Semiannual Groundwater Monitoring Report
Third Quarter 2013 and Fourth Quarter 2013
Potrero Canyon (Lockheed Martin Beaumont Site 1)
Beaumont, California

Prepared for:

LOCKHEED MARTIN

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April 16, 2014

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

Subject: Submittal of the *Semiannual Groundwater Monitoring Report, Third Quarter 2013 and Fourth Quarter 2013, Lockheed Martin Corporation, Potrero Canyon (Lockheed Martin Beaumont Site 1), Beaumont, California*

Dear Mr. Zogaib:

Please find enclosed one hard copy of the body of the report and two compact disks with the report body and appendices of the *Semiannual Groundwater Monitoring Report, Third Quarter 2013 and Fourth Quarter 2013, Lockheed Martin Corporation, Potrero Canyon (Lockheed Martin Beaumont Site 1), Beaumont, California* for your review and approval or comment.

If you have any questions regarding this submittal, please contact me at 818-847-9901 or brian.thorne@lmco.com.

Sincerely,

Brian T. Thorne

Brian T. Thorne
Project Lead

Enclosure: *Semiannual Groundwater Monitoring Report, Third Quarter 2013 and Fourth Quarter 2013, Lockheed Martin Corporation, Potrero Canyon (Lockheed Martin Beaumont Site 1), Beaumont, California*

Copy: Gene Matsushita, LMC (electronic copy)
Barbara Melcher, CDM Smith (electronic copy)
Tom Villeneuve, Tetra Tech (electronic copy)

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SEMIANNUAL GROUNDWATER MONITORING REPORT THIRD QUARTER AND FOURTH QUARTER 2013 POTRERO CANYON (LOCKHEED MARTIN BEAUMONT SITE 1) BEAUMONT, CALIFORNIA

Prepared for:

Lockheed Martin Corporation

Prepared by:

Tetra Tech, Inc.

April 2014

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ACRONYMS AND ABBREVIATIONS

BPA	Burn Pit Area
BTOC	below top of casing
CA	contaminant attenuation
cfs	cubic feet per second
1,1-DCA	1,1-dichloroethane
1,1 -DCE	1,1-dichloroethene
DG	downgradient
DO	dissolved oxygen
DWNL	California Department of Public Health drinking water notification level
EC	electrical conductivity
ft/sec	feet per second
GPS	global positioning system
HCP	Habitat Conservation Plan
LMC	Lockheed Martin Corporation
MCL	California Department of Public Health maximum contaminant level
MCEA	Massacre Canyon Entrance Area
MDL	method detection limit
MEF	Mount Eden formation
mg/L	milligrams per liter
µg/L	micrograms per liter
MS/MSD	matrix spike/matrix spike duplicate
msl	mean sea level

mV	millivolts
NA	not analyzed / not applicable / not available
ND	non-detect
NPCA	Northern Potrero Creek Area
NTU	nephelometric turbidity unit
NWS	National Weather Service
ORP	oxidation-reduction potential
psi	pounds per square inch
QAL	Quaternary alluvium
QAL/MEF	Quaternary alluvium/Mount Eden formation
QA/QC	quality assurance/quality control
Radian	Radian Corporation, Inc.
RMPA	Rocket Motor Production Area
RPD	relative percent difference
site	Potrero Canyon (Lockheed Martin Beaumont Site 1)
1,1,1-TCA	1,1,1-trichloroethane
Tetra Tech	Tetra Tech, Inc.
TCE	trichloroethene
UG	upgradient
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compound

SECTION 1 INTRODUCTION

On behalf of Lockheed Martin Corporation, Tetra Tech, Inc. has prepared this Semiannual Groundwater Monitoring Report, which presents the results of the Third Quarter 2013 (1 July 2013 through 30 September 2013) and Fourth Quarter 2013 (1 October 2013 through 31 December 2013) groundwater monitoring activities for the Potrero Canyon (Lockheed Martin Beaumont Site 1) Groundwater Monitoring Program. The site is located in an undeveloped area in the southern portion of the city of Beaumont in Riverside County, California (Figure 1). Currently, the site is inactive except for environmental investigations performed under Consent Order 88/89-034 and Operation and Maintenance Agreement 93/94-025 with the California Department of Toxic Substances Control. The State of California owns approximately 94% (8,552 acres) of the site. The remaining 565 acres, referred to as the conservation easement, were retained by Lockheed Martin Corporation (Figure 2).

The objectives of this report are to accomplish the following:

- Briefly summarize the site history.
- Document water level and water quality monitoring activities and results.
- Analyze and evaluate the groundwater elevation and water quality monitoring data generated.

This report is organized into the following sections: 1) Introduction, 2) Summary of Monitoring Activities, 3) Groundwater Monitoring Results, 4) Summary and Conclusions, and 5) References. Tables and figures are provided at the end of the report body following Section 5. The conceptual site model for Potrero Canyon is described in Appendix A (Conceptual Site Model).

1.1 SITE BACKGROUND

The site consists of a 9,117-acre parcel located in the southern portion of Beaumont, California. The site was primarily used for ranching before 1960. From 1960 to 1974, Lockheed Propulsion Company used the site for solid rocket motor and ballistics testing (Tetra Tech, 2003a). Activities at the site also included burning of process chemicals and waste rocket propellants in an area commonly referred to as the Burn Pit Area.

Tetra Tech identified nine primary historical operational areas at the site. A map of site historical operational areas and features is presented as Figure 2. Historical operational areas were used for various activities associated with rocket motor assembly, testing, and propellant burning. A brief description of each historical operational area follows.

Historical Operational Area A – Eastern Aerojet Range

Between 1970 and 1972, Aerojet leased an area (referred to as the Eastern Aerojet Range) along the eastern portion of the site. The Eastern Aerojet Range was used periodically for ballistics research and development experimentation on several types of 30-millimeter projectiles. Avanti, a highly classified project, used the land directly east of the Eastern Aerojet Range, including several U-shaped revetments for the storage of explosive materials and rocket motors.

Historical Operational Area B – Rocket Motor Production Area

The Rocket Motor Production Area, also known as the Propellant Mixing Area, was used for the processing and mixing of rocket motor solid propellants. The rocket motor production process consisted of: 1) a fuel slurry station, 2) a mixing station, and 3) a cast and curing station.

If a defect was found in the solid propellant mix, the rocket motor was scrapped. The solid propellant was removed from the casings by water jetting at the motor washout south of the mixing station (Radian, 1986).

In 1973, an area east of the mixing station, known as the Blue Motor Burn Pit, was used for the destruction of four motors, which included a motor with “Malloy blue” solid propellant, also referred to as milori blue or Prussian blue (Radian, 1986).

Historical Operational Area C – Burn Pit Area

The Burn Pit Area had three primary features: 1) the chemical storage area, 2) burn pits, and 3) the beryllium test stand. Hazardous wastes generated at the site were stored in 55-gallon drums on a concrete pad east of the burn pits at the chemical storage area until enough material was accumulated for a burning event. The hazardous materials burned in the pits included ammonium perchlorate, wet propellant from motor washout, dry propellant, batches of out-of-specification propellant, various kinds of adhesives, resin curatives such as polybutadiene acrylonitrile/acrylic acid copolymer, burn rate modifiers such as ferrocene, pyrotechnic and ignition components, packaging materials (e.g., metal drums, plastic bags, and paper drums), and solvents (Radian, 1986).

On the south side of the bedrock outcrop where the burn pit instrumentation bunker was located, there was a one-time firing of small beryllium research motors.

Historical Operational Area D – Lockheed Propulsion Company Ballistics Test Range

The Lockheed Propulsion Company Ballistics Test Range facilities included gun mounts, a ballistic tunnel, and storage buildings and trailers. Guns were tested by firing through the tunnel toward a terraced hill. Live rounds were not used, although projectiles were often specially shaped and weighted to simulate actual live rounds (Radian, 1986). Another major project conducted in this area was experimentation on a rocket-assisted projectile to test penetration capability. Additional experiments included impact testing of various motors and pieces of equipment (Radian, 1986).

Class A explosives were reportedly stored in two or three 10-foot by 10-foot buildings behind a berm. A small canyon behind the hill to the south of the former storage buildings was reportedly used as a small test area for incendiary bombs. An incendiary bomb was detonated in the center of drums containing various types of fuel (e.g., jet fuel, gasoline, and diesel) set in circles of different radii to observe shrapnel and penetration patterns. (Alternatively, this test may have been conducted in Historical Operational Area I.) At a small area near the bend in the road, acetone was used to dissolve 2,4,6-trinitrotoluene out of projectiles before they were fired (Radian, 1986).

Historical Operational Area E – Radioactive Waste Disposal Site

During 1971, low-level radioactive waste was buried in one of four canyons southeast of the Lockheed Propulsion Company test services area as reported by former site employees. In 1990, the radioactive waste was located and removed. Soil samples were collected after removal of the waste. The analytical results indicated that detected radiation levels were within the range of naturally occurring levels (Radian, 1990). Maps from the removal action report suggest the waste was removed from Canyon 2.

Historical Operational Area F – Lockheed Propulsion Company Test Services Area

The Lockheed Propulsion Company Test Services Area included the following features: 1) three bays for structural load tests, 2) a 13-foot-diameter spherical pressure vessel, 3) six temperature-conditioning chambers, 4) four environmental chambers, 5) a 25-million electron volt Betatron for X-raying large structures, 6) personnel and instrumentation protection bunkers, and 7) supporting workshops and storage areas (Radian, 1986).

If defects were identified during the integrity and environmental testing activities, the rocket motors were taken to the large motor washout area south of the conditioning chambers adjacent to Potrero Creek (Radian, 1986).

Rocket motor structural load testing under static and captive firing conditions occurred at the Lockheed Propulsion Company test bays. During several of the initial tests conducted at Bay 309, a small motor vertical test bay located in eastern portion of Feature F-39, the readied motor exploded instead of firing (Radian, 1986).

Historical Operational Area G – Helicopter Weapons Test Area

The helicopter weapons test area was used to develop equipment for handling helicopter weapons systems. The facilities in this area included a hangar (Building 302), helicopter landing pad, stationary ground-mounted gun platforms, and a mobile target suspended between towers. The primary project at this area was testing of both stationary guns and guns mounted on helicopters. Experimentation was also performed on the solid propellant portion of an armor-piercing round. Most rounds were fired into the side of the creek wash, about 100 yards to the south of the hangar. A longer impact area labeled with distance markers was located in the canyon to the south of the wash. Projectiles were steel only; warheads were not used during tests at this facility (Tetra Tech, 2003a).

Historical Operational Area H – Sanitary Landfill

A permitted sanitary landfill was located along the western side of the site. The permit for the landfill authorized Lockheed Propulsion Company to dispose of trash such as paper, scrap metal, concrete, and wood generated during routine daily operations. Lockheed policy strictly dictated that no hazardous materials were to have been disposed at this landfill. The trenches were later covered and leveled, with only an occasional tire, metal scrap, or piece of wood remaining on the surface (Tetra Tech, 2003a).

Historical Operational Area I – Western Aerojet Range

Between 1970 and 1972, Aerojet leased an area (referred to as the Western Aerojet Range) along the western portion of the site. Lockheed Propulsion Company conducted an incendiary test with a 500-pound bomb at the southwest end of the Western Aerojet Range. This test was reportedly similar to testing performed at the Lockheed Propulsion Company Ballistics Test Area. According to Radian Corporation, Inc.'s historical report, the Western Aerojet Range was originally leveled to be used as an airstrip (Radian, 1986). Based on employee interviews, the airstrip may have been used only on one occasion (Tetra Tech, 2003a). During investigations performed in 2006 for munitions and explosives of concern (Tetra Tech, 2007), it was discovered that inert 27.5-millimeter projectiles were tested in this area.

Post Lockheed Propulsion Company and Aerojet Test Range Usage

Lockheed Martin Corporation leased portions of the site to several outside parties for use in various activities (Radian, 1986; Tetra Tech, 2003a). The International Union of Operating Engineers used the site from 1971 through 1991 for surveying and heavy equipment training. The Union's main office was located in Bunker 304 of Historical Operational Area F (Lockheed Propulsion Company Test Services Area). The Union's earth-moving actions involved maintaining roads and reshaping various parts of the site, primarily in Historical Operational Areas F and G.

On several occasions, General Dynamics used Historical Operational Area B (Rocket Motor Production Area) for testing activities (Radian, 1986). In 1983 and 1984, General Dynamics conducted weapons testing of a Viper Bazooka and Phalanx Gatling gun.

Structural Composites used the steep terrain of the site for vehicle rollover tests on a number of occasions. Structural Composites also conducted heat and puncture tests on pressurized fiberglass and plastic reinforced cylinders. The tests involved shooting a single 30-caliber round at the cylinders and recording the results (Radian, 1986).

SECTION 2 SUMMARY OF MONITORING ACTIVITIES

Section 2 summarizes the Third Quarter 2013 and Fourth Quarter 2013 groundwater monitoring events conducted at the site. The results from these monitoring events are discussed in Section 3.

2.1 GROUNDWATER LEVEL MEASUREMENTS

Groundwater level measurements are collected at the site on a quarterly basis from all available wells. Water level measurements were proposed for 182 wells for the Third Quarter 2013 and Fourth Quarter 2013 monitoring events. During Third Quarter 2013, groundwater level measurements were collected from 175 monitoring wells between 13 August and 15 August 2013. During Fourth Quarter 2013, groundwater level measurements were collected from 173 monitoring wells between 4 November and 8 November 2013. Six wells (OW-05, OW-06, OW-07, P-06S, VRW-01 and VRW-02) were found to be dry during both monitoring events; a seventh well (MW-72C) was dry during Fourth Quarter 2013. Additionally, water level measurements were unable to be collected from monitoring well MW-108 during Third and Fourth Quarter 2013 and from monitoring well F33-TW01 during Fourth Quarter 2013 due to a blockage in each well caused by plant roots growing through the well screen. A tabulated summary of groundwater elevations for all the wells measured during the Third Quarter 2013 and Fourth Quarter 2013 monitoring events is presented in Table 3. Copies of the field data sheets from the water quality monitoring events are presented in Appendix B. A summary of well construction details is presented in Appendix C.

2.2 SURFACE WATER FLOW AND SAMPLING

The site is primarily drained by Potrero Creek, an ephemeral stream which follows the valley from north to south before turning southwest to pass through Massacre Canyon toward its convergence with the San Jacinto River. Potrero Creek is fed by local tributary drainages and storm water runoff from the city of Beaumont as well as from other ephemeral streams in the southern and eastern portions of the site. The largest of the tributary drainages is Bedsprings Creek, which is southwest of the former Rocket Motor Production Area (RMPA) and former Burn Pit Area (BPA). In general, creeks are dry except during and immediately after periods of rainfall. However, springs and seeps occur in and adjacent to Potrero Creek in the western portion of the site. Surface water flow is not continuous through most of Potrero Valley. In Massacre Canyon, although perennial surface water flow is present, during dryer periods surface water flow becomes limited to two reaches, 50 to 100 feet in length, along the western portion of the Northern Potrero Creek Area (NPCA) (Figure 3).

2.2.1 Surface Water Mapping Procedures

The areas in Potrero and Bedsprings creek where surface water was present were mapped during the Third Quarter 2013 and Fourth Quarter 2013 groundwater monitoring events. Mapping activities include plotting locations where surface water was encountered on a site map, collecting GPS coordinates, and determining whether the water was flowing or stagnant.

2.2.2 Stream Flow Measurement Procedures

If flowing water was observed in the stream bed, stream flow is estimated at four locations (SF-1 is located near Gilman Hot Springs at the southeast border of the site, SF-2 is near MW-67, SF-3 is near MW-15 and MW-18, and SF-4 is near MW-101) using a modified version of the method presented in *United States Environmental Protection Agency Volunteer Stream Monitoring: A Methods Manual* (USEPA, 1997). At each location, a section of the stream bed that is relatively straight for a distance of at least 20 feet is chosen for measurement. This 20-foot section is marked and width measurements taken at various points to determine the average width. Depth measurements are then collected at nine points along the width of the stream to determine the average depth of the stream. The average width and average depth measurements are then be multiplied together to estimate the channel cross-sectional area. Water velocity is then measured by releasing a float upstream and recording the time needed to traverse the 20-foot marked section. Three timed measurements are taken and averaged, and the length of the measured section is divided by the average time to obtain a velocity. This result is then multiplied by a correction factor of 0.9 to account for friction between the water and stream bed. The average cross-sectional area is then multiplied by the corrected average surface velocity to obtain the average flow in cubic feet of water per second through that section of the stream. The four stream flow measurement locations are shown on Figure 3.

2.2.3 Proposed and Actual Surface Water Sampling Locations

Surface water samples are collected semiannually during the second and fourth quarter sampling events from up to 21 fixed locations and one designated alternate surface water location (Figure 3). The designated alternate surface water location (SW-17) is sampled if flowing water is not encountered at the southern end of Massacre Canyon at Gilman Springs Road (SW-16). Additionally surface water samples are collected from up to 13 locations during a storm event.

During the Third Quarter 2013 monitoring event, no surface water samples were scheduled to be collected. During the Fourth Quarter 2013 monitoring event, 21 surface water sampling locations and one alternate surface water location were proposed for water quality monitoring. Seventeen surface water locations were dry and could not be sampled. The alternate surface water location (SW-17) was also dry and was not sampled. Therefore, water quality data were collected from four surface water sampling locations during this event. Table 2 lists the locations monitored for the Fourth Quarter 2013 monitoring event, analytical methods, sampling dates, and quality assurance/quality control (QA/QC) samples collected. Figure 4 illustrates the sampling locations for the Fourth Quarter 2013 monitoring event.

2.2.4 Surface Water Sampling Procedures

Surface water sampling locations were previously located using a global positioning system (GPS) and are marked in the field. Surface water samples were collected at these GPS-mapped locations either by using a disposable bailer with the sample transferred to the laboratory-supplied water sample containers, or by collecting the water sample directly in the laboratory-supplied water sample containers. Temperature, pH, electrical conductivity (EC), turbidity, oxidation-reduction potential (ORP), and dissolved oxygen (DO) were measured and recorded on field data sheets at surface water sampling locations.

2.3 GROUNDWATER SAMPLING

The Groundwater Monitoring Program includes quarterly, semiannual, annual, and biennial monitoring tasks as shown in Table 1. The table shows the well classification and the current approved sampling frequency for each well in the monitoring program. The annual and biennial events are larger major monitoring events, and the quarterly and semiannual events are smaller minor events. All new wells are sampled quarterly for one year after which a frequency for future sampling is proposed based on the well classification (i.e. the purpose of the well). Semiannual wells are sampled the second and fourth quarter of each year, annual wells are sampled the second quarter of each year, and biennial wells are sampled during the second quarter of even-numbered years. The frequency of groundwater monitoring depends on the well's classification in the network and intended monitoring purpose. A description of each well classification can be found in the *Revised Groundwater Sampling and Analysis Plan, Lockheed Martin Corporation, Beaumont Site 1, Beaumont, California* (Tetra Tech, 2003b). Sampling, analytical, and QA/QC procedures for the monitoring events are described in the *Programmatic Sampling and Analysis Plan, Lockheed Martin Corporation, Beaumont Sites 1 and 2, Beaumont, California* (Tetra Tech, 2010).

The groundwater monitoring schedule is reviewed and modified as necessary annually following the second quarter groundwater monitoring event. Modifications to the sampling schedule are made in accordance with the approved *Revised Groundwater Sampling and Analysis Plan* (Tetra Tech, 2003b). The First and Second Quarter 2013 sampling events followed the monitoring schedule proposed in the *Semiannual Groundwater Monitoring Report, First Quarter and Second Quarter 2012, Potrero Canyon, Lockheed Martin, Beaumont Site 1, Beaumont, California* (Tetra Tech, 2012), which was submitted to the California Department of Toxic Substances Control in October 2012, and was approved with no comments to the proposed schedule.

2.3.1 Proposed and Actual Well Locations Sampled

The Third Quarter 2013 monitoring event consisted of water level monitoring only, and no groundwater sampling was scheduled.

During the Fourth Quarter 2013 monitoring event, 13 monitoring wells were proposed for water quality monitoring. Additionally, one off-site private production well was sampled during the Fourth Quarter 2013 monitoring event. This well was originally scheduled for sampling during the Second Quarter 2013 event, but contact was unable to be made with the landowner to arrange access. Therefore, water quality data were collected from 13 monitoring wells and one private production well. Table 2 lists the locations monitored for the Fourth Quarter 2013 monitoring event, analytical methods, sampling dates, and QA/QC samples collected. Figure 4 illustrates the sampling locations for the Fourth Quarter 2013 monitoring event.

2.3.2 Groundwater Sampling Procedures

The following water quality field parameters were measured and recorded on field data sheets (Appendix B) during well purging: water level, temperature, pH, EC, turbidity, ORP, and DO. Groundwater samples were collected from monitoring wells by low-flow purging and sampling through dedicated double-valve pumps, a portable bladder pump, or a peristaltic pump.

Collection of water quality parameters started when at least one discharge hose/pump volume had been removed, and purging was considered complete when the above parameters had stabilized, or when the well was purged dry (evacuated). Stabilization of water quality parameters was used as an indication that representative formation water had entered the well and was being purged. The criteria for stabilization of these parameters are as follows: water level ± 0.1 foot, pH ± 0.1, EC ± 3 percent, turbidity < 10 nephelometric turbidity units (NTUs) (if > 10 NTUs ± 10%), DO ± 0.3 milligrams per liter (mg/L), and ORP ± 10 millivolts (mV). Sampling instruments and equipment were maintained, calibrated, and operated in accordance with the manufacturers' specifications, guidelines, and recommendations. If a well was purged dry, the well was sampled with a disposable bailer after sufficient recharge had taken place to allow sample collection.

Groundwater samples were collected in order of decreasing volatilization potential and placed in appropriate containers. A sample identification label was affixed to each sample container, and sample custody was maintained by chain-of-custody record. Samples collected were chilled and transported via courier to E.S. Babcock & Sons, Inc., a California-accredited analytical laboratory, thus maintaining proper temperatures and sample integrity. Trip blanks were collected for the monitoring events to assess cross-contamination potential of water samples while in transit in accordance with the *Programmatic Sampling and Analysis Plan* (Tetra Tech, 2010). Equipment blanks were collected when sampling with non-dedicated equipment to assess cross-contamination potential of water samples via sampling equipment.

2.4 ANALYTICAL DATA QA/QC

The samples were tested using approved United States Environmental Protection Agency (USEPA) methods. Since the analytical data were obtained by following USEPA-approved method criteria, the data were evaluated by using the USEPA-approved validation methods described in the National Functional Guidelines (USEPA, 2008 and 2010). The National

Functional Guidelines contain instructions on method-required quality control parameters and on how to interpret these parameters to confer validation to environmental data results.

Quality control parameters used in validating data results include holding times, field blanks, laboratory control samples, method blanks, duplicate environmental samples, spiked samples, and surrogate and spike recovery data.

2.5 HABITAT CONSERVATION

All monitoring activities were performed in accordance with the United States Fish and Wildlife Service (USFWS)-approved Habitat Conservation Plan (HCP) (USFWS, 2005) and subsequent clarifications (Lockheed Martin Corporation (LMC), 2006a, 2006b, and 2006c) of the HCP. Groundwater sampling activities were conducted with light-duty vehicles, and were supervised by a USFWS-approved biologist as specified in the Low Effect HCP.

SECTION 3 GROUNDWATER MONITORING RESULTS

Section 3 presents the results and interpretations of the Third Quarter 2013 and Fourth Quarter 2013 groundwater monitoring events. The following subsections include tabulated summaries of groundwater elevation and water quality data, contour maps, and primary chemicals of potential concern results. Plots of groundwater elevation versus time (hydrographs) and concentration versus time (time series graphs) for primary and secondary chemicals of potential concern are presented in Appendices D and E, respectively.

3.1 GROUNDWATER ELEVATION AND FLOW

Groundwater elevations during the Third Quarter 2013 and Fourth Quarter 2013 monitoring events ranged from approximately 2,151 feet mean sea level (msl) upgradient of the former Burn Pit Area (BPA) to approximately 1,790 feet msl in the Massacre Canyon Entrance Area (MCEA).

Monitoring wells that have previously been identified as artesian wells are fitted with pressure caps to prevent groundwater flow onto the ground surface, and pressure gauges for measurement of shut-in head for calculation of static water level. Groundwater elevations for the Third Quarter 2013 and Fourth Quarter 2013 monitoring events from wells screened in the alluvium and weathered Mount Eden formation (MEF) are shown on Figures 5 and 6, respectively. A tabulated summary of groundwater elevations for all the wells measured during the Third Quarter 2013 and Fourth Quarter 2013 monitoring events is presented in Table 3. Hydrographs for individual wells and for well groups are presented in Appendix D.

To correlate observed changes in groundwater levels with local precipitation, precipitation data are collected from the local weather station in Beaumont. During Third Quarter 2013, the Beaumont National Weather Service (NWS) reported approximately 0.71 inches of precipitation, and the average site-wide groundwater elevation decreased approximately 1.20 feet. During Fourth Quarter 2013, the Beaumont NWS reported approximately 2.27 inches of precipitation and the average site-wide groundwater elevation decreased approximately 0.73 feet. Generally the groundwater elevations in site wells show a one-to two-quarter lag before responding to seasonal precipitation except for wells located within or immediately adjacent to a drainage. Table 4 presents the range and average change in groundwater elevation by area. Figures 7 and 8 present elevation differences between the Second Quarter 2013 and Third Quarter 2013, and between the Third Quarter 2013 and Fourth Quarter 2013 groundwater monitoring events respectively.

Groundwater elevations and seasonal responses to changes in recharge for select shallow and deeper wells are shown on Figures 9 through 11. The selected wells represent a groundwater flow path from upgradient of the former BPA, through the former BPA, through the former Rocket Motor Production Area (RMPA), and southwestward (downgradient) through the Northern Potrero Creek Area (NPCA) and MCEA. Groundwater elevations in shallow wells (alluvium and shallow MEF) upgradient of the former BPA and at the former BPA show a rapid and significant response to rainfall, with a more dampened response observed farther out in the valley through the RMPA, NPCA, and MCEA (Figures 9 and 11). The deeper MEF and granitic/metasedimentary bedrock wells show a response very similar to the shallow wells during the periods of increased precipitation (Figure 10).

Groundwater flow directions from Third Quarter 2013 and Fourth Quarter 2013 (Figures 5 and 6, respectively) were similar to previously observed patterns for a dry period (Appendix A, Figure 2-7). Generally, groundwater flowed northwest from the southeastern limits of the valley (near the former BPA) beneath the former RMPA toward Potrero Creek, where groundwater flow then changed direction and began heading southwest, parallel to the flow of Potrero Creek, into Massacre Canyon.

3.2 GROUNDWATER GRADIENTS

Horizontal groundwater gradients are calculated using a segmented path from well to well that approximates the overall site flowline. The horizontal gradient is a measure of the change in the hydraulic head over a change in distance between wells (the slope of the water table). The overall horizontal groundwater gradient (approximating a flowline from MW-36, upgradient of the former BPA, through the former RMPA and NPCA to MW-18, in the MCEA) remained constant at 0.012 feet/foot between Third Quarter 2013 and Fourth Quarter 2013. Horizontal gradients are relatively high upgradient of the former BPA where recharge from Bedsprings Creek and the adjacent mountain areas enter the main valley. The gradients significantly decrease downgradient of the former BPA in the main valley, and then begin to increase again as groundwater flows from the main valley into the canyon just below the confluence of Bedsprings and Potrero creeks.

Vertical groundwater gradients are calculated from individual clusters of wells. Well clusters are used to measure the difference in static water level at different depths in the aquifer. The vertical gradient is a comparison of static water level between wells at different depths in the aquifer, and is an indication of the vertical flow (downward - negative gradient; upward - positive gradient) of groundwater. The vertical groundwater gradients at the site are generally negative in the former BPA, former RMPA, and NPCA, indicating areas of recharge, and they are positive in the MCEA, indicating an area of discharge.

Table 5 presents a summary of horizontal and vertical groundwater gradients. Appendix F provides a complete listing of historical horizontal and vertical groundwater gradients and associated calculations.

3.3 SURFACE WATER FLOW

During Third Quarter 2013 and Fourth Quarter 2013, Tetra Tech personnel walked the Potrero and Bedsprings creek riparian corridors to determine the presence, nature, and quantity of surface water in the creek beds. The locations where surface water was encountered were plotted in the field, global positioning system (GPS) coordinates were collected, and a determination was made whether the water was flowing or stagnant. If flowing water was encountered at the fixed stream flow measurement locations, SF-1 through SF-4, the flow rate was determined using a modified version of the *USEPA Volunteer Stream Monitoring: A Methods Manual* (USEPA, 1997).

A summary of the surface water flow rates is presented in Table 6. The measurement locations, the locations where surface water was encountered, and surface water flow rates (unless denoted as "Dry") are shown on Figures 12 and 13.

3.4 ANALYTICAL DATA SUMMARY

Summaries of validated laboratory analytical results for organic (volatile organic compounds [VOCs] and 1,4-dioxane) and inorganic (perchlorate) analytes detected above their respective method detection limits (MDLs) for the Fourth Quarter 2013 monitoring event are presented in Table 7. Appendix G provides a complete list of analytes tested, along with validated sample results by analytical method for this reporting period.

Sample results detected above the published California Department of Public Health maximum contaminant level (MCL) or the California Department of Public Health drinking water notification level (DWNL) are bolded in Table 7. Appendix H provides laboratory analytical data packages, which include environmental, field quality control (QC), and laboratory QC results, and Appendix I contains consolidated analytical data summary tables. Table 8 presents summary statistics of the organic and inorganic analytes detected during the Fourth Quarter 2013 monitoring events, respectively.

3.4.1 Data Quality Review

The quality control samples were reviewed as described in the *Programmatic Sampling and Analysis Plan, Lockheed Martin Corporation, Beaumont Sites 1 and 2, Beaumont, California* (Tetra Tech, 2010). The data for the groundwater sampling activities were contained in analytical data packages generated by E.S. Babcock and Sons Laboratories, Inc. These data packages were reviewed using the latest versions of the National Functional Guidelines for organic and inorganic data review (USEPA, 2008 and 2010).

Preservation criteria, holding times, field blanks, laboratory control samples, method blanks, duplicate environmental samples, spiked samples, and surrogate and spike recovery data were reviewed. Within each environmental sample the sample-specific quality control spike recoveries were examined. These data examinations included 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 matrix spiked/matrix spiked duplicates (MS/MSD) RPD results. Surrogate recoveries were examined for all organic compound analyses and compared to their control limits.

Environmental samples were analyzed by the following methods: EPA Method E332.0 for perchlorate; EPA Method SW8270C SIM for 1,4-dioxane; and EPA Methods E524.2 or SW8260B for VOCs.

Unless otherwise noted below, all data results met required criteria, were of known precision and accuracy, did not require qualification, and may be used as reported.

Method E332.0 for perchlorate had field duplicate RPD errors that caused 10.5 percent (2 samples out of 19 samples) of the total E332.0 data to be qualified as estimated. The data qualified as estimated are usable for the intended purpose.

3.5 CHEMICALS OF POTENTIAL CONCERN

The identification of chemicals of potential concern is an ongoing process that takes place annually as part of the second quarter sampling. The purpose of identifying chemicals of potential concern is to establish a list of analytes that best represents the extent and magnitude of affected groundwater and to focus more detailed analysis on only those analytes. The analytes were organized and evaluated in two groups, organic and inorganic, and divided into primary and secondary chemicals of potential concern. Table 7 presents summaries of the organic and inorganic analytes detected during the Fourth Quarter 2013 monitoring event.

The chemical of potential concern process does not eliminate analytes from testing but does reduce the number of analytes that are evaluated and discussed during reporting. Testing for all of the secondary chemicals of potential concern will continue in future monitoring events because of their association with other analytes that are listed as primary chemicals of potential concern. However, these secondary chemicals of potential concern are detected on a more limited or inconsistent basis, and/or their detection falls below a regulatory threshold. Therefore, the secondary chemicals of potential concern will not be discussed in the later sections of this report. Testing and annual screening of the standard list of analytes for each method will continue to ensure that the appropriate chemicals of potential concern are being identified and evaluated as specified in the *Programmatic Sampling and Analysis Plan, Lockheed Martin Corporation, Beaumont Sites 1 and 2, Beaumont, California* (Tetra Tech, 2010).

3.5.1 Identification of Chemicals of Potential Concern

Chemicals of potential concern have been selected to include compounds that are consistently detected in groundwater at concentrations above regulatory limits and that can be used to assess the extent of affected groundwater. Primary chemicals of potential concern are parent products such as trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA), and are always present with a secondary chemicals of potential concern. Secondary chemicals of potential concern are breakdown products such as 1,1-dichloroethane (1,1-DCA) and 1,1-dichloroethene (1,1-DCE), and are detected at lower concentrations than their parent products. At this site 1,1-DCE, a breakdown product of 1,1,1-TCA, is detected at higher concentrations than 1,1,1-TCA, so 1,1-DCE is considered the primary chemical of potential concern, and 1,1,1-TCA is considered a secondary chemical of potential concern.

As discussed above, identification of the chemicals of potential concern analysis is intended to streamline and focus the evaluation of the contaminant data collected during monitoring events. It is not intended to trivialize or dismiss the analytes screened out as part of the process. Therefore, to ensure that all analytes detected receive the proper attention, this chemical of potential concern analysis is performed annually.

An annual evaluation of chemicals of potential concern based on the results of the Second Quarter 2012 water quality monitoring event was presented in the First and Second Quarter 2012 *Semiannual Groundwater Monitoring Report* (Tetra Tech, 2012). Based on the results of water quality monitoring and the screening of those results against the existing chemicals of potential concern, the MCLs, and DWNLs, no additional chemicals of potential concern were identified, nor was there evidence for removing an analyte from the existing list of chemicals of potential concern. Table 9 presents those groundwater analytes that have been identified as chemicals of potential concern. Time-series graphs of primary and secondary chemicals of potential concern are provided in Appendix E.

3.6 DISTRIBUTION OF THE PRIMARY CHEMICALS OF POTENTIAL CONCERN

The Fourth Quarter 2013 monitoring event is a minor event. Only guard wells, wells with increasing contaminant trends, and surface water locations were sampled and tested during this event (Tetra Tech, 2003b). Additionally, one off-site private production well was sampled during the Fourth Quarter 2013 monitoring event. No monitoring wells or surface water locations were scheduled to be sampled during the Third Quarter monitoring event. Figure 14 presents the primary chemicals of potential concern sampling results for the wells sampled during the Fourth Quarter 2013 monitoring event. Figure 15 illustrates the extent of the primary chemicals of potential concern based on the recent data.

3.6.1 Guard Wells

Four monitoring wells are designated as guard wells: MW-15, MW-18, MW-67, and MW-100. MW-15 and MW-18 are a clustered well pair upstream of the Large Motor Washout Area (Feature F-33). All guard wells are located along Potrero Creek, downgradient of the former BPA and former RMPA. The analyte 1,4-dioxane was detected above the DWNL in monitoring wells MW-15 and MW-18. No other chemicals of potential concern were detected above the MCL or DWNL during the Fourth Quarter 2013 sampling event. Sample results for the guard wells from Fourth

Quarter 2013 are consistent with results from previous sampling events. A summary of the guard well sample results from Fourth Quarter 2013 and previous sampling events can be found in Table 10.

3.6.2 Increasing Trend Wells

During the Second Quarter 2012 statistical trend analyses, (Tetra Tech, 2012), 25 monitoring wells were designated as having increasing or probably increasing trends. Based on the magnitude of the trend and the wells' locations, eight of these wells were included in the Fourth Quarter 2013 semiannual sampling event. The portion of the site where these wells are located, the location identification, and the chemicals of potential concern that have the increasing trend are listed below:

Two wells are located in the BPA.

- MW-59A: perchlorate, TCE, 1,1-DCE, and 1,4-dioxane
- MW-60B: TCE and 1,4-dioxane

Two wells are located in the RMPA.

- MW-68: perchlorate, 1,1-DCE,and 1,4-dioxane
- MW-75: perchlorate
- MW-98B: TCE and 1,1-DCE

Two wells are located in the NPCA.

- MW-103: perchlorate
- MW-104: TCE

One well is located in the MCEA.

- MW-93: perchlorate

These increasing trend wells were chosen based on the Second Quarter 2012 trend analyses, and may change pending approval of the *Semiannual Groundwater Monitoring Report, First Quarter and Second Quarter 2013, Potrero Canyon, Lockheed Martin, Beaumont Site 1, Beaumont, California* (Tetra Tech, 2013). Table 11 presents a summary of the detected chemicals of potential concern reported in increasing trend well samples collected during Fourth Quarter 2013, and previous monitoring events.

3.6.3 Surface Water

During Fourth Quarter 2013, surface water samples were collected from four locations (SW-02, SW-03, SW-09, and SW-18) along the Potrero and Bedsprings creek drainages. The remaining 17 locations were dry at the time of sampling. Because surface water location SW-16 was dry, an attempt was made to collect a sample from the alternate location SW-17, but it was also dry. The four primary chemicals of potential concern (1,4-dioxane, 1,1-DCE, TCE, and perchlorate) and two secondary chemicals of potential concern (1,1-DCA and cis-1,2-dichloroethene) were detected in samples collected from surface water locations SW-02 and SW-03. Perchlorate and 1,4-dioxane were detected in both samples above their respective MCL and DWNL. Additionally, 1,1-DCE and TCE were detected above their respective MCL in the sample from SW-02. These two samples (SW-02 and SW-03) were collected from springs and/or manmade surface depressions fed by nearby springs located outside of the stream beds but near the intersection of Bedsprings and Potrero creeks.

1,4-dioxane was detected above the DWNL of 1 microgram per liter (µg/L) in the surface water samples collected from locations SW-09 and SW-18. 1,1-DCE and TCE were detected below the MCL in the sample collected from SW-09. These samples were collected from water flowing in Potrero Creek and are topographically downgradient of the springs discussed in the previous paragraph. Figure 14 presents concentrations of chemicals of potential concern reported in surface water samples collected from the Fourth Quarter 2013 monitoring event.

In general, the concentration of chemicals of potential concern in surface water is highest in the area of the surface depressions, which is an area of discharging groundwater; the concentration decreases rapidly to at or near the MDL, as one moves downgradient through the riparian zone toward the property boundary. The concentration gradient of 1,4-dioxane in surface water samples, however, is much smaller and appears to be less affected by movement through the primary contaminant attenuation area near the intersection of Bedsprings and Potrero creeks. Table 12 presents a summary of the detected chemicals of potential concern reported in surface samples collected during Fourth Quarter 2013.

3.6.4 Off-site Private Production Wells

One off-site private production well, located upgradient of the site, was sampled during the Fourth Quarter 2013 sampling event. The well was originally scheduled to be sampled during the Second Quarter 2013 monitoring event, but the landowner was unable to be contacted to arrange access after numerous attempts. Samples were analyzed for VOCs by EPA Method E524.2, for 1,4-dioxane by EPA Method SW8270C SIM, and for perchlorate by EPA Method E332.0. No site chemicals of potential concern were detected in the sample collected from the off-site private production well.

3.7 HABITAT CONSERVATION

Consistent with the United States Fish and Wildlife Service (USFWS) approved Habitat Conservation Plan (HCP) (USFWS, 2005) and subsequent clarifications (LMC, 2006a, 2006b, and 2006c) of the HCP describing activities for environmental remediation at the site, field activities were performed under the supervision of a USFWS-approved biologist. No impact to the Stephens' kangaroo rat occurred during the performance of field activities related to the Third Quarter 2013 and Fourth Quarter 2013 monitoring events.

SECTION 4 SUMMARY AND CONCLUSIONS

This section summarizes the results of the Third Quarter 2013 and Fourth Quarter 2013 groundwater monitoring events.

4.1 GROUNDWATER ELEVATIONS

Groundwater elevation differences in all wells from quarter to quarter appear to depend on the short- and long-term weather patterns. In general, the greatest differences in quarterly groundwater elevations occur during periods of seasonal precipitation. Wells in the Northern Potrero Creek Area and the Massacre Canyon Entrance Area appear to respond most quickly to precipitation compared to the former Burn Pit Area and former Rocket Motor Production Area, which generally show a one- to two-quarter lag before responding to seasonal precipitation. However, wells near Bedsprings Creek just south of the Burn Pit Area also show rapid responses to precipitation due to surface water infiltration and mountain front recharge. The response also diminishes in each area with depth and distance from the Potrero and Bedsprings creeks. The site has experienced overall groundwater level declines since 2005.

4.2 GROUNDWATER FLOW AND GRADIENTS

Groundwater flow directions from Third Quarter 2013 and Fourth Quarter 2013 were similar to previously observed patterns for a dry period. Generally, groundwater flows northwest from the southeastern limits of the valley (near the former Burn Pit Area) beneath the former Rocket Motor Production Area, toward Potrero Creek, where groundwater flow then changes direction and begins heading southwest, parallel to the flow of Potrero Creek, into Massacre Canyon.

In general the horizontal gradient was lowest between the former Burn Pit Area and the former Rocket Motor Production Area, with an increased flow through the Northern Potrero Creek Area and the Massacre Canyon Entrance Area. The flattening of the gradient in the former Burn Pit Area and former Rocket Motor Production Area appears to be attributable to the lithology, aquifer transmissivity, and aquifer thickness in these areas.

Vertical groundwater gradients between shallow and deeper monitoring well pairs are generally downward (negative) in the former Burn Pit Area, former Rocket Motor Production Area, and the Northern Potrero Creek Area, and upward (positive) in the Massacre Canyon Entrance Area. The response to seasonal changes in groundwater recharge, although dampened by depth, are consistent within the different vertical well pairs installed at the site. This suggests that there is vertical hydraulic communication within the aquifer.

4.3 SURFACE WATER FLOW RESULTS

During the Third Quarter 2013 and Fourth Quarter 2013, Tetra Tech personnel walked the Potrero and Bedsprings creek riparian corridors to determine the presence, nature, and quantity of surface water in the creek beds. The four fixed stream locations previously chosen for stream flow measurements were dry during both quarters so an average site flow rate could not be calculated.

4.4 WATER QUALITY

An evaluation of chemicals of potential concern is performed annually, and reported in the First and Second Quarter Semiannual Groundwater Monitoring Report. The primary chemicals of potential concern previously identified for the site during the 2012 evaluation, (Tetra Tech, 2012), were perchlorate, 1,1-dichloroethene, trichloroethene, and 1,4-dioxane. The secondary chemicals of potential concern identified for the site during the 2012 evaluation were 1,1-dichloroethane, 1,2-dichloroethane, 1,1,1-trichloroethane, 1,1,2-trichloroethane, cis-1,2-dichloroethene, and vinyl chloride. The 2013 evaluation yielded no additions or deletions to the list of chemicals of potential concern. The results of surface and groundwater samples collected and tested during the Fourth Quarter 2013 monitoring event are discussed below.

4.4.1 Surface Water Sampling Results

During the Fourth Quarter 2013 sampling event, surface water samples were collected from four locations. The remaining 17 locations were dry at the time of sampling. Because surface water location SW-16 was dry, an attempt was made to collect a sample from the alternate location SW-17, but it was also dry and therefore not sampled. The sample results from the locations sampled are consistent with previous sample results obtained at the site.

4.4.2 Off-Site Private Production Well Sampling Results

A sample from a selected off-site private production well was collected as part of the Fourth Quarter 2013 monitoring event. No chemicals of potential concern were detected in the downgradient private production well that was sampled. Historically, no site chemicals of potential concern have been detected in the off-site private production wells. The private production wells will continue to be monitored annually during the second quarter sampling event.

4.4.3 Groundwater

Groundwater monitoring wells were sampled during the fourth quarter. The fourth quarter event included the semiannual sampling of guard wells and increasing trend wells (Tetra Tech, 2003b).

Guard Wells

Guard wells MW-15, MW-18, MW-67, and MW-100 were sampled during the Fourth Quarter 2013 sampling event. Sample results for the guard wells are generally consistent with results from previous sampling events and appear to indicate that the plumes are not expanding. Historically, 1,4-dioxane and perchlorate are the only chemicals of potential concern to be detected above the maximum contaminant level or drinking water notification level in guard wells. During the Fourth Quarter 2013 sampling event 1,4-dioxane was detected above the drinking water notification level of 1 µg/L in guard wells, MW-15 and MW18. These wells are located along Potrero Creek upgradient of the Large Rocket Motor Washout Area (F-33). 1,4 Dioxane was detected below the drinking water notification level in guard wells MW-67, located downgradient of known site activity areas, and MW-100, located offsite, downgradient of Massacre Canyon (Figure 4). Perchlorate has not been detected above the maximum contaminate level of 6 µg/L in guard wells since May 2008. A summary of recent sample results from the guard wells can be found in Table 10.

Increasing Trend Monitoring Wells

The number of increasing or probably increasing trend wells has increased from 25 wells and one surface water location in 2012 to 29 wells and two surface water locations in 2013. Six of the 29 increasing or probably increasing trend wells are ports in the Water FLUTe™ multilevel monitoring system, for which insufficient data were available to run statistics in 2012. During this period the percentage of locations identified as having either a decreasing or probably decreasing trend has remained the same.

Possible reasons for the change in the number of increasing trend wells are the following:

1. With an increase in the amount of data for the individual locations, the trends become more noticeable due to the ability to better define outliers.
2. The site groundwater extraction, treatment, and reinjection system was shut down in late 2002. As time passes, potential influence from the former extraction and reinjection wells become less noticeable as the groundwater flow patterns return to a normal state.
3. Nine new wells were installed in the former Burn Pit Area in late 2011 to help characterize the Mount Eden sandstone and contaminant concentrations with depth, and to provide additional hydraulic data to support the evaluation of remedial alternatives at the site. Six of these wells had increasing trends which appears to be a result of the wells not reaching equilibrium yet. The very low permeability sandstone matrix in which these wells were installed delays the time required to reach equilibration, since the natural groundwater flow near the wells is extremely slow.

In general, the plume morphology has not changed, and most of the wells and the surface water locations are either non-detect for chemicals of potential concern, display a stable trend, or show no trend.

4.5 PROPOSED CHANGES TO THE GROUNDWATER MONITORING PROGRAM

4.5.1 Groundwater Sampling Frequency

The sampling frequency of a monitoring well is based on the well's classification (i.e., its function) (Tetra Tech, 2003b). Groundwater monitoring well classifications are based on the evaluation of the temporal trends, spatial distribution, and other qualitative criteria. There are seven different well classifications. Currently no wells are designated as remedial monitoring wells, because a final remedy has not yet been selected for the site. A summary of the sampling frequency by well classification is presented in Table 13.

4.5.2 Proposed Changes

The analytical scheme is evaluated annually during the second quarter of each year, and changes may be proposed then to accommodate expanded site knowledge or changing site conditions. The classification of the wells in the network and their corresponding sampling frequency are also evaluated annually during the second quarter of each year, and are modified as needed. No unusual events or observations occurred during the fourth quarter reporting period that require consideration of modifying the monitoring program.

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TABLES

Table 1 2013 Water Quality Monitoring Locations and Sampling Frequency

Monitoring Well	Classification	1st Quarter 2013 to 4th Quarter 2013 Monitoring Program																								
		VOCs (EPA SW8260B or E524.2)					Perchlorate (EPA E332.0)					1,4-Dioxane (EPA SW8270C SIM)					CA Parameters (various methods)					Lead (EPA 6020)				
		2013					2013					2013					2013					2013				
		1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI
Surface Water Locations																										
SW-01	-		●		●			●		●			●		●											
SW-02	-		●		●			●		●			●		●											
SW-03	-		●		●			●		●			●		●											
SW-04	-		●		●			●		●			●		●											
SW-06	-	●	●		●		●	●		●		●	●		●											
SW-07	-	●	●		●		●	●		●		●	●		●											
SW-08	-		●		●			●		●			●		●											
SW-09	-	●	●		●		●	●		●		●	●		●											
SW-10	-	●	●		●		●	●		●		●	●		●											
SW-11	-	●	●		●		●	●		●		●	●		●											
SW-12	-	●	●		●		●	●		●		●	●		●											
SW-13	-	●	●		●		●	●		●		●	●		●											
SW-14	-	●	●		●		●	●		●		●	●		●											
SW-15	-	●	●		●		●	●		●		●	●		●											
SW-16	-	●	●		●		●	●		●		●	●		●											
SW-16B	-	●	●		●		●	●		●		●	●		●											
SW-17 (alternate)	-																									
SW-18	-	●	●		●		●	●		●		●	●		●											
SW-19	-	●	●		●		●	●		●		●	●		●											
SW-20	-		●		●			●		●			●		●											
SW-21	-		●		●			●		●			●		●											
SW-22	-		●		●			●		●			●		●											
Private Production Wells																										
PPW1	-		●					●					●													
PPW2	-		●					●					●													
PPW3	-		●					●					●													
PPW4	-		●					●					●													
Monitoring Wells																										
EW-13	PM		●					●					●													
F33-TW2	PM/CA		●					●					●					●								
F33-TW3	PM/CA		●					●					●					●								
F33-TW6	PM/CA		●					●					●					●								
F33-TW7	PM		●					●					●													
F34-TW1	PM/CA		●					●					●					●								
IW-04	PM		●					●					●													
MW-01	V					●					●					●										
MW-02	PM					●					●					●										
MW-03	V					●					●					●										
MW-05	PM/CA		●					●					●					●								
MW-06	V					●					●					●										
MW-07	PM		●					●					●													
MW-08	V/CA		●					●					●					●								
MW-09	PM		●					●					●													
MW-11	PM					●					●					●										
MW-12	PM					●					●					●										
MW-13	PM/CA		●					●					●					●								
MW-14	PM		●					●					●													
MW-15	G		●		●			●		●			●		●											
MW-17	PM		●					●					●													
MW-18	G		●		●			●		●			●		●											
MW-19	PM		●					●					●													
MW-22	PM		●					●					●													
MW-23	V					●					●					●										
MW-26	PM		●					●					●													
MW-27	PM					●					●					●										
MW-28	PM		●					●					●													
MW-29	PM		●					●					●													
MW-31	V					●					●					●										
MW-32	V					●					●					●										
MW-34	PM		●					●					●													
MW-35	PM		●					●					●													
MW-36	PM		●					●					●													
MW-40	PM		●					●					●													
MW-43	V/CA		●					●					●					●								
MW-45	PM		●					●					●													
MW-46	PM		●					●					●													
MW-47	PM					●					●					●										
MW-48	V/CA		●					●					●					●								
MW-49	PM					●					●					●										
MW-53	PM		●					●					●													
MW-54	PM		●					●					●													
MW-55	V					●					●					●										
MW-56A	V					●					●					●										
MW-56B	V					●					●					●										

Table 1 Water Quality Monitoring Locations and Sampling Frequency (continued)

Monitoring Well	Classification	1st Quarter 2013to 4th Quarter 2013 Monitoring Program																								
		VOCs (EPA SW8260B or E524.2)					Perchlorate (EPA E332.0)					1,4-Dioxane (EPA SW8270C SIM)					CA Parameters (various methods)					Lead (EPA 6020)				
		2013					2013					2013					2013					2013				
		1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI
MW-56C	PM		●					●					●													
MW-59A	V / I		●		●			●		●			●		●											
MW-59B	PM		●					●					●													
MW-59D	V					●					●					●										
MW-60A	V					●					●					●										●
MW-60B	PM/I		●		●			●		●			●		●											
MW-61A	V					●					●					●										
MW-61B	PM		●					●					●													
MW-61C	V					●					●					●										
MW-62A	PM					●					●					●										
MW-66	PM		●					●					●													
MW-67	G		●		●			●		●			●		●											
MW-68	PM/I		●		●			●		●			●		●											
MW-69	PM					●					●					●										
MW-70	PM/CA		●					●					●					●								
MW-71A	V					●					●					●										
MW-71B	PM		●					●					●													
MW-71C	PM					●					●					●										
MW-72A	V					●					●					●										
MW-72B	PM					●					●					●										
MW-72C	V					●					●					●										
MW-73A	V					●					●					●										
MW-73B	PM					●					●					●										
MW-73C	V					●					●					●										
MW-74A	V					●					●					●										
MW-74B	V					●					●					●										
MW-74C	PM					●					●					●										
MW-75A	V					●					●					●										
MW-75B	PM					●					●					●										
MW-75C	V/I		●		●			●		●			●		●											
MW-76A	V					●					●					●										
MW-76B	PM/CA		●					●					●					●								
MW-76C	V					●					●					●										
MW-77A	V					●					●					●										
MW-77B	PM		●					●					●													
MW-78	V					●					●					●										
MW-79A	V					●					●					●										
MW-79C	V					●					●					●										
MW-80	V					●					●					●										
MW-81	V					●					●					●										
MW-82	PM		●					●					●													
MW-83	PM		●					●					●													
MW-84A	V					●					●					●										
MW-84B	V					●					●					●										
MW-85A	V					●					●					●										
MW-85B	PM		●					●					●													
MW-86A	V					●					●					●										
MW-86B	PM/CA		●					●					●					●								
MW-87A	V					●					●					●										
MW-87B	PM		●					●					●													
MW-88	PM		●					●					●													
MW-89	PM		●					●					●													
MW-90	PM		●					●					●													
MW-91	PM		●					●					●													
MW-92	PM		●					●					●													
MW-93	PM/I		●		●			●		●			●		●											
MW-94	PM		●					●					●													
MW-95	PM		●					●					●													
MW-96	PM					●					●					●										
MW-97	PM					●					●					●										
MW-98A	V					●					●					●										
MW-98B	PM/I		●		●			●		●			●		●											
MW-99	V					●					●					●										
MW-100	G		●		●			●		●			●		●											
MW-101	PM/CA		●					●					●					●								
MW-102	PM/CA		●					●					●					●								
MW-103	PM/CA/I		●		●			●		●			●		●			●								
MW-104	PM/CA/I		●		●			●		●			●		●			●								
MW-105	PM/CA		●					●					●					●								
MW-106	PM/CA		●					●					●					●								
MW-107	PM/CA		●					●					●					●								
MW-108	PM		●					●					●													
MW-109	PM/CA		●					●					●					●								
MW-110	N	●	●	●	●		●	●	●	●		●	●	●	●											
MW-111A	N	●	●	●	●		●	●	●	●		●	●	●	●											

Table 1 Water Quality Monitoring Locations and Sampling Frequency (continued)

Monitoring Well	Classification	1st Quarter 2013 to 4th Quarter 2013 Monitoring Program																								
		VOCs (EPA SW8260B or E524.2)					Perchlorate (EPA E332.0)					1,4-Dioxane (EPA SW8270C SIM)					CA Parameters (various methods)					Lead (EPA 6020)				
		2013					2013					2013					2013					2013				
		1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI	1Q	2Q	3Q	4Q	BI
MW-111B	N	●	●	●	●		●	●	●	●		●	●	●	●											
MW-111C	N	●	●	●	●		●	●	●	●		●	●	●	●											
MW-111D	N	●	●	●	●		●	●	●	●		●	●	●	●											
MW-111E	N	●	●	●	●		●	●	●	●		●	●	●	●											
MW-112A	N	●	●	●	●		●	●	●	●		●	●	●	●											
MW-112B	N	●	●	●	●		●	●	●	●		●	●	●	●											
MW-112C	N	●	●	●	●		●	●	●	●		●	●	●	●											
OW-01	PM					●					●					●										
OW-02	PM/CA		●					●					●					●								
OW-08	PM					●					●					●										
P-02	PM/CA		●					●					●					●								
P-03	PM		●					●					●													
P-05	PM		●					●					●													
Monitoring Wells (Not Sampled)																										
MW-04	R																									
MW-10	R																									
MW-20	R																									
MW-21	R																									
MW-24	R																									
MW-30	R																									
MW-37	R																									
MW-38	R																									
MW-39	R																									
MW-41	R																									
MW-42	R																									
MW-44	R																									
MW-50	R																									
MW-51	R																									
MW-52	R																									
MW-56D	R																									
MW-57A	R																									
MW-57B	R																									
MW-57C	R																									
MW-57D	R																									
MW-58A	R																									
MW-58B	R																									
MW-58C	R																									
MW-58D	R																									
MW-59C	R																									
MW-61D	R																									
MW-62B	R																									
MW-63	R																									
MW-64	R																									
MW-65	R																									
OW-03	R																									
OW-05	R																									
OW-06	R																									
OW-07	R																									
P-04	R																									
P-06D	R																									
P-06S	R																									
IW-01	R																									
IW-02	R																									
IW-03	R																									
IW-05	R																									
EW-01	R																									
EW-02	R																									
EW-08	R																									
EW-09	R																									
EW-10	R																									
EW-11	R																									
EW-12	R																									
EW-14	R																									
EW-15	R																									
EW-16	R																									
EW-18	R																									
EW-19	R																									
EW-20	R																									
Totals		22	106	9	42	53	22	106	9	42	53	22	106	9	42	53	0	22	0	0	0	0	0	0	0	1
		232					**232**					**232**					**22**					**1**				

Notes:

EPA -	United States Environmental Protection Agency	G -	Guard well	R -	Redundant well
VOCs -	Volatile organic compounds	I -	Increasing contaminant trend well	RW -	Remedial well
CA -	Contaminant attenuation	N -	New well	V -	Vertical distribution well
BI -	Biennial, wells sampled in even numbered years	PM -	Plume monitoring	-	

Table 2 Sampling Schedule - Fourth Quarter 2013

Sampling Location	Sample Date	VOCs (1)	1,4-Dioxane (2)	Perchlorate (3)	Comments and QA / QC Samples
SW-01	-	-	-	-	Surface Water - Dry no sample collected
SW-02	11/08/13	X	X	X	Surface Water
SW-03	11/08/13	X	X	X	Surface Water, Duplicate Sample SW-03-Dup
SW-04	-	-	-	-	Surface Water - Dry no sample collected
SW-06	-	-	-	-	Surface Water - Dry no sample collected
SW-07	-	-	-	-	Surface Water - Dry no sample collected
SW-08	-	-	-	-	Surface Water - Dry no sample collected
SW-09	11/11/13	X	X	X	Surface Water
SW-10	-	-	-	-	Surface Water - Dry no sample collected
SW-11	-	-	-	-	Surface Water - Dry no sample collected
SW-12	-	-	-	-	Surface Water - Dry no sample collected
SW-13	-	-	-	-	Surface Water - Dry no sample collected
SW-14	-	-	-	-	Surface Water - Dry no sample collected
SW-15	-	-	-	-	Surface Water - Dry no sample collected
SW-16	-	-	-	-	Surface Water - Dry no sample collected
SW-16B	-	-	-	-	Surface Water - Dry no sample collected
SW-17	-	-	-	-	Surface Water - Dry no sample collected
SW-18	11/08/13	X	X	X	Surface Water, MS/MSD Sample
SW-19	-	-	-	-	Surface Water - Dry no sample collected
SW-20	-	-	-	-	Surface Water - Dry no sample collected
SW-21	-	-	-	-	Surface Water - Dry no sample collected
SW-22	-	-	-	-	Surface Water - Dry no sample collected
PPW-1-4	12/20/13	X	X	X	Private Production Well
MW-15	11/11/13	X	X	X	Sample with Dedicated Pump
MW-18	11/11/13	X	X	X	Sample with Dedicated Pump, Duplicate MW-18-Dup
MW-59A	11/13/13	X	X	X	Sample with Dedicated Pump
MW-60B	11/13/13	X	X	X	Sample with Dedicated Pump
MW-67	11/11/13	X	X	X	Sample with Dedicated Pump
MW-68	11/14/13	X	X	X	Sample with Dedicated Pump
MW-75C	11/13/13	X	X	X	Sample with Dedicated Pump
MW-93	11/11/13	X	X	X	Sample with Dedicated Pump
MW-98B	11/13/13	X	X	X	Sample with Dedicated Pump
MW-100	11/11/13	X	X	X	Sample with Dedicated Pump
MW-103	11/13/13	X	X	X	Sampled with Peristaltic Pump
MW-104	11/13/13	X	X	X	Sampled with Peristaltic Pump
MW-106	11/14/13	X	X	X	Sampled with Peristaltic Pump

Total Sampling Locations: 36

Total Samples Collected: 18

Notes:

(grey shading)	Well not sampled or surface water sample not collected.
(1) -	Volatile organic compounds (VOCs) analyzed by EPA Method SW8260 B or E524.2.
(2) -	1,4 - Dioxane analyzed by EPA Method SW8270C SIM
(3) -	Perchlorate analyzed by EPA Method E332.0
NA -	Not analyzed.
MS/MSD -	Matrix Spike / Matrix Spike Duplicate.

Table 3 Groundwater Elevation - Third Quarter 2013 and Fourth Quarter 2013

Well ID	Site Area	Formation Screened	Measuring Point Elevation (feet msl)	Third Quarter 2013				Fourth Quarter 2013			
				Date Measured	Depth to Water (feet BTOC)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from Second Quarter 2013	Date Measured	Depth to Water (feet BTOC)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from Third Quarter 2013
EW-01	RMPA	QAL	2142.62	08/16/13	42.44	2100.18	-1.17	11/6/2013	43.35	2099.27	-0.91
EW-02	RMPA	QAL	2126.15	08/16/13	27.83	2098.32	-1.00	11/6/2013	28.64	2097.51	-0.81
EW-08	BPA	MEF	2178.40	08/15/13	74.40	2104.02	-1.22	11/7/2013	75.28	2103.14	-0.88
EW-09	BPA	MEF	2179.67	08/15/13	76.09	2103.58	-1.18	11/7/2013	77.04	2102.63	-0.95
EW-10	BPA	MEF	2180.19	08/15/13	76.33	2103.90	-1.20	11/7/2013	77.33	2102.90	-1.00
EW-11	BPA	MEF	2182.09	08/15/13	77.37	2104.63	-1.19	11/7/2013	78.36	2103.64	-0.99
EW-12	BPA	MEF	2183.28	08/15/13	79.42	2103.74	-1.22	11/7/2013	80.40	2102.76	-0.98
EW-13	BPA	MEF	2185.57	08/15/13	81.40	2104.17	-1.23	11/7/2013	82.53	2103.04	-1.13
EW-14	BPA	QAL/MEF	2184.59	08/15/13	80.75	2103.85	-1.20	11/7/2013	81.85	2102.75	-1.10
EW-15	BPA	MEF	2184.10	08/15/13	78.75	2105.08	-1.14	11/7/2013	79.89	2103.94	-1.14
EW-16	BPA	MEF	2185.52	08/15/13	80.51	2105.02	-1.28	11/7/2013	81.61	2103.92	-1.10
EW-17	BPA	MEF	2179.04	08/15/13	77.20	2101.84	-1.20	11/7/2013	78.15	2100.89	-0.95
EW-18	BPA	MEF	2184.98	08/15/13	78.60	2106.45	-1.20	11/7/2013	79.73	2105.32	-1.13
EW-19	MCEA	QAL	2033.89	08/14/13	41.13	1992.76	-1.82	11/7/2013	42.41	1991.48	-1.28
EW-20	BPA	MEF	2187.45	08/15/13	81.39	2106.06	-1.28	11/7/2013	82.55	2104.90	-1.16
F33-TW2	NPCA	QAL	1959.75	08/15/13	9.50	1950.25	-2.27	11/4/2013	9.85	1949.90	-0.35
F33-TW6	NPCA	QAL	1950.62	08/15/13	9.58	1941.04	-1.72	11/4/2013	9.71	1940.91	-0.13
F33-TW7	NPCA	QAL	NA	08/13/13	11.61	NA	NA	11/4/2013	11.21	NA	NA
F34-TW1	MCEA	QAL	1894.08	08/13/13	6.92	1887.16	-1.23	11/4/2013	Blockage in Well	NA	NA
IW-01	RMPA	QAL	2160.73	08/14/13	59.25	2101.48	-0.13	11/5/2013	61.21	2099.52	-1.96
IW-02	RMPA	QAL	2155.01	08/14/13	54.68	2100.33	-1.14	11/5/2013	55.63	2099.38	-0.95
IW-03	RMPA	QAL	2132.86	08/14/13	37.97	2094.89	-0.67	11/5/2013	38.55	2094.31	-0.58
IW-04	RMPA	QAL	2135.09	08/14/13	41.20	2093.89	-1.01	11/5/2013	41.24	2093.85	-0.04
IW-05	RMPA	QAL	2136.94	08/14/13	42.65	2094.29	-0.64	11/5/2013	43.20	2093.74	-0.55
MW-01	RMPA	MEF	2176.98	08/14/13	76.51	2100.47	-1.18	11/5/2013	77.43	2099.55	-0.92
MW-02	RMPA	MEF	2170.10	08/15/13	68.81	2101.29	-1.15	11/8/2013	69.77	2100.33	-0.96
MW-03	RMPA	MEF	2169.36	08/15/13	127.96	2041.40	-0.87	11/8/2013	128.70	2040.66	-0.74
MW-04	RMPA	QAL	2160.02	08/15/13	58.76	2101.26	-1.17	11/8/2013	59.71	2100.31	-0.95
MW-05	RMPA	QAL	2121.40	08/14/13	23.50	2097.90	-0.79	11/6/2013	24.31	2097.09	-0.81
MW-06	RMPA	QAL	2121.76	08/14/13	26.73	2095.03	-0.90	11/6/2013	27.51	2094.25	-0.78
MW-07	BPA	QAL	2176.52	08/14/13	75.86	2100.66	-1.13	11/5/2013	76.83	2099.69	-0.97
MW-08	NPCA	QAL	2090.53	08/14/13	15.71	2074.82	-1.03	11/7/2013	16.39	2074.14	-0.68
MW-09	NPCA	QAL	2089.16	08/14/13	4.08	2085.08	-1.00	11/7/2013	4.79	2084.37	-0.71
MW-10	RMPA	QAL	2179.40	08/15/13	76.08	2103.32	-1.30	11/7/2013	77.10	2102.30	-1.02
MW-11	NPCA	QAL	2122.61	08/15/13	45.36	2077.25	-0.33	11/4/2013	45.52	2077.09	-0.16
MW-12	NPCA	QAL	2098.49	08/15/13	19.83	2078.66	-3.17	11/4/2013	18.98	2079.51	0.85
MW-13	NPCA	QAL	2057.89	08/15/13	17.75	2040.14	-3.29	11/4/2013	17.64	2040.25	0.11
MW-14	MCEA	QAL	2029.67	08/14/13	35.80	1993.87	-1.94	11/7/2013	37.22	1992.45	-1.42
MW-15	MCEA	QAL	2009.76	08/15/13	30.51	1979.25	-1.01	11/4/2013	30.65	1979.11	-0.14
MW-17	RMPA	QAL	2140.40	08/14/13	40.70	2099.70	-1.13	11/5/2013	41.64	2098.76	-0.94
MW-18	MCEA	QAL	2008.69	08/15/13	30.25	1978.44	-0.98	11/4/2013	30.30	1978.39	-0.05
MW-19	NPCA	QAL	2118.49	08/14/13	22.16	2096.33	-0.97	11/5/2013	22.93	2095.56	-0.77
MW-20	RMPA	QAL	2162.03	08/15/13	61.43	2100.60	-1.15	11/8/2013	62.41	2099.62	-0.98
MW-22	RMPA	QAL	2173.48	08/15/13	71.60	2101.88	-1.20	11/8/2013	72.58	2100.90	-0.98
MW-23	RMPA	QAL	2165.02	08/15/13	64.12	2100.90	-1.14	11/8/2013	65.11	2099.91	-0.99
MW-26	BPA	MEF	2183.81	08/15/13	80.71	2103.10	-1.15	11/7/2013	81.68	2102.13	-0.97
MW-27	BPA	QAL	2182.73	08/15/13	79.48	2103.25	-1.26	11/7/2013	80.53	2102.20	-1.05
MW-28	RMPA	QAL	2160.84	08/15/13	60.34	2100.50	-1.13	11/8/2013	61.34	2099.50	-1.00
MW-29	NPCA	MEF	2115.09	08/14/13	28.41	2086.68	-0.66	11/6/2013	29.01	2086.08	-0.60
MW-30	RMPA	QAL	2165.01	08/15/13	52.26	2112.75	9.82	11/8/2013	64.26	2100.75	-12.00
MW-31	BPA	Granite	2186.52	08/15/13	95.76	2090.76	-1.09	11/7/2013	96.74	2089.78	-0.98
MW-32	RMPA	Granite	2176.61	08/14/13	89.16	2087.45	-1.07	11/5/2013	90.13	2086.48	-0.97
MW-34	RMPA	QAL	2153.80	08/15/13	51.38	2102.42	-1.12	11/8/2013	52.31	2101.49	-0.93
MW-35	RMPA	QAL	2170.98	08/14/13	70.44	2100.54	-1.17	11/5/2013	71.41	2099.57	-0.97
MW-36	UG	QAL	2205.18	08/14/13	87.94	2117.24	-0.96	11/7/2013	88.29	2116.89	-0.35
MW-38	MCEA	MEF	2030.29	08/15/13	47.51	1982.78	-0.64	11/4/2013	47.97	1982.32	-0.46
MW-39	RMPA	QAL	2144.18	08/15/13	43.61	2100.57	-1.18	11/8/2013	44.58	2099.60	-0.97
MW-40	NPCA	MEF	2126.39	08/15/13	42.97	2083.42	-0.60	11/4/2013	43.29	2083.10	-0.32
MW-41	RMPA	MEF	2133.95	08/14/13	35.37	2098.58	-1.00	11/5/2013	36.19	2097.76	-0.82
MW-43	NPCA	QAL	2068.58	08/14/13	8.85	2059.73	-2.44	11/7/2013	9.40	2059.18	-0.55
MW-44	NPCA	QAL	2128.69	08/14/13	32.24	2096.45	-0.74	11/6/2013	32.88	2095.81	-0.64
MW-45	MCEA	QAL	2068.18	08/14/13	2.9 PSI	2074.88	-0.69	11/7/2013	2.8 PSI	2074.64	-0.23
MW-46	MCEA	QAL	2072.17	08/14/13	52.35	2019.82	-0.63	11/7/2013	52.71	2019.46	-0.36
MW-47	NPCA	QAL	2076.67	08/14/13	2.1 PSI	2081.52	-1.15	11/7/2013	1.9 PSI	2081.06	-0.46
MW-48	NPCA	QAL	2076.44	08/14/13	11.39	2065.05	-2.18	11/7/2013	11.30	2065.14	0.09
MW-49	RMPA	QAL	2130.92	08/14/13	31.45	2099.47	-1.10	11/5/2013	32.38	2098.54	-0.93
MW-50	RMPA	QAL	2151.43	08/14/13	51.12	2100.31	-1.12	11/5/2013	52.08	2099.35	-0.96
MW-51	RMPA	QAL	2138.36	08/14/13	37.84	2100.52	-1.02	11/5/2013	38.76	2099.60	-0.92
MW-52	RMPA	QAL	2136.18	08/14/13	36.33	2099.85	-1.08	11/5/2013	37.25	2098.93	-0.92
MW-53	RMPA	QAL	2153.29	08/14/13	53.00	2100.29	-1.15	11/5/2013	53.95	2099.34	-0.95
MW-54	RMPA	QAL	2153.44	08/15/13	52.90	2100.54	-1.15	11/8/2013	53.80	2099.64	-0.90
MW-55	RMPA	QAL	2166.66	08/15/13	65.87	2100.79	-1.12	11/8/2013	66.84	2099.82	-0.97
MW-56A	RMPA	MEF	2143.09	08/14/13	54.39	2088.70	-1.05	11/6/2013	55.29	2087.80	-0.90
MW-56B	RMPA	QAL	2142.58	08/14/13	42.35	2100.23	-1.15	11/6/2013	43.29	2099.29	-0.94
MW-56C	RMPA	QAL	2142.77	08/14/13	43.57	2099.20	-2.10	11/6/2013	43.55	2099.22	0.02
MW-56D	RMPA	QAL	2142.48	08/14/13	42.19	2100.29	-1.13	11/6/2013	43.21	2099.27	-1.02
MW-57A	RMPA	QAL	2145.98	08/15/13	45.59	2100.39	-1.16	11/6/2013	46.53	2099.45	-0.94
MW-57B	RMPA	QAL	2146.19	08/15/13	45.80	2100.39	-1.16	11/6/2013	46.74	2099.45	-0.94
MW-57C	RMPA	QAL	2146.02	08/15/13	45.62	2100.40	-1.19	11/6/2013	46.55	2099.47	-0.93
MW-57D	RMPA	QAL	2146.10	08/15/13	45.73	2100.37	-1.15	11/6/2013	46.66	2099.44	-0.93
MW-58A	RMPA	QAL	2140.73	08/14/13	40.75	2099.98	-1.04	11/6/2013	41.73	2099.00	-0.98
MW-58B	RMPA	QAL	2140.78	08/14/13	40.62	2100.16	-1.11	11/6/2013	41.57	2099.21	-0.95
MW-58C	RMPA	QAL	2141.02	08/14/13	40.94	2100.08	-1.10	11/6/2013	41.91	2099.11	-0.97
MW-58D	RMPA	QAL	2140.94	08/14/13	41.00	2099.94	-1.13	11/6/2013	41.96	2098.98	-0.96
MW-59A	BPA	MEF	2180.14	08/15/13	81.82	2098.32	-1.17	11/7/2013	82.84	2097.30	-1.02
MW-59B	BPA	MEF	2180.39	08/15/13	77.17	2103.22	-1.15	11/7/2013	78.15	2102.24	-0.98
MW-59C	BPA	MEF	2179.93	08/15/13	79.00	2100.93	-1.18	11/7/2013	80.00	2099.93	-1.00
MW-59D	BPA	MEF	2180.53	08/15/13	78.91	2101.62	-1.16	11/7/2013	79.90	2100.63	-0.99
MW-60A	BPA	MEF	2182.59	08/15/13	81.35	2101.24	-1.16	11/7/2013	82.35	2100.24	-1.00
MW-60B	BPA	MEF	2182.77	08/15/13	79.97	2102.80	-1.21	11/7/2013	80.97	2101.80	-1.00

Notes:

BPA - Burn Pit Area
MCEA - Massacre Canyon Entrance Area
NPCA - Northern Potrero Creek Area
RMPA - Rocket Motor Production Area
UG - Upgradient

DG - Downgradient
BTOC - Below top of casing
msl - Mean sea level
NA - Not available
PSI - Pounds per square inch

"-" Formation screened not defined
QAL - Quaternary alluvium
QAL/MEF - Quaternary alluvium / Mt Eden
MEF - Mount Eden formation

Table 3 Groundwater Elevation - Third Quarter 2013 and Fourth Quarter 2013 (continued)

Well ID	Site Area	Formation Screened	Measuring Point Elevation (feet msl)	Third Quarter 2013				Fourth Quarter 2013			
				Date Measured	Depth to Water (feet BTOC)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from Second Quarter 2013	Date Measured	Depth to Water (feet BTOC)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from Third Quarter 2013
MW-61A	BPA	MEF	2186.95	08/15/13	89.15	2097.80	-1.10	11/7/2013	90.15	2096.80	-1.00
MW-61B	BPA	MEF	2186.77	08/15/13	80.95	2105.82	-1.22	11/7/2013	82.03	2104.74	-1.08
MW-61C	BPA	MEF	2186.84	08/15/13	86.87	2099.97	-1.14	11/7/2013	87.88	2098.96	-1.01
MW-61D	BPA	MEF	2186.83	08/15/13	84.21	2102.62	-1.18	11/7/2013	85.22	2101.61	-1.01
MW-62A	RMPA	QAL	2131.32	08/14/13	31.90	2099.42	-0.95	11/5/2013	32.73	2098.59	-0.83
MW-62B	RMPA	QAL	2131.49	08/14/13	32.25	2099.24	-1.06	11/5/2013	33.14	2098.35	-0.89
MW-63	RMPA	QAL	2156.20	08/15/13	55.61	2100.59	-1.15	11/8/2013	56.60	2099.60	-0.99
MW-64	RMPA	QAL	2128.41	08/14/13	29.79	2098.62	-0.87	11/6/2013	30.61	2097.80	-0.82
MW-65	RMPA	QAL	2128.92	08/14/13	30.53	2098.39	-0.90	11/6/2013	31.35	2097.57	-0.82
MW-66	RMPA	QAL	2130.43	08/14/13	35.06	2095.37	-0.66	11/5/2013	35.73	2094.70	-0.67
MW-67	MCEA	QAL	1799.54	08/13/13	9.31	1790.23	-4.29	11/4/2013	10.62	1788.92	-1.31
MW-68	RMPA	QAL	2144.69	08/15/13	39.03	2105.66	-0.54	11/8/2013	39.65	2105.04	-0.62
MW-69	RMPA	QAL	2143.26	08/15/13	41.06	2102.20	-1.00	11/8/2013	41.60	2101.66	-0.54
MW-70	MCEA	QAL	1976.15	08/13/13	32.05	1944.10	-2.10	11/4/2013	32.27	1943.88	-0.22
MW-71A	BPA	Granite	2193.77	08/15/13	159.89	2033.88	-0.52	11/7/2013	160.48	2033.29	-0.59
MW-71B	BPA	QAL/MEF	2194.01	08/15/13	86.18	2107.83	-0.97	11/7/2013	86.94	2107.07	-0.76
MW-71C	BPA	MEF	2193.87	08/15/13	89.94	2103.93	-1.99	11/7/2013	89.79	2104.08	0.15
MW-72A	BPA	Granite	2199.06	08/14/13	103.46	2095.60	-1.41	11/7/2013	104.97	2094.09	-1.51
MW-72B	BPA	MEF	2199.22	08/14/13	97.69	2101.53	-1.34	11/7/2013	98.84	2100.38	-1.15
MW-72C	BPA	QAL	2199.35	08/14/13	97.78	2101.57	-1.35	11/7/2013	Dry	Dry Well	NA
MW-73A	BPA	MEF	2189.39	08/14/13	114.84	2074.55	-1.06	11/7/2013	115.77	2073.62	-0.93
MW-73B	BPA	MEF	2189.48	08/14/13	100.03	2089.45	-1.19	11/7/2013	101.03	2088.45	-1.00
MW-73C	BPA	QAL	2189.65	08/14/13	88.60	2101.05	-1.42	11/7/2013	89.77	2099.88	-1.17
MW-74A	UG	Granite	2199.66	08/14/13	159.92	2039.74	-0.31	11/7/2013	160.45	2039.21	-0.53
MW-74B	UG	Granite	2199.81	08/14/13	117.06	2082.75	0.52	11/7/2013	117.54	2082.27	-0.48
MW-74C	UG	MEF	2199.96	08/14/13	87.50	2112.46	-0.44	11/7/2013	87.85	2112.11	-0.35
MW-75A	RMPA	MEF	2149.44	08/14/13	58.79	2090.65	-1.08	11/7/2013	59.70	2089.74	-0.91
MW-75B	RMPA	QAL	2149.51	08/14/13	50.20	2099.31	-1.13	11/7/2013	51.17	2098.34	-0.97
MW-75C	RMPA	QAL	2150.02	08/14/13	50.73	2099.29	-1.13	11/7/2013	51.69	2098.33	-0.96
MW-76A	NPCA	MEF	2105.91	08/14/13	27.21	2078.70	-1.13	11/7/2013	28.11	2077.80	-0.90
MW-76B	NPCA	QAL	2105.40	08/14/13	20.03	2085.37	-1.08	11/7/2013	20.65	2084.75	-0.62
MW-76C	NPCA	QAL	2106.29	08/14/13	12.30	2093.99	-1.06	11/7/2013	13.18	2093.11	-0.88
MW-77A	MCEA	MEF	1930.62	08/13/13	15.72	1914.90	-2.34	11/4/2013	15.85	1914.77	-0.13
MW-77B	MCEA	MEF	1930.88	08/13/13	18.72	1912.16	-1.66	11/4/2013	18.59	1912.29	0.13
MW-78	BPA	MEF	2182.63	08/15/13	91.53	2091.10	-1.14	11/7/2013	92.52	2090.11	-0.99
MW-79A	RMPA	MEF	2142.00	08/14/13	45.76	2096.24	-1.11	11/5/2013	46.72	2095.28	-0.96
MW-79C	RMPA	QAL	2142.07	08/14/13	42.78	2099.29	-1.09	11/5/2013	43.75	2098.32	-0.97
MW-80	NPCA	MEF	2070.47	08/14/13	0.2 PSI	2070.93	3.51	11/7/2013	0.1 PSI	2070.70	-0.23
MW-81	MCEA	MEF	2010.72	08/15/13	31.90	1978.82	-1.07	11/4/2013	32.07	1978.65	-0.17
MW-82	NPCA	QAL	1974.17	08/13/13	28.90	1945.27	-1.72	11/4/2013	29.20	1944.97	-0.30
MW-83	NPCA	QAL	1976.93	08/13/13	29.17	1947.76	-2.38	11/4/2013	29.58	1947.35	-0.41
MW-84A	MCEA	MEF	2,010.02	08/13/13	64.64	1945.38	-0.39	11/4/2013	64.77	1945.25	-0.13
MW-84B	MCEA	MEF	2,011.19	08/13/13	66.83	1944.36	-0.35	11/4/2013	66.96	1944.23	-0.13
MW-85A	MCEA	MEF	1,929.31	08/13/13	9.07	1920.24	-1.30	11/4/2013	9.23	1920.08	-0.16
MW-85B	MCEA	MEF	1,928.74	08/13/13	7.70	1921.04	-2.66	11/4/2013	7.07	1921.67	0.63
MW-86A	MCEA	MEF	1,923.21	08/13/13	17.84	1905.37	-1.25	11/4/2013	17.94	1905.27	-0.10
MW-86B	MCEA	QAL/MEF	1,923.21	08/13/13	20.16	1903.05	-0.70	11/4/2013	20.32	1902.89	-0.16
MW-87A	MCEA	MEF	1,938.92	08/13/13	23.75	1915.17	-1.02	11/4/2013	23.98	1914.94	-0.23
MW-87B	MCEA	MEF	1,938.82	08/13/13	22.82	1916.00	-1.15	11/4/2013	23.21	1915.61	-0.39
MW-88	RMPA	QAL	2,141.97	08/15/13	38.72	2103.25	-0.87	11/8/2013	39.49	2102.48	-0.77
MW-89	RMPA	QAL	2,130.82	08/14/13	33.37	2097.45	-1.93	11/5/2013	34.20	2096.62	-0.83
MW-90	RMPA	QAL	2,147.71	08/15/13	45.05	2102.66	-0.89	11/8/2013	45.73	2101.98	-0.68
MW-91	RMPA	MEF	2,144.85	08/15/13	40.44	2104.41	-0.65	11/8/2013	40.92	2103.93	-0.48
MW-92	MCEA	MEF	1,919.83	08/13/13	34.69	1885.14	-1.50	11/4/2013	34.58	1885.25	0.11
MW-93	MCEA	MEF	1,931.47	08/13/13	36.96	1894.51	-1.41	11/4/2013	36.77	1894.70	0.19
MW-94	MCEA	MEF	1,936.55	08/13/13	23.99	1909.63	-0.61	11/4/2013	24.10	1909.52	-0.11
MW-95	MCEA	MEF	1,920.80	08/13/13	22.95	1897.85	-0.84	11/4/2013	22.98	1897.82	-0.03
MW-96	MCEA	MEF	1998.63	08/13/13	55.72	1942.91	-0.48	11/4/2013	55.89	1942.74	-0.17
MW-97	MCEA	MEF	1996.47	08/13/13	52.15	1944.32	-1.09	11/4/2013	52.33	1944.14	-0.18
MW-98A	RMPA	MEF	2141.68	08/15/13	48.23	2093.45	-0.98	11/8/2013	49.04	2092.64	-0.81
MW-98B	RMPA	MEF	2141.73	08/15/13	39.47	2102.26	-0.52	11/8/2013	39.90	2101.83	-0.43
MW-99	RMPA	MEF	2144.63	08/15/13	57.94	2086.69	-0.66	11/8/2013	58.50	2086.13	-0.56
MW-100	DG	Granite	1525.79	08/13/13	106.67	1418.98	-4.80	11/4/2013	108.15	1417.50	-1.48
MW-101	NPCA	QAL	2095.90	08/14/13	16.80	2079.10	-1.94	11/5/2013	17.11	2078.79	-0.31
MW-102	MCEA	QAL	2067.21	08/14/13	39.39	2027.82	-3.22	11/7/2013	40.03	2027.18	-0.64
MW-103	NPCA	QAL	2075.88	08/14/13	20.22	2055.66	-5.78	11/7/2013	16.88	2059.00	3.34
MW-104	NPCA	QAL	2087.47	08/14/13	16.69	2070.78	-2.33	11/7/2013	16.77	2070.70	-0.08
MW-105	NPCA	QAL	2092.23	08/14/13	16.99	2075.24	-2.16	11/6/2013	16.44	2075.79	0.55
MW-106	NPCA	QAL	2085.25	08/14/13	22.81	2062.44	-3.36	11/6/2013	22.68	2062.57	0.13
MW-107	NPCA	QAL	2084.84	08/14/13	24.97	2059.87	-2.72	11/6/2013	25.40	2059.44	-0.43
MW-108	NPCA	QA/MEF	2087.22	08/14/13	Blockage in Well	NA	NA	11/6/2013	Blockage in Well	NA	NA
MW-109	NPCA	QA/MEF	2092.86	08/14/13	15.87	2076.99	-1.48	11/6/2013	15.94	2076.92	-0.07
MW-110	BPA	QAL	2188.54	08/15/13	101.76	2086.78	-1.35	11/7/2013	102.96	2085.58	-1.20
OW-01	BPA	QAL	2204.62	08/14/13	53.76	2150.86	-0.75	11/7/2013	54.37	2150.25	-0.61
OW-02	NPCA	QAL	2078.97	08/14/13	3.10	2075.87	-0.17	11/7/2013	3.14	2075.83	-0.04
OW-03	RMPA	QAL	2143.65	08/14/13	43.33	2100.32	-1.12	11/6/2013	44.30	2099.35	-0.97
OW-05	NPCA	QAL	2160.85	08/15/13	Dry	Dry Well	NA	11/4/2013	Dry	Dry Well	NA
OW-06	MCEA	QAL	2084.67	08/15/13	Dry	Dry Well	NA	11/4/2013	Dry	Dry Well	NA
OW-07	MCEA	QAL	2108.06	08/15/13	Dry	Dry Well	NA	11/4/2013	Dry	Dry Well	NA
OW-08	MCEA	QAL	2036.33	08/15/13	52.42	1983.91	-0.89	11/4/2013	53.09	1983.24	-0.67
P-02	NPCA	QAL	2081.15	08/15/13	18.82	2062.33	-2.71	11/4/2013	18.93	2062.22	-0.11
P-03	NPCA	QAL	2140.25	08/14/13	48.04	2092.21	-0.84	11/5/2013	48.61	2091.64	-0.57
P-04	NPCA	QAL	2112.63	08/15/13	24.64	2087.99	-3.36	11/4/2013	23.57	2089.06	1.07
P-05	RMPA	QAL	2162.20	08/14/13	62.10	2100.10	-1.14	11/6/2013	63.07	2099.13	-0.97
P-06S	MCEA	QAL	2034.44	08/14/13	Dry	Dry Well	NA	11/7/2013	Dry	Dry Well	NA
P-06D	MCEA	QAL	2034.41	08/14/13	41.51	1992.90	-1.82	11/7/2013	42.81	1991.60	-1.30
P-07	MCEA	QAL	2034.60	08/14/13	42.00	1992.60	-1.82	11/7/2013	43.26	1991.34	-1.26
P-08	MCEA	QAL	2030.87	08/14/13	37.80	1993.07	-1.85	11/7/2013	39.10	1991.77	-1.30
P-09	BPA	MEF	2187.38	08/15/13	81.43	2105.95	-1.28	11/7/2013	82.51	2104.87	-1.08
VRW-01	BPA	QAL	2187.35	08/15/13	Dry	Dry Well	NA	11/7/2013	Dry	Dry Well	NA
VRW-02	BPA	QAL	2181.66	08/15/13	Dry	Dry Well	NA	11/7/2013	Dry	Dry Well	NA
VRW-03	BPA	MEF	2184.32	08/15/13	74.00	2110.32	-0.80	11/7/2013	74.82	2109.50	-0.82

Notes:

BPA -	Burn Pit Area	DG -	Downgradient	"-"	Formation screened not defined
MCEA -	Massacre Canyon Entrance Area	BTOC -	Below top of casing	QAL -	Quaternary alluvium
NPCA -	Northern Potrero Creek Area	msl -	Mean sea level	QAL/MEF -	Quaternary alluvium / Mt Eden
RMPA -	Rocket Motor Production Area	NA -	Not available	MEF -	Mount Eden formation
UG -	Upgradient	PSI -	Pounds per square inch		

Table 4 Groundwater Elevation Change - Third Quarter 2013 and Fourth Quarter 2013

Site Area	Range of Groundwater Elevation Change - Third Quarter 2013 (feet)		Average Change By Area (feet)	Range of Groundwater Elevation Change - Fourth Quarter 2013 (feet)		Average Change By Area (feet)
BPA	-1.99	-0.52	-1.19	-1.51	0.15	-0.98
MCEA	-4.29	-0.35	-1.40	-1.42	0.63	-0.38
NPCA	-5.78	3.51	-1.69	-0.90	3.34	-0.13
RMPA	-2.10	9.82	-0.88	-12.00	0.02	-1.03

Notes:

BPA - Burn Pit Area

MCEA - Massacre Canyon Entrance Area

NPCA - Northern Potrero Creek Area

RMPA - Rocket Motor Production Area.

Table 5 Summary of Horizontal and Vertical Groundwater Gradients

Horizontal Groundwater Gradients (feet / foot), approximating a flowline from MW-36 to MW-18 and subsections

Location: / Date	Overall MW-36 to MW-18	BPA MW-36 to MW-2	RMPA MW-2 to MW-5	NPCA MW-5 to MW-46	MCEA MW-46 to MW-18
Previous - Second Quarter (May) 2013	0.012	0.008	0.002	0.021	0.013
Third Quarter (August) 2013	0.012	0.008	0.001	0.021	0.014
Fourth Quarter (November) 2013	0.012	0.008	0.001	0.021	0.013

Vertical Groundwater Gradients (feet / foot)

Location:	BPA	RMPA	NPCA	MCEA	MCEA
shallow screen	**MW-59B** (MEF)	**MW-56B** (QAL	**MW-75B** (QAL)	**MW-18** (QAL)	**MW-77B** (MEF)
Date deep screen	**MW-59A** (MEF)	**MW-56A** (MEF)	**MW-75A** (MEF)	**MW-15** (QAL)	**MW-77A** (MEF)
Previous - Second Quarter (May) 2013	-0.13	-0.14	-0.07	0.02	0.04
Third Quarter (August) 2013	-0.13	-0.13	-0.07	0.02	0.03
Fourth Quarter (November) 2013	-0.13	-0.13	-0.07	0.02	0.03

Notes:

BPA - Burn Pit Area

RMPA - Rocket Motor Production Area

NPCA - Northern Potrero Creek Area

MCEA - Massacre Canyon Entrance Area

QAL - Quaternary alluvium

MEF - Mount Eden formation

Table 6 Surface Water Flow Rates

Location ID	Description of Location	Date Measured	Length of Measured Section (ft)	Width of Measured Section (ft)	Depth of Measured Section (ft)	Float Travel Time (seconds)	Cross Sectional Area (ft^2)	Surface Velocity (ft /sec)	Stream Flow Rate (cfs)	Site Stream Flow Rate (cfs)
Third Quarter (August) 2013										
SF-1	Near Gilman Hot Springs Road	08/16/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SF-2	Near MW-67	08/16/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
SF-3	Near MW-15 and 18	08/16/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
SF-4	Near MW-42	08/16/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
Fourth Quarter (November) 2013										
SF-1	Near Gilman Hot Springs Road	11/14/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SF-2	Near MW-67	11/14/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
SF-3	Near MW-15 and 18	11/14/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
SF-4	Near MW-42	11/14/13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
Notes:	Measurements are averaged. cfs - cubic feet per second ft/sec - feet per second									

Table 7 Summary of Validated Detected Organic and Inorganic Analytes - Fourth Quarter 2013

Sampling Location	Sample Date	Perchlorate	1,4-Dioxane	Acetone	Chloro-form	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	Methylene Chloride	Styrene	Toluene	Trichloro-ethene	Vinyl Chloride
All results are reported in µg/L unless otherwise stated															
MW-15	11/11/13	<0.071	**7.0**	<5.0	<0.46	0.33 Jq	<0.21	2.0	0.35 Jq	<0.10	<0.15	<0.22	<0.22	0.93	<0.13
MW-18	11/11/13	2.4	**5.2**	<5.0	<0.46	0.19 Jq	<0.21	1.4	<0.18	<0.10	<0.15	<0.22	<0.22	1.2	<0.13
MW-59A	11/13/13	**1,600**	**2.5**	<5.0	<0.46	1.6	**1.9**	**40**	0.19 Jq	<0.10	<0.15	<0.22	<0.22	**33**	<0.13
MW-60B	11/13/13	**1,600**	**34**	<5.0	0.55	1.2	**2.0**	**87**	0.46 Jq	<0.10	<0.15	<0.22	<0.22	**40**	<0.13
MW-67	11/11/13	<0.071	0.65	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.15	<0.22	<0.22	<0.25	<0.13
MW-68	11/14/13	**16,000**	**35**	<5.0	<0.46	0.26 Jq	<0.21	**7.6**	<0.18	<0.10	<0.15	<0.22	<0.22	<0.25	<0.13
MW-75C	11/13/13	0.90	<0.10	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.15	<0.22	<0.22	<0.25	<0.13
MW-93	11/11/13	4.0	**20**	<5.0	<0.46	0.18 Jq	<0.21	1.1	<0.18	<0.10	<0.15	<0.22	<0.22	3.3	<0.13
MW-98B	11/13/13	**1,100**	**16**	<5.0	1.5	0.44 Jq	<0.21	**18**	<0.18	<0.10	<0.15	<0.22	<0.22	**34**	<0.13
MW-100	11/11/13	<0.071	0.23	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.15	<0.22	<0.22	<0.25	<0.13
MW-103	11/13/13	<0.71	**15**	100	<0.46	0.55	<0.21	1.4	2.3	0.16 Jq	<0.15	<0.22	<0.22	4.0	<0.13
MW-104	11/13/13	<0.071	**28**	<5.0	<0.46	**5.1**	<0.21	**44**	2.9	0.22 Jq	<0.15	<0.22	<0.22	4.0	**8.8**
MW-106	11/14/13	**120**	**29**	<5.0	<0.46	3.0	**0.57**	**49**	0.81	0.49 Jq	<0.15	<0.22	<0.22	**47**	0.44 Jq
PPW1-4	12/20/13	<0.71 UJ	<0.10	NA	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.15	<0.22	<0.22	<0.25	<0.13
SW-02	11/08/13	**43**	**13**	5.6 Jq	<0.46	0.28 Jq	<0.21	**6.7**	0.71	<0.10	<0.15	<0.22	1.9	**6.6**	**0.52**
SW-03	11/08/13	**41 Jf**	**13**	<5.0	<0.46	0.14 Jq	<0.21	1.7	0.49 Jq	<0.10	0.27 Jq	<0.22	0.40 Jq	1.7	<0.13
SW-09	11/11/13	<0.071	**3.5**	<5.0	<0.46	<0.098	<0.21	0.42 Jq	<0.18	<0.10	<0.15	0.51	0.73	0.25 Jq	<0.13
SW-18	11/08/13	<0.071	**4.9**	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	0.17 Jq	<0.22	<0.22	<0.25	<0.13
MDL (µg/L)		0.071	0.10	5	0.46	0.098	0.21	0.12	0.18	0.10	0.15	0.22	0.22	0.25	0.13
MCL/DWNL (µg/L)		6	1.0 (1)	-	-	5.0	0.50	6.0	6.0	10	5.0	100	150	5.0	0.50

Notes: Only analytes positively detected are presented in this table. For a complete list, refer to the laboratory data package.

µg/L - Micrograms per liter

<# - Analyte not detected; method detection limit concentration is shown.

DWNL - California Department of Public Health drinking water notification level

MCL - California Department of Public Health maximum contaminant level

MDL - Method detection limit

Bold - MCL or DWNL exceeded.

(1) - DWNL

"-" - MCL or DWNL not available.

J - The analyte was positively identified, but the analyte concentration is an estimated value.

U - The analyte was analyzed for, but was not detected above the MDL.

f - The duplicate Relative Percent Difference was outside the control limit.

q - The analyte detection was below the Practical Quantitation Limit (PQL).

NA – Not analyzed

Table 8 Summary Statistics of Validated Organic and Inorganic Analytes - Fourth Quarter 2013

Organic Analytes Detected	Total Number of Samples Analyzed	Total Number of Detections (1)	Number of Detections Exceeding MCL or DWNL (1)	MCL / DWNL		Minimum Concentration Detected		Maximum Concentration Detected	
1,4-Dioxane	18	16	14	1 (2)	µg/L	0.23	µg/L	35	µg/L
Acetone	17	2	0	-	µg/L	5.6	µg/L	100	µg/L
Chloroform	18	2	0	-	µg/L	0.55	µg/L	1.5	µg/L
1,1-Dichloroethane	18	12	1	5.0	µg/L	0.14	µg/L	5.1	µg/L
1,2-Dichloroethane	18	3	3	0.5	µg/L	0.57	µg/L	2.0	µg/L
1,1-Dichloroethene	18	13	7	6.0	µg/L	0.42	µg/L	87	µg/L
cis-1,2-Dichloroethene	18	8	0	6.0	µg/L	0.19	µg/L	2.9	µg/L
trans-1,2-Dichloroethene	18	3	0	10	µg/L	0.16	µg/L	0.49	µg/L
Methylene Chloride	18	2	0	5.0	µg/L	0.17	µg/L	0.27	µg/L
Styrene	18	1	0	100	µg/L	0.51	µg/L	0.51	µg/L
Toluene	18	3	0	150	µg/L	0.40	µg/L	1.9	µg/L
Trichloroethene	18	12	5	5.0	µg/L	0.25	µg/L	47	µg/L
Vinyl Chloride	18	3	2	0.5	µg/L	0.44	µg/L	8.8	µg/L
Inorganic Analytes Detected	**Total Number of Samples Analyzed**	**Total Number of Detections (1)**	**Number of Detections Exceeding MCL or DWNL (1)**	**MCL / DWNL**		**Minimum Concentration Detected**		**Maximum Concentration Detected**	
Perchlorate	18	10	7	6	µg/L	0.90	µg/L	16,000	**µg/L**

Notes:
DWNL - California Department of Public Health drinking water notification level
MCL - California Department of Public Health maximum contaminant level
" - " - MCL or DWNL not established.
(1) - Number of detections excludes sample duplicates, trip blanks and equipment blanks.
(2) - DWNL
mg/L - Milligrams per liter
µg/L - Micrograms per liter

Table 9 Groundwater Chemicals of Potential Concern

Analyte	Classification	Comments
Perchlorate	Primary	Parent product (propellant), widely detected at site
1,1-Dichloroethene	Primary	Breakdown product of 1,1,1-TCA, detected at higher concentrations than 1,1,1-TCA at site
Trichloroethene	Primary	Parent product (solvent), widely detected at site
1,4-Dioxane	Primary	Stabilizer in 1,1,1-TCA, widely detected at site
1,1-Dichloroethane	Secondary	Breakdown product of 1,1,1-TCA
1,2-Dichloroethane	Secondary	Breakdown product of 1,1,1-TCA
1,1,1-Trichloroethane	Secondary	Parent product (solvent), detected at lower concentrations than breakdown product (1,1-DCE) at site
1,1,2-Trichloroethane	Secondary	Isomeric impurity of 1,1,1-TCA
cis-1,2-Dichloroethene	Secondary	Breakdown product of TCE
Vinyl chloride	Secondary	Breakdown product of TCE and/or 1,1,1-TCA

Table 10 Summary of Detected Chemicals of Potential Concern in Guard Wells

Sampling Location	Site Area	Sample Date	Per chlorate	1,4-Dioxane	1,1-Dichloro ethane	1,1-Dichloro ethene	cis-1,2-Dichloro ethene	Trichloro ethene
All results reported in µg/L unless otherwise stated								
MW-15	MCEA	06/07/11	<0.071	**6.8**	0.30 Jq	1.9	0.29 Jq	1.1
		12/09/12	<0.071	**5.8**	0.25 Jq	1.6	0.28 Jq	1.0
		05/31/12	<0.071	**6.7**	0.34 Jq	1.8	0.26 Jq	1.1
		11/16/12	<0.071	**6.2**	0.32 Jq	1.7	0.29 Jq	0.9
		05/30/13	<0.071	**6.4**	0.37 Jq	2.0	0.34 Jq	0.9
		11/11/13	<0.071	**7.0**	0.33 Jq	2.0	0.35 Jq	0.93
MW-18	MCEA	06/07/11	1.3	**4.3**	0.15 Jq	0.93	<0.18	0.76
		12/09/12	0.72	**3.7**	0.14 Jq	0.88	<0.18	0.83
		05/31/12	2.1	**3.8**	0.14 Jq	1.1	<0.18	1.1
		11/16/12	3.0	**4.5**	0.18 Jq	1.3	<0.18	1.0
		05/30/13	2.1	**4.4**	0.19 Jq	1.4	<0.18	1.0
		11/11/13	2.4	**5.2**	0.19 Jq	1.4	<0.18	1.2
MW-67	MCEA	06/06/11	<0.071	**1.2**	<0.098	<0.12	<0.18	<0.25
		12/08/12	<0.071	**1.1**	<0.098	<0.12	<0.18	<0.25
		05/29/12	<0.071	**1.2**	<0.098	<0.12	<0.18	<0.25
		11/16/12	<0.071	0.92	<0.098	<0.12	<0.18	<0.25
		06/12/13	<0.071	**1.0**	<0.098	<0.12	<0.18	<0.25
		11/11/13	<0.071	0.65	<0.098	<0.12	<0.18	<0.25
MW-100	DG	06/06/11	<0.071	0.15 Jq	<0.098	<0.12	<0.18	<0.25
		12/12/12	<0.071	0.18 Jq	<0.098	<0.12	<0.18	<0.25
		05/29/12	<0.35	0.21	<0.098	<0.12	<0.18	<0.25
		11/16/12	<0.071	0.23	<0.098	<0.12	<0.18	<0.25
		05/29/13	<0.071	0.23	<0.098	<0.12	<0.18	<0.25
		11/11/13	<0.071	0.23	<0.098	<0.12	<0.18	<0.25
MCL/DWNL (µg/L)			6	1 (1)	5	6	6	5

Notes:
DG - Downgradient
MCEA - Massacre Canyon Entrance Area
MCL - California Department of Public Health maximum contaminant level
DWNL - California Department of Public Health drinking water notification level
(1) DWNL
µg/L - Micrograms per liter
Bold - MCL or DWNL exceeded.
<# - Analyte not detected; method detection limit concentration is shown.
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 11 Summary of Detected Chemicals of Potential Concern in Increasing Trend Wells - Fourth Quarter 2013

Sampling Location	Site Area	Sample Date	Perchlorate	1,4-Dioxane	1,1-Dichloro ethene	Trichloroethene
All results reported in µg/L unless otherwise stated						
MW-59A	BPA	06/10/10	**1,400 Jd**	**1.2**	**22**	**13**
		06/22/12	**2,000**	**2.7**	**39**	**24**
		06/12/13	**1,800**	**2.6**	**42**	**31**
		11/13/13	**1,600**	**2.5**	**40**	**33**
MW-60B	BPA	06/22/12	**1,100**	**10**	**39**	**15**
		11/29/12	**1,800**	**15**	**52**	**22**
		06/03/13	**1,700**	**26**	**81**	**33**
		11/13/13	**1,600**	**34**	**87**	**40**
MW-68	RMPA	06/15/12	**9,100**	**18**	4.4	<0.25
		11/28/12	**17,000**	**21**	**6.3**	<0.25
		06/03/13	**15,000**	**37**	**9.5**	<0.25
		11/14/13	**16,000**	**35**	**7.6**	<0.25
MW-93	MCEA	05/31/12	4.9	**19**	1.1	3.1
		11/19/12	5.5	**22**	1.0	3.2
		05/29/13	3.7	**18**	1.0	3.0
		11/11/13	4.0	**20**	1.1	3.3
MW-98B	RMPA	06/05/12	**570**	**2.0**	**11**	**12**
		11/28/12	**1,700**	**11**	**11**	**26**
		06/06/13	**1,400**	**12**	**15**	**31**
		11/13/13	**1,100**	**16**	**18**	**34**
MW-103	NPCA	06/12/12	**120**	**15**	4.8	**8.6**
		11/27/12	**31**	**14**	3.7	**11**
		06/10/13	**34**	**13**	2.1	**7.3**
		11/13/13	<0.71	**15**	1.4	4
MW-104	NPCA	06/12/12	<0.071	**31**	**52**	2.9
		11/27/12	<0.071	**27**	**55**	4.5
		06/10/13	<0.071	**29**	**51**	4.0
		11/13/13	<0.071	**28**	**44**	4.0
MW-106	NPCA	06/12/12	**58**	**27**	**38**	**33**
		11/27/12	<0.071	**28**	**28**	**27**
		06/11/13	**130**	**33**	**48**	**49**
		11/14/13	**120**	**29**	**49**	**47**
MCL/DWNL (µg/L)			6	1 (1)	6	5

Notes:
MCL - California Department of Public Health maximum contaminant level
DWNL - California Department of Public Health drinking water notification level
(1) DWNL
µg/L - Micrograms per liter.
Bold - MCL or DWNL exceeded.
BPA - Burn Pit Area
MCEA - Massacre Canyon Entrance Area
NPCA - Northern Potrero Creek Area
RMPA - Rocket Motor Production Area
<# - Analyte not detected; method detection limit concentration is shown.
J - The analyte was positively identified, but the analyte concentration is an estimated value.
d - The Laboratory Control Sample (LCS) recovery was outside control limits.

Table 12 Summary of Detected Chemicals of Potential Concern in Surface Water - Fourth Quarter 2013

Sampling Location	Sample Date	Perchlorate	1,4-Dioxane	1,1-Dichloro ethane	1,1-Dichloro ethene	c-1,2-Dichloro ethene	Trichloroethene
All results reported in µg/L unless otherwise stated							
SW-02	11/08/13	**43**	**13**	0.28 Jq	**6.7**	0.71	**6.6**
SW-03	11/08/13	**41 Jf**	**13**	0.14 Jq	1.7	0.49 Jq	1.7
SW-09	11/11/13	<0.071	**3.5**	<0.098	0.42 Jq	<0.18	0.25 Jq
SW-18	11/08/13	<0.071	**4.9**	<0.098	<0.12	<0.18	<0.25
Method Detection Limit (µg/L)		0.071	0.10	0.098	0.12	0.18	0.25
MCL/DWNL (µg/L)		6	1 (1)	5	6	6	5.0

Notes:

µg/L - Micrograms per liter

MCL - California Department of Public Health maximum contaminant level

DWNL - California Department of Public Health drinking water notification level

(1) DWNL

Bold - MCL or DWNL exceeded.

<# - Analyte not detected; method detection limit concentration is shown.

J - The analyte was positively identified, but the analyte concentration is an estimated value.

f - The duplicate Relative Percent Difference was outside the control limit.

q - The analyte detection was below the Practical Quantitation Limit (PQL).

Table 13 Well Classification and Sampling Frequency

Classification	Sampling Frequency
Horizontal Extent (Plume) Wells	Annual
Vertical Distribution Wells	Biennial
Increasing Trend Wells	Semiannual
Remedial Monitoring Wells	Semiannual
Guard Wells	Semiannual
Redundant Wells	Suspend
New Wells	Quarterly

FIGURES

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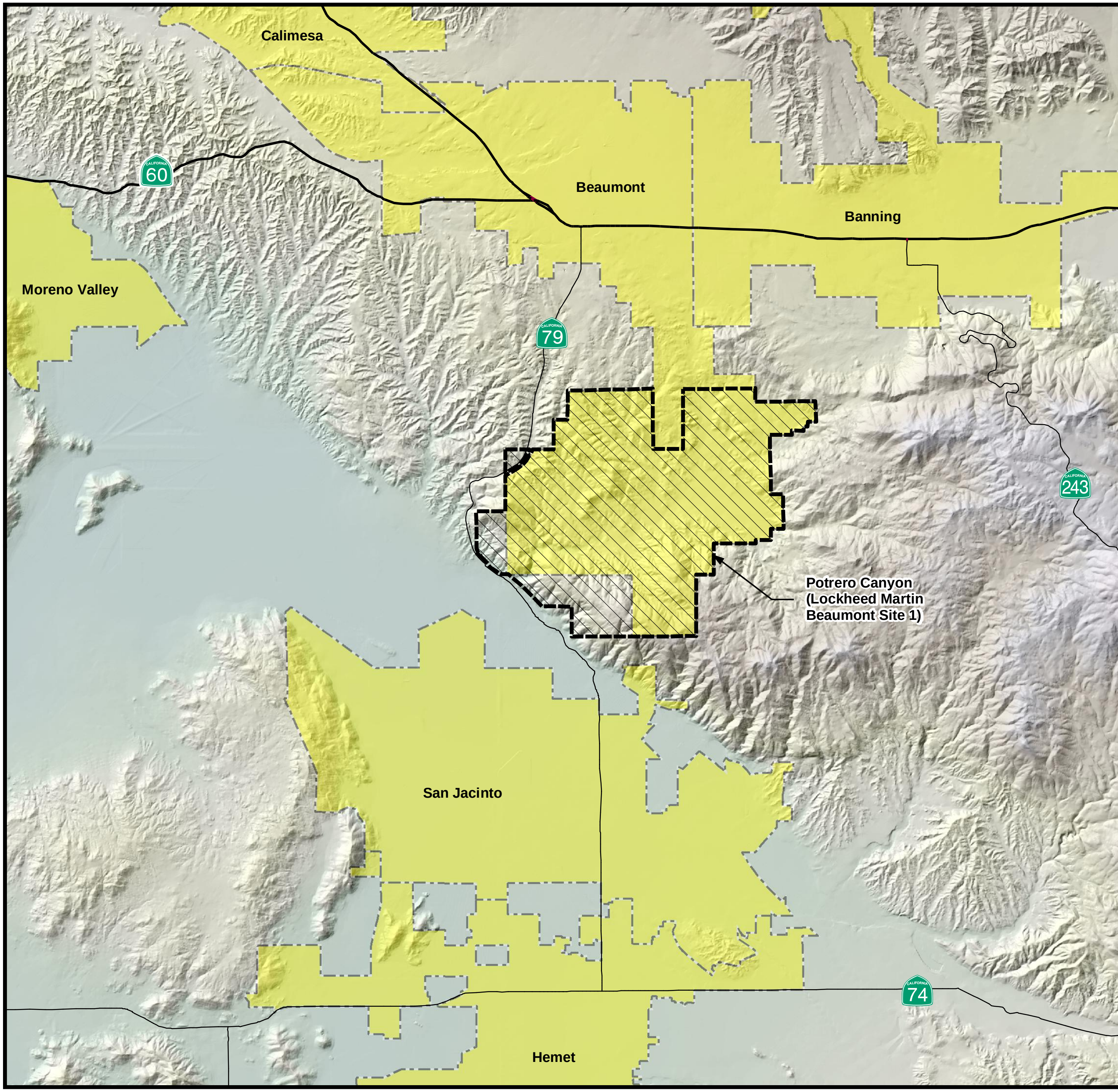

0 2
Miles

Adapted from:

U.S. Census Bureau TIGER line data, 2000.

LEGEND

Interstate/Freeway

State Highway

County Boundary

Potrero Canyon Property Boundary
(Lockheed Martin Beaumont Site 1)

City/Municipality

Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 1

Regional Location of Beaumont Site 1

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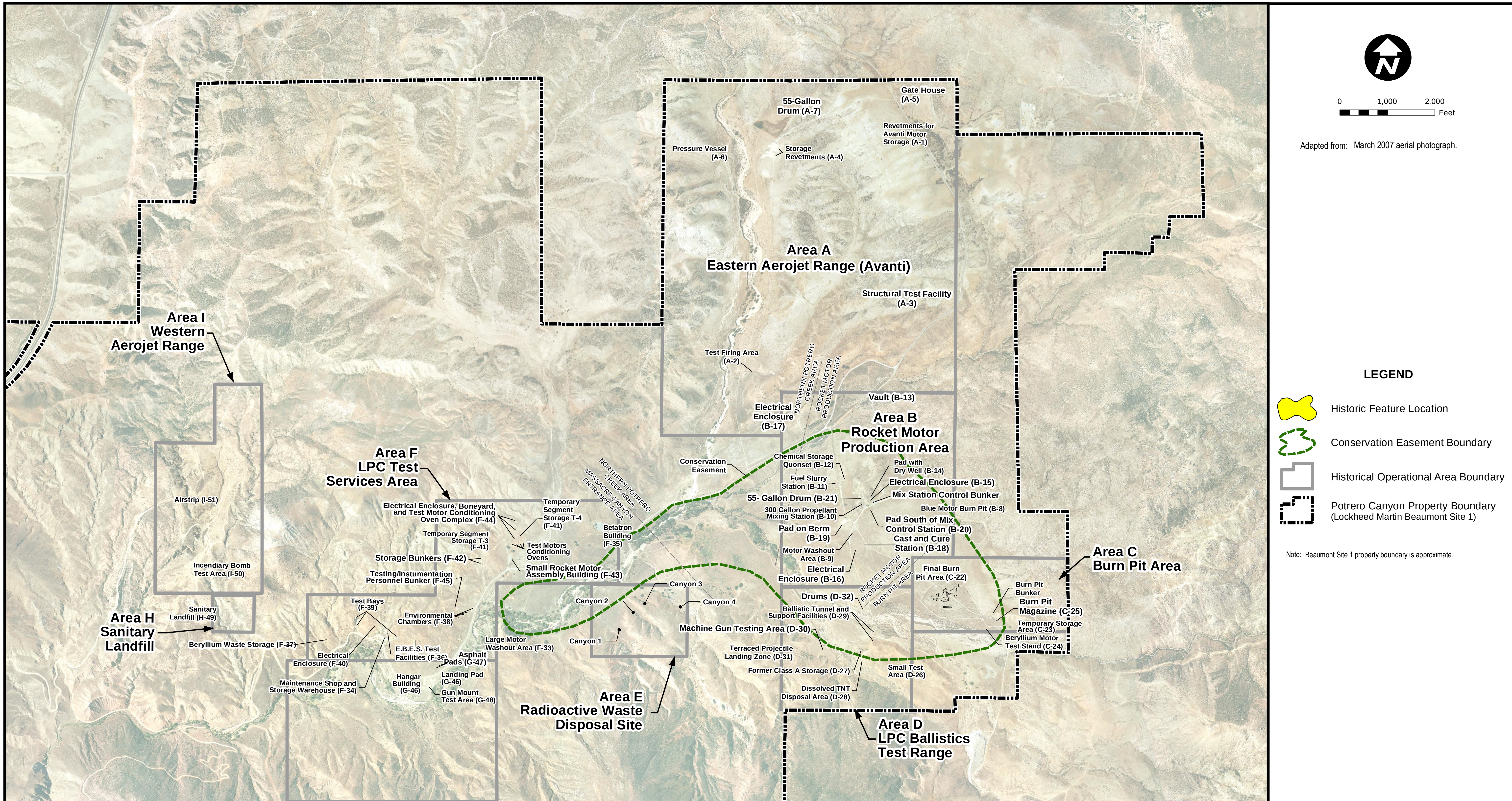
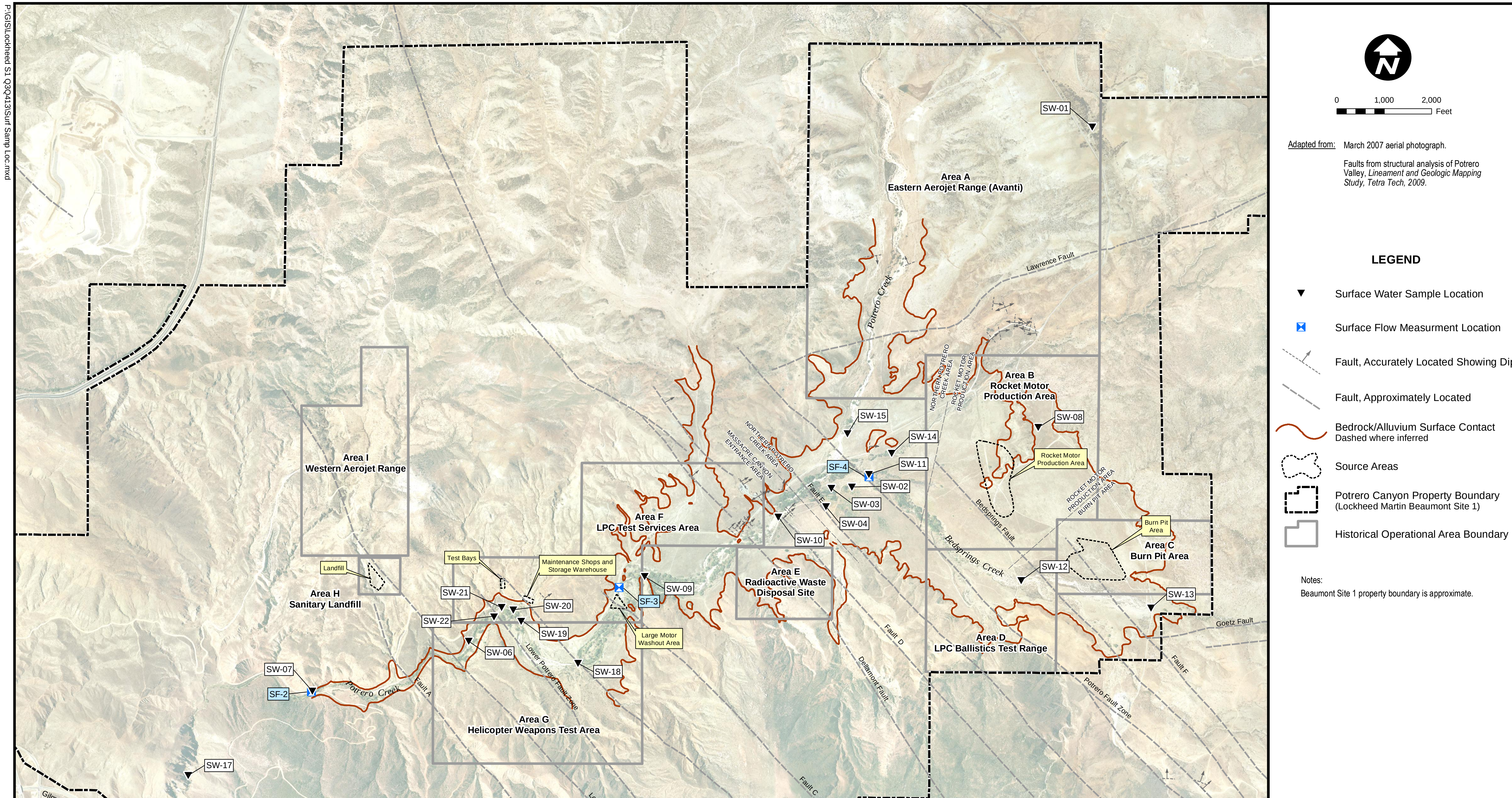


Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 2
Historical Operational Areas, Site Features, and Conservation Easement

TETRA TECH



Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 3

Surface Water Sample Locations

TETRA TECH

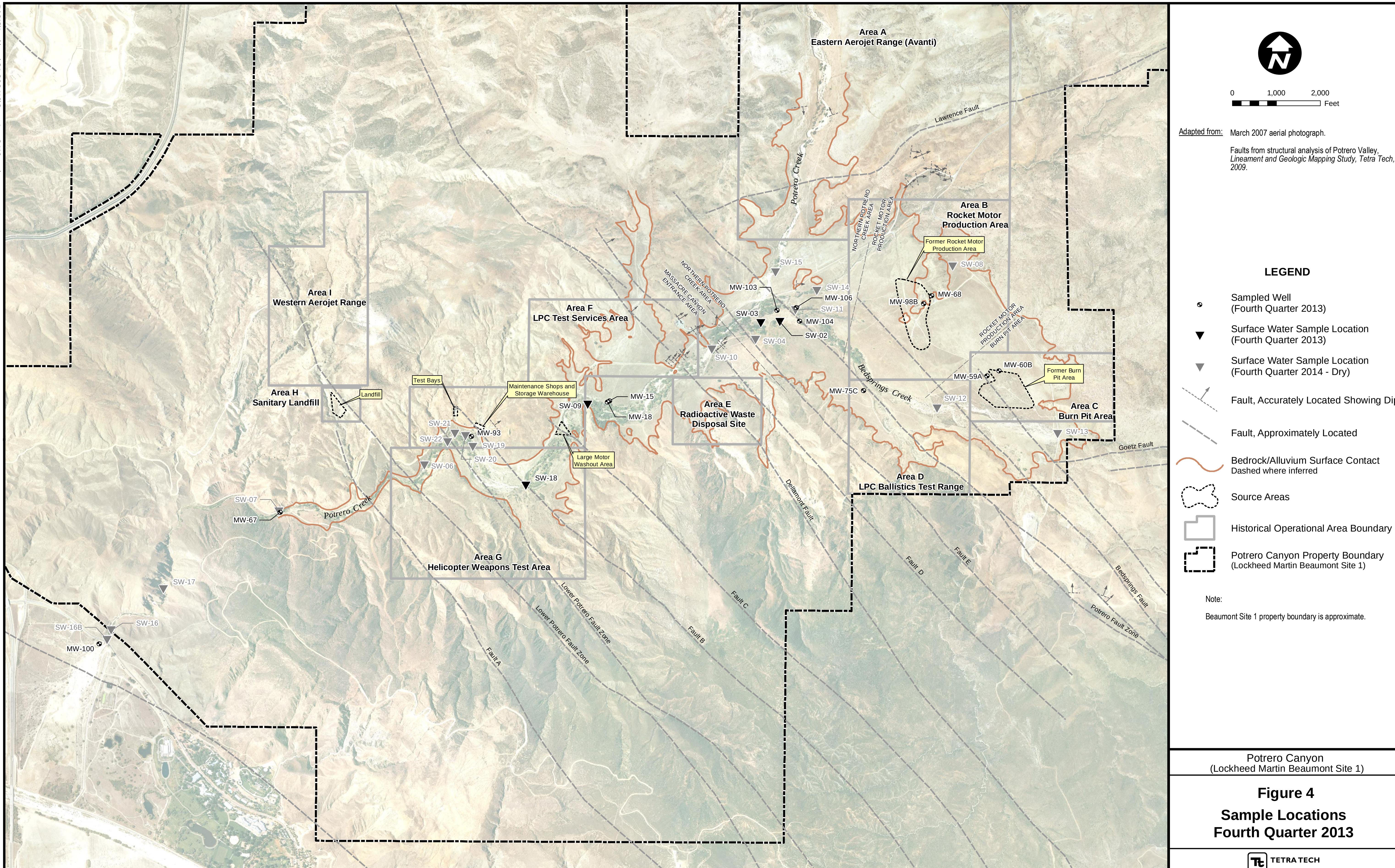


Figure 4
Sample Locations
Fourth Quarter 2013

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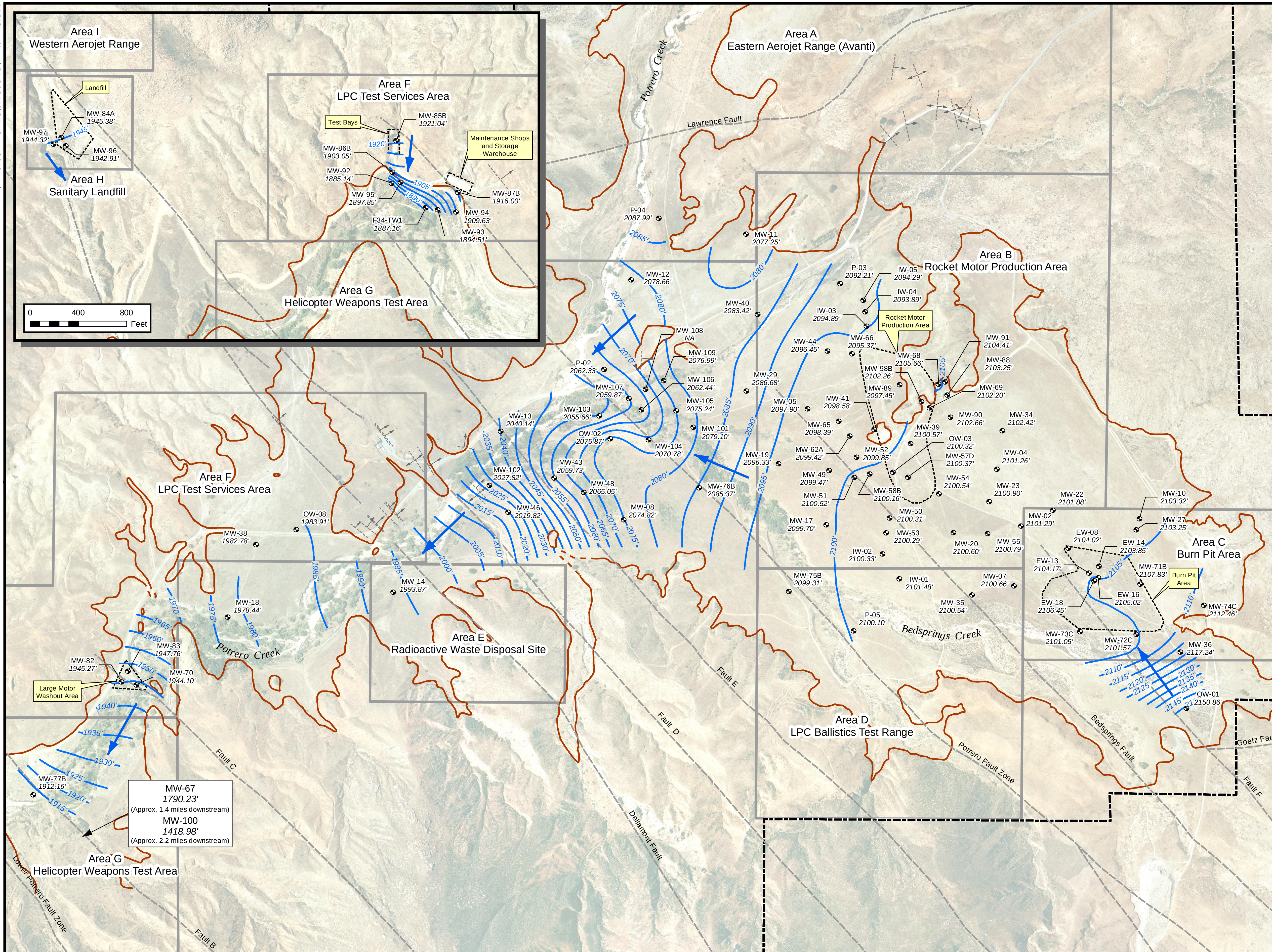


Adapted from: March 2007 aerial photograph.

Faults from structural analysis of Potrero Valley, *Lineament and Geologic Mapping Study, Tetra Tech, 2009.*

0 500 1,000 Feet

LEGEND

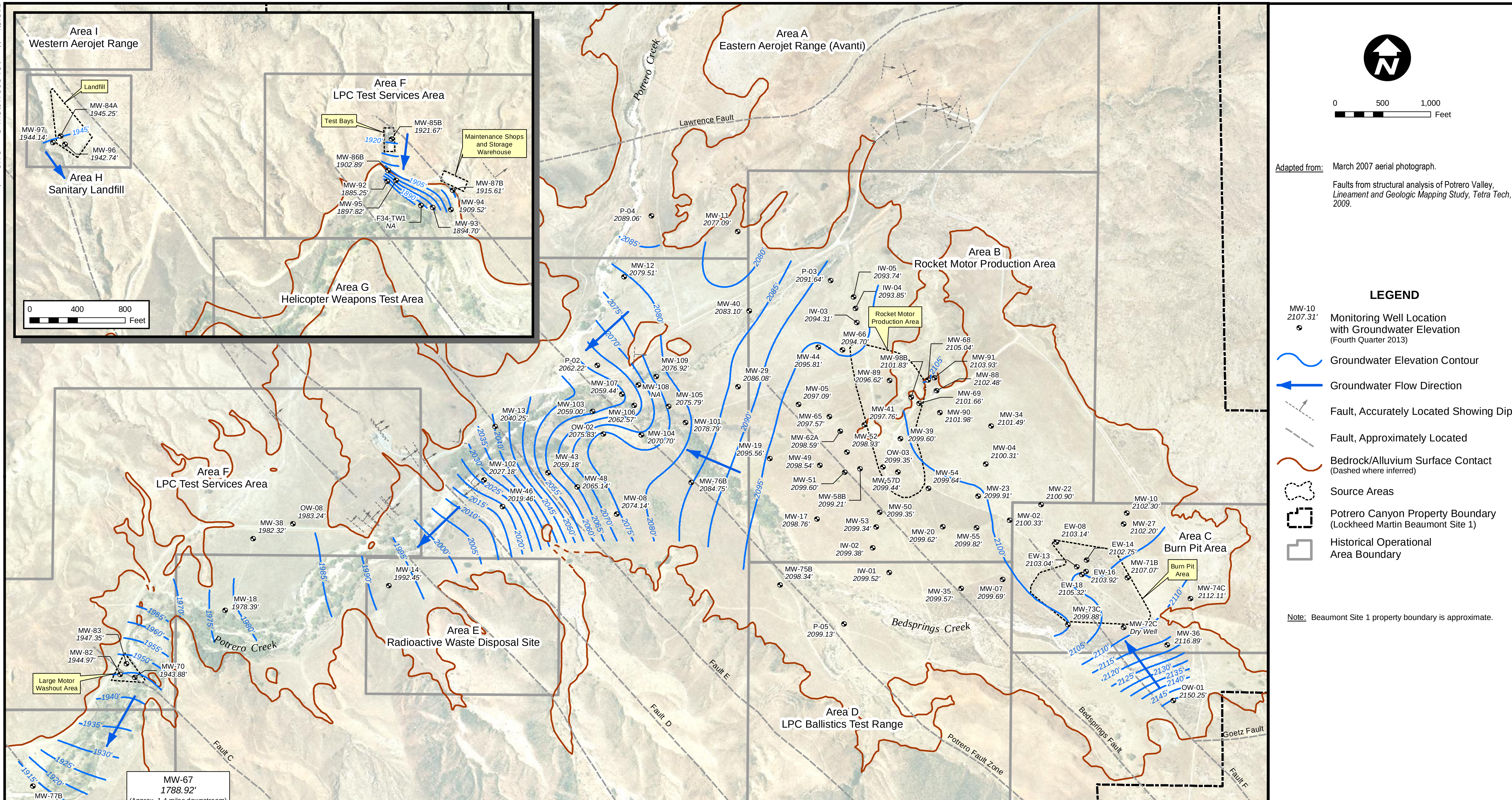
- MW-10 2107.31' — Monitoring Well Location with Groundwater Elevation (Third Quarter 2013)
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Bedrock/Alluvium Surface Contact (Dashed where inferred)
- Source Areas
- Potrero Canyon Property Boundary (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Note: Beaumont Site 1 property boundary is approximate.

Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 5
Groundwater Contours for Alluvium and Weathered Mount Eden Formation- Third Quarter 2013

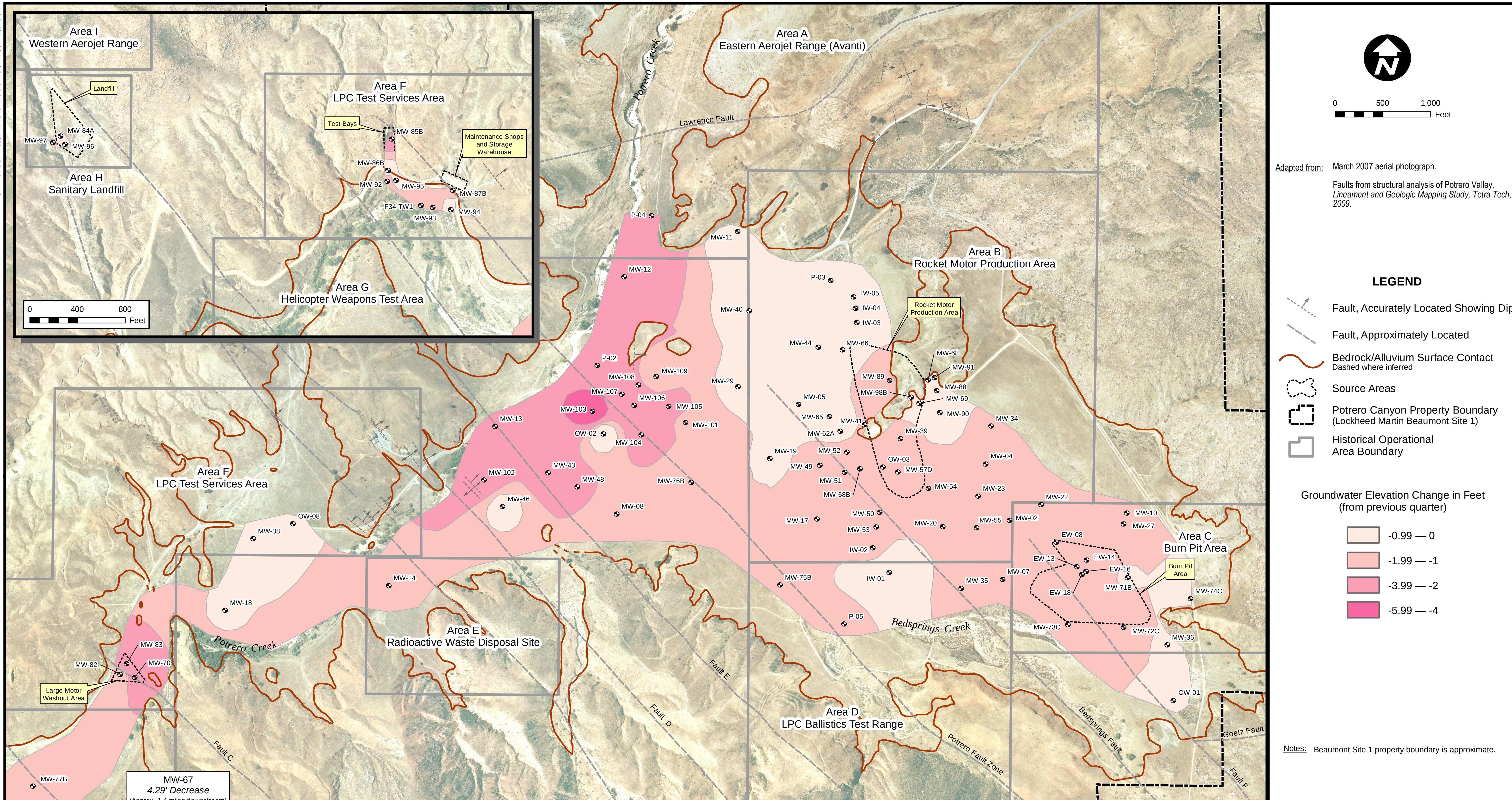
TETRA TECH



Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 6
Groundwater Contours for Alluvium and Weathered Mount Eden Formation-Fourth Quarter 2013

TETRA TECH

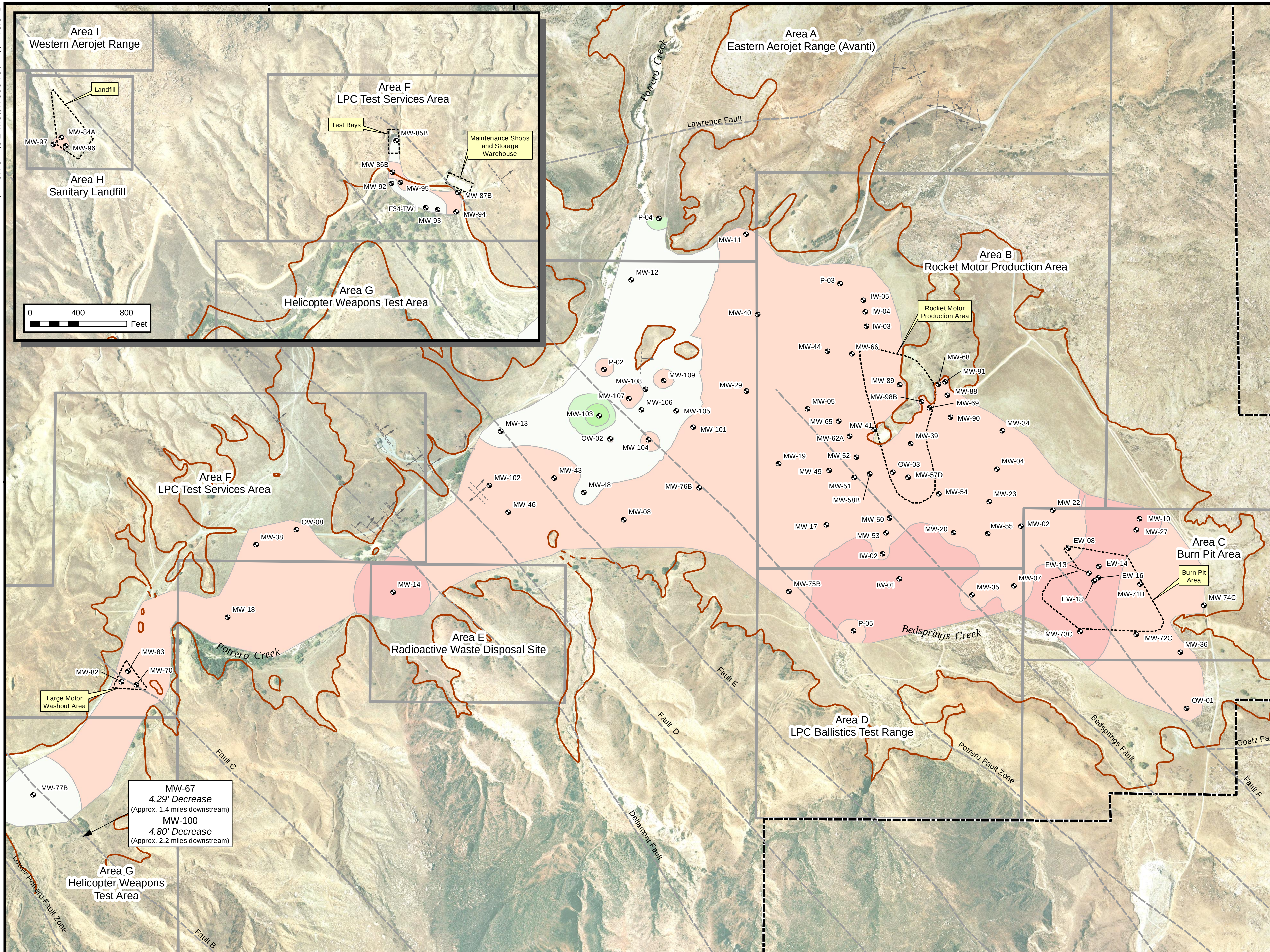


Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 7

Groundwater Elevation Change- Third Quarter 2013

TETRA TECH



0 500 1,000 Feet

Adapted from: March 2007 aerial photograph.

Faults from structural analysis of Potrero Valley, *Lineament and Geologic Mapping Study, Tetra Tech, 2009.*

LEGEND

- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Bedrock/Alluvium Surface Contact (Dashed where inferred)
- Source Areas
- Potrero Canyon Property Boundary (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Groundwater Elevation Change in Feet (from previous quarter)

- 2.01 — 4
- 1.01 — 2
- 0 — 1
- -0.99 — 0
- -1.99 — -1

Notes: Beaumont Site 1 property boundary is approximate.

Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 8

Groundwater Elevation Change- Fourth Quarter 2013

TETRA TECH

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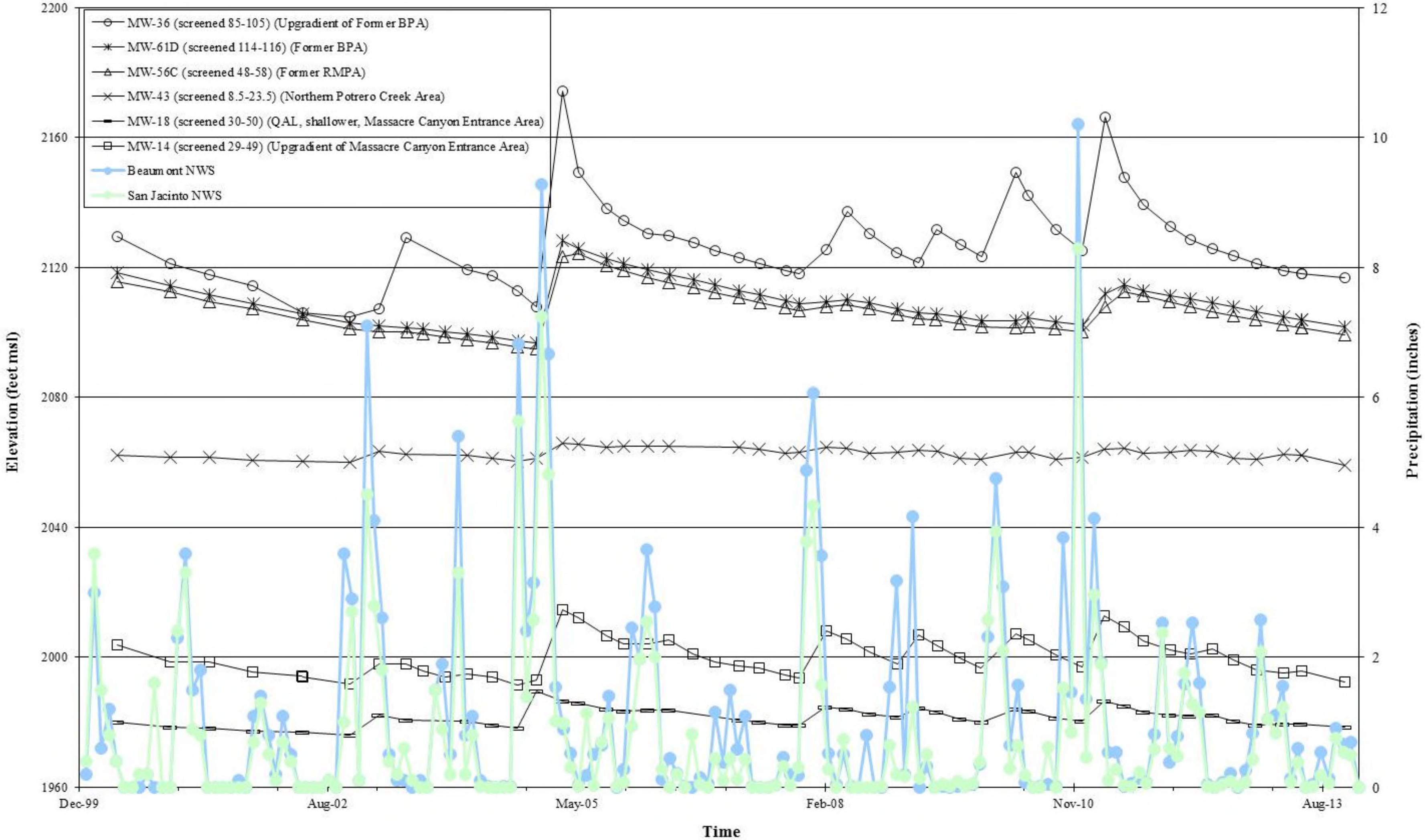
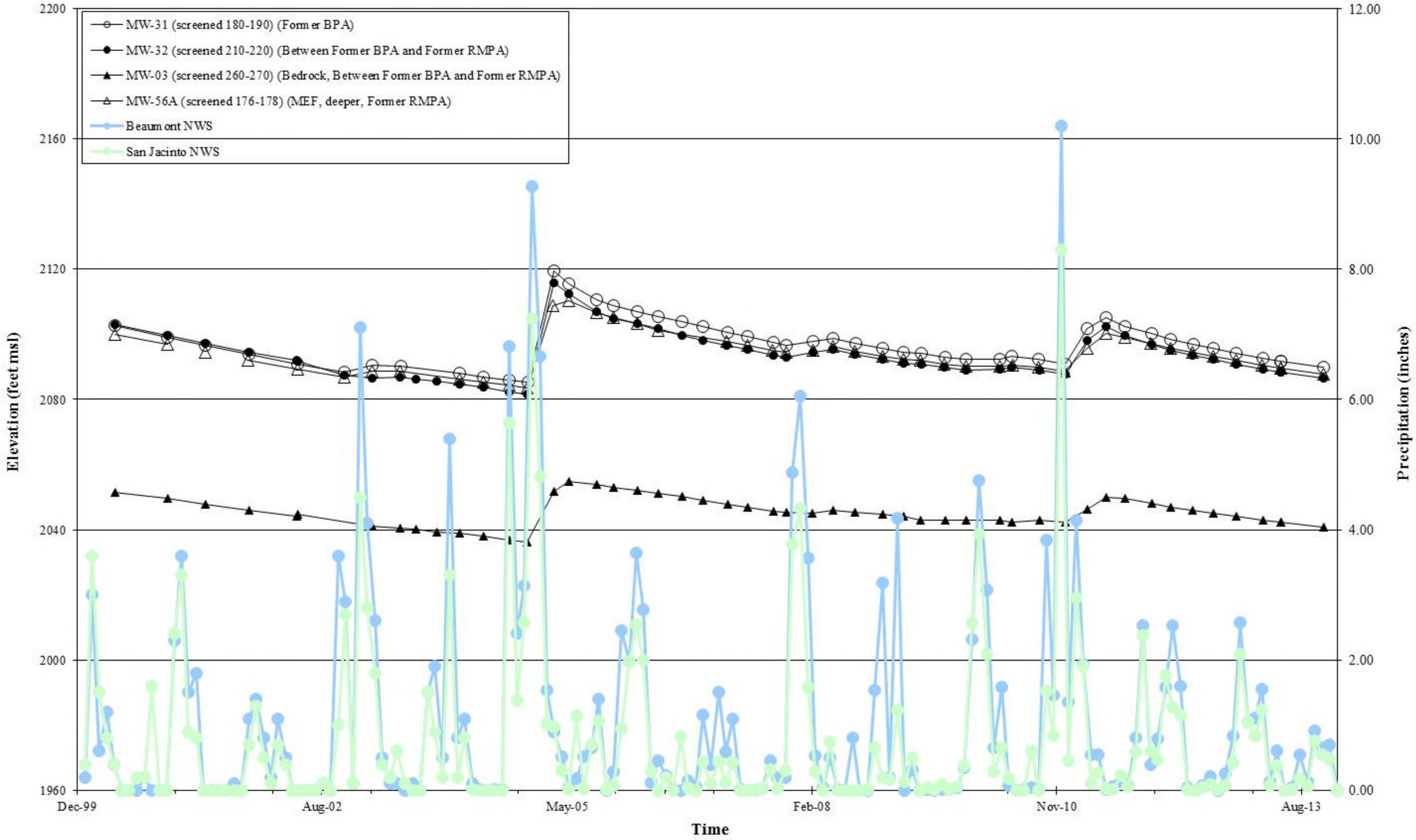
Figure 9 Groundwater Elevations vs. Time - Selected Alluvial and Shallow Mount Eden Formation Wells



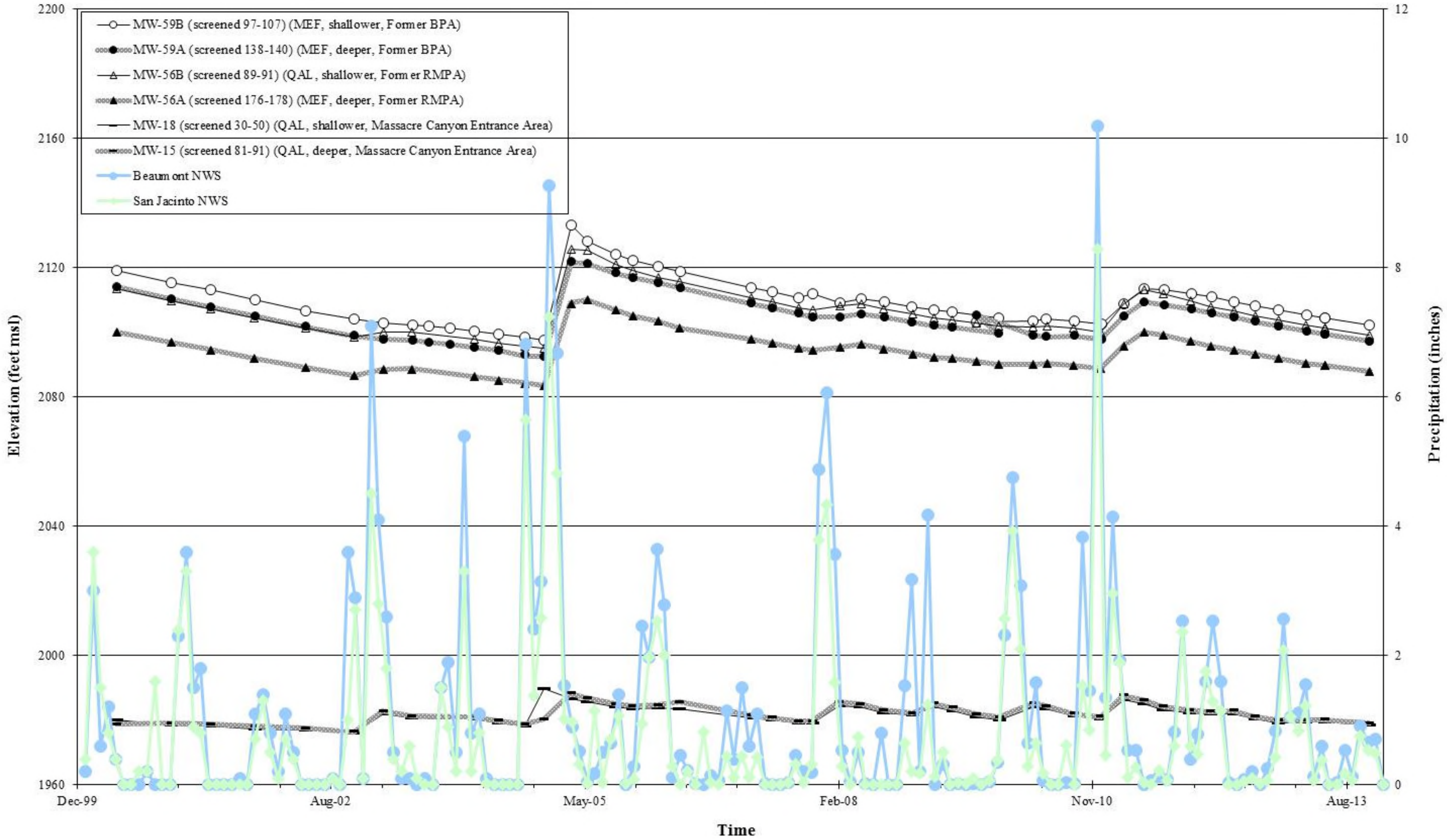
Notes: BPA – Burn Pit Area msl – mean sea level NWS - National Weather Service QAL – Quaternary alluvium RMPA – Rocket Motor Production Area

Figure 10 Groundwater Elevations vs. Time - Deeper Mount Eden Formation and Granitic/Metasedimentary Bedrock Wells



Notes: BPA – Burn Pit Area msl – mean sea level NWS - National Weather Service QAL – Quaternary alluvium RMPA – Rocket Motor Production Area

Figure 11 Groundwater Elevations Comparison - Selected Shallower and Deeper Screened Wells in the Alluvium and Shallow Mount Eden Formation



Notes: BPA – Burn Pit Area msl – mean sea level NWS - National Weather Service QAL – Quaternary alluvium RMPA – Rocket Motor Production Area

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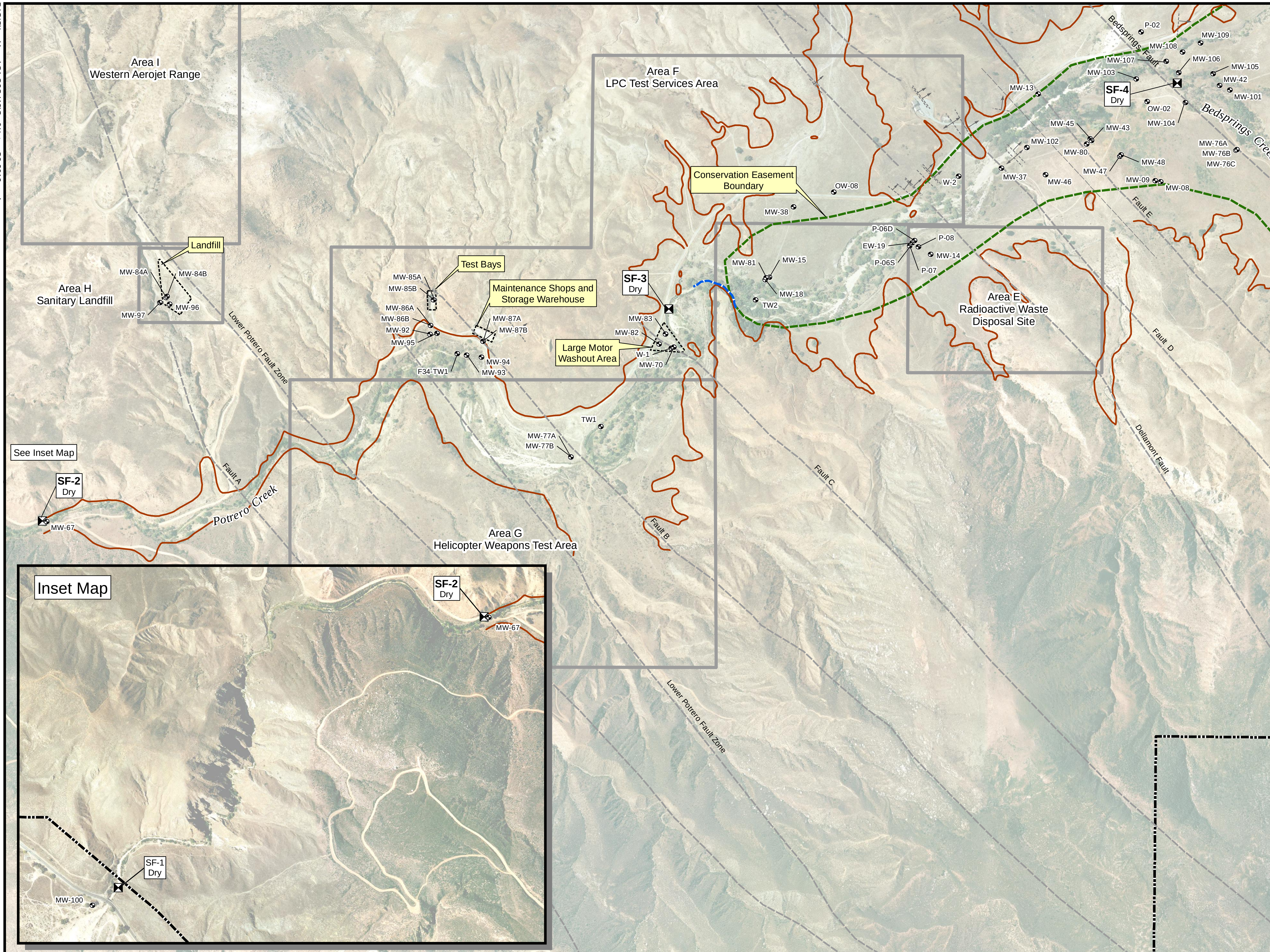

0 500 1,000 Feet

Adapted from: March 2007 aerial photograph.

Faults from structural analysis of Potrero Valley, *Lineament and Geologic Mapping Study, Tetra Tech, 2009.*

LEGEND

- Existing Well Location
- Surface Flow Measurement Location
- Surface Water Flow
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Bedrock/Alluvium Surface Contact
  Dashed where inferred
- Source Areas
- Conservation Easement Boundary
- Potrero Canyon Property Boundary
  (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Notes:

Beaumont Site 1 property boundary is approximate.

cfs - Cubic feet per second.

Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 12

**Surface Water Flow Locations-
Third Quarter 2013**

TETRA TECH

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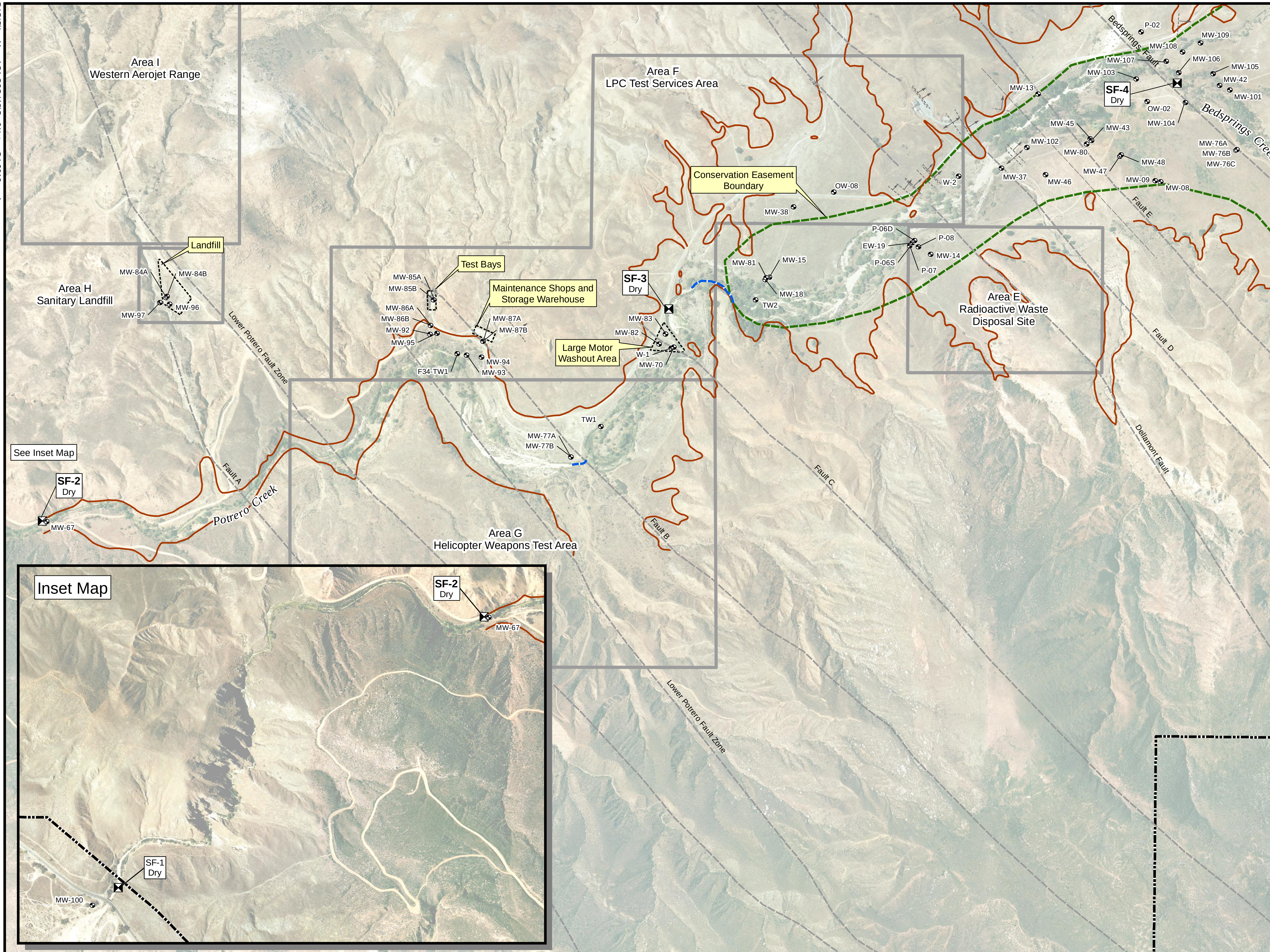

0 500 1,000 Feet

Adapted from: March 2007 aerial photograph.

Faults from structural analysis of Potrero Valley, *Lineament and Geologic Mapping Study, Tetra Tech, 2009.*

LEGEND

- Existing Well Location
- Surface Flow Measurement Location
- Surface Water Flow
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Bedrock/Alluvium Surface Contact
  Dashed where inferred
- Source Areas
- Conservation Easement Boundary
- Potrero Canyon Property Boundary
  (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Notes:

Beaumont Site 1 property boundary is approximate.

cfs - Cubic feet per second.

Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 13

Surface Water Flow Locations-
Fourth Quarter 2013

TETRA TECH

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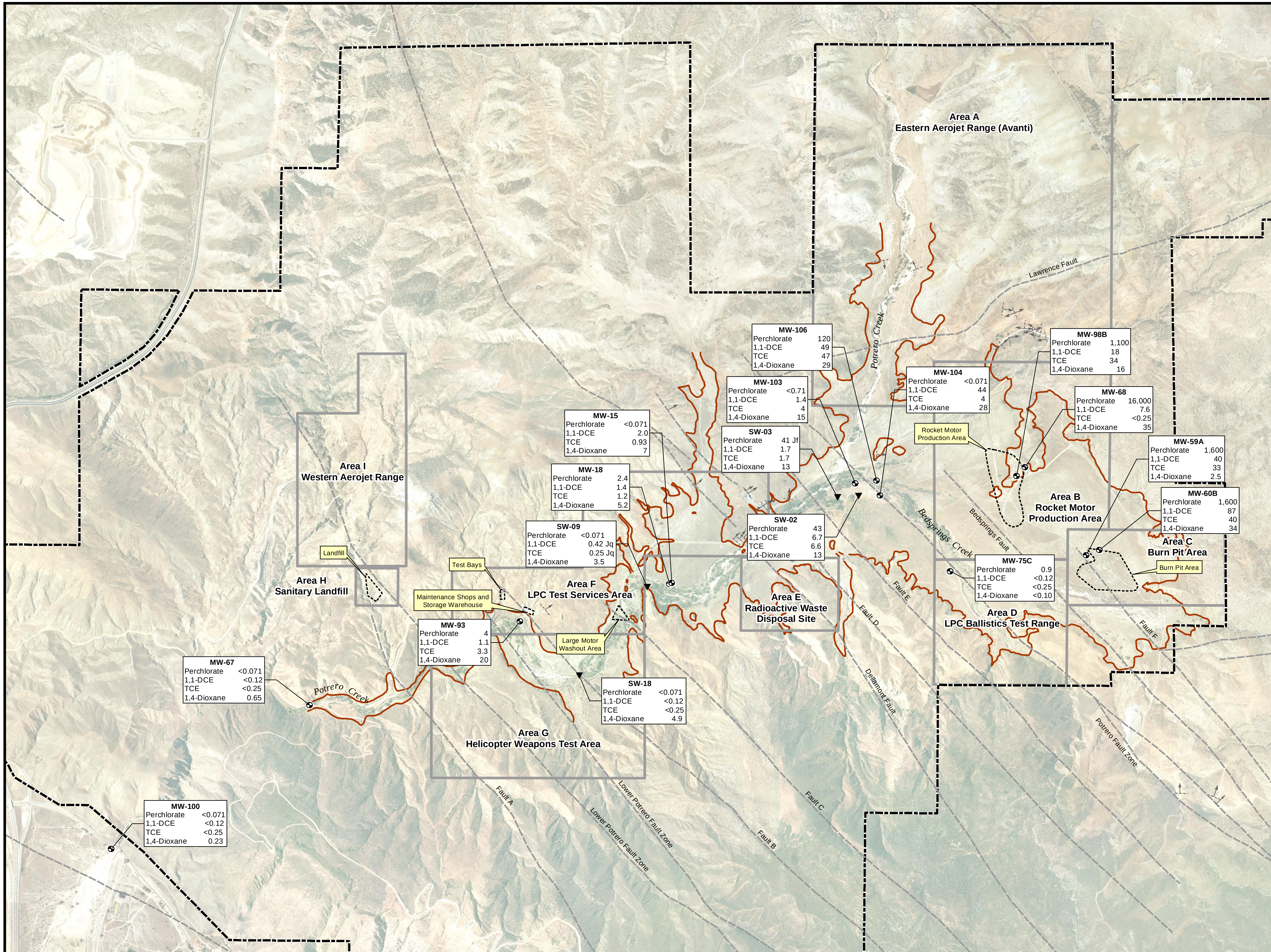

N

0 1,000 2,000 Feet

Adapted from: March 2007 aerial photograph.

Faults from structural analysis of Potrero Valley, *Lineament and Geologic Mapping Study, Tetra Tech, 2009.*

LEGEND

- Monitoring Well Sampling Location
- Surface Water Sampling Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Bedrock/Alluvium Surface Contact
  Dashed where inferred
- Source Areas
- Potrero Canyon Property Boundary
  (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Notes:

DCE - Dichloroethene.

TCE - Trichloroethene

Beaumont Site 1 property boundary is approximate.

Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 14
Primary Chemicals of Potential Concern Sampling Results (µg/L)- Fourth Quarter 2013

TETRA TECH

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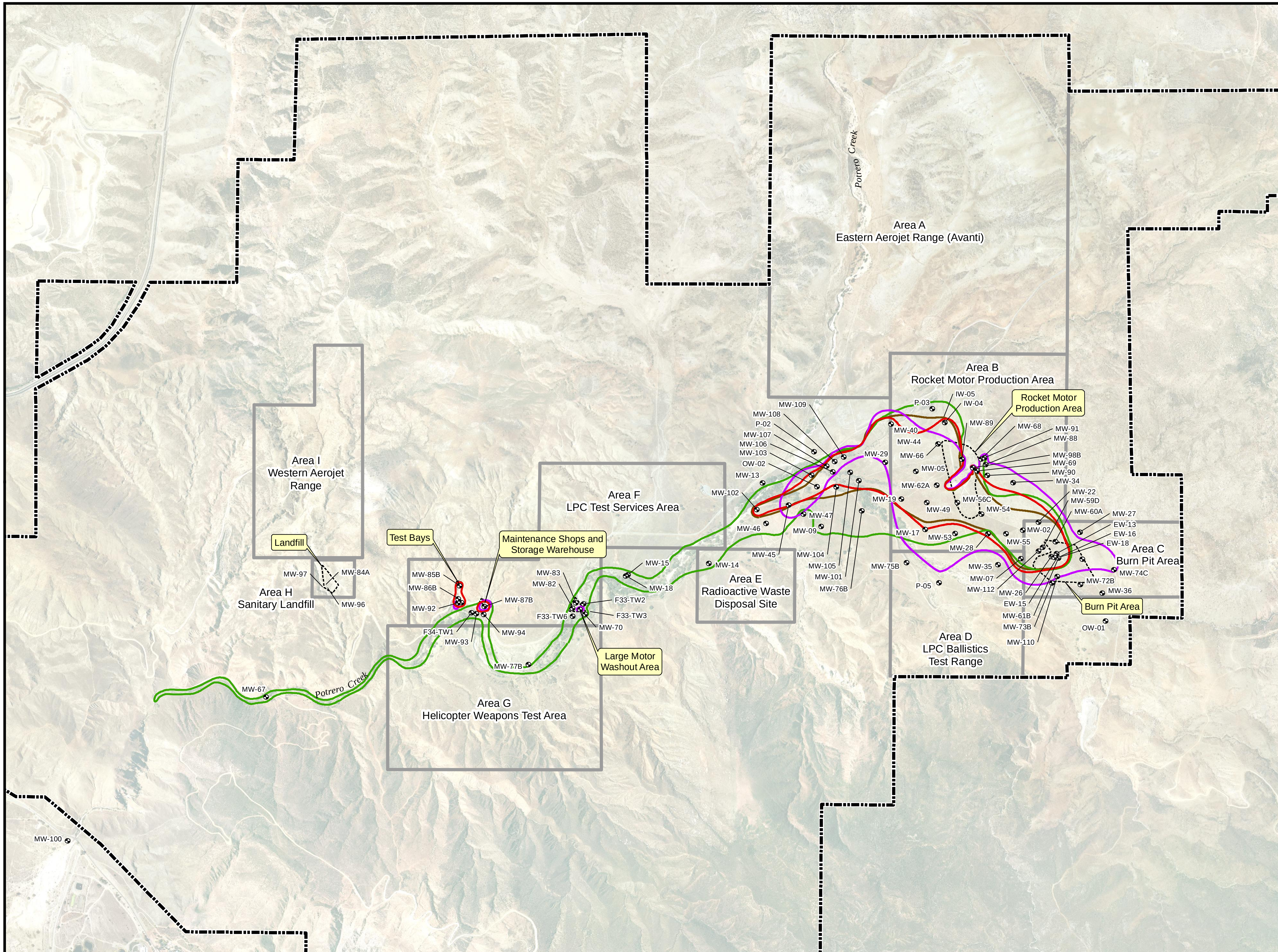

0 1,000 2,000 Feet

Adapted from: March 2007 aerial photograph.

Faults from structural analysis of Potrero Valley, *Lineament and Geologic Mapping Study, Tetra Tech, 2009.*

LEGEND

- Perchlorate (6.0 µg/L) - Dashed where inferred
- 1,4-Dioxane (1.0 µg/L) - Dashed where inferred
- Tricloroethene (5.0 µg/L) - Dashed where inferred
- 1,1-DCE (6.0 µg/L) - Dashed where inferred
- Historical Operational Area Boundary
- Potrero Canyon Property Boundary (Lockheed Martin Beaumont Site 1)

Notes: Beaumont Site 1 property boundary is approximate.

Potrero Canyon
(Lockheed Martin Beaumont Site 1)

Figure 15
Primary Chemicals of Potential Concern Extents for Alluvium and Shallow Mount Eden Formation

TETRA TECH