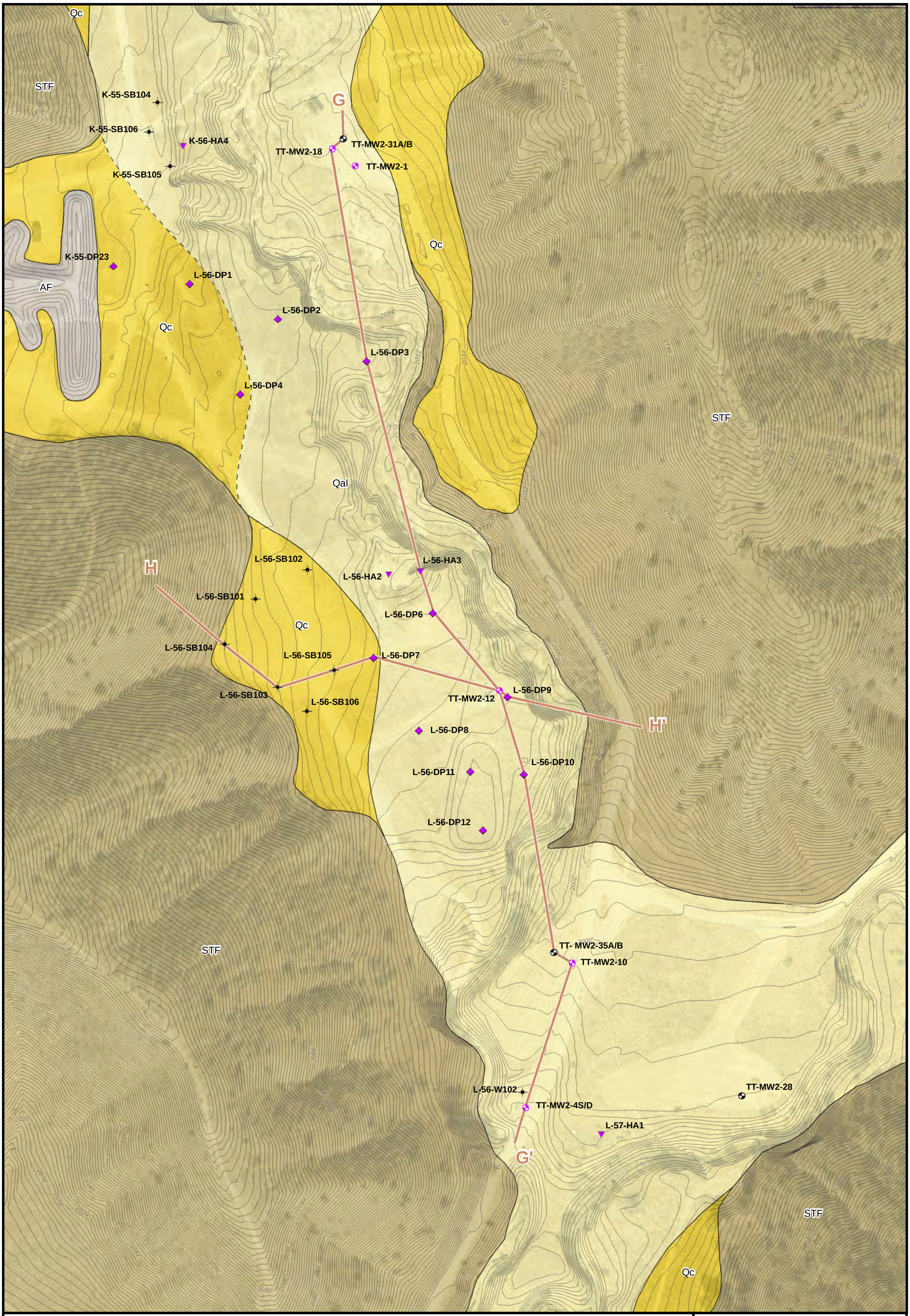


LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Geologic Cross Section Location
- Contact (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)

AF	Artificial Fill
Qal	Alluvium
Qc	Colluvium
STF	San Timoteo Formation

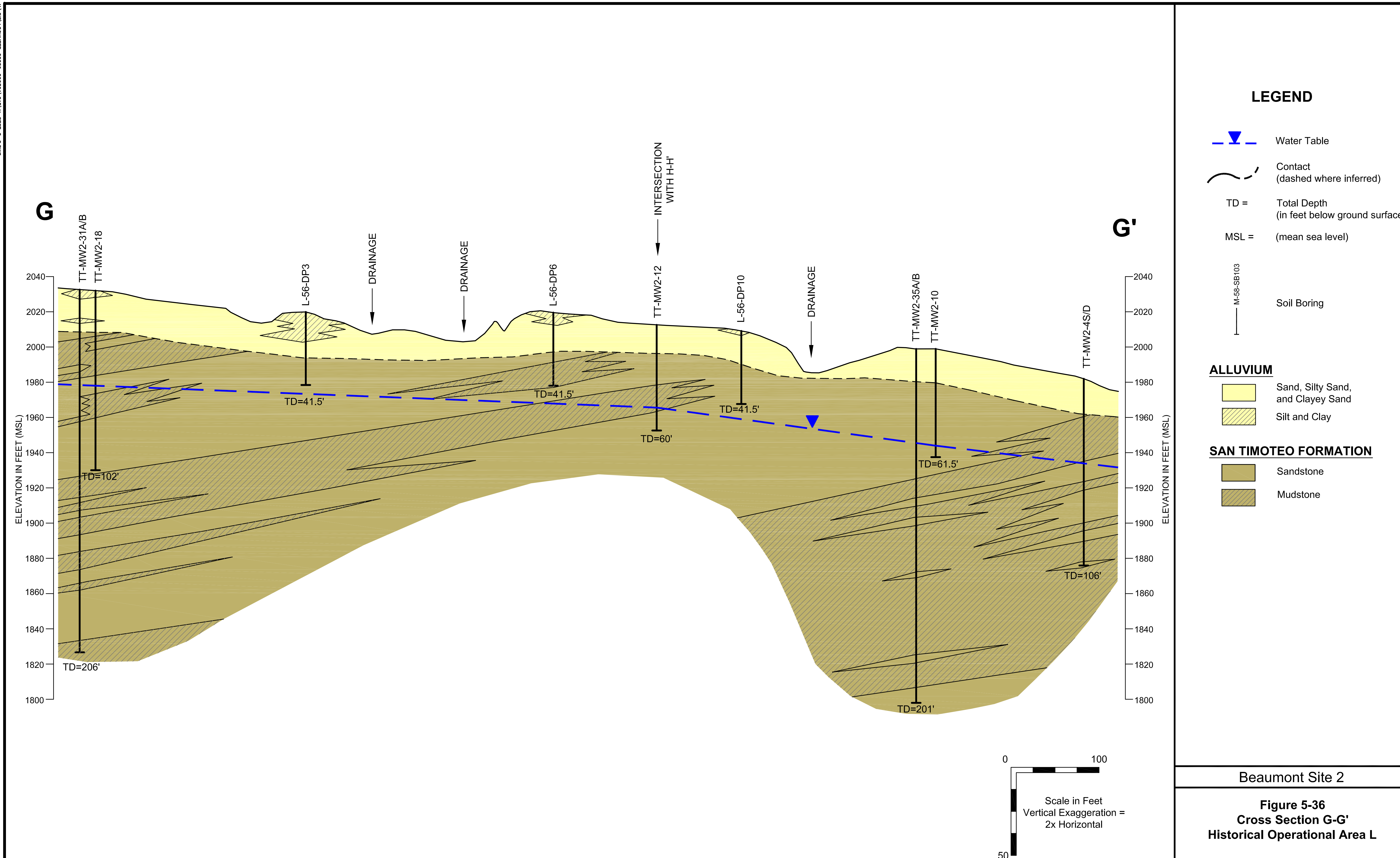
0 50 100 Feet

Beaumont Site 2

Figure 5-35

Surface Geology Historical Operational Area L

TETRA TECH

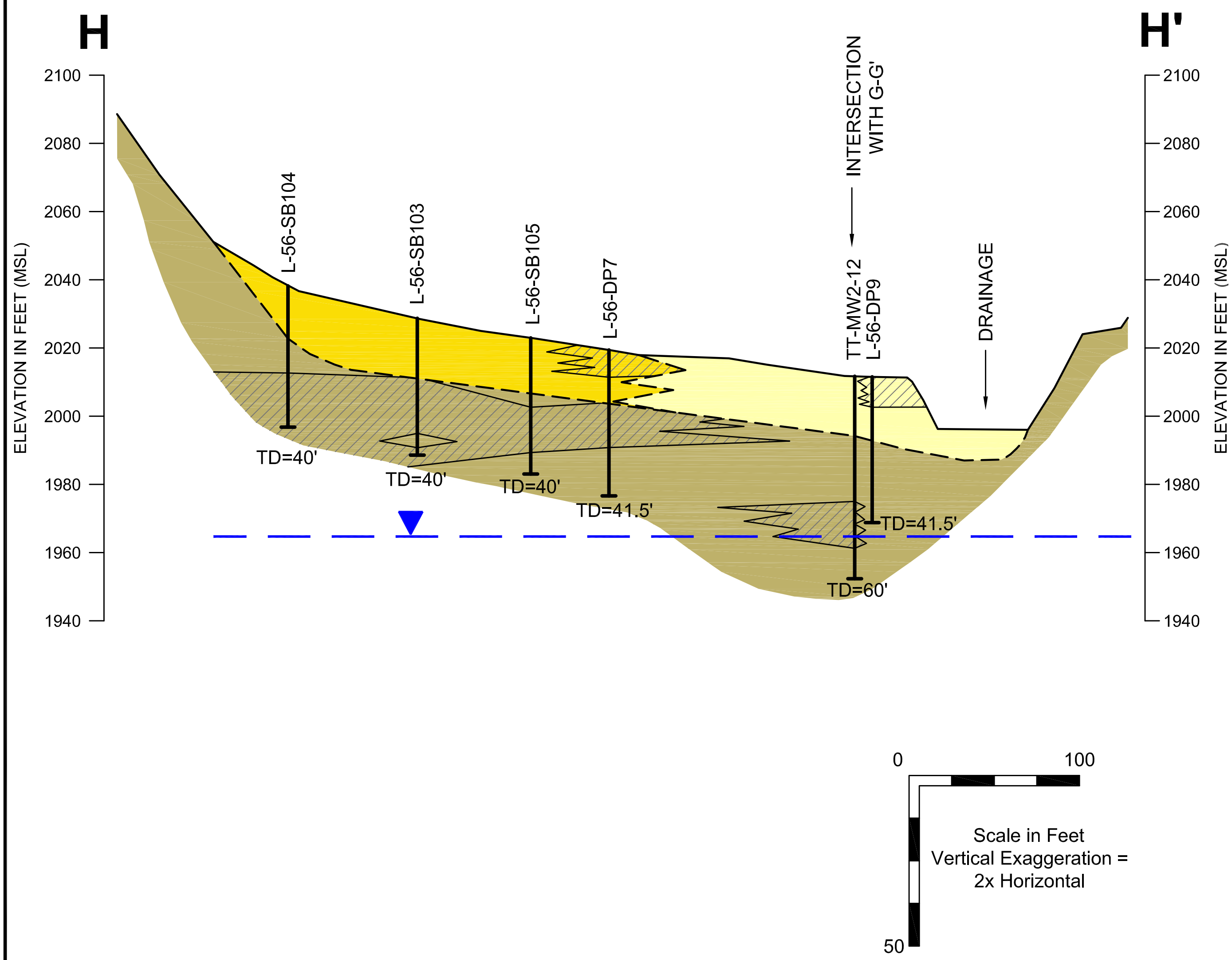


Beaumont Site 2

Figure 5-36
Cross Section G-G'
Historical Operational Area L

TETRA TECH

X:\GIS\LOCKHEED 22289-090301\CAD\X-SECT H-H.DWG



LEGEND

Water Table

Contact (dashed where inferred)

TD = Total Depth (in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

Silt and Clay

COLLUVIUM

Sand, Silty Sand, and Clayey Sand

Silt and Clay

SAN TIMOTEO FORMATION

Sandstone

Mudstone

Beaumont Site 2

Figure 5-37
Cross Section H-H'
Historical Operational Area L

TETRA TECH

maximum depth explored. An approximately 120-foot thick mudstone sequence was noted at TT-MW2-35A and B.

The depths to groundwater in shallow wells TT-MW2-12, TT-MW2-10, and TT-MW2-4S were approximately, 47.3 feet bgs, 48.2 feet bgs, and 55.1 feet bgs, respectively, in May 2009. The depth to groundwater in deep wells TT-MW2-4D, TT-MW2-35A, and TT-MW2-35B were approximately 55.0 feet bgs, 46.8 feet bgs, and 51.76 feet bgs, respectively. The vertical gradient between wells TT-MW2-4S and TT-MW2-4D was downward at -0.16 ft/ft. The vertical gradient between wells TT-MW2-10 and TT-MW2-35A was upward at +0.11 ft/ft. The cause of the upward gradient between TT-MW2-10 and TT-MW2-35A is not fully understood at this time, but may be related to the thick mudstone sequence noted above. Groundwater flow is inferred to be generally southward, down Laborde Canyon.

5.4.3.4 Soil Sampling Results

Analytical results for soil samples collected during the DSI and previous investigations are summarized in Table 5-12. Sample locations are shown in Figure 5-34. A total of 125 soil samples have been analyzed in Area L, including 47 samples collected during the DSI and 78 samples collected during previous investigations. Soil results for the DSI samples include the following:

- Perchlorate was detected in 13 of the 45 samples analyzed, at concentrations ranging from 1.1 to 69 µg/kg. The highest perchlorate concentrations were found in 3 samples collected at depths of 30 feet bgs or greater; the highest detected perchlorate concentration at depths shallower than 30 feet bgs was 6.2 µg/kg in boring L-56-SB105 at a depth of 25 feet bgs.
- TPHg was not positively detected in any of the 45 samples analyzed. TPHd was detected in 24 of the 45 samples analyzed, at concentrations ranging from 0.77 to 43 µg/kg. The highest TPHd concentrations were detected in the 0.5-foot bgs samples from boring L-56-SB102. No VOCs or SVOCs commonly associated with refined petroleum products (i.e., benzene, toluene, ethylbenzene, xylenes, naphthalene, or PAHs) were detected in this sample. The remaining TPHd detections were at concentrations of 4.2 µg/kg or less.
- Several VOCs were detected at low concentrations in soil, including acetone (2 samples), MEK; 1 sample), carbon disulfide (2 samples), chloromethane (1 sample), methyl tert-butyl ether (1 sample), methylene chloride (3 samples), toluene (16 samples), and vinyl acetate (2 samples).
- Bis-2-ethylhexyl phthalate was detected in 3 samples, at concentrations ranging from 41 to 180 µg/kg. NDMA was detected in one sample, at a concentration of 0.5 µg/kg. No SVOCs were detected in the 41 remaining samples.
- The metals background comparisons conducted as part of the DSI found that concentrations of several metals were either statistically elevated or potentially elevated relative to background. These results are discussed below in Section 5.4.3.6.

5.4.3.5 Groundwater Sampling Results

Analytical results for groundwater samples collected during the DSI are summarized in Table 5-13. A total of 8 groundwater samples were collected during the DSI, including 4 grab samples collected while

TABLE 5-13
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Area L (Propellant Burn Area)

Boring/Well No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/L)	VOCs (µg/L)						
					Acetone	2-Butanone (MEK)	Benzene	Carbon Disulfide	Chloromethane	2-Hexanone	Toluene
California MCL:				6	-	-	1	-	-	-	150
California DWNL:				-	-	-	-	160	-	-	-
GRAB GROUNDWATER SAMPLES											
TT-MW2-35A/B	L56-W101-GW117'	117	12/08/08	<0.071	**6.5**	**1.2 Jq**	<0.14	<0.36	<0.36	<1.2	<0.22
	L-56-W101-GW-144'	144	12/10/08	<0.071	**6.0**	**1.4 Jq**	**0.38 Jq**	<0.36	<0.36	<1.2	<0.22
	L-56-W101-GW-165'	165	12/11/08	<0.071	**19**	**4.0**	**1.9**	<0.36	<0.36	**1.9 Jq**	<0.22
	L-56-W101-GW-190.5'	190.5	12/11/08	<0.071	<5.0	<1.2	<0.14	<0.36	<0.36	<1.2	<0.22
MONITORING WELL SAMPLES											
TT-MW2-35A/B	TT-MW2-35A	135 - 145	02/13/09	<0.071	<5.0	<1.2	<0.14	**1.9**	<0.36	<1.2	**0.71**
	TT-MW2-35A	135 - 145	03/18/09	<0.71	<5.0	<1.2	<0.14	**2.6**	<0.36	<1.2	**0.67**
	TT-MW2-35B	190 - 200	02/11/09	<0.071	<5.0	<1.2	**0.28 Jq**	**2.1**	**0.37 Jq**	<1.2	**5.9**
	TT-MW2-35B	190 - 200	03/18/09	<0.071	<5.0	<1.2	**0.21 Jq**	**5.4**	<0.36	<1.2	**3.7**

Notes:

"Bold" - Indicates concentrations detected above the method detection limit.
MCL - California Maximum Contaminant Level (February 4, 2010).
DWNL - California Drinking Water Notification Level (December 14, 2007).
VOCs - Volatile organic compounds.
µg/L - Micrograms per liter.
bgs - Below ground surface.
"<" - Indicates concentration below indicated method detection limit.
"-" - Not analyzed or not available.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).

drilling TT-MW2-35A and B, and four samples from monitoring wells TT-MW2-35A and B. Groundwater results include the following:

- Perchlorate was not detected in any of the groundwater samples collected from wells TT-MW2-35A and B.
- Benzene was detected at a concentration of 1.9 µg/L (above the California MCL of 1 µg/L) in the grab sample collected from boring TT-MW2-35 at a depth of approximately 165 feet bgs. This concentration was not confirmed in samples collected from monitoring wells TT-MW2-35A and B.

Soil boring L-56-W102 was drilled adjacent to existing monitoring wells TT-MW2-4S, which is screened from 60 to 70 feet bgs, and has a groundwater level of approximately 48.2 feet bgs. The intent of boring L-56-W102 was to install a water table well at this location. L-56-W102 was initially drilled to a depth of 55 feet bgs with an HSA rig. After reaching total depth, the augers were raised 10 feet to allow groundwater to enter the borehole. No groundwater was observed after three days. The boring was then drilled an additional five feet to a depth of 60 feet bgs (the depth of the top of screen for well TT-MW2-4S), and the augers raised 15 feet. Groundwater was not observed after seven days. Based on these results, it was concluded that groundwater in this area is confined, and that existing well TT-MW2-4S is screened across the shallowest water-bearing zone in this area. Boring L-56-W102 was subsequently abandoned by backfilling with bentonite/cement grout.

5.4.3.6 Discussion

Metals in Soil

The background comparisons conducted as part of the DSI divided soils in Area L into alluvium and colluvium, as shown in Figure 5-35. The background comparisons for samples collected in alluvium found that no metals had concentrations that were statistically elevated with respect to background. Several metals (beryllium, cobalt, lead, and molybdenum) were found at potentially elevated concentrations (i.e., concentrations exceeding the alluvium BTVs) in one or more samples. In all cases, the potentially elevated concentrations represented only slight exceedances of the BTVs, and were not characterized further. Beryllium, cobalt, lead, and molybdenum in alluvium samples will be evaluated as COPCs in future risk assessments for the Site.

The background comparisons for samples collected in colluvium found that three metals (antimony, beryllium, and chromium) have concentrations that were statistically elevated with respect to background. Metals that have potentially elevated concentrations (i.e., concentrations exceeding colluvium/STF BTVs) include antimony, lead, mercury, and selenium. The maximum detected antimony, lead, mercury, and selenium concentrations were just 0.47 mg/kg, 16 mg/kg, 0.05 mg/kg, and 2.8 mg/kg, respectively. None of the detected chromium concentrations exceeded the BTV of 54.76. It should be noted that chromium concentrations of up to 72 mg/kg were detected in Area L at depths greater than 10 feet bgs. The three samples with the highest total chromium concentrations were also analyzed for hexavalent chromium. Hexavalent chromium was not detected in any of the analyzed samples (Table 5-12). Based on the low detected concentrations, no further characterization of these metals was conducted as part of the DSI. Antimony, beryllium, chromium, lead, mercury, and selenium in colluvium samples will be evaluated as COPCs in future risk assessments for the Site.

Additional investigation was conducted to evaluate molybdenum at one location in Area L. Molybdenum was initially detected at a concentration of 170 mg/kg in the sample collected at 0.5 feet bgs from boring L-56-SB103. This concentration exceeds the BTV of 14.3 mg/kg by more than a factor of 10. This location was resampled to confirm the initial molybdenum detection; molybdenum was not detected in the replicate sample from boring L-56-SB103A, nor was it detected in step-out boring L-56-SB106. Because the initial detection of molybdenum in boring L-56-SB103 could not be replicated, it was not considered further in the background comparisons.

Perchlorate in Groundwater

Perchlorate was not detected in monitoring wells TT-MW2-35A and B. These results suggest that a preferred perchlorate migration pathway is not present at depth in Area L. The decline in perchlorate concentrations between wells TT-MW2-1, TT-MW2-18, and TT-MW2-31A and B in Area K and well TT-MW2-10 in Area L is therefore considered to represent the southernmost extent of the Test Bay Canyon perchlorate plume.

Area L as a Source Area

To date, a total of 23 borings have been drilled in Area L, and a total of 125 soil samples have been analyzed for at least one constituent. This work has found no credible evidence for the presence of a source of perchlorate or other chemicals in soil. Furthermore, 6 monitoring wells (TT-MW2-12, TT-MW2-10, TT-MW2-35A and B, and TT-MW2-4S and D have been installed in Area L, none of which have detectable concentrations of perchlorate. These results also suggest that a significant source of perchlorate or other chemicals is not present in Area L. Based on these results, it is concluded that Area L was not used for propellant incineration. The discussion in Section 1.1.5 suggests that propellant incineration may have been conducted in the WDA rather than in Area L. Based on these findings, no further investigation of Area L is warranted at this time.

5.4.4 Historical Operational Area M – Garbage Disposal Area

5.4.4.1 Previous Work

Previous work in Area M includes the following:

- Characterization, excavation, and off-site disposal of 816 tons of non-hazardous debris from the former disposal area (Radian, 1993).
- Drilling and sampling 3 soil borings M-58-DP1 to M-58-DP3) to a depth of 20 feet bgs, and installing soil gas probes at a depth of 10 feet bgs in all of the borings (Tetra Tech, 2005a).
- Installing 1 shallow groundwater monitoring well (TT-MW2-11; Tetra Tech, 2009g).

Sampling locations are shown in Figure 5-38. Analytical results for the soil and groundwater samples are summarized in Tables 5-14 and Appendix A, respectively.

Soil results included the following:

- Perchlorate was detected in 5 of the 15 soil samples analyzed, at concentrations ranging from 22.4 to 2,220 µg/kg. The highest perchlorate concentrations were detected in boring M-58-DP1, at a depths of 10 and 20 feet bgs.
- The initial metals background comparisons (Tetra Tech, 2009h) found that no metals were statistically elevated above background concentrations, and that no metals that had potentially elevated concentrations (i.e., concentrations above alluvium BTVs).
- TPHg and TPHd were not detected in any of the 12 samples analyzed.
- Benzene was detected in 2 of the 12 samples analyzed, at concentrations of 5.2 and 6.3 µg/kg. Toluene was detected in 2 of the 12 soil samples analyzed, at concentrations of 6.9 and 7.5 µg/kg. No other VOCs were detected in soil.
- 1,4-dioxane was not detected in the 6 samples analyzed.
- SVOCs were not detected in the 9 samples analyzed.

Soil gas results include the following:

- VOCs were not detected in any of the analyzed soil gas samples.

Groundwater results include the following:

- Perchlorate and TCE have been consistently detected in well TT-MW2-11. In May 2008, the perchlorate and TCE concentrations in TT-MW2-11 were 286 and 8.6 µg/L, respectively, exceeding the California MCLs 6 µg/L for perchlorate and 5 µg/L for TCE.

5.4.4.2 DSI Activities

Based on the previous results discussed above, no further assessment of metals, TPHg, THPd,, VOCs, SVOCs, or 1,4-dioxane in soil was conducted as part of the DSI. Additional soil investigation proposed in the DSI work plan focused on characterization of perchlorate and VOCs in the area of boring M-58-DP1.

Initial field activities included the following:

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

0 50 100 Feet

Beaumont Site 2

Figure 5-38

Sample Locations Historical Operational Area M

TETRA TECH

TABLE 5-14
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area M (Former Garbage Disposal Area)

Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)		1,4-Dioxane (mg/kg)	SVOCS (mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range	Benzene	Toluene		
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	1,100	5.0E+06	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	5,400	4.5E+07	160	-
M-58-SB101	M-58-SB101-0.5'	0.5	10/06/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-5'	5	10/06/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-10'	10	10/06/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-15'	15	10/06/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-20'	20	10/06/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-25'	25	10/06/08	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-30'	30	10/06/08	**6.8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-35'	35	10/06/08	**680**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-40'	40	10/06/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-45'	45	10/06/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-50'	50	10/06/08	<4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-55'	55	10/06/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-60'	60	10/06/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-65'	65	10/06/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-70'	70	10/06/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-75'	75	10/06/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB101-80'	80	10/06/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB102	M-58-SB102-0.5'	0.5	10/06/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-5'	5	10/06/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-10'	10	10/06/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-15'	15	10/06/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-20'	20	10/06/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-25'	25	10/06/08	<4.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-30'	30	10/06/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-35'	35	10/06/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-40'	40	10/06/08	**12**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-45'	45	10/06/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-50'	50	10/06/08	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-55'	55	10/06/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-60'	60	10/06/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-65'	65	10/06/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB102-70'	70	10/06/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB103	M-58-SB103-0.5'	0.5	10/07/08	**21**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-5'	5	10/07/08	**120**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-10'	10	10/07/08	**740**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-15'	15	10/07/08	**2,000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-20'	20	10/07/08	**1,700**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-25'	25	10/07/08	**2,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-30'	30	10/07/08	**3,100**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-35'	35	10/07/08	**2,200**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-14
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area M (Former Garbage Disposal Area)

Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)		1,4-Dioxane (mg/kg)	SVOCS (mg/kg)
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range	Benzene	Toluene		
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	1,100	5.0E+06	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	5,400	4.5E+07	160	-
M-58-SB103	M-58-SB103-40'	40	10/07/08	**730**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-45'	45	10/07/08	**740**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-50'	50	10/07/08	**140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-55'	55	10/07/08	**54**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-60'	60	10/07/08	**26**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB103-65'	65	10/07/08	**140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB104	M-58-SB104-0.5'	0.5	10/03/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-5'	5	10/03/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-10'	10	10/03/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-15'	15	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-20'	20	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-25'	25	10/03/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-30'	30	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-35'	35	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-40'	40	10/03/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB104-45'	45	10/03/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB105	M-58-SB105-0.5'	0.5	10/21/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB105-5'	5	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB105-10'	10	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB105-15'	15	10/21/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB105-20'	20	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB105-25'	25	10/21/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB105-30'	30	10/21/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB105-35'	35	10/21/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB105-40'	40	10/21/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB106	M-58-SB106-0.5'	0.5	10/21/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB106-5'	5	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB106-10'	10	10/21/08	<4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB106-15'	15	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB106-20'	20	10/21/08	**4.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB106-25'	25	10/21/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB106-30'	30	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB106-35'	35	10/21/08	<4.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB106-40'	40	10/21/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB107	M-58-SB107-0.5'	0.5	10/21/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB107-5'	5	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB107-10'	10	10/21/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB107-15'	15	10/21/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB107-20'	20	10/21/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB107-25'	25	10/21/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB107-30'	30	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB107-35'	35	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB107-40'	40	10/21/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-14
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Area M (Former Garbage Disposal Area)

					Metals (mg/kg)																	TPH (mg/kg)		VOCs (µg/kg)			
Boring ID	Sample ID	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Silver	Selenium	Thallium	Vanadium	Zinc	Gasoline Range	Diesel Range	Benzene	Toluene	1,4-Dioxane (mg/kg)	SVOCS (mg/kg)
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5.0	530	23,000	-	-	-	-	18	-
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000	-	-	-	-	64	-
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000	-	-	1,100	5.0E+06	44	-
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000	-	-	5,400	4.5E+07	160	-
M-58-SB108	M-58-SB108-0.5'	0.5	10/22/08	**4.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-5'	5	10/22/08	<4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-10'	10	10/22/08	<4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-15'	15	10/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-20'	20	10/22/08	<4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-25'	25	10/22/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-30'	30	10/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-35'	35	10/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-40'	40	10/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-SB108	M-58-SB108-45'	45	10/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-50'	50	10/22/08	<4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-55'	55	10/22/08	<4.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-60'	60	10/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M-58-SB108-65'	65	10/22/08	<4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tt-MW2-11	MW-11-5-6.5	5	08/30/06	<10.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW11-20-21.5'	20	08/30/06	<11 UJe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW11-30-31.5'	30	08/30/06	<11.9 UJe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M-58-DP1	M-58-DP1-0.5	0.5	09/17/04	**22.4**	<0.191	1.32	143	0.491	<0.00988	20.2	10.3	20.2	4.89	<0.0130	<0.0206	16.4	<0.0209	<0.175	<0.0987	40.1	49.8	<0.13	<4.8	**6.3**	**6.9**	<0.031	All ND
	M-58-DP1-5	5	09/17/04	<5.94	<0.191	1.37	154	0.476	<0.00988	20.3	10.3	20.9	4.97	<0.0130	<0.0206	16.8	<0.0209	<0.175	<0.0987	39.7	50.1	<0.13	<4.8	<0.12	<0.21	<0.031	All ND
	M-58-DP1-10	10	09/17/04	**2,220**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	2.6 Bp	2.9 Bp	-	All ND
	M-58-DP1-20	20	09/17/04	**55.7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.098	<0.17	-	-
M-58-DP2	M-58-DP2-0.5	0.5	09/17/04	<5.94	<0.191	1.26	127	0.495	<0.00988	21.5	10.8	19.8	5.07	<0.0130	<0.0206	16.9	<0.0209	<0.175	<0.0987	39.2	50.0	<0.13	<4.8	<0.12	<0.21	<0.031	All ND
	M-58-DP2-5	5	09/17/04	**23.7**	<0.191 UJc	1.42	164	0.454	<0.00988	19.2	9.39	19	4.91	<0.0130	<0.0206	15.3	<0.0209	<0.175	<0.0987	37.4	45.3	<0.13	<4.8	<0.11	<0.19	<0.031	All ND
	M-58-DP2-10	10	09/17/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.10	<0.18	-	All ND
	M-58-DP2-20	20	09/17/04	**32.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	**5.2**	**7.5**	-	-
M-58-DP3	M-58-DP3-0.5	0.5	09/17/04	<5.94	<0.191	1.37	116	0.464	<0.00988	20.4	10.4	19.1	4.62	<0.0130	<0.0206	16.7	<0.0209	<0.175	<0.0987	38.1	48.3	<0.13	<4.8	1.4 Bp	1.3 Bp	<0.031	All ND
	M-58-DP3-5	5	09/17/04	<5.94	<0.191	<0.130	48.3	<0.00368	<0.00988	10.9	5.08	8.61	2.54	<0.0130	<0.0206	7.77	<0.0209	<0.175	<0.0987	19.7	23.8	<0.13	<4.8	<0.13	<0.22	<0.031	All ND
	M-58-DP3-10	10	09/17/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.12	1.5 Bp	-	All ND
	M-58-DP3-20	20	09/17/04	<5.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.13	<4.8	<0.099	<0.17	-	-

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
mg/kg - Concentration in milligrams per kilogram.
Metals - California Title 22 Metals.
TPH - Total petroleum hydrocarbons.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
"<" - Indicates concentration below indicated method detection limit.
"-" - Sample not analyzed for analyte.

"B" - The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination.
The result is considered not to have originated from the environmental sample, because cross-contamination is suspected.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"U" - The analyte was not detected above the method detection limit (MDL).
"UJ" - The analyte was not detected above the MDL. However, the MDL may be elevated above the reported detection limit.
"c" -The MS and/or MSD recoveries were outside control limits.
"e" - A holding time violation occurred.
"p" - Professional judgment determined the data should be qualified.
"ND" - Concentration of analyte(s) was not detected above the MDL.

- Drilling and sampling 4 primary soil borings (M-58-SB101 to M-58-SB104) to further characterize perchlorate impacts in soil.
- Collecting grab groundwater samples from the 4 primary soil borings, installing 1 deep monitoring well (TT-MW2-32) to assess the vertical extent of perchlorate and TCE in the area of TT-MW2-11, and installing one shallow monitoring well (TT-MW2-28) to characterize the downgradient extent of perchlorate- and TCE-impacted groundwater.

Based upon results from the primary borings and wells described above, 4 additional soil borings (M-58-SB105 to M-58-SB108) were installed in Area M to further characterize perchlorate concentrations in soil and groundwater.

5.4.4.3 Geology and Hydrogeology

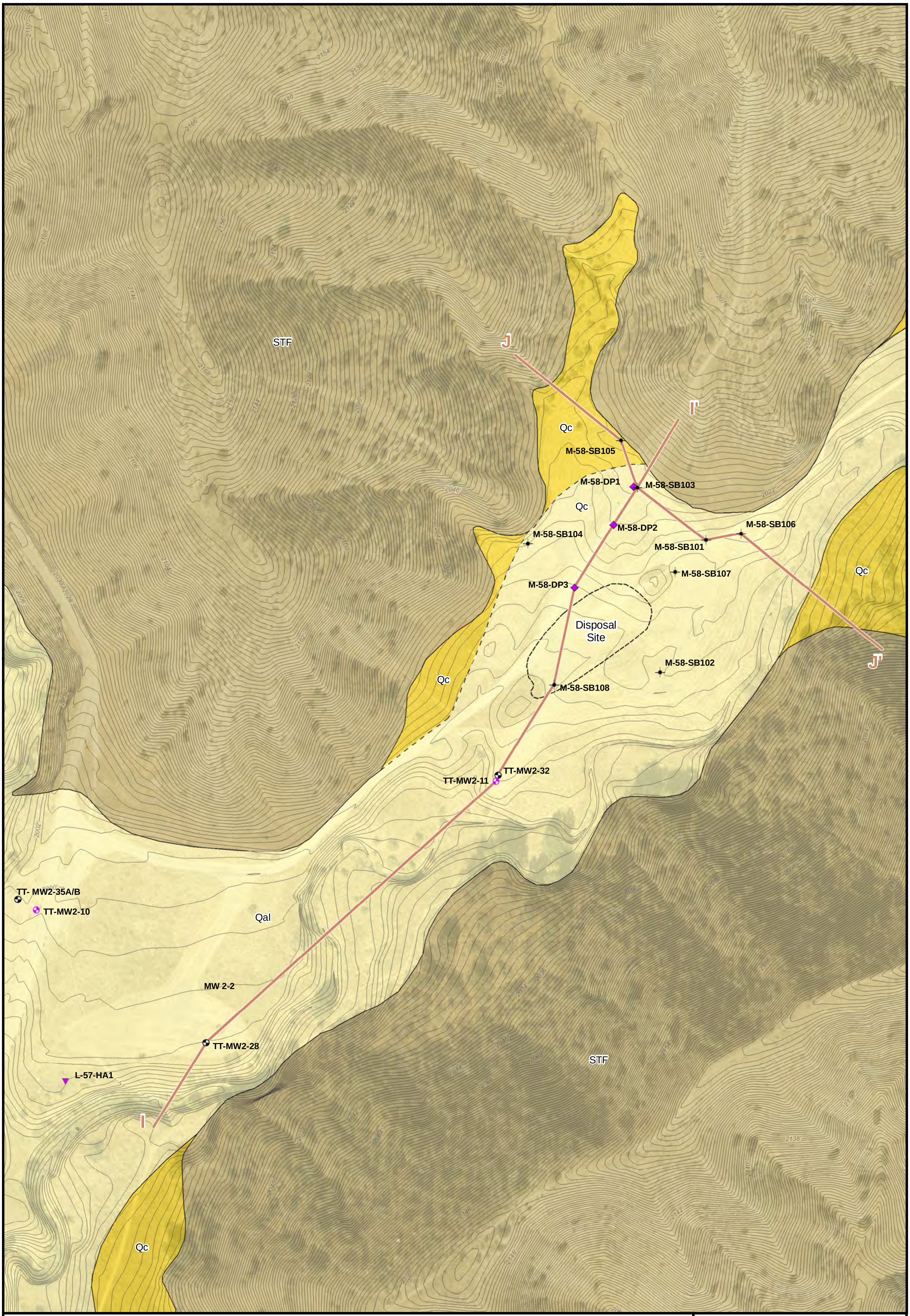
The surface geology of Area M is shown on Figure 5-39. An incised active drainage channel is present along the southeastern margin of Disposal Site Canyon. Alluvium underlies the southeastern portion of the canyon, and forms a broad terrace near the confluence of Disposal Site Canyon and Laborde Canyon. Colluvium underlies the northwestern side of the canyon, and forms aprons along the southeastern margin of the canyon. Regrading of the canyon floor during the disposal site removal action has obscured landforms within the canyon, including the contact between alluvium and colluvium. The STF is exposed on hillsides surrounding the canyon. Artificial fill is present where the disposal site excavation was backfilled. According to Radian (1993), the fill was obtained locally.

Figure 5-40 (cross-section I-I’) shows the subsurface geology of Area M along the length of Disposal Site Canyon; Figure 5-41 (cross-section J-J’) shows the subsurface geology across the northwestern portion of Disposal Site Canyon. The STF in this area consists of generally north to northwest dipping, interfingering beds of sandstone and mudstone to a depth of 175 feet, the maximum depth explored.

The depths to groundwater in shallow wells TT-MW2-11 and TT-MW2-28 were approximately 46.8 feet bgs and 59.7 feet bgs, respectively, in May 2009. The depth to groundwater in deep well TT-MW2-32, was approximately 50.8 feet bgs. The vertical gradient between wells TT-MW2-11 and TT-MW2-32 was downward at -0.10 ft/ft. Groundwater flow is inferred to be generally to the southwest, down Disposal Site Canyon.

5.4.4.4 Soil Sampling Results

Analytical results for soil samples collected during the DSI and previous investigations are summarized in Table 5-14. Boring locations are shown on Figure 3-38. A total of 112 soil samples have been analyzed for perchlorate, including 97 samples collected as part of the DSI and 15 samples collected during previous investigations. Perchlorate was detected in 21 of the 97 DSI soil samples, at concentrations



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LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Geologic Cross Section Line
- Contact (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Qal Alluvium
- Qc Colluvium
- STF San Timoteo Formation

0 50 100 Feet

Beaumont Site 2

Figure 5-39

Surface Geology Historical Operational Area M

TETRA TECH

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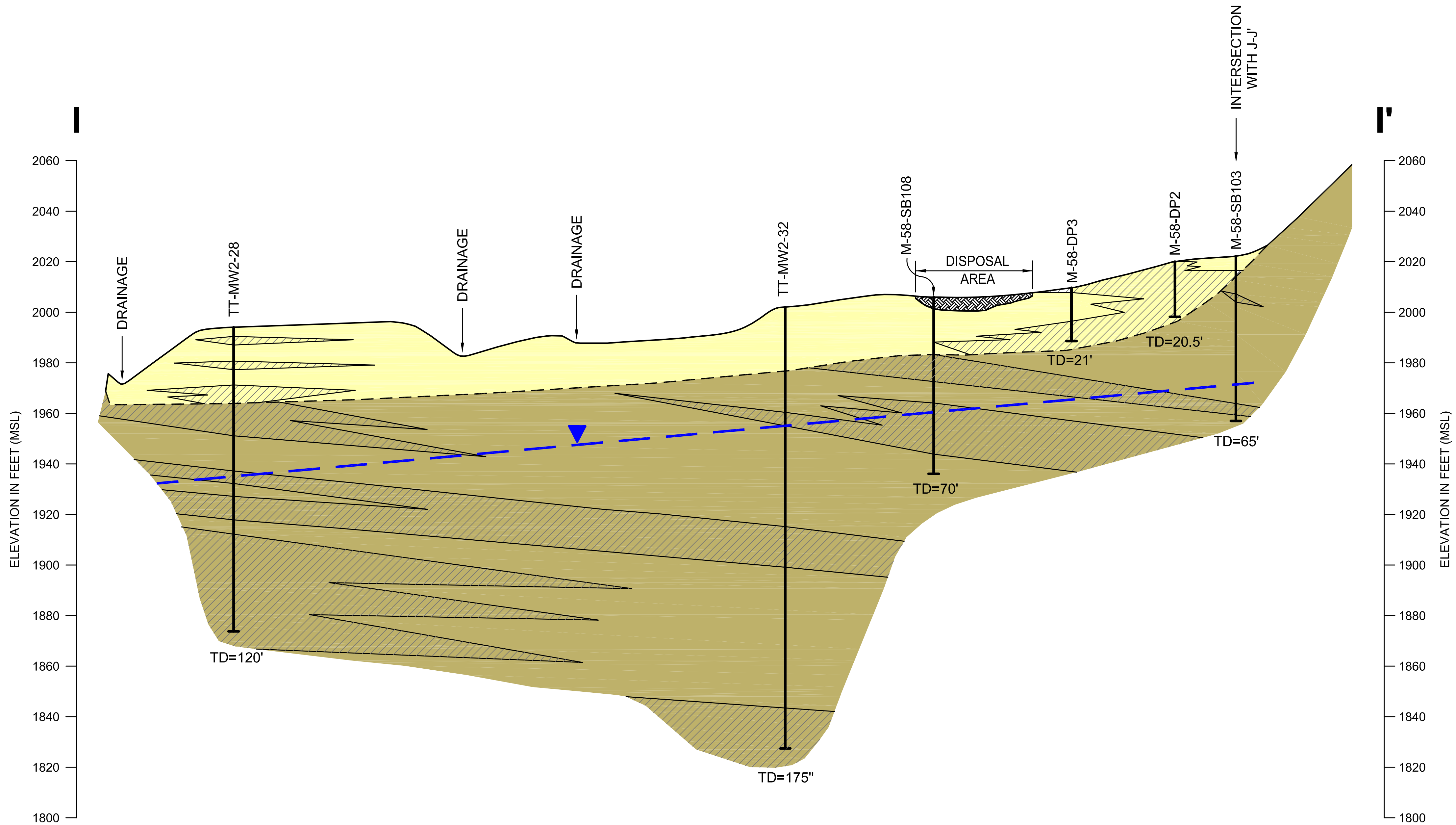
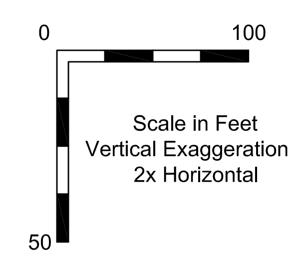




LEGEND

Water Table

Contact
(dashed where inferred)

TD = Total Depth
(in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

Silt and Clay

SAN TIMOTEO FORMATION

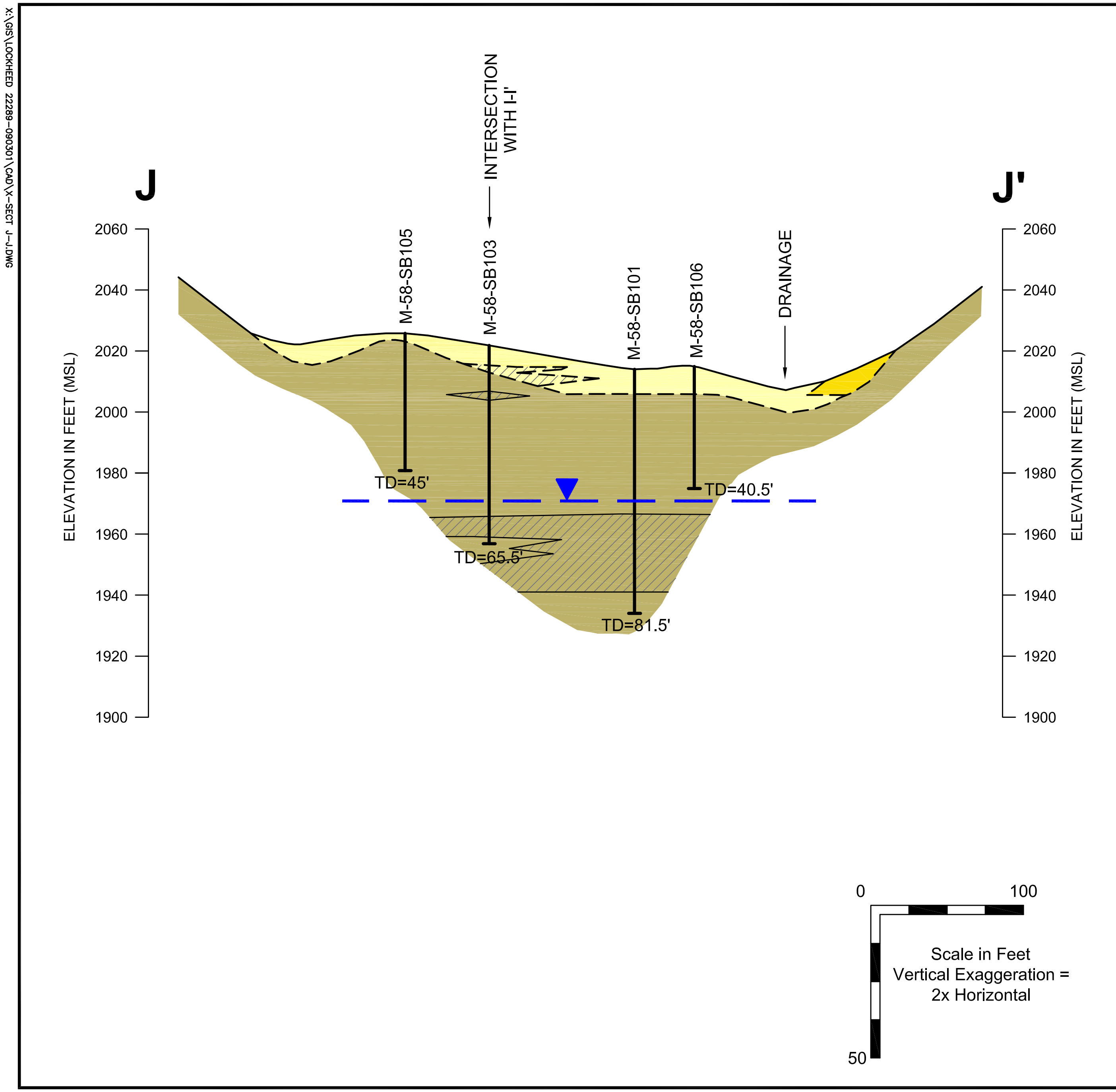
Sandstone

Mudstone

Beaumont Site 2

Figure 5-40
Cross Section I-I'
Historical Operational Area M

TETRA TECH



LEGEND

Water Table

Contact (dashed where inferred)

TD = Total Depth (in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

Silt and Clay

COLLUVIUM

Sand, Silty Sand, and Clayey Sand

Silt and Clay

SAN TIMOTEO FORMATION

Sandstone

Mudstone

Beaumont Site 2

Figure 5-41
Cross Section J-J'
Historical Operational Area M

TETRA TECH

ranging from 4.4 to 3,100 µg/kg. The highest perchlorate concentration was detected in boring M-58-SB103, at a depth of 30 feet bgs. Boring M-58-SB103 is adjacent to previous boring M-58-DP1.

5.4.4.5 Groundwater Sampling Results

Analytical results for groundwater samples collected during the DSI and previous investigations are summarized in Table 5-15 and Appendix A. Sample locations are shown on Figure 5-38. A total of 10 groundwater samples, including 6 grab samples and 4 monitoring well samples, were collected as part of the DSI. Perchlorate was detected at concentrations exceeding the MCL of 6 µg/L in 6 of the 10 samples, at concentrations ranging from 12 to 560 µg/L. The highest perchlorate concentration was detected in the grab sample from boring M-58-SB103. TCE was detected at concentrations below the MCL of 5 µg/L in three samples; the highest TCE concentration (2 µg/L) found during the DSI was in the grab sample from boring M-58-SB108. In May 2008, TCE was detected in well TT-MW2-11 at a concentration of 8.6 µg/L.

5.4.4.6 Discussion

Perchlorate in Soil

A 3-D model geostatistical model of the perchlorate distribution in soil in Area M was generated using MVS. All of the previous and DSI data were used in the 3-D model. Figure 5-42 shows 3-D renderings of the extent of perchlorate concentrations in soil greater than 100 µg/kg. In some areas, the model results show the perchlorate-impacted soil as consisting of disconnected segments. This is considered to be an artifact of the choice of 100 µg/kg as the cutoff concentration for defining the impacted soil; the segments become connected when lower cutoff concentrations are used.

Significant features of the perchlorate-impacted soil shown in Figures 5-42 include the following:

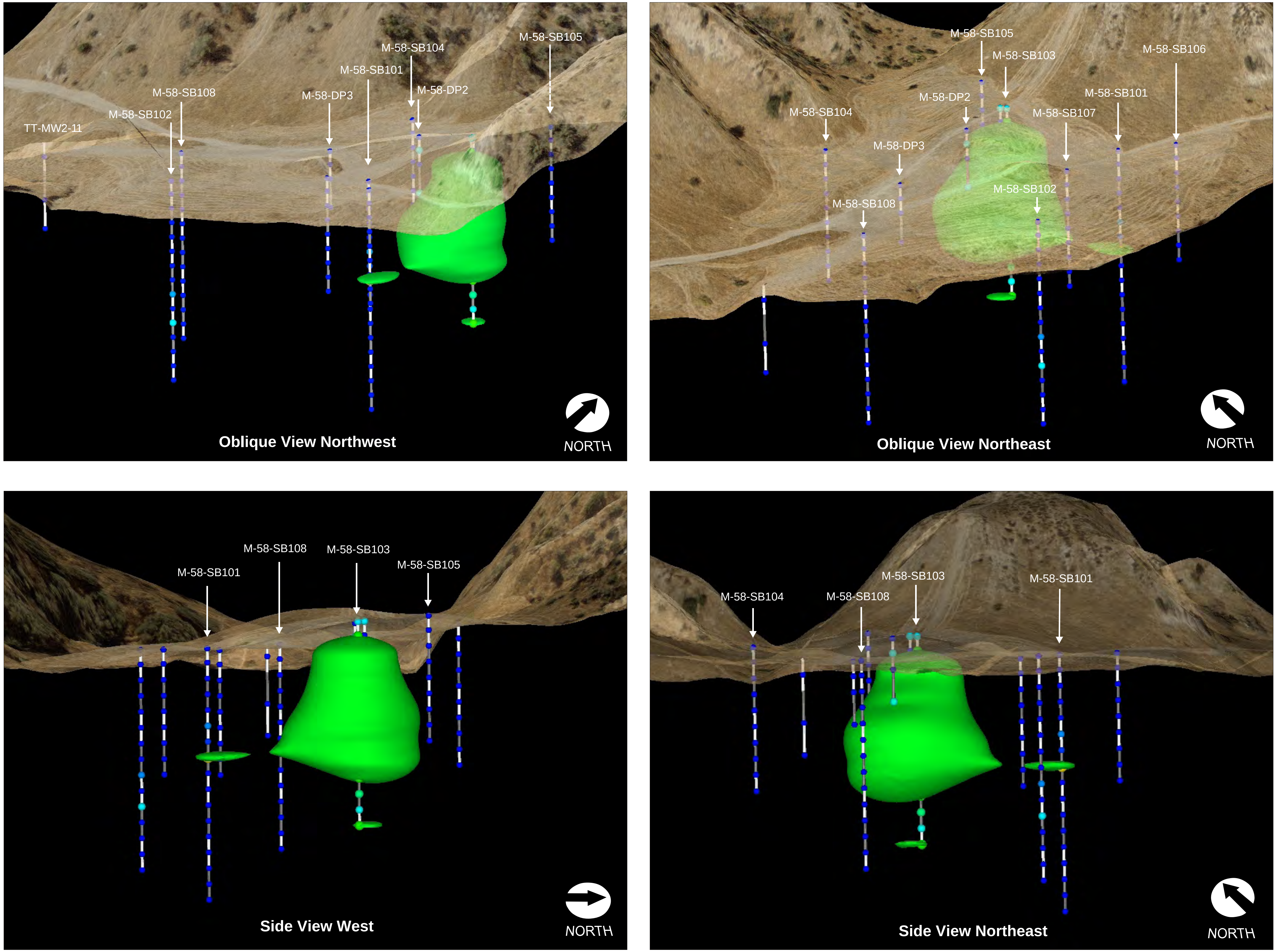
- The primary perchlorate source area is located near boring M-58-SB103. A “tongue” of impacted soil extends to the southeast toward boring M-58-SB101 at a depth of approximately 35 feet bgs. This may reflect the presence of a localized stratigraphic control on perchlorate migration through the vadose zone.
- The main portion of the perchlorate-impacted soil attenuates at a depth of approximately 50 feet bgs, the approximate depth of a mudstone layer in the STF shown in cross-sections I-I’ and J-J’ (Figures 5-40 and 5-41). Perchlorate impacts below this depth are localized near boring M-58-SB103.

The areal extent of the perchlorate-impacted soil greater than 100 µg/kg is shown in plan view in Figure 5-43. Figure 5-43 shows that the perchlorate-impacted soil does not appear to geographically coincide with the former disposal area, suggesting that the perchlorate release may have been related to surface disposal rather than disposal within the original trench. The approximate area of perchlorate impacts above 100 µg/kg is 5,500 square feet, or 0.1 acres.

TABLE 5-15
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Area M (Garbage Disposal Area)

Boring/ Well ID	Sample ID	Depth (feet bgs)	Sample Date	Perchlorate (µg/L)	VOCs (µg/L)						
					Acetone	**2-Butanone (MEK)**	**Benzene**	**Carbon Disulfide**	**Ethylbenzene**	**Toluene**	**Trichloroethene**
California MCL				6	-	-	1	-	300	150	5
Calfiornia DWNL				-	-	-	-	160	-	-	-
GRAB GROUNDWATER SAMPLES											
M-58-SB101	M-58-SB101-GW-73'	73	10/07/08	**180**	**8.8**	**2.0 Jq**	**0.17 Jq**	<0.36	<0.26	<0.22	<0.17
M-58-SB102	M-58-SB102-GW-71'	71	10/06/08	**0.76**	<5.0	<1.2	<0.14	<0.36	<0.26	<0.22	<0.17
M-58-SB103	M-58-SB103-GW-65'	65	10/07/08	**560**	<5.0	**1.2 Jq**	**0.49 Jq**	<0.36	<0.26	**0.41 Jq**	<0.17
M-58-SB104	M-58-SB104-GW-49'	49	10/03/08	**12**	12 Bk	<1.2	<0.14	<0.36	<0.26	<0.22	<0.17
M-58-SB108	M-58-SB108-GW-64.5'	64.5	10/23/08	**0.52**	**13**	<1.2	**1.1**	<0.36	**0.28 Jq**	**1.2**	**2.0**
TT-MW2-28	M-58-W101-GW-68.5	68.5	10/23/08	**12**	<5.0	<1.2	<0.14	<0.36	<0.26	<0.22	<0.17
MONITORING WELL SAMPLES											
TT-MW2-28	TT-MW2-28	45.3 -65.3	02/09/09	**26**	<5.0	<1.2	<0.14	<0.36	<0.26	<0.22	<0.17
	TT-MW2-28		03/13/09	**28**	<5.0	<1.2	<0.14	**0.69**	<0.26	<0.22	<0.17
TT-MW2-32	TT-MW2-32	77 - 87	02/09/09	**0.66**	<5.0	<1.2	<0.14	**2.3**	<0.26	<0.22	**1.1**
	TT-MW2-32		03/16/09	<0.071	<5.0	<1.2	<0.14	**0.98**	<0.26	**0.30 Jq**	**0.24 Jq**

Notes:
Bold - Indicates concentrations detected above the method detection limit.
MCL - California Maximum Contaminant Level (February 4, 2010).
DWNL - California Drinking Water Notification Level (December 14, 2007).
VOCs - Volatile organic compounds.
µg/L - Micrograms per liter.
bgs - Below ground surface.
"<" - Indicates concentration below indicated method detection limit.
"-" - Not analyzed or not available.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).



Sample Location

10'

Perchlorate Concentration

>3,000 µg/kg

1,000 µg/kg

300 µg/kg

100 µg/kg

30 µg/kg

10 µg/kg

<5 µg/kg

Note:

µg/kg - micrograms per kilogram.
Diagrams not to scale.
2X vertical exaggeration.

Beaumont Site 2

Figure 5-42

3-D Renderings of Perchlorate in Soil Above 100 µg/kg - Historical Operational Area M

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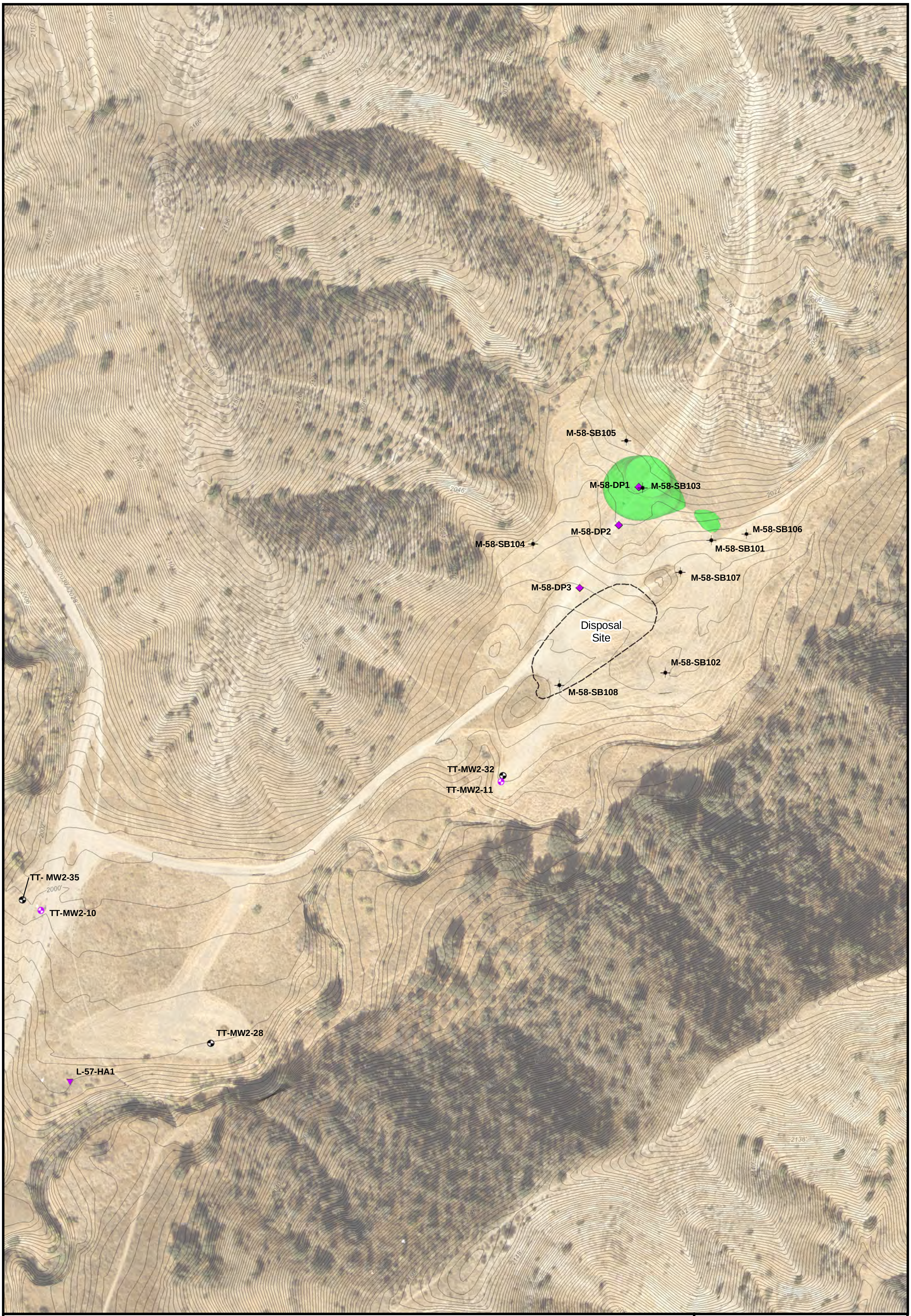

LEGEND

- DSI Soil Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Perchlorate Concentration

- >100,000 µg/kg
- 30,000 µg/kg
- 10,000 µg/kg
- 3,000 µg/kg
- 1,000 µg/kg
- 300 µg/kg
- 100 µg/kg
- 30 µg/kg
- 10 µg/kg

0 50 100 Feet

Beaumont Site 2

Figure 5-43
Extent of Perchlorate in Soil Above 100 µg/kg Historical Operational Area M

TETRA TECH

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Figure 5-44 shows perchlorate concentration contours in soil at depths of 5, 10, 20, 35, 40, and 50 feet bgs. The lateral extent of the perchlorate-impacted soil is greatest at depths of approximately 30 to 35 feet bgs, where the highest perchlorate concentrations were detected, and becomes progressively smaller with increasing depth to the water table at a depth of approximately 65 feet bgs. Figure 5-44 shows that the extent of perchlorate-impacted soil is well-defined by the existing data and the topography of the canyon.

Perchlorate in Groundwater

Perchlorate concentrations in groundwater are plotted and contoured in Figure 5-45. Figure 5-45 is modified from a 2-D geostatistical model generated with MVS, which used the grab sample results from the soil borings and results for water table wells TT-MW2-11 and TT-MW2-28. The perchlorate plume generally extends from the area of boring M-58-SB103 (which had 560 µg/L of perchlorate) to the southwest. The plume attenuates in the downgradient direction to a concentration of 28 µg/L at well TT-MW2-28 (Figure 5-45). Relatively low concentrations of perchlorate likely extend downgradient from TT-MW2-28. The groundwater plume is relatively well-defined by the existing data and the topography of the canyon. Given the low concentrations of perchlorate detected in well TT-MW2-28, the downgradient extent of the Area M perchlorate plume is considered to be adequately defined.

Well TT-MW2-32 was installed adjacent to existing well TT-MW2-11 to assess the vertical extent of perchlorate and TCE in Area M. Perchlorate was not detected in well TT-MW2-32 during the second DSI sampling round (Table 5-15). The vertical extent of perchlorate in Area M is therefore considered to be adequately defined.

TCE in Groundwater

The highest TCE concentration detected in Area M groundwater is in well TT-MW2-11, which had a concentration of 8.6 µg/L in May 2008 (Appendix A). TCE was also detected in the grab sample from boring M-58-SB108 (the boring located closest to TT-MW2-11) at a concentration of 2.0 µg/L. TCE was not detected in well TT-MW2-28, indicating that the downgradient extent of TCE in groundwater exceeding the MCL of 5.0 µg/L is defined. The TCE-impacted groundwater appears to be restricted to Area M.

TCE was detected in well TT-MW2-32 at a concentration of 0.24 µg/L during the second DSI sampling round (Table 5-15). The vertical extent of TCE in groundwater exceeding the MCL of 5.0 µg/L in Area M is therefore considered to be adequately defined.

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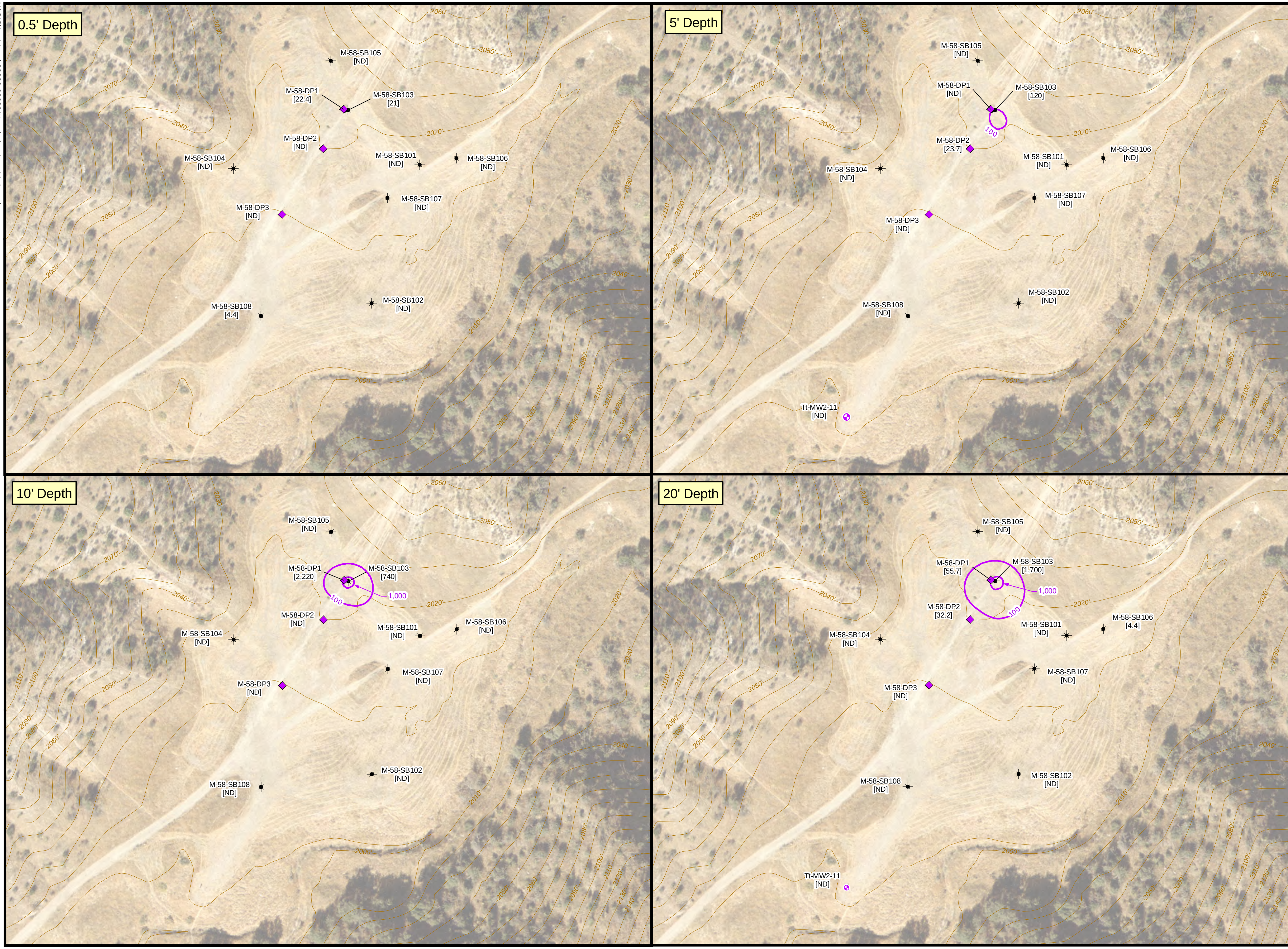


0 50 100 Feet

Adapted from: March 2007 aerial photograph.

LEGEND

- DSI Soil Sample Location
- Previous Soil/Soil Gas Sample Location
- Previous Sample Location/Well
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour

Note:

[#] Perchlorate results in μg/kg.

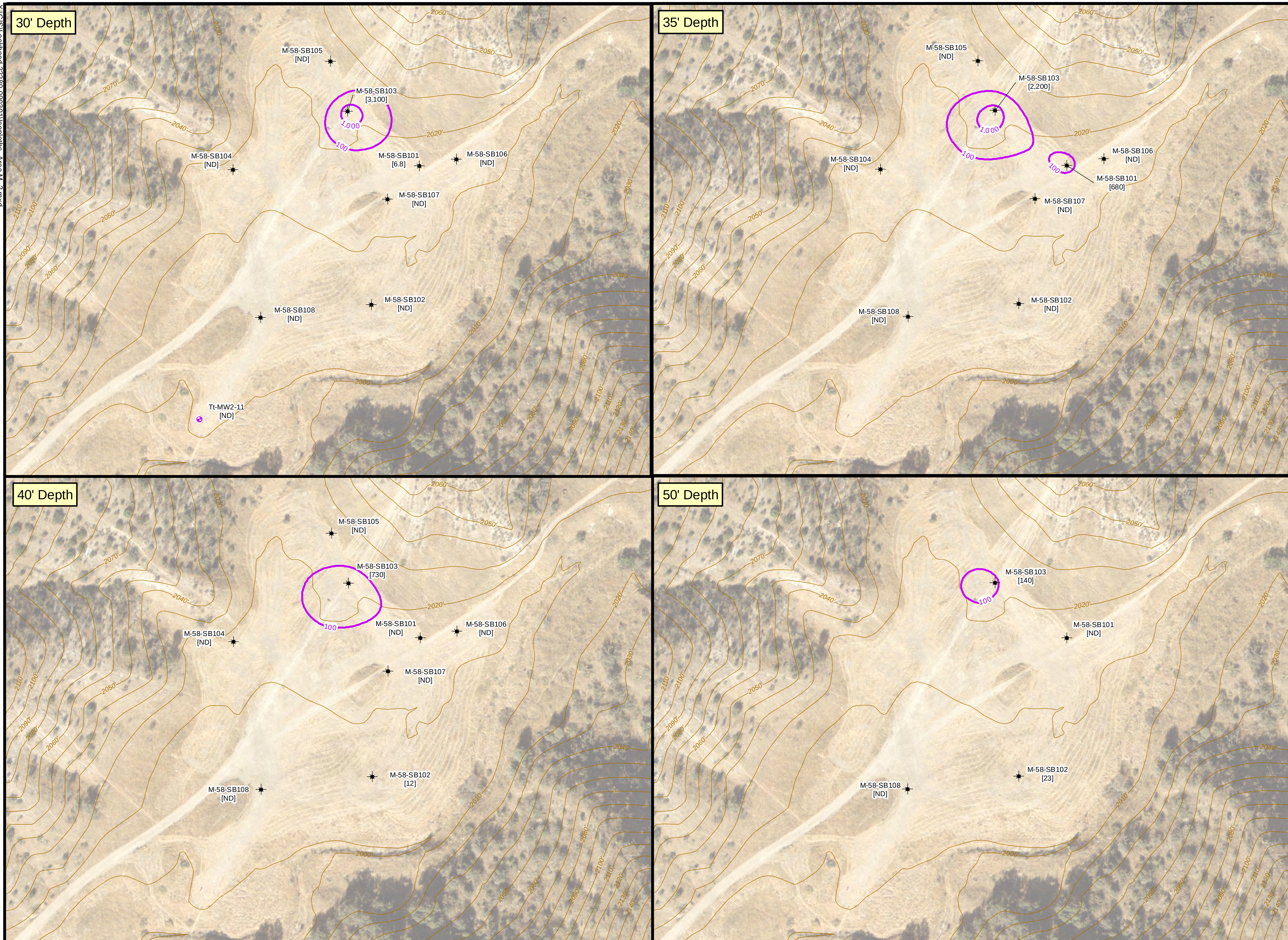
[ND] Non-Detect.

Beaumont Site 2

Figure 5-44

Perchlorate Concentrations in Soil - Historical Operational Area M

TETRA TECH



0 50 100
Feet

Adapted from: March 2007 aerial photograph.

LEGEND

- DSI Soil Sample Location
- Previous Sample Location/Well
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour

Note:

[#] Perchlorate results in µg/kg.

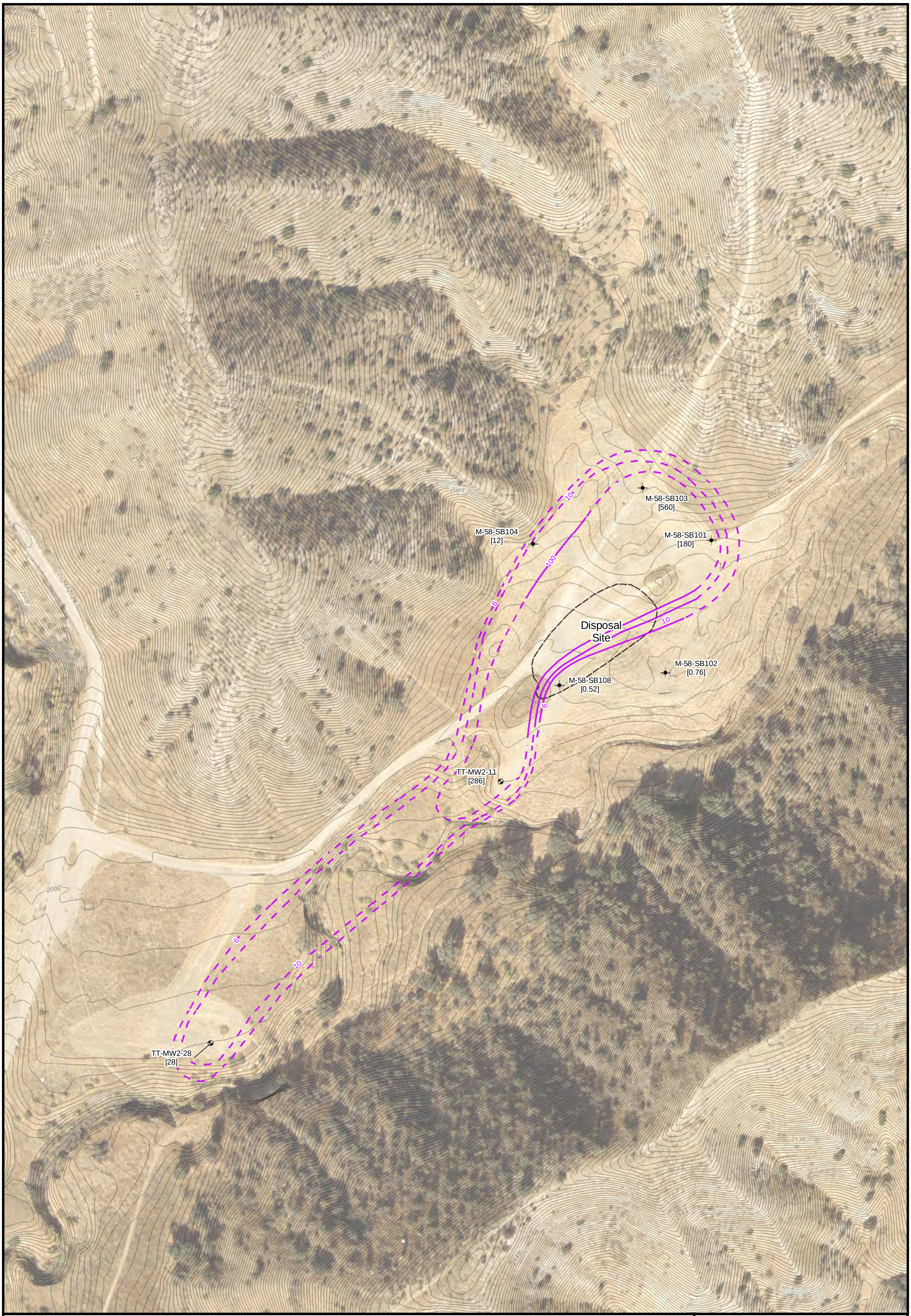
[ND] Non-Detect.

Beaumont Site 2

Figure 5-44 (cont.)

Perchlorate Concentrations in Soil - Historical Operational Area M

TETRA TECH



LEGEND

- Sample Location
- Monitoring Well/Sample Location
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Note:
[#] - Perchlorate in groundwater (μg/L).
[ND] - Non-detect.
μg/L - Micrograms per liter.

0 50 100 Feet

Beaumont Site 2

Figure 5-45

Perchlorate Concentrations in Groundwater Above 6 μg/L - Historical Operational Area M

TETRA TECH

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Metals in Soil

The metals background comparisons conducted as part of the DSI found that no metals in Area M had concentrations statistically elevated above background, and that no metals had concentrations considered to be potentially elevated (i.e., above the BTVs for alluvium).

5.4.5 Waste Discharge Area

5.4.5.1 Previous Work

Previous work in the WDA includes the following:

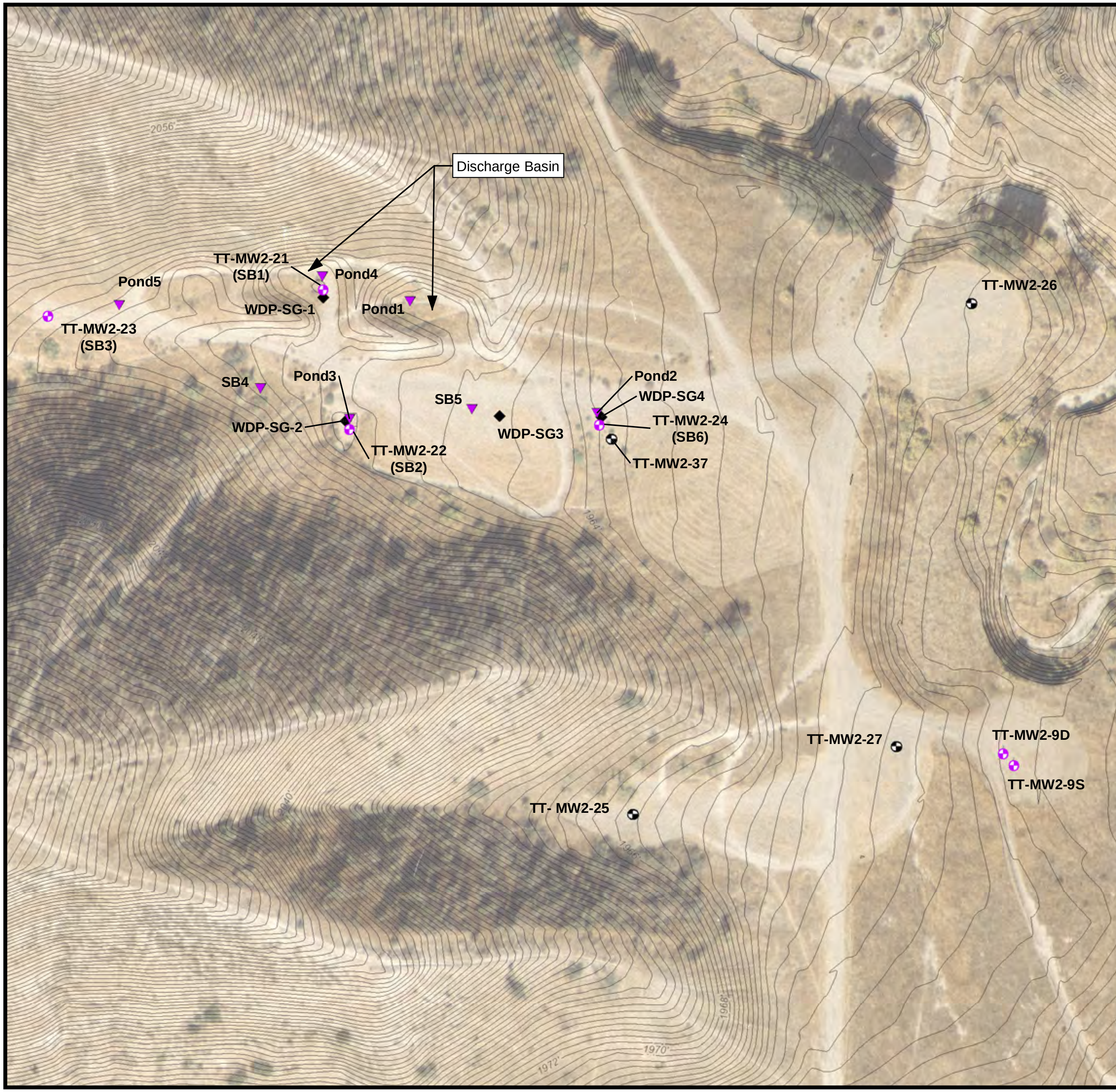
- Drilling and sampling 5 soil borings (Pond1 to Pond5) to depths ranging from 30 to 33 feet bgs (Tetra Tech, 2007b).
- Drilling and sampling 6 soil borings (SB1 to SB6) to depths ranging from 60.5 to 100 feet bgs, and installing groundwater monitoring wells TT-MW2-21 to TT-MW2-24 in borings SB1 to SB3 and SB6 (Tetra Tech, 2009d).
- Collecting 2 soil samples from the borehole for well TT-MW2-9 (Tetra Tech, 2009g).

Sampling locations are shown in Figure 5-46. Analytical results for soil are summarized in Tables 5-16; groundwater results are summarized in Appendix A.

Analytical results for soil include the following:

- Perchlorate was detected in 58 of the 99 samples analyzed, at concentrations ranging from 14.0 to 114,000 µg/kg. The highest perchlorate concentrations were found in boring SB1, which was collocated with boring Pond4. The lateral extent of perchlorate in soil was adequately defined by the available data and the topography of the canyon (Tetra Tech, 2009d).
- The initial metals background comparisons (Tetra Tech, 2009h) found that concentrations of several metals were statistically elevated above background concentrations or were considered to be potentially elevated (i.e., concentrations above alluvium BTVs). These metals include barium, beryllium, chromium, lead, nickel, vanadium and zinc.
- Fifteen VOCs were detected in the soil samples. VOCs detected include benzene (detected at 14 µg/kg a 5 feet bgs in boring Pond3), chloromethane (detected at 22 µg/kg at 0.5 feet in boring Pond4), 1,2-dichloroethane; detected at 5.6 and 35 µg/kg at 35 and 40 feet bgs in boring SB2), methylene chloride (detected at concentrations from 30 to 21,000 µg/kg in 10 samples from borings SB1 and SB2), and TCE (detected at 90 and 680 µg/kg at 40 and 45 feet bgs, respectively, in boring SB2, and at 44 µg/kg at 50 feet bgs in SB4). Other VOC detected include acetone, bromomethane, MEK, carbon disulfide, chloroform, 1,1-dichloroethane, 1,1-dichloroethene, 4-methyl-2-pentanone, toluene, and m,p-xylenes. The lateral extent of VOCs in soil was adequately defined by the existing data and the topography of the canyon(Tetra Tech, 2009d).
- Bis-2-ethylhexyl phthalate was detected at a concentration of 0.18 µg/kg in the 0.5-foot sample from Pond3. SVOCs were not detected in any of the 20 other samples analyzed

Analytical results for groundwater from the May 2008 groundwater monitoring event include the following:



LEGEND

- DSI Soil/Soil Gas Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)

Beaumont Site 2

Figure 5-46

Sample Locations Waste Discharge Area

TETRA TECH

TABLE 5-16
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Waste Discharge Area

Boring No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg)																
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5	530	23,000
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000
TT-MW2-21 (SB1)	SB1-15'	15	10/26/07	**51**	<2.21	10.5 Jf	196 Jf	0.739 Jq	<0.551	36.3	14.2	29.3	7.16	<0.0364	<0.551	22.5	1.94 Jf	<0.551	1.11	91.7 Jf	64
	SB1-18'	18	10/26/07	**41**	<2.2	8.88	99	0.534 Jq	<0.549	57.1	15.1	29.5	6.46	<0.0363	<0.549	24.6	1.46	<0.549	0.886 Jq	66.6	60.6
	SB1-20'	20	10/26/07	**108**	<2.17	28.9	114	1.16	<0.543	79.1	26.3	57.4	9.18	<0.0358	<0.543	40.4	2.78	<0.543	1.41	128	109
	SB1-35'	35	10/26/07	**114,000**	<2.21 UJc	5.32	188 Jc	0.965 Jq	<0.552	57.9	15.4	35.1	8.15	<0.0365	<0.552	27.4	2.32	<0.552	1.14	86	87.9
	SB1-40'	40	10/26/07	**21,400**	<2.22	7.95	119	0.815 Jq	<0.554	110	14.7	34	9.06	<0.0366	<0.554	25.9	1.78	<0.554	0.958 Jq	75.3	76.7
	SB1-45'	45	10/26/07	**11,900**	<2.18	3.22	66	0.491 Jq	<0.545	18.8	6.56	14.3	4.62	<0.036	<0.545	12.8	1.22	<0.545	0.703 Jq	29.3	40.4
	SB1-50'	50	10/26/07	**223**	<2.17	3.08	124	0.516 Jq	<0.543	13.5 Jf	7.36	15.8	5.37	<0.0359	<0.543	14.4	1.07 Jq	<0.543	0.616 Jq	32.5	47.9
	SB1-55	55	10/29/07	**29.4**	<2.22	3.4	254	1.18	<0.555	30.8	17.9	38.1	16.3	<0.0366	<0.555	31	1.67	<0.555	1.05 Jq	54.4	99.9
	SB1-60	60	10/29/07	**70.6**	<2.12	5.34	133	0.608 Jq	<0.531	21.5	9.75	21.2	9.54	<0.035	<0.531	17.4	0.577 Jq	<0.531	0.687 Jq	38.1	56.9
	SB1-70'	70	10/30/07	<11	<2.21	0.777 Jq	40.2	0.267 Jq	<0.551	8.51	3.25	6.89	2.48	<0.0364	<0.551	5.34	<0.551	<0.551	<0.551	13.5	22
TT-MW2-22 (SB2)	SB2-15'	15	10/30/07	<11.3	<2.27	2.4	160 Jf	0.513 Jq	<0.566	19.7	10.9	21	6.86	<0.0374	<0.566	17.5	0.569 Jq	<0.566	0.757 Jq	47.6	61.4
	SB2-20'	20	10/30/07	**27.2**	<2.29	5.17	161	0.803 Jq	0.783 Jq	27.7	14	30.5	10.3	<0.0377	<0.571	21.5	0.967 Jq	<0.571	0.949 Jq	59.3	68.7
	SB2-30'	30	10/30/07	<11.1	<2.22 UJc	8.9	115	0.755 Jq	<0.554	36.3	12.7	25.4	7.44	<0.0366	<0.554	22.3	1.21	<0.554	0.97 Jq	65.2	71.2
	SB2-35'	35	10/30/07	<11.1	<2.22	7.61	177	0.804 Jq	0.659 Jq	44.3	12.9	28.4	8.55	<0.0366	<0.554	22.9	1.15	<0.554	0.967 Jq	60.2	71.4
	SB2-40'	40	10/30/07	**3140**	<2.18	2.78	67.6	0.491 Jq	<0.545	14	7.86	16.6	4.76	<0.0359	<0.545	15.1	0.998 Jq	<0.545	0.98 Jq	29.7	48
	SB2-45'	45	10/30/07	**25,800**	<2.24	5.82	161	0.908 Jq	0.861 Jq	24.7	14.3	33	16	<0.037	<0.56	25	0.947 Jq	<0.56	0.943 Jq	53.8	85.8
	SB2-50'	50	10/30/07	**7,970**	<2.11	5.29	109	0.427 Jq	0.78 Jq	19.2	7.51	19.2	8.57	<0.0348	<0.527	13.5	<0.527	<0.527	<0.527	30	46.5
	SB2-55	55	10/30/07	**1,320**	<2.09	4.96	125	0.696 Jq	0.89 Jq	27.4	10.8	22.5	9.17	<0.0345	<0.523	18.3	0.913 Jq	<0.523	0.783 Jq	56.8	60.3
	SB2-60'	60	10/30/07	**1,090**	<2.18	1.98	65.3	0.407 Jq	<0.545	11.5	5.55	9.8	3.95	<0.036	<0.545	9.07	0.628 Jq	<0.545	0.583 Jq	26.8	34.6
	SB2-65'	65	10/30/07	**296**	<2.18	0.847 Jq	35	0.248 Jq	<0.544	13.1	2.86	7.15	1.92	<0.0359	<0.544	6.29	<0.544	<0.544	<0.544	14.8	20.8
	SB2-70'	70	10/30/07	**35**	<2.21	0.949 Jq	36.3	0.254 Jq	<0.552	8.11	3.37	6.03	2.24	<0.0365	<0.552	5.16	<0.552	<0.552	<0.552	17.9	20.5
TT-MW2-23 (SB3)	SB3-0.5'	0.5	11/01/07	<10.5	<2.11	2.35	139	0.581 Jq	<0.526	20.2	10.6	21.5	5.38	<0.0347	<0.526	17.3	0.801 Jq	<0.526	0.818 Jq	43.7	51.4
	SB3-5	5	11/01/07	<10.4	<2.08	2.45	133	0.583 Jq	<0.52	20.1	11	22.5	5.81	<0.0343	<0.52	18.2	0.977 Jq	<0.52	0.884 Jq	44.8	54.5
	SB3-10	10	11/01/07	<10.6	<2.12 UJc	2.63	148	0.565 Jq	<0.53	20.8	10.7	21.8	5.95	<0.035	<0.53	17.4	0.834 Jq	<0.53	0.775 Jq	45.7	52.2
	SB3-15	15	11/01/07	**14.2 Jq**	<2.1	2.25	134	0.535 Jq	0.54 Jq	20.9	9.82	22.7	5.1	<0.0346	<0.524	16.8	1.06	<0.524	0.65 Jq	40	53.7
	SB3-20	20	11/01/07	<11	<2.2	5.52 Jf	243	0.892 Jq	0.946 Jq	42.5	18.7	39	8.74	<0.0363	<0.549	30.1	1.8	<0.549	1.1 Jr	75.2	77.5
	SB3-25	25	11/01/07	**14 Jq**	<2.12	3.4 Jf	192	0.397 Jq	<0.53	30.8	9.26	18.1	3.81	<0.035	<0.53	15.6	0.644 Jq	<0.53	0.583 Jq	61.2	42.4
	SB3-30	30	11/01/07	<10.6	<2.11	3.98	145	0.411 Jq	0.586 Jq	25.7	9.16	19	4.32	<0.0348	1 Jq	16.1	0.69 Jq	<0.528	0.633 Jq	45.6	45.4
	SB3-35	35	11/01/07	<10.8	<2.16	7.16	106	0.583 Jq	0.614 Jq	37.9	13.2	27.3	4.59	<0.0356	<0.539	22.4	1.4	<0.539	0.782 Jq	58.2	68.3
	SB3-40	40	11/01/07	<10.9	<2.18	3.13	143	0.513 Jq	0.706 Jq	22.1	7.74	14.1	4.48	<0.036	<0.545	10.4	0.578 Jq	<0.545	0.616 Jq	37.3	61.4
	SB3-45	45	11/01/07	<11.1	<2.21	12.5	101	1.02 Jq	1.03 Jq	54.3	23	49.5	11.6	<0.0365	<0.554	37.5	1.84	<0.554	1.02 Jq	96.4	98.7
	SB3-50	50	11/01/07	<10.6	<2.13	2.64	88.7	0.405 Jq	0.62 Jq	19.2	7.98	13.6	4.38	<0.0351	<0.531	12.4	<0.531	<0.531	<0.531	32.3	34.1
	SB3-55	55	11/01/07	<10.9	<2.19	6.88	126	0.822 Jq	0.752 Jq	42.6	15.5	34.1	8.81	<0.0361	<0.547	25.9	1.5	<0.547	0.991 Jq	74.9	80.5
	SB3-60	60	11/01/07	<10.8	<2.17	4.78	74.7	0.52 Jq	<0.542	19.5	7.97	16.3	4.87	<0.0358	<0.542	13.8	0.874 Jq	<0.542	0.572 Jq	32.9	43.9
	SB3-65	65	11/01/07	<10.9	<2.18	2.26	73.5	0.397 Jq	<0.546	13.3	6.2	13.6	3.1	<0.036	<0.546	12	0.614 Jq	<0.546	0.55 Jq	26.4	40.7
	SB3-70	70	11/01/07	<11.1	<2.22	5.29	140	0.797 Jq	<0.554	20.2	11.8	24.9	9.1	<0.0366	<0.554	22.9	1.19	<0.554	0.887 Jq	44.8	71
	SB3-75	75	11/01/07	<11.2	<2.24	4.54	141	0.8 Jq	0.632 Jq	22.7	13	26.7	13.4	<0.0369	<0.559	24.8	1.02 Jq	<0.559	0.917 Jq	48.5	81
	SB3-80	80	11/01/07	<10.9	<2.18	2.1	110	0.626 Jq	<0.545	20	11.1	23.1	6.68	<0.036	<0.545	19	1.08 Jq	<0.545	0.709 Jq	41.4	56.9
	SB3-85	85	11/01/07	<11.1	<2.21	5.27	92.8	0.545 Jq	<0.554	46.7	8.52	16.6	4.71	<0.0365	<0.554	16	0.788 Jq	<0.554	0.795 Jq	44.3	51.1
	SB3-90	90	11/01/07	<11.3	<2.25	0.77 Jq	31	0.23 Jq	<0.564	8.49	2.85	5.6	2.15	<0.0372	<0.564	5.12	0.567 Jq	<0.564	<0.564	17.9	21.4

TABLE 5-16
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Waste Discharge Area

Boring No.	Sample No.	Depth (feet bgs)	Date Sampled	VOCs (µg/kg)															SVOCs (mg/kg)
				Acetone	Benzene	Bromomethane	2-Butanone (MEK)	Carbon Disulfide	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	4-Methyl-2-Pentanone	Methylene Chloride	Toluene	Trichloroethene	m,p-Xylenes	bis(2-Ethylhexyl)phthalate
Residential CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Commercial/Industrial CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residential RSL:				6.1E+07	1,100	7,300	2.8E+07	8.2E+05	290	1.2E+05	3,300	430	2.4E+05	5.3E+06	11,000	5.0E+06	2,800	3.4E+06	35
Commercial/Industrial RSL:				6.3E+08	5,400	32,000	2.0E+08	3.7E+06	1,500	5.0E+05	17,000	2,200	1.1E+06	5.3E+07	53,000	4.5E+07	14,000	1.7E+07	120
TT-MW2-21 (SB1)	SB1-15'	15	10/26/07	**6.8 Jq**	<2.2	<2.2	<5.5	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<5.5	<2.2	<2.2	<2.2	<2.2	-
	SB1-18'	18	10/26/07	<6	<2.4	<2.4	<6	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<6	<2.4	<2.4	<2.4	<2.4	-
	SB1-20'	20	10/26/07	**9 Jq**	<2.2	<2.2	<5.4	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<5.4	<2.2	<2.2	<2.2	<2.2	-
	SB1-35'	35	10/26/07	**7.6 Jq**	<2.2	<2.2	<5.5	<2.2	<2.2	<2.2	<2.2	**5.0 Jq**	<2.2	**42**	**920 Jr**	<2.2	**26**	<2.2	-
	SB1-40'	40	10/26/07	<5.2	<2.1	<2.1	<5.2	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<5.2	**130**	<2.1	**16**	<2.1	-
	SB1-45'	45	10/26/07	<4.2	<1.7	<1.7	<4.2	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<4.2	**6.9 Jq**	<1.7	**14**	<1.7	-
	SB1-50'	50	10/26/07	<4.5	<1.8	<1.8	<4.5	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<4.5	**15 Jf**	<1.8	**2.9 Jq**	<1.8	-
	SB1-55	55	10/29/07	<4.7	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.7	**4.4 Jq**	<1.9	<1.9	<1.9	-
	SB1-60	60	10/29/07	<4.7	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	-
	SB1-70'	70	10/30/07	<4.7	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	-
TT-MW2-22 (SB2)	SB2-15'	15	10/30/07	<4	**2.2 Jq**	<1.6	<4	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<4	<1.6	<1.6	<1.6	<1.6	-
	SB2-20'	20	10/30/07	<5	<2	<2	<5	<2	<2	<2	<2	<2	<2	<5	**2.5 Jq**	<2	<2	<2	-
	SB2-30'	30	10/30/07	**66**	<1.7	<1.7	<4.3	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<4.3	**7.2 Jq**	<1.7	**2.1 Jq**	<1.7	-
	SB2-35'	35	10/30/07	**170**	<2.2	<2.2	**13**	<2.2	<2.2	<2.2	<2.2	**5.6**	<2.2	<5.4	**170**	<2.2	**25**	<2.2	-
	SB2-40'	40	10/30/07	**30**	<1.6	<1.6	**4.5 Jq**	<1.6	**4.4**	<1.6	<1.6	**35**	<1.6	**100**	**1,600 Jr**	<1.6	**90**	<1.6	-
	SB2-45'	45	10/30/07	**1,400 Jq**	<490	<490	<1,200	<490	<490	<490	**7.0**	<490	<490	<1,200	**21,000**	<490	**680 Jq**	<490	-
	SB2-50'	50	10/30/07	**180**	<1.8	<1.8	**14**	<1.8	<1.8	<1.8	<1.8	**2.0 Jq**	<1.8	**42**	**230**	<1.8	**5.5**	<1.8	-
	SB2-55	55	10/30/07	<4.8	<1.9	<1.9	<4.8	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.8	**30**	<1.9	<1.9	<1.9	-
	SB2-60'	60	10/30/07	<4.3	<1.7	<1.7	<4.3	<1.7	<1.7	<1.7	<1.7	**1.8 Jq**	<1.7	**14**	**270 Jr**	<1.7	**7.1**	<1.7	-
	SB2-65'	65	10/30/07	**7.5 Jq**	<1.8	<1.8	<4.5	<1.8	<94	<94	<1.8	**1.8 Jq**	<1.8	**5.0 Jq**	**350 Jq**	<94	**8.6**	<1.8	-
	SB2-70'	70	10/30/07	<4.3	<1.7	<1.7	<4.3	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<4.3	**33**	<1.7	<1.7	<1.7	-
TT-MW2-23 (SB3)	SB3-0.5'	0.5	11/01/07	<4.7	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.7	**2.4 Jq**	<1.9	<1.9	<1.9	-
	SB3-5	5	11/01/07	<5.3	<2.1	<2.1	<5.3	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<5.3	**4.3 Jq**	<2.1	<2.1	<2.1	-
	SB3-10	10	11/01/07	<4.5	<1.8	<1.8	<4.5	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<4.5	<1.8	<1.8	<1.8	<1.8	-
	SB3-15	15	11/01/07	**5.0 Jq**	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	-
	SB3-20	20	11/01/07	<4.7	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.7	**2.7 Jq**	<1.9	<1.9	<1.9	-
	SB3-25	25	11/01/07	<4.9	<2	<2	<4.9	<2	<2	<2	<2	<2	<2	<4.9	<2	<2	<2	<2	-
	SB3-30	30	11/01/07	**6.7 Jq**	<1.9	<1.9	<4.6	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.6	<1.9	<1.9	<1.9	<1.9	-
	SB3-35	35	11/01/07	<4.1	<1.6	<1.6	<4.1	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<4.1	<1.6	<1.6	<1.6	<1.6	-
	SB3-40	40	11/01/07	<4.3	<1.7	<1.7	<4.3	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<4.3	<1.7	<1.7	<1.7	<1.7	-
	SB3-45	45	11/01/07	<4.1 UJe	<1.6 UJe	<1.6 UJe	<4.1 UJe	<1.6 UJe	<1.6 UJe	<1.6 UJe	<1.6 UJe	<1.6 UJe	<1.6 UJe	<4.1 UJe	<1.6 UJe	<1.6 UJe	<1.6 UJe	<1.6 UJe	-
	SB3-50	50	11/01/07	<4.2 UJe	<1.7 UJe	<1.7 UJe	<4.2 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<4.2 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	-
	SB3-55	55	11/01/07	<4.6 UJe	<1.9 UJe	<1.9 UJe	<4.6 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<4.6 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	-
	SB3-60	60	11/01/07	<5.3 UJe	<2.1 UJe	<2.1 UJe	<5.3 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<5.3 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	-
	SB3-65	65	11/01/07	<5.3 UJe	<2.1 UJe	<2.1 UJe	<5.3 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<5.3 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	<2.1 UJe	-
	SB3-70	70	11/01/07	<4.2 UJe	<1.7 UJe	<1.7 UJe	<4.2 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<4.2 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	-
	SB3-75	75	11/01/07	<4.8 UJe	<1.9 UJe	<1.9 UJe	<4.8 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<4.8 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	-
	SB3-80	80	11/01/07	<4.2 UJe	<1.7 UJe	<1.7 UJe	<4.2 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<4.2 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	<1.7 UJe	-
	SB3-85	85	11/01/07	<4.9 UJe	<1.9 UJe	<1.9 UJe	<4.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<4.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	<1.9 UJe	-
	SB3-90	90	11/01/07	<4.3	<1.7	<1.7	<4.3	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<4.3	<1.7	<1.7	<1.7	<1.7	-

TABLE 5-16
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Waste Discharge Area

Boring No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)	Metals (mg/kg)																
					Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5	530	23,000
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000
	SB4-0.5'	0.5	10/25/07	<10.3 UJt	<2.06 UJct	2.08 Jt	113 Jt	0.538 Jqt	<0.516 UJt	17.8 Jt	9.54 Jt	20.5 Jt	4.66 Jt	<0.0341 UJt	<0.516 UJt	15.5 Jt	0.991 Jqt	<0.516 UJt	0.876 Jqt	38.5 Jt	46.8 Jt
	SB4-5'	5	10/25/07	14.7 Jqt	<2.11 UJt	2.26 Jt	115 Jt	0.483 Jqt	<0.527 UJt	17.1 Jt	9.01 Jt	18.7 Jt	4.44 Jt	<0.0348 UJt	<0.527 UJt	14.7 Jt	0.633 Jqt	<0.527 UJt	0.888 Jqt	37 Jt	43.7 Jt
	SB4-10'	10	10/25/07	<11.2 UJt	<2.23 UJt	5.03 Jt	185 Jt	0.657 Jqt	0.631 Jqt	31.5 Jt	12.5 Jt	26.4 Jt	6.18 Jt	<0.0369 UJt	<0.559 UJt	21.2 Jt	0.978 Jqt	<0.559 UJt	0.859 Jqt	57.2 Jt	57.8 Jt
	SB4-15'	15	10/25/07	<10.8 UJt	<2.16 UJt	10.2 Jt	170 Jt	0.61 Jqt	0.783 Jqt	33.9 Jt	14.6 Jt	29.9 Jt	6.34 Jt	<0.0356 UJt	<0.54 UJt	24 Jt	1.13 Jt	<0.54 UJt	0.85 Jqt	54.3 Jt	56.7 Jt
	SB4-20'	20	10/25/07	<10.7 UJt	<2.14 UJt	8.07 Jt	94.3 Jt	0.518 Jqt	1.2 Jt	52.2 Jt	12.5 Jt	30 Jt	9.41 Jt	<0.0354 UJt	<0.536 UJt	19 Jt	<0.536 UJt	<0.536 UJt	0.642 Jqt	60.9 Jt	57.7 Jt
	SB4-25'	25	10/25/07	<10.8 UJt	<2.16 UJt	5.13 Jt	174 Jt	0.961 Jqt	1.05 Jqt	30 Jt	14.9 Jt	35.6 Jt	12.2 Jt	<0.0356 UJt	<0.539 UJt	22.4 Jt	0.973 Jqt	<0.539 UJt	1.26 Jt	55.5 Jt	73.5 Jt
	SB4-30'	30	10/25/07	<10.7 UJt	<2.13 UJt	3.52 Jt	143 Jt	0.623 Jqt	<0.533 UJt	32.6 Jt	10.6 Jt	18.6 Jt	5.57 Jt	<0.0352 UJt	<0.533 UJt	16.5 Jt	1.09 Jt	<0.533 UJt	0.698 Jqt	55.7 Jt	47.2 Jt
SB4	SB4-35'	35	10/25/07	<11 UJt	<2.21 UJt	7.77 Jt	145 Jt	1.14 Jt	1.03 Jqt	43.5 Jt	17.5 Jt	45.3 Jt	14 Jt	<0.0365 UJt	<0.552 UJt	30.1 Jt	1.84 Jt	<0.552 UJt	0.85 Jqt	95.1 Jt	94.8 Jt
	SB4-40'	40	10/25/07	**16.6 Jqt**	<2.14 UJt	3.48 Jt	83.7 Jt	0.4 Jqt	<0.536 UJt	12.9 Jt	6.96 Jt	17.2 Jt	7.54 Jt	<0.0354 UJt	<0.536 UJt	11.4 Jt	0.688 Jqt	<0.536 UJt	0.717 Jqt	27.2 Jt	34.6 Jt
	SB4-45'	45	10/25/07	**889 Jt**	<2.16 UJt	4.76 Jt	79.1 Jt	0.708 Jqt	<0.539 UJt	32.8 Jt	9.72 Jt	21.2 Jt	8.89 Jt	<0.0356 UJt	<0.539 UJt	17.9 Jt	1.07 Jqt	<0.539 UJt	0.616 Jqt	44.4 Jt	57.4 Jt
	SB4-50'	50	10/25/07	**1,480 Jt**	<2.21 UJt	3.83 Jt	115 Jt	0.71 Jqt	<0.552 UJt	29.4 Jt	12.1 Jt	27.4 Jt	6.32 Jt	<0.0365 UJt	<0.552 UJt	21.8 Jt	1.08 Jqt	<0.552 UJt	0.787 Jqt	42.6 Jt	72.5 Jt
	SB4-55'	55	10/30/07	**413**	<2.24	6.32	147	0.823 Jq	0.666 Jq	24.1	13.6	29	11.5	<0.0369	<0.559	26.5	1.09 Jq	<0.559	1.19	55.4	85.8
	SB4-60'	60	10/30/07	**334**	<2.18	7.51	108	0.708 Jq	<0.545	22.7	11.4	23.4	8.31	<0.0359	<0.545	20.1	1.13	<0.545	0.798 Jq	48.4	61.8
	SB4-65'	65	10/30/07	**1,470**	<2.19	0.832 Jq	60.1	0.324 Jq	<0.547	53.1	5.17	12.4	2.65	<0.0361	<0.547	8.9	<0.547	<0.547	<0.547	24.3	34
	SB4-70'	70	10/30/07	**68.1**	<2.2	1.23	46.3	0.297 Jq	<0.55	10.9	3.95	8.24	3.05	<0.0363	<0.55	6.55	<0.55	<0.55	<0.55	16.3	27.9
	SB5-0.5'	0.5	10/25/07	28.2 Jt	<2.11 UJt	2.17 Jt	116 Jt	0.54 Jqt	<0.528 UJt	17.8 Jt	9.48 Jt	19.3 Jt	5.12 Jt	<0.0348 UJt	<0.528 UJt	15.4 Jt	0.906 Jqt	<0.528 UJt	0.747 Jqt	39.2 Jt	48.3 Jt
	SB5-5'	5	10/25/07	32.2 Jt	<2.16 UJt	1.98 Jt	109 Jt	0.496 Jqt	<0.541 UJt	15.9 Jt	8.57 Jt	17.7 Jt	4.77 Jt	<0.0357 UJt	<0.541 UJt	14 Jt	0.895 Jqt	<0.541 UJt	0.781 Jqt	35.7 Jt	42 Jt
	SB5-10'	10	10/25/07	306 Jt	<2.19 UJt	2.38 Jt	142 Jt	0.539 Jqt	<0.547 UJt	19.5 Jt	9.88 Jt	20.3 Jt	5.39 Jt	<0.0361 UJt	<0.547 UJt	16.1 Jt	0.905 Jqt	<0.547 UJt	0.835 Jqt	42.1 Jt	47.2 Jt
	SB5-15'	15	10/25/07	129 Jt	<2.17 UJt	3.01 Jt	145 Jt	0.6 Jqt	<0.542 UJt	22.1 Jt	11.1 Jt	22.6 Jt	5.94 Jt	<0.0358 UJt	<0.542 UJt	18.3 Jt	1.03 Jqt	<0.542 UJt	0.899 Jqt	48.5 Jt	52.9 Jt
	SB5-20'	20	10/25/07	2,750 Jt	<2.17 UJt	3.94 Jt	96.2 Jt	0.748 Jqt	<0.542 UJt	27.7 Jt	13.9 Jt	27.6 Jt	7.08 Jt	<0.0358 UJt	<0.542 UJt	22.7 Jt	1.45 Jt	<0.542 UJt	1.01 Jqt	62.4 Jt	65.5 Jt
	SB5-25'	25	10/25/07	754 Jt	<2.17 UJt	2.67 Jt	239 Jt	0.564 Jqt	<0.543 UJt	20 Jt	10.3 Jt	21.1 Jt	5.17 Jt	<0.0359 UJt	<0.543 UJt	16.9 Jt	0.989 Jqt	<0.543 UJt	0.755 Jqt	44.5 Jt	48.4 Jt
SB5	SB5-30'	30	10/25/07	2,870 Jt	<2.25 UJt	3.73 Jt	124 Jt	0.508 Jqt	<0.562 UJt	27.6 Jt	10.1 Jt	20.5 Jt	4.35 Jt	<0.0371 UJt	<0.562 UJt	18.5 Jt	1.18 Jt	<0.562 UJt	0.884 Jqt	53.8 Jt	56.6 Jt
	SB5-35'	35	10/25/07	2,890 Jt	<2.18 UJt	2.46 Jt	63.8 Jt	0.404 Jqt	<0.545 UJt	11.9 Jt	5.47 Jt	11.6 Jt	5.2 Jt	<0.0359 UJt	<0.545 UJt	12 Jt	0.85 Jqt	<0.545 UJt	<0.545 UJt	22.9 Jt	31.3 Jt
	SB5-40'	40	10/25/07	6,380 Jt	<2.19 UJt	4.5 Jt	106 Jt	0.7 Jqt	<0.547 UJt	17.5 Jt	11.5 Jt	20 Jt	9.37 Jt	<0.0361 UJt	<0.547 UJt	20.7 Jt	0.661 Jqt	<0.547 UJt	1.41 Jt	42.9 Jt	61.1 Jt
	SB5-45'	45	10/25/07	8,280 Jt	<2.17 UJct	3.9 Jt	181 Jct	0.928 Jqt	<0.543 UJt	21.3 Jt	11.3 Jt	26.2 Jt	10.8 Jt	<0.0359 UJt	<0.543 UJt	18.8 Jt	1.16 Jt	<0.543 UJt	1.05 Jqt	39.2 Jt	61 Jt
	SB5-50'	50	10/25/07	16,600 Jt	<2.19 UJt	3.11 Jt	64.8 Jt	0.708 Jqt	0.551 Jqt	18.5 Jt	7.92 Jt	13 Jt	3.79 Jt	<0.0361 UJt	<0.547 UJt	13.7 Jt	1.1 Jt	<0.547 UJt	0.875 Jqt	43.1 Jt	43 Jt
	SB5-55	55	10/29/07	**9,970**	<2.18	5.04	110	0.726 Jq	<0.544	33.9	11.1	21.7	7.23	<0.0359	<0.544	19.5	1.36	<0.544	0.905 Jq	49.6	63.1
	SB5-60	60	10/29/07	**20,300**	<2.2	1.95	55.7	0.371 Jq	<0.549	12.2	5.07	9.23	3.53	<0.0362	<0.549	8.59	0.631 Jq	<0.549	0.555 Jq	21.6	31.9
	SB6-15'	15	10/25/07	<11.1 UJt	<2.23 UJt	2.22 Jt	124 Jt	0.566 Jqt	<0.557 UJt	18.7 Jt	9.94 Jt	19.4 Jt	4.81 Jt	<0.0367 UJt	<0.557 UJt	16.5 Jt	0.851 Jqt	<0.557 UJt	0.876 Jqt	41.3 Jt	47.7 Jt
	SB6-20'	20	10/25/07	21.7 Jqt	<2.21 UJt	2.38 Jt	153 Jt	0.599 Jqt	<0.551 UJt	20.5 Jt	10.5 Jt	21 Jt	5.59 Jt	<0.0364 UJt	<0.551 UJt	17.3 Jt	1.05 Jqt	<0.551 UJt	0.731 Jqt	45.1 Jt	49.5 Jt
	SB6-25'	25	10/25/07	19.8 Jqt	<2.21 UJt	2.04 Jt	81 Jt	0.474 Jqt	<0.552 UJt	15.7 Jt	7.78 Jt	16.1 Jt	4.08 Jt	<0.0364 UJt	<0.552 UJt	13.1 Jt	0.735 Jqt	<0.552 UJt	0.667 Jqt	36.1 Jt	39.4 Jt
TT-MW2-24	SB6-35'	35	10/25/07	8,170 Jt	<2.22 UJt	4.17 Jt	124 Jt	0.6 Jqt	<0.554 UJt	22.1 Jt	10.8 Jt	22.1 Jt	5.57 Jt	<0.0366 UJt	<0.554 UJt	17.6 Jt	1.24 Jt	<0.554 UJt	0.618 Jqt	50.2 Jt	50.8 Jt
(SB6)	SB6-39.5'	40	10/25/07	5,360 Jt	<2.21 UJt	4.56 Jt	109 Jt	0.527 Jqt	<0.551 UJt	23 Jt	10 Jt	21.1 Jt	5.93 Jt	<0.0364 UJt	<0.551 UJt	16.3 Jt	0.777 Jqt	<0.551 UJt	0.688 Jqt	46.8 Jt	44.1 Jt
	SB6-45'	45	10/25/07	4,610 Jt	<2.24 UJt	1.86 Jt	73.6 Jt	0.37 Jqt	<0.559 UJt	60.8 Jt	5.28 Jt	10.5 Jt	2.46 Jt	<0.0369 UJt	<0.559 UJt	9.98 Jt	0.732 Jqt	<0.559 UJt	<0.559 UJt	24.4 Jt	34.1 Jt
	SB6-50'	50	10/25/07	4,500 Jt	<2.2 UJt	1.21 Jt	40.7 Jt	0.233 Jqt	<0.55 UJt	6.82 Jt	2.59 Jt	4.77 Jt	2.54 Jt	<0.0363 UJt	<0.55 UJt	4.12 Jt	<0.55 UJt	<0.55 UJt	<0.55 UJt	11.6 Jt	16.6 Jt
	SB6-55'	55	10/26/07	**8,640**	<2.25	2.32	45.6	0.39 Jq	<0.562	11.7	5.31	12	3.5	<0.0371	<0.562	9.66	0.903 Jq	<0.562	<0.562	23	35.6
	POND1-0.5'	0.5	08/17/07	<10.3	<2.07	8.09	203	0.658 Jq	<0.517	35.1	10.8	26	5.17	<0.0341	<0.517	19.4	<0.517	<0.517	1.04	70.4	52.8
	POND1@5	5	06/29/07	<10.9	<2.18	15.8	1650	0.818 Jq	<0.545	36.9	18.2	41.9	13.1	<0.036	<0.545	28.7	1.83	<0.545	<0.545	96.4	72.5
POND1	POND1@10	10	06/29/07	<10.9	<2.17	9.55	222	0.703 Jq	<0.543	46.2	17.1	33.9	11.1	<0.0359	<0.543	26.6	1.36	<0.543	<0.543	76.4	62.9
	POND1@25	25	06/29/07	**1,200**	<2.18	6.5	86.4	0.586 Jq	<0.546	20.7	9	18.4	6.7	<0.036	<0.546	16.4	1.27	<0.546	<0.546	54.2	45.8
	POND101@25	25	06/29/07	**1,000**	<2.15	5.72	92.3	0.558 Jq	<0.538	22.7	8.93	18.7	6.31	<0.0355	<0.538	16.3	1.47	<0.538	<0.538	50.9	44.8

TABLE 5-16
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Waste Discharge Area

				VOCs (µg/kg)															SVOCs (mg/kg)
Boring No.	Sample No.	Depth (feet bgs)	Date Sampled	Acetone	Benzene	Bromomethane	2-Butanone (MEK)	Carbon Disulfide	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	4-Methyl-2-Pentanone	Methylene Chloride	Toluene	Trichloroethene	m,p-Xylenes	bis(2-Ethylhexyl)phthalate
Residential CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Commercial/Industrial CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residential RSL:				6.1E+07	1,100	7,300	2.8E+07	8.2E+05	290	1.2E+05	3,300	430	2.4E+05	5.3E+06	11,000	5.0E+06	2,800	3.4E+06	35
Commercial/Industrial RSL:				6.3E+08	5,400	32,000	2.0E+08	3.7E+06	1,500	5.0E+05	17,000	2,200	1.1E+06	5.3E+07	53,000	4.5E+07	14,000	1.7E+07	120
	SB4-0.5'	0.5	10/25/07	<5 UJt	<2 UJt	<2 UJt	<5 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<5 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	-
	SB4-5'	5	10/25/07	<4.9 UJt	<2 UJt	<2 UJt	<4.9 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<4.9 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	-
	SB4-10'	10	10/25/07	6.5 Jqt	<2.2 UJt	<2.2 UJt	<5.6 UJt	<2.2 UJt	<2.2 UJt	<2.2 UJt	<2.2 UJt	<2.2 UJt	<2.2 UJt	<5.6 UJt	**3.4 Jqt**	<2.2 UJt	<2.2 UJt	<2.2 UJt	-
	SB4-15'	15	10/25/07	<4.5 UJt	<1.8 UJt	<1.8 UJt	<4.5 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<4.5 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	-
	SB4-20'	20	10/25/07	<4.6 UJt	<1.8 UJt	<1.8 UJt	<4.6 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<4.6 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	-
	SB4-25'	25	10/25/07	<5.2 UJt	<2.1 UJt	<2.1 UJt	<5.2 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<5.2 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	-
	SB4-30'	30	10/25/07	<4.2 UJt	<1.7 UJt	<1.7 UJt	<4.2 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	**1.7 Jqt**	<4.2 UJt	<1.7 UJt	<1.7 UJt	**9.8 Jt**	<1.7 UJt	-
SB4	SB4-35'	35	10/25/07	<4.6 UJt	<1.8 UJt	<1.8 UJt	<4.6 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<4.6 UJt	<1.8 UJt	<1.8 UJt	**7.8 Jt**	<1.8 UJt	-
	SB4-40'	40	10/25/07	<5.3 UJt	<2.1 UJt	<2.1 UJt	<5.3 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<5.3 UJt	<2.1 UJt	<2.1 UJt	**2.4 Jqt**	<2.1 UJt	-
	SB4-45'	45	10/25/07	**26 Jt**	<2.2 UJt	<2.2 UJt	<5.4 UJt	<2.2 UJt	<2.2 UJt	<2.2 UJt	<2.2 UJt	<2.2 UJt	<2.2 UJt	<5.4 UJt	<2.2 UJt	<2.2 UJt	**11 Jt**	<2.2 UJt	-
	SB4-50'	50	10/25/07	<5 UJt	<2 UJt	<2 UJt	<5 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	**31 Jt**	<5 UJt	<2 UJt	<2 UJt	**44 Jt**	<2 UJt	-
	SB4-55'	55	10/30/07	<4.4	<1.8	<1.8	<4.4	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<4.4	**3.1 Jq**	<1.8	**1.9 Jq**	<1.8	-
	SB4-60'	60	10/30/07	<4.2	<1.7	<1.7	<4.2	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<4.2	**3.8 Jq**	<1.7	<1.7	<1.7	-
	SB4-65'	65	10/30/07	**23**	<3.5	<3.5	<8.8	<3.5	<3.5	<3.5	<3.5	<3.5	<3.5	<8.8	<3.5	<3.5	<3.5	<3.5	-
	SB4-70'	70	10/30/07	<5.1	<2	<2	<5.1	<2	<2	<2	<2	<2	<2	<5.1	<2	<2	<2	<2	-
	SB5-0.5'	0.5	10/25/07	<4.8 UJt	<1.9 UJt	<1.9 UJt	<4.8 UJt	<1.9 UJt	<1.9 UJt	<1.9 UJt	<1.9 UJt	<1.9 UJt	<1.9 UJt	<4.8 UJt	<1.9 UJt	<1.9 UJt	<1.9 UJt	<1.9 UJt	-
	SB5-5'	5	10/25/07	<4.6 UJt	<1.8 UJt	<1.8 UJt	<4.6 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<4.6 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	-
	SB5-10'	10	10/25/07	<4.3 UJt	<1.7 UJt	<1.7 UJt	<4.3 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<4.3 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	-
	SB5-15'	15	10/25/07	<5.1 UJt	<2 UJt	<2 UJt	<5.1 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<5.1 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	-
	SB5-20'	20	10/25/07	<4.4 UJt	<1.8 UJt	<1.8 UJt	<4.4 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<4.4 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	-
	SB5-25'	25	10/25/07	<5.2 UJt	<2.1 UJt	<2.1 UJt	<5.2 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<5.2 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	-
SB5	SB5-30'	30	10/25/07	<3.8 UJt	<1.5 UJt	<1.5 UJt	<3.8 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<3.8 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	-
	SB5-35'	35	10/25/07	<4.2 UJt	<1.7 UJt	<1.7 UJt	<4.2 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<4.2 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	-
	SB5-40'	40	10/25/07	<4.3 UJt	<1.7 UJt	<1.7 UJt	<4.3 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<4.3 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	-
	SB5-45'	45	10/25/07	<3.7 UJt	<1.5 UJt	<1.5 UJt	<3.7 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<3.7 UJt	<1.5 UJt	<1.5 UJt	**2.8 Jqt**	<1.5 UJt	-
	SB5-50'	50	10/25/07	<5.1 UJt	<2 UJt	<2 UJt	<5.1 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<5.1 UJt	<2 UJt	<2 UJt	**2.8 Jqt**	<2 UJt	-
	SB5-55	55	10/29/07	<4.1	<1.7	<1.7	<4.1	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<4.1	<1.7	<1.7	**2.5 Jq**	<1.7	-
	SB5-60	60	10/29/07	<4.3	<1.7	<1.7	<4.3	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<4.3	<1.7	<1.7	**2.0 Jq**	<1.7	-
	SB6-15'	15	10/25/07	<5 UJt	<2 UJt	<2 UJt	<5 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	<5 UJt	<2 UJt	<2 UJt	<2 UJt	<2 UJt	-
	SB6-20'	20	10/25/07	<4.4 UJt	<1.7 UJt	<1.7 UJt	<4.4 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<4.4 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	-
	SB6-25'	25	10/25/07	<4.3 UJt	<1.7 UJt	<1.7 UJt	<4.3 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<4.3 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	<1.7 UJt	-
TT-MW2-24	SB6-35'	35	10/25/07	**13 Jt**	<1.8 UJt	<1.8 UJt	<4.5 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<4.5 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	<1.8 UJt	-
(SB6)	SB6-39.5'	40	10/25/07	<3.6 UJt	<1.5 UJt	<1.5 UJt	<3.6 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<3.6 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	<1.5 UJt	-
	SB6-45'	45	10/25/07	<4 UJt	<1.6 UJt	<1.6 UJt	<4 UJt	<1.6 UJt	<1.6 UJt	<1.6 UJt	<1.6 UJt	<1.6 UJt	<1.6 UJt	<4 UJt	<1.6 UJt	<1.6 UJt	<1.6 UJt	<1.6 UJt	-
	SB6-50'	50	10/25/07	<5.3 UJt	<2.1 UJt	<2.1 UJt	<5.3 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<5.3 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	<2.1 UJt	-
	SB6-55'	55	10/26/07	<4.4	<1.8	<1.8	<4.4	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<4.4	<1.8	<1.8	<1.8	<1.8	-
	POND1-0.5'	0.5	08/17/07	100	**4.8 Jq**	<2.3	12	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<5.7	<2.3	**4.5 Jq**	<2.3	<2.3	<0.17
	POND1@5	5	06/29/07	30	<2.4	<2.4	**6.7 Jq**	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<6	<2.4	<2.4	<2.4	<2.4	<0.18
POND1	POND1@10	10	06/29/07	13	<2.1	<2.1	<5.2	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<5.2	<2.1	<2.1	<2.1	<2.1	<0.18
	POND1@25	25	06/29/07	**8.0 Jq**	<2	<2	<5.1	<2	<2	<2	<2	<2	<2	<5.1	<2	<2	<2	<2	<0.18
	POND101@25	25	06/29/07	**5.6 Jq**	<1.8	<1.8	<4.6	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<4.6	<1.8	<1.8	<1.8	<1.8	<0.18

TABLE 5-16
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Waste Discharge Area

					Metals (mg/kg)																
Boring No.	**Sample No.**	**Depth (feet bgs)**	**Date Sampled**	**Perchlorate (µg/kg)**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
Residential CHHSL:				-	30	0.070	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5	530	23,000
Commercial/Industrial CHHSL:				-	380	0.24	63,000	190	7.5	100,000	3,200	38,000	320	180	4,800	16,000	4,800	4,800	63	6,700	100,000
Residential RSL:				55,000	31	0.39	15,000	160	70	120,000	23	3,100	400	23	390	1,500	390	390	-	390	23,000
Commercial/Industrial RSL:				720,000	410	1.6	190,000	2,000	800	1,500,000	300	41,000	800	310	5,100	20,000	5,100	5,100	-	5,200	310,000
POND2	POND2-0.5'	0.5	08/17/07	<10.3	<2.05	3.13	124	0.583 Jq	<0.513	19.2	8.96	22.4	5.29	<0.0338	<0.513	16.7	<0.513	<0.513	0.954 Jq	45.3	50.9
	POND2@5	5	07/02/07	<10.5	<2.1 UJc	3.2	148	0.642 Jq	<0.524	23	11.3	32.1	7.33	<0.0346	0.701 Jq	23	<0.524 Rd	<0.524	1.3	47.5	57.3
	POND2@10	10	07/02/07	<10.9	<2.18	2.8	147	0.556 Jq	<0.545	18.8	9.89	23	5.43	<0.036	<0.545	16.9	0.667 Jdq	<0.545	1.13	43.8	48.9
	POND2@30	30	07/02/07	<11.1	<2.22	4.4	159	0.656 Jq	<0.556	22.7	12.3	28.5	6.93	<0.0367	0.641 Jq	19.9	0.63 Jdq	<0.556	1.83	55.9	54.4
POND3	POND3-0.5'	0.5	08/17/07	**173**	<2.07	3.79	150	0.657 Jq	5.37	28.2	10.3	49	236	<0.0341	<0.517	21.5	<0.517	<0.517	1.17	50.4	1720
	POND3@5	5	06/29/07	**297**	<2.18	4.25	142	0.59 Jq	1.71	23.7	10.5	31.9	60.2	<0.0359	<0.544	18.6	1.24	<0.544	<0.544	48.5	424
	POND3@10	10	06/29/07	**68.2**	<2.25	6.09	171	0.638 Jq	<0.562	28.5	12.7	29.9	20	<0.0371	<0.562	21.4	1.22	<0.562	<0.562	59.9	147
	POND3@25	25	06/29/07	**33.2**	<2.18	5.51	70.2	0.596 Jq	<0.546	23.6	10.2	21.6	6.46	<0.036	<0.546	19.2	1.12	<0.546	<0.546	55	52.9
POND4	POND4-0.5'	0.5	08/17/07	**322**	<2.06	3.59	157	0.633 Jq	0.697 Jq	30.6	10.3	57.2	19.4	<0.0339	<0.514	19.2	<0.514	<0.514	0.994 Jq	52.5	142
	POND4@5	5	06/29/07	**36.8**	<2.12	4.69	166	0.617 Jq	<0.53	27.6	11.9	28.7	8.63	<0.035	<0.53	20	1.13	<0.53	<0.53	55.1	57.2
	POND4@10	10	06/29/07	**155**	<2.18	9.74	234	0.773 Jq	<0.546	34.3	17	40.9	11.7	<0.036	<0.546	26.4	1.76	<0.546	<0.546	82.1	79.6
	POND4@25	25	06/29/07	**13,400**	<2.1	5.6	138	0.484 Jq	<0.524	26.5	8.43	17.2	9.33	<0.0346	<0.524	12.3	<0.524	<0.524	<0.524	35.3	31.3
POND5	POND5-0.5'	0.5	08/17/07	<10.2	<2.04 UJc	3.33	138	0.651 Jq	<0.51	21.3	9.93	25.8	9.44	<0.0337	<0.51	18.5	<0.51	<0.51	1 Jq	48.4	58
	POND5@5	5	06/29/07	<10.6	<2.12	2.53	93.5	0.427 Jq	<0.53	15.9	7.93	19.9	6.04	<0.035	<0.53	13.9	0.556 Jq	<0.53	<0.53	34.2	41
	POND5@10	10	06/29/07	**29.5**	<2.14	3.06	135	0.562 Jq	<0.536	20.6	10.8	24.5	7.39	<0.0354	<0.536	18.3	1.2	<0.536	<0.536	45.4	54.1
	POND5@30	30	06/29/07	<11	<2.19	17.4	194	1.53	<0.548	47.3	24.8	66.3	27.6	<0.0362	<0.548	36	2.54	<0.548	<0.548	103	137
TT-MW2-9	MW-9-5-6.5	6.5	08/25/06	<13.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-9-20-21.5	21.5	08/25/06	<12.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 5-16
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Waste Discharge Area

				VOCs (µg/kg)															SVOCs (mg/kg)
Boring No.	Sample No.	Depth (feet bgs)	Date Sampled	Acetone	Benzene	Bromomethane	2-Butanone (MEK)	Carbon Disulfide	Chloroform	Chloromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	4-Methyl-2-Pentanone	Methylene Chloride	Toluene	Trichloroethene	m,p-Xylenes	bis(2-Ethylhexyl)phthalate
Residential CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Commercial/Industrial CHHSL:				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Residential RSL:				6.1E+07	1,100	7,300	2.8E+07	8.2E+05	290	1.2E+05	3,300	430	2.4E+05	5.3E+06	11,000	5.0E+06	2,800	3.4E+06	35
Commercial/Industrial RSL:				6.3E+08	5,400	32,000	2.0E+08	3.7E+06	1,500	5.0E+05	17,000	2,200	1.1E+06	5.3E+07	53,000	4.5E+07	14,000	1.7E+07	120
POND2	POND2-0.5'	0.5	08/17/07	**110**	**3.0 Jq**	<2.1	**12**	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<5.1	<2.1	**2.4 Jq**	<2.1	<2.1	<0.17
	POND2@5	5	07/02/07	**27**	**2.8 Jq**	<2.1	<5.2	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<5.2	<2.1	**2.7 Jq**	<2.1	<2.1	<0.18
	POND2@10	10	07/02/07	**29**	<2.1	<2.1	<5.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<5.1	<2.1	**2.2 Jq**	<2.1	<2.1	<0.18
	POND2@30	30	07/02/07	**14**	<2.2	<2.2	<5.6	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<5.6	<2.2	<2.2	<2.2	<2.2	<0.19
POND3	POND3-0.5'	0.5	08/17/07	**83**	**5.6 Jq**	<2.5	**12**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<6.2	<2.5	**3.9 Jq**	<2.5	<2.5	**0.19 Jq**
	POND3@5	5	06/29/07	**48**	**14**	<2.2	**18**	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<5.4	<2.2	**13**	<2.2	**3.0 Jq**	<0.18
	POND3@10	10	06/29/07	**22**	<2	<2	<5.1	**3.1 Jq**	<2	<2	<2	<2	<2	<5.1	<2	<2	<2	<2	<0.19
	POND3@25	25	06/29/07	<4.7	<1.9	<1.9	<4.7	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<4.7	**3.4 Jq**	<1.9	<1.9	<1.9	<0.18
POND4	POND4-0.5'	0.5	08/17/07	**140**	**8.4**	**18 Jf**	**15**	**3.5 Jq**	<2.1	**22 Jf**	<2.1	<2.1	<2.1	<5.1	<2.1	**8.7**	<2.1	**2.3 Jq**	<0.17
	POND4@5	5	06/29/07	**43**	**5.4 Jq**	<2.3	**8.2 Jq**	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<5.8	<2.3	**5.9**	<2.3	<2.3	<0.18
	POND4@10	10	06/29/07	**21**	**5.1 Jq**	<2.2	<5.5	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<5.5	<2.2	**5.8**	<2.2	<2.2	<0.18
	POND4@25	25	06/29/07	**7.7 Jq**	<2	<2	<5	<2	<2	<2	<2	<2	<2	<5	<2	<2	**5.2**	<2	<0.18
POND5	POND5-0.5'	0.5	08/17/07	**65**	<2	<2	**6.7 Jq**	<2	<2	<2	<2	<2	<2	<5.1	<2	<2	<2	<2	<0.17
	POND5@5	5	06/29/07	**42**	<1.8	<1.8	<4.6	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<4.6	<1.8	<1.8	<1.8	<1.8	<0.18
	POND5@10	10	06/29/07	**26**	<2.4	<2.4	<5.9	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<5.9	<2.4	<2.4	<2.4	<2.4	<0.18
	POND5@30	30	06/29/07	<5.5	<2.2	<2.2	<5.5	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<5.5	<2.2	<2.2	<2.2	<2.2	<0.18
TT-MW2-9	MW-9-5-6.5	6.5	08/25/06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW-9-20-21.5	21.5	08/25/06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
mg/kg - Concentration in milligrams per kilogram.
Metals - California Title 22 Metals.
VOCs - Volatile organic compounds.
SVOCs - Semivolatile organic compounds.
"<" - indicates concentration below indicated method detection limit.

"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"R" - The sample result is rejected and not usable for any purpose. The presence or absence of the analyte cannot be verified.
"U" - The analyte was not detected above the method detection limit (MDL).
"UJ" - The analyte was not detected above the MDL. However, the MDL may be elevated above the reported detection limit.
"c" - The MS and/or MSD recoveries were outside control limits.
"d" - The laboratory control sample recovery was outside control limits.
"e" - A holding time violation occurred.
"f" - The duplicate/replicate sample's relative percent difference (RPD) was outside the control limit.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).
"r" - The result is above the instrument's calibration range.
"t" - The temperature was outside acceptance criteria.
"ND" - Concentration of analyte(s) was not detected above the MDL.

- Perchlorate was detected in shallow well TT-MW2-24 at a concentration of 142,000 µg/L. Perchlorate was not detected in shallow upgradient and crossgradient monitoring wells TT-MW2-21, TT-MW2-22, and TTMW2-23. Perchlorate was detected in shallow well TT-MW2-9S at 426 µg/L, and was not detected in deep well TT-MW2-9D. Wells TT-MW2-9S and D are located in Laborde Canyon, downgradient of the WDA.
- Methylene chloride was detected at a concentration of 220 µg/L in monitoring well TT-MW2-22, and was not detected in wells TT-MW2-21, TT-MW2-23, and TT-MW2-24. TCE was detected at concentrations of 84 and 110 µg/L in wells TT-MW2-22 and TT-MW2-24, respectively, and was not detected in wells TT-MW2-21 and TT-MW2-23. No other VOCs were detected at concentrations exceeding screening criteria.

5.4.5.2 DSI Activities

Based on the previous results discussed above, Tetra Tech (2009d) proposed no further assessment of perchlorate, VOCs, or SVOCs in soil. Additional work proposed in Tetra Tech (2009d) included the following:

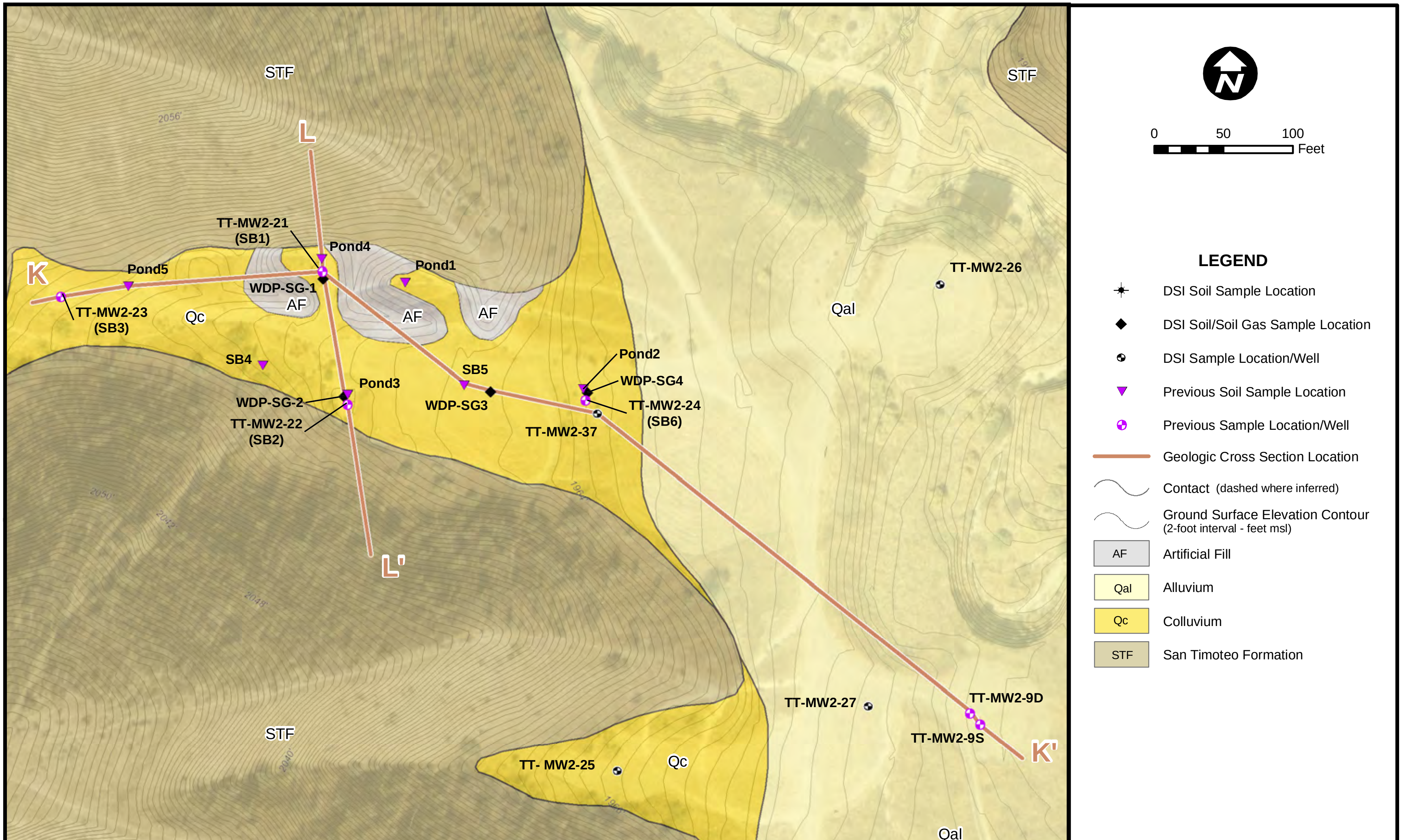
- Installing 4 additional monitoring wells, including 3 shallow wells and 1 deep well, to further characterize the lateral and vertical extent of perchlorate and VOCs in groundwater.
- Installing soil gas probes at depths of 5 and 15 feet bgs at 4 locations, to characterize potential soil gas impacts related to VOCs detected in soil and groundwater.

A groundwater sample was also collected from well TT-MW2-24 for analysis of RDX, which had not previously been analyzed at the WDA. No additional work was conducted based on the results from the primary wells and soil gas probes.

5.4.5.3 Geology and Hydrogeology

The surface geology of the WDA is shown on Figure 5-47. The WDA is located in a small side canyon underlain by colluvium. Colluvium also occurs in a second small side canyon to the south of the WDA. Laborde Canyon, which is underlain by alluvium, lies to the east of the WDA. An incised active drainage channel is present in Laborde Canyon. The STF is exposed on hillsides surrounding WDA. Artificial fill was used to construct low berms which define two basins on the north side of the WDA. Some regrading appears to have been conducted in the WDA, and it is likely that the fill used to construct the berms was locally derived.

Figure 5-48 (cross-section K-K’) shows the subsurface geology along the length of the WDA side canyon; Figure 5-49 (cross-section L-L’) show the subsurface geology across the WDA. The STF underlying the WDA consists mainly of sandstone with some mudstone interbeds to a depth of approximately 115 feet bgs at well TT-MW2-37A and B. The sandstone is underlain by mudstone with some sandstone interbeds to a depth of 187 feet bgs.

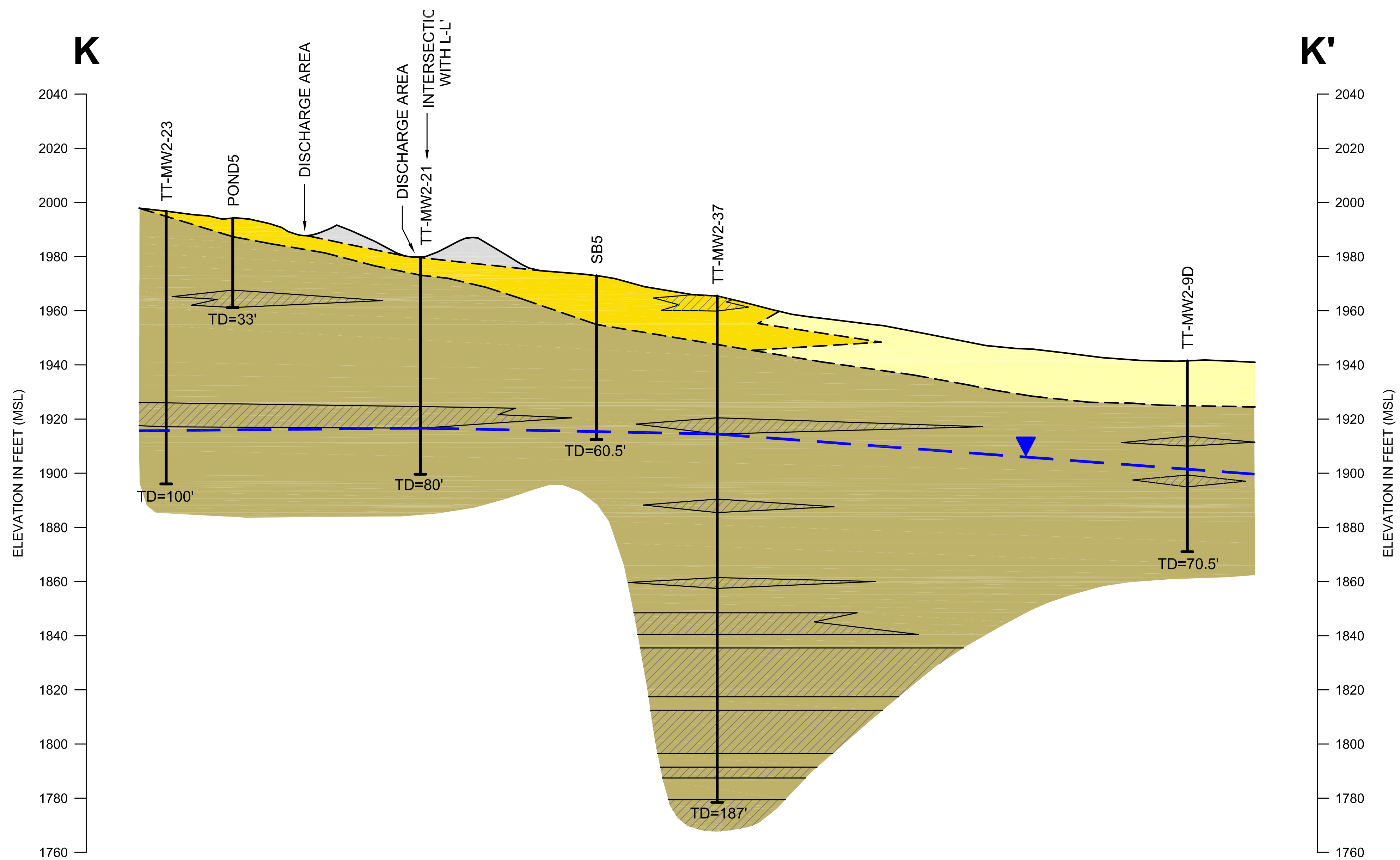


Beaumont Site 2

Figure 5-47

Surface Geology Waste Discharge Area

TETRA TECH



0 100

50

Scale in Feet
Vertical Exaggeration = 2x Horizontal

LEGEND

Water Table

Contact (dashed where inferred)

TD = Total Depth (in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

Artificial Fill

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

COLLUVIUM

Sand, Silty Sand, and Clayey Sand

Silt and Clay

SAN TIMOTEO FORMATION

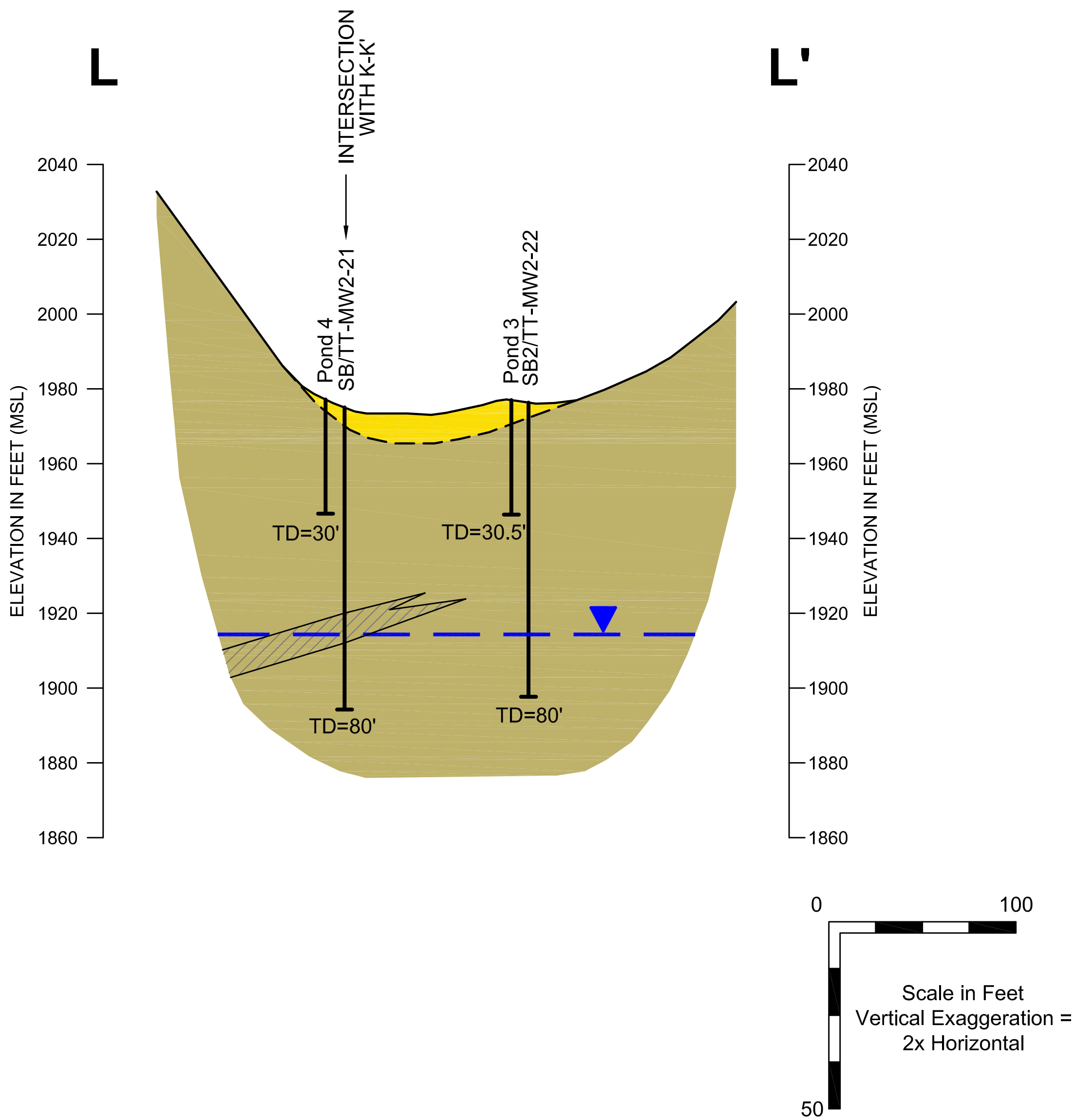
Sandstone

Mudstone

Beaumont Site 2

Figure 5-48
Cross Section K-K'
Waste Discharge Area

TETRA TECH



LEGEND

Water Table

Contact (dashed where inferred)

TD = Total Depth (in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

COLLUVIUM

Sand, Silty Sand, and Clayey Sand

SAN TIMOTEO FORMATION

Sandstone

Mudstone

Beaumont Site 2

Figure 5-49
Cross Section L-L'
Waste Discharge Area

TETRA TECH

The depths to groundwater in shallow wells TT-MW2-21, TT-MW2-22, TT-MW2-23, and TT-MW2-24 in May 2009 were 63.1, 62.2, 80.6 and 61.3 feet bgs, respectively. The depth to groundwater in deep wells TT-MW2-37A and TT-MW2-37B in May 2009 were 60.1 and 67.8 feet bgs. The vertical gradient between wells TT-MW2-24 and TT-MW2-37A was downward at -0.15 ft/ft. Groundwater flow beneath the WDA is generally to the east, and then turns to the south as it enters Laborde Canyon.

5.4.5.4 Groundwater Sampling Results

Analytical results for groundwater are summarized in Table 5-17. A total of 15 groundwater samples, including 5 grab samples and 10 monitoring well samples, were collected at the WDA during the DSI. Perchlorate concentrations exceeding the MCL of 6 µg/L were found in samples from shallow monitoring wells TT-MW2-26, TT-MW2-27, both of which are located in Laborde Canyon. Perchlorate was not detected in the groundwater sample collected from well TT-MW2-25, which is located in a side canyon south of the WDA. Perchlorate was detected at concentrations up to 66 µg/L in deep well TT-MW2-37A, and was not detected in deep well TT-MW2-37B. Benzene was detected at concentrations of 1.3 and 2.2 µg/L, above the MCL of 1 µg/L, in grab samples collected from the TT-MW2-37 borehole. These concentrations were not confirmed in the samples collected from wells TT-MW2-37A and TT-MW2-37B.

5.4.5.5 Soil Gas Sampling Results

Analytical results for VOCs in soil gas are summarized in Table 5-18. VOCs detected in the soil gas samples include benzene, 1,1-DCE, 1,1,1-trichloroethane, and TCE, and 1,2,4-trimethylbenzene.

5.4.5.6 Discussion

Perchlorate in Soil

As part of the DSI, a 3-D geostatistical model of the perchlorate distribution in soil in the WDA was generated using MVS. All of the previous data were used in the 3-D model. Figure 5-50 provides 3-D renderings showing the extent of perchlorate concentrations in soil greater than 100 µg/kg. In some areas, the model results show the perchlorate impacted soil as consisting of disconnected segments. This is considered to be an artifact of the choice of 100 µg/kg as the cutoff concentration for defining the impacted soil; the segments become connected when lower cutoff concentrations are used.

Figures 5-50 shows that the perchlorate source area generally appears to underlie the area of the former disposal basins. At depth, the impacted soil spreads laterally to the south and east, across and down the side canyon.

TABLE 5-17
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Waste Discharge Area

Boring/ Well ID	Sample ID	Depth	Sample Date	Perchlorate (µg/L)	VOCs (µg/L) Acetone	2-Butanone (MEK)	Benzene	Carbon Disulfide	Chloromethane	2-Hexanone	4-Methyl-2-Pentanone	Toluene	RDX (µg/L)
California MCL				6	-	-	1	-	-	-	-	150	-
California DWNL				-	-	-	-	160	-	-	120	-	0.3
GRAB GROUNDWATER SAMPLES													
TT-MW2-37A/B	WDP-W101-GW-117'	117	01/07/09	**19**	**18**	**5.1**	**1.3**	<0.36	<0.36	<1.2	<0.95	**0.58**	-
TT-MW2-37A/B	WDP-W101-GW-187'	187	01/07/09	<0.071	**15**	**4.8**	**2.2**	<0.36	<0.36	**2.5 Jq**	<0.95	**1.0**	-
TT-MW2-37A/B	WDP-W102-GW-75'	75	10/08/08	<0.071	<5.0	<1.2	**0.14 Jq**	<0.36	<0.36	<1.2	<0.95	<0.22	-
TT-MW2-37A/B	WDP-W103-GW-61'	61	10/09/08	<0.071	**5.2**	**1.2 Jq**	**<0.14**	<0.36	<0.36	<1.2	<0.95	<0.22	-
TT-MW2-37A/B	WDP-W104-GW-74'	74	10/09/08	**0.57**	<5.0	<1.2	**0.21 Jq**	<0.36	<0.36	<1.2	<0.95	**0.27 Jq**	-
MONITORING WELL SAMPLES													
TT-MW2-24	TT-MW2-24	47 - 67	05/05/09	-	-	-	-	-	-	-	-	-	**4.7**
TT-MW2-25	TT-MW2-25	54.5 - 74.5	02/10/09	<0.071	<5.0	<1.2	<0.14	<0.36	<0.36	<1.2	<0.95	<0.22	-
TT-MW2-25	TT-MW2-25	54.5 - 74.5	03/13/09	<0.071	<5.0	<1.2	<0.14	<0.36	<0.36	<1.2	<0.95	<0.22	-
TT-MW2-26	TT-MW2-26	44 - 64	02/06/09	**44**	<5.0	<1.2	<0.14	<0.36	<0.36	<1.2	<0.95	<0.22	-
TT-MW2-26	TT-MW2-26	44 - 64	03/13/09	**51**	<5.0	<1.2	<0.14	**0.49 Jq**	<0.36	<1.2	<0.95	<0.22	-
TT-MW2-27	TT-MW2-27	32.5 - 52.5	02/06/09	**22**	<5.0	<1.2	<0.14	<0.36	<0.36	<1.2	<0.95	<0.22	-
TT-MW2-27	TT-MW2-27	32.5 - 52.5	03/13/09	**15**	<5.0	<1.2	<0.14	<0.36	<0.36	<1.2	<0.95	<0.22	-
TT-MW2-37A	TT-MW2-37A	113 - 118	02/12/09	**7.7**	**22**	**4.5**	<0.14	<0.36	<0.36	<1.2	<0.95	**1.6**	-
TT-MW2-37A	TT-MW2-37A	113 - 118	03/13/09	**66**	**76**	**11**	**0.38 Jq**	<0.36	<0.36	**1.6 Jq**	**1.9 Jq**	**1.6**	-
TT-MW2-37B	TT-MW2-37B	180 - 185	02/12/09	<0.071	**6.3**	<1.2	<0.14	<0.36	<0.36	<1.2	<0.95	**0.59**	-
TT-MW2-37B	TT-MW2-37B	180 - 185	03/13/09	<0.71	**6.0**	**2.2 Jq**	**0.18 Jq**	**7.6**	**0.48 Jq**	<1.2	<0.95	**1.2**	-

Notes:

Bold - Indicates concentrations detected above the method detection limit.
MCL - California Maximum Contaminant Level (February 4, 2010).
DWNL - California Drinking Water Notification Level (December 14, 2007).
VOCs - Volatile organic compounds.
µg/L - Micrograms per liter.
bgs - Below ground surface.
"<" - Indicates concentration below indicated method detection limit.
"-" - Not analyzed or not available.

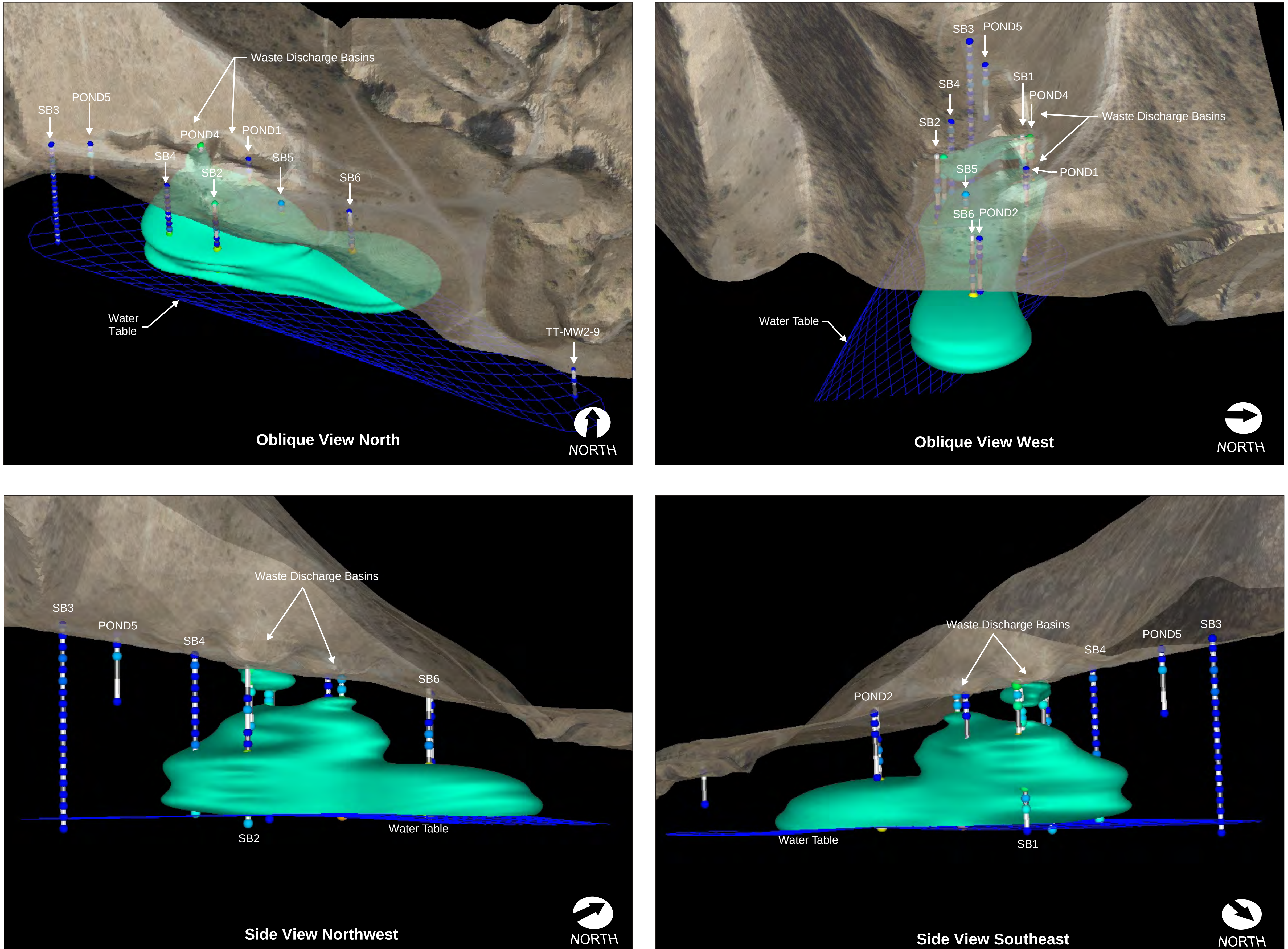
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).

TABLE 5-18
SUMMARY OF VALIDATED SOIL GAS ANALYTICAL RESULTS
Waste Discharge Area

Probe ID	Sample ID	Depth (feet bgs)	Date Sampled	VOCs (µg/m^3) Benzene	1,1-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	1,2,4-Trimethylbenzene
Residential CHHSL:				36	-	991,000	528	-
Commercial/Industrial CHHSL:				122	-	2,790,000	1,770	-
WDP-SG1	WEP-SG1-5'	5	9/29/2008	<34	<42	<58	<57	**88.1**
	WEP-SG1-15'	15	9/29/2008	**46.8**	**131**	<58	**1,010**	**156**
WDP-SG2	WEP-SG2-5'	5	9/29/2008	<34	<42	**60.5**	<57	**84.1**
	WEP-SG2-15'	15	9/29/2008	**37.0**	<42	**74.4**	**66.7**	**106**
WDP-SG3	WEP-SG3-5'	5	9/29/2008	<34	<42	<58	**87.2**	**98.0**
	WEP-SG3-15'	15	9/29/2008	<34	<42	<58	**450**	**107**
WDP-SG4	WEP-SG4-5'	5	9/29/2008	<34	<42	<58	<57	**110**
	WEP-SG4-15'	15	9/29/2008	<34	<42	<58	**151**	**200**

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
bgs - Below ground surface.
µg/m^3 - Concentration in micrograms per cubic meter.
VOCs - Volatile organic compounds.
"<" - Indicates concentration below indicated method detection limit.



Sample Location

10'

Perchlorate Concentration

>100,000 µg/kg
30,000 µg/kg
10,000 µg/kg
3,000 µg/kg
1,000 µg/kg
300 µg/kg
100 µg/kg
30 µg/kg
10 µg/kg
<5 µg/kg

Note:

µg/kg - micrograms per kilogram.
Diagrams not to scale.
2X vertical exaggeration.

Beaumont Site 2

Figure 5-50
3-D Renderings of Perchlorate in Soil Above 100 µg/kg - Waste Discharge Area

TETRA TECH

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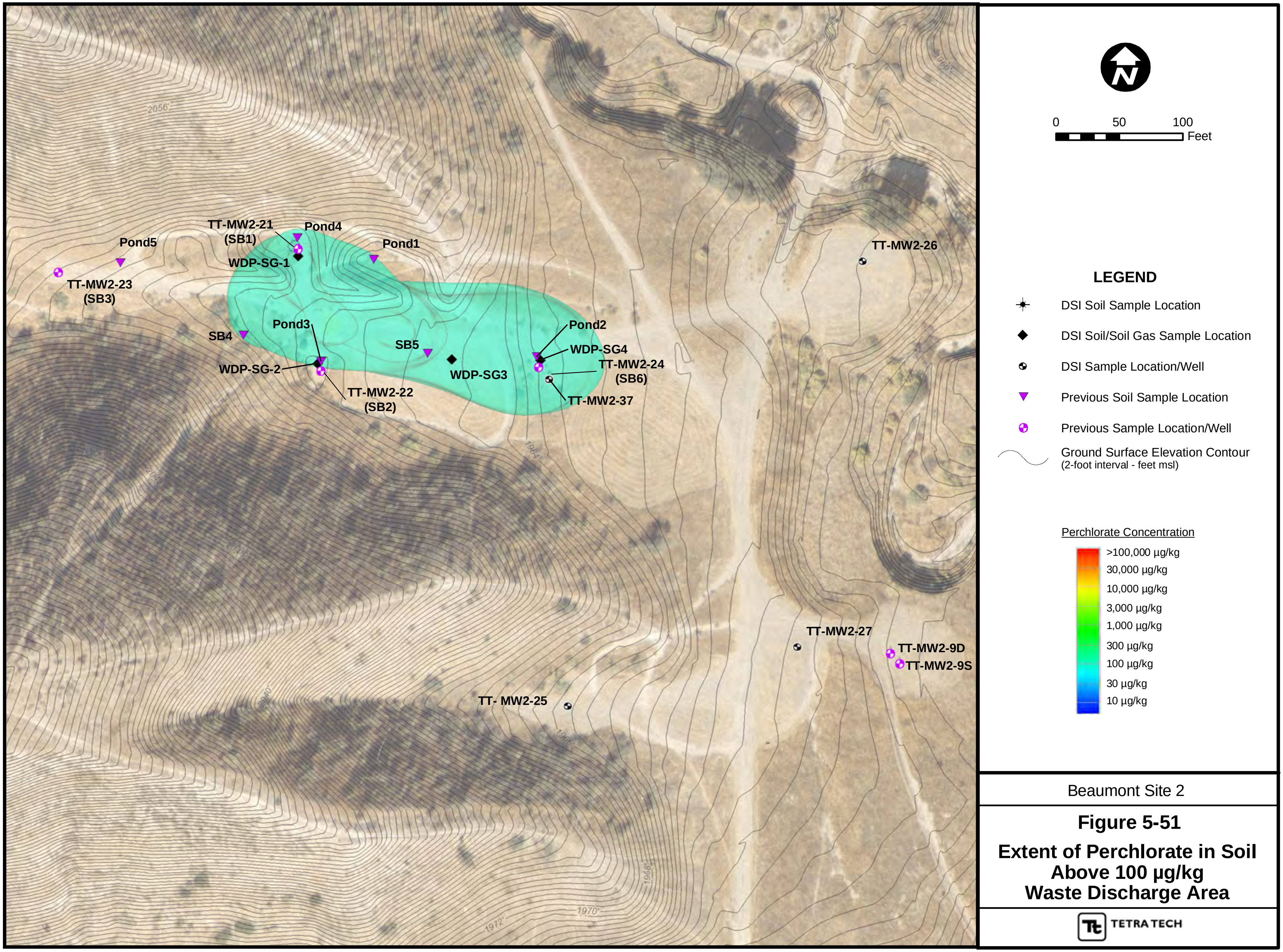
The areal extent of the perchlorate-impacted soil based on the MVS 3-D model is shown in plan view in Figure 5-51. The impacted soil underlies most of the side canyon from the area of the former disposal basins east toward Laborde Canyon. The approximate area of perchlorate impacts above 100 µg/kg is 25,800 square feet, or 0.6 acres.

Perchlorate concentration contours for soil at depths of 0.5, 5, 10, 20, 40, and 50 feet bgs are shown in Figure 5-52. Figure 5-52 shows that the extent of perchlorate concentrations greater than 100 µg/kg increases with depth. Perchlorate concentrations also tend to increase with depth, and the area with the highest concentrations becomes progressively displaced toward the east with increasing depth, suggesting that the perchlorate migrated down the side canyon. Figure 5-52 shows that the area of perchlorate-impacted soil is defined by the topography of the side canyon to the north and south, and by borings Pond3 and SB2 to the west. To the east, perchlorate concentrations attenuate toward TT-MW2-24, suggesting that the extent of perchlorate does not extend a large distance beyond this boring.

Perchlorate in Groundwater

3-D and 2-D geostatistical models of the perchlorate distribution in groundwater in the WDA were generated using MVS. All of the previous and DSI data were used in the 3-D model; the 2-D model was based only on samples collected at or near the water table. The fit between the 3-D model and the available data for first groundwater was found to be reasonably good near the center of the WDA, but relatively poor near the plume margins. The fit between the 2-D model and the available data was considered to be good. The 2-D model, with slight modifications to more accurately represent the data, is presented in Figure 5-53. Figure 5-53 shows the perchlorate plume extending east from the area of TT-MW2-24, and then migrating to the south as it enters Laborde Canyon. The plume appears to spread somewhat to the north, to include well TT-MW2-26. The extent of the perchlorate plume is bounded laterally by TT-MW2-21, TT-MW2-22, and TT-MW2-23 to the west. Within Laborde Canyon, the high concentration portion of the plume is bounded to the north by TT-MW2-26 (51 µg/L of perchlorate), and to the east by TT-MW2-27 (15 µg/L of perchlorate).

The spatial relationship between perchlorate impacted soil and the perchlorate plume in groundwater at the WDA is illustrated in Figure 5-54. Figure 5-54 consists of superimposed profiles through the MVS 3-D impacted soil and groundwater plume models, along a portion of cross-section K-K’ (Figure 5-47 and 5-48). The cutoff concentration used for the soil model is 100 µg/kg; the cutoff concentration for the groundwater model is the California MCL of 6 µg/L. It should be noted that the soil and groundwater



Beaumont Site 2

Figure 5-51

Extent of Perchlorate in Soil Above 100 µg/kg Waste Discharge Area

TETRA TECH

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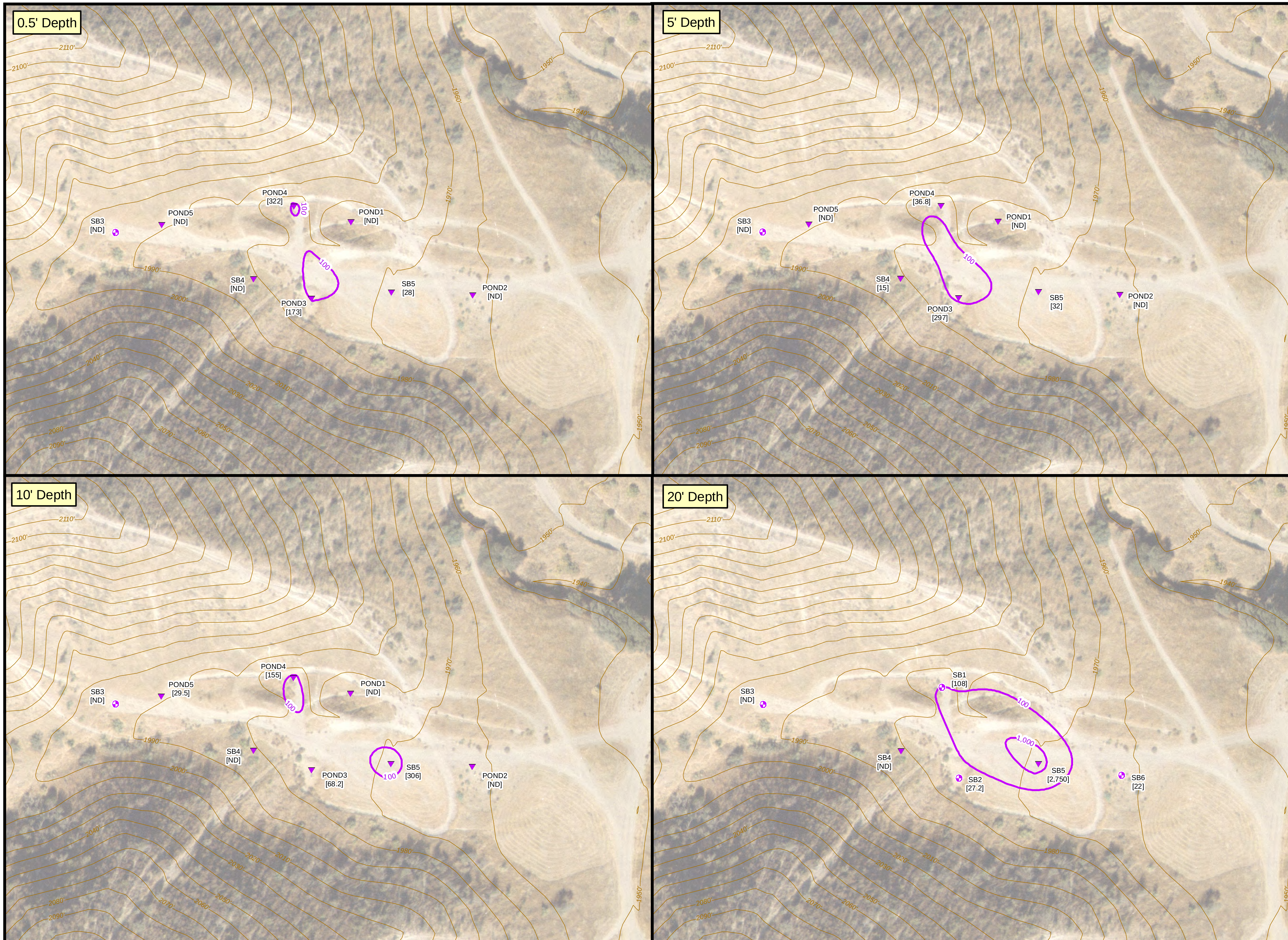

0 50 100 Feet

Adapted from: March 2007 aerial photograph.

LEGEND

Previous Soil Sample Location

Previous Sample Location/Well

Perchlorate Isoconcentration Contour (dashed where inferred)

Ground Surface Elevation Contour

Note:

[#] Perchlorate results in µg/kg.

[ND] Non-Detect.

Beaumont Site 2

Figure 5-52

Perchlorate Concentrations in Soil - Waste Discharge Area

TETRA TECH

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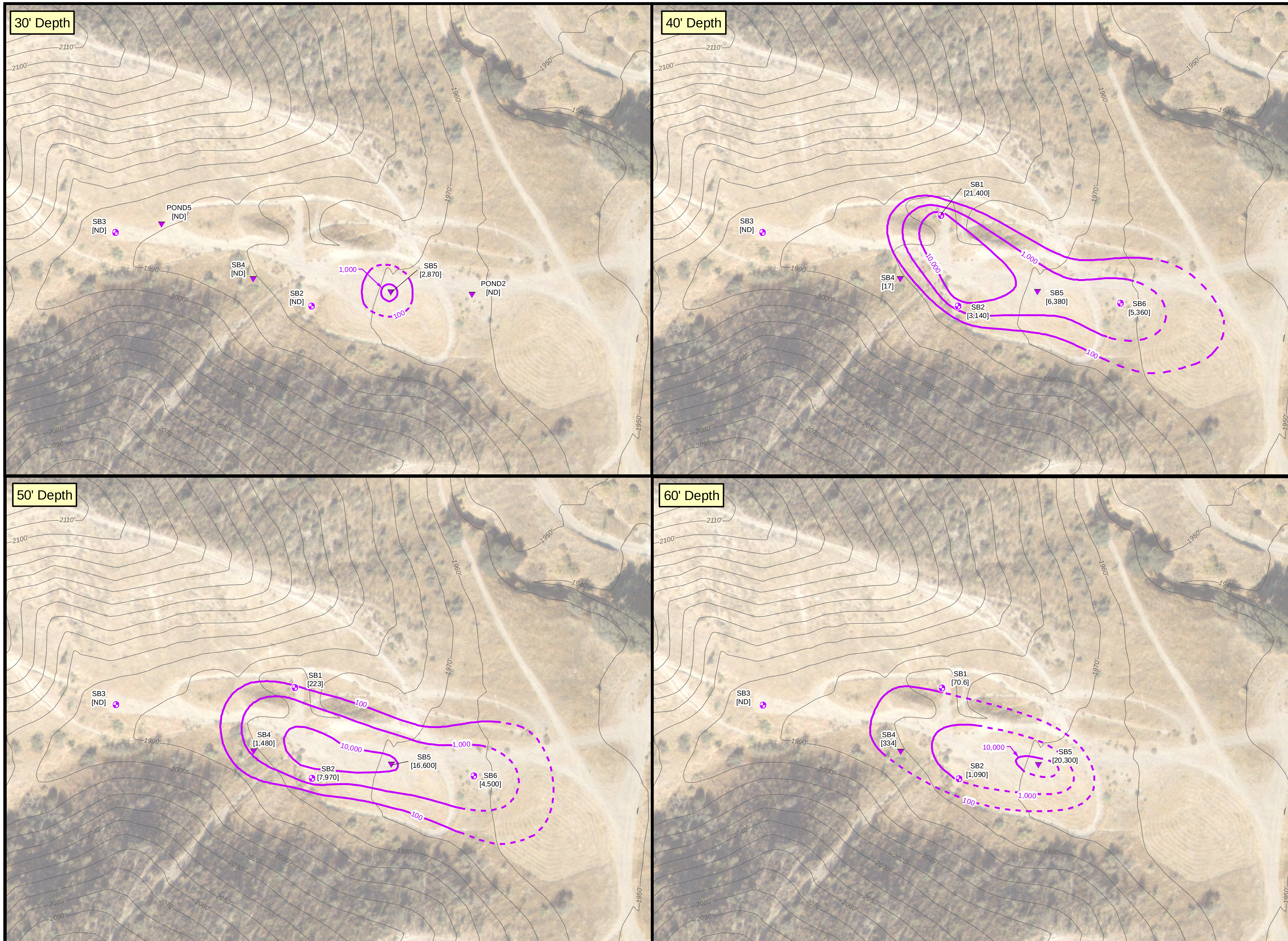


0 50 100 Feet

Adapted from: March 2007 aerial photograph.

LEGEND

- Previous Soil Sample Location
- Previous Sample Location/Well
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour

Note:

[#] Perchlorate results in µg/kg.

[ND] Non-Detect.

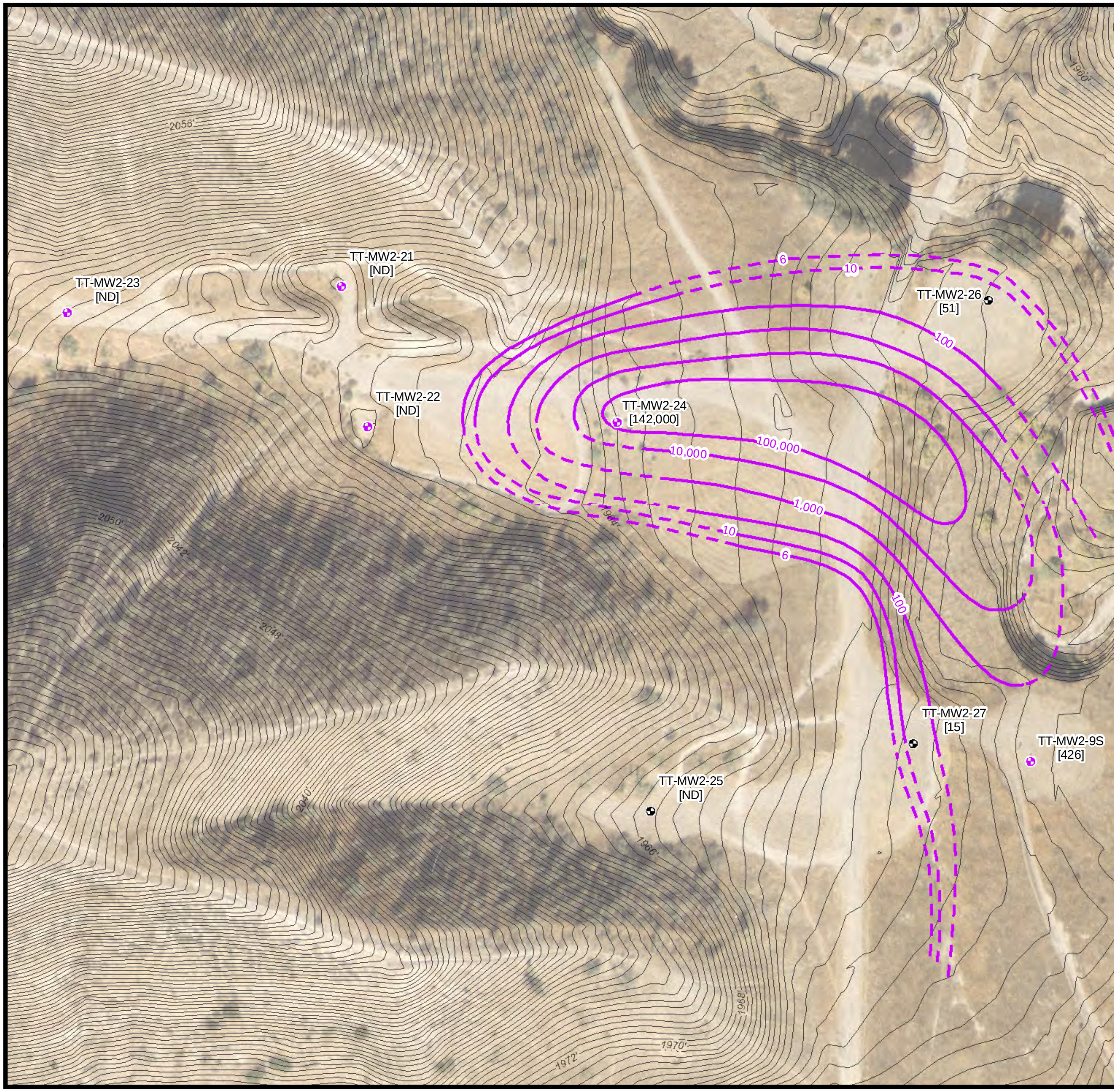
Beaumont Site 2

Figure 5-52 (cont.)

Perchlorate Concentrations in Soil - Waste Discharge Area

TETRA TECH

X:\GIS\Lockheed 22289-09030\Extent_WDP_GW.mxd



LEGEND

- DSI Sample Location/Well
- Previous Sample Location/Well
- Perchlorate Isoconcentration Contour (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)

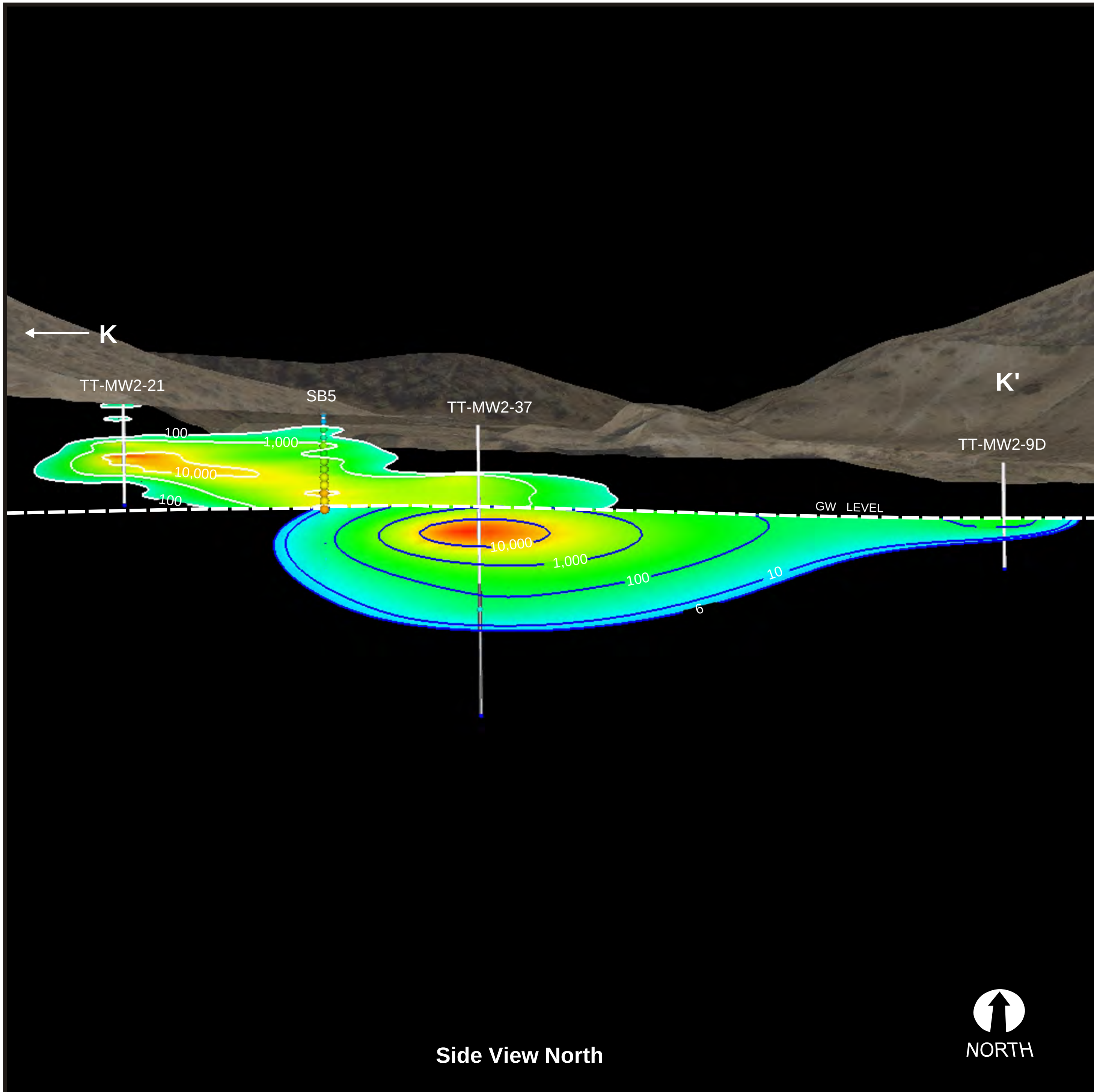
Note:

[#] - Perchlorate in groundwater (µg/L).
[ND] - Non-detect.
µg/L - Micrograms per liter.

Beaumont Site 2

Figure 5-53
Perchlorate Concentrations in Groundwater Above 6 µg/L - Waste Discharge Area

TETRA TECH



Perchlorate Concentration
(values in µg/kg and µg/L)

>100,000
30,000
10,000
3,000
1,000
300
100
30
10
6

Note:

µg/kg - micrograms per kilogram.
µg/L - micrograms per liter.
Diagrams not to scale.
No vertical exaggeration.

Beaumont Site 2

Figure 5-54
Vertical Profile of Perchlorate in Soil and Groundwater Cross Section K-K' - Waste Discharge Area

TETRA TECH

models were generated independently, so some amount of spatial mismatch between the soil and groundwater models is to be expected.

The soil model profile in Figure 5-54 shows that the high concentration core of the perchlorate-impacted soil migrates toward the east and downward from the area of TT-MW2-21, intersecting the present-day water table somewhere between boring SB5 and well TT-MW2-37. The stratigraphy of the STF is relatively uncomplicated at the WDA, and does not appear to have significantly controlled perchlorate migration through the vadose zone. Migration may instead have been controlled by permeability contrasts related to weathering of the STF.

The groundwater model profile shows the highest concentration portion of the groundwater plume in the area of TT-MW2-37, attenuating to the east in the area of wells TT-MW2-9S and TT-MW2-9D. The highest perchlorate concentrations are located in the general area where the core area of the impacted soil intersects the water table. Assuming that groundwater levels were deeper during the operational period of the Site than observed today, it is likely that the perchlorate-impacted soil originally extended to greater depth than currently observed, and that a portion of the impacted soil was subsequently inundated by rising groundwater.

Well TT-MW2-25 was installed in a small side canyon immediately south of the WDA. A ridge of STF is present between TT-MW2-25 and the WDA; this well was installed to evaluate whether relatively unweathered STF acts as a barrier to the migration of perchlorate in groundwater, as proposed in the CSM, or whether preferred pathways are present within the STF that allow perchlorate to migrate across topographic boundaries. Perchlorate was not detected in TT-MW2-25 during the first and second DSI sampling rounds (Table 5-17). These results suggest that relatively unweathered STF acts as a barrier to perchlorate migration in groundwater, confirming the CSM.

RDX in Groundwater

RDX was detected in a groundwater sample collected from well TT-MW2-24, at a concentration of 4.7 µg/L. Well TT-MW2-24 had not been previously tested for RDX. No other wells in this area were analyzed for RDX, so the extent of RDX in groundwater at the WDA is not currently defined. Additional groundwater samples will be collected from wells in the area of TT-MW2-24 and analyzed for RDX during the second quarter 2009 groundwater monitoring event. The results of the additional RDX evaluation will be provided as part of the GMP.

VOCs in Soil Gas

VOCs detected in the soil gas samples are compared with residential and commercial/industrial land use California Human Health Screening Levels (CHHSLs) in Table 5-18. None of the detected soil gas concentrations exceed commercial/industrial CHHSLs. No additional soil gas characterization is considered to be warranted at this time.

Metals in Soil

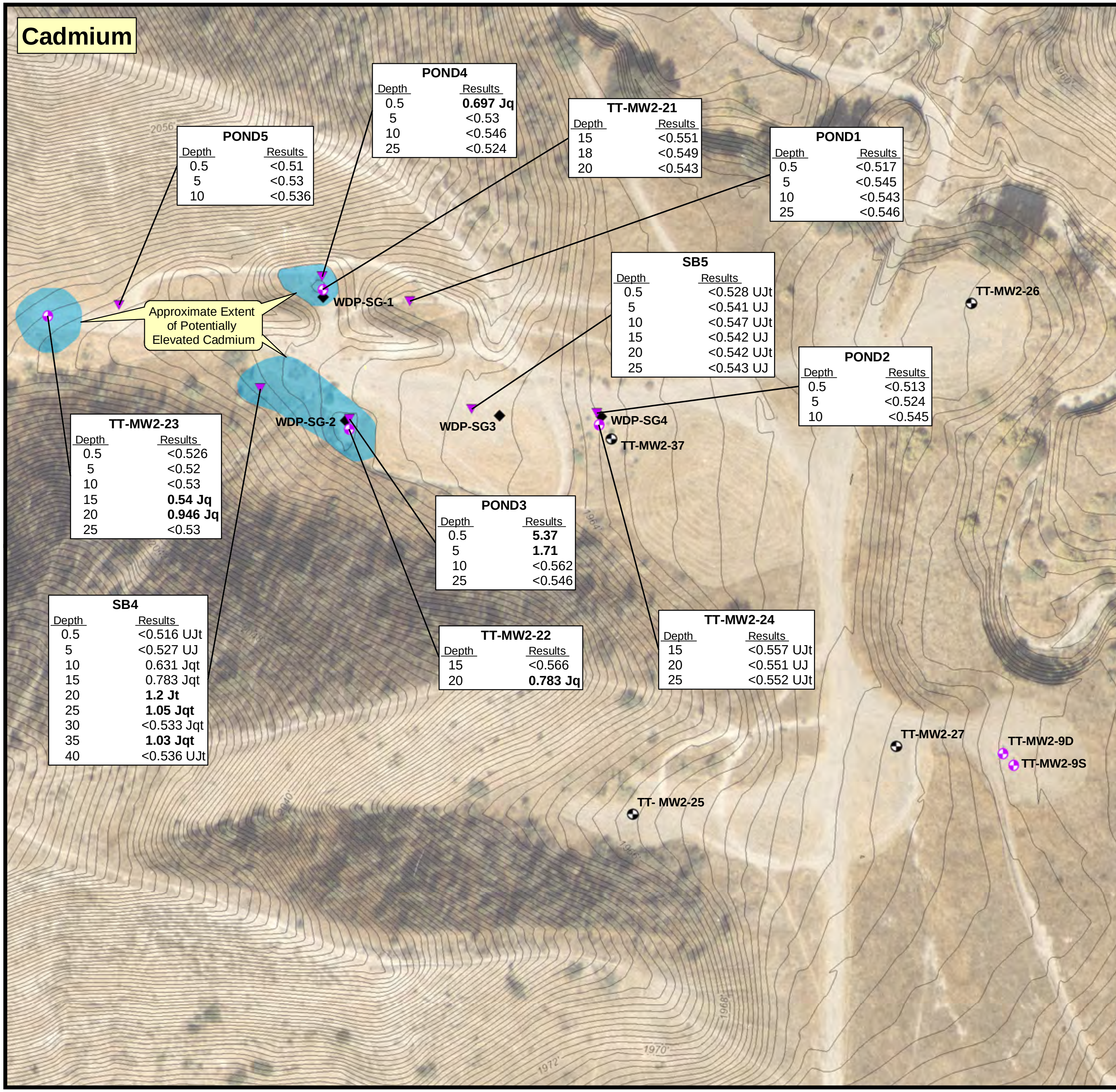
The initial background comparison study (Tetra Tech, 2009h) assumed that all of the soil samples collected at the WDA were alluvium. Figure 5-47 shows that shallow soils in the WDA are actually colluvium, which are underlain by the STF. The background comparisons conducted as part of the DSI (Appendix H) compared the WDA data at depths of 0.5, 5, and 10 feet bgs with background data for colluvium/STF at similar depth intervals. The results of the DSI background comparisons found that beryllium, thallium, and zinc concentrations were statistically elevated above background. Metals with potentially elevated concentrations (i.e., concentrations exceeding colluvium/STF BTVs) include barium, cadmium, lead, selenium, and zinc.

None of the beryllium concentrations in the WDA at depths of 10 feet or less exceed the BTV of 0.859, and the maximum selenium and thallium concentrations are just 1.83 and 1.23 mg/kg. One soil sample has a barium concentration of 1,650 mg/kg, which exceeded the BTV of 904 mg/kg; however this concentration is not significantly higher than the maximum value for the background dataset of 1,550 mg/kg. Based on these observations, no further characterization of barium, beryllium, selenium, or thallium was conducted during the DSI. All of these metals will be evaluated as COPCs in future risk assessments for the Site.

The remaining metals (cadmium, lead, and zinc) have localized concentrations which significantly exceed their respective BTVs. Furthermore, cadmium concentrations in samples Pond3-0.5’(5.37 mg/kg) and Pond3@5’ (1.71 mg/kg) and the lead concentration in sample Pond3-0.5’ (236 mg/kg) exceed their respective residential land use CHHSLs. Cadmium, lead, and zinc concentrations in the WDA were therefore evaluated further as part of the DSI.

The distribution of cadmium, lead, and zinc concentrations in the WDA is shown on Figure 5-55. The approximate lateral extent of potentially elevated concentrations (i.e., concentrations exceeding colluvium/STF BTVs) of each metal is also shown on Figure 5-55. Based on the data shown in Figure 5-55, the extents of potentially elevated cadmium, lead, and zinc concentrations in the WDA are considered to be adequately defined by the existing data. Cadmium, lead, and zinc will be evaluated as COPCs in future risk assessments for the Site.

X:\GIS\Lockheed 22289-09030\Area WDP Cadmium_(a).mxd



0 50 100 Feet

LEGEND

- DSI Soil/Soil Gas Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Extent of Potentially Elevated Cadmium

Notes:
Results in mg/kg.
Bold indicates concentrations exceeding BTV.

Beaumont Site 2

Figure 5-55

Approximate Extent of Potentially Elevated Metals, Waste Discharge Area

TETRA TECH

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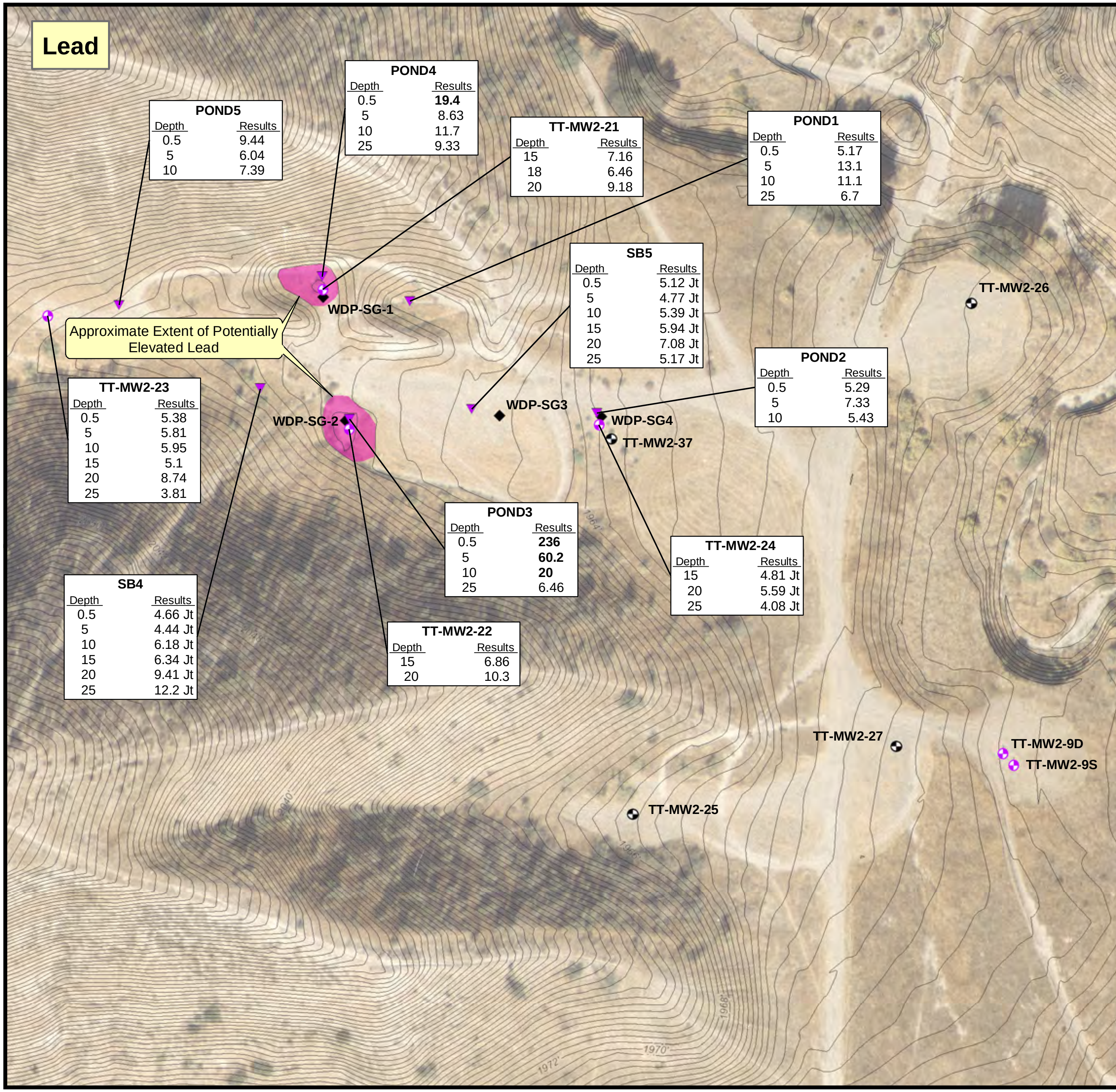

0 50 100 Feet

LEGEND

- DSI Soil/Soil Gas Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Extent of Potentially Elevated BTV

Notes:
Results in mg/kg.
Bold indicates concentrations exceeding BTV.

Beaumont Site 2

Figure 5-55 (cont.)
Approximate Extent of Potentially Elevated Metals, Waste Discharge Area

TETRA TECH

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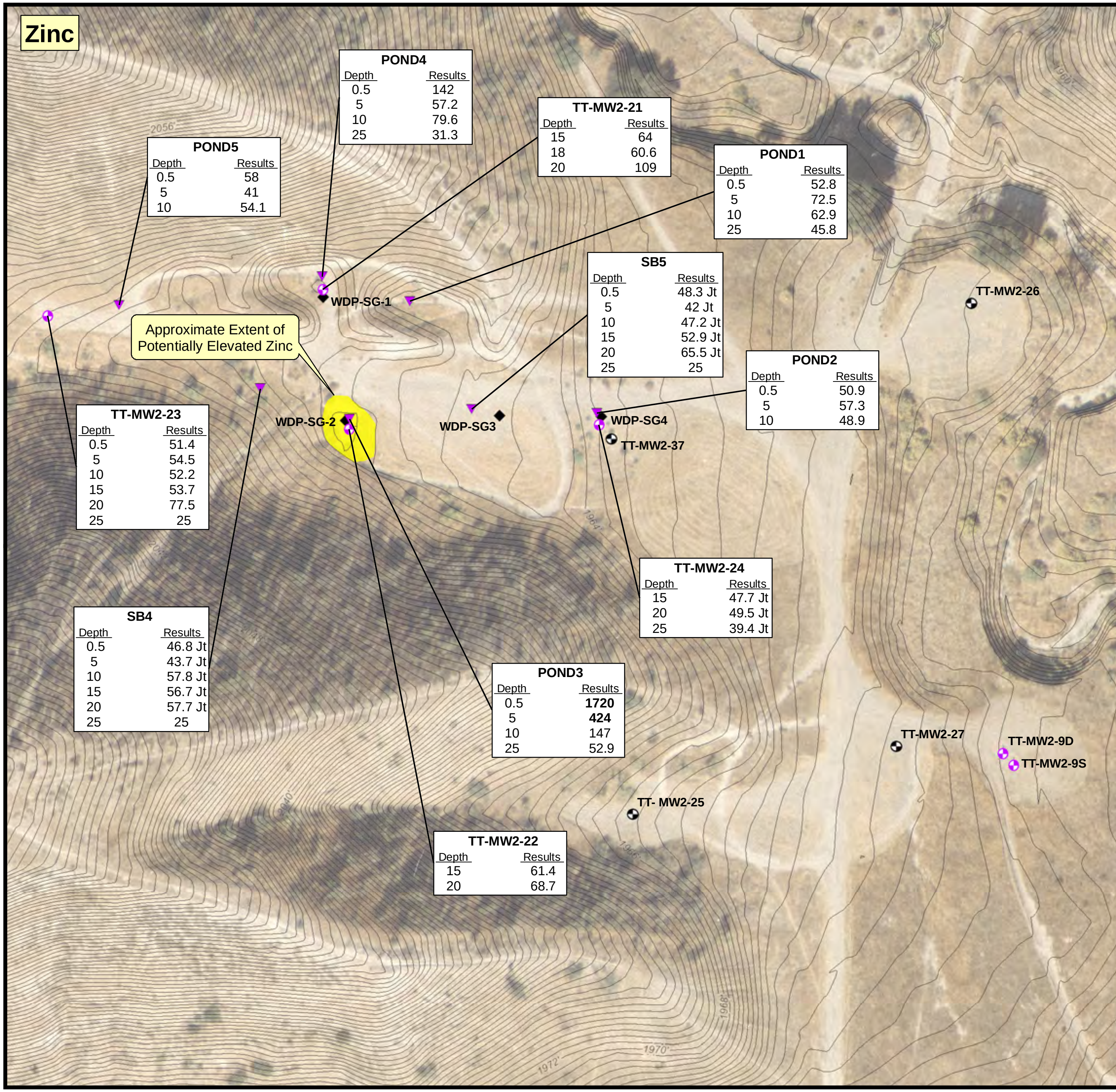

0 50 100 Feet

LEGEND

- DSI Soil/Soil Gas Sample Location
- DSI Sample Location/Well
- Previous Soil Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Extent of potentially elevated Zinc

Notes:
Results in mg/kg.
Bold indicates concentrations exceeding BTV.

Beaumont Site 2

Figure 5-55 (cont.)
Approximate Extent of Potentially Elevated Metals, Waste Discharge Area

TETRA TECH

5.4.6 South Boundary Area

5.4.6.1 Previous Work

Previous work in the South Boundary area includes the following:

- Installing shallow monitoring wells TT-MW2-7S and TT-MW2-8, shallow piezometer TT-PZ2-1, and deep monitoring well TT-MW2-7D (Tetra Tech, 2009d and 2009g)
- Collecting soil samples from the monitoring well and piezometer boreholes.
- Drilling and sampling soil boring TT-SB2-7 (Tetra Tech, 2009b).

Sampling locations are shown in Figure 5-56. Analytical results for soil are summarized in Table 5-19. Analytical results for groundwater are summarized in Table 5-20 and in Appendix A. Soil results include the following:

- Perchlorate was detected in 5 of the 8 samples analyzed, at concentrations ranging from 17.3 to 89.3 µg/kg. The highest perchlorate concentration was detected at TT-PZ2-1, at a depth of 5 feet bgs.

Groundwater results include the following:

- Perchlorate was detected in shallow monitoring well TT-MW2-7 at a concentration of 517 µg/L, and in shallow monitoring well TT-MW2-8 at a concentration of 519 µg/L. Perchlorate was not detected in deep monitoring well TT-MW2-7D.

5.4.6.2 DSI Activities

Based on the previous results, additional assessment was conducted in the area of TT-PZ2-1 to evaluate whether the shallow perchlorate detection in boring TT-PZ2-1 (89.3 µg/L at a depth of 5 feet bgs) could represent a potential perchlorate source area at the SBA.

Initial field activities included the following:

- Drilling and sampling three primary soil borings (SBA-SB101 to SBA-SB103) to further characterize potential perchlorate impacts in soil in the area of TT-PZ2-1.
- Collecting grab groundwater samples from the 3 primary soil borings, and collecting a groundwater sample from TT-PZ2-1 to further characterize perchlorate-impacted groundwater in the SBA area.

Based upon the initial results, no additional step-out work was conducted in the SBA.

5.4.6.3 Geology and Hydrogeology

The surface geology of the SBA is shown in Figure 5-57. The SBA is located within Laborde Canyon; a smaller unnamed side canyon joins Laborde Canyon from the west. Incised drainage channels are present in both Laborde Canyon and the smaller side canyon. Alluvium underlies both Laborde Canyon and the

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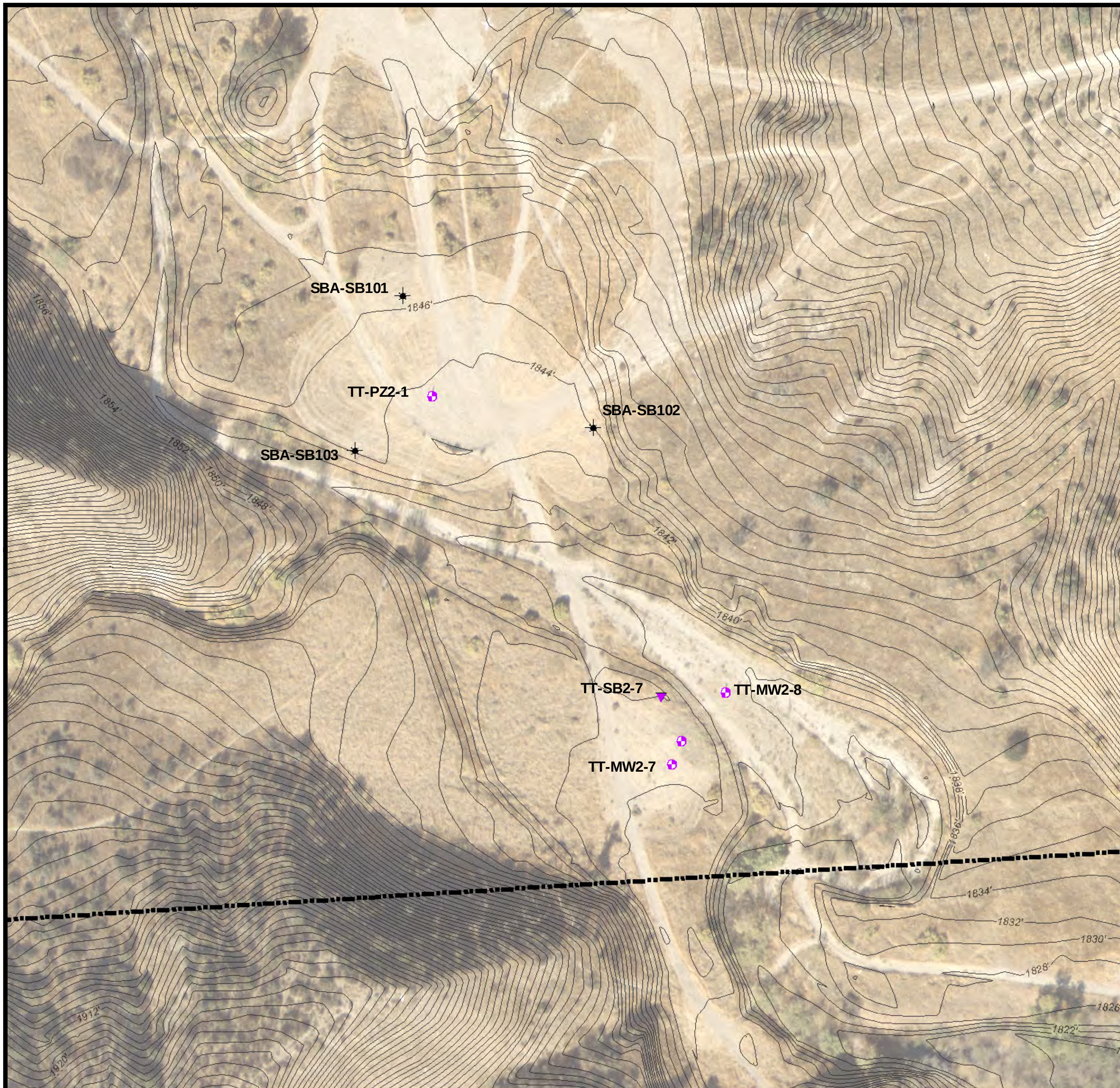

N

0 50 100 Feet

LEGEND

- DSI Soil Sample Location
- Previous Soil Sample Location
- Previous Sample Location/Well
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Beaumont Site 2 Property Boundary

Beaumont Site 2

Figure 5-56

Sample Locations Southern Boundary Area

TETRA TECH

TABLE 5-19
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Southern Boundary Area

Boring No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)
Residential CHHSL:				-
Commercial/Industrial CHHSL:				-
Residential RSL:				55,000
Commercial/Industrial RSL:				720,000
SBA-SB101	SBA-SB101-0.5'	0.5	10/07/08	<4.1
	SBA-SB101-5'	5	10/07/08	<4.1
	SBA-SB101-10'	10	10/07/08	**18**
	SBA-SB101-15'	15	10/07/08	<4.4
	SBA-SB101-20'	20	10/07/08	<4.5
	SBA-SB101-25'	25	10/07/08	<4.4
SBA-SB102	SBA-SB102-0.5'	0.5	10/07/08	<4.3
	SBA-SB102-5'	5	10/07/08	<4.3
	SBA-SB102-10'	10	10/07/08	<4.4
	SBA-SB102-15'	15	10/07/08	**5.1**
	SBA-SB102-20'	20	10/07/08	**16**
	SBA-SB102-25'	25	10/07/08	<4.4
	SBA-SB102-30'	30	10/07/08	<4.4
SBA-SB103	SBA-SB103-0.5'	0.5	10/07/08	<4.1
	SBA-SB103-5'	5	10/07/08	<4.3
	SBA-SB103-10'	10	10/07/08	**6.8**
	SBA-SB103-15'	15	10/07/08	**33**
	SBA-SB103-20'	20	10/07/08	**11**
TT-MW2-7	MW-7-6-6.5	6	08/21/06	<10.4
	MW-7-9-10.5	9	08/21/06	<10.4
	MW-7-15-16.5	15	08/21/06	**21.5**
SB2-7	SB2-7-15	15	04/17/08	**26.4**
TT-MW2-8	MW-8-5-6.5	6.5	08/22/06	**17.3 Jq**
	MW-8-9-10.5	10.5	08/22/06	<12.1
TT-PZ2-1	PZ-1-5-6.5	6.5	08/22/06	**89.3**
	PZ-1-9-10.5	10.5	08/22/06	**23.5**

Notes:
Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
"<" - Indicates concentration below indicated method detection limit.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).

TABLE 5-20
SUMMARY OF VALIDATED GROUNDWATER ANALYTICAL RESULTS
Southern Boundary Area

Boring/Well No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/L)	VOCs (µg/L)		
					Acetone	2-Butanone (MEK)	Benzene
California MCL				6	-	-	1
California DWNL				-	-	-	-
GRAB GROUNDWATER SAMPLES							
SBA-SB101	SBA-SB101-GW-24'	24	10/08/08	**4.2**	**15**	**3.1**	**0.16 Jq**
SBA-SB102	SBA-SB102-GW-23'	23	10/08/08	**180**	<5.0	<1.2	<0.14
SBA-SB103	SBA-SB103-GW-18'	18	10/07/08	**410**	<5.0	<1.2	<0.14
PIEZOMETER SAMPLES							
TT-MW2-PZ1	TT-MW2-PZ1	14-34	04/27/09	**240**	<5.0	<1.2	<0.14

Notes:
Bold - Indicates concentrations detected above the method detection limit.
MCL - California Maximum Contaminant Level (February 4, 2010).
DWNL - California Drinking Water Notification Level (December 14, 2007).
VOCs - Volatile organic compounds.
µg/L - Micrograms per liter.
bgs - Below ground surface.
"-" - Not applicable or not available.
"<" - Indicates concentration below indicated method detection limit.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"q" - The analyte detection was below the Practical Quantitation Limit (PQL).

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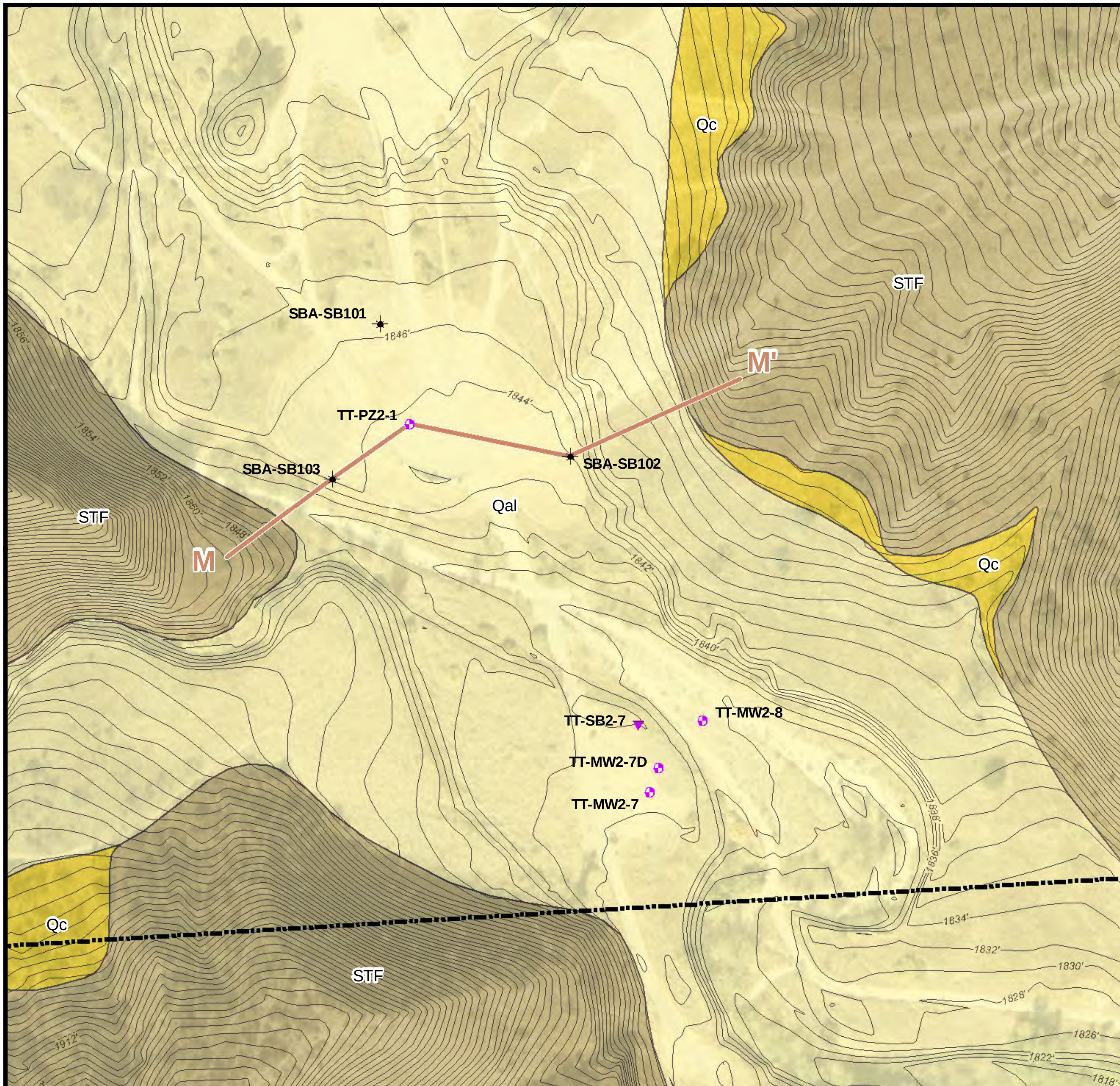


0 50 100
Feet

LEGEND

- DSI Soil Sample Location
- Previous Soil Sample Location
- Previous Sample Location/Well
- Geologic Cross Section Location
- Contact (dashed where inferred)
- Ground Surface Elevation Contour (2-foot interval - feet msl)
- Beaumont Site 2 Property Boundary
- Qal Alluvium
- Qc Colluvium
- STF San Timoteo Formation

Beaumont Site 2

Figure 5-57

Surface Geology
Southern Boundary Area

TETRA TECH

side canyon, and forms two distinct terraces in this area. Colluvium occurs as aprons adjacent to some hillsides. The hillsides are comprised of STF.

The subsurface geology of the SBA area is shown in cross-section M-M' (Figure 5-58). The STF in this area consists of sandstone to a depth of 40 feet bgs.

The depth to groundwater in TT-PZ2-1 was 15.8 feet bgs in May 2009. Depths to groundwater in nearby shallow wells TT-MW2-7S and TT-MW2-8 were 17.1 and 14.5 feet bgs in May 2009. The depth to groundwater in deep well TT-MW2-7D was 16.2 feet in May 2009. The vertical gradient between adjacent wells TT-MW2-7S and D was upward at +0.02 ft/ft.

5.4.6.4 Soil Sampling Results

Analytical results for perchlorate in soil samples collected during the DSI and previous investigations are summarized in Table 5-19. The entire dataset consists of 26 soil samples, including 8 samples analyzed during previous investigations, and 18 soil samples analyzed as part of the DSI. Perchlorate was detected in 6 of the 18 samples analyzed as part of the DSI, at concentrations ranging from 5.1 to 33 µg/kg. The highest perchlorate concentration was detected in boring SBA-SB103, at a depth of 15 feet bgs.

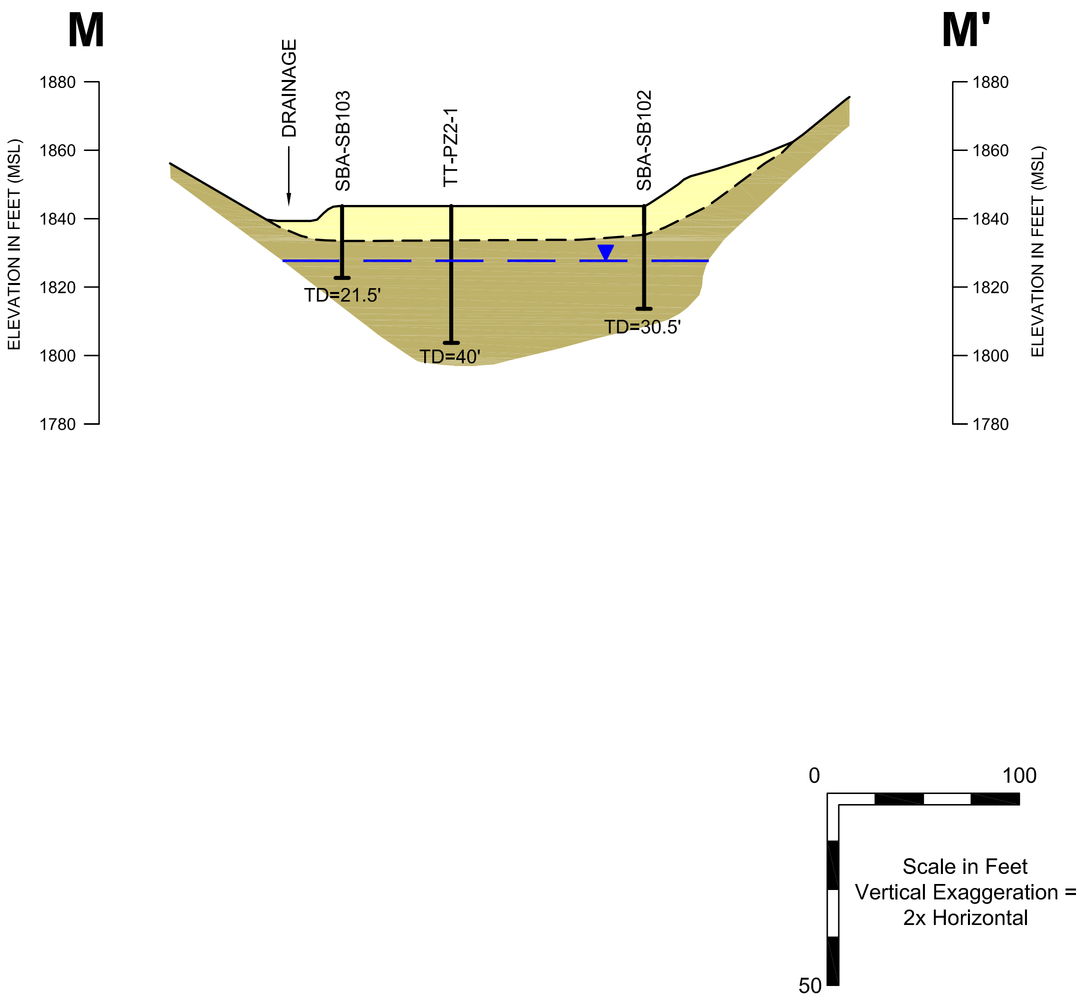
5.4.6.5 Groundwater Sampling Results

Analytical results for perchlorate in grab groundwater samples collected from the DSI soil borings are summarized in Table 5-20. Perchlorate was detected at in the grab samples collected from borings SBA-SB101 to SBA-SB103 at concentrations ranging from 4.2 to 410 µg/L; the highest perchlorate concentration was detected in the sample from SBA-SB103. Perchlorate was detected in the groundwater sample collected from TT-PZ2-1 at a concentration of 240 µg/L. VOCs were not detected at concentrations exceeding screening levels in any of the groundwater samples.

5.4.6.6 Discussion

The low perchlorate concentrations detected in soil, as well as the small extent of apparent perchlorate impacts in soil, suggest that a significant release of perchlorate has not occurred in the SBA. An alternate hypothesis for the perchlorate detections in soil is that perchlorate-impacted groundwater is present in the soil pore space, due to capillary rise above the water table.

Mass balance calculations were performed to evaluate the possibility that the perchlorate detections in soil represent impacted groundwater in the soil pore space. The calculations assume a soil porosity of 30% (Tetra Tech, 2009b; data from boring SB2-7), and perchlorate concentrations ranging from 240 to 519 µg/L, the range of values detected in groundwater samples collected from the wells and piezometer



LEGEND

Water Table

Contact
(dashed where inferred)

TD = Total Depth
(in feet below ground surface)

MSL = (mean sea level)

M-58-SB103 Soil Boring

ALLUVIUM

Sand, Silty Sand, and Clayey Sand

SAN TIMOTEO FORMATION

Sandstone

Beaumont Site 2

Figure 5-58
Cross Section M-M'
Southern Boundary Area

TETRA TECH

installed in the SBA. Perchlorate concentrations in soil were then calculated as a function of fractional saturation, where a value of 1 corresponds to fully-saturated conditions (i.e., below the water table or within the capillary fringe). The results of the calculations are presented in Figure 5-59. The mass balance calculations show that soil samples at or near saturation with groundwater containing 519 µg/L of perchlorate could have perchlorate concentrations as high as 78 µg/kg, generally consistent with the maximum perchlorate concentration of 89.3 µg/kg detected in the soil sample from TT-PZ2-1. The lower concentrations measured in other soil samples collected in the SBA are consistent with partial saturation with impacted groundwater.

5.4.7 Drainage Channel Soil Sampling

5.4.7.1 Previous Work

Surface water samples were collected at 5 locations at the Site and one location off-Site following a storm event in January 2008 (Tetra Tech, 2009e). The surface water sampling locations are shown in Figure 5-60. Perchlorate was detected at a concentration of 38.3 µg/L in a surface water sample collected in Test Bay Canyon, and was not detected in the remaining samples.

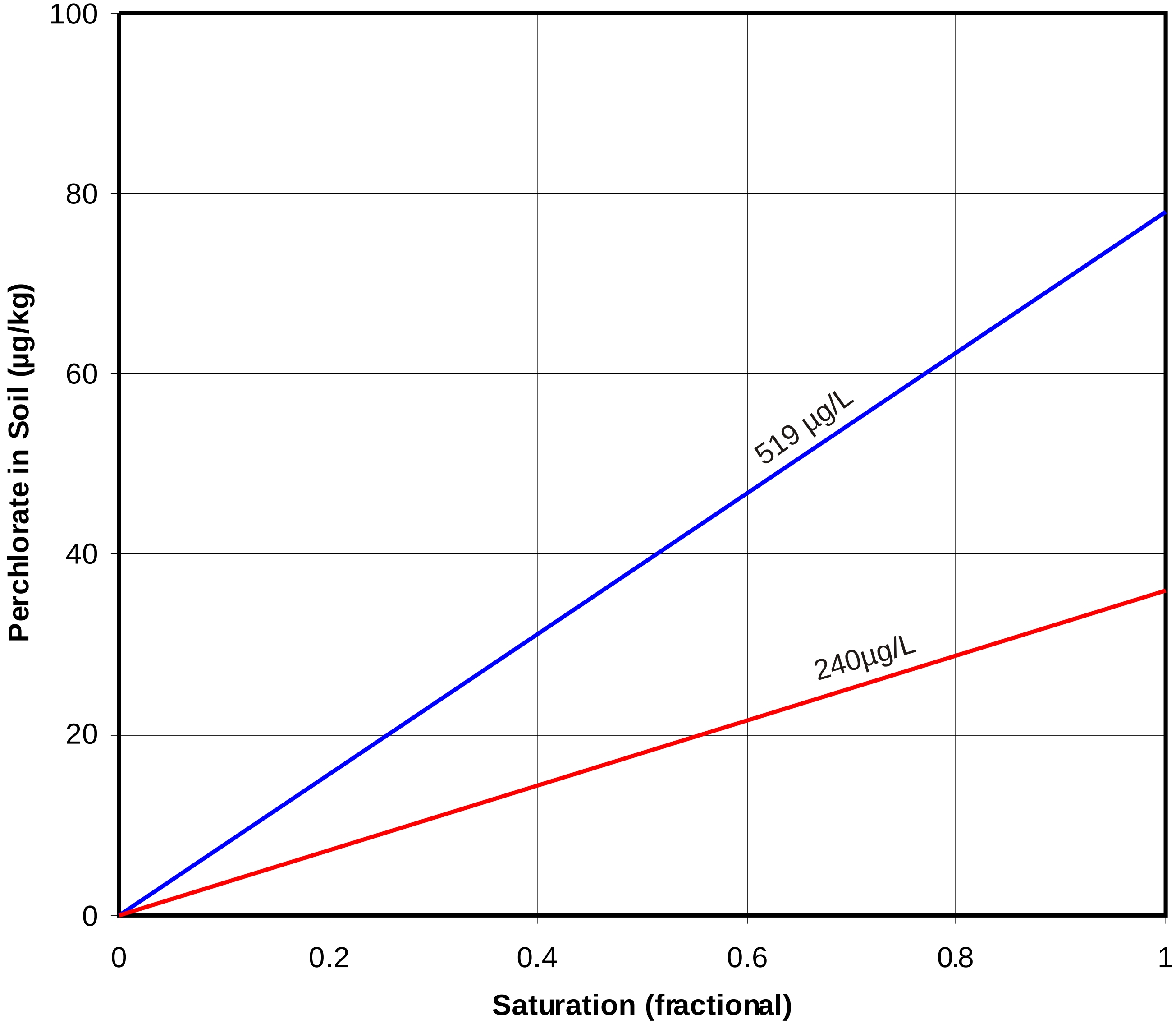
5.4.7.2 DSI Activities

Based on the detection of perchlorate in surface water at the Site, 6 primary soil borings (J-DCS-SB101, K-DCS-SB101, L-DCS-SB101, M-DCS-SB101, WDP-DCS-SB101, and SBA-DCA-SB101) were drilled and sampled in Areas J, K, L, M, the WDA, and the SBA, respectively, to evaluate whether perchlorate sources are present in the drainage channels. The primary borings were drilled at the locations where the surface water samples were previously collected.

Based on the initial soil sampling results, 9 step-out borings (K-DCS-SB102 to K-DCS-SB109, and K-KCS-SB111) were drilled in Area K, and 2 step-out borings (L-DCS-SB102 and L-DCS-SB103) were drilled in Area L to assess the extent of perchlorate impacts within the drainage channels.

5.4.7.3 Soil Sampling Results

A total of 34 soil samples were collected from 17 soil borings drilled in the drainage channels at depths of 0.5 and 2 feet bgs. Analytical results for the soil samples collected are summarized in Table 5-21. Perchlorate was detected in 14 of the 34 samples analyzed, at concentrations ranging from 5.0 to 570 µg/kg. The highest perchlorate concentration was detected in boring K-DCS-SB101, located in southern Test Bay Canyon, at the approximate location where perchlorate was previously detected in surface water.



Beaumont Site 2

Figure 5-59

Perchlorate Mass Balance Calculation Results

TETRA TECH

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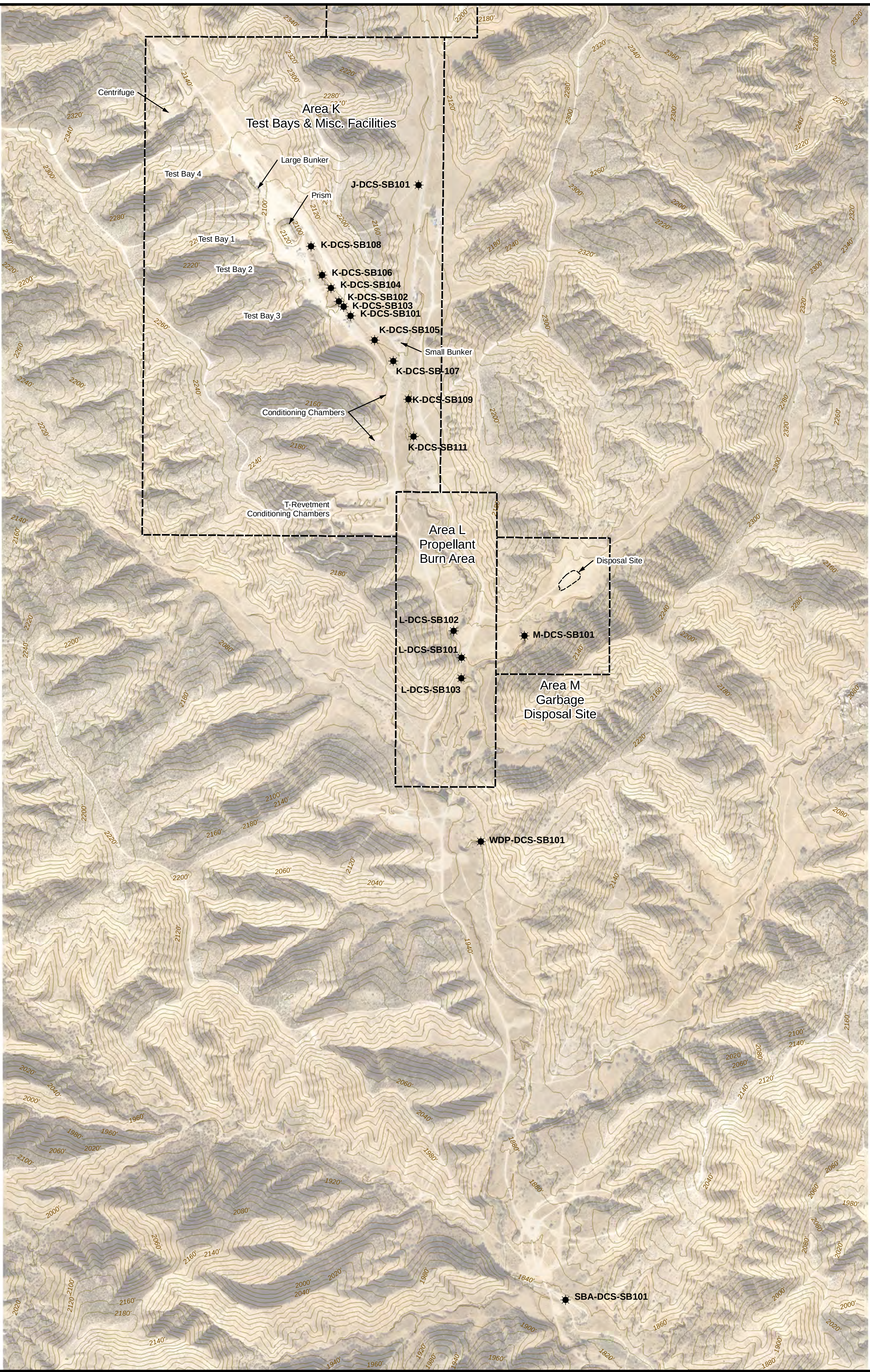

LEGEND

- Drainage Sample Location
- Historic Operational Area Boundary
- Ground Surface Elevation Contour (20-foot interval - feet msl)

0 300 600 Feet

Beaumont Site 2

Figure 5-60

Sample Locations - Drainage Channels

TETRA TECH

TABLE 5-21
SUMMARY OF VALIDATED SOIL ANALYTICAL RESULTS
Drainage Channels

Boring No.	Sample No.	Depth (feet bgs)	Date Sampled	Perchlorate (µg/kg)
Residential CHHSL:				-
Commercial/Industrial CHHSL:				-
Residential RSL:				55,000
Commercial/Industrial RSL:				720,000
J-DCS-SB101	J-DCS-SB101-0.5'	0.5	10/24/08	<4.0
	J-DCS-SB101-2'	2	10/24/08	<4.0
K-DCS-SB101	K-DCS-SB101-0.5'	0.5	10/24/08	**570**
	K-DCS-SB101-2'	2	10/24/08	**78**
K-DCS-SB102	K-DCS-SB102-0.5'	0.5	10/24/08	**5.8**
	K-DCS-SB102-2'	2	10/24/08	**7.3**
K-DCS-SB103	K-DCS-SB103-0.5'	0.5	11/10/08	**63**
	K-DCS-SB103-2'	2	11/10/08	**35**
K-DCS-SB104	K-DCS-SB104-0.5'	0.5	11/10/08	**37 Jf**
	K-DCS-SB104-2'	2	11/10/08	<4.2
K-DCS-SB105	K-DCS-SB105-0.5'	0.5	11/20/08	**5.0 Jf**
	K-DCS-SB105-2'	2	11/20/08	<4.1
K-DCS-SB106	K-DCS-SB106-0.5'	0.5	11/10/08	**6.3**
	K-DCS-SB106-2'	2	11/10/08	<4.3
K-DCS-SB107	K-DCS-SB107-0.5'	0.5	11/20/08	**8.8**
	K-DCS-SB107-2'	2	11/20/08	<4.1
K-DCS-SB108	K-DCS-SB108-0.5'	0.5	11/20/08	**5.1**
	K-DCS-SB108-2'	2	11/20/08	**12**
K-DCS-SB109	K-DCS-SB109-0.5'	0.5	11/20/08	**15 Je**
	K-DCS-SB109-2'	2	11/20/08	<4.0 UJe
K-DCS-SB111	K-DCS-SB111-0.5'	0.5	11/20/08	<4.0 UJe
	K-DCS-SB111-2'	2	11/20/08	<4.0 UJe
L-DCS-SB101	L-DCS-SB101-0.5'	0.5	10/24/08	**5.5**
	L-DCS-SB101-2'	2	10/24/08	<4.3
L-DCS-SB102	L-DCS-SB102-0.5'	0.5	11/10/08	<4.1
	L-DCS-SB102-2'	2	11/10/08	<4.1
L-DCS-SB103	L-DCS-SB103-0.5'	0.5	11/10/08	<4.0
	L-DCS-SB103-2'	2	11/10/08	<4.0
M-DCS-SB101	M-DCS-SB101-0.5'	0.5	10/24/08	<4.1
	M-DCS-SB101-2'	2	10/24/08	<4.2
WDP-DCS-SB101	WDP-DCS-SB101-0.5'	0.5	11/10/08	<4.0
	WDP-DCS-SB101-2'	2	11/10/08	<4.0
SBA-DCS-SB101A	SBA-DCS-SB101A-0.5'	0.5	01/05/09	<4.1
SBA-DCS-SB101	SBA-DCS-SB101-2'	2	10/24/08	<4.0

Notes:

Bold - Indicates concentrations detected above the method detection limit.
CHHSL - California Human Health Screening Level
RSL - USEPA Region 9 Regional Screening Level
bgs - Below ground surface.
µg/kg - Concentration in micrograms per kilogram.
"<" - Indicates concentration below indicated method detection limit.
"-" - Not applicable or not analyzed.
"J" - The analyte was positively identified, but the analyte concentration is an estimated value.
"UJ" - The analyte was not detected above the MDL. However, the MDL may be elevated above the reported detection limit.
"e" - A holding time violation occurred.
"f" - The duplicate/replicate sample's relative percent difference (RPD) was outside the control limit.

5.4.7.4 Discussion

Perchlorate concentrations in the drainage channel soil samples are shown in Figure 5-61. The extent of detectable perchlorate is also shown on Figure 5-61. Perchlorate was detected throughout the drainage channel in Test Bay Canyon downstream to Laborde Canyon. The highest perchlorate concentrations were detected in boring K-DCS-SB101, which is located near the former berm area. As previously noted in Section 5.4.2.2.6, the near-surface perchlorate impacts in southern Test Bay Canyon appear to have been limited to the south by the former berm, which may have directed surface water flow toward the drainage channel. The presence of relatively high concentrations of perchlorate in soil at boring K-DCS-SB101 is thus generally consistent with the conceptual model for the southern Test Bay Canyon perchlorate release discussed in Section 5.4.2.2.6.

Perchlorate was also detected at a concentration of 5.5 µg/kg in Area L. Stepout borings L-DCS-SB102 and L-DCS-SB103 show that the extent of perchlorate in this area is very limited.

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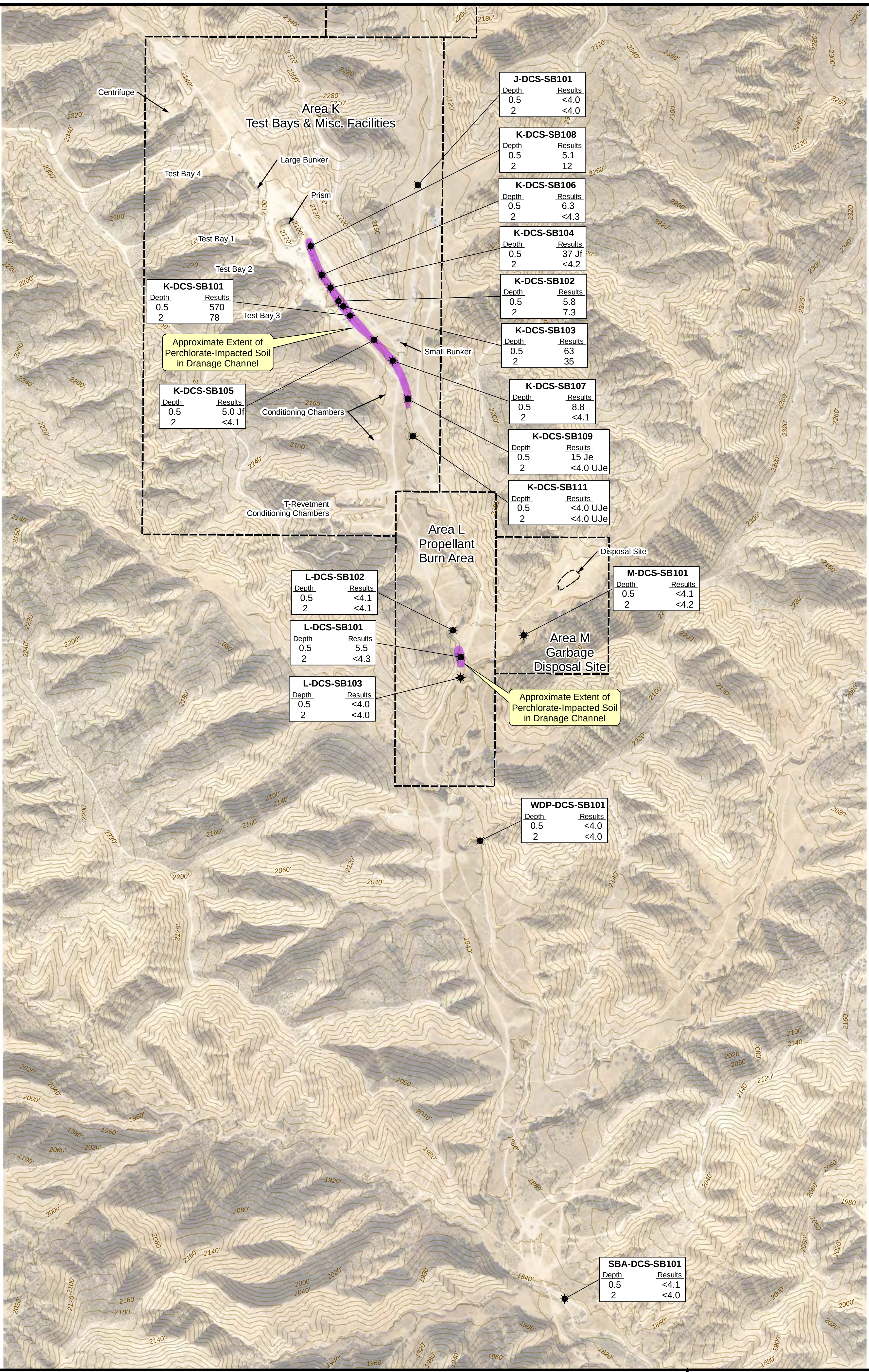

LEGEND

- Surface Sample Location
- Historic Operational Area Boundary
- Approximate Extent of Perchlorate-Impacted Soil in Drainage Channel
- Ground Surface Elevation Contour (20-foot interval - feet msl)

Note:
Results in µg/kg.

0 300 600 Feet

Beaumont Site 2

Figure 5-61

Extent of Perchlorate in Soil-Drainage Channel Samples

TETRA TECH

6.0 UPDATED CONCEPTUAL SITE MODEL

This section updates the CSM for the Site based on new data collected during the DSI. The CSM provides a representation of the environmental setting of the Site based on all available data. The CSM is a tool for site managers and regulators to evaluate the nature, extent, and magnitude of contamination at the Site, along with the physical setting and historical operations that influence the fate and transport of contaminants within the environment. The CSM will be used to evaluate potential risks to human health and the environment and determine appropriate mitigation measures and remedial alternatives that are both technically and economically feasible.

6.1 GEOLOGY AND HYDROGEOLOGY

6.1.1.1 Geologic Units

The recognition of two surficial geologic units at the Site (colluvium and alluvium) rather than one (alluvium) has resulted in the reinterpretation of metals data for the Site. Initial background comparisons conducted as part of the SERA (Tetra Tech, 2009h) identified a number of locations with potentially elevated metals concentrations (i.e., concentrations exceeding BTVs for alluvium) which were investigated during the DSI. As fieldwork progressed, it was noted that a disproportionate number of these locations were in small side canyons or at locations where STF is present essentially at the ground surface. Geologic mapping was conducted during the DSI to further delineate soil types at all previous and DSI borings where metals data were collected. Based on the more detailed classification of soils, a new background comparison study was conducted, which reclassified all existing and new metals results into alluvium and colluvium/STF subgroups. The metals data for alluvium samples were then compared with the existing background dataset for alluvium at the Site, and the metals data for colluvium or STF samples were compared with a background dataset for the lower member of the STF collected at Beaumont Site 1. The results of the new background comparisons will be used to identify COPCs for the purpose of risk assessment.

6.1.1.2 Lithology of the San Timoteo Formation

Prior to the DSI, 41 borings had been drilled at the Site to depths of at least 40 feet bgs or first groundwater. As part of the DSI, 63 additional soil borings were drilled to depths of at least 40 feet bgs or first groundwater, including 12 borings drilled to deep water-bearing zones between 175 and 253 feet bgs. The additional borings greatly increased the density of lithologic data, and allowed for the construction of detailed cross-sections showing the lithology of the STF.

The cross-sections show generally north-dipping mudstone beds within the STF, which appear to have locally controlled the migration of perchlorate in the vadose zone (for example, in southern Test Bay Canyon), adding to the understanding of the distribution of perchlorate in soil and groundwater.

The recognition of dipping beds within the STF also has hydrogeologic implications. Where dipping beds are present, the lithology at the water table will vary along the length of the canyons. The presence of alternating mudstone and sandstone sections at the water table can result in localized changes in hydraulic gradient, with steeper gradients in the finer-grained, less permeable beds, and shallower gradients in coarser-grained, more permeable units. As an example, cross-section A'-A'' through southern Test Bay Canyon (Figure 5-19) shows a dramatic steepening of the hydraulic gradient where a relatively thick mudstone bed crosses the water table. It is possible that highly variable, lithology-controlled hydraulic gradients may be commonplace at the Site.

6.1.1.3 Weathering in the San Timoteo Formation and Groundwater Flow

Prior to the DSI, it was believed that groundwater flow direction was at least in part controlled by the interface between weathered and unweathered STF. The DSI included the installation of monitoring wells TT-MW2-25 and TT-MW2-34A, B, and C to test this aspect of the CSM. The wells were installed in side canyons located south (generally downgradient with respect to the expected direction of groundwater flow in Laborde Canyon) of the highest concentration areas of the Test Bay Canyon and WDA perchlorate plumes. At each location, a ridge of STF was present between the perchlorate plume and the monitoring well. The presence of high concentrations of perchlorate in these wells could indicate that relatively unweathered STF is not a significant barrier to groundwater flow. Perchlorate was not detected in well TT-MW2-25, and was detected at a concentration of just 0.30 µg/L in well TT-MW2-34A, suggesting that relatively unweathered STF does act as a barrier to groundwater flow.

Observations made during drilling and the results of the seismic reflection and refraction survey (Terra Physics, 2009) both indicate that the depth to relatively unweathered STF is shallower in side canyons than near the canyon centers, suggesting that the interface between the weathered and unweathered STF has a trough-like configuration. Shallow groundwater flow may therefore follow the major canyons as a result of lateral permeability variations.

6.2 SOIL SOURCE AREA AND IMPACTS

6.2.1 Perchlorate

The extent of perchlorate-impacted soil at the Site is shown in Figure 6-1. Two major areas of perchlorate-impacted soil have been identified at the Site: one in southern Test Bay Canyon, and one in

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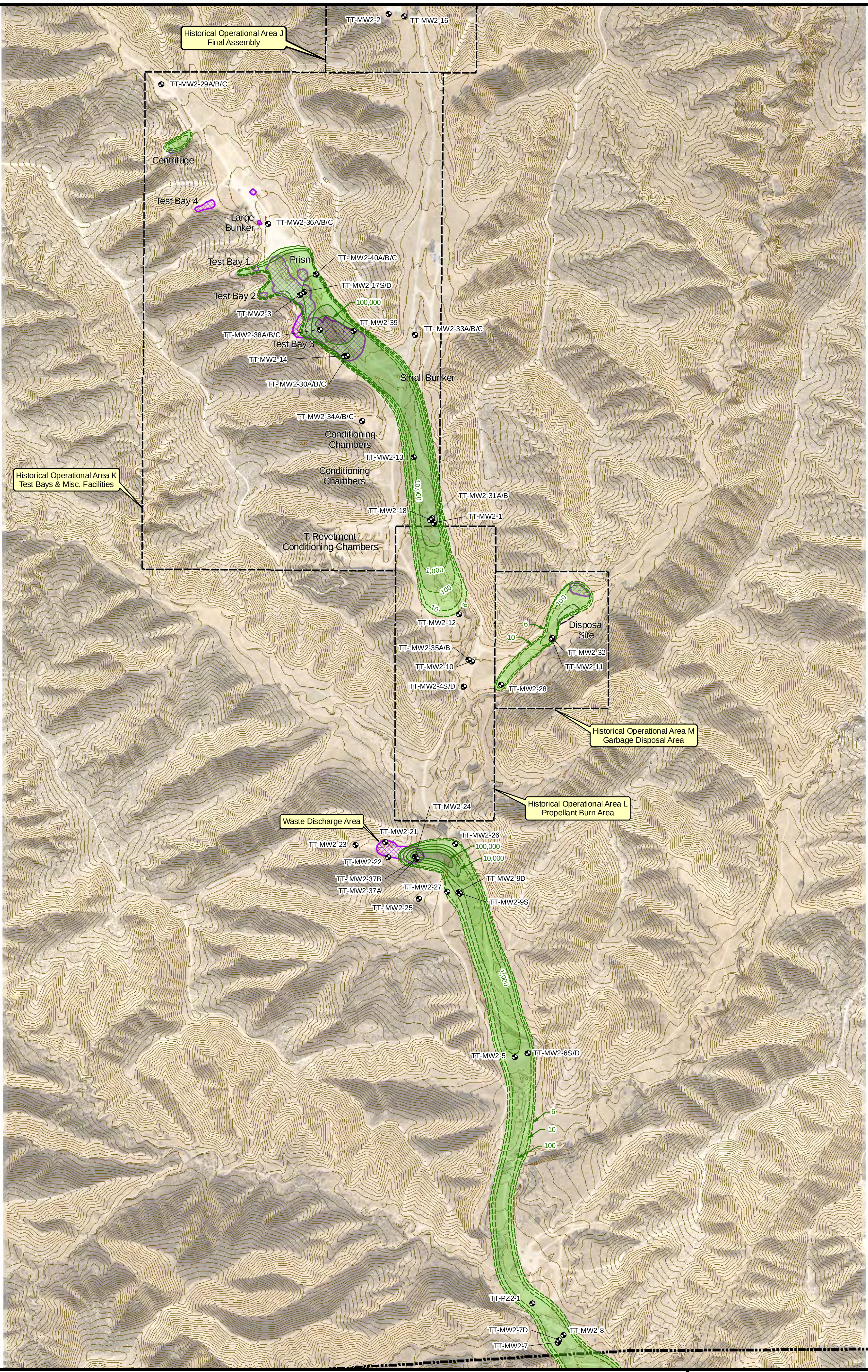

LEGEND

Perchlorate in Groundwater

- 6 µg/L
- 10 µg/L
- 100 µg/L
- 1,000 µg/L
- 10,000 µg/L
- 100,000 µg/L

Perchlorate Soil Source >µg/kg

Monitoring Well Location

Ground Surface Elevation Contour (10-foot interval - feet msl)

Historic Operational Area Boundary

0 300 600 Feet

Note:
µg/L - Micrograms per liter.

Beaumont Site 2

Figure 6-1

Perchlorate Source Areas and Groundwater Impacts

TETRA TECH

the WDA. Minor areas of perchlorate-impacted soil have also been identified in northern Test Bay Canyon and in Area M.

The perchlorate-impacted soil in southern Test Bay Canyon includes a relatively large area of near surface impacts mainly restricted to depths of 15 feet or less, and three areas of deeper impacts which extend to groundwater. The deeper impacts are located near Test Bays 1, 2, and 3; near the water table, a thin “tongue” of impacted soil extends across the canyon and downgradient from Test Bay 3. The maximum perchlorate concentration detected in soil at Test Bays 1 and 2 is 1,700 µg/kg; the maximum perchlorate concentration at Test Bay 3 is greater than 100,000 µg/kg. Test Bay 3 is considered to be primary perchlorate source area in southern Test Bay Canyon. Near-surface perchlorate-impacted soil in southern Test Bay Canyon occurs over an area of approximately 2.0 acres; deeper impacts extend over an area of 1.6 acres, which partially overlaps the near-surface impacted soil. Most of the area of deeper soil impacts is only slightly above the water table.

Perchlorate-impacted soil in the WDA is confined to a small side canyon located on the western side of Laborde Canyon. The maximum perchlorate concentration detected in soil in the WDA was greater than 100,000 µg/kg. The areal extent of impacted soil is approximately 0.6 acres.

Minor areas of perchlorate-impacted soil have also been identified in northern Test Bay canyon and in Area M. Four relatively small areas of impacted soil are present in northern Test Bay Canyon, the largest of which (0.1 acres in area) is located in Test Bay 4. The highest perchlorate concentration detected in northern Test Bay Canyon was 690 µg/kg, in Test Bay 4. The perchlorate-impacted soil in Area M has an area of approximately 0.1 acres, and the maximum detected perchlorate concentration was 3,100 µg/kg..

6.2.2 TCE

The extent of TCE-impacted soil at the Site is shown in Figure 6-2. TCE was detected in soil from borings TT-MW2-21, TT-MW2-22, SB4, and SB5, all of which are located in the WDA. TCE was not detected in any other borings. The maximum detected TCE concentration was 680 µg/kg, in boring TT-MW2-22. Based on these results, the extent of TCE-impacted soil appears to be localized to the WDA.

6.2.3 Methylene Chloride

The extent of methylene chloride-impacted soil at the Site is shown in Figure 6-3. Methylene chloride was detected in soil from borings TT-MW2-21, TT-MW2-22, TT-MW2-23, and SB4, all of which are located in the WDA. Methylene chloride was not detected in any other borings. The maximum detected methylene chloride concentration was 21,000 µg/kg, in boring TT-MW2-22. Based on these results, the

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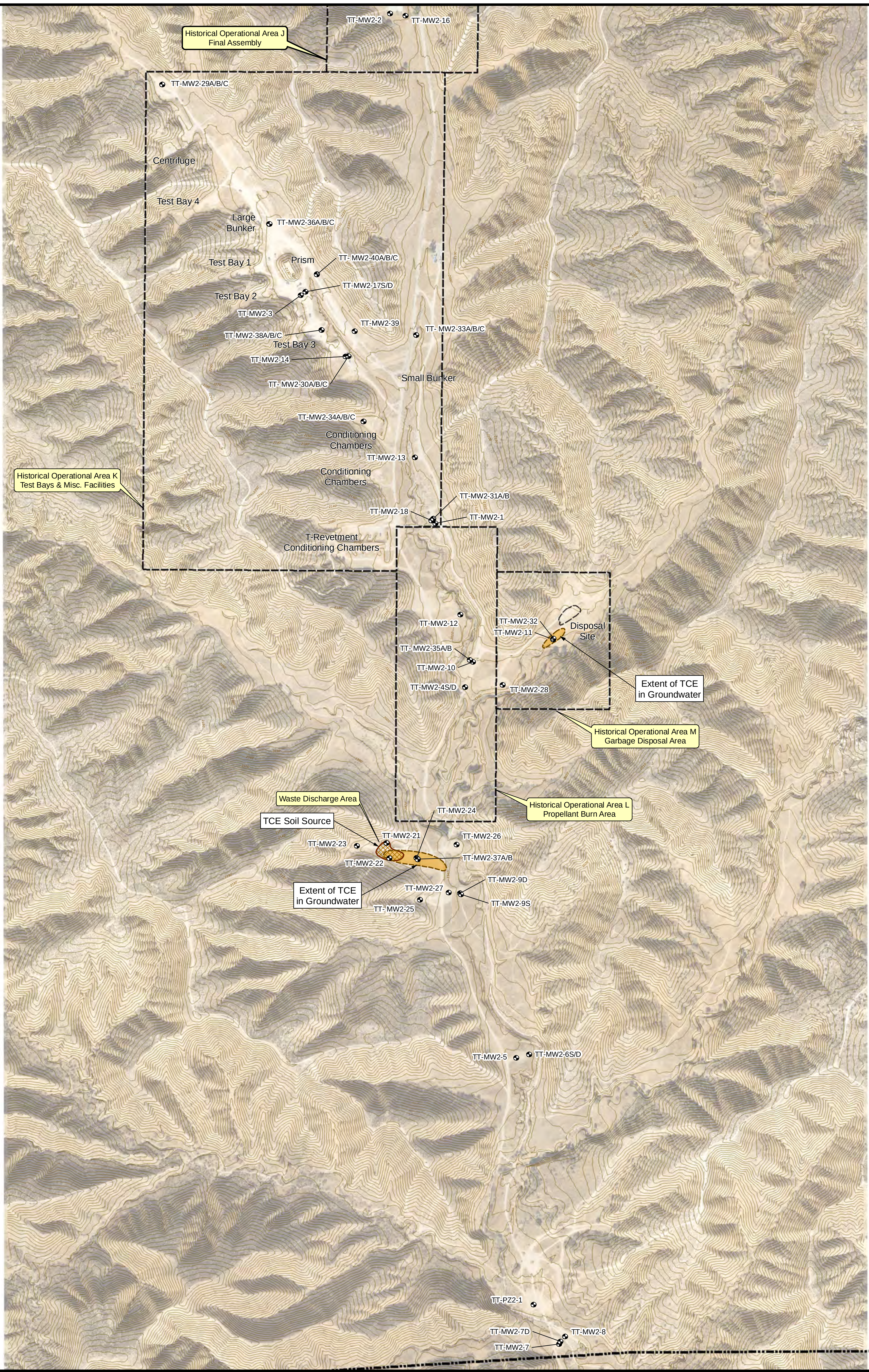

LEGEND

- Monitoring Well Location
- TCE Soil Source
- TCE in Groundwater
- Ground Surface Elevation Contour (10-foot interval - feet msl)
- Historic Operational Area Boundary

0 300 600 Feet

Beaumont Site 2

Figure 6-2

TCE Source Areas and Groundwater Impacts

TETRA TECH

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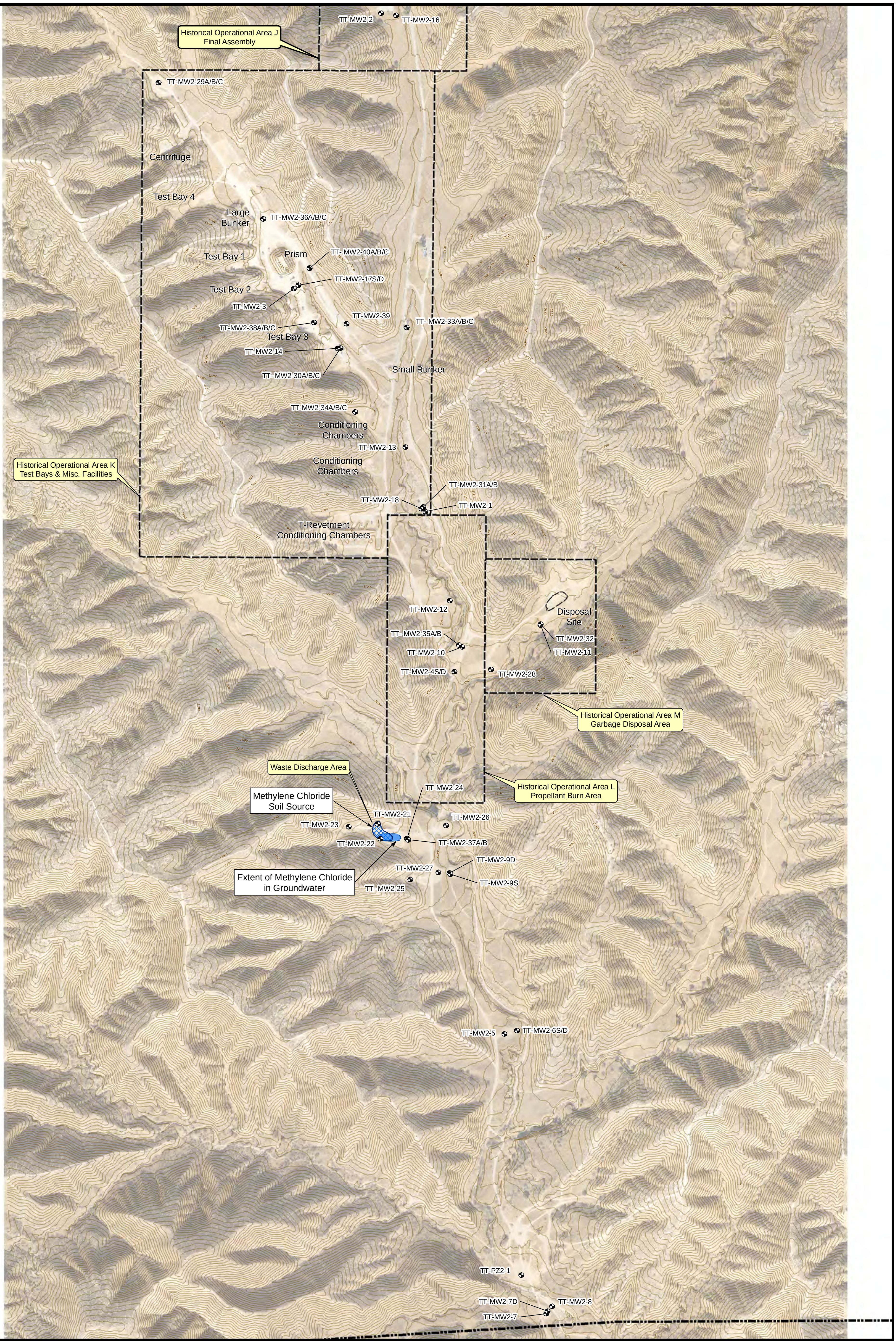


LEGEND

- Monitoring Well Location
- Methylene Chloride Soil Source
- Methylene Chloride in Groundwater
- Ground Surface Elevation Contour (10-foot interval - feet msl)
- Historic Operational Area Boundary

0 300 600 Feet

Beaumont Site 2

Figure 6-3
Methylene Chloride Source Areas and Groundwater Impacts

TETRA TECH

extent of methylene chloride-impacted soil is coincident with but smaller than the TCE-impacted soil, and appears to be localized to the WDA.

6.3 GROUNDWATER SOURCE AREAS AND IMPACTS

6.3.1 Perchlorate

The extent of perchlorate in groundwater is shown in Figure 6-1. Two major perchlorate plumes have been identified at the Site: one related to soil impacts in southern Test Bay Canyon (Test Bay Canyon plume), and one related to soil impacts in the WDA (WDA plume).

The Test Bay Canyon groundwater plume extends approximately 2,100 feet downgradient from the source area near Test Bay 3, terminating to the north of well TT-MW2-12 in Laborde Canyon. Perchlorate concentrations in groundwater at the source area exceed 100,000 µg/L. Perchlorate concentrations gradually attenuate to approximately 13,000 µg/L at well TT-MW2-18, and then rapidly attenuate to non-detectable concentrations at well TT-MW2-12, located approximately 625 feet downgradient of TT-MW2-18.

The WDA groundwater plume extends at least 3,700 feet downgradient from the source area in the WDA to beyond the southern boundary of the Site. Maximum perchlorate concentrations in groundwater at the source area exceed 100,000 µg/L. Perchlorate concentrations gradually attenuate to approximately 500 µg/L at the southern property boundary. In May 2008, perchlorate was not detected in off-Site wells TT-MW2-19S and D, located approximately 4,200 feet south of the southern property boundary, indicating that the WDA plume is less than approximately 7,900 feet long.

Minor perchlorate plumes are also present in groundwater at the Centrifuge area in northern Test Bay Canyon, and in Area M. The perchlorate-impacted groundwater at the Centrifuge area appears to be a perched groundwater zone. The maximum perchlorate concentration in groundwater is 230 µg/L, and based on the apparently limited occurrence of perched groundwater at the Site, is likely to be relatively small in lateral extent. The Area M groundwater plume extends approximately 900 feet downgradient from the soil source area in Disposal Site Canyon. The maximum detected perchlorate concentration in groundwater at the source area is 560 µg/L, and gradually attenuates to 28 µg/L at downgradient well TT-MW2-28.

6.3.2 TCE

The extent of TCE in groundwater at the Site is shown in Figure 6-2. In May 2008, TCE was detected at concentrations exceeding the MCL of 5 µg/L in three monitoring wells: TT-MW2-11, located in Area M, and TT-MW2-22 and TT-MW2-24, both of which are located in the WDA.

The TCE concentration in well TT-MW2-11 in May 2008 was 8.6 µg/L. During the DSI, TCE was detected at a concentration of 2.0 µg/L in a grab sample collected from boring M-58-SB108, and at a concentration of 0.24 µg/L in deep monitoring well TT-MW2-32, which is located adjacent to TT-MW2-11. TCE was not detected in groundwater samples collected from any of the other borings and wells in Area M, including downgradient well TT-MW2-28. Based on these results, the extent of TCE in Area M appears to be localized in the area of well TT-MW2-11. No soil source for TCE has been identified in Area M.

TCE concentrations in wells TT-MW2-22 and TT-MW2-24 in May 2008 were 84 µg/L and 110 µg/L, respectively. TCE has not been detected in upgradient well TT-MW2-23, crossgradient well TT-MW2-21, downgradient wells TT-MW2-9S and D, or in deep wells TT-MW2-37A and B, which are located adjacent to TT-MW2-24. Based on these results, the extent of TCE appears to be shallow and localized in the WDA. As shown in Figure 6-2, a soil source for the TCE in groundwater has been identified in the vicinity of wells TT-MW2-21 and TT-MW2-22.

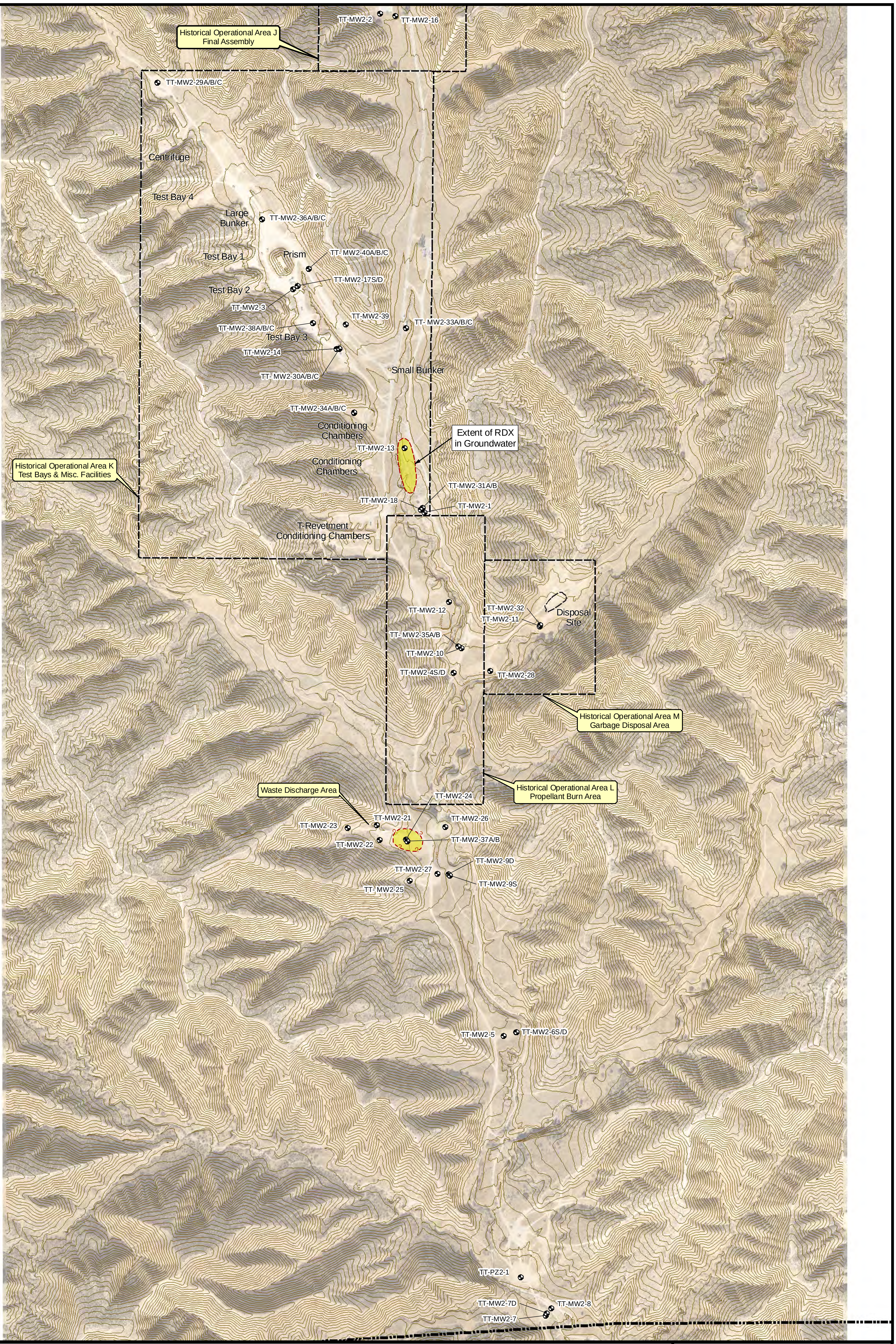
6.3.3 Methylene Chloride

The approximate extent of methylene chloride in groundwater is shown in Figure 6-3. Methylene chloride has been detected at concentrations exceeding the MCL of 5 µg/L in monitoring well TT-MW2-22, located in the WDA. In May 2008, methylene chloride was detected at a concentration of 220 µg/L, and was not detected in upgradient well TT-MW2-23, crossgradient well TT-MW2-21, downgradient wells TT-MW2-24, or in deep well TT-MW2-37A and B, which are located adjacent to TT-MW2-24. Based on these results, the extent of methylene chloride in the WDA is defined laterally, and appears to be localized in the area of well TT-MW2-22. As shown in Figure 6-3, a soil source for the methylene chloride in groundwater has been identified in the vicinity of wells TT-MW2-21 and TT-MW2-22.

6.3.4 RDX

The approximate extent of RDX in groundwater is shown in Figure 6-4. RDX has been detected at concentrations exceeding the DWNL of 0.5 µg/L in wells TT-MW2-13 and TT-MW2-1, both of which are located in Laborde Canyon. In May 2008, RDX was detected in well TT-MW2-13 at a concentration of 0.57 µg/L, and was not detected in well TT-MW2-1. During the DSI, RDX was detected in well

X:\GIS\Lockheed 22289-09030\RDX_Source.mxd



LEGEND

- Monitoring Well Location
- RDX in Groundwater
- Historic Operational Area Boundary
- Ground Surface Elevation Contour (10-foot interval - feet msl)

0 300 600 Feet

Beaumont Site 2

Figure 6-4

RDX Groundwater Impacts

TETRA TECH

TT-MW2-13 at a concentration of 0.8 µg/L, and was not detected in wells TT-MW2-31A, B, C, or in TT-MW2-34A, B, and C. Based on these results, the extent of RDX in groundwater in Laborde Canyon south of Test Bay Canyon is approximately defined, and appears to be localized in the area of well TT-MW2-13. A soil source for the RDX in groundwater has not been identified in this area.

During the DSI, RDX was also detected well TT-MW2-24, at a concentration of 4.7 µg/L. Well TT-MW2-24 is located in the WDA, and had not been previously tested for RDX. Additional groundwater samples will be collected from wells in the area of TT-MW2-24 and analyzed for RDX during the second quarter 2009 groundwater monitoring event, with reporting of the results in the Second and Third Quarter 2009 Groundwater Monitoring Report for the Site.

6.3.5 Other Compounds

Groundwater samples collected from selected existing and new monitoring wells across the entire Site will be analyzed for 1,4-dioxane and NDMA during the second quarter 2009 groundwater monitoring event. The results of the 1,4-dioxane and NDMA analyses will be provided in the Second and Third Quarter 2009 Groundwater Monitoring Report for the Site.

7.0 CONCLUSIONS

The following section presents the conclusions of the DSI.

7.1 HISTORICAL OPERATIONAL AREA J – FINAL ASSEMBLY

Additional investigation conducted as part of the DSI was limited to assessment of potentially elevated concentrations of cadmium, lead, vanadium, and zinc in soil. Conclusions for Area J include the following:

- The background comparisons for metals found potentially elevated concentrations of beryllium, cadmium, cobalt, lead, selenium, silver, vanadium, and zinc in Area J. All metals identified as having statistically or potentially elevated concentrations will be evaluated as COPCs in future risk assessments for the Site.
- The extent of potentially elevated cadmium, lead, vanadium, and zinc in soil were defined to concentrations below BTVs.

Based on the DSI and previous results, no further investigation is warranted at this time in Area J.

7.2 HISTORICAL OPERATIONAL AREA K – TEST BAYS AND MISCELLANEOUS FACILITIES

7.2.1 Northern Test Bay Canyon

Additional investigation conducted as part of the DSI was limited to characterization of perchlorate in soil and groundwater at the Centrifuge, Test Bay 4, and within Test Bay Canyon, and characterization of potentially elevated barium concentrations in one previous boring. Conclusions for northern Test Bay Canyon include the following:

- Perchlorate was detected in soil at the Centrifuge, Test Bay 4, in Test Bay Canyon near Test Bay 4, and near the Large Bunker. None of the detected perchlorate concentrations exceeded the IG of 780 µg/kg.
- The extent of perchlorate-impacted soil is adequately constrained by topography and by borings drilled as part of the DSI.
- Perchlorate-impacted perched groundwater was identified in the Centrifuge area. The extent of the impacted groundwater is presumed to be small based on the limited occurrence of perched groundwater at the Site.
- Analytical results for groundwater samples collected from soil borings and monitoring wells at the southern end of the area indicate that any groundwater impacts in northern Test Bay Canyon do not extend to southern Test Bay Canyon.
- The background comparisons for metals identified potentially elevated antimony and silver concentrations in northern Test Bay Canyon. Barium concentrations previously thought to be elevated were found to be consistent with background concentrations in colluvium. All metals identified as having statistically or potentially elevated concentrations will be evaluated as COPCs in future risk assessments for the Site.

Based on the DSI and previous results, no further investigation is warranted at this time in northern Test Bay Canyon.

7.2.2 Southern Test Bay Canyon

Additional investigation conducted as part of the DSI was limited to characterization of perchlorate in soil and groundwater, and characterization of potentially elevated barium and zinc concentrations detected in one previous boring. The conclusions of the DSI include the following:

- Perchlorate source areas appear to be present at Test Bays 1, 2, and 3. Perchlorate concentrations in soil at Test Bays 1 and 2 are relatively low (maximum concentration of 1,700 µg/kg) compared with Test Bay 3 (maximum concentration of 130,000 µg/kg). Test Bay 3 is therefore considered to represent the primary perchlorate source area in southern Test Bay Canyon.
- The perchlorate source area consists of a broad area of near-surface impacts, which is largely restricted to depths of 15 feet bgs or less, and area of deep impacts at Test Bays 1, 2, and 3. At Test Bay 3, the deep impacts extend across- and down-canyon at depth.
- The deep impacted soil extending across- and down-canyon is only present near the water table. Mass balance calculations show that the perchlorate concentrations detected in soil near the water can be accounted for by the presence of perchlorate-impacted groundwater in the pore space of the soil samples. This portion of the perchlorate-impacted soil is considered to be an artifact of proximity to the water table.
- The extent of perchlorate-impacted soil is adequately defined by the DSI soil borings and topography.
- The background comparisons for metals identified potentially elevated concentrations of beryllium, cobalt, silver, and zinc in southern Test Bay Canyon. The background comparisons found that barium and zinc concentrations previously thought to be potentially elevated are consistent with background concentrations in the STF. All metals identified as having statistically or potentially elevated concentrations will be evaluated as COPCs in future risk assessments for the Site.

Based on the DSI and previous results, no further investigation is warranted at this time in southern Test Bay Canyon.

7.2.3 Laborde Canyon

Additional investigation conducted as part of the DSI was limited to characterization of potentially elevated concentrations of barium, cadmium, lead, and zinc detected in four previous borings, and installation of three sets of nested groundwater monitoring wells to further characterize the extent of perchlorate and RDX in groundwater. The conclusions of the DSI include the following:

- The results of the background comparisons for metals found potentially elevated cadmium, lead, silver and zinc concentrations. Concentrations of barium previously thought to be elevated were found to be consistent with background concentrations for colluvium. All metals identified as having statistically or potentially elevated concentrations will be evaluated as COPCs in future risk assessments for the Site.

- Potentially elevated zinc concentrations detected in previous boring K-56-HA4 were characterized to concentrations consistent with BTVs for alluvium.
- Potentially elevated cadmium, lead, and zinc concentrations detected in previous boring K55-DP24 were characterized to concentrations consistent with BTVs for colluvium.
- The vertical extent of perchlorate at previous wells TT-MW2-1 and TT-MW2-18 was defined by the results from DSI monitoring wells TT-MW2-31A and B.
- The results from DSI monitoring wells TT-MW2-33A, B, and C confirmed that a source of perchlorate is not present in Laborde Canyon north of Test Bay Canyon.
- The results from DSI wells TT-MW2-34A, B, and C, which were installed in a small side canyon off of Laborde Canyon to the south (downgradient) of the Test Bay Canyon groundwater plume confirmed that relatively unweathered STF acts as a barrier to the migration of perchlorate in groundwater.
- RDX detected in groundwater samples from well TT-MW2-13 was adequately defined. A source for RDX in soil was not identified.

Based on the DSI and previous results, no further investigation is warranted at this time in the Laborde Canyon portion of Area K.

7.3 HISTORICAL OPERATIONAL AREA L – PROPELLENT BURN AREA

Additional investigation conducted as part of the DSI was limited to characterization of an area specifically designated as the propellant burn area on Figure 3-43 of the Radian (1986a) historical report, evaluating whether a preferred pathway for perchlorate migration in groundwater is present at depth in Area L, and installing a monitoring well screened across the water table adjacent to previous well TT-MW2-4S. The conclusions of the DSI are as follows:

- No credible evidence for the presence of a source of perchlorate or other chemicals in soil has been found in Area L, and groundwater monitoring results do not suggest the presence of a potential source area. Based on these results, it is concluded that Area L was not used for propellant incineration.
- Perchlorate was not detected in monitoring wells TT-MW2-35A and B, suggesting that a preferred perchlorate migration pathway is not present at depth in Area L.
- Field evidence indicated that groundwater in the area of well TT-MW2-4S is confined, and a water table well was not installed.
- The background comparisons found several metals to be statistically elevated above background, or to have concentrations exceeding BTVs for alluvium or colluvium. An elevated molybdenum concentration identified in Area L was resampled, and the original detection was not replicated. All metals identified as having statistically or potentially elevated concentrations will be evaluated as COPCs in future risk assessments for the Site.

Based on the DSI and previous results, no further investigation is warranted at this time in Area L.

7.4 HISTORICAL OPERATIONAL AREA M – GARBAGE DISPOSAL AREA

Additional investigation conducted as part of the DSI included characterization of perchlorate and TCE impacts in soil and groundwater. The conclusions of the DSI are as follows:

- The extent of perchlorate-impacted soil in Area M was fully characterized by the DSI soil borings. The perchlorate-impacted soil does not appear to geographically coincide with the former disposal area, suggesting that the perchlorate release may have been related to surface disposal rather than disposal within the original trench.
- The lateral and vertical extent of perchlorate in groundwater was adequately defined by the DSI soil borings and monitoring wells.
- The extent of TCE in groundwater appears to be limited to the immediate area of previous well TT-MW2-11.

Based on the DSI and previous results, no further investigation is warranted at this time in Area M.

7.5 WASTE DISCHARGE AREA

Additional investigation conducted as part of the DSI included the installation 3 shallow wells and 1 deep well to further characterize the lateral and vertical extent of perchlorate and VOCs in groundwater, collecting soil gas samples at 4 locations to evaluate potential soil gas impacts related to VOC-impacted soil and groundwater, and analysis of a groundwater sample from existing well TT-MW2-24 to evaluate potential RDX impacts at the WDA. The conclusions of the DSI are as follows:

- The lateral and vertical extent of perchlorate in groundwater was adequately defined by the previous and DSI soil borings and monitoring wells.
- The results from DSI well TT-MW2-25, which was installed in a small side canyon off of Laborde Canyon to the south (downgradient) of the WDA groundwater plume, confirmed that relatively unweathered STF acts as a barrier to the migration of perchlorate in groundwater.
- VOC concentrations detected in the soil gas samples were below commercial/industrial CHHSLs.
- Concentrations of several metals were found to be statistically elevated or potentially elevated by the background comparisons. However, only cadmium, lead, and zinc concentrations appeared to be consistent with a potential release. Cadmium, lead, and zinc concentrations were defined to concentrations below colluvium BTVs by previous results. All metals identified as having statistically or potentially elevated concentrations will be evaluated as COPCs in future risk assessments for the Site.
- RDX was detected at a concentration of 4.7 µg/L in a groundwater sample collected from monitoring well TT-MW2-24. The extent of RDX in groundwater at the WDA has not been defined.

Based on the DSI and previous results, no further investigation of perchlorate, VOCs, or metals in soil and/or groundwater is warranted at this time in the WDA. Additional groundwater sampling to define the extent of RDX in groundwater is planned for the second quarter 2008 groundwater monitoring event, and will be reported as part of the GMP.

7.6 SOUTH BOUNDARY AREA

Additional investigation conducted as part of the DSI included drilling three soil borings to evaluate whether a shallow perchlorate detection in boring TT-PZ2-1 could represent a potential perchlorate source area at the SBA. The conclusions of the DSI are as follows:

- Low perchlorate concentrations detected in soil from the DSI borings, as well as the small extent of apparent perchlorate impacts in soil, suggest that a significant release of perchlorate has not occurred in the SBA.
- Mass balance calculations show that soil samples at or near saturation with SBA groundwater would have perchlorate concentrations similar to those detected in soil at the SBA.

Based on the DSI and previous results, no further investigation is warranted at this time in the SBA.

7.7 DRAINAGE CHANNELS

Additional investigation conducted as part of the DSI included soil borings in drainage channels across the Site to evaluate whether perchlorate detections in surface water could be related to a perchlorate source in drainage channel soil. The conclusions of the DSI are as follows:

- Perchlorate was detected throughout the Area K drainage channel from Test Bay Canyon downstream to Laborde Canyon. The extent of perchlorate-impacted soil was defined by step-out borings.
- Perchlorate was also detected at a low concentration in the Area L drainage channel. Stepout borings show that the extent of perchlorate in this area is very limited.
- Perchlorate was not detected in drainage channels in Area J, Area M, the WDA, or the SBA.

Based on the DSI results, no further investigation is warranted at this time in the drainage channels.

7.8 SUMMARY

Based on the results of the DSI and previous investigations, the lateral and vertical extent of perchlorate, VOCs, and metals in soil and/or groundwater are considered to be adequately characterized at the Site. Sufficient information is available for these contaminants to proceed with feasibility studies at the Site.

Additional groundwater sampling to define the extent of RDX in groundwater at the WDP is currently planned as part of the second quarter 2009 groundwater monitoring event, and will be reported as part of the GMP. Additional Site-wide groundwater sampling for 1,4-dioxane and NDMA is also planned for the second quarter 2009 groundwater monitoring event, and will be reported as part of the GMP.

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9.0 ACRONYMS

AETL	American Environmental Testing Laboratories, Inc.
ASTM	American Society for Testing and Materials
bgs	below ground surface
BTV	background threshold value
CDHS	California Department of Health Services
COPC	chemical(s) of potential concern
CSM	Conceptual Site Model
1,1-DCE	1,1-dichloroethene
DKR	Dulzura Kangaroo Rat
DSI	Dynamic Site Investigation
DTSC	Department of Toxic Substances Control
DWNL	Drinking Water Notification Level
EM	electromagnetic
EMWD	Eastern Municipal Water District
ft/ft	feet per foot
ft/day	feet per day
GCR	Grand Central Rocket Company
GMP	Groundwater Monitoring Program
HRA	Human Health Risk Assessment
HSA	hollow-stem auger
IDW	investigation-derived waste
IG	investigation goal
LAC	Lockheed Aircraft Corporation
LMC	Lockheed Martin Corporation
LPC	Lockheed Propulsion Company
MCL	maximum contaminant level
MDL	method detection limit
MEF	Mount Eden Formation

MEK	methyl ethyl ketone (2-butanone)
mg/kg	milligrams per kilogram
ml	milliliter
msl	mean sea level
MS/MSD	matrix spike/matrix spike duplicate
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
NDMA	N-nitrosodimethylamine
NWS	National Weather Service
PAHs	polyaromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PCE	tetrachloroethene
PERA	Predictive Ecological Risk Assessment
PPE	personal protective equipment
RCDEH	Riverside County Department of Environmental Health
RDX	Royal demolition explosive
RPD	relative percent difference
SAF	San Andreas Fault
SARWPCB	Santa Ana River Basin Regional Water Pollution Control Board
SARWQCB	California Regional Water Quality Control Board, Santa Ana Region
SAP	sampling and analysis plan
SBA	South Boundary Area
SERA	Scoping Ecological Risk Assessment
SKR	Stephen's Kangaroo rat
STF	San Timoteo formation
STLC	Soluble Threshold Limit Concentration
SVOCs	semivolatile organic compounds
TAT	turnaround time
TCE	trichloroethene
TPHd	total petroleum hydrocarbons as diesel

TPHg	total petroleum hydrocarbons as gasoline
2-D	2-dimensional
3-D	3-dimensional
UDMH	unsymmetrical dimethylhydrazine
U.S.	United States
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTL95	95% upper tolerance limit
VOCs	volatile organic compounds
WDA	Waste Discharge Area
WDC	WDC Exploration and Wells
WRS	Wilcoxon Rank-Sum test