Semiannual Groundwater Monitoring Report
First Quarter and Second Quarter 2011
Potrero Canyon Unit (Lockheed Martin Beaumont Site 1)
Beaumont, California

Prepared for:

LOCKHEED MARTIN

TETRA TECH

301 E. Vanderbilt Way, Suite 450
San Bernardino, California 92408

TC# 26205-01.010301 / October 2011

Lockheed Martin Enterprise Business Services
Energy, Environment, Safety and Health
2950 North Hollywood Way, Suite 125 Burbank, CA 91505
Telephone 818•847•0197 Facsimile 818•847•0256

LOCKHEED MARTIN

October 24, 2011

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, First and Second Quarter 2011, Lockheed Martin Corporation, Potrero Canyon Unit (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, First and Second Quarter 2011, Lockheed Martin Corporation, Potrero Canyon Unit (Lockheed Martin Beaumont Site 1), Beaumont, California* for your review and approval or comment.

In the meantime, 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 Thorne, Project Lead

Enclosure: *Semiannual Groundwater Monitoring Report, First and Second Quarter 2011, Lockheed Martin Corporation, Potrero Canyon Unit (Lockheed Martin Beaumont Site 1), Beaumont, California*

Copy: Gene Matsushita, LMC (electronic and hard copy)
Sally Drinkard, CDM (electronic copy)
Tom Villeneuve, Tetra Tech (electronic copy)
Hans Kernkamp, Riverside County Waste Management (electronic copy)
Alan Bick, Gibson Dunn (electronic copy)

Semiannual Groundwater Monitoring Report First Quarter and Second Quarter 2011 Potrero Canyon Unit (Lockheed Martin Beaumont Site 1) Beaumont, California

Prepared for:

Lockheed Martin Corporation

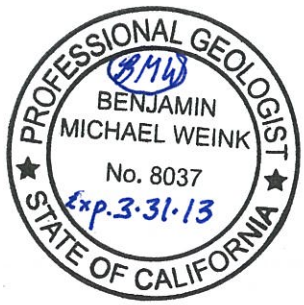
Prepared by:

Tetra Tech, Inc.

October 2011

Christopher Patrick
Environmental Scientist

Benjamin M. Weink, P.G. (8037)
Project Manager



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ACRONYMS

AFCEE	Air Force Center for Environmental Excellence
BPA	burn pit area
BTOC	below top of casing
cfs	cubic feet per second
COPC	chemical of potential concern
COV	Coefficient of Variation
CSM	conceptual site model
1,1-DCA	1,1-dichloroethane
1,2-DCA	1,2-dichloroethane
1,1 -DCE	1,1-dichloroethene
cis-1,2-DCE	cis-1,2-dichloroethene
DG	downgradient
DO	dissolved oxygen
DOC	dissolved organic carbon
DWNL	California Department of Public Health drinking water notification level
EC	electrical conductivity
EPA	United States Environmental Protection Agency
ft/ft	feet per foot
GMP	Groundwater Monitoring Program
GPS	global positioning system
HCP	Habitat Conservation Plan
IUOE	International Union of Operating Engineers

LCS	laboratory control samples
LMC	Lockheed Martin Corporation
LPC	Lockheed Propulsion Company
MAROS	Monitoring and Remediation Optimization System
MCL	maximum contaminant level
MCEA	Massacre Canyon Entrance Area
MDLs	method detection limits
MEF	Mount Eden formation
MeV	million electron volts
mg/L	milligrams per liter
µg/L	micrograms per liter
MS/MSD	matrix spike/matrix spike duplicate
msl	mean sea level
MTBE	methyl tert-butyl ether
MWD	Metropolitan Water District
mV	millivolts
NA	not analyzed / not applicable / not available
ND	Non-detect
nM	nanoMoles
NPCA	Northern Potrero Creek Area
NTUs	nephelometric turbidity units
NWS	National Weather Service
ORP	oxidation-reduction potential
PQL	practical quantitation limit
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.
Report	Semiannual Groundwater Monitoring Report
RMPA	Rocket Motor Production Area
RPD	relative percent difference
S	Mann-Kendall statistic
Site	Potrero Canyon Unit (Lockheed Martin Beaumont Site 1)
1,1,1-TCA	1,1,1-trichloroethane
1,1,2-TCA	1,1,2-trichloroethane
Tetra Tech	Tetra Tech, Inc.
TOC	total organic carbon
TCE	trichloroethene
TNT	2,4,6-trinitrotoluene
UG	upgradient
USFWS	United States Fish and Wildlife Service
VFA	volatile fatty acids
VOCs	volatile organic compounds

SECTION 1 INTRODUCTION

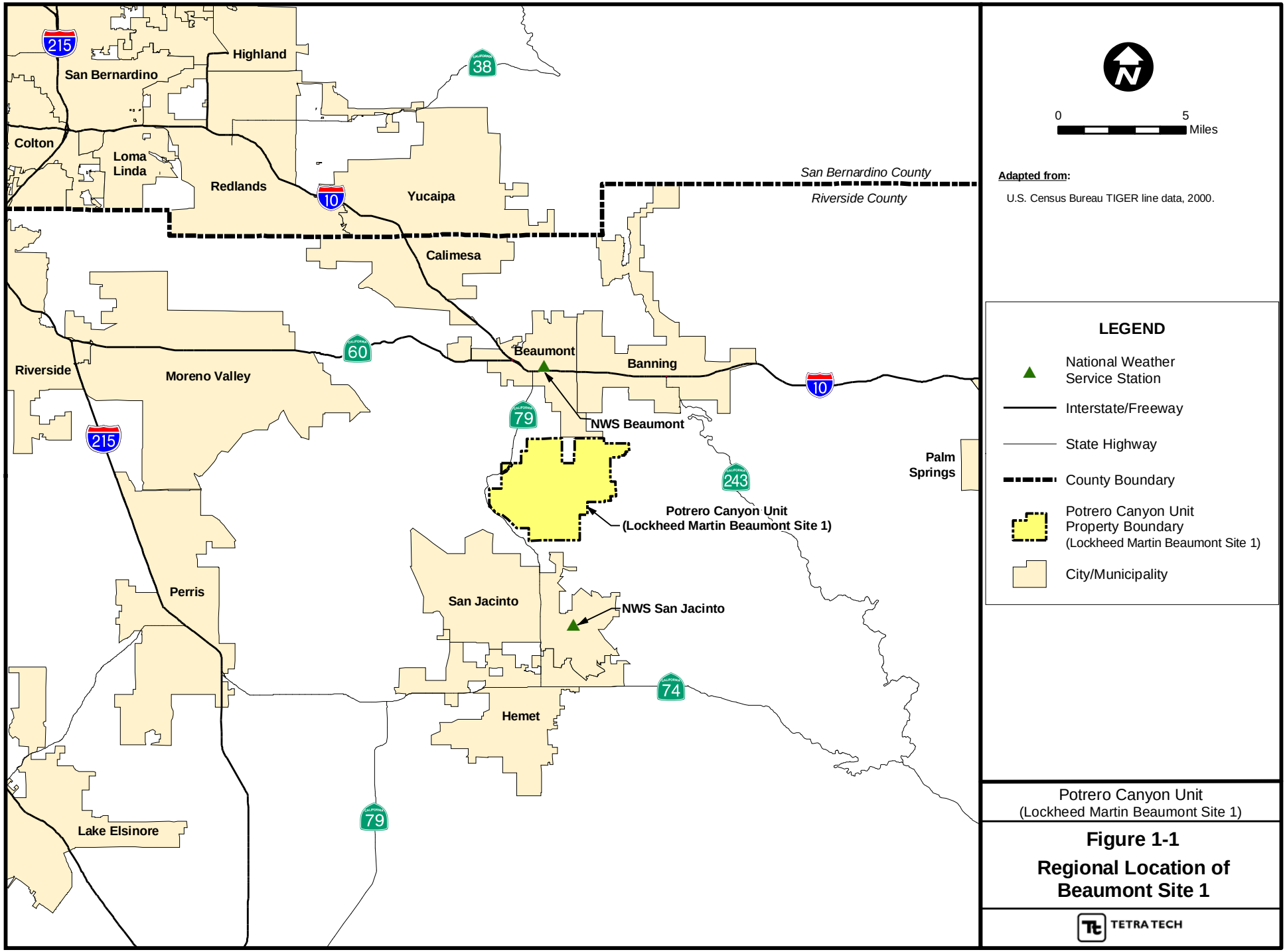
This Semiannual Groundwater Monitoring Report (Report) has been prepared by Tetra Tech, Inc. (Tetra Tech), on behalf of Lockheed Martin Corporation (LMC), and presents the results of the First Quarter 2011 (1 January 2011 through 31 March 2011) and Second Quarter 2011 (1 April 2011 through 7 July 2011) water quality monitoring activities of the Potrero Canyon Unit (Lockheed Martin Beaumont Site 1) (Site) Groundwater Monitoring Program (GMP). The Second Quarter monitoring activities extended into the first week of the Third Quarter due to the significant road repair activities caused by the heavy rainfall this winter. Site 1 is located within the Beaumont City limits in an undeveloped area south of the City of Beaumont, Riverside County, California (Figure 1-1). Currently, the Site is inactive with the exception of environmental investigations performed under Consent Order 88/89-034 and Operation and Maintenance Agreement 93/94-025 with the Department of Toxic Substances Control. The State of California owns approximately 94 percent (8,552 acres) of Beaumont Site 1. The remaining 565 acres, referred to as the conservation easement, was retained by LMC (Figure 1-2).

The GMP includes quarterly, semiannual, annual, and biennial monitoring tasks with both groundwater and surface water collected and sampled as shown in Appendix A, Table 1-1. 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. 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 objectives of this Report are to accomplish the following:

- Briefly summarize the site history
- Document water level and water quality monitoring procedures and results, and
- 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. A brief description of the previous site environmental investigations and the current conceptual site model (CSM) can be found in Appendix A.



Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 1-1

Regional Location of Beaumont Site 1

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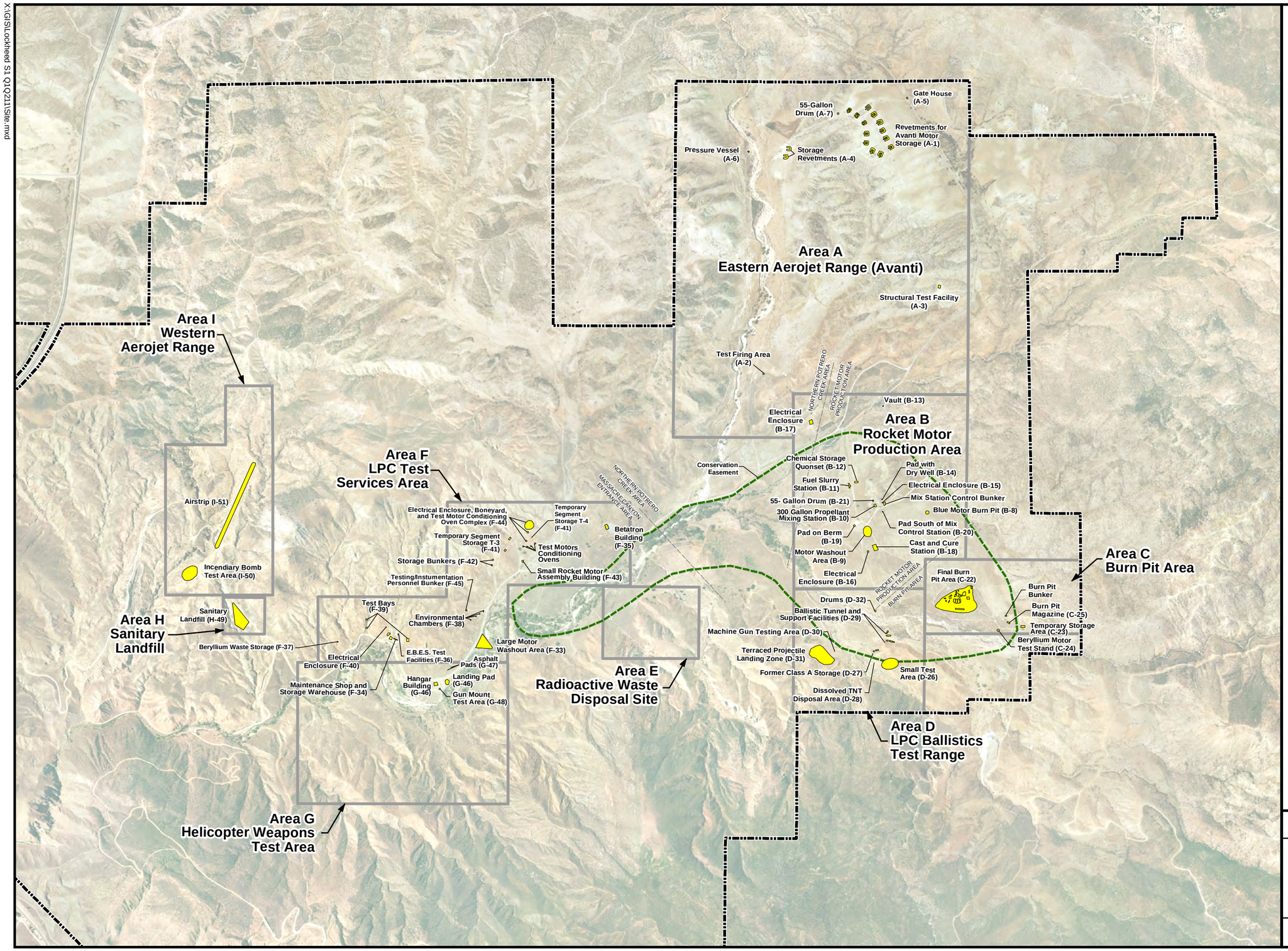
X:\GIS\Lockheed S1 Q1Q2211\Site.mxd



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

- Historic Feature Location
- Conservation Easement Boundary
- Historical Operational Area Boundary
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)

Note: Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 1-2
Historical Operational Areas, Site Features, and Conservation Easement

TETRA TECH

1.1 SITE BACKGROUND

The Site is a 9,117 acre parcel located in the southern portion of Beaumont, California. The Site was primarily used for ranching prior to 1960. From 1960 to 1974, the Site was used by Lockheed Propulsion Company (LPC) 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 (BPA).

Nine primary historical operational areas have been identified at the Site. A site historical operational areas and features map is presented as Figure 1-2. Historical operational areas were used for various activities associated with rocket motor assembly, testing, and propellant incineration. 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, utilized the land directly east of the Eastern Aerojet Range, including several U-shaped revetments for the storage of explosive materials and rocket motors. Due to its classified status, the purpose of the Avanti project and its operational procedures are unknown (Radian, 1986).

Historical Operational Area B – Rocket Motor Production Area

The Rocket Motor Production Area (RMPA), 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 located south of the mixing station (Radian, 1986).

In 1973, an area east of the mixing station, known as the Blue Motor Burn Pit, was utilized 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 BPA consisted of 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 – LPC Ballistics Test Range

The LPC 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 located 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 Area I.) At a small area near the bend in the road, acetone was used to dissolve 2,4,6-trinitrotoluene (TNT) 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 LPC test services area as reported by former site employees. In 1990, the radioactive waste was located

and removed. 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 – LPC Test Services Area

The LPC 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 (MeV) 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 a secondary washout area located 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 LPC test bays. During several of the initial tests conducted at Bay 309, 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 within this area included a hanger (Building 302), helicopter landing pad, stationary ground-mounted gun platforms, and a mobile target suspended between towers. The primary project at this test area was testing of both stationary guns and guns mounted on helicopters. Experimentation also was performed on the solid propellant portion of an armor-piercing round. The majority of rounds were fired into the side of the creek wash, about 100 yards to the south of the hanger. 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 LPC to dispose of trash such as paper, scrap metal, concrete, and wood generated during routine daily operations. Lockheed policy strictly dictated that hazardous

materials were not to be disposed of 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. LPC 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 LPC Ballistics Test Area. According to Radian'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 Munitions and Explosives of Concern investigations performed in 2006 (Tetra Tech, 2007), it was discovered that inert 27.5-millimeter projectiles were tested in this area.

Post LPC and Aerojet Facility Usage

LMC 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 (IUOE) utilized the Site from 1971 through 1991 for surveying and heavy equipment training. The main office of the IUOE was formerly located within Bunker 304 of Historical Operational Area F (LPC Test Services Area). The IUOE earth-moving activities involved maintaining roads and reshaping various parts of the Site, primarily within Historical Operational Areas F and G.

On several occasions, General Dynamics utilized Historical Operational Area B (RMPA) 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 First Quarter 2011 and Second Quarter 2011 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 for 179 wells were proposed for the First Quarter 2011 and Second Quarter 2011 monitoring events. The First Quarter 2011 groundwater level measurements were collected from 179 of the Site's wells between March 14 and March 17, 2011. The Second Quarter 2011 groundwater level measurements were collected from 179 of the Site's wells between June 1 and June 3, 2011. Copies of 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.

In order to correlate observed changes in groundwater levels with local precipitation, precipitation data is collected from the local weather station in Beaumont. During First Quarter 2011, the Beaumont National Weather Service (NWS) station reported approximately 7.42 inches of precipitation. During Second Quarter 2011, the Beaumont NWS reported approximately 1.09 inches of precipitation.

2.2 SURFACE WATER FLOW

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 drainage and storm water runoff from the city of Beaumont as well as other ephemeral streams in the southern and eastern portions of the Site. The largest of the tributary drainages is Bedsprings Creek, which is located southwest of the former RMPA and former 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, while 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). In general, creeks are dry except during and immediately after periods of heavy rainfall. The areas within Potrero and Bedsprings Creek where surface water was present were mapped during the First Quarter 2011 and Second Quarter 2011 groundwater monitoring events. The four previously identified fixed locations were checked for flowing water and, if present, the flow rate and volume were determined through field observation and measurements.

2.3 GROUNDWATER AND SURFACE WATER SAMPLING

The frequency of groundwater monitoring is dependent on the well's classification within the network and intended monitoring purpose. Groundwater is sampled as frequently as quarterly and surface water samples are collected semiannually. The First Quarter 2011 monitoring event consisted of water level monitoring, the quarterly sampling of newly installed wells, and storm water sampling. The Second Quarter 2011 monitoring event consisted of water level monitoring; surface water sampling; the quarterly sampling of newly installed wells; the semiannual sampling of increasing contaminant trend wells, guard wells, contaminant attenuation wells, and the annual sampling of plume monitoring and vertical distribution wells. Tables 2-1 and 2-2 list the locations sampled during the First Quarter 2011 and Second Quarter 2011 monitoring events, and the locations sampled for contaminant attenuation parameters, respectively. Contaminant attenuation parameters include: total organic carbon (TOC), dissolved organic carbon (DOC), total iron, ferrous iron, sulfide, sulfate, methane, ethane, ethene, hydrogen, and volatile fatty acids (VFAs). The tables summarize analytical methods, sampling dates, quality assurance/quality control (QA/QC) samples collected, and field notes.

Surface water samples are collected from up to 17 fixed locations. One 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) (Figure 2-1).

Because of the ephemeral nature of the streams on the Site, certain locations are generally sampled only during or shortly after periods of precipitation. Sampling, analytical, and QA/QC procedures for the monitoring events are described in the Beaumont Sites 1 and 2, Programmatic Sampling and Analysis Plan (Tetra Tech, Inc., 2010a).

Table 2-1 Sampling Schedule - First Quarter 2011

Sample Location	Sample Date	VOCs (1)	1,4-Dioxane (2)	Per-chlorate (3)	Comments and QA / QC Samples
SW-06	03/21/11	X	X	X	Surface Water
SW-07	NA	-	-	-	Surface Water - Dry no sample collected
SW-08	03/21/11	X	X	X	Surface Water
SW-09	03/21/11	X	X	X	Surface Water
SW-10	03/21/11	X	X	X	Surface Water
SW-11	NA	-	-	-	Surface Water - Dry no sample collected
SW-12	03/21/11	X	X	X	Surface Water
SW-13	03/21/11	X	X	X	Surface Water
SW-14	03/21/11	X	X	X	Surface Water
SW-15	03/21/11	X	X	X	Surface Water
SW-16	03/21/11	X	X	X	Surface Water
SW-18	03/21/11	X	X	X	Surface Water
SW-19	03/21/11	X	X	X	Surface Water
MW-103	03/24/11	X	X	X	Sample with Peristaltic Pump
MW-104	03/24/11	X	X	X	Sample with Peristaltic Pump, MS/MSD
MW-105	03/24/11	X	X	X	Sample with Peristaltic Pump
MW-106	03/24/11	X	X	X	Sample with Peristaltic Pump
MW-107	03/24/11	X	X	X	Sample with Peristaltic Pump
MW-108	03/24/11	X	X	X	Sample with Peristaltic Pump
MW-109	03/24/11	X	X	X	Sample with Peristaltic Pump, Duplicate MW-109-Dup

Total Sample Locations: 20

Total Samples Collected: 18

Notes:

Well not sampled or surface water sample not collected.

(1) - Volatile organic compounds (VOCs) analyzed by EPA Method SW8260B.

(2) - 1,4 - Dioxane analyzed by EPA Method SW8270C SIM

(3) - Perchlorate analyzed by EPA Method E332.0.

"-" - Not analyzed.

MS / MSD - Matrix Spike / Matrix Spike Duplicate.

Table 2-2 Sampling Schedule - Second Quarter 2011

Sample Location	Sample Date	VOCs (1)	VOCs (2)	1,4-Dioxane (3)	Per chlorate (4)	Lead (5)	Natural Attenuation Parameters (6)	Comments and QA / QC Samples
PPW-1-1	05/10/11	-	X	X	X	-	-	Private Production Well - MS/MSD
PPW-1-2	05/10/11	-	X	X	X	-	-	Private Production Well - Duplicate
PPW-1-3	NA	-	-	-	-	-	-	Private Production Well - Well unable to be sampled
PPW-1-4	05/10/11	-	X	X	X	-	-	Private Production Well
SW-01	NA	-	-	-	-	-	-	Surface Water - Dry no sample collected
SW-02	06/10/11	X	-	X	X	-	-	Surface Water - Duplicate SW-02-Dup
SW-03	06/10/11	X	-	X	X	-	-	Surface Water
SW-04	06/10/11	X	-	X	X	-	-	Surface Water
SW-06	06/10/11	X	-	X	X	-	-	Surface Water
SW-07	06/10/11	X	-	X	X	-	-	Surface Water
SW-08	NA	-	-	-	-	-	-	Surface Water Sample - Dry no sample collected
SW-09	06/10/11	X	-	X	X	-	-	Surface Water
SW-10	NA	-	-	-	-	-	-	Surface Water - Dry no sample collected
SW-11	NA	-	-	-	-	-	-	Surface Water - Dry no sample collected
SW-12	NA	-	-	-	-	-	-	Surface Water - Dry no sample collected
SW-13	NA	-	-	-	-	-	-	Surface Water - Dry no sample collected
SW-14	NA	-	-	-	-	-	-	Surface Water - Dry no sample collected
SW-15	NA	-	-	-	-	-	-	Surface Water - Dry no sample collected
SW-16	06/10/11	X	-	X	X	-	-	Surface Water
SW-17	NA	-	-	-	-	-	-	Sample only if SW-16 is dry
SW-18	06/10/11	X	-	X	X	-	-	Surface Water - MS/MSD
SW-19	06/10/11	X	-	X	X	-	-	Surface Water
EW-13	07/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
F33-TW2	06/08/11	X	-	X	X	-	X	Sample with Peristaltic Pump
F33-TW3	06/08/11	X	-	X	X	-	X	Sample with Peristaltic Pump
F33-TW6	06/13/11	X	-	X	X	-	X	Sample with Peristaltic Pump
F33-TW7	06/13/11	X	-	X	X	-	X	Sample with Peristaltic Pump
F34-TW1	06/06/11	X	-	X	X	-	-	Sample with Peristaltic Pump, MS/MSD
IW-04	06/14/11	X	-	X	X	-	-	Sample with Dedicated Pump, Duplicate IW-04-Dup
MW-02	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-05	06/16/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-07	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-09	06/13/11	X	-	X	X	-	-	Sample with Peristaltic Pump
MW-13	06/09/11	X	-	X	X	-	-	Sample with Dedicated Pump, MS/MSD
MW-14	06/09/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-15	06/07/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-17	06/15/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-18	06/07/11	X	-	X	X	-	-	Sample with Dedicated Pump, Duplicate MW-18-Dup
MW-19	06/16/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-22	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump, Duplicate MW-22-Dup
MW-26	07/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-27	06/14/11	X	-	X	X	-	-	Sample with Dedicated Pump, MS/MSD
MW-28	06/16/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-29	7/6/2011	X	-	X	X	-	-	Sample with Portable Bladder Pump
MW-34	06/16/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-35	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-36	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-40	06/17/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-45	06/13/11	X	-	X	X	-	-	Sample with Peristaltic Pump
MW-46	06/09/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-47	06/13/11	X	-	X	X	-	-	Sample with Peristaltic Pump
MW-49	06/17/11	X	-	X	X	-	-	Sample with Dedicated Pump

Total Sample Locations: 103
Total Samples Collected: 93

Notes:

Well not sampled or surface water sample not collected.

(1) - Volatile organic compounds (VOCs) analyzed by EPA Method SW8260B.
(2) - Volatile organic compounds (VOCs) analyzed by EPA Method 524.2.
(3) - 1,4 - Dioxane analyzed by EPA Method SW8270C SIM
(4) - Perchlorate analyzed by EPA Method E332.0
(5) - Lead analyzed by EPA Method SW6020
(6) - Natural attenuation parameters by various methods
"-" - Not analyzed.
MS / MSD - Matrix Spike / Matrix Spike Duplicate.

Table 2-2 Sampling Schedule - Second Quarter 2011 (continued)

Sample Location	Sample Date	VOCs (1)	VOCs (2)	1,4-Dioxane (3)	Perchlorate (4)	Lead (5)	Natural Attenuation Parameters (6)	Comments and QA / QC Samples
MW-53	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-54	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-56C	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-59B	07/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-60A	06/21/11	X	-	X	X	X	-	Sample with Dedicated Pump, Duplicate MW-60A-Dup, MS/MSD for lead
MW-60B	06/21/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-61B	07/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-62A	06/16/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-66	06/17/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-67	06/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-68	06/21/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-69	06/17/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-70	06/08/11	X	-	X	X	-	X	Sample with Dedicated Pump, Duplicate MW-70-Dup
MW-71B	06/14/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-71C	06/14/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-72B	06/14/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-73B	06/14/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-74C	06/14/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-75B	06/17/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-76A	06/09/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-76B	06/09/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-77B	06/07/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-82	06/08/11	X	-	X	X	-	X	Sample with Dedicated Pump, MS/MSD
MW-83	06/08/11	X	-	X	X	-	X	Sample with Dedicated Pump
MW-85B	06/07/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-86B	06/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-87B	06/07/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-88	06/17/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-89	06/17/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-90	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-91	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-92	06/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-93	06/07/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-94	06/07/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-95	06/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-98B	06/17/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-100	06/06/11	X	-	X	X	-	-	Sample with Dedicated Pump
MW-101	06/15/11	X	-	X	X	-	-	Sample with Dedicated Pump, Duplicate MW-101-Dup
MW-102	06/15/11	X	-	X	X	-	-	Sample with Dedicated Pump, Duplicate MW-102-Dup
MW-103	06/09/11	X	-	X	X	-	-	Sample with Peristaltic Pump
MW-104	06/09/11	X	-	X	X	-	-	Sample with Peristaltic Pump
MW-105	06/09/11	X	-	X	X	-	-	Sample with Peristaltic Pump
MW-106	06/07/11	X	-	X	X	-	-	Sample with Peristaltic Pump
MW-107	06/07/11	X	-	X	X	-	-	Sample with Peristaltic Pump, Duplicate MW-107-Dup
MW-108	06/09/11	X	-	X	X	-	-	Sample with Peristaltic Pump
MW-109	06/09/11	X	-	X	X	-	-	Sample with Peristaltic Pump
OW-01	06/20/11	X	-	X	X	-	-	Sample with Dedicated Pump
OW-02	06/13/11	X	-	X	X	-	-	Sample with Peristaltic Pump, Duplicate OW-02-Dup
P-02	06/09/11	X	-	X	X	-	-	Sample with Dedicated Pump
P-03	06/14/11	X	-	X	X	-	-	Sample with Dedicated Pump
P-05	06/15/11	X	-	X	X	-	-	Sample with Dedicated Pump

Total Sample Locations: 103
Total Samples Collected: 93

Notes:

Well not sampled or surface water sample not collected.

(1) - Volatile organic compounds (VOCs) analyzed by EPA Method SW8260 B.
(2) - Volatile organic compounds (VOCs) analyzed by EPA Method 524.2.
(3) - 1,4 - Dioxane analyzed by EPA Method SW8270C SIM
(4) - Perchlorate analyzed by EPA Method E332.0
(5) - Lead analyzed by EPA Method SW6020
(6) - Natural attenuation parameters by various methods
"-" - Not analyzed.
MS / MSD - Matrix Spike / Matrix Spike Duplicate.

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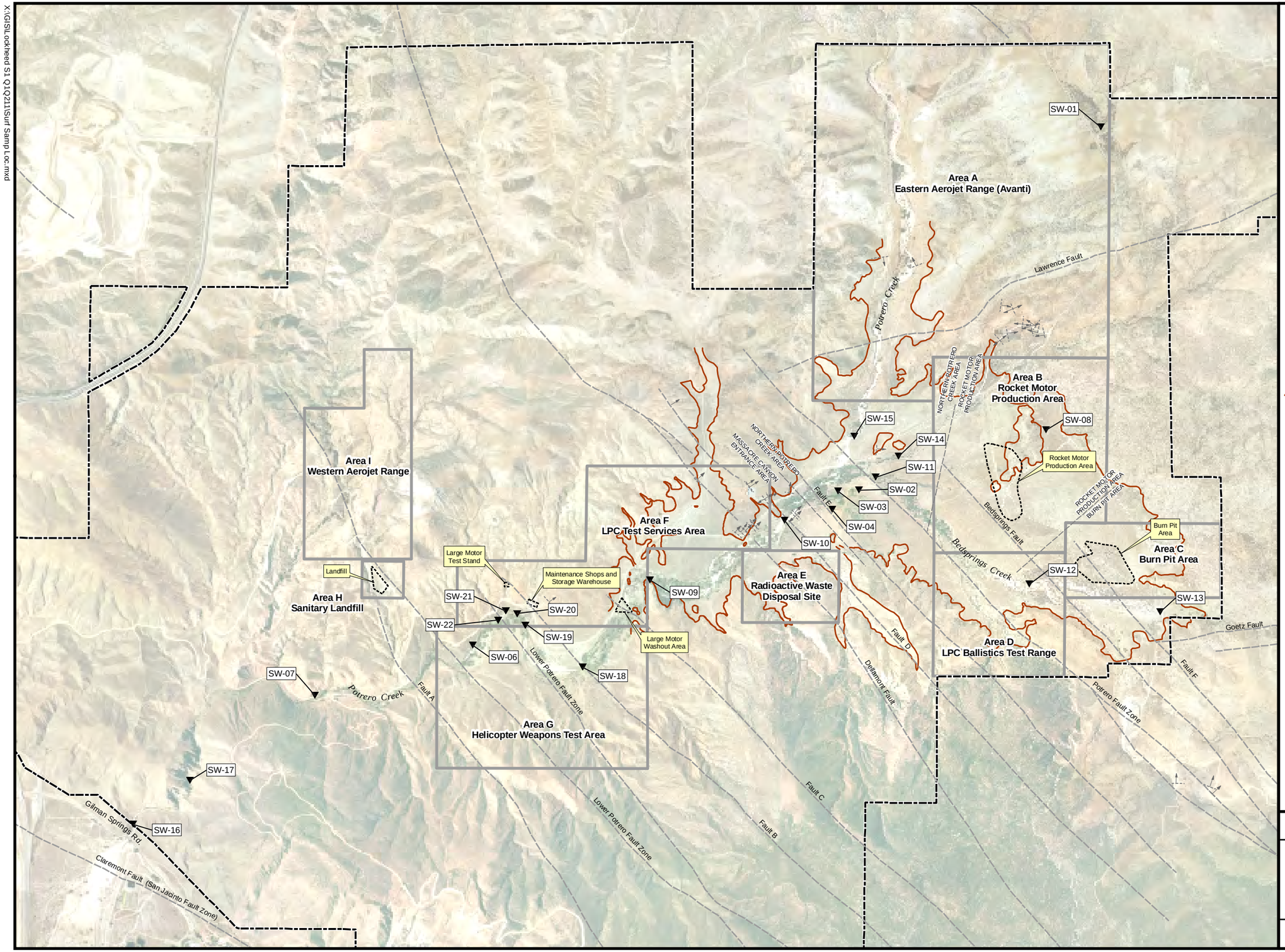

0 1,000 2,000 Feet

Adapted from: March 2007 aerial photograph.

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

LEGEND

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

Notes:
Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 2-1

Surface Water Sample Locations

TETRA TECH

2.3.1 Proposed and Actual Surface Water and Well Locations Sampled

For the First Quarter 2011 monitoring event, a total of 20 sampling locations (13 surface water, and seven monitoring wells) were proposed for water quality monitoring. Two proposed surface water sample locations, SW-06 and SW-11, were not sampled because the locations were dry. Therefore, water quality data was collected from 11 surface water and 7 monitoring well locations. Figure 2-2 presents groundwater and surface water locations sampled for the First Quarter 2011 monitoring event.

For the Second Quarter 2011 monitoring event, a total of 103 sampling locations (17 surface water, one alternate surface water location, four private production wells, and 81 monitoring wells) were proposed for water quality monitoring. One private production well was unable to be sampled due to equipment problems with the well. Eight surface water sample locations were not sampled because the locations were dry. SW-16 was sampled so SW-17, an alternate surface water location sampled when SW-16 is dry, was not sampled. Therefore, water quality data was collected from three private production wells, nine surface water, and 81 monitoring well locations during this event. Figure 2-3 presents groundwater and surface water locations sampled for the Second Quarter 2011 monitoring event.

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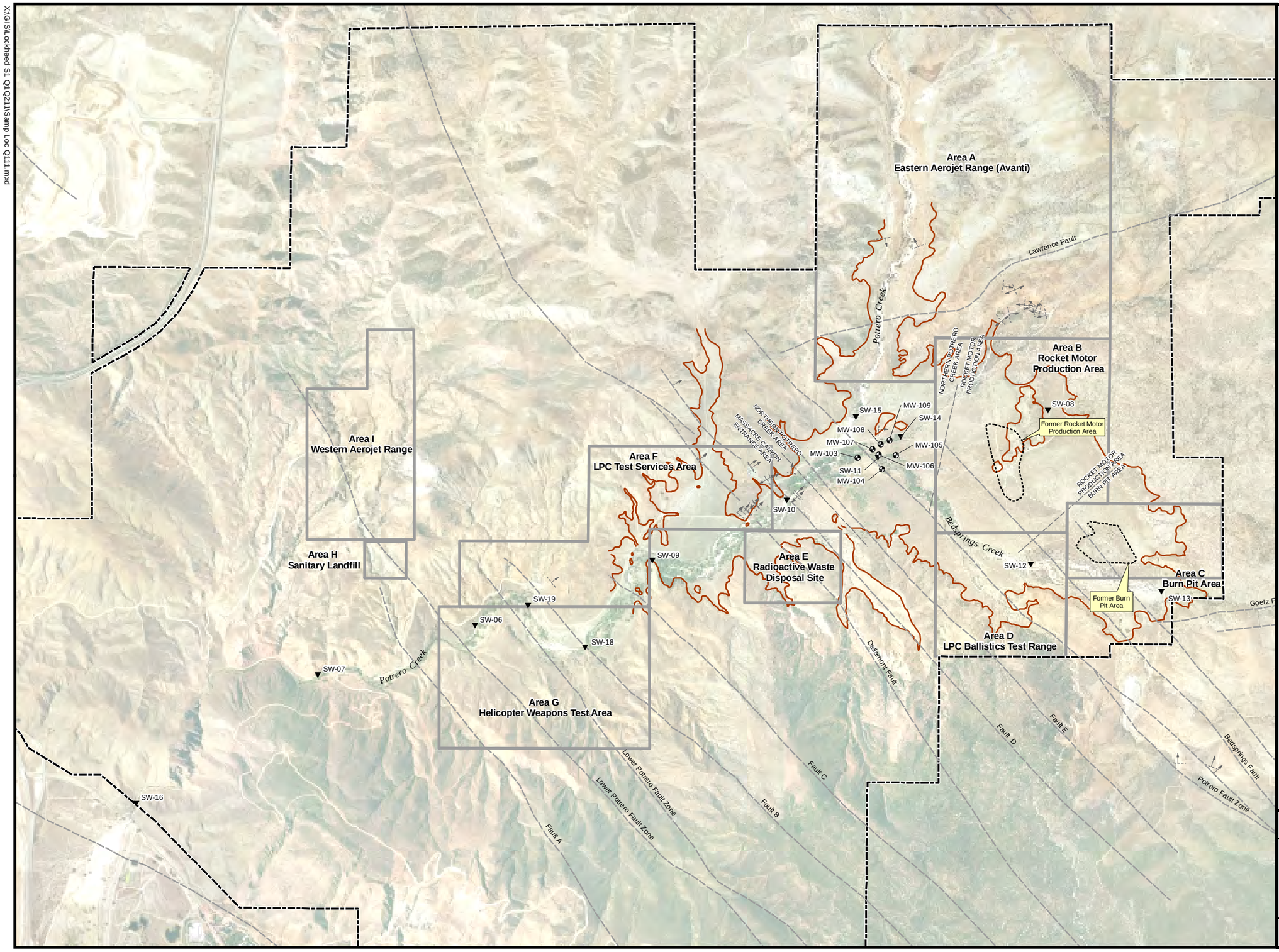

0 1,000 2,000 Feet

Adapted from: March 2007 aerial photograph.

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

LEGEND

- Sampled Well (First Quarter 2011)
- Surface Water Sample Location (First Quarter 2011)
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Bedrock/Alluvium Surface Contact Dashed where inferred
- Burn Pit and Rocket Motor Production Area
- Historical Operational Area Boundary
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)

Note:

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 2-2

First Quarter (March) 2011 Sample Locations

TETRA TECH

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Area A
Eastern Aerojet Range (Avanti)

Area B
Rocket Motor Production Area

Former Rocket Motor Production Area

Area C
Burn Pit Area

Former Burn Pit Area

Area D
LPC Ballistics Test Range

Area E
Radioactive Waste Disposal Site

Area F
LPC Test Services Area

Area G
Helicopter Weapons Test Area

Area H
Sanitary Landfill

Area I
Western Aerojet Range

NORTHERN POTRERO CREEK AREA

ROCKET MOTOR PRODUCTION AREA

MASSACRE CANYON ENTRANCE AREA

ROCKET MOTOR PRODUCTION AREA BURN PIT AREA

Potrero Creek

Lawrence Fault

Bedsprings Creek

Goetz Fault

Dalfamont Fault

Fault A

Fault B

Fault C

Fault D

Fault E

Fault F

Lower Potrero Fault Zone

Potrero Fault Zone

Bedsprings Fault

SW-01 (Dry)
SW-14 (Dry)
MW-109
MW-108
SW-11(Dry)
MW-106
MW-107
SW-15 (Dry)
P-02
MW-103
SW-03
MW-13
MW-102
SW-10 (Dry)
MW-46
MW-45
SW-04
OW-02
SW-02
MW-09
MW-47
MW-18
MW-15
MW-14
SW-09
MW-85B
MW-86B
MW-92
MW-95
MW-87B
F33-TW2
MW-83
MW-82
MW-70
F33-TW3
F33-TW7
F34-TW1
MW-93
MW-94
F33-TW6
SW-06
SW-19
SW-18
MW-77B
SW-07
MW-67
SW-17 (Not Sampled)
SW-16
MW-100
MW-40
MW-89
MW-66
IW-04
P-03
SW-08 (Dry)
MW-68
MW-91
MW-98B
MW-88
MW-69
MW-105
MW-29
MW-05
MW-90
MW-101
MW-62A
MW-34
MW-59B
MW-104
MW-19
MW-56C
MW-22
MW-60A
MW-60B
MW-76A
MW-76B
MW-49
MW-54
MW-27
MW-28
MW-26
MW-61B
MW-17
MW-53
MW-02
MW-71B
MW-07
MW-71C
MW-74C
MW-35
EW-13
MW-36
MW-75B
P-05
SW-12 (Dry)
MW-73B
MW-72B
SW-13 (Dry)
OW-01

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

- Sampled Well (Second Quarter 2011)
- Surface Water Sample Location (Second Quarter 2011)
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Bedrock/Alluvium Surface Contact Dashed where inferred
- Burn Pit and Rocket Motor Production Area
- Historical Operational Area Boundary
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)

Note:

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 2-3

Second Quarter (June) 2011 Sample Locations

TETRA TECH

2.3.2 Field Sampling Procedures

The following water quality field parameters were measured and recorded on field data sheets (Appendix B) during well purging activities: water level, temperature, pH, electrical conductivity (EC), turbidity, oxidation reduction potential (ORP), and dissolved oxygen (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 was initiated when at least one discharge hose / pump volume had been removed and purging was considered complete when the above parameters had stabilized, or 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 manufacturer's 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. Groundwater samples collected were chilled and transported to a state accredited analytical laboratory, via courier, 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. Equipment blanks were collected when sampling with non-dedicated equipment to assess cross-contamination potential of water samples via sampling equipment.

Surface water sampling locations were previously located using a global positioning satellite (GPS) system and marked in the field. Surface water samples were collected at previously GPS-mapped locations either using a disposable bailer with the sample transferred to the laboratory supplied water sample containers, or the water sample was collected directly in the laboratory supplied water sample containers. Temperature, pH, EC, turbidity, ORP, and DO were measured and recorded on field data sheets at surface water sampling locations.

2.4 ANALYTICAL DATA QA/QC

The samples were tested using approved United States Environmental Protection Agency (EPA) methods. Since the analytical data was obtained by following EPA approved method criteria, the data was evaluated by using the EPA approved validation methods described in the National Functional Guidelines (EPA, 2008 and EPA, 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 U.S. Fish and Wildlife Service approved Habitat Conservation Plan (HCP) (USFWS, 2005) and subsequent clarifications (LMC, 2006a and 2006b) of the HCP. Groundwater sampling activities were conducted with light duty vehicles and were supervised by a United States Fish and Wildlife Service (USFWS) approved biologist as specified in the Low Effect HCP.

SECTION 3 GROUNDWATER MONITORING RESULTS

Section 3 presents the results and interpretations of the First Quarter 2011 and Second Quarter 2011 groundwater monitoring events. The following subsections include tabulated summaries of groundwater elevation and water quality data, contour maps, and primary chemicals of potential concern (COPC) results. Plots of groundwater elevation versus time (hydrographs) and concentration versus time (time series graphs) for primary and secondary COPCs are presented in Appendices D and E, respectively.

3.1 GROUNDWATER ELEVATION

Groundwater elevations during the First Quarter 2011 and Second Quarter 2011 monitoring events ranged from approximately 2,174 feet mean sea level (msl) upgradient of the former BPA to approximately 1,795 feet msl in the Massacre Canyon Entrance Area (MCEA). A total of 179 monitoring wells were identified for groundwater level measurements for the First Quarter 2011 and Second Quarter 2011 monitoring events. For the First Quarter 2011 and Second Quarter monitoring events, four wells were dry (OW-05, OW-06, OW-07, and VRW-01). EW-01 and EW-02 are former extraction wells with pumps and associated wiring and piping still in place. Whereas these down-hole items make water level measurements difficult, the wells may be needed for future site remediation and/or monitoring activities and therefore continue to be included in the monitoring well network. However, if water level measurements cannot be collected from either of these wells, several monitoring wells are located in close proximity to these former extraction wells which can be utilized for contouring and temporal trends in their absence. Water level elevations will continue to be monitored from these two former extraction wells and recorded when possible. 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 First Quarter 2011 and Second Quarter 2011 monitoring events from wells screened in the alluvium and weathered Mount Eden formation are shown on Figures 3-1 and 3-2, respectively. A tabulated summary of groundwater elevations for all the wells measured during the First Quarter 2011 and Second Quarter 2011 monitoring events is presented in Table 3-1. Hydrographs for individual wells and for well groups are presented in Appendix D.

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Area I
Western Aerojet Range

Landfill
MW-84A
1946.46'
MW-97
1947.51'
MW-96
1944.15'
1940'

Area H
Sanitary Landfill

Area F
LPC Test Services Area

Large Motor Test Stand
MW-85B
1928.26'
Maintenance Shops and Storage Warehouse
MW-86B
1906.71'
1925'
MW-92
1889.42'
1900'
1915'
1925'
MW-95
1900.95'
1890'
1880'
MW-87B
1924.91'
MW-94
1919.23'
F34-TW1
1890.64'
MW-93
1900.64'

Area G
Helicopter Weapons Test Area

0 400 800 Feet

Area A
Eastern Aerojet Range (Avanti)

Potrero Creek
Lawrence Fault

P-04
2095.50'
2095'
2090'
MW-11
2077.59'
2080'
MW-12
2086.10'
2085'
P-03
2094.40'
IW-05
2094.53'
MW-40
2085.55'
IW-04
2091.65'
IW-03
2095.24'
Rocket Motor Production Area
MW-66
2096.25'
MW-98B
2101.99'
MW-68
2104.70'
MW-91
2104.49'
MW-88
2104.03'
MW-69
2103.37'
MW-34
2106.11'
MW-90
2104.12'
MW-39
2107.41'
MW-41
2101.82'
MW-65
2102.06'
MW-62A
2103.54'
OW-03
2107.91'
MW-57D
2107.99'
MW-04
2107.36'
MW-49
2106.97'
MW-51
2107.46'
MW-58B
2107.57'
MW-54
2108.53'
MW-23
2108.40'
MW-02
2107.85'
MW-52
2106.82'
MW-50
2108.89'
MW-53
2108.88'
MW-17
2108.78'
MW-22
2106.88'
MW-10
2105.89'
MW-27
2105.84'
EW-08
2106.24'
EW-14
2106.38'
MW-20
2109.68'
MW-55
2109.24'
IW-02
2109.82'
EW-13
2108.95'
MW-71B
2107.75'
Burn Pit Area
MW-75B
2109.77'
IW-01
2110.56'
MW-07
2113.56'
EW-18
2110.67'
EW-16
2107.74'
MW-74C
2115.13'
MW-35
2111.97'
P-05
2110.85'
MW-73C
2125.38'
MW-72C
2143.87'
MW-36
2166.38'
OW-01
2174.30'

Area B
Rocket Motor Production Area

Area C
Burn Pit Area

Bedsprings Creek

Area D
LPC Ballistics Test Range

Area E
Radioactive Waste Disposal Site

MW-108
2075.27'
MW-109
2082.51'
P-02
2070.01'
MW-107
2069.58'
MW-29
2088.50'
MW-44
2098.38'
MW-89
2097.69'
MW-105
2080.66'
MW-103
2064.25'
MW-106
2072.56'
MW-13
2050.08'
OW-02
2077.82'
MW-101
2085.69'
MW-104
2076.86'
MW-43
2064.13'
MW-48
2068.71'
MW-76B
2091.75'
MW-19
2100.49'
MW-102
2036.45'
MW-46
2029.24'
MW-08
2075.54'
OW-08
1992.96'
MW-38
1990.26'
MW-14
2012.64'
MW-18
1986.40'
MW-83
1953.49'
MW-82
1949.25'
MW-70
1949.13'
Large Motor Washout Area
MW-77B
1916.61'
MW-67
1795.08'
(Approx. 1.4 miles downstream)
MW-100
1426.16'
(Approx. 2.2 miles downstream)

Potrero Creek
Fault E
Fault D
Fault C
Fault B
Lower Potrero Fault Zone
Delianont Fault
Potrero Fault Zone
Bedsprings Fault
Goetz Fault
Fault F

N

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

MW-10
2107.31'
Monitoring Well Location with Groundwater Elevation (March 2011)

Fault, Accurately Located Showing Dip

Fault, Approximately Located

Groundwater Elevation Contour

Bedrock/Alluvium Surface Contact
Dashed where inferred

Groundwater Flow Direction

Source Areas

Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)

Historical Operational Area Boundary

Notes: Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-1

First Quarter (March) 2011 Groundwater Contours for Alluvium and Weathered Mount Eden Formation

TETRA TECH

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Area I
Western Aerojet Range

Area H
Sanitary Landfill

Landfill

MW-97 1947.16'
MW-84A 1946.59'
MW-96 1944.47'

Area F
LPC Test Services Area

Large Motor Test Stand
Maintenance Shops and Storage Warehouse

MW-85B 1927.04'
MW-86B 1905.40'
MW-92 1888.44'
MW-95 1900.29'
MW-87B 1922.79'
MW-94 1917.49'
F34-TW1 1890.46'
MW-93 1900.09'

Area G
Helicopter Weapons Test Area

0 400 800 Feet

Area A
Eastern Aerojet Range (Avanti)

Potrero Creek
Lawrence Fault

P-04 2092.54'
MW-11 2078.03'
MW-12 2083.12'
P-03 2094.77'
MW-40 2086.04'

Area B
Rocket Motor Production Area

IW-05 2096.04'
IW-04 2093.18'
IW-03 2096.94'
Rocket Motor Production Area
MW-66 2098.34'
MW-98B 2103.52'
MW-68 2106.13'
MW-89 2099.90'
MW-91 2106.22'
MW-88 2106.78'
MW-65 2105.56'
MW-69 2106.41'
MW-41 2105.85'
MW-90 2107.66'
MW-34 2110.23'
MW-39 2112.35'
MW-44 2100.87'
MW-29 2089.19'
MW-05 2103.10'
MW-62A 2108.28'
MW-52 2111.41'
OW-03 2112.52'
MW-04 2112.69'
MW-57D 2112.79'
MW-49 2111.36'
MW-51 2112.10'
MW-23 2113.23'
MW-54 2113.34'
MW-58B 2112.26'
MW-50 2113.39'
MW-22 2111.84'
MW-10 2109.95'
MW-27 2109.90'
MW-02 2112.97'
MW-17 2112.80'
MW-53 2113.36'
MW-20 2114.13'
MW-55 2114.00'
IW-02 2114.00'
EW-08 2110.92'
EW-14 2110.50'
Area C
Burn Pit Area
EW-13 2113.20'
MW-71B 2110.38'
Burn Pit Area
MW-75B 2112.32'
IW-01 2114.58'
MW-07 2116.50'
EW-18 2115.26'
MW-74C 2115.45'
MW-35 2115.47'
EW-16 2111.93'
P-05 2114.38'
Bedsprings Creek
MW-73C 2100.69'
MW-72C 2132.07'
MW-36 2147.71'
OW-01 2165.54'

Area F
LPC Test Services Area

OW-08 1993.18'
MW-38 1990.84'
MW-46 2028.76'
MW-102 2034.81'
MW-13 2048.77'
MW-107 2067.92'
MW-103 2063.23'
OW-02 2077.76'
MW-43 2064.27'
MW-48 2068.30'
MW-08 2077.09'
MW-76B 2092.13'
MW-104 2075.13'
MW-106 2070.10'
MW-105 2080.33'
MW-101 2084.76'
MW-109 2081.42'
MW-108 2073.98'
P-02 2068.04'
MW-19 2102.45'
P-06S 2008.01'
MW-14 2009.23'
MW-18 1985.11'
Potrero Creek
Area E
Radioactive Waste Disposal Site
Fault E
Fault D
Fault C
Fault B
Area D
LPC Ballistics Test Range
Potrero Fault Zone
Bedsprings Fault
Goetz Fault
Fault F
Delamont Fault
Lower Potrero Fault Zone

MW-83 1953.26'
MW-82 1949.02'
MW-70 1948.63'
Large Motor Washout Area
MW-77B 1915.66'

MW-67
1794.77'
(Approx. 1.4 miles downstream)
MW-100
1426.63'
(Approx. 2.2 miles downstream)

Area G
Helicopter Weapons Test Area

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

- MW-10 2107.31' — Monitoring Well Location with Groundwater Elevation (June 2011)
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Groundwater Elevation Contour
- Bedrock/Alluvium Surface Contact (Dashed where inferred)
- Groundwater Flow Direction
- Source Areas
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Notes:
Beaumont Site 1 property boundary is approximate.
5-foot contour interval.
MW-73C was not used for groundwater contours.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-2
Second Quarter (June) 2011 Groundwater Contours for Alluvium and Weathered Mount Eden Formation

TETRA TECH

Table 3-1 Groundwater Elevation - First Quarter 2011 and Second Quarter 2011

Well ID	Site Area	Formation Screened	Measuring Point Elevation (feet msl)	March 2011 Groundwater Elevation Data				June 2011 Groundwater Elevation Data			
				Date Measured	Depth to Water (feet BTOC)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from Fourth Quarter 2010	Date Measured	Depth to Water (feet BTOC)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from First Quarter 2011
EW-01	RMPA	QAL	2142.62	03/17/11	34.74	2107.88	7.79	06/03/11	30.13	2112.49	4.61
EW-02	RMPA	QAL	2126.15	03/16/11	22.70	2103.45	5.23	06/03/11	18.99	2107.16	3.71
EW-08	BPA	MEF	2178.40	03/17/11	72.16	2106.24	3.04	06/03/11	67.48	2110.92	4.68
EW-09	BPA	MEF	2179.67	03/17/11	71.68	2107.99	5.03	06/03/11	66.59	2113.08	5.09
EW-10	BPA	MEF	2180.19	03/17/11	73.38	2106.81	3.65	06/03/11	68.62	2111.57	4.76
EW-11	BPA	MEF	2182.09	03/17/11	72.12	2109.97	3.85	06/03/11	66.27	2115.82	5.85
EW-12	BPA	MEF	2183.28	03/17/11	76.65	2106.63	2.15	06/03/11	72.21	2111.07	4.44
EW-13	BPA	MEF	2185.57	03/17/11	76.62	2108.95	4.98	06/03/11	72.37	2113.20	4.25
EW-14	BPA	QAL/MEF	2184.59	03/17/11	78.21	2106.38	3.44	06/03/11	74.09	2110.50	4.12
EW-15	BPA	MEF	2184.10	03/17/11	71.26	2112.29	6.47	06/03/11	67.31	2116.24	3.95
EW-16	BPA	MEF	2185.52	03/17/11	77.78	2107.74	2.43	06/03/11	73.59	2111.93	4.19
EW-17	BPA	MEF	2179.04	03/17/11	64.09	2114.95	12.85	06/03/11	61.09	2117.95	3.00
EW-18	BPA	MEF	2184.98	03/17/11	74.31	2110.67	4.05	06/03/11	69.72	2115.26	4.59
EW-19	MCEA	QAL	2033.89	03/16/11	22.83	2011.06	15.09	06/02/11	26.37	2007.52	-3.54
F33-TW2	NPCA	QAL	1959.75	03/16/11	4.94	1954.81	0.53	06/02/11	5.34	1954.41	-0.40
F33-TW3	NPCA	QAL	1955.79	03/16/11	5.39	1950.40	-0.60	06/02/11	5.87	1949.92	-0.48
F33-TW6	NPCA	QAL	1950.62	03/16/11	5.97	1944.65	-0.67	06/02/11	6.23	1944.39	-0.26
F33-TW7	NPCA	QAL	NA	03/16/11	7.63	NA	NA	06/02/11	8.10	NA	NA
F34-TW1	MCEA	QAL	1894.08	03/16/11	3.44	1890.64	1.75	06/02/11	3.62	1890.46	-0.18
IW-01	RMPA	QAL	2160.73	03/17/11	50.17	2110.56	10.27	06/03/11	46.15	2114.58	4.02
IW-02	RMPA	QAL	2155.01	03/17/11	45.19	2109.82	9.64	06/03/11	41.01	2114.00	4.18
IW-03	NPCA	QAL	2132.86	03/16/11	37.61	2095.24	1.00	06/03/11	35.92	2096.94	1.69
IW-04	NPCA	QAL	2135.09	03/16/11	43.44	2091.65	-1.90	06/03/11	41.91	2093.18	1.53
IW-05	NPCA	QAL	2136.94	03/16/11	42.41	2094.53	-0.11	06/03/11	40.90	2096.04	1.51
MW-01	RMPA	MEF	2176.98	03/17/11	63.27	2113.71	13.14	06/03/11	60.45	2116.53	2.82
MW-02	RMPA	MEF	2170.10	03/17/11	62.25	2107.85	6.90	06/03/11	57.13	2112.97	5.12
MW-03	RMPA	MEF	2169.36	03/17/11	123.00	2046.36	4.17	06/03/11	119.33	2050.03	3.67
MW-04	RMPA	QAL	2160.02	03/17/11	52.66	2107.36	6.37	06/03/11	47.33	2112.69	5.33
MW-05	RMPA	QAL	2121.40	03/16/11	20.83	2100.57	3.08	06/03/11	18.30	2103.10	2.53
MW-06	RMPA	QAL	2121.76	03/16/11	22.18	2099.58	4.84	06/03/11	19.32	2102.44	2.86
MW-07	BPA	QAL	2176.52	03/17/11	62.95	2113.56	12.88	06/03/11	60.02	2116.50	2.93
MW-08	NPCA	QAL	2090.53	03/17/11	14.99	2075.54	1.54	06/02/11	13.44	2077.09	1.55
MW-09	NPCA	QAL	2089.16	03/17/11	1.15PSI	2091.82	5.52	06/02/11	2.23 PSI	2094.31	2.49
MW-10	RMPA	QAL	2179.40	03/17/11	73.51	2105.89	3.53	06/02/11	69.45	2109.95	4.06
MW-11	NPCA	QAL	2122.61	03/14/11	45.02	2077.59	0.43	06/02/11	44.58	2078.03	0.44
MW-12	NPCA	QAL	2098.49	03/14/11	12.39	2086.10	6.12	06/02/11	15.37	2083.12	-2.98
MW-13	NPCA	QAL	2057.89	03/14/11	7.81	2050.08	8.60	06/02/11	9.12	2048.77	-1.31
MW-14	MCEA	QAL	2029.67	03/16/11	17.02	2012.64	15.49	06/02/11	20.44	2009.23	-3.42
MW-15	MCEA	QAL	2009.76	03/14/11	21.97	1987.79	6.54	06/02/11	23.39	1986.37	-1.42
MW-17	RMPA	QAL	2140.40	03/17/11	31.62	2108.78	9.20	06/03/11	27.60	2112.80	4.02
MW-18	MCEA	QAL	2008.69	03/14/11	22.29	1986.40	6.01	06/03/11	23.58	1985.11	-1.29
MW-19	NPCA	QAL	2118.49	03/16/11	18.00	2100.49	4.16	06/03/11	16.04	2102.45	1.96
MW-20	RMPA	QAL	2162.03	03/17/11	52.35	2109.68	9.23	06/03/11	47.90	2114.13	4.45
MW-22	RMPA	QAL	2173.48	03/17/11	66.60	2106.88	5.52	06/03/11	61.64	2111.84	4.96
MW-23	RMPA	QAL	2165.02	03/17/11	56.62	2108.40	7.75	06/03/11	51.79	2113.23	4.83
MW-26	BPA	MEF	2183.81	03/17/11	65.18	2118.63	15.26	06/03/11	63.19	2120.62	1.99
MW-27	BPA	QAL	2182.73	03/17/11	76.89	2105.84	3.59	06/03/11	72.83	2109.90	4.06
MW-28	RMPA	QAL	2160.84	03/17/11	51.11	2109.73	9.43	06/03/11	46.81	2114.03	4.30
MW-29	NPCA	MEF	2115.09	03/16/11	26.59	2088.50	1.80	06/03/11	25.90	2089.19	0.69
MW-30	RMPA	QAL	2165.01	03/17/11	57.45	2107.56	6.31	06/03/11	53.07	2111.94	4.38
MW-31	BPA	Granite	2186.52	03/17/11	84.82	2101.70	10.78	06/03/11	81.49	2105.03	3.33
MW-32	RMPA	Granite	2176.61	03/17/11	78.35	2098.26	10.46	06/03/11	74.15	2102.46	4.20
MW-34	RMPA	QAL	2153.80	03/17/11	47.69	2106.11	4.31	06/03/11	43.57	2110.23	4.12
MW-35	RMPA	QAL	2170.98	03/17/11	59.01	2111.97	11.47	06/03/11	55.51	2115.47	3.50
MW-36	UG	QAL	2205.18	03/17/11	38.80	2166.38	41.10	06/03/11	57.47	2147.71	-18.67
MW-38	MCEA	MEF	2030.29	03/14/11	40.03	1990.26	5.03	06/02/11	39.45	1990.84	0.58
MW-39	RMPA	QAL	2144.18	03/17/11	36.77	2107.41	7.04	06/03/11	31.83	2112.35	4.94
MW-40	NPCA	MEF	2126.39	03/14/11	40.84	2085.55	1.99	06/02/11	40.35	2086.04	0.49
MW-41	RMPA	MEF	2133.95	03/16/11	32.13	2101.82	3.67	06/03/11	28.10	2105.85	4.03
MW-43	NPCA	QAL	2068.58	03/16/11	4.45	2064.13	2.59	06/02/11	4.31	2064.27	0.14
MW-44	NPCA	QAL	2128.69	03/16/11	30.31	2098.38	2.32	06/03/11	27.82	2100.87	2.49
MW-45	MCEA	QAL	2068.18	03/16/11	5.4 PSI	2080.65	6.01	06/02/11	6.0 PSI	2082.04	1.39
MW-46	MCEA	QAL	2072.17	03/16/11	42.93	2029.24	9.13	06/02/11	43.41	2028.76	-0.48
MW-47	NPCA	QAL	2076.67	03/16/11	4.6 PSI	2087.30	5.54	06/02/11	5.0 PSI	2088.22	0.92
MW-48	NPCA	QAL	2076.44	03/16/11	7.73	2068.71	3.05	06/02/11	8.14	2068.30	-0.41
MW-49	RMPA	QAL	2130.92	03/16/11	23.95	2106.97	7.65	06/03/11	19.56	2111.36	4.39
MW-50	RMPA	QAL	2151.43	03/17/11	42.54	2108.89	8.73	06/03/11	38.04	2113.39	4.50
MW-51	RMPA	QAL	2138.36	03/16/11	30.90	2107.46	7.26	06/03/11	26.26	2112.10	4.64
MW-52	RMPA	QAL	2136.18	03/16/11	29.36	2106.82	7.19	06/03/11	24.77	2111.41	4.59
MW-53	RMPA	QAL	2153.29	03/17/11	44.41	2108.88	9.72	06/03/11	39.93	2113.36	4.48
MW-54	RMPA	QAL	2153.44	03/17/11	44.90	2108.53	8.16	06/03/11	40.10	2113.34	4.80
MW-55	RMPA	QAL	2166.66	03/17/11	57.42	2109.24	8.68	06/03/11	52.66	2114.00	4.76
MW-56A	RMPA	MEF	2143.09	03/17/11	47.25	2095.84	7.06	06/03/11	42.92	2100.17	4.33
MW-56B	RMPA	QAL	2142.58	03/17/11	33.78	2108.80	8.67	06/03/11	29.34	2113.24	4.44
MW-56C	RMPA	QAL	2142.77	03/17/11	35.03	2107.74	7.70	06/03/11	30.36	2112.41	4.67
MW-56D	RMPA	QAL	2142.48	03/17/11	33.95	2108.53	8.38	06/03/11	29.41	2113.07	4.54
MW-57A	RMPA	QAL	2145.98	03/17/11	37.32	2108.66	8.40	06/03/11	32.75	2113.23	4.57
MW-57B	RMPA	QAL	2146.19	03/17/11	37.23	2108.96	8.70	06/03/11	32.72	2113.47	4.51
MW-57C	RMPA	QAL	2146.02	03/17/11	37.19	2108.83	8.55	06/03/11	32.64	2113.38	4.55
MW-57D	RMPA	QAL	2146.10	03/17/11	38.11	2107.99	7.77	06/03/11	33.31	2112.79	4.80
MW-58A	RMPA	QAL	2140.73	03/17/11	32.47	2108.26	8.43	06/03/11	28.11	2112.62	4.36
MW-58B	RMPA	QAL	2140.78	03/17/11	33.21	2107.57	7.57	06/03/11	28.52	2112.26	4.69
MW-58C	RMPA	QAL	2141.02	03/17/11	33.43	2107.58	7.67	06/03/11	28.85	2112.17	4.58
MW-58D	RMPA	QAL	2140.94	03/17/11	32.53	2108.41	8.58	06/03/11	28.21	2112.73	4.32
MW-59A	BPA	MEF	2180.14	03/17/11	74.95	2105.19	7.25	06/03/11	70.68	2109.46	4.27
MW-59B	BPA	MEF	2180.39	03/17/11	71.69	2108.70	6.06	06/03/11	66.73	2113.66	4.96
MW-59C	BPA	MEF	2179.93	03/17/11	72.26	2107.67	7.19	06/03/11	67.90	2112.03	4.36
MW-59D	BPA	MEF	2180.53	03/17/11	71.60	2108.93	7.65	06/03/11	67.34	2113.19	4.26
MW-60A	BPA	MEF	2182.59	03/17/11	70.20	2112.39	11.68	06/03/11	72.16	2110.43	-1.96
MW-60B	BPA	MEF	2182.77	03/17/11	76.34	2106.43	4.36	06/03/11	71.82	2110.95	4.52

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 / Mount Eden formation.
MEF - Mount Eden formation.

Table 3-1 Groundwater Elevation - First Quarter 2011 and Second Quarter 2011 (continued)

Well ID	Site Area	Formation Screened	Measuring Point Elevation (feet msl)	March 2011 Groundwater Elevation Data				June 2011 Groundwater Elevation Data			
				Date Measured	Depth to Water (feet BTOC)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from Fourth Quarter 2010	Date Measured	Depth to Water (feet BTOC)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from First Quarter 2011
MW-61A	BPA	MEF	2186.95	03/17/11	80.44	2106.51	9.04	06/03/11	77.19	2109.76	3.25
MW-61B	BPA	MEF	2186.77	03/17/11	75.88	2110.89	5.81	06/03/11	71.59	2115.18	4.29
MW-61C	BPA	MEF	2186.84	03/17/11	77.95	2108.89	9.33	06/03/11	74.90	2111.94	3.05
MW-61D	BPA	MEF	2186.83	03/17/11	74.90	2111.93	9.74	06/03/11	72.13	2114.70	2.77
MW-62A	RMPA	QAL	2131.32	03/16/11	27.78	2103.54	4.49	06/03/11	23.04	2108.28	4.74
MW-62B	RMPA	QAL	2131.49	03/16/11	25.54	2105.95	6.90	06/03/11	21.24	2110.25	4.30
MW-63	RMPA	QAL	2156.20	03/17/11	47.17	2109.03	8.63	06/03/11	42.49	2113.71	4.68
MW-64	RMPA	QAL	2128.41	03/16/11	26.66	2101.75	3.61	06/03/11	22.98	2105.43	3.68
MW-65	RMPA	QAL	2128.92	03/16/11	26.85	2102.06	4.03	06/03/11	23.36	2105.56	3.49
MW-66	RMPA	QAL	2130.43	03/16/11	34.18	2096.25	1.39	06/03/11	32.09	2098.34	2.09
MW-67	MCEA	QAL	1799.54	03/14/11	4.46	1795.08	0.34	06/02/11	4.77	1794.77	-0.31
MW-68	RMPA	QAL	2144.69	03/17/11	39.99	2104.70	0.56	06/03/11	38.56	2106.13	1.43
MW-69	RMPA	QAL	2143.26	03/17/11	39.89	2103.37	1.62	06/03/11	36.85	2106.41	3.04
MW-70	NPCA	QAL	1976.15	03/16/11	27.02	1949.13	0.27	06/02/11	27.52	1948.63	-0.50
MW-71A	BPA	Granite	2193.77	03/17/11	156.75	2037.02	4.01	06/03/11	154.96	2038.81	1.79
MW-71B	BPA	QAL/MEF	2194.01	03/17/11	86.26	2107.75	1.57	06/03/11	83.63	2110.38	2.63
MW-71C	BPA	MEF	2193.87	03/17/11	84.57	2109.30	5.24	06/03/11	82.28	2111.59	2.29
MW-72A	BPA	Granite	2199.06	03/17/11	62.44	2136.62	35.59	06/03/11	72.38	2126.68	-9.94
MW-72B	BPA	MEF	2199.22	03/17/11	56.66	2142.56	38.37	06/03/11	67.91	2131.31	-11.25
MW-72C	BPA	QAL	2199.35	03/17/11	55.48	2143.87	39.63	06/03/11	67.28	2132.07	-11.80
MW-73A	BPA	MEF	2189.39	03/17/11	99.28	2090.11	13.59	06/03/11	97.44	2091.95	1.84
MW-73B	BPA	MEF	2189.48	03/17/11	80.88	2108.60	16.67	06/03/11	81.03	2108.45	-0.15
MW-73C	BPA	QAL	2189.65	03/17/11	64.27	2125.38	18.85	06/03/11	88.96	2100.69	-24.69
MW-74A	UG	Granite	2199.66	03/17/11	157.64	2042.02	2.82	06/03/11	157.24	2042.42	0.40
MW-74B	UG	Granite	2199.81	03/17/11	116.91	2082.89	1.55	06/03/11	115.17	2084.64	1.74
MW-74C	UG	MEF	2199.96	03/17/11	84.83	2115.13	3.36	06/03/11	84.51	2115.45	0.32
MW-75A	RMPA	MEF	2149.44	03/17/11	50.08	2099.35	8.73	06/02/11	46.42	2103.02	3.66
MW-75B	RMPA	QAL	2149.51	03/17/11	39.74	2109.77	10.57	06/02/11	37.19	2112.32	2.55
MW-75C	RMPA	QAL	2150.02	03/17/11	40.28	2109.74	10.54	06/02/11	37.04	2112.98	3.24
MW-76A	NPCA	MEF	2105.91	03/17/11	19.89	2086.02	6.47	06/02/11	16.79	2089.12	3.10
MW-76B	NPCA	QAL	2105.40	03/17/11	13.65	2091.75	6.26	06/02/11	13.27	2092.13	0.38
MW-76C	NPCA	QAL	2106.29	03/17/11	4.33	2101.96	7.99	06/02/11	1.12	2105.17	3.21
MW-77A	MCEA	MEF	1930.62	03/16/11	9.49	1921.13	3.58	06/02/11	9.99	1920.63	-0.50
MW-77B	MCEA	MEF	1930.88	03/16/11	14.27	1916.61	2.43	06/02/11	15.22	1915.66	-0.95
MW-78	BPA	MEF	2182.63	03/17/11	85.09	2097.54	6.54	06/03/11	80.57	2102.06	4.52
MW-79A	RMPA	MEF	2142.00	03/17/11	36.37	2105.63	13.34	06/03/11	32.71	2109.29	3.66
MW-79C	RMPA	QAL	2142.07	03/17/11	33.12	2108.95	9.80	06/03/11	29.46	2112.61	3.66
MW-80	NPCA	MEF	2070.47	03/16/11	1.6PSI	2074.17	6.99	06/02/11	2.5 PSI	2076.25	2.08
MW-81	MCEA	MEF	2010.72	03/14/11	23.46	1987.26	6.37	06/02/11	24.66	1986.06	-1.20
MW-82	NPCA	QAL	1974.17	03/14/11	24.92	1949.25	0.14	06/02/11	25.15	1949.02	-0.23
MW-83	NPCA	QAL	1976.93	03/16/11	23.44	1953.49	0.47	06/02/11	23.67	1953.26	-0.23
MW-84A	MCEA	MEF	2,010.02	03/16/11	63.56	1946.46	0.52	06/02/11	63.43	1946.59	0.13
MW-84B	MCEA	MEF	2,011.19	03/16/11	66.30	1944.89	0.90	06/02/11	65.88	1945.31	0.42
MW-85A	MCEA	MEF	1,929.31	03/16/11	3.56	1925.75	3.69	06/02/11	4.40	1924.91	-0.84
MW-85B	MCEA	MEF	1,928.74	03/16/11	0.48	1928.26	4.03	06/02/11	1.70	1927.04	-1.22
MW-86A	MCEA	MEF	1,923.21	03/16/11	12.93	1910.28	3.44	06/02/11	13.89	1909.32	-0.96
MW-86B	MCEA	QAL/MEF	1,923.21	03/16/11	16.50	1906.71	3.07	06/02/11	17.81	1905.40	-1.31
MW-87A	MCEA	MEF	1,938.92	03/16/11	18.20	1920.72	3.49	06/02/11	17.62	1921.30	0.58
MW-87B	MCEA	MEF	1,938.82	03/16/11	13.91	1924.91	6.86	06/02/11	16.03	1922.79	-2.12
MW-88	RMPA	QAL	2,141.97	03/17/11	37.94	2104.03	1.48	06/03/11	35.19	2106.78	2.75
MW-89	RMPA	QAL	2,130.82	03/16/11	33.13	2097.69	1.18	06/03/11	30.92	2099.90	2.21
MW-90	RMPA	QAL	2,147.71	03/17/11	43.59	2104.12	1.97	06/03/11	40.05	2107.66	3.54
MW-91	RMPA	MEF	2,144.85	03/17/11	40.36	2104.49	0.68	06/03/11	38.63	2106.22	1.73
MW-92	MCEA	MEF	1,919.83	03/16/11	30.41	1889.42	2.62	06/02/11	31.39	1888.44	-0.98
MW-93	MCEA	MEF	1,931.47	03/16/11	30.83	1900.64	4.06	06/02/11	31.38	1900.09	-0.55
MW-94	MCEA	MEF	1,936.55	03/16/11	17.32	1919.23	4.96	06/02/11	19.06	1917.49	-1.74
MW-95	MCEA	MEF	1,920.80	03/16/11	19.85	1900.95	2.03	06/02/11	20.51	1900.29	-0.66
MW-96	MCEA	MEF	1998.63	03/16/11	54.48	1944.15	0.77	06/02/11	54.16	1944.47	0.32
MW-97	MCEA	MEF	1996.47	03/16/11	48.96	1947.51	2.48	06/02/11	49.31	1947.16	-0.35
MW-98A	RMPA	MEF	2141.68	03/17/11	43.93	2097.75	4.54	06/03/11	39.89	2101.79	4.04
MW-98B	RMPA	MEF	2141.73	03/17/11	39.74	2101.99	0.29	06/03/11	38.21	2103.52	1.53
MW-99	RMPA	MEF	2144.63	03/17/11	56.24	2088.39	1.99	06/01/11	54.77	2089.86	1.47
MW-100	DG	Granite	1525.79	03/14/11	99.63	1426.16	9.18	06/01/11	99.16	1426.63	0.47
MW-101	NPCA	QAL	2095.90	03/16/11	10.21	2085.69	4.76	06/03/11	11.14	2084.76	-0.93
MW-102	MCEA	QAL	2067.21	03/16/11	30.76	2036.45	7.70	06/02/11	32.40	2034.81	-1.64
MW-103	NPCA	QAL	2075.88	03/17/11	11.63	2064.25	7.64	06/02/11	12.65	2063.23	-1.02
MW-104	NPCA	QAL	2087.47	03/17/11	10.61	2076.86	3.93	06/02/11	12.34	2075.13	-1.73
MW-105	NPCA	QAL	2092.23	03/16/11	11.57	2080.66	2.28	06/03/11	11.90	2080.33	-0.33
MW-106	NPCA	QAL	2085.25	03/16/11	12.69	2072.56	7.36	06/03/11	15.15	2070.10	-2.46
MW-107	NPCA	QAL	2084.84	03/16/11	15.26	2069.58	8.12	06/03/11	16.92	2067.92	-1.66
MW-108	NPCA	QA/MEF	2087.22	03/16/11	11.95	2075.27	8.74	06/03/11	13.24	2073.98	-1.29
MW-109	NPCA	QA/MEF	2092.86	03/16/11	10.35	2082.51	4.40	06/03/11	11.44	2081.42	-1.09
OW-01	BPA	QAL	2204.62	03/17/11	30.32	2174.30	25.19	06/03/11	39.08	2165.54	-8.76
OW-02	NPCA	QAL	2078.97	03/17/11	1.15	2077.82	2.16	06/02/11	1.21	2077.76	-0.06
OW-03	RMPA	QAL	2143.65	03/17/11	35.74	2107.91	7.74	06/03/11	31.13	2112.52	4.61
OW-05	NPCA	QAL	2160.85	03/14/11	Dry	Dry Well	NA	06/02/11	Dry	Dry Well	NA
OW-06	MCEA	QAL	2084.67	03/14/11	Dry	Dry Well	NA	06/02/11	Dry	Dry Well	NA
OW-07	MCEA	QAL	2108.06	03/14/11	Dry	Dry Well	NA	06/02/11	Dry	Dry Well	NA
OW-08	MCEA	QAL	2036.33	03/14/11	43.37	1992.96	6.74	06/02/11	43.15	1993.18	0.22
P-02	NPCA	QAL	2081.15	03/14/11	11.14	2070.01	6.83	06/02/11	13.11	2068.04	-1.97
P-03	NPCA	QAL	2140.25	03/16/11	45.84	2094.40	2.16	06/03/11	45.48	2094.77	0.36
P-04	NPCA	QAL	2112.63	03/14/11	17.13	2095.50	5.59	06/02/11	20.09	2092.54	-2.96
P-05	RMPA	QAL	2162.20	03/16/11	51.34	2110.85	10.83	06/02/11	47.82	2114.38	3.52
P-06S	MCEA	QAL	2034.44	03/16/11	22.59	2011.85	NA	06/02/11	26.43	2008.01	-3.84
P-06D	MCEA	QAL	2034.41	03/16/11	23.16	2011.25	15.15	06/02/11	26.66	2007.75	-3.50
P-07	MCEA	QAL	2034.60	03/16/11	23.73	2010.87	15.11	06/02/11	27.27	2007.33	-3.54
P-08	MCEA	QAL	2030.87	03/16/11	19.42	2011.45	15.21	06/02/11	22.93	2007.94	-3.51
VRW-01	BPA	QAL	2187.35	03/17/11	Dry	Dry Well	NA	06/03/11	Dry	Dry Well	NA
VRW-03	BPA	MEF	2184.32	03/17/11	72.88	2111.44	1.72	06/03/11	69.28	2115.04	3.60

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 / Mount Eden formation.
MEF - Mount Eden formation.

During First Quarter 2011, the Beaumont NWS reported approximately 7.42 inches of precipitation, and the average site-wide groundwater elevation increased approximately 6.84 feet. During Second Quarter 2011, the Beaumont NWS reported approximately 1.09 inches of precipitation and the average site-wide groundwater elevation increased approximately 1.39 feet. Generally the groundwater elevations in Site wells show a one-season lag before responding to seasonal precipitation. Table 3-2 presents the range and average change in groundwater elevation by area. Figures 3-3 and 3-4 present elevation differences between the Fourth Quarter 2010 and First Quarter 2011, and between the First Quarter 2011 and Second Quarter 2011 groundwater monitoring events respectively.

Table 3-2 Groundwater Elevation Change - First Quarter 2011 and Second Quarter 2011

Site Area	Range of Groundwater Elevation Change First Quarter 2011		Average Change By Area	Range of Groundwater Elevation Change Second Quarter 2011		Average Change By Area
BPA	1.57	39.63	10.26	-24.69	5.85	1.22
MCEA	0.34	15.49	5.83	-3.84	1.39	-1.14
NPCA	-1.90	8.74	3.63	-2.98	3.21	0.07
RMPA	0.29	13.34	6.84	1.43	5.33	3.92

Notes:
BPA - Burn Pit Area.
MCEA - Massacre Canyon Entrance Area.
NPCA - Northern Potrero Creek Area.
RMPA - Rocket Motor Production Area.

Groundwater elevations and seasonal responses to changes in recharge for select shallow and deeper wells are shown on Figures 3-5 through 3-7. The selected wells represent a groundwater flow path from upgradient of the former BPA, through the former BPA, through the former RMPA, and southwestward (downgradient) through the NPCA and MCEA. Groundwater elevations in shallow wells (alluvium and shallow MEF) upgradient of the BPA and at the BPA show a rapid and significant response to rainfall, with a more dampened response observed further out in the valley through the RMPA, NPCA, and MCEA (Figures 3-5 and 3-7). The deeper MEF and granitic/metasedimentary bedrock wells show a response very similar to the shallow wells during the periods of increased precipitation (Figure 3-6).

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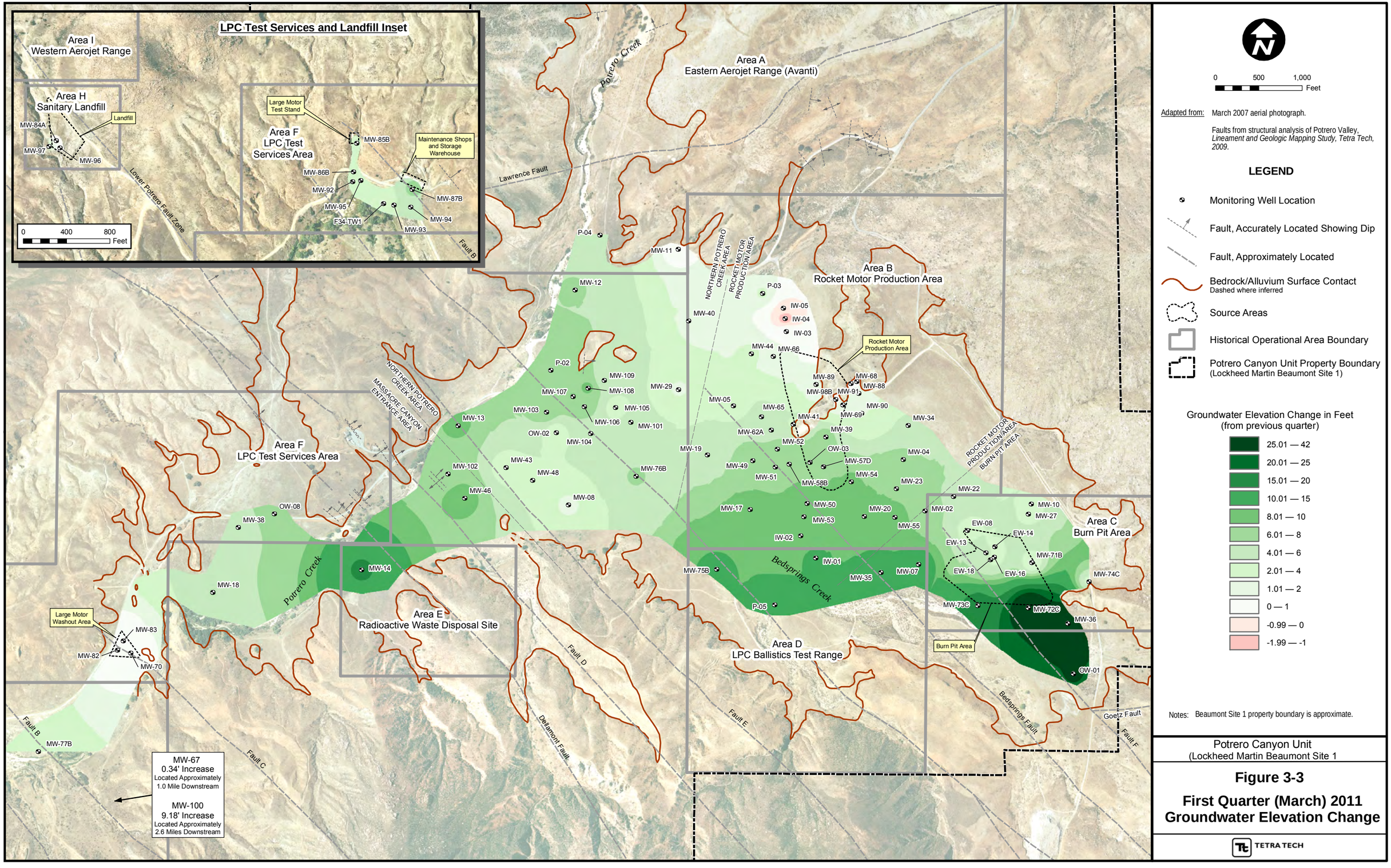

Notes: Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1

Figure 3-3

First Quarter (March) 2011 Groundwater Elevation Change

TETRA TECH

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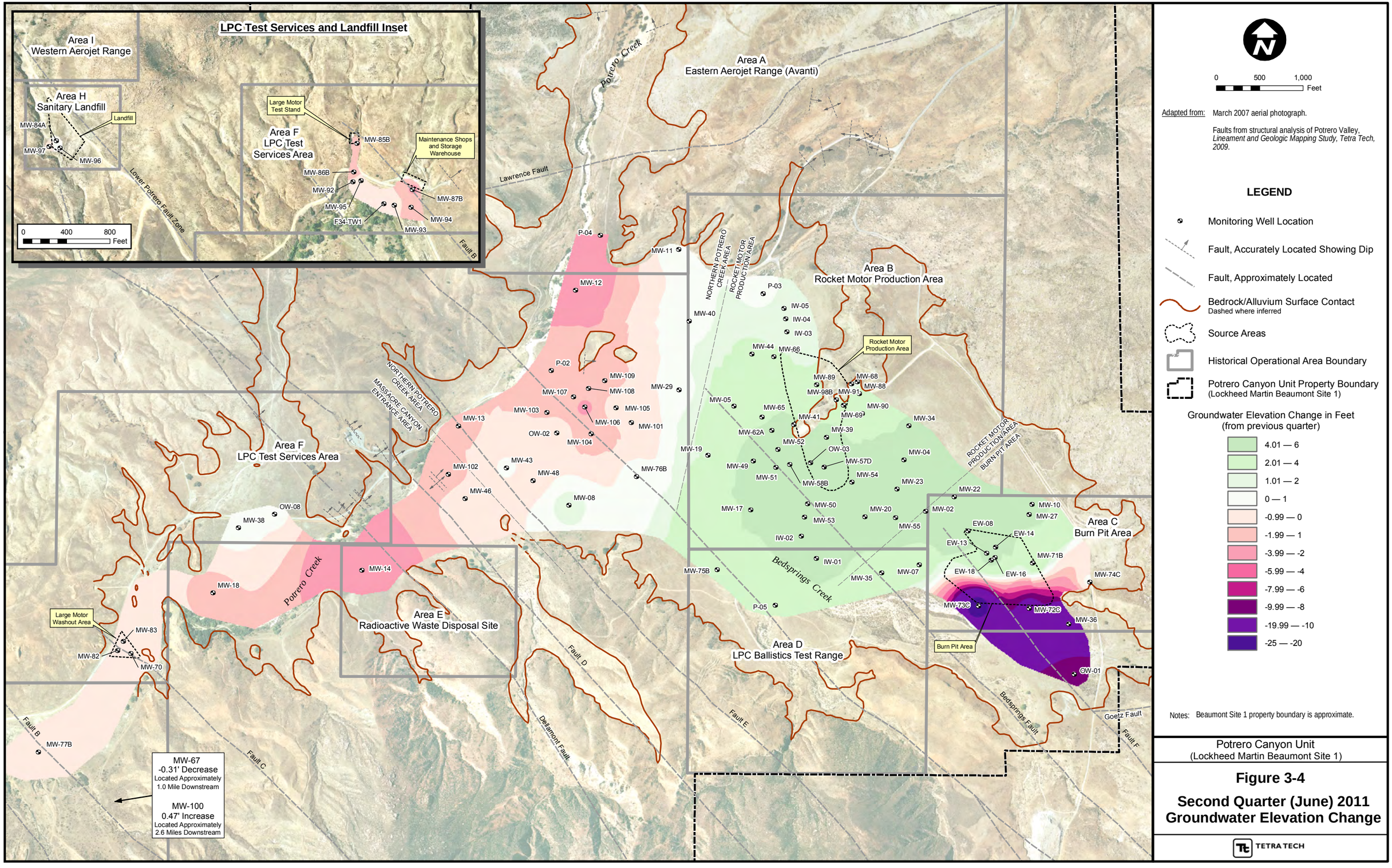


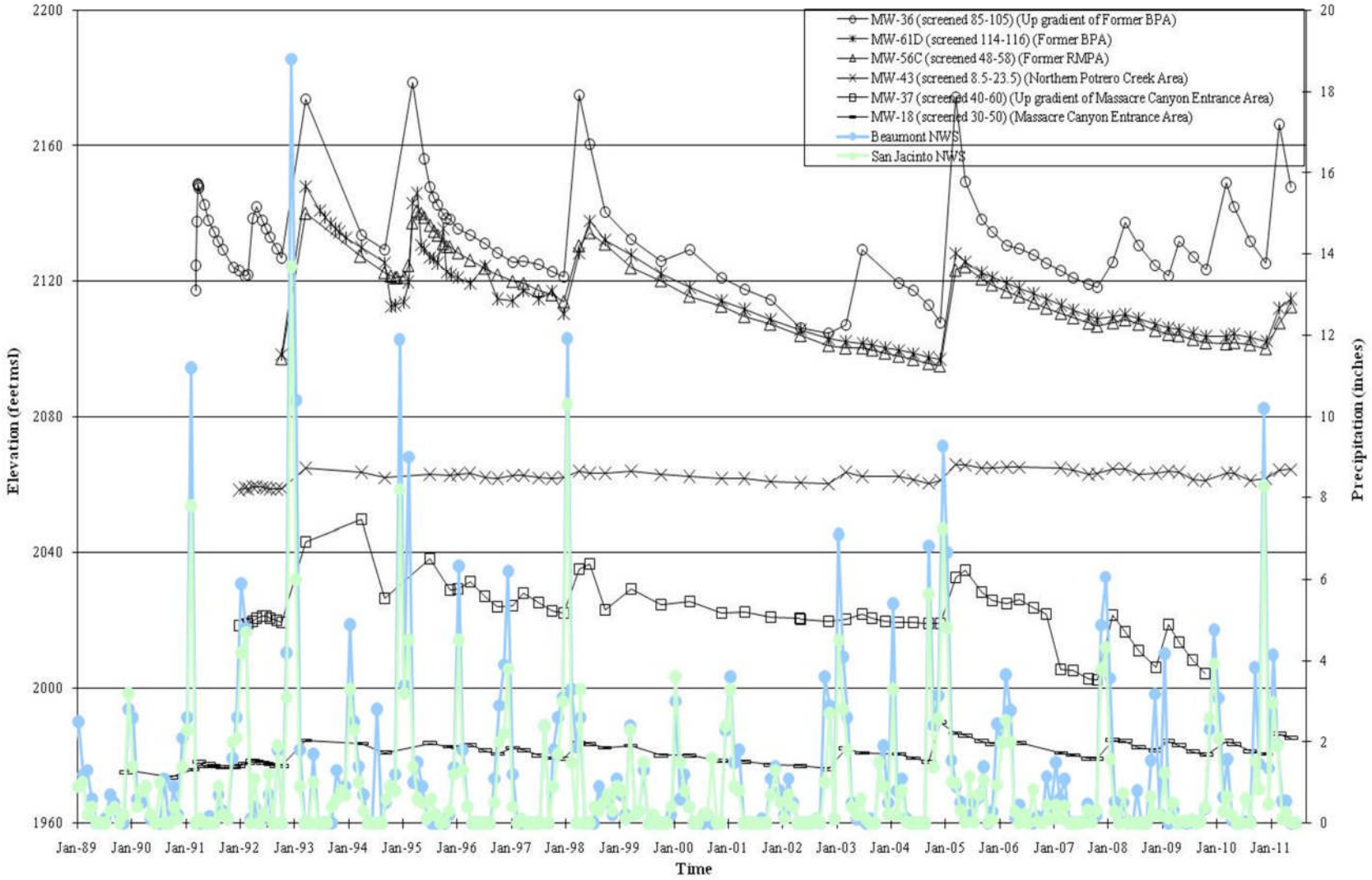
Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-4

Second Quarter (June) 2011 Groundwater Elevation Change

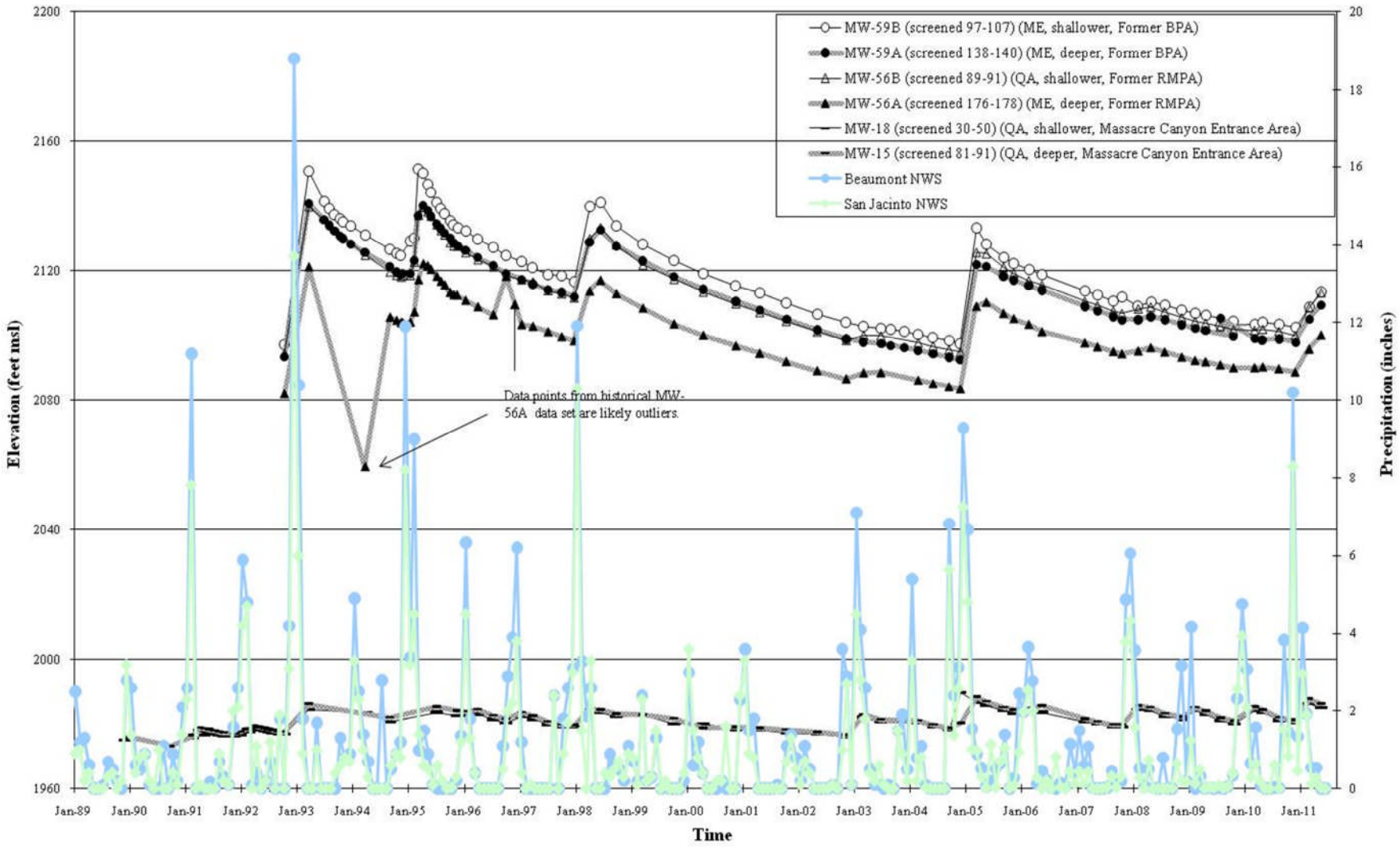
TETRA TECH

Figure 3-5 Groundwater Elevations vs. Time - Selected Alluvial and Shallow Mount Eden Formation Wells



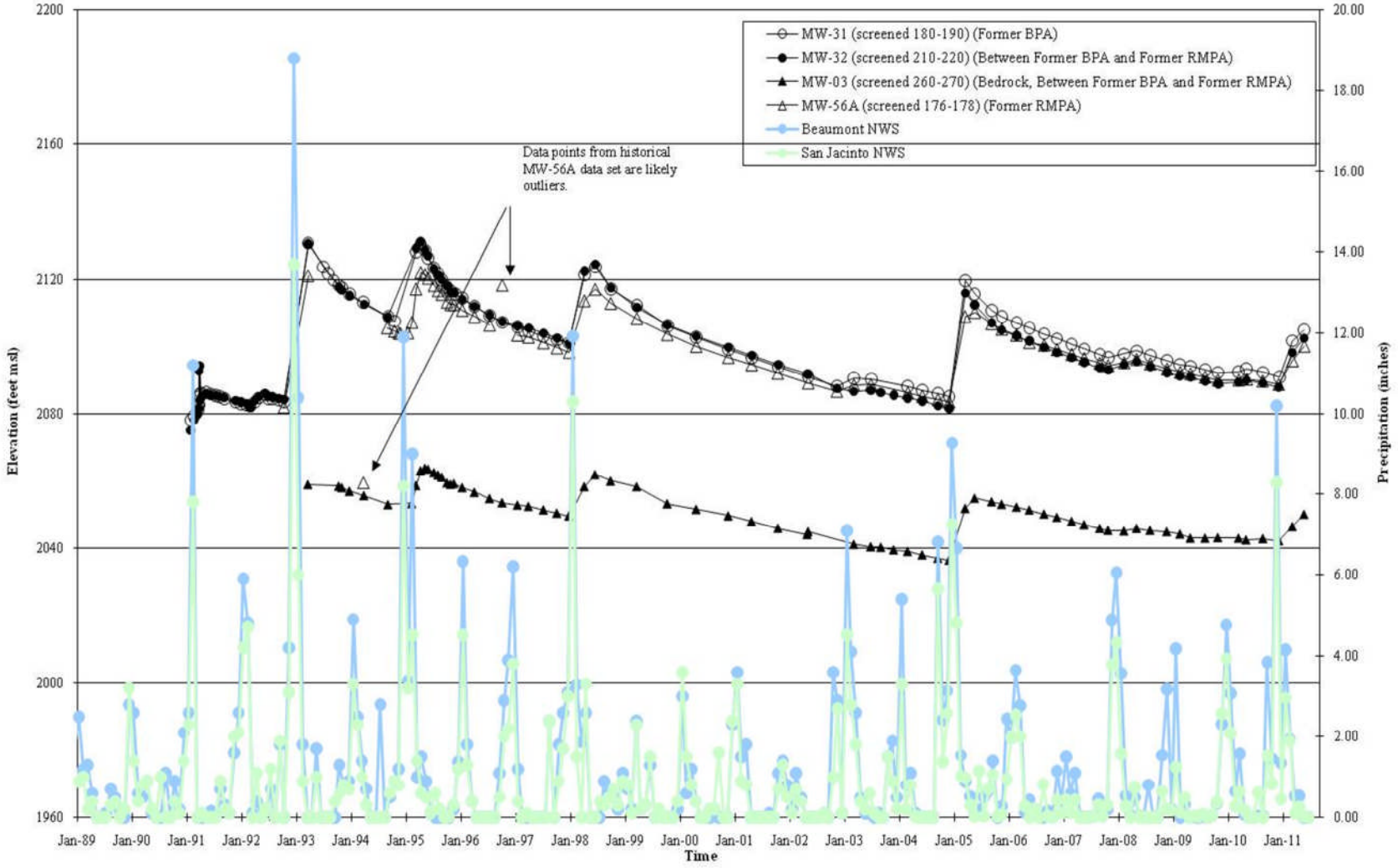
NWS - National Weather Service

Figure 3-6 Groundwater Elevations vs. Time - Deeper Mount Eden Formation and Granitic/Metasedimentary Bedrock Wells



NWS - National Weather Service

Figure 3-7 Groundwater Elevations Comparison - Selected Shallower and Deeper Screened Wells in the Alluvial and Shallow Mount Eden Formation



NWS - National Weather Service

3.2 SURFACE WATER FLOW

During First Quarter 2011 and Second Quarter 2011, the Potrero and Bedsprings creek riparian corridors were walked to determine the presence, nature, and quantity of surface water within the creek beds. The locations where surface water was encountered were plotted and a determination was made whether the water was flowing or stagnant. Where flowing water was encountered, the flow rate was determined using a modified version of the EPA Volunteer Stream Monitoring: A Methods Manual (USEPA, 1997).

Four fixed stream locations, SF-1 through SF-4, were previously chosen for stream flow measurements. SF-1 is located near Gilman Hot Springs at the southeast border of the Site, SF-2 is located in the vicinity of MW-67, SF-3 is located in the vicinity of MW-15 and MW-18, and SF-4 is located near MW-101.

At each location a section of stream that is relatively straight for at least 20 feet was chosen for measurement. This 20-foot section was marked and width measurements were taken at various points to determine the average width. Depth measurements were collected at five points along the width of the stream to determine the average depth of the stream. The average width and depth measurements were multiplied together to obtain an average cross sectional area. Velocity was measured by releasing a float upgradient and recording the time it took to float through the 20-foot marked section.

Three velocity measurements were taken and averaged. The length of the measured section was divided by the average velocity and the answer was multiplied by a correction factor of 0.9 to correct for friction between the water and stream bed. The average cross sectional area was then multiplied by the corrected average surface velocity to obtain the average cubic feet per second (cfs) for water flowing through that section of the stream.

A summary of the surface water flow rates is presented in Table 3-3, and the measurement locations and the locations where surface water was encountered are shown on Figures 3-8 and 3-9.

Table 3-3 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)
First Quarter 2011										
SF-1	Near Gilman Hot Springs Road	04/04/11	20	15.65	0.08	12.28	1.23	1.47	1.81	2.10
SF-2	Near MW-67	04/04/11	20	11.28	0.09	8.61	0.99	2.09	2.07	
SF-3	Near MW-15 and 18	04/04/11	20	20.97	0.01	11.41	1.54	1.58	2.43	
SF-4	Near MW-42	04/04/11	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
Second Quarter 2011										
SF-1	Near Gilman Hot Springs Road	06/02/11	20	17.08	0.05	12.27	0.82	1.47	1.20	1.24
SF-2	Near MW-67	06/02/11	20	15.83	0.07	13.16	1.14	1.37	1.56	
SF-3	Near MW-15 and 18	06/02/11	20	10.45	0.05	10.45	0.56	1.72	0.96	
SF-4	Near MW-42	06/02/11	Dry	Dry	Dry	Dry	Dry	Dry	Dry	

Notes: Measurements are averaged.
cfs - cubic feet per second

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Area I
Western Aerojet Range

Area H
Sanitary Landfill

Landfill

MW-84A
MW-84B
MW-96
MW-97

Area F
LPC Test Services Area

Large Motor
Test Stand

MW-85A
MW-85B
MW-86A
MW-86B
MW-92
MW-95
F34-TW1
MW-93
MW-87A
MW-87B
MW-94

Maintenance Shops and
Storage Warehouse

Lower Potrero Fault Zone

SF-3
(2.43 cfs)

MW-83
MW-82
W-1
MW-70

Large Motor
Washout Area

TW1
MW-77A
MW-77B

Conservation Easement
Boundary

OW-08
MW-38
W-2
TW2
MW-81
MW-15
MW-18

P-06D
EW-19
P-06S
P-08
MW-14
P-07

Area E
Radioactive Waste
Disposal Site

P-02
Bedsprings Fault
SF-4
(Dry)
MW-42
MW-101
OW-02
MW-13
Bedsprings Creek
MW-45
MW-43
MW-102
MW-80
MW-76A
MW-76B
MW-76C
MW-47
MW-48
MW-37
MW-46
MW-09
MW-08
Fault E
Fault D
Fault C
Dellamonn Fault

See Inset Map

SF-2
(2.07 cfs)
MW-67

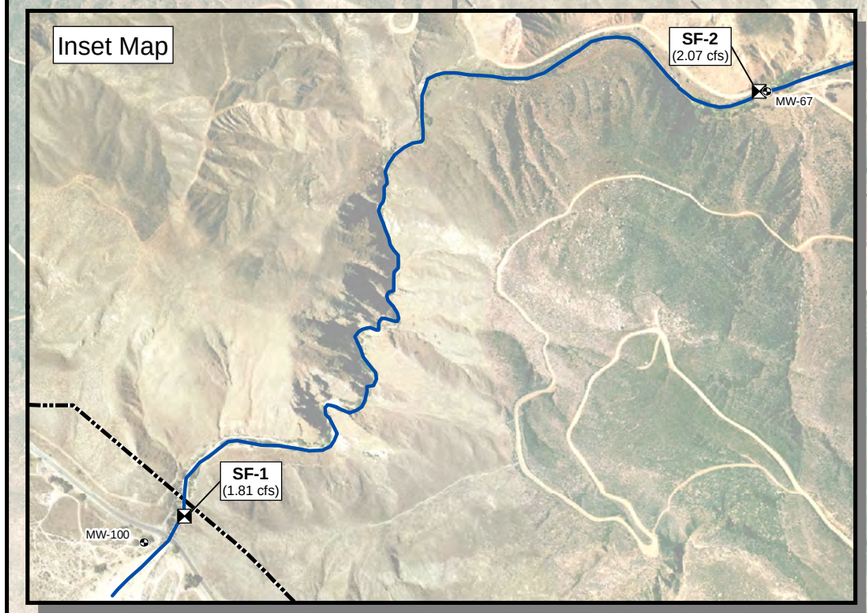
Fault A
Potrero Creek

Area G
Helicopter Weapons Test Area

Fault B

Lower Potrero Fault Zone

Inset Map



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
- Conservation Easement Boundary
- Potrero Canyon Unit Property Boundary
  (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Notes:

Beaumont Site 1 property boundary is approximate.

cfs - Cubic feet per second.

N/A - Surface flow not significant enough for measurement.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-8

First Quarter (March) 2011
Surface Water Flow Locations

TETRA TECH

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Area I
Western Aerojet Range

Area H
Sanitary Landfill

Landfill

MW-84A
MW-84B
MW-96
MW-97

Area F
LPC Test Services Area

Conservation Easement Boundary

OW-08
MW-38
W-2

Large Motor Test Stand

MW-85A
MW-85B
MW-86A
MW-86B
MW-92
MW-95

Maintenance Shops and Storage Warehouse

MW-87A
MW-87B

Large Motor Washout Area

MW-94
MW-93
F34-TW1

SF-3
(0.96 cfs)

MW-83
MW-82
W-1
MW-70
TW2

MW-81
MW-15
MW-18

P-06D
EW-19
P-06S
P-08
MW-14
P-07

Area E
Radioactive Waste Disposal Site

P-02
SF-4
(Dry)
MW-42
MW-101
OW-02
MW-13
MW-45
MW-43
MW-102
MW-80
MW-47
MW-48
MW-37
MW-46
MW-09
MW-08
MW-76A
MW-76B
MW-76C

Bedsprings Fault
Bedsprings Creek
Fault E
Fault D
Dellamonti Fault

TW1
MW-77A
MW-77B

Fault C
Fault B

Lower Potrero Fault Zone

See Inset Map

SF-2
(1.56 cfs)
MW-67

Fault A
Potrero Creek

Area G
Helicopter Weapons Test Area

Inset Map

SF-2
(1.56 cfs)
MW-67

SF-1
(1.20 cfs)
MW-100

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
- Conservation Easement Boundary
- Potrero Canyon Unit Property Boundary
  (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Notes:

Beaumont Site 1 property boundary is approximate.

cfs - Cubic feet per second.

N/A - Surface flow not significant enough for measurement.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-9

Second Quarter (June) 2011
Surface Water Flow Locations

TETRA TECH

3.3 GROUNDWATER FLOW

Groundwater flow directions from First Quarter 2011 and Second Quarter 2011 (Figures 3-1 and 3-2 respectively) were similar to previously observed patterns for a dry period (Appendix A, Figure 2-14). Generally, groundwater flowed northwest from the southeastern limits of the valley (near the former BPA) beneath the former RMPA, towards Potrero Creek where groundwater flow then changed direction and began heading southwest, parallel to the flow of Potrero Creek, into Massacre Canyon.

3.3.1 Horizontal and Vertical 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 BPA, through the RMPA and NPCA to MW-18, in the MCEA) increased to 0.015 feet/foot (ft/ft) between First Quarter 2011 and Second Quarter 2011. Horizontal gradients are relatively high upgradient of the BPA where recharge from Bedsprings Creek and the adjacent mountain areas enters the main valley. The gradients significantly decrease downgradient of the BPA within 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 within the aquifer. The vertical gradient is a comparison of static water level between wells at different depths within 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 BPA, RMPA, and NPCA, indicating areas of recharge, and positive in the MCEA indicating an area of discharge.

A summary of horizontal and vertical groundwater gradients is presented in Table 3-4. A complete listing of historical horizontal and vertical groundwater gradients and associated calculations is presented in Appendix F.

Table 3-4 Summary of Horizontal and Vertical Groundwater Gradient

Horizontal Groundwater Gradients (feet / foot), approximating a flowline from MW-36 to MW-18 and subsections					
Location:	**Overall**	**BPA**	**RMPA**	**NPCA**	**MCEA**
Date	**MW-36 to MW-18**	**MW-36 to MW-2**	**MW-2 to MW-5**	**MW-5 to MW-46**	**MW-46 to MW-18**
Previous - Fourth Quarter (Dec) 2010	0.013	0.0118	0.0014	0.021	0.013
First Quarter (March) 2011	0.016	0.0285	0.0030	0.020	0.014
Fourth Quarter (June) 2011	0.015	0.0169	0.0041	0.020	0.014
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 - Fourth Quarter (Dec) 2010	-0.13	-0.13	-0.07	0.02	0.04
First Quarter (March) 2011	-0.09	-0.15	-0.08	0.03	0.05
Fourth Quarter (June) 2011	-0.11	-0.15	-0.07	0.03	0.05

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.

3.4 ANALYTICAL DATA SUMMARY

Summaries of validated laboratory analytical results for organic (VOCs, 1,4-dioxane) and inorganic (perchlorate, natural attenuation, and general minerals parameters) analytes detected above their respective method detection limits (MDLs) from the First Quarter 2011 and Second Quarter 2011 water quality monitoring events are presented in Tables 3-5 and 3-6, respectively. A complete list of analytes tested, along with validated sample results by analytical method, are provided in Appendix G.

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 Tables 3-5 and 3-6. Laboratory analytical data packages, which include environmental, field QC, and laboratory QC results, are provided in Appendix H, and consolidated analytical data summary tables are presented in Appendix I. Tables 3-7 and 3-8 present summary statistics of the organic and inorganic analytes detected during the First Quarter 2011 and Second Quarter 2011 monitoring events, respectively.

Table 3-5 Summary of Validated Detected Organic and Inorganic Analytes - First Quarter 2011

Sample Location	Sample Date	Per-chlorate	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	Trichloro-ethene	Vinyl Chloride
All results reported in µg/L unless otherwise stated												
MW-103	03/24/11	**56**	**12**	<5.0	<0.46	0.42 Jq	<0.21	2.6	3.2	<0.10	4.8	<0.13
MW-104	03/24/11	<0.071	**34**	<5.0	<0.46	**5.8**	0.24 Jq	**46**	3.1	0.17 Jq	0.94	**16**
MW-105	03/24/11	<0.071	**33**	<5.0	<0.46	**5.7**	**0.65**	**90**	4.4	0.32 Jq	**72**	**2.2**
MW-106	03/24/11	**40**	**21**	<5.0	<0.46	1.6	0.26 Jq	**27**	1.8	1.8	**23**	0.38 Jq
MW-107	03/24/11	**12**	**12**	<5.0	<0.46	0.53	<0.21	4.2	1.5	0.75	**6.3**	<0.13
MW-108	03/24/11	**84**	**25**	<5.0	<0.46	3.3	**0.50**	**60**	1.7	1.0	**44**	0.45 Jq
MW-109	03/24/11	**510**	**27**	<5.0	0.50	2.6	**0.55**	**56**	3.0	0.22 Jq	**60**	0.32 Jq
SW-06	03/21/11	<0.071	0.29	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-08	03/21/11	<0.071	<0.10	6.3 Jq	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-09	03/21/11	0.074 Jq	<0.10	5.2 Jq	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-10	03/21/11	<0.071	<0.10	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-12	03/21/11	<0.071	<0.10	5.7 Jq	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-13	03/21/11	<0.071	<0.10	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-14	03/21/11	**14**	**4.4**	<5.0	<0.46	<0.098	<0.21	0.48 Jq	0.46 Jq	<0.10	<0.25	<0.13
SW-15	03/21/11	0.18	<0.10	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-16	03/21/11	0.24	0.41	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-18	03/21/11	<0.071	0.22	<5.0	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
SW-19	03/21/11	0.082 Jq	0.31	5.2 Jq	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.25	<0.13
MDL (µg/L)		0.071	0.10	5	0.46	0.098	0.21	0.12	0.18	0.10	0.25	0.13
MCL/DWNL (µg/L)		6	1 (1)	-	-	5	0.5	6	6	10	5	0.5

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.

MDL - Method detection limit.

DWNL - California Department of Public Health drinking water notification level.

MCL - California Department of Public Health Maximum Contaminant Level

(1) - DWNL

"-" - MCL or DWNL not available.

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 3-6 Summary of Validated Detected Organic and Inorganic Analytes - Second Quarter 2011

Sample Location	Sample Date	Per chlorate	Lead - mg/L	1,4-Dioxane	Acetone	Benzene	Carbon disulfide	Chloro benzene	Chloro ethane	Carbon Tetra chloride	Chloro form	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1-Dichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Methyl tert-butyl ether	Methylene Chloride	Toluene	1,1,1-Trichloro ethane	1,1,2-Trichloro ethane	Trichloro ethene	Tetra chloro ethene	Vinyl Chloride
All results reported in µg/L unless otherwise stated																								
EW-13	07/06/11	1.0	NA	**4,200 Je**	<5.0	**5.1**	<0.36	<0.23	2.2	<0.15	3.6	**180**	**350**	**13,000**	**1,100**	**11**	<0.43	**5.2**	0.28 Jq	<0.12	**46**	**1,700**	**6.6**	**440**
F33-TW2	06/08/11	1.1	NA	**3.0**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
F33-TW3	06/08/11	0.19	NA	**2.8**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
F33-TW6	06/13/11	<0.071	NA	**2.4**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
F33-TW7	06/13/11	<0.071	NA	**2.6**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
F34-TW1	06/06/11	2.1	NA	**9.6**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	0.23 Jq	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	0.76	<0.23	<0.13
IW-04	06/14/11	<0.071	NA	**25**	<5.0	0.29 Jq	<0.36	<0.23	0.64	<0.15	<0.46	0.53	0.44 Jq	**35**	1.9	0.38 Jq	<0.43	0.27 Jq	0.34 Jq	<0.12	<0.31	**23**	<0.23	**0.87**
MW-02	06/20/11	**1,800**	NA	**69**	<5.0	<0.14	<0.36	<0.23	<0.35	0.15 Jq	1.1	4.8	**3.5**	**180**	1.1	0.17 Jq	<0.43	<0.15	<0.22	0.65	1.2	**160**	0.51	<0.13
MW-05	06/16/11	**1,200**	NA	**29**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	1.6	1.6	**0.51**	**75**	0.30 Jq	<0.10	<0.43	0.24 BJkq	<0.22	0.33 Jq	0.35 Jq	**85**	<0.23	<0.13
MW-07	06/20/11	**150**	NA	**1.3**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.69	**1.1**	**16**	<0.18	<0.10	<0.43	<0.15	<0.22	0.14 Jq	<0.31	**28**	<0.23	<0.13
MW-09	06/13/11	<0.071	NA	**6.7**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-13	06/09/11	<0.071	NA	0.42	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	0.16 Jq	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-14	06/09/11	1.2	NA	**1.1**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-15	06/07/11	<0.071	NA	**6.8**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.30 Jq	<0.21	1.9	0.29 Jq	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	1.1	<0.23	<0.13
MW-17	06/15/11	**1,000**	NA	**40**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.54	<0.21	5.9	<0.18	<0.10	<0.43	<0.15	<0.22	0.54	<0.31	**7.6**	<0.23	<0.13
MW-18	06/07/11	1.3	NA	**4.3**	<5.0	<0.14	0.42 Jq	<0.23	<0.35	<0.15	<0.46	0.15 Jq	<0.21	0.93	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	0.76	<0.23	<0.13
MW-19	06/16/11	**93**	NA	**78**	<5.0	<0.14	0.51	<0.23	<0.35	<0.15	<0.46	2.4	0.38 Jq	**31**	0.51	<0.10	<0.43	0.20 BJkq	<0.22	0.17 Jq	<0.31	**15**	<0.23	**1.4**
MW-22	06/20/11	**1,200**	NA	**29**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	0.79	1.6	**0.79**	**160**	0.58	<0.10	<0.43	<0.15	<0.22	0.41 Jq	0.41 Jq	**98**	<0.23	<0.13
MW-26	07/06/11	**7,000**	NA	**590**	<5.0	**1.8**	0.41 Jq	<0.23	<0.35	**3.9**	14	**84**	**94**	**4,700**	**40**	2.1	1.1 Jq	<0.15	<0.22	3.7	**25**	**2,600**	**7.8**	0.15 Jq
MW-27	06/14/11	2.8	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-28	06/16/11	**55**	NA	0.59	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.35 Jq	0.33 Jq	**6.1**	<0.18	<0.10	<0.43	0.21 BJkq	<0.22	0.15 Jq	<0.31	**12**	<0.23	<0.13
MW-29	07/06/11	**9.3**	NA	**26**	<5.0	<0.14	<0.36	0.33 Jq	<0.35	<0.15	<0.46	2.2	0.47 Jq	**22**	0.75	<0.10	<0.43	<0.15	0.29 Jq	<0.12	<0.31	**45**	<0.23	0.14 Jq
MW-34	06/16/11	**110**	NA	0.58	<5.0	<0.14	0.41 Jq	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	0.80	<0.18	<0.10	<0.43	0.24 BJkq	<0.22	<0.12	<0.31	**5**	<0.23	<0.13
MW-35	06/20/11	0.38	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	0.16 Jq	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-36	06/21/11	0.28	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-40	06/17/11	**460**	NA	**15**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	0.54	0.84	<0.21	**14**	0.81	<0.10	<0.43	0.19 BJkq	<0.22	<0.12	<0.31	**24**	<0.23	<0.13
MW-45	06/13/11	**120**	NA	**8.4**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.41 Jq	<0.21	**8.6**	<0.18	<0.10	<0.43	<0.15	<0.22	0.16 Jq	<0.31	**9.3**	<0.23	<0.13
MW-46	06/09/11	4.6	NA	**6.4**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.26 Jq	<0.21	1.6	0.53	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	1.3	<0.23	0.18 Jq
MW-47	06/13/11	3.9	NA	0.13 Jq	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-49	06/17/11	**280**	NA	**8.4**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.18 Jq	<0.21	**11**	<0.18	<0.10	<0.43	0.38 BJkq	<0.22	0.19 Jq	<0.31	**12**	<0.23	<0.13
MW-53	06/20/11	**13**	NA	**0.46**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	0.49 Jq	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	0.77	<0.23	<0.13
MW-54	06/20/11	**940**	NA	**24**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.96	**0.58**	**60**	0.28 Jq	<0.10	<0.43	<0.15	<0.22	0.23 Jq	0.31 Jq	**47**	<0.23	<0.13
MW-56C	06/20/11	**830**	NA	**22**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	0.46 Jq	0.96	0.48 Jq	**54**	0.25 Jq	<0.10	<0.43	<0.15	<0.22	0.24 Jq	<0.31	**46**	<0.23	<0.13
MW-59B	07/06/11	**4,900**	NA	**60**	<5.0	0.25 Jq	<0.36	<0.23	<0.35	0.35 Jq	2.6	**12**	**16**	**210**	1.6	0.19 Jq	0.51 Jq	<0.15	0.36 Jq	0.19 Jq	1.7	**120**	0.23 Jq	<0.13
MW-60A	06/21/11	**4,900**	**0.021**	**130**	<5.0	0.25 Jq	<0.36	<0.23	<0.35	0.31 Jq	2.4	**5**	**6.6**	**460**	2.2	0.25 Jq	<0.43	0.26 Jq	<0.22	0.30 Jq	1.4	**280**	0.36 Jq	<0.13
MW-60B	06/21/11	**1,300**	NA	**8.8**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.47 Jq	**0.53**	**41**	<0.18	<0.10	<0.43	0.22 Jq	<0.22	<0.12	<0.31	**12**	<0.23	<0.13
MW-61B	07/06/11	**81,000**	NA	**590**	<5.0	**2.1**	<0.36	0.55	<0.35	**6.7**	28	**180**	**110**	**11,000**	**51**	4.1	<0.43	0.40 Jq	<0.22	4.9	**16**	**1,700**	**7.7**	0.47 Jq
MW-62A	06/16/11	**1,000**	NA	**24**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	1.2	1.0	0.31 Jq	**51**	0.18 Jq	<0.10	<0.43	0.22 BJkq	<0.22	0.21 Jq	<0.31	**63**	<0.23	<0.13
MW-66	06/17/11	**1,200**	NA	**28**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	2.2	2.7	**0.68**	**110**	0.44 Jq	<0.10	<0.43	0.19 BJkq	<0.22	0.17 Jq	<0.31	**120**	0.24 Jq	<0.13
MW-67	06/06/11	<0.071	NA	**1.2**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-68	06/21/11	**13,000**	NA	**25**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.19 Jq	<0.21	**6.1**	<0.18	<0.10	<0.43	0.16 Jq	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-69	06/17/11	**1,100**	NA	**3.6**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	0.90	0.34 Jq	<0.21	**11**	<0.18	<0.10	<0.43	0.41 BJkq	<0.22	<0.12	<0.31	**13**	<0.23	<0.13
MW-70	06/08/11	0.51	NA	**2.6**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-71B	06/14/11	0.92	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	0.28 Jq	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-71C	06/14/11	0.56	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-72B	06/14/11	0.17	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-73B	06/14/11	4.4	NA	<0.10	<5.0	<0.14	0.68	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MDL (µg/L)		0.071	0.00019	0.10	5	0.14	0.36	0.23	0.35	0.15	0.46	0.098	0.21	0.12	0.18	0.10	0.43	0.15	0.22	0.12	0.31	0.25	0.23	0.13
MCL/DWNL (µg/L)		6	0.015	1 (1)	-	1	160 (1)	-	-	0.5	-	5	0.5	6	6	10	13	5	150	200	5	5	5	0.5

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.
mg/L - milligrams per liter
MDL - Method detection limit
DWNL - California Department of Public Health drinking water notification level.
MCL - California Department of Public Health Maximum Contaminant Level
(1) DWNL
"-" - MCL or DWNL not available.
Bold - MCL or DWNL exceeded.

<# - Analyte not detected, method detection limit concentration is shown.
NA - not analyzed
B - The result is < 5 times the blank contamination. Cross contamination is suspected and the data is considered unusable
J - The analyte was positively identified, but the analyte concentration is an estimated value.
e - a holding time violation occurred.
k - The analyte was found in a field blank.
q - The analyte detection was below the Practical Quantitation Limit (PQL).

Table 3-6 Summary of Validated Detected Organic and Inorganic Analytes - Second Quarter 2011 (continued)

Sample Location	Sample Date	Per chlorate	Lead - mg/L	1,4-Dioxane	Acetone	Benzene	Carbon disulfide	Chloro benzene	Chloro ethane	Carbon Tetra chloride	Chloro form	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1-Dichloro ethene	cis-1,2-Dichloro ethene	trans-1,2-Dichloro ethene	Methyl tert-butyl ether	Methylene Chloride	Toluene	1,1,1-Trichloro ethane	1,1,2-Trichloro ethane	Trichloro ethene	Tetra chloro ethene	Vinyl Chloride
All results reported in µg/L unless otherwise stated																								
MW-74C	06/14/11	**8.7**	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-75B	06/17/11	2.1	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	0.21 BJkq	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-76A	06/09/11	<0.071	NA	**3.2**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-76B	06/09/11	<0.071	NA	0.53	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-77B	06/07/11	<0.071	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-82	06/08/11	<0.071	NA	**2.4**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-83	06/08/11	0.25	NA	**2.6**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-85B	06/07/11	<0.071	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	**19**	<0.23	<0.13
MW-86B	06/06/11	<0.071	NA	0.67	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	0.16 Jq	0.55	0.29 Jq	<0.43	<0.15	<0.22	<0.12	<0.31	**98**	<0.23	<0.13
MW-87B	06/07/11	**31**	NA	**7.3**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	2.2	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	**15**	<0.23	<0.13
MW-88	06/17/11	**6,100**	NA	0.23	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	0.19 BJkq	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-89	06/17/11	**2,000**	NA	**7.5**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	0.61	0.15 Jq	<0.21	3.0	<0.18	<0.10	<0.43	0.18 BJkq	<0.22	<0.12	<0.31	**5.3**	<0.23	<0.13
MW-90	06/20/11	**180**	NA	0.19 Jq	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	1.5	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	1.8	<0.23	<0.13
MW-91	06/20/11	**3,400**	NA	**2.2**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	0.24 Jq	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-92	06/06/11	**23**	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	**9.3**	<0.23	<0.13
MW-93	06/07/11	**8.4**	NA	**4.4**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-94	06/07/11	0.41	NA	**6.0**	<5.0	<0.14	0.37 Jq	<0.23	<0.35	<0.15	<0.46	0.21 Jq	<0.21	0.37 Jq	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	1.4	<0.23	<0.13
MW-95	06/06/11	<0.071	NA	0.24	<5.0	<0.14	0.60	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	**12**	<0.23	<0.13
MW-98B	06/17/11	**1,600**	NA	**5.2**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	0.95	0.32 Jq	<0.21	**12**	<0.18	<0.10	<0.43	0.36 BJkq	<0.22	<0.12	<0.31	**17**	<0.23	<0.13
MW-100	06/06/11	<0.071	NA	0.15 Jq	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MW-101	06/15/11	<0.071	NA	**23**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	1.5	0.46 Jq	**51**	**44**	1.5	<0.43	<0.15	<0.22	<0.12	<0.31	**37**	<0.23	**1.9**
MW-102	06/15/11	<0.071	NA	**20**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	1.5	0.24 Jq	**21**	**29**	1.9	<0.43	<0.15	<0.22	<0.12	<0.31	**17**	<0.23	**2.9**
MW-103	06/09/11	**160**	NA	**11**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.38 Jq	<0.21	**3.6**	2.2	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	**5.9**	<0.23	<0.13
MW-104	06/09/11	<0.071	NA	**31**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	**5.6**	0.26 Jq	**56**	3.7	0.22 Jq	<0.43	<0.15	<0.22	<0.12	<0.31	1.7	<0.23	**14**
MW-105	06/09/11	<0.071	NA	**34**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	**5.4**	**0.66**	**87**	3.8	0.49 Jq	<0.43	<0.15	<0.22	<0.12	<0.31	**69**	<0.23	**1.6**
MW-106	06/07/11	**42**	NA	**23**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	1.7	0.26 Jq	**27**	1.9	1.8	<0.43	<0.15	<0.22	<0.12	<0.31	**24**	<0.23	0.34 Jq
MW-107	06/07/11	**34**	NA	**11**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.60	<0.21	4.8	1.8	0.85	<0.43	<0.15	<0.22	<0.12	<0.31	**7.8**	<0.23	<0.13
MW-108	06/09/11	**84**	NA	**20**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	2.1	0.32 Jq	**36**	2.9	1.3	<0.43	<0.15	<0.22	<0.12	<0.31	**28**	<0.23	0.25 Jq
MW-109	06/09/11	**450**	NA	**27**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	0.48 Jq	2.6	**0.53**	**55**	2.8	0.22 Jq	<0.43	<0.15	<0.22	<0.12	<0.31	**61**	<0.23	0.24 Jq
OW-01	06/20/11	0.3	NA	<0.10	<5.0	<0.14	0.56	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
OW-02	06/13/11	**360**	NA	**14**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.57	<0.21	**22**	<0.18	<0.10	<0.43	<0.15	<0.22	0.31 Jq	<0.31	**23**	<0.23	<0.13
P-02	06/09/11	<0.071	NA	<0.10	<5.0	<0.14	0.53	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
P-03	06/14/11	<0.071	NA	0.14 Jq	<5.0	<0.14	0.39 Jq	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
P-05	06/15/11	4.3	NA	<0.10	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
SW-02	06/10/11	<0.071	NA	**11**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	0.30 Jq	<0.21	**8.9**	0.78	<0.10	<0.43	0.15 BJkq	0.35 Jq	0.14 Jq	<0.31	**9.2**	<0.23	0.17 Jq
SW-03	06/10/11	<0.071	NA	**8.6**	7.7 Jq	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	0.37 Jq	<0.18	<0.10	<0.43	<0.15	0.61	<0.12	<0.31	0.64	<0.23	<0.13
SW-04	06/10/11	**23**	NA	**5.9**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	0.19 Jq	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	0.36 Jq	<0.23	<0.13
SW-06	06/10/11	<0.071	NA	**1.6**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
SW-07	06/10/11	<0.071	NA	**1.2**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
SW-09	06/10/11	<0.071	NA	0.22	5.1 Jq	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	0.16 BJkq	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
SW-16	06/10/11	0.21	NA	0.87	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
SW-18	06/10/11	<0.071	NA	**2.5**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
SW-19	06/10/11	0.18	NA	**2.0**	<5.0	<0.14	<0.36	<0.23	<0.35	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.15	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
PPW-1-1	05/10/11	<0.071	NA	<0.10	NA	<0.14	NA	<0.23	<0.50	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.50	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
PPW-1-2	05/10/11	<0.071	NA	<0.10	NA	<0.14	NA	<0.23	<0.50	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.50	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
PPW-1-4	05/10/11	<0.071	NA	<0.10	NA	<0.14	NA	<0.23	<0.50	<0.15	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.43	<0.50	<0.22	<0.12	<0.31	<0.25	<0.23	<0.13
MDL (µg/L)		0.071	0.00019	0.10	5	0.14	0.36	0.23	0.35	0.15	0.46	0.098	0.21	0.12	0.18	0.10	0.43	0.15	0.22	0.12	0.31	0.25	0.23	0.13
MCL/DWNL (µg/L)		6	0.015	1 (1)	-	1	160 (1)	-	-	0.5	-	5	0.5	6	6	10	13	5	150	200	5	5	5	0.5

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.
mg/L - milligrams per liter
MDL - Method detection limit
DWNL - California Department of Public Health drinking water notification level.
MCL - California Department of Public Health Maximum Contaminant Level
(1) DWNL
"-" - MCL or DWNL not available.
Bold - MCL or DWNL exceeded.

<# - Analyte not detected, method detection limit concentration is shown.
NA - not analyzed
B - The result is < 5 times the blank contamination. Cross contamination is suspected and the data is considered unusable
J - The analyte was positively identified, but the analyte concentration is an estimated value.
e - a holding time violation occurred.
k - The analyte was found in a field blank.
q - The analyte detection was below the Practical Quantitation Limit (PQL).

Table 3-7 Summary Statistics of Validated Organic and Inorganic Analytes - First Quarter 2011

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	12	8	1 (2)	µg/L	0.22	µg/L	34	µg/L
Acetone	18	4	0	-	µg/L	5.2	µg/L	6.3	µg/L
Chloroform	18	1	0	-	µg/L	0.50	µg/L	0.50	µg/L
1,1-Dichloroethane	18	7	2	5	µg/L	0.42	µg/L	5.8	µg/L
1,2-Dichloroethane	18	5	3	0.5	µg/L	0.24	µg/L	0.65	µg/L
1,1-Dichloroethene	18	8	5	6	µg/L	0.48	µg/L	90	µg/L
cis-1,2-Dichloroethene	18	8	0	6	µg/L	0.46	µg/L	4.4	µg/L
trans-1,2-Dichloroethene	18	6	0	10	µg/L	0.17	µg/L	1.8	µg/L
Trichloroethene	18	7	5	5	µg/L	0.94	µg/L	72	µg/L
Vinyl chloride	18	5	2	0.5	µg/L	0.32	µg/L	16	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	6	6	µg/L	0.074	µg/L	510	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 3-8 Summary Statistics of Validated Organic and Inorganic Analytes - Second Quarter 2011

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	93	75	61	1 [2]	µg/L	0.13	µg/L	4,200	µg/L
Acetone	90	2	0	-	µg/L	5.1	µg/L	7.7	µg/L
Benzene	93	3	3	1	µg/L	0.25	µg/L	5.1	µg/L
Carbon disulfide	90	10	0	160 [2]	µg/L	0.37	µg/L	0.68	µg/L
Chlorobenzene	93	2	0	-	µg/L	0.33	µg/L	0.55	µg/L
Chloroethane	93	2	0	-	µg/L	0.64	µg/L	2.2	µg/L
Carbon tetrachloride	93	5	2	0.5	µg/L	0.15	µg/L	6.7	µg/L
Chloroform	93	16	0	-	µg/L	0.46	µg/L	28	µg/L
1,1-Dichloroethane	93	41	7	5	µg/L	0.15	µg/L	180	µg/L
1,2-Dichloroethane	93	25	14	0.5	µg/L	0.24	µg/L	350	µg/L
1,1-Dichloroethene	93	51	33	6	µg/L	0.16	µg/L	13,000	µg/L
cis-1,2-Dichloroethene	93	29	5	6	µg/L	0.18	µg/L	1,100	µg/L
trans-1,2-Dichloroethene	93	16	1	10	µg/L	0.17	µg/L	11	µg/L
Methyl tert-butyl ether	93	2	0	13	µg/L	0.51	µg/L	1.1	µg/L
Methylene Chloride	93	8	1	5	µg/L	0.16	µg/L	5.20	µg/L
Toluene	93	6	0	150	µg/L	0.28	µg/L	0.61	µg/L
1,1,1-Trichloroethane	93	19	0	200	µg/L	0.14	µg/L	4.9	µg/L
1,1,2-Trichloroethane	93	8	3	5	µg/L	0.31	µg/L	46	µg/L
Trichloroethene	93	51	41	5	µg/L	0.36	µg/L	2,600	µg/L
Tetrachloroethene	93	7	3	5	µg/L	0.23	µg/L	7.8	µg/L
Vinyl chloride	93	15	7	0.5	µg/L	0.14	µg/L	440	µg/L
Methane	7	4	0	-	µg/L	0.23	µg/L	169	µg/L
Acetic Acid	7	7	0	-	mg/L	0.090	mg/L	0.190	mg/L
Lactic Acid and HIBA	7	7	0	-	mg/L	0.960	mg/L	1.500	mg/L
Propionic Acid	7	6	0	-	mg/L	0.060	mg/L	0.810	mg/L
Total Organic Carbon	7	7	0	-	mg/L	1.5	mg/L	2.6	mg/L
Dissolved Organic Carbon	7	7	0	-	mg/L	1.8	mg/L	4.0	mg/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	93	63	40	6	µg/L	0.17	µg/L	81,000	µg/L
Hydrogen	7	7	0	-	nM	0.86	nM	2.0	nM
Iron	7	7	3	0.3	mg/L	0.0042	mg/L	2.0	mg/L
Lead	1	1	1	0.015	mg/L	0.021	mg/L	0.021	mg/L
Nitrate	7	1	0	10	mg/L	0.88	mg/L	0.88	mg/L
Sulfate	7	7	0	250	mg/L	33	mg/L	50	mg/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.
nM - NanoMoles

3.4.1 Data Quality Review

The quality control samples were reviewed as described in the Beaumont Sites 1 and 2, Programmatic Sampling and Analysis Plan (Tetra Tech, Inc., 2010a). The data for the groundwater sampling activities was contained in analytical data packages generated by Microseeps Laboratories Inc, and 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 documents from the EPA (EPA, 2008 and EPA, 2010).

Preservation criteria, holding times, field blanks, laboratory control samples (LCS), 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 include comparing statistically calculated control limits to percent recoveries of all spiked analytes and duplicate spiked analytes. Relative Percent Difference (RPD) control limits are compared to actual spiked (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: Method AM23G for volatile fatty acids, Method AM20GAX for hydrogen, Method E300.0 for anions, Method E332.0 for perchlorate, Method A5310 for total organic carbon, Method RSK-175 for methane, ethane, ethene, Method SW8270C SIM for 1,4-dioxane, Methods SW6010B and SW6020 for metals, and Methods SW524.2 and SW8260B for VOCs.

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

Method SW8270C SIM for 1,4-dioxane had holding time errors which caused 0.8 percent (one sample out of 121 samples) of the total SW8270C SIM data to be qualified as estimated. The sample was extracted within holding times but the sample extract vial was broken after extraction holding times were expired and the sample had to be extracted outside of holding times. The data qualified as estimated is usable for the intended purpose.

Method SM5310B for total organic carbon had field duplicate RPD errors that caused 12.5 percent (two samples out of 16 samples) of the total SM5310B data to be qualified as estimated. The data qualified as estimated is usable for the intended purpose.

Method SW8260B for VOCs had trip blank contamination for methylene chloride that caused 0.3 percent (15 of 5203 analytes) of the total SW8260B data to be qualified for blank contamination. The blank qualified results should be considered not detected at elevated detection levels.

Method AM23G for volatile fatty acids had field duplicate RPD errors that qualified as estimated 2.8 percent (two analytes out of 72 analytes) of the total AM23G data. The data qualified as estimated is usable for the intended purpose.

3.5 CHEMICALS OF POTENTIAL CONCERN

The identification of COPCs is an ongoing process that takes place annually as part of the Second Quarter sampling. The purpose of identifying COPCs 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 COPCs. Tables 3-5 and 3-6 present summaries of the organic and inorganic analytes detected during the First Quarter 2011 and Second Quarter 2011 monitoring events. Data that is "B" qualified because of associations with either laboratory blank or field cross contamination is not included in the COPC evaluation.

The COPC process does not eliminate analytes from testing but reduces the number of analytes that are evaluated and discussed during reporting. While all of the secondary COPCs will continue to be tested for in future monitoring events because of their association with other analytes that are listed as primary COPCs, these secondary COPCs are detected on a more limited or inconsistent basis, and/or their detection falls below a regulatory threshold. Therefore, the secondary COPCs will not be discussed further in the later sections of this report. Additionally, the standard list of analytes for each method will continue to be tested for and screened annually to insure that the appropriate COPCs are being identified and evaluated as specified in the Beaumont Sites 1 and 2, Programmatic Sampling and Analysis Plan (Tetra Tech, Inc., 2010a).

3.5.1 Identification of Chemicals of Potential Concern

COPCs have been selected to include compounds that consistently are detected in groundwater at concentrations above regulatory limits and that can be used to assess the extent of affected groundwater. Primary COPCs are parent products such as TCE and 1,1,1-TCA and are always present with a secondary COPC. Secondary COPCs are breakdown products such as 1,1-DCA and 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 it is considered the primary COPC, and 1,1,1-TCA is considered a secondary COPC.

As discussed above, the COPC 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 analysis is performed annually.

Laboratory analytical results from the First Quarter 2011 and Second Quarter 2011 monitoring events were reviewed to develop a consolidated list of analytes detected. The results were then screened against the MCLs and DWNLs (if an MCL has not been established).

3.5.2 Organic Analytes

Twenty one organic analytes were detected in the groundwater and/or surface water samples. Thirteen organic analytes were detected at concentrations above their respective MCLs/DWNLs: benzene, carbon tetrachloride, 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), 1,1-DCE, cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene, methylene chloride 1,4-dioxane, TCE, PCE, 1,1,2-trichloroethane (1,1,2-TCA), and vinyl chloride.

TCE was disposed of at the Site and has been routinely detected in groundwater samples collected from the Site. Observed concentrations of TCE breakdown products have been generally lower than TCE concentrations observed, therefore TCE is classified as a primary COPC. While 1,1,1-TCA was reportedly disposed of at the Site, it has not been detected at elevated concentrations in recent groundwater samples collected. However, in general, 1,1,1-TCA is not stable in the subsurface (Bielefeldt et al., 1995; Vogel et al., 1987); therefore it is assumed that concentrations of 1,1-DCE detected in groundwater samples collected from the Site resulted from the breakdown of 1,1,1-TCA. Since observed concentrations of 1,1-DCE are higher than the parent product, 1,1-DCE is classified as a primary COPC. Similarly, because detected concentrations of 1,1,1-TCA

are relatively low and the distribution of 1,1,1-TCA is within the 1,1-DCE plume, 1,1,1-TCA is regarded as a secondary COPC.

It is assumed that 1,4-dioxane was introduced into the subsurface along with the solvent 1,1,1-TCA, since it is commonly used as a stabilizer in 1,1,1-TCA (Archer, 1996; Mohr, 2001). Because of the concentration and distribution of 1,4-dioxane and because its chemical properties (hydrophilic, high solubility, minimal retardation, and resistance to biodegradation) are different from the other organic COPCs identified, 1,4-dioxane is also classified as a primary COPC.

The compounds 1,1-DCA, 1,2-DCA, 1,1-DCE, and cis-1,2-DCE could have been introduced into the environment as a primary product (solvent) but they are more commonly introduced as an impurity in a more common solvent such as TCE or 1,1,1-TCA, or as a breakdown product of TCE or 1,1,1-TCA. In groundwater samples collected, concentrations of 1,1-DCA, 1,2-DCA, and cis-1,2-DCE are detected at one to two orders of magnitude less than concentrations of TCE and 1,1-DCE. Until 1,1-DCA, 1,2-DCA, or cis-1,2-DCE are detected in groundwater samples where a primary chlorinated COPC is absent or the concentration of 1,1-DCA, 1,2-DCA or cis-1,2-DCE is higher than the primary COPC, these analytes will continue to be classified as secondary COPCs.

Vinyl chloride was likely introduced into the environment as a breakdown product of TCE or 1,1,1-TCA. In groundwater samples, the compound is always found with one or more of the primary COPCs and generally detected at one to two orders of magnitude less than concentrations of TCE and 1,1-DCE. Until vinyl chloride is detected in groundwater samples where a primary chlorinated COPC is absent or the concentration of vinyl chloride is higher than the primary COPC, it will continue to be classified as a secondary COPC.

1,1,2-TCA was likely introduced into the environment as an isomeric impurity of 1,1,1-TCA. The distribution of 1,1,2-TCA is limited to the BPA and just downgradient of the BPA. The compound is always found with one or more of the primary COPCs and generally detected at one to two orders of magnitude less than concentrations of TCE and 1,1-DCE. Until 1,1,2-TCA is detected in groundwater samples where a primary chlorinated COPC is absent or the concentration of 1,1,2-TCA is higher than the primary COPC, it will continue to be classified as a secondary COPC.

Five additional analytes--benzene, carbon tetrachloride, trans-1,2-dichloroethene, methylene chloride, and tetrachloroethene (PCE)--were detected at concentrations which exceed their respective MCLs. The analytes are infrequently detected from one sampling event to the next, the

concentrations are relatively low with respect to the MCLs, and they are always detected with a primary COPC. Therefore, these analytes are not proposed as primary or secondary COPCs.

1,1,1-TCA, a secondary COPC, was not detected above its MCL of 200 µg/L. The remaining seven organic analytes detected in the groundwater samples collected include acetone, carbon disulfide, chlorobenzene, chloroethane, chloroform, methyl tert-butyl ether (MTBE), and toluene. None of these organic analytes were detected at concentrations above their respective MCL/DWNL.

3.5.3 Inorganic Analytes

Based on the number of detections, the concentrations, and the distribution of perchlorate reported in groundwater samples collected from the Site, perchlorate has been identified as a primary COPC. Perchlorate is the only inorganic analyte identified as a COPC at the Site.

Previously, groundwater samples collected from well MW-60A showed lead concentrations exceeding the MCL of 0.015 mg/L. As proposed in the Semiannual Groundwater Monitoring Report First Quarter 2010 and Second Quarter 2010 (Tetra Tech, 2010b), a groundwater sample was collected from MW-60A for total lead analysis during Second Quarter 2011. Lead was detected at a concentration of 0.021 mg/L. In general, the reported concentration of lead is limited in distribution and relatively close to its MCL. Lead, therefore is not considered a primary or secondary COPC at the Site.

3.5.4 Chemicals of Potential Concern Conclusions

Table 3-9 presents those groundwater analytes that have been identified as COPCs. Time-series graphs of primary and secondary COPCs are provided in Appendix E. There have been no additions or deletions to the list of COPCs since the previous analysis was completed in 2010 (Tetra Tech, 2010b).

Table 3-9 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

3.6 DISTRIBUTION OF THE PRIMARY CHEMICALS OF POTENTIAL CONCERN

The distribution of the COPCs in the alluvium and shallow Mount Eden formation groundwater zones are described in the following subsections and illustrated in Figures 3-10 through 3-14. The figures were generated from the Second Quarter 2011 groundwater monitoring analytical results and from the latest analytical results for the other wells.

X:\GIS\Lockheed S1 Q1Q211\Perc.mxd

Area I
Western Aerojet Range

Large Motor Washout Area

Landfill

Lower Potrero Fault Zone

Fault A

Fault B

Area F
LPC Test Services Area

Large Motor Test Stand

Maintenance Shops and Storage Warehouse

MW-85B [<0.071]
MW-86B [<0.071]
MW-95 [<0.071]
MW-92 [23]
MW-87B [31]
MW-94 [0.41]
F34-TW1 [2.1]
MW-93 [8.4]
SW-19 [0.18]
SW-06 [>0.071]

0 500 1,000 Feet

Area A
Eastern Aerojet Range (Avanti)

Potrero Creek

Area B
Rocket Motor Production Area

NORTHERN POTRERO CREEK AREA

ROCKET MOTOR PRODUCTION AREA

Former Rocket Motor Production Area

P-03 [<0.071]
IW-04 [<0.071]
MW-40 [460]
MW-109 [450]
MW-108 [84]
P-02 [<0.071]
MW-107 [34]
MW-103 [160]
MW-13 [<0.071]
MW-45 [120]
MW-102 [<0.071]
SW-04 [23]
MW-46 [4.6]
MW-47 [3.9]
SW-03 [>0.071]
SW-02 [>0.071]
OW-02 [360]
MW-104 [<0.071]
MW-105 [<0.071]
MW-106 [42]
MW-101 [<0.071]
MW-09 [<0.071]
MW-76A [<0.071]
MW-76B [<0.071]
MW-29 [9.3]
MW-05 [1,200]
MW-19 [93]
MW-49 [280]
MW-56C [830]
MW-54 [940]
MW-17 [1,000]
MW-53 [13]
MW-28 [55]
MW-66 [1,200]
MW-89 [2,000]
MW-98B [1,600]
MW-69 [1,100]
MW-62A [1,000]
MW-68 [13,000]
MW-91 [3,400]
MW-88 [6,100]
MW-90 [180]
MW-34 [110]
MW-22 [1200]
MW-02 [1,800]
MW-60A [4,900]
MW-60B [1,300]
MW-27 [2.8]
MW-59B [4,900]
EW-13 [1.0]
MW-26 [7000]
MW-07 [150]
MW-75B [2.1]
MW-35 [0.38]
P-05 4.3
MW-71B [0.92]
MW-71C [0.56]
MW-74C [8.7]
MW-61B [81,000]
MW-73B [4.4]
MW-72B [0.17]
MW-36 [0.28]
OW-01 [0.30]

ROCKET MOTOR PRODUCTION AREA BURN PIT AREA

Former Burn Pit Area

Bedsprings Creek

NORTHERN POTRERO CREEK AREA
MASSACRE CANYON ENTRANCE AREA

Area F
LPC Test Services Area

Potrero Creek

MW-14 [1.2]

Area E
Radioactive Waste Disposal Site

Large Motor Washout Area

MW-18 [1.3]
MW-15 [<0.071]
SW-09 [>0.071]
MW-83 [0.25]
F33-TW2 [1.1]
MW-82 [<0.071]
F33-TW3 [0.19]
F33-TW6 [<0.071]
F33-TW7 [<0.071]
MW-70 [0.51]

Area G
Helicopter Weapons Test Area

MW-77B [<0.071]
SW-18 [>0.071]

Area D
LPC Ballistics Test Range

MW-67 [<0.071]
SW-07 [<0.071] Located Approximately 1 Mile Downstream
SW-16 [0.21] Located Approximately 2.5 Miles Downstream
MW-100 [<0.071] Located Approximately 2.6 Miles Downstream

N

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

- MW-22 [340] — Well ID, Perchlorate Concentration
- SW-07 [23] — Surface Water Sample Location, Perchlorate Concentration
- Perchlorate Concentration Contour (µg/L) - Dashed where inferred
- MCL Contour (6.0 µg/L) - Dashed where inferred
- Bedrock/Alluvium Surface Contact, Dashed where inferred
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Source Areas
- Historical Operational Area Boundary
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)

Notes:

MCL - Maximum Contaminant Level.
Concentrations shown are in microgram per liter (µg/L)

Highest concentration shown is contoured for clustered or nested well locations.

Bold indicates MCL value exceeded.

Beaumont Site 1 property boundary is approximate.

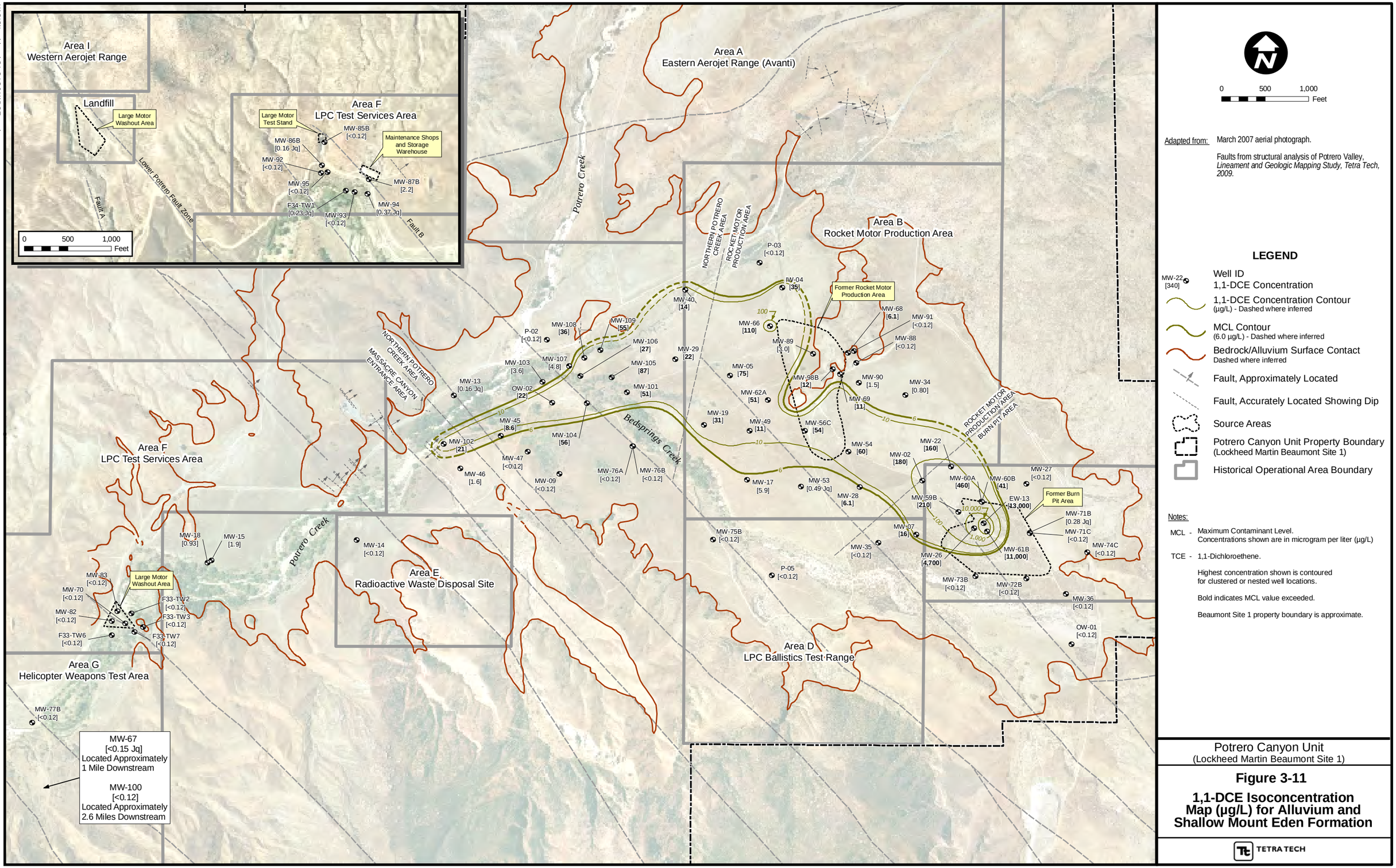
Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-10

Perchlorate Isoconcentration Map (µg/L) for Alluvium and Shallow Mount Eden Formation

TETRA TECH

X:\GIS\Lockheed S1 Q1Q211\DCE.mxd



Adapted from: March 2007 aerial photograph.

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

LEGEND

- Well ID / 1,1-DCE Concentration
- 1,1-DCE Concentration Contour (µg/L) - Dashed where inferred
- MCL Contour (6.0 µg/L) - Dashed where inferred
- Bedrock/Alluvium Surface Contact — Dashed where inferred
- Fault, Approximately Located
- Fault, Accurately Located Showing Dip
- Source Areas
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Notes:

MCL - Maximum Contaminant Level. Concentrations shown are in microgram per liter (µg/L)

TCE - 1,1-Dichloroethene.

Highest concentration shown is contoured for clustered or nested well locations.

Bold indicates MCL value exceeded.

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-11

1,1-DCE Isoconcentration Map (µg/L) for Alluvium and Shallow Mount Eden Formation

TETRA TECH

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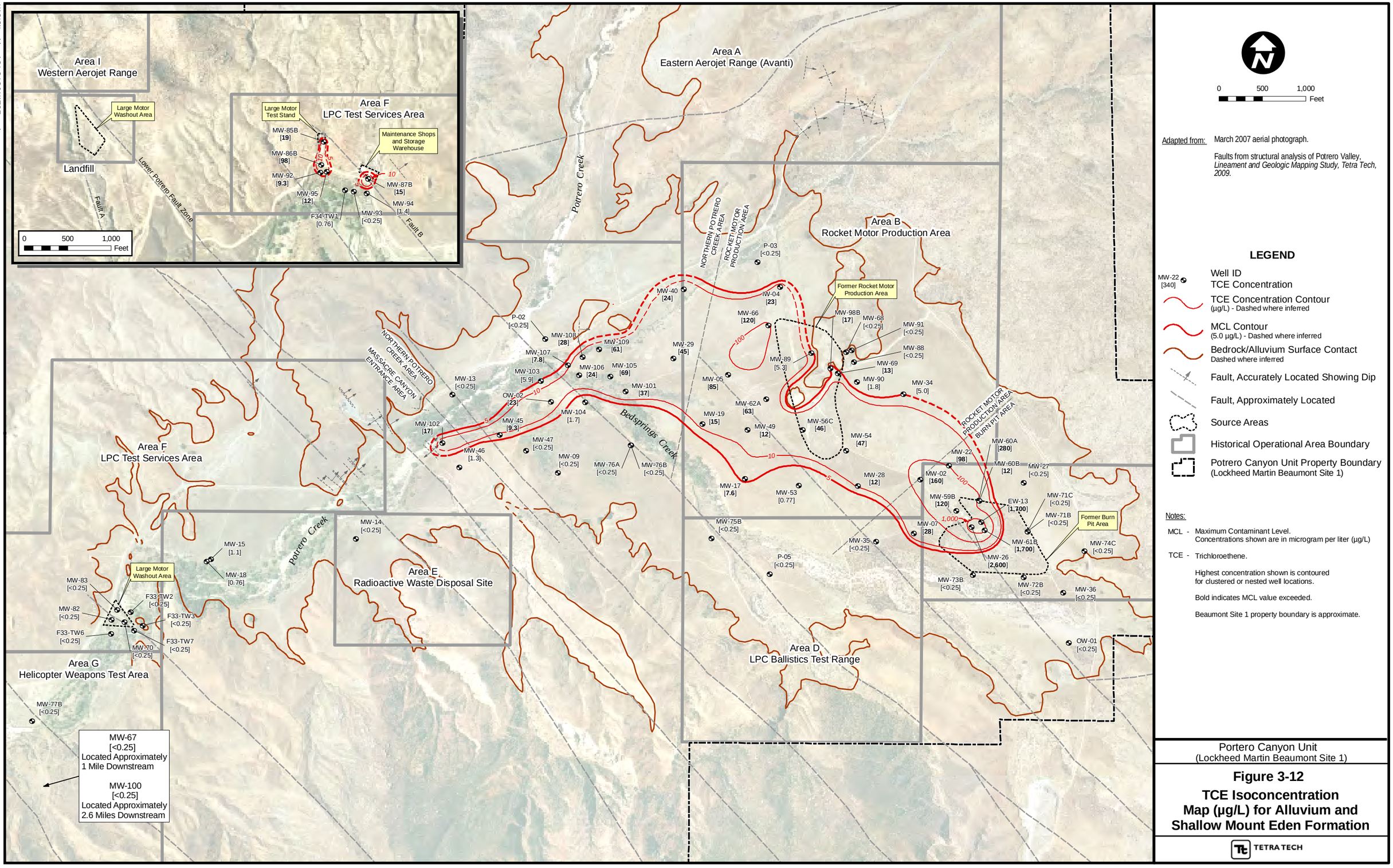

0 500 1,000 Feet

Adapted from: March 2007 aerial photograph.

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

LEGEND

- MW-22 [340] — Well ID, TCE Concentration
- TCE Concentration Contour (µg/L) - Dashed where inferred
- MCL Contour (5.0 µg/L) - Dashed where inferred
- Bedrock/Alluvium Surface Contact, Dashed where inferred
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Source Areas
- Historical Operational Area Boundary
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)

Notes:

MCL - Maximum Contaminant Level. Concentrations shown are in microgram per liter (µg/L)

TCE - Trichloroethene.

Highest concentration shown is contoured for clustered or nested well locations.

Bold indicates MCL value exceeded.

Beaumont Site 1 property boundary is approximate.

Portero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-12

TCE Isoconcentration Map (µg/L) for Alluvium and Shallow Mount Eden Formation

TETRA TECH

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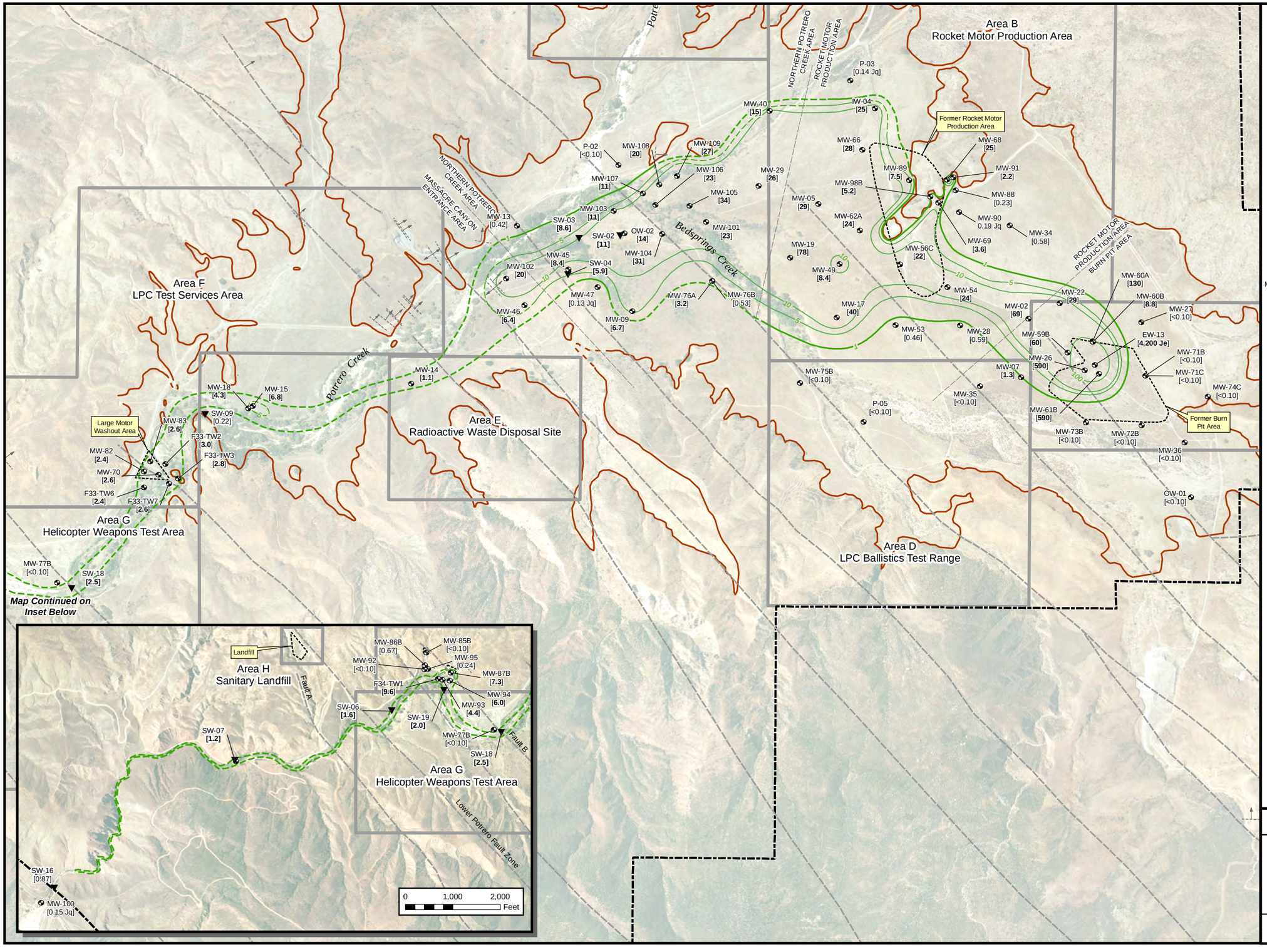


Adapted from: March 2007 aerial photograph.

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

LEGEND

- Well ID, 1,4-Dioxane Concentration
- Surface Water Sample Location, Perchlorate Concentration
- 1,4-Dioxane Concentration Contour (µg/L) - Dashed where inferred
- DWNL Contour (1.0 µg/L) - Dashed where inferred
- Bedrock/Alluvium Surface Contact, Dashed where inferred
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Source Areas
- Historical Operational Area Boundary
- Potrero Canyon Unit 1 Property Boundary (Lockheed Martin Beaumont Site 1)

Notes:

DWNL - Drinking water notification level. Concentrations shown are in microgram per liter (µg/L)

Highest concentration shown is contoured for clustered or nested well locations.

Bold indicates DWNL value exceeded.

Beaumont Site 1 property boundary is approximate.

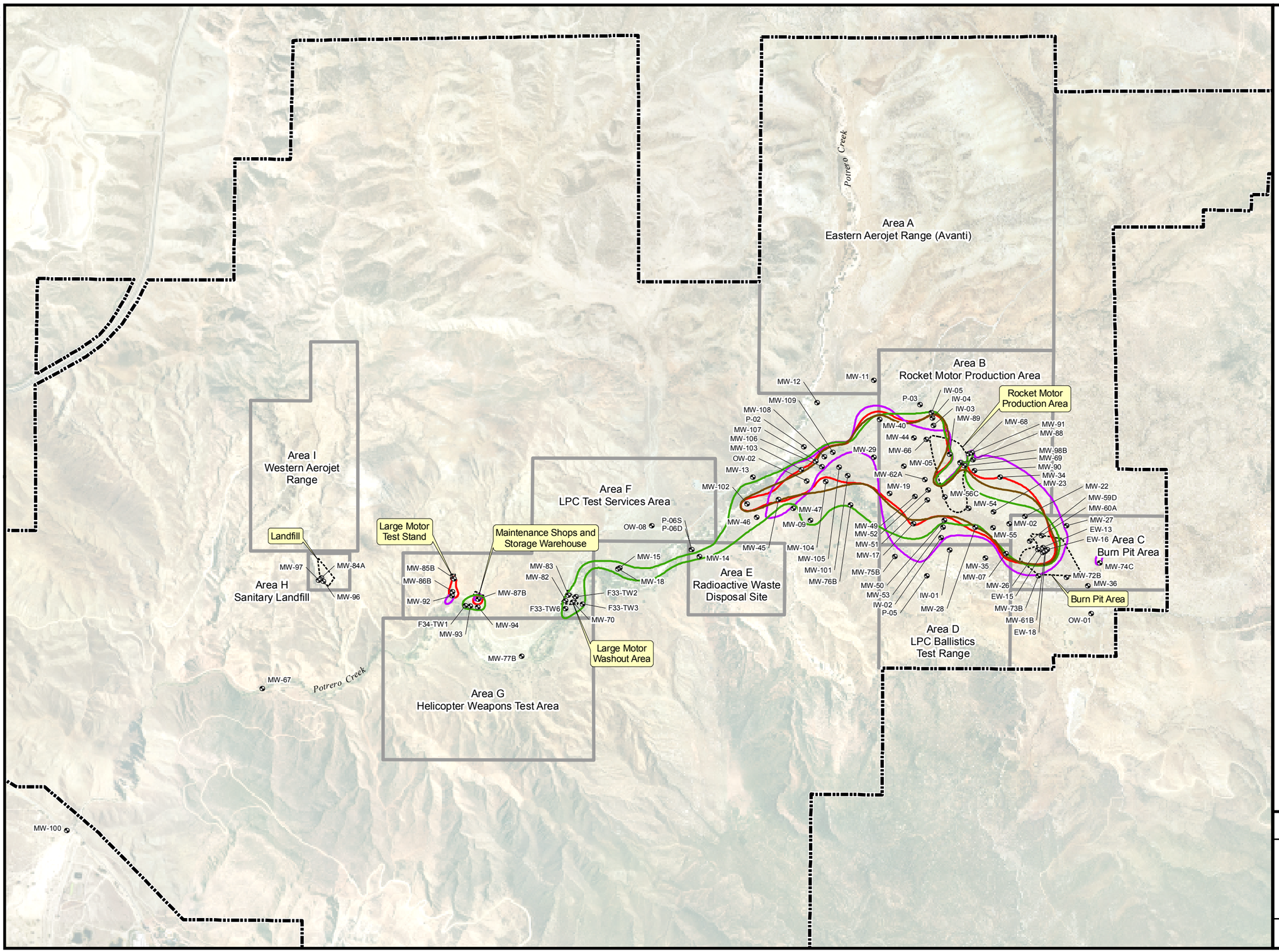
Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-13

1,4-Dioxane Isoconcentration Map (µg/L) for Alluvium and Shallow Mount Eden Formation

TETRA TECH

X:\GIS\Lockheed S1 Q1Q2\11\COPC Extents.mxd



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

- Well Location
- 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
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)
- Historical Operational Area Boundary

Notes: Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-14

Primary COPC Extents for Alluvium and Shallow Mount Eden Formation

TETRA TECH

3.6.1 Perchlorate

Concentrations of perchlorate reported in groundwater samples collected from the Second Quarter 2011 event ranged from not detected above the MDL to 81,000 µg/L (MW-61B). The MCL for perchlorate is 6 µg/L. Concentrations of perchlorate above the MDL were reported in 63 of the 93 groundwater samples collected, of which 40 groundwater samples exceeded the perchlorate MCL.

Based on the data collected during this reporting period, the highest concentrations of perchlorate continue to be reported in groundwater samples collected from monitoring wells screened in the alluvium and shallow Mount Eden formation located in the former BPA. Groundwater concentrations decrease by several orders of magnitude outside and downgradient of the footprint of the former BPA. Downgradient of the former BPA, perchlorate concentrations decrease to below 1,000 µg/L. Further downgradient in the RMPA, the concentrations of perchlorate increase to a high of 13,000 µg/L (MW-68). Downgradient of the RMPA, the concentrations decrease to below 1,000 µg/L again. The plume continues its migration downgradient of the RMPA toward Massacre Canyon with concentrations decreasing rapidly to below the MCL just downgradient of the riparian corridor near the confluence of Potrero and Bedsprings creeks. The primary source area is the former BPA, but secondary perchlorate sources are present in the former RMPA, the Large Motor Washout Area (F-33), the Maintenance Shops and Warehouse Storage Area (F-34), and the Test Bays (F-39). Secondary perchlorate sources in the RMPA have much greater impacts to groundwater (up to 13,000 µg/L) than the other three perchlorate source areas in the western (downgradient) portion of the Site where the highest concentration detected in groundwater was 31 µg/L (MW-87B).

Figure 3-10 presents the lateral distribution of perchlorate based on recent Second Quarter 2011 groundwater sampling results collected from alluvium and shallow Mount Eden formation screened wells.

3.6.2 1,1-Dichloroethene

Concentrations of 1,1-DCE reported in groundwater samples collected from the Second Quarter 2011 monitoring event ranged from not detected above the MDL to 13,000 µg/L (EW-13). The MCL for 1,1-DCE is 6 µg/L. Concentrations of 1,1-DCE above the MDL were reported in 51 of the 93 groundwater samples collected from wells, of which 33 groundwater samples exceeded the 1,1-DCE MCL.

Based on the data collected during this reporting period, the highest concentrations of 1,1-DCE continue to be reported in groundwater samples collected from monitoring wells screened in the alluvium and shallow Mount Eden formation located in the former BPA. Concentrations decrease two orders of magnitude immediately downgradient of the BPA and drop below 100 µg/L downgradient (west) of the RMPA. 1,1-DCE is the highest VOC concentration detected at the Site. Approximately 4,000 feet downgradient of the former RMPA, groundwater concentrations have generally decreased to around 20 µg/L. The primary source area is the former BPA, but secondary and fairly minor sources of 1,1-DCE are present at the Maintenance Shops and Warehouse Storage Area (F-34) and at the Test Bays (F-39) based on the concentrations detected in groundwater.

Figure 3-11 presents the lateral distribution of 1,1-DCE based on recent Second Quarter 2011 groundwater sampling results collected from alluvium and shallow Mount Eden formation screened wells.

3.6.3 Trichloroethene

Concentrations of TCE reported in groundwater samples collected from the Second Quarter 2011 monitoring event ranged from not detected above the MDL to 2,600 µg/L (MW-26). The MCL for TCE is 5 µg/L. Concentrations of TCE above the MDL were reported in 51 of the 93 groundwater samples collected from wells, of which 41 groundwater samples exceeded the TCE MCL.

Based on the data collected during this reporting period, the highest concentrations of TCE continue to be reported in groundwater samples collected from monitoring wells screened in the alluvial/shallow Mount Eden formation located in the former BPA. Concentrations decrease an order of magnitude immediately downgradient of the BPA and drop below 100 µg/L downgradient (west) of the RMPA. Approximately 4,000 feet downgradient of the former RMPA, TCE concentrations decrease to below 20 µg/L. The primary source area is the former BPA, but secondary sources are present at the Maintenance Shops and Warehouse Storage Area (F-34) and at the Test Bays (F-39) based on the concentrations detected in groundwater.

Figure 3-12 presents the lateral distribution of TCE based on recent Second Quarter 2011 groundwater sampling results collected from alluvium and shallow Mount Eden formation screened wells.

3.6.4 1,4-Dioxane

Concentrations of 1,4-dioxane reported in groundwater samples collected from the Second Quarter 2011 monitoring event ranged from not detected above the MDL to 4,200 µg/L (EW-13). The DWNL for 1,4-dioxane is 1 µg/L. Concentrations of 1,4-dioxane above the MDL were reported in 75 of the 93 groundwater samples collected from wells, of which 61 groundwater samples exceeded the 1,4-dioxane DWNL.

Based on the data collected during this reporting period, the highest concentrations of 1,4-dioxane continue to be reported in groundwater samples collected from monitoring wells screened in the alluvial/shallow Mount Eden formation located in the former BPA. Concentrations decrease two orders of magnitude immediately downgradient of the BPA and are generally below 50 µg/L downgradient (west) of the RMPA. Approximately 4,000 feet downgradient of the former RMPA, 1,4-dioxane concentrations decrease to below 20 µg/L. The primary source area for 1,4-dioxane is the former BPA, but secondary and fairly minor sources are present at the Maintenance Shops and Warehouse Storage Area (F-34) and at the Test Bays (F-39) based on the concentrations detected in groundwater.

Figure 3-13 presents the lateral distribution of 1,4-dioxane based on recent Second Quarter 2011 groundwater sampling results collected from alluvium and shallow Mount Eden formation screened wells.

3.6.5 Guard Wells

Guard wells MW-15, MW-18, MW-67, and MW-100 were sampled during the Second Quarter 2011 sampling event. Sample results for the guard wells are generally consistent with results from previous sampling events except for a small declining trend in 1,4-dioxane in MW-18. A summary of the sample results from Second Quarter 2011 and previous sampling events can be found in Table 3-10.

Table 3-10 Summary of Detected COPCs in Guard Wells

Sample Location	Site Area	Sample Date	1,4-Dioxane	1,1-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	Trichloroethene	Perchlorate
All results reported in µg/L unless otherwise stated								
MW-15	MCEA	06/08/09	**6.4**	0.47 Jq	2.6	<0.49	1.3	<0.071
		06/14/10	**6.6**	0.43 Jq	2.7	0.33 Jq	1.2	<0.071
		06/07/11	**6.8**	0.30 Jq	1.9	0.29 Jq	1.1	<0.071
MW-18	MCEA	06/10/09	**6.5**	<0.37	1.5 Jd	<0.49	1.2	2.1
		05/05/10	**5.2**	0.18 Jq	1.2	<0.18	1.0	2.5
		06/07/11	**4.3**	0.15 Jq	0.93	<0.18	0.76	1.3
MW-67	MCEA	06/10/09	**1.2 Jcq**	<0.37	<0.40 Rd	<0.49	<0.30	<0.071
		05/07/10	**1.2**	<0.098	<0.12	<0.18	<0.17	<0.071
		06/06/11	**1.2**	<0.098	<0.12	<0.18	<0.25	<0.071
MW-100	DG	11/16/09	0.060 Jq	<0.098	<0.12	<0.18	<0.17	<0.071
		06/02/10	0.13 Jeq	<0.098	<0.12	<0.18	<0.17	0.072 Jq
		06/06/11	0.15 Jq	<0.098	<0.12	<0.18	<0.25	<0.071
MCL/DWNL (µg/L)			1 (1)	5	6	6	5	6

Notes: Only analytes positively detected are presented in this table. For a complete list, refer to the laboratory data package.
MCEA - Massacre Canyon Entrance Area.
DG - Downgradient
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.
R - The sample result is rejected and not usable for any purpose. The presence or absence of the analyte cannot be verified.
c - The Matrix Spike (MS) and/or Matrix Spike Duplicate (MSD) recoveries were outside control limits.
d - The Laboratory Control Sample (LCS) recovery was outside control limits.
e - A holding time violation occurred.
q - The analyte detection was below the Practical Quantitation Limit (PQL).

3.6.6 Private Production Wells

Four offsite private production wells (one upgradient and three downgradient) were scheduled to be sampled during the Second Quarter 2011 sampling event. One downgradient well was unable to be sampled due to down-hole equipment problems with the well. The remaining wells were sampled on 10 May 2011. Samples were analyzed for VOCs by Method 524.2, 1,4-dioxane by Method SW8270C SIM, and perchlorate by Method E332.0. No site COPCs were detected in samples collected from the offsite private production wells.

3.6.7 New Wells

New monitoring wells MW-103 through MW-109, which were installed as part of the Site 1 Plant Uptake Study (Tetra Tech, 2010c), were sampled during the First Quarter 2011 and Second Quarter 2011 sampling events. With the exception of the perchlorate results in MW-103, which are increasing, sample results for the new wells are generally consistent with results from previous sampling events. The addition of these wells helped to better define the plume connection between the RMPA and the area downgradient (west) of the confluence of Bedsprings and Potrero creeks

near the groundwater discharge ponds. A summary of the sample results from Second Quarter 2011 and previous sampling events can be found in Table 3-11.

Table 3-11 Summary of Detected COPCs in New Wells

Sample Location	Sample Date	Per chlorate	1,4-Dioxane	1,1-Dichloro ethane	1,2-Dichloro ethane	1,1-Dichloro ethene	c-1,2-Dichloro ethene	Trichloro ethene	Vinyl Chloride
All results reported in µg/L unless otherwise stated									
MW-103	12/14/10	5.6	**17**	0.69	<0.21	2.8	2.7	**7.5**	<0.13
MW-103	03/03/11	**36**	**11**	NA	NA	NA	NA	NA	NA
MW-103	03/24/11	**56**	**12**	0.42 Jq	<0.21	2.6	3.2	4.8	<0.13
MW-103	06/09/11	**160**	**11**	0.38 Jq	<0.21	3.6	2.2	**5.9**	<0.13
MW-104	12/14/10	<0.071	**31**	**5.2**	<0.21	**60**	4.3	1.9	**15**
MW-104	03/07/11	<0.071	**35**	NA	NA	NA	NA	NA	NA
MW-104	03/24/11	<0.071	**34**	**5.8**	0.24 Jq	**46**	3.1	0.94	**16**
MW-104	06/09/11	<0.071	**31**	**5.6**	0.26 Jq	**56**	3.7	1.7	**14**
MW-105	12/13/10	<0.071	**32**	**5.9**	0.76	**130**	4.1	**81**	**2.4**
MW-105	03/03/11	<0.071	**33**	NA	NA	NA	NA	NA	NA
MW-105	03/24/11	<0.071	**33**	**5.7**	0.65	**90**	4.4	**72**	**2.2**
MW-105	06/09/11	<0.071	**34**	**5.4**	0.66	**87**	**3.8**	**69**	1.6
MW-106	12/13/10	<0.071	**27**	2.7	0.30 Jq	**24**	**10**	2.0	0.22 Jq
MW-106	03/04/11	**68**	**25**	NA	NA	NA	NA	NA	NA
MW-106	03/24/11	**40**	**21**	1.6	0.26 Jq	**27**	1.8	**23**	0.38 Jq
MW-106	06/07/11	**42**	**23**	1.7	0.26 Jq	**27**	1.9	**24**	**0.34 Jq**
MW-107	12/14/10	**14**	**12**	0.90	<0.21	**11**	2.8	**9.6**	<0.13
MW-107	03/04/11	**20**	**14**	NA	NA	NA	NA	NA	NA
MW-107	03/24/11	**12**	**12**	0.53	<0.21	4.2	1.5	**6.3**	<0.13
MW-107	06/07/11	**34**	**11**	0.60	<0.21	4.8	1.8	**7.8**	<0.13
MW-108	12/13/10	**75**	**30**	4.7	0.83	**100**	0.68	**64**	**0.65**
MW-108	03/07/11	**66**	**28**	NA	NA	NA	NA	NA	NA
MW-108	03/24/11	**84**	**25**	3.3	0.50	**60**	1.7	**44**	0.45 Jq
MW-108	06/09/11	**84**	**20**	2.1	0.32 Jq	**36**	2.9	**28**	0.25 Jq
MW-109	12/13/10	**440**	**27**	2.7	0.58	**66**	2.8	**64**	0.34 Jq
MW-109	03/08/11	**500**	**26**	NA	NA	NA	NA	NA	NA
MW-109	03/24/11	**510**	**27**	2.6	0.55	**56**	3.0	**60**	0.32 Jq
MW-109	06/09/11	**450**	**27**	2.6	0.53	**55**	2.8	**61**	0.24 Jq
MCL/DWNL (µg/L)		6	1 (1)	5	5	6	6	5	0.5

Notes: Only analytes positively detected are presented in this table. For a complete list, refer to the laboratory data package.
msl - mean sea level
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).

3.6.8 Surface Water

Surface water samples were collected during First Quarter 2011 during a storm event and during Second Quarter 2011 during the routine groundwater sampling event. Table 3-12 presents concentrations of COPCs reported in surface water samples collected from these sampling events.

First Quarter 2011

During First Quarter 2011 surface water samples were collected during a storm event from 11 locations located along the Potrero and Bedsprings creek drainages (SW-06, SW-08, SW_09, SW-10, SW-12, SW-13, SW-14, SW-15, SW-16, SW-18, and SW-19). The remaining two locations were dry. Three primary COPCs (perchlorate, 1,1-DCE, and 1,4-dioxane) and one secondary COPC (cis-1,2-DCE) were detected in the surface water samples. The COPCs were only detected at SW-13 (southeast of the BPA), SW-14 (above the confluence of Bedsprings and Potrero creeks), and SW-16 (at the property boundary). Figure 3-15 illustrates concentrations of COPCs reported in surface water samples collected from the First Quarter 2011 monitoring event.

Second Quarter 2011

During Second Quarter 2011 surface water samples were collected from nine locations (SW-02, SW-03, SW-04, SW-06, SW-07, SW-09, SW-16, SW-18, and SW-19) along the Potrero and Bedsprings creek drainages. The remaining eight locations were dry at the time of sampling. Because surface water location SW-16 was sampled, there was no need to sample the alternate location, SW-17. The four primary COPCs (1,4-dioxane, 1,1-DCE, TCE, and perchlorate) and three secondary COPCs (1,1-DCA, cis-1,2-dichloroethene, and vinyl chloride) were detected in surface water samples collected from locations SW-02, SW-03, and SW-04; these samples were collected from springs and or spring-fed ponds located outside of the stream beds but near the intersection of Bedsprings and Potrero creeks.

Three of the primary COPCs (1,4-dioxane, 1,1-DCE, and perchlorate) and no secondary COPCs were detected in the surface water samples collected from locations SW-06, SW-07, SW-16, SW-18, and SW-19. These samples were collected from water flowing in Potrero Creek and are located topographically downgradient of the springs discussed in the previous paragraph. Figure 3-16 presents concentrations of COPCs reported in surface water samples collected from the Second Quarter 2011 monitoring event.

In general, the concentration of COPCs in surface water is highest in the area of the ponds, an area of discharging groundwater, and decreases rapidly to concentrations at or near the MDL as one moves downgradient through the riparian zone towards 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 riparian zone.

Table 3-12 Summary of Detected COPCs in Surface Water - First Quarter 2011 and Second Quarter 2011

Sample Location	Sample Date	Perchlorate	1,4-Dioxane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	c-1,2-Dichloroethene	Trichloroethene	Vinyl Chloride
All results reported in µg/L unless otherwise stated									
SW-02	06/10/11	<0.071	**11**	**0.30 Jq**	<0.21	**8.9**	0.78	**9.2**	0.17 Jq
SW-03	06/10/11	<0.071	**8.6**	<0.098	<0.21	0.37 Jq	<0.18	0.64	<0.13
SW-04	06/10/11	**23**	**5.9**	<0.098	<0.21	0.19 Jq	<0.18	0.36 Jq	<0.13
SW-06	03/21/11	<0.071	0.29	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
	06/10/11	<0.071	**1.6**	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-07	06/10/11	<0.071	**1.2**	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-08	03/21/11	<0.071	<0.10	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-09	03/21/11	0.074 Jq	<0.10	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
	06/10/11	<0.071	0.22	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-10	03/21/11	<0.071	<0.10	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-12	03/21/11	<0.071	<0.10	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-13	03/21/11	<0.071	<0.10	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-14	03/21/11	**14**	**4.4**	<0.098	<0.21	0.48 Jq	0.46 Jq	<0.25	<0.13
SW-15	03/21/11	0.18	<0.10	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-16	03/21/11	0.24	0.41	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
	06/10/11	0.21	0.87	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-18	03/21/11	<0.071	0.22	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
	06/10/11	<0.071	**2.5**	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
SW-19	03/21/11	0.082 Jq	0.31	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
	06/10/11	0.18	**2.0**	<0.098	<0.21	<0.12	<0.18	<0.25	<0.13
Method Detection Limit (µg/L)		0.071	0.10	0.098	0.21	0.12	0.18	0.20	0.13
MCL/DWNL (µg/L)		6	1 (1)	5	0.5	6	6	5	0.5

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

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Area A
Eastern Aerojet Range (Avanti)

Area I
Western Aerojet Range

Area H
Sanitary Landfill

Area F
LPC Test Services Area

Area E
Radioactive Waste
Disposal Site

Area G
Helicopter Weapons Test Area

Area B
Rocket Motor
Production Area

Area C
Burn Pit Area

Area D
LPC Ballistics Test Range

Former Rocket Motor
Production Area

Former Burn
Pit Area

NORTHERN POTRERO CREEK AREA

ROCKET MOTOR PRODUCTION AREA

NORTHERN POTRERO CREEK AREA

MASSACRE CANYON ENTRANCE AREA

ROCKET MOTOR PRODUCTION AREA

BURN PIT AREA

SW-14	
Perchlorate	0.33
1,1-DCE	<0.12
TCE	<0.17
1,4-Dioxane	<0.10

SW-15	
Perchlorate	<0.071
1,1-DCE	<0.12
TCE	<0.17
1,4-Dioxane	<0.10

SW-12	
Perchlorate	<0.071
1,1-DCE	<0.12
TCE	<0.17
1,4-Dioxane	<0.10

SW-13	
Perchlorate	<0.071
1,1-DCE	<0.12
TCE	<0.17
1,4-Dioxane	0.17 Jq

SW-16	
Perchlorate	0.34
1,1-DCE	<0.12
TCE	<0.17
1,4-Dioxane	0.13 BJaq

Potrero Creek

Lawrence Fault

Bedsprings Fault

Bedsprings Creek

Goetz Fault

Fault A

Fault B

Fault C

Fault D

Fault E

Fault F

Lower Potrero Fault Zone

Potrero Fault Zone

Dellamont Fault

Claremont Fault (San Jacinto Fault Zone)

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

- Surface Water Sample Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Surface Water Flow
- Bedrock/Alluvium Surface Contact
  Dashed where inferred
- Burn Pit and Rocket
  Motor Production Area
- Historical Operational Area Boundary
- Potrero Canyon Unit Property Boundary
  (Lockheed Martin Beaumont Site 1)

Notes:

DCE - Dichloroethene.

TCE - Trichloroethene

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-15
Surface Water Primary COPC Sampling Results (µg/L) First Quarter 2011

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Area A
Eastern Aerojet Range (Avanti)

Area B
Rocket Motor
Production Area

Area I
Western Aerojet Range

Area H
Sanitary Landfill

Area F
LPC Test Services Area

Area E
Radioactive Waste
Disposal Site

Area C
Burn Pit Area

Area D
LPC Ballistics Test Range

Area G
Helicopter Weapons Test Area

Lawrence Fault
Potrero Creek
Bedsprings Creek
Fault E
Fault D
Fault A
Fault B
Fault C
Fault F
Goetz Fault
Delamont Fault
Lower Potrero Fault Zone
Potrero Fault Zone
Claremont Fault (San Jacinto Fault Zone)

NORTHERN POTRERO CREEK AREA
ROCKET MOTOR PRODUCTION AREA
NORTHERN POTRERO CREEK AREA
MASSACRE CANYON ENTRANCE AREA
ROCKET MOTOR PRODUCTION AREA
BURN PIT AREA

Former Rocket Motor Production Area
Former Burn Pit Area
Maintenance Shops and Storage Warehouse
Landfill
Large Motor Test Stand
Large Motor Washout Area

SW-03	
Perchlorate	<0.071
1,1-DCE	0.37 Jq
TCE	0.64
1,4-Dioxane	8.6

SW-02	
Perchlorate	<0.071
1,1-DCE	8.9
TCE	9.2
1,4-Dioxane	11

SW-04	
Perchlorate	23
1,1-DCE	0.19 Jq
TCE	0.36 Jq
1,4-Dioxane	5.9

SW-09	
Perchlorate	<0.071
1,1-DCE	<0.12
TCE	<0.25
1,4-Dioxane	0.22

SW-06	
Perchlorate	<0.071
1,1-DCE	<0.12
TCE	<0.25
1,4-Dioxane	1.6

SW-07	
Perchlorate	<0.071
1,1-DCE	<0.12
TCE	<0.25
1,4-Dioxane	1.2

SW-19	
Perchlorate	0.18
1,1-DCE	<0.12
TCE	<0.25
1,4-Dioxane	2.0

SW-18	
Perchlorate	<0.071
1,1-DCE	<0.12
TCE	<0.25
1,4-Dioxane	2.5

SW-16	
Perchlorate	0.21
1,1-DCE	<0.12
TCE	<0.25
1,4-Dioxane	0.87

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

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

Notes:

DCE - Dichloroethene.

TCE - Trichloroethene

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-16
Surface Water Primary COPC Sampling Results (µg/L)
Second Quarter 2010

TETRA TECH

3.7 F-33 CONTAMINANT ATTENUATION SAMPLING

Seven monitoring wells (F33-TW2, F33-TW3, F33-TW6, F33-TW7, MW-70, MW-82, and MW-83) located in the F-33 area were sampled for contaminant attenuation parameters during the Second Quarter 2011 monitoring event. Samples for laboratory analysis were collected for TOC, DOC, total iron, ferrous iron, sulfide, sulfate, methane, hydrogen, and VFAs. DO and ORP were monitored with field instruments during purging and sampling, and ferrous iron and sulfide were analyzed using a field instrument prior to sample collection during these sampling events. Figure 3-17 presents monitoring well locations sampled for contaminant attenuation during the Second Quarter 2011 monitoring event. Table 3-13 presents a summary of validated detected analytes and field measurements.

Perchlorate

Historically, perchlorate concentrations have been at or below detection limits in all monitoring wells within the F-33 area except for MW-70, where concentrations appear to increase seasonally with increased rainfall and higher groundwater levels (Figure 3-18). During Second Quarter 2011 perchlorate was detected in F33-TW2, F33-TW3, MW-70, and MW-83 at concentrations of 1.1 µg/L, 0.19 µg/L, 0.51, µg/L and 0.25 µg/L, respectively. In MW-70, perchlorate concentrations have ranged from below the MDL to 48.5 µg/L (First Quarter 2008). The high concentrations of perchlorate in the Feature F-33 vadose zone soil and the fact that perchlorate was below the detection limit in all other area wells support the conclusion that geochemical conditions in groundwater are generally conducive to natural biodegradation. The concentration of perchlorate in soil samples collected in the vicinity of the surrounding and downgradient wells is much lower than the perchlorate concentrations in soil samples collected adjacent to MW-70. Therefore, even though geochemical conditions appear to support natural attenuation in the entire vicinity, seasonal increases in surface water infiltration and groundwater elevation result in an increase in perchlorate concentrations in groundwater in the vicinity of MW-70. Perchlorate movement from soil into groundwater appears to be limited or halted completely by biodegradation, as perchlorate is not observed in the surrounding and downgradient wells.

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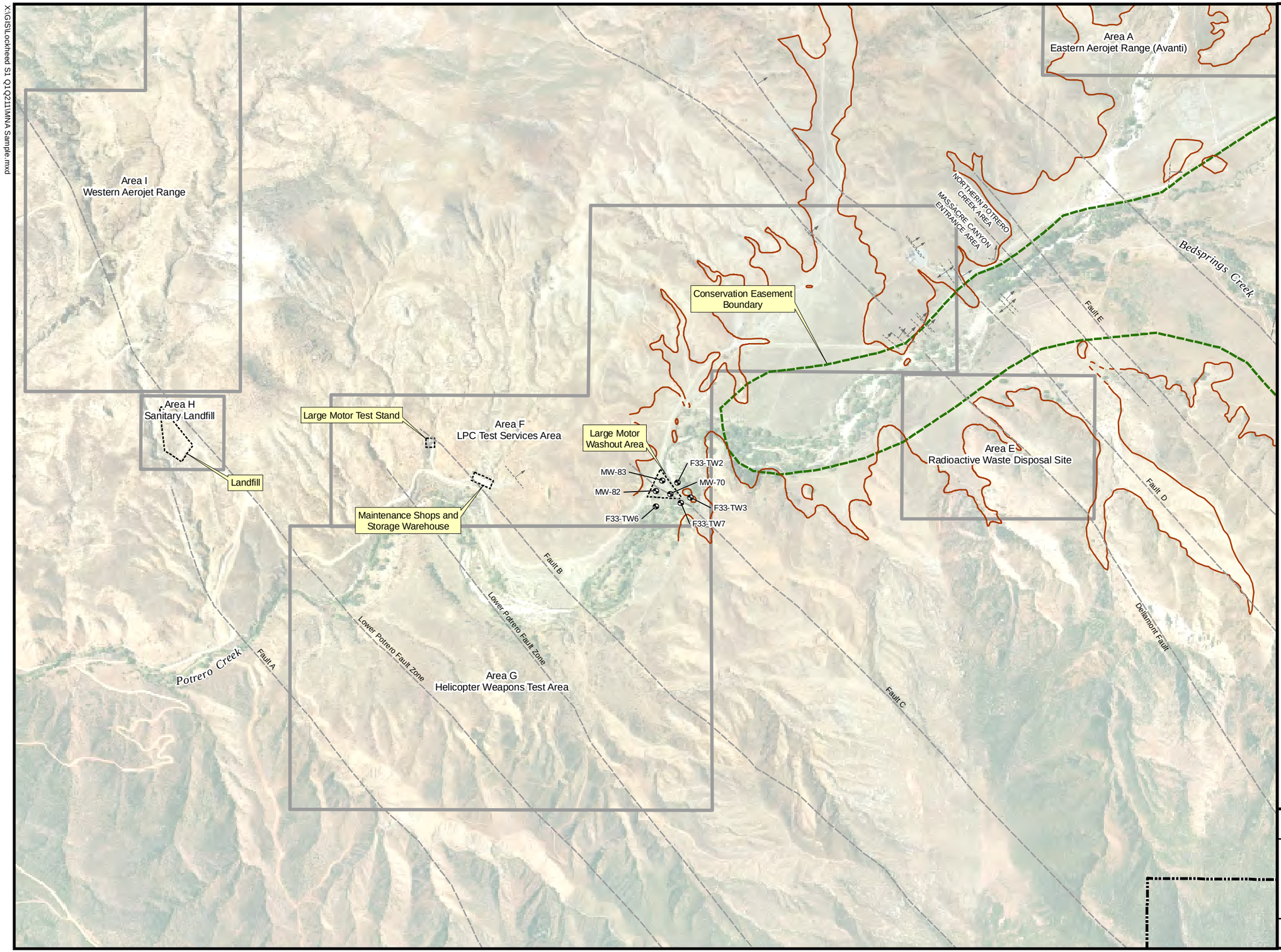


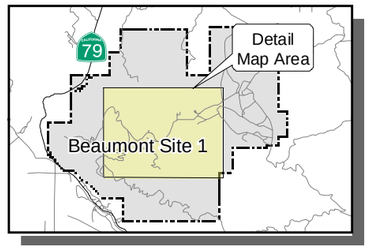
0 500 1,000 Feet

Adapted from: March 2007 aerial photograph.

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

LEGEND

- Sample Locations Second Quarter 2010
- Bedrock/Alluvium Surface Contact Dashed where inferred
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Source Areas
- Conservation Easement Boundary
- Historical Operational Area Boundary
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)



Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-17

MNA Sample Locations Second Quarter 2010

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Table 3-13 Summary of Validated Detected Contaminant Attenuation Analytes and Field Measurements - Second Quarter 2011

		Field Parameters				Analytes										
Sample Location	**Sample Date**	**DO - mg/L**	**ORP - mVs**	**Sulfide - mg/L (1)**	**Ferrous Iron - mg/L (1)**	**Per chlorate -ug/L**	**Acetic Acid - mg/L**	**Lactic Acid and HIBA - mg/L**	**Propionic Acid - mg/L**	**Dissolved Organic Carbon - mg/L**	**Total Organic Carbon -mg/L**	**Hydrogen -nM**	**Methane -ug/L**	**Nitrate (as N) - mg/L**	**Sulfate - mg/L**	**Iron - mg/L**
F33-TW2	06/08/11	0.33	-108.8	0.00	1.17	1.1	0.16	1.3	<0.007	2.7	2.4	0.86	160	0.88	33	2.0
F33-TW3	06/08/11	1.80	85.2	0.01	0.04	0.19	0.072	1.2	0.06	2.6	2.2	1	100	<0.11	34	0.027
F33-TW6	06/13/11	0.29	-20.6	0.00	0.18	<0.071	0.19	1.3	0.081	2.3	1.8	1.2	0.23	<0.11	44	0.17
F33-TW7	06/13/11	0.57	-214.4	0.03	1.64	<0.071	0.13	1.5	0.072	4.0	2.6	1.2	110	<0.11	39	1.8
MW-70	06/08/11	1.79	-16.2	0.00	0.00	0.51	0.09 Jf	1.3	0.076	3.1 Jf	1.7	0.88	<0.022	<0.11	38	.0042 Jq
MW-82	06/08/11	1.14	-179.0	0.00	0.00	<0.071	0.15	0.96	0.064	1.8	1.5	0.9	<0.022	<0.11	50	0.034
MW-83	06/08/11	2.03	-153.5	0.00	0.02	0.25	0.096	1.3	0.081	2.0	1.7	2	<0.022	<0.11	40	0.010 Jq
MDL		-	-	-	-	0.071	0.06		0.07	0.36	0.36	0.6	0.01	0.05	0.37	0.0023
MCL/DWNL		-	-	-	0.3	6	-		-	-	-	-	-	10	250	0.3

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

(1) - Sulfide and ferrous iron sample analysis was performed in the field using a Hach DR 850 colorimeter.

MCL - California Department of Public Health Maximum Contaminant Level

DWNL - California Department of Public Health drinking water notification level.

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

B - The result is < 5 times the blank contamination. Cross contamination is suspected and the data is considered unusable

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

a - The analyte was found in the method blank.

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

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

MDL - Method Detection Limit

mg/L - milligrams per liter

µg/L - micrograms per liter.

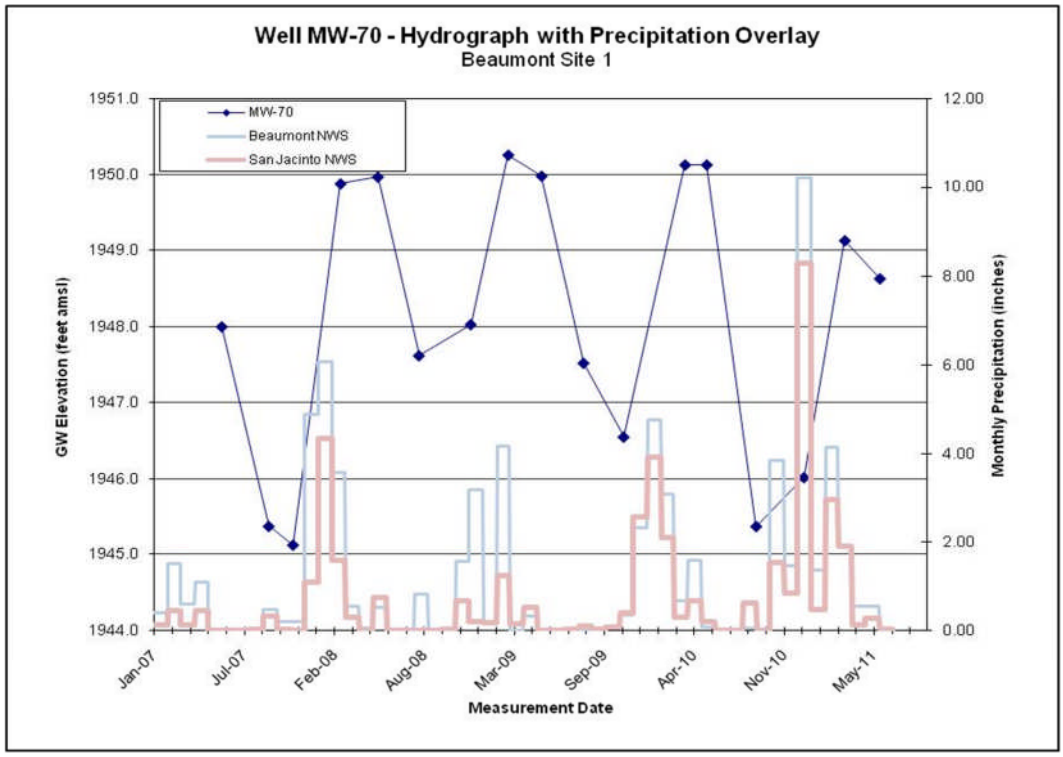
nM - nanoMoles

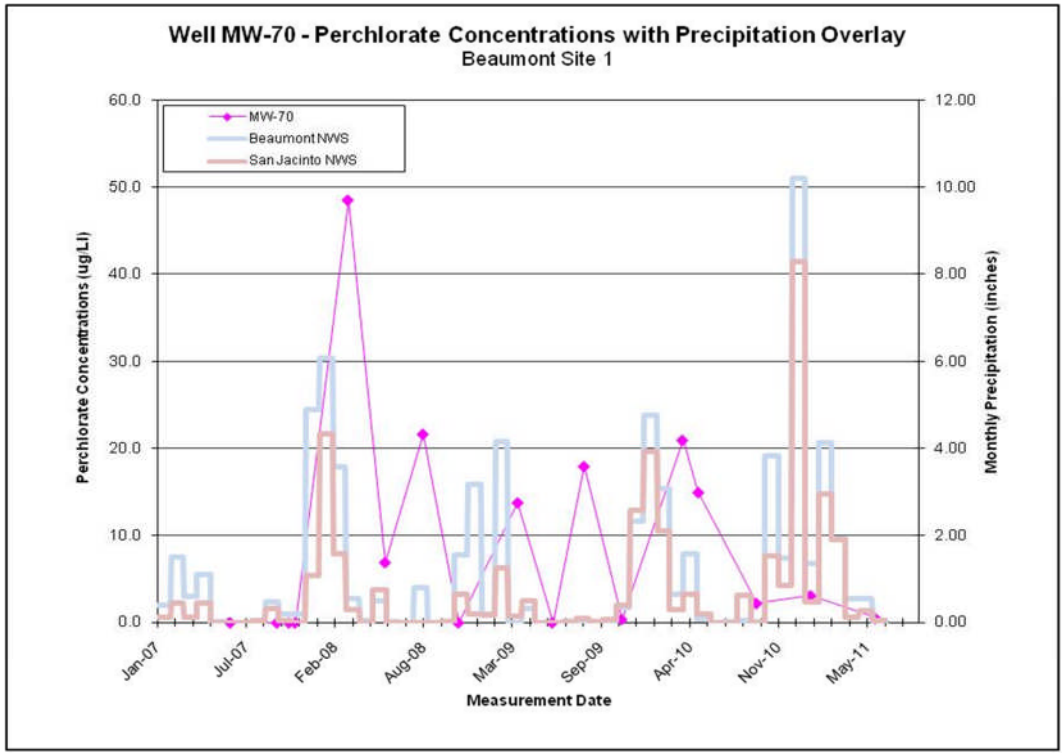
Bold - MCL or DWNL exceeded.

"-" - Not available.

NA - not analyzed

Figure 3-18 Water Level Elevation and Perchlorate Concentrations with Precipitation Overlay





NWS – National Weather Service

Nitrate

During the Second Quarter 2011 monitoring event, nitrate was detected in F33-TW2 at a concentration of 0.88 µg/L. Nitrate was not detected above the MDL in the other six locations sampled. Nitrate is often considered the most critical electron acceptor competitor to perchlorate. Its absence in the aquifer permits native groundwater microorganisms to utilize perchlorate as an electron acceptor in the respiratory process. The absence of nitrate is also significant because it means that natural organic carbon that exists in the aquifer does not get consumed for denitrification.

DO and ORP

DO measurements are used to assess whether the aquifer is aerobic or anaerobic. In F-33 monitoring wells the DO concentrations have generally been less than 1.0 mg/L, which is considered to be anaerobic and provides an environment that could sustain natural perchlorate biodegradation. However, following periods of precipitation, DO levels greater than 1.0 mg/L have been recorded. This increase in DO measurements generally corresponds with elevated perchlorate detections.

ORP values in the F-33 monitoring wells are generally measured below 50 mV. These results are indicative of anaerobic conditions. Therefore, the DO and the ORP values are in tandem, suggesting a redox environment that encourages natural perchlorate biodegradation.

Total Iron and Ferrous Iron

Both forms of iron were measured during Second Quarter 2011. Generally, total iron and ferrous iron are either not detected or detected at very low levels in the groundwater samples collected from monitoring wells MW-70, MW-82, and MW-83. Therefore, it appears that there is almost no oxidized or reduced iron in the aquifer in this area. Oxidized iron could have consumed natural organic carbon in the process of biological iron reduction. In the vicinity of F-33 this does not appear to be the case, leaving the available organic carbon for direct consumption by native perchlorate-reducing microorganisms. Total iron and ferrous iron are detected in temporary wells F33-TW2, F33-TW3, F33-TW6, and F33-TW7 located in Potrero Creek below F33.

Sulfate and Sulfide

During Second Quarter 2011 sulfate was detected at concentrations up to 50 mg/L in F-33 monitoring wells, and sulfide was generally absent or detected at very low concentrations. Very little biological sulfate reduction appears to be occurring in the vicinity of F-33, primarily because redox conditions do not strongly support such an occurrence. In general, sulfate is not a major competitor for perchlorate as an electron acceptor, in comparison with nitrate. However, it is important to note that sulfate does exist at high enough concentrations where it could consume natural organic carbon that would otherwise be used for perchlorate biodegradation.

Methane

Methane concentrations ranged from below the MDL to a high of 160 µg/L in F33-TW2, located below F-33 in Potrero Creek. Methanogenesis generally occurs when the aquifer becomes strongly anaerobic and, as a result, methane is found in the 1,000 µg/L range. Under moderately anaerobic conditions, methane may generally be greater than 500 µg/L; and under mildly methanogenic conditions, methane is generally measured at concentrations greater than 100 µg/L. These results indicate that conditions are mildly anaerobic and sufficiently reducing to support perchlorate biodegradation.

Hydrogen

Hydrogen concentrations were generally measured at concentrations at or above 1.0 nanoMoles (nM) in all monitoring wells where it was analyzed during Second Quarter 2011. Hydrogen above 1.0 nM is indicative of anaerobic conditions with the likelihood of the onset of mildly sulfate-reducing conditions. This level of hydrogen is supportive of natural perchlorate biodegradation. Hydrogen is considered a more reliable indicator of redox conditions than ORP because it is easier to measure to a high degree of accuracy, and ORP measurements using field instruments can be impacted by the various redox pairs in the groundwater. In this area, redox measurements from ORP field instruments and hydrogen concentrations match fairly closely, making deductions about the geochemical environment in the aquifer more accurate. In general, hydrogen measurements in the F-33 monitoring wells point to anaerobic conditions that are reducing enough to support perchlorate biodegradation.

TOC and DOC

TOC and DOC in the F-33 monitoring wells were both generally measured at concentrations ranging from 1.5 mg/L to 4.0 mg/L. Although these levels are not suggestive of an aquifer rich in natural organic carbon, they are likely to be sufficient to sustain natural biodegradation of low levels of perchlorate. However, as seen in MW-70, perchlorate concentrations tend to increase in groundwater following periods of heavy precipitation as perchlorate from the vadose zone migrates into the aquifer. Increasing perchlorate concentrations in the groundwater do not appear to coincide with higher amounts of organic carbon, which would be required to keep perchlorate concentrations below detectable levels. Hence, we see perchlorate in MW-70 where the natural processes are not able to degrade the increased perchlorate with fluctuating groundwater levels, and a continuing absence in surrounding and downgradient wells where perchlorate degradation can still be sustained.

Therefore, the current natural biodegradation potential may not be sufficient to sustain perchlorate degradation in the immediate vicinity of MW-70 during periods of heavy precipitation or elevated groundwater levels, but it is attenuated before it can migrate to other F-33 monitoring wells. This may be the case even though other electron acceptors such as iron and nitrate do not appear to be competing for organic carbon in the aquifer.

VFAs

VFAs are a more direct indication of the carbon substrate form which is immediately available to native microorganisms involved in biodegradation. Perhaps the most important of the VFAs is acetic acid, which plays a key and direct role in metabolism and energy generation. Acetic acid, when present even in small amounts, indicates that there is an excess that is available for consumption by perchlorate-reducing microorganisms. In the Feature F-33 vicinity, acetic acid concentrations generally range up to 0.19 mg/L. These concentrations appear to be sufficient to sustain natural biodegradation of perchlorate except during periods of heavy precipitation.

3.8 GROUNDWATER QUALITY STATISTICAL TEMPORAL TREND

All groundwater and surface water monitoring locations sampled and tested between the Third Quarter 2010 and the Second Quarter 2011 sampling events were included in the trend analyses. Samples were collected from 93 monitoring wells and 16 fixed surface water locations. Temporal trend analyses were performed on the primary COPCs (perchlorate, 1,1-DCE, TCE, and 1,4-

dioxane). The temporal trend analyses were performed using data from Second Quarter 2002 to Second Quarter 2011. The start of this period spans the shutdown of the groundwater extraction system located in the RMPA. The system was shut down in late 2002. While including data from Second Quarter (May) 2002 represents a time of active remediation, it was near the end of the active phase and should represent initial concentrations at the termination of active remediation.

Time trend analysis was conducted using the Monitoring and Remediation Optimization System (MAROS) developed by the Air Force Center for Environmental Excellence (AFCEE, 2006). MAROS is a statistical database application developed to assist with groundwater quality data trend analysis and long-term monitoring optimization at contaminated groundwater sites. The software performs parametric and nonparametric trend analyses to evaluate temporal and spatial contaminant trends using Mann-Kendall and linear regression methods. Brief descriptions of the methods follow:

- Mann Kendall Analysis – This statistical procedure was used to evaluate the data for trends. It is a nonparametric statistical procedure that is well suited for analyzing trends in data over time that does not require assumptions as to the statistical distribution of the data and can be used with irregular sampling intervals and missing data. The Mann-Kendall test for trend is suitable for analyzing data that follows a normal or non-normal distribution pattern. The Mann-Kendall test has no distributional assumptions and allows for irregularly spaced measurement periods. The advantage with this approach involves the cases where outliers in the data would produce biased estimates of the least squares estimated slope.

- Linear Regression Analysis – This parametric statistical procedure was used to calculate the magnitude of the trends. A parametric statistical procedure is typically used for analyzing trends in data over time and requires a normal statistical distribution of the data.

There are seven statistical concentration trend types derived from Mann-Kendall analysis: 1) decreasing, 2) increasing, 3) no trend [displaying two sets of conditions], 4) probably decreasing, 5) probably increasing, 6) stable, and 7) non-detect (all sample results are below the detection limit). If a location has less than four quarters of data then the Mann-Kendall analysis cannot be run and not applicable (NA) would be applied to the results. These statistical concentration trend types are determined by the following conditions, as summarized in Table 3-14.

Table 3-14 Mann-Kendall Concentration Trend Matrix

Mann-Kendall Statistic (S)	Confidence in Trend	Concentration Trend
S > 0	> 95%	Increasing
S > 0	90 - 95%	Probably Increasing
S > 0	< 90%	No Trend
S ≤ 0	< 90% and COV ≥ 1	No Trend
S ≤ 0	< 90% and COV < 1	Stable
S < 0	90 - 95%	Probably Decreasing
S < 0	> 95%	Decreasing
ND	-	Non-detect
NA	-	Not applicable

Notes:

> - Greater than.
< - Less than.
≤ - Less than or equal to.
COV - Coefficient of Variation.
S - Mann-Kendall statistic.
ND - All results non-detect.
NA - Not applicable, less than four quarters of data.

The Mann-Kendall statistic (S) measures the trend in the data. Positive values indicate an increase in constituent concentrations over time, whereas negative values indicate a decrease in constituent concentrations over time. The strength of the trend is proportional to the magnitude of the Mann-Kendall Statistic (i.e., large magnitudes indicate a strong trend).

The Coefficient of Variation (COV) is a statistical measure of how the individual data points vary about the mean value. Values less than or near 1.00 indicate that the data forms a relatively close group about the mean value. Values larger than 1.00 indicate that the data shows a greater degree of scatter about the mean.

The "Confidence in Trend" is the statistical confidence that the constituent concentration is increasing (S>0) or decreasing (S<0).

The four primary COPCs were analyzed for temporal trends at 93 monitoring wells and 16 surface water sample locations. If there is insufficient data, less than four sampling events, then not applicable (NA) would be applied to the results.

3.8.1 Temporal Trends in Monitoring Well Locations

Any one well location may have a different trend for each of the four analytes evaluated. For the 93 monitoring well locations, 372 trends were evaluated. A summary of the Mann-Kendall trend analysis is presented in Table 3-15.

Table 3-15 Summary of Mann-Kendall Trend Analysis of COPCs for 2011 Sampled Monitoring Wells

Analyte	Wells Tested	Insufficient Data	Non-detect	No Trend	Decreasing Trend	Probably Decreasing Trend	Stable Trend	Probably Increasing Trend	Increasing Trend
Perchlorate	93	11	15	26	13	4	18	3	3
1,1-Dichloroethene	93	16	20	18	9	6	15	4	5
Trichloroethene	93	17	19	24	10	2	15	2	4
1,4-Dioxane	93	10	12	23	13	4	19	2	10
Total Analysis	372	54	66	91	45	16	67	11	22

Notes:
COPC - Chemicals of Potential Concern.

The 33 probably increasing or increasing trends were detected in 21 groundwater monitoring locations. The portion of the site where they are located, the location identification, and the COPC that has the increasing trend are listed below:

Seven wells are located in the BPA.

- MW-07: 1,4-dioxane
- MW-26: 1,1-DCE and 1,4-dioxane
- MW-60A: perchlorate, TCE, 1,1-DCE, and 1,4-dioxane
- MW-60B: TCE and 1,4-dioxane
- MW-61B: 1,4-dioxane
- MW-61C: TCE,1,1-DCE, 1,4-dioxane
- MW-71B: 1,1-DCE

Nine wells are located in the RMPA.

- IW-04: TCE and 1,1-DCE
- MW-05: TCE
- MW-09: 1,4-dioxane
- MW-19: 1,1-DCE
- MW-28: 1,1-DCE

- MW-68: perchlorate, 1,1-DCE,and 1,4-dioxane
- MW-88: perchlorate
- MW-91: perchlorate, 1,4-dioxane
- MW-98B: TCE and 1,1-DCE

Two wells are located in the NPCA.

- MW-76A: 1,4-dioxane
- MW-103: perchlorate

Three wells are located in the MCEA.

- F34-TW1: 1,4-dioxane
- MW-70: 1,4-dioxane
- MW-93: perchlorate

A summary of the magnitude of the trends (ug/L/yr) determined by linear regression analyses and the percent change with respect to the mean of the data used in the linear regression is presented in Table 3-16. Figures 3-19 through 3-22 present a spatial representation of the results of the trend analysis for monitoring well locations.

Table 3-16 Magnitude of Trends Detected for COPC for 2011 Sampled Monitoring Wells

	Decreasing Trend		Probably Decreasing Trend		Probably Increasing Trend				Increasing Trend			
Analyte	Number	Magnitude (ug/L/yr)	Number	Magnitude (ug/L/yr)	Number	Location	Magnitude (ug/L/yr)	Magnitude (%/yr)	Number	Location	Magnitude (ug/L/yr)	Magnitude (%/yr)
Perchlorate	13	0.06 to 848.7	4	0.03 to 198.6	3	MW-88	735.48	56.6	3	MW-60A	1115.1	23.7
						MW-91	256.78	12.2		MW-68	1489.2	21.9
						MW-93	1.92	45.6		MW-103	221.9	346.8
1,1-Dichloroethene	9	0.01 to 2.98	6	0.01 to 592.9	4	MW-19	0.33	1.20	5	IW-04	3.29	21.9
						MW-26	94.54	2.56		MW-60A	17.7	4.9
						MW-28	1.38	7.67		MW-61C	13.0	13.0
						MW-71B	0.04	15.3		MW-68	2.83	29.2
										MW-98B	2.61	20.1
Trichloroethene	10	0.02 to 9.25	2	0.07 to 0.36	2	MW-05	5.78	6.57	4	IW-04	1.66	12.8
						MW-60B	0.18	1.53		MW-60A	13.2	6.0
										MW-61C	2.49	11.3
										MW-98B	3.69	16.1
1,4-Dioxane	13	0.03 to 18.1	4	0.02 to 2.30	2	MW-09	0.13	2.56	10	F34-TW1	1.16	23.7
						MW-70	0.15	5.29		MW-07	0.04	6.6
										MW-26	12.3	2.9
										MW-60A	5.42	4.9
										MW-60B	1.33	25.6
										MW-61B	12.6	2.7
										MW-61C	0.29	4.9
										MW-68	3.22	34.7
										MW-76A	0.38	18.1
										MW-91	0.25	15.3

Notes:

ug/L/yr - Micrograms per liter per year.

%/yr - Percent change per year.

NA - Not applicable.

COPC - Chemicals of Potential Concern.

3.8.2 Temporal Trends in Surface Water Locations

For the 16 surface water locations, 64 trends were evaluated. A summary of the Mann-Kendall trend analysis is presented in Table 3-17.

Table 3-17 Summary of Mann-Kendall Trend Analysis of COPCs for 2011 Sampled Surface Water Locations

Analyte	Wells Tested	Insufficient Data	Non-detect	No Trend	Decreasing Trend	Probably Decreasing Trend	Stable Trend	Probably Increasing Trend	Increasing Trend
Perchlorate	16	2	3	7	2	0	2	0	0
1,1-Dichloroethene	16	1	11	2	2	0	0	0	0
Trichloroethene	16	0	12	2	2	0	0	0	0
1,4-Dioxane	16	2	5	1	3	1	3	0	1
Total Analysis	64	5	31	12	9	1	5	0	1

Notes:
COPC - Chemicals of Potential Concern.

The one increasing trend was detected at surface water location SW-07 in the MCEA. The trend had a magnitude of 0.04 µg/L/yr and a 4.6 percent change with respect to the mean of the data used in the linear regression.

With the exception of SW-10 and SW-14, which had insufficient data for Mann-Kendall trend analysis, the remaining surface water locations were either non-detect for all samples or displayed no trend, a stable trend, a decreasing trend, or a probably decreasing COPC trend. Figure 3-23 presents a spatial representation of the results of the trend analysis for surface water locations. Appendix J presents a summary of the results of the Mann-Kendall and linear regression analyses.

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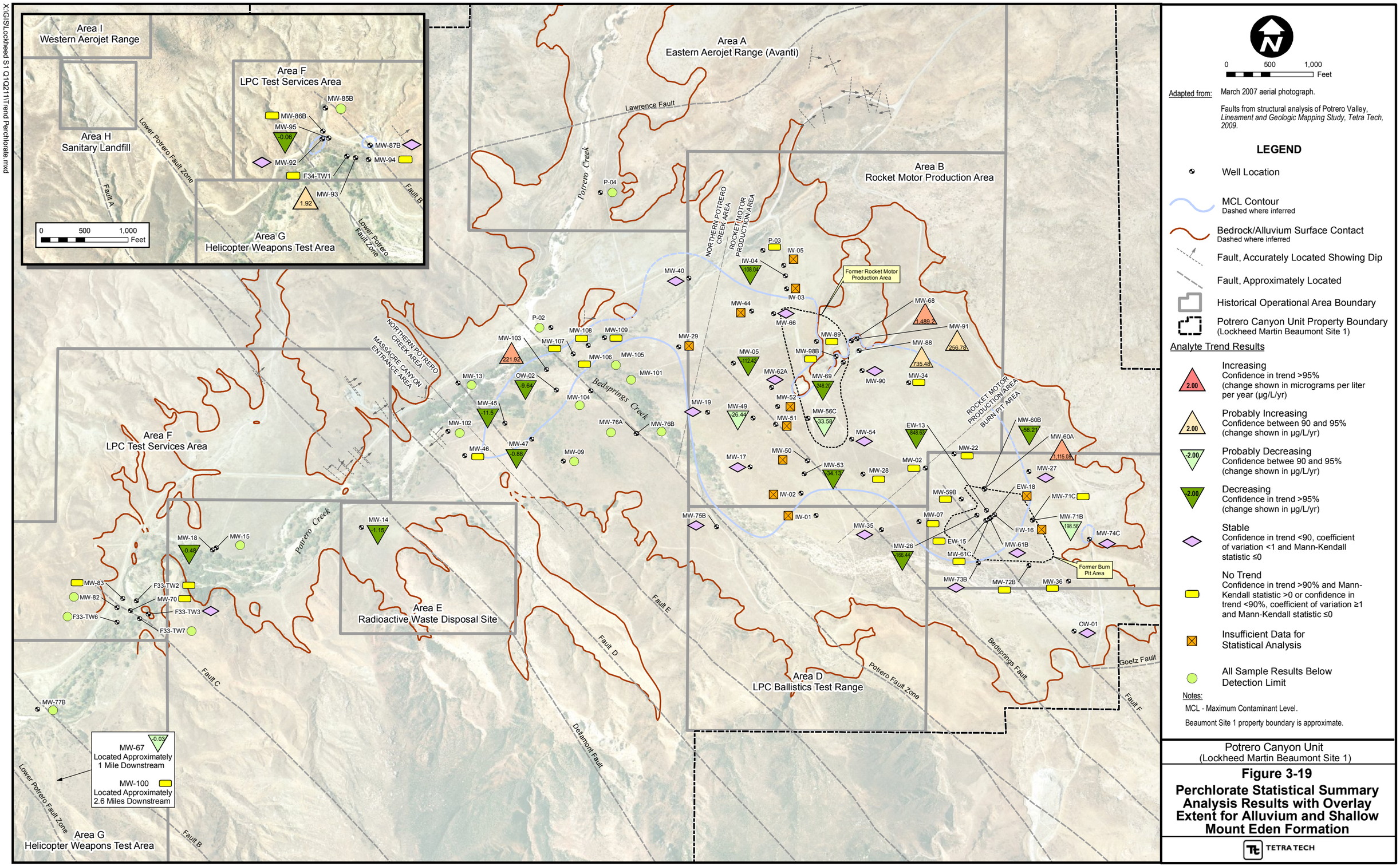

Adapted from: March 2007 aerial photograph.

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

LEGEND

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

Analyte Trend Results

- 2.00 — Increasing: Confidence in trend >95% (change shown in micrograms per liter per year (µg/L/yr)
- 2.00 — Probably Increasing: Confidence between 90 and 95% (change shown in µg/L/yr)
- -2.00 — Probably Decreasing: Confidence betwee 90 and 95% (change shown in µg/L/yr)
- -2.00 — Decreasing: Confidence in trend >95% (change shown in µg/L/yr)
- Stable: Confidence in trend <90, coefficient of variation <1 and Mann-Kendall statistic ≤0
- No Trend: Confidence in trend >90% and Mann-Kendall statistic >0 or confidence in trend <90%, coefficient of variation ≥1 and Mann-Kendall statistic ≤0
- Insufficient Data for Statistical Analysis
- All Sample Results Below Detection Limit

Notes:

MCL - Maximum Contaminant Level.

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-19

Perchlorate Statistical Summary Analysis Results with Overlay Extent for Alluvium and Shallow Mount Eden Formation

TETRA TECH

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Area I
Western Aerojet Range

Area H
Sanitary Landfill

Area F
LPC Test Services Area

Area G
Helicopter Weapons Test Area

Area A
Eastern Aerojet Range (Avanti)

Area B
Rocket Motor Production Area

Area D
LPC Ballistics Test Range

Area E
Radioactive Waste Disposal Site

Lawrence Fault
Lower Potrero Fault Zone
Potrero Creek
Bedsprings Creek
Fault A
Fault B
Fault C
Fault D
Fault E
Fault F
Goetz Fault
Deltamont Fault
Potrero Fault Zone
NORTHERN POTRERO CREEK AREA
ROCKET MOTOR PRODUCTION AREA
MASSACRE CANYON ENTRANCE AREA
ROCKET MOTOR PRODUCTION AREA BURN PIT AREA
Former Rocket Motor Production Area
Former Burn Pit Area

MW-67
Located Approximately 1 Mile Downstream

MW-100
Located Approximately 2.6 Miles Downstream

0 500 1,000 Feet

N

Adapted from: March 2007 aerial photograph.

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

LEGEND

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

Analyte Trend Results

- Increasing — Confidence in trend >95% (change shown in micrograms per liter per year (µg/L/yr)
- Probably Increasing — Confidence between 90 and 95% (change shown in µg/L/yr)
- Probably Decreasing — Confidence betwee 90 and 95% (change shown in µg/L/yr)
- Decreasing — Confidence in trend >95% (change shown in µg/L/yr)
- Stable — Confidence in trend <90, coefficient of variation <1 and Mann-Kendall statistic ≤0
- No Trend — Confidence in trend >90% and Mann-Kendall statistic >0 or confidence in trend <90%, coefficient of variation ≥1 and Mann-Kendall statistic ≤0
- Insufficient Data for Statistical Analysis
- All Sample Results Below Detection Limit

Notes:

MCL - Maximum Contaminant Level.

1,1-DCE - 1,1-Dichloroethene.

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-20

1,1-DCE Statistical Summary Analysis Results with Overlay Extent for Alluvium and Shallow Mount Eden Formation

TETRA TECH

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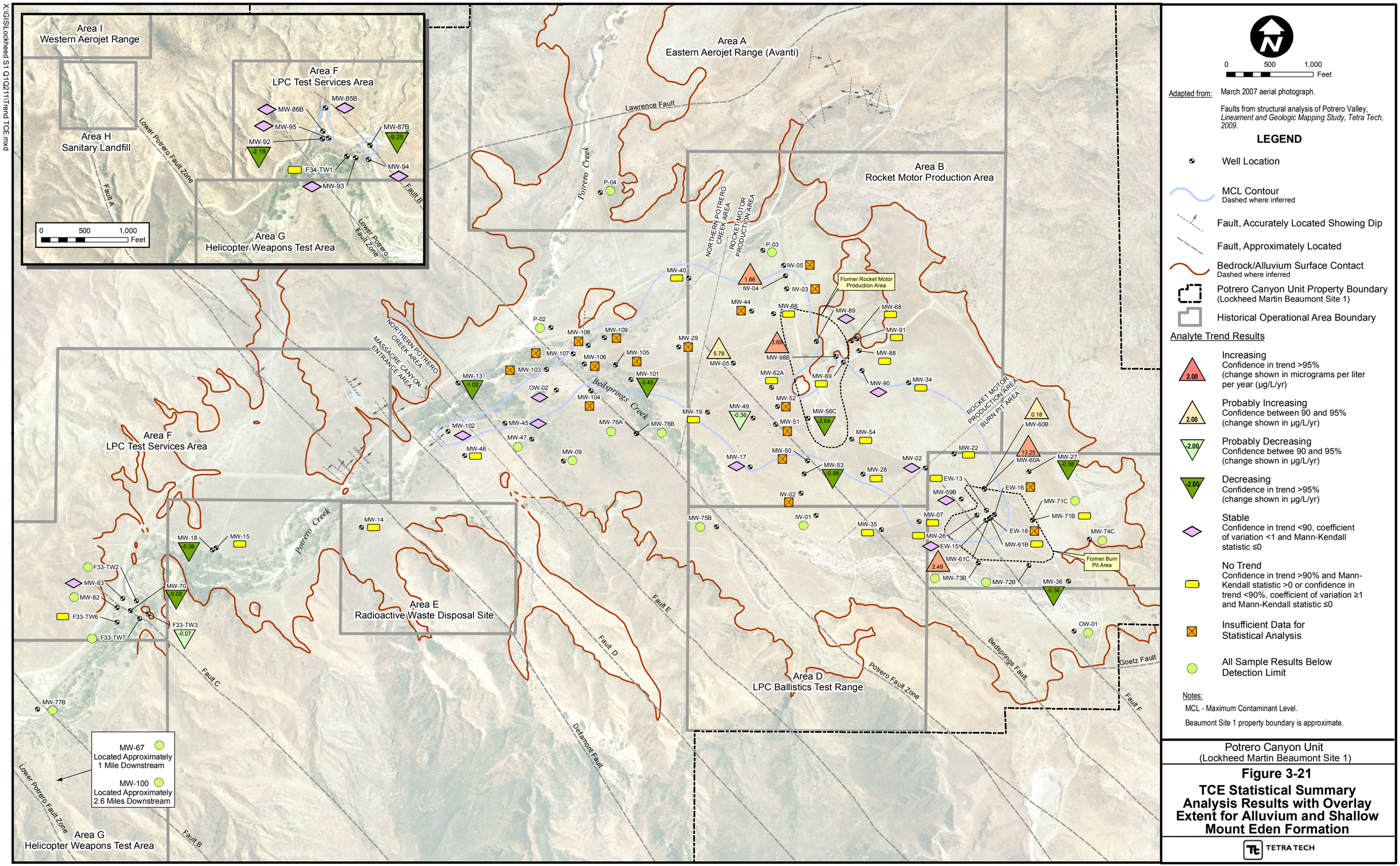

Adapted from: March 2007 aerial photograph.

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

LEGEND

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

Analyte Trend Results

- Increasing
  Confidence in trend >95%
  (change shown in micrograms per liter per year (µg/L/yr)
- Probably Increasing
  Confidence between 90 and 95%
  (change shown in µg/L/yr)
- Probably Decreasing
  Confidence betwee 90 and 95%
  (change shown in µg/L/yr)
- Decreasing
  Confidence in trend >95%
  (change shown in µg/L/yr)
- Stable
  Confidence in trend <90, coefficient of variation <1 and Mann-Kendall statistic ≤0
- No Trend
  Confidence in trend >90% and Mann-Kendall statistic >0 or confidence in trend <90%, coefficient of variation ≥1 and Mann-Kendall statistic ≤0
- Insufficient Data for Statistical Analysis
- All Sample Results Below Detection Limit

Notes:

MCL - Maximum Contaminant Level.

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-21

TCE Statistical Summary Analysis Results with Overlay Extent for Alluvium and Shallow Mount Eden Formation

TETRA TECH

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Area I
Western Aerojet Range

Area H
Sanitary Landfill

Area F
LPC Test Services Area

Area G
Helicopter Weapons Test Area

Area A
Eastern Aerojet Range (Avanti)

Area B
Rocket Motor Production Area

Area D
LPC Ballistics Test Range

Area E
Radioactive Waste Disposal Site

Lawrence Fault
Lower Potrero Fault Zone
Potrero Creek
Bedsprings Creek
Fault A
Fault B
Fault C
Fault D
Fault E
Fault F
Goetz Fault
Deltamont Fault
Potrero Fault Zone
NORTHERN POTRERO CREEK AREA
ROCKET MOTOR PRODUCTION AREA
MASSACRE CANYON ENTRANCE AREA
ROCKET MOTOR PRODUCTION AREA BURN PIT AREA
Former Rocket Motor Production Area
Former Burn Pit Area

MW-67
Located Approximately 1 Mile Downstream

MW-100
Located Approximately 2.6 Miles Downstream

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

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

Analyte Trend Results

- Increasing (2.00) — Confidence in trend >95% (change shown in micrograms per liter per year (µg/L/yr)
- Probably Increasing (2.00) — Confidence between 90 and 95% (change shown in µg/L/yr)
- Probably Decreasing (-2.00) — Confidence betwee 90 and 95% (change shown in µg/L/yr)
- Decreasing (-2.00) — Confidence in trend >95% (change shown in µg/L/yr)
- Stable — Confidence in trend <90, coefficient of variation <1 and Mann-Kendall statistic ≤0
- No Trend — Confidence in trend >90% and Mann-Kendall statistic >0 or confidence in trend <90%, coefficient of variation ≥1 and Mann-Kendall statistic ≤0
- Insufficient Data for Statistical Analysis
- All Sample Results Below Detection Limit

Notes:
DWNL - Drinking Water Notification Level
1,1-DCE - 1,1-Dichloroethene
Beaumont Site 1 property boundary is approximate.

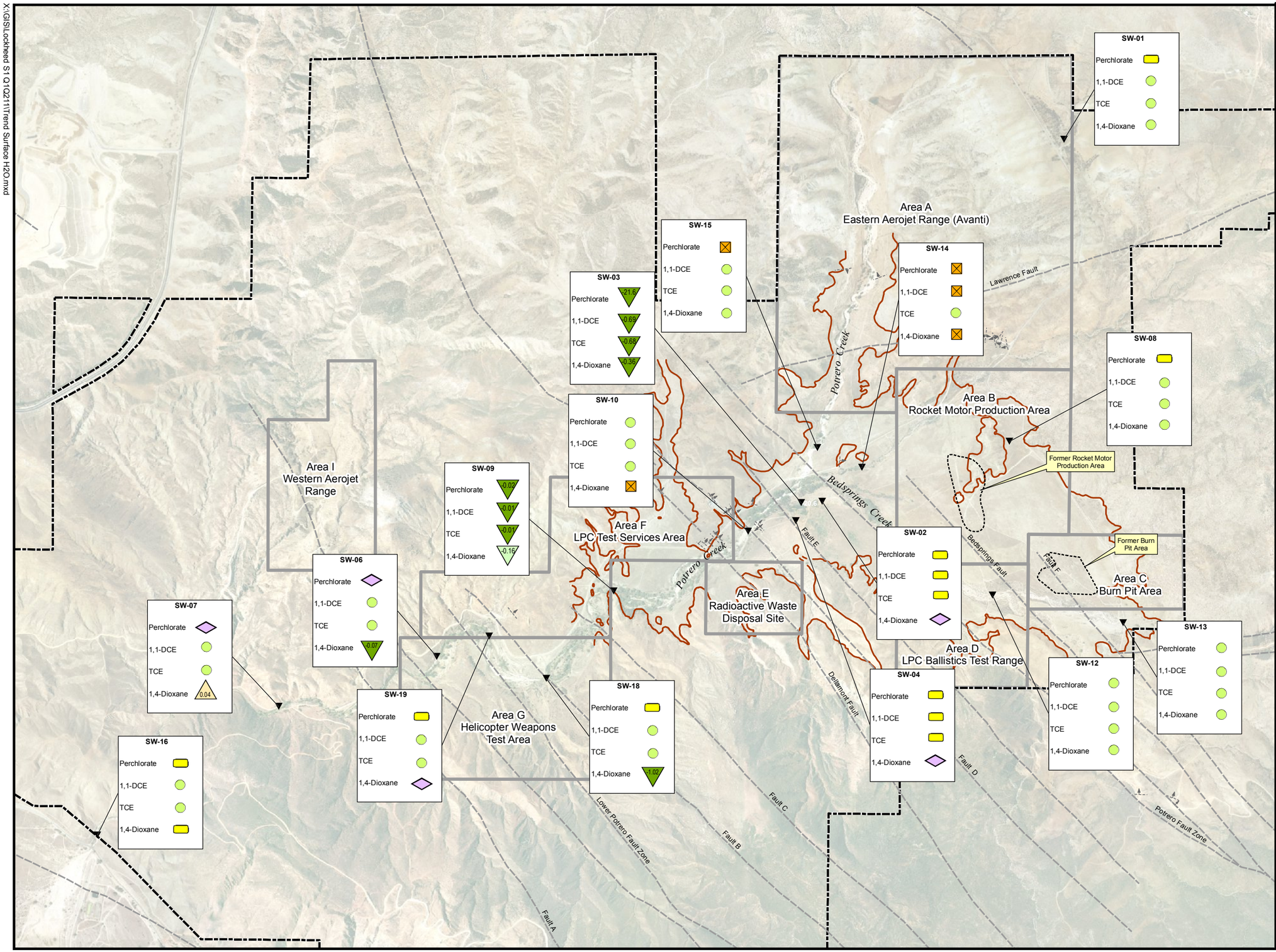
Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-22

1,4-Dioxane Statistical Summary Analysis Results with Overlay Extent for Alluvium and Shallow Mount Eden Formation

TETRA TECH

X:\GIS\Lockheed S1 Q1Q2\11\Trend Surface H2O.mxd



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

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

Analyte Trend Results

- 2.00 Increasing
  Confidence in trend >95%
  (change shown in micrograms per liter per year (µg/L/yr)
- -2.00 Probably Decreasing
  Confidence betwee 90 and 95%
  (change shown in µg/L/yr)
- -2.00 Decreasing
  Confidence in trend >95%
  (change shown in µg/L/yr)
- Stable
  Confidence in trend <90, coefficient of variation <1 and Mann-Kendall statistic ≤0
- No Trend
  Confidence in trend >90% and Mann-Kendall statistic >0 or confidence in trend <90%, coefficient of variation ≥1 and Mann-Kendall statistic ≤0
- Insufficient Data for Statistical Analysis
- All Sample Results Below Detection Limit

Notes:

Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 3-23

COPC Statistical Summary Analysis Results for Surface Water Samples

TETRA TECH

3.9 HABITAT CONSERVATION

Consistent with the U.S. Fish and Wildlife Service approved 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 First Quarter 2011 and Second Quarter 2011 monitoring events.

SECTION 4 SUMMARY AND CONCLUSIONS

Groundwater level measurements were collected for the First Quarter 2011 and Second Quarter 2011 water quality monitoring events. A total of 179 groundwater level measurements were collected for the First Quarter 2011 monitoring event and a total 179 groundwater level measurements were collected during the Second Quarter 2011 monitoring event. For the First and Second Quarter 2011 monitoring events, four wells were observed to be dry during each of the events.

For the First Quarter 2011 monitoring event, a total of 20 sampling locations (13 storm water, and seven monitoring wells) were proposed for water quality monitoring. Two proposed storm water sample locations, SW-06 and SW-11, were not sampled because the locations were dry. Therefore, water quality data was collected from 11 surface water and seven monitoring wells locations.

For the Second Quarter 2011 monitoring event, a total of 103 sampling locations (17 surface water, one alternate surface water location, four private production wells, and 81 monitoring wells) were proposed for water quality monitoring. One private production well was unable to be sampled due to down-hole equipment problems with the well. Eight surface water sample locations were not sampled because the locations were dry. SW-16 was sampled so SW-17, an alternate surface water location sampled when SW-16 is dry, was not sampled. Therefore, water quality data was collected from three private production wells, nine surface water and 81 monitoring well locations.

4.1 GROUNDWATER ELEVATIONS

The Beaumont NWS reported approximately 7.42 inches of rain during First Quarter 2011 and approximately 1.09 inches of precipitation during Second Quarter 2011. During this time period groundwater elevations generally increased across the Site. During First Quarter 2011, groundwater elevation increases were seen in wells located in all areas. During Second Quarter 2011 groundwater elevation increases were seen in wells located in the BPA, RMPA, and the NPCA. During this same period, groundwater elevation decreases were seen in wells located in the MCEA.

Groundwater elevations during the First Quarter 2011 monitoring event ranged from approximately 2,174 feet msl upgradient of the former BPA to approximately 1,795 feet msl in the MCEA. Groundwater elevations during the Second Quarter 2011 monitoring event ranged from approximately 2,166 feet msl upgradient of the former BPA to approximately 1,795 feet msl in the MCEA.

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 located within the NPCA and the MCEA appear to respond most quickly to precipitation compared to the former BPA and RMPA, which generally show a one-season lag before responding to seasonal precipitation. However, wells near Bedsprings Creek just south of the BPA also show rapid responses to precipitation due to surface water infiltration and mountain front recharge. The response also diminishes within each area with depth and distance from the Potrero and Bedsprings creeks. The Site has experienced overall groundwater level declines since 2005.

4.2 SURFACE WATER FLOW

During the First Quarter 2011 and Second Quarter 2011, the Potrero and Bedsprings creek riparian corridors were walked to determine the presence, nature, and quantity of surface water within the creek beds. The locations where surface water was encountered were plotted and a determination was made whether the water was flowing or stagnant. At specific locations where flowing water was encountered, the flow rate was determined using a modified version of the EPA Volunteer Stream Monitoring: A Methods Manual (USEPA, 1997).

Four fixed stream locations were chosen for stream flow measurements: SF-1, located near Gilman Hot Springs at the southwest border of the Site; SF-2, located in the vicinity of MW-67; SF-3, located in the vicinity of MW-15 and -18; and SF-4, located near MW-101.

During First Quarter 2011 SF-1 had an average flow rate of 1.81 cfs, SF-2 had an average flow rate of 2.07 cfs, SF-3 had an average flow rate of 2.43 cfs, and SF-4 was dry. The average site flow rate for First Quarter 2011 was 2.10 cfs.

During Second Quarter 2011 SF-1 had an average flow rate of 1.20 cfs, SF-2 had an average flow rate of 1.56 cfs, SF-3 had an average flow rate of 0.96 cfs, and SF-4 was dry. The average site flow rate for Second Quarter 2011 was 1.24 cfs.

4.3 GROUNDWATER FLOW AND GRADIENTS

Groundwater flow directions from First Quarter 2011 and Second Quarter 2011 were similar to previously observed patterns for a dry period. Generally, groundwater flows northwest from the southeastern limits of the valley (near the former BPA) beneath the former RMPA, towards Potrero Creek where groundwater flow then changes direction and begins heading southwest, parallel to the flow of Potrero Creek, into Massacre Canyon.

Between December 2010 (Fourth Quarter 2010) and March 2011 (First Quarter 2011), the overall groundwater gradient (approximating a flowline from MW-36, upgradient of the BPA, through the RMPA and NPCA to MW-18, in the MCEA) increased to 0.016 ft/ft. Between March 2011 (First Quarter 2011) and June 2011 (Second Quarter 2011), the overall groundwater gradient through the same flow path decreased to 0.015 ft/ft. In general the horizontal gradient is lowest between the BPA and the RMPA with a greatly increased flow through the NPCA and the MCEA. The flattening of the gradient in the BPA and RMPA appears to be attributed 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 BPA, RMPA, and the NPCA, and upward (positive) in the MCEA. 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.

4.4 WATER QUALITY

Both groundwater and surface water are collected and sampled as part of the GMP. The GMP has a quarterly/semiannual/annual/biennial frequency. 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. The semiannual wells are sampled second and fourth quarter of each year, annual wells are sampled second quarter of each year, and the biennial wells are sampled second quarter of even-numbered years.

A COPC evaluation is performed annually, and reported in the First and Second Quarter Semiannual Groundwater Monitoring Report. The primary COPCs previously identified for the Site during the 2010 evaluation, (Tetra Tech, 2010b), were perchlorate, 1,1-DCE, TCE and 1,4-dioxane. The secondary COPCs identified for the Site during 2010 evaluation were 1,1-DCA, 1,2-DCA, 1,1,1-TCA, 1,1,2-TCA, cis-1,2-DCE, and vinyl chloride. The 2011 evaluation yielded no additions or deletions to the list of COPCs. The results of surface and groundwater samples collected and tested during the First and Second Quarter 2011 monitoring events are discussed below.

4.4.1 Private Production Wells

Samples from select offsite private production wells were collected as part of the Second Quarter 2011 monitoring event. Wells were selected that are in close proximity to the site boundary to monitor for potential impact to offsite water supplies from groundwater leaving the site. No COPCs were detected in the upgradient or downgradient private production wells that were sampled. The private production wells will continue to be monitored annually during the second quarter sampling event.

4.4.2 Surface Water

Surface water samples are collected semiannually during the second and fourth quarter sampling events, and during a storm event. Seventeen surface water sample locations and one alternate sample location have been identified for semiannual surface water sampling at the Site. Sample locations have been chosen to include springs and spring-fed ponds, ephemeral ponds, and locations in the Bedsprings and Potrero creek drainages. Twelve locations within the active drainages and one ephemeral pond location have been identified for surface water sampling during a storm event. Due to the ongoing drought conditions and the ephemeral nature of the ponds and creeks, it is common for many of the locations to be dry at the time of sampling.

During the First Quarter 2011 sampling event, surface water samples were collected from 11 locations during a storm event. The remaining two locations were dry.

During the Second Quarter 2011 sampling event, surface water samples were collected from nine locations. The remaining eight locations were dry at the time of sampling. Because surface water location SW-16 was able to be sampled, the alternate location, SW-17, was not sampled. The

sample results from the locations sampled are consistent with previous sample results obtained at the Site.

No primary or secondary COPCs were detected in upgradient surface water locations SW-13 (in Bedsprings Creek near the eastern property boundary), or in surface water location SW-08 (an ephemeral pond north of the building 315).

Perchlorate was detected at surface water location SW-14 at a concentration of 14 µg/L and at surface water location SW-15 at a concentration of 0.18 µg/L. Sample location SW-14 is located in an unnamed drainage east of the intersection of Potrero and Bedsprings Creek and downgradient of the RMPA, and SW-15 is located in Potrero Creek just north of its intersection with Bedsprings Creek.

The four primary COPCs (1,4-dioxane, 1,1-DCE, TCE, and perchlorate) and three secondary COPCs (1,1-DCA, cis-1,2-DCE, and vinyl chloride) were detected in surface water samples collected from locations SW-02, SW-03, and SW-04. These samples were collected from springs and or spring-fed ponds located outside of the stream beds but near the intersection of Bedsprings and Potrero Creeks, downgradient from the RMPA.

Surface water sample locations SW-06, SW-07, SW-09, SW-10, SW-12, SW-18, and SW-19 are located in areas of flowing water in Potrero Creek, topographically downgradient of the springs discussed in the previous paragraph. Two of the primary COPCs, 1,4-dioxane and perchlorate, and no secondary COPCs were detected in the surface water samples collected from these locations. During Second Quarter 2011, 1,4-dioxane was the only COPC detected above the MCL or DWNL in these locations.

1,4-Dioxane has been intermittently detected in surface water samples collected at location SW-16 located at the mouth of Massacre Canyon and Gilman Hot Springs Road during or following periods of rainfall. During Second Quarter 2011 1,4-dioxane was detected at a concentration of 0.87 µg/L. Additionally, perchlorate was detected Second Quarter 2011 at a concentration of 0.21 µg/L. Perchlorate has only recently been detected at this location. This is likely a result of a lower detection limit. During previous monitoring events the detection limit for perchlorate was 0.5 µg/L. In 2010, a more sensitive method for testing perchlorate was used and the detection limit was lowered to 0.07 µg/L.

4.4.3 Groundwater

Groundwater monitoring wells were sampled during the first and second quarters. The first quarter event included the quarterly sampling of newly installed wells. The second quarter event included the quarterly sampling of newly installed wells; the semiannual sampling of increasing contaminant trend wells, guard wells, and contaminant attenuation wells; and the annual sampling of plume monitoring wells (Tetra Tech, 2003b).

Plume Wells

Analyses were performed for the primary COPCs (perchlorate, 1,1-DCE, TCE, and 1,4-dioxane) in groundwater samples collected from 60 wells designated as plume monitoring wells during the Second Quarter 2011 monitoring event. Perchlorate was detected in 49 groundwater samples collected at concentrations ranging from below the MDL to 81,000 µg/L. The highest concentration was detected in MW-61B located in the BPA. The perchlorate MCL of 6 µg/L was exceeded in 33 of the groundwater samples collected.

1,1-DCE was detected in 37 groundwater samples collected at concentrations ranging from below the MDL to 13,000 µg/L. The highest concentration was detected in EW-13 located in the BPA. The 1,1-DCE MCL of 6 µg/L was exceeded in 25 of the groundwater samples collected.

TCE was detected in 37 groundwater samples collected at concentrations ranging from below the MDL to 2,600 µg/L. The highest concentration was detected in MW-26 located in the BPA. The TCE MCL of 5 µg/L was exceeded in 32 of the groundwater samples collected.

1,4-dioxane was detected in 45 groundwater samples collected at concentrations ranging from below the MDL to 4,200 µg/L. The highest concentration was detected in EW-13 located in the BPA. The 1,4-dioxane DWNL of 3 µg/L was exceeded in 34 of the groundwater samples collected.

In general, plume morphology does not appear to have changed significantly from Second Quarter 2010. The primary contaminant source area for perchlorate, 1,1-DCE, TCE and 1,4-dioxane is the former BPA, but secondary sources are present in the former RMPA and Features F-33, F-34, and F-39.

New Wells

Monitoring wells MW-103 through MW-109 were installed as part of the Site 1 Plant Uptake Study (Tetra Tech, 2010c) to determine the relationship between the concentration of perchlorate and 1,4-dioxane found in shallow groundwater and the concentrations found in leaf tissue. Perchlorate was detected in five of the seven wells at concentrations ranging from 34 µg/L to 450 µg/L, and 1,4-dioxane was detected in all wells ranging in concentration from 11 µg/L to 34 µg/L. A complete description of the work performed can be found in the Site 1 Plant Uptake Study Report, which will be included with the Human Health and Ecological Risk Assessment Report. Quarterly sampling for four quarters is proposed, after which the sampling frequency will be evaluated.

Guard Wells

Four monitoring wells are designated as guard wells: MW-15, MW-18, MW-67, and MW-100. Wells MW-15 and MW-18 are a clustered well pair located upstream of the Large Motor Washout Area (Feature F-33). All guard wells are located along Potrero Creek, downgradient of the BPA and RMPA source areas. Well MW-18 is completed near the top of the alluvial aquifer and MW-15 is completed near the bottom of the alluvial aquifer. These wells are located approximately three miles from the southern site boundary and are located upgradient of the secondary sources identified at F-33, F-34, and F-39. Well MW-67, the furthest downgradient site well, is located approximately 0.9 miles upgradient of the southern site boundary, and MW-100, an offsite well, is located approximately 500 feet south of the southern site boundary near the mouth of Potrero Creek. Both of these wells are located below the secondary sources identified at F-33, F-34, and F-39. The analyte 1,4-dioxane was detected in monitoring wells MW-15, MW-18, MW-67, and MW-100 at concentrations of 6.8 µg/L, 4.3 µg/L, 1.2 µg/L, and 0.15 µg/L, respectively. The analyte 1,4-dioxane is the only COPC to be detected above the MCL or DWNL in these guard wells during the Second Quarter 2011 sampling event. The MCLs for 1,1-DCE, TCE, and perchlorate are 6 µg/L, 5 µg/L, and 6 µg/L, respectively. The DWNL for 1,4-dioxane is 1 µg/L. Sample results for the guard wells from Second Quarter 2011 are consistent with results from previous sampling events.

4.5 CONTAMINANT ATTENUATION SAMPLING

The objective of the contaminant attenuation sampling and analyses effort is to understand the geochemical characteristics that appear to be contributing to the natural attenuation of the low level perchlorate in groundwater in two areas: the Potrero Creek area that has migrated into the area from the BPA and the RMPA, and the area around the Large Motor Washout Area (F-33). In the F-33 area, elevated perchlorate concentrations (up to 302 mg/kg at 16 feet below ground surface in F33-DP20, July 2008) have been detected in soil samples, while groundwater concentrations in nearby monitoring well MW-70 have fluctuated from below detection limits up to 48.5 µg/L.

The contaminant attenuation sampling results confirm that the various geochemical parameters (redox conditions, the absence of electron acceptor competition, and the availability of low levels of usable organic carbon), as well as the environmental conditions in the aquifer, are within the required range to promote biodegradation of perchlorate in groundwater in the area. It appears this riparian area and its organic-rich lithologic layers observed in the area are contributing to the TOC, which is in turn creating the small amounts of VFAs that provide the carbon substrate for perchlorate-reducing microorganisms. Seasonal detections of perchlorate in MW-70 may indicate that during periods of heavy rainfall, perchlorate contamination from the overlying soil is being flushed into the aquifer. However, the organic carbon in the aquifer does not appear to be sufficient to completely degrade the increased amount of perchlorate migrating from the vadose zone during periods of heavy rainfall, which results in temporary increases in perchlorate concentrations at MW-70. Perchlorate has not been detected in the wells downgradient of MW-70. Therefore, it would appear biodegradation conditions are sufficient to control the temporary increases observed near MW-70. It is likely that seasonal and long-term changes in precipitation have an influence on the geochemical conditions observed, impacting the perchlorate-reducing conditions. This is likely the reason for the fluctuation in perchlorate concentrations at MW-70.

The data obtained from the F-33 contaminant attenuation sampling will be combined with the data obtained during the Site 1 contaminant attenuation study to help refine the CSM and to help determine which areas of the site may be conducive to natural attenuation of perchlorate, chlorinated solvents, and 1,4-dioxane. The data will be presented in the Beaumont Site 1 Contaminant Attenuation Summary Report currently in preparation.

4.6 TEMPORAL TREND ANALYSES

All groundwater and surface water monitoring locations sampled and tested between the Third Quarter 2010 and the Second Quarter 2011 sampling events were included in the temporal trend analyses. Sampling results from 93 monitoring wells and 16 fixed surface water locations were included in a temporal trend analysis of perchlorate, 1,1-DCE, TCE, and 1,4-dioxane (the primary COPCs). The temporal trend analyses were performed using data from Second Quarter 2002 to Second Quarter 2011. This period was chosen because operation of the RMPA groundwater pump and treat system was discontinued in 2002. This temporal trend analysis updates the analysis performed following completion of the Second Quarter 2010 monitoring event (Tetra Tech, 2010b). The temporal trends were analyzed using Mann-Kendall and linear regression methods. The magnitude of the trends is presented as a change in concentration per year.

The number of increasing or probably increasing trend wells has decreased from 24 wells and one surface water location in 2010 to 21 wells and one surface water location in the 2011 temporal trend analyses. During this time period the number of locations identified as having either a decreasing or probably decreasing trend has increased. Additionally, due to the new non-detect designation, the number of locations previously identified as having either a stable trend or no trend has decreased. Tables 4-1 through 4-4 display a summary of the historical trend analyses for perchlorate, 1,1-DCE, TCE, and 1,4-dioxane in groundwater monitoring wells.

A summary of the trend analysis results for the 21 increasing or probably increasing trend locations is presented in Table 4-5. The percent change that these increases represent with respect to the mean of the data used to calculate each trend is also presented in Table 4-5. Twelve of the 21 increasing or probably increasing trend locations have trend magnitudes that represent less than a 20 percent change.

Table 4-1 Historical Perchlorate Trend Summary

Trend Category	Locations Tested					
	2006	2007	2008	2009	2010	2011
Insufficient Data	40	6	33	27	7	11
Non-Detect (new designation)	--	--	--	--	--	15
No Trend	9	11	13	16	50	26
Stable	17	13	27	37	40	18
Increasing	1	2	4	6	7	3
Probably Increasing	0	0	0	1	2	3
Decreasing	2	5	4	15	12	13
Probably Decreasing	0	6	7	5	5	4
Total Locations	69	43	88	107	123	93
Notes: Non-Detect was not a category designation prior to the 2011 statistics						

Table 4-2 Historical 1,1-DCE Trend Summary

Trend Category	Locations Tested					
	2006	2007	2008	2009	2010	2011
Insufficient Data	40	7	34	29	9	16
Non-Detect (new designation)	--	--	--	--	--	20
No Trend	7	6	20	38	62	18
Stable	14	15	25	31	36	15
Increasing	1	1	1	2	6	5
Probably Increasing	0	3	0	2	4	4
Decreasing	6	7	7	1	3	9
Probably Decreasing	1	4	1	4	3	6
Total Locations Tested	69	43	88	107	123	93
Notes: Non-Detect was not a category designation prior to the 2011 statistics						

Table 4-3 Historical TCE Trend Summary

Trend Category	Locations Tested					
	2006	2007	2008	2009	2010	2011
Insufficient Data	40	7	34	29	8	17
Non-Detect (new designation)	--	--	--	--	--	19
No Trend	8	13	28	44	66	24
Stable	16	16	21	28	33	15
Increasing	0	1	0	0	7	4
Probably Increasing	0	0	1	1	5	2
Decreasing	4	4	3	4	4	10
Probably Decreasing	1	2	1	1	0	2
Total Locations Tested	69	43	88	107	123	93
Notes: Non-Detect was not a category designation prior to the 2011 statistics						

Table 4-4 Historical 1,4-Dioxane Trend Summary

Trend Category	Locations Tested					
	2006	2007	2008	2009	2010	2011
Insufficient Data	40	6	33	29	7	10
Non-Detect (new designation)	--	--	--	--	--	12
No Trend	5	6	19	28	43	23
Stable	20	7	21	36	44	19
Increasing	1	1	0	2	7	10
Probably Increasing	0	1	0	1	4	2
Decreasing	2	15	11	7	15	13
Probably Decreasing	1	7	4	4	3	4
Total Locations	69	43	88	107	123	93
Notes: Non-Detect was not a category designation prior to the 2011 statistics						

Table 4-5 Summary of Increasing COPC Trends – Second Quarter 2011

Analyte:	Perchlorate			1,1-Dichloroethene			Trichloroethene			1,4-Dioxane		
Sample Location	**Trend**	**Magnitude (%/yr)**	**Magnitude (µg/L/y)**	**Trend**	**Magnitude (%/yr)**	**Magnitude (µg/L/y)**	**Trend**	**Magnitude (%/yr)**	**Magnitude (µg/L/y)**	**Trend**	**Magnitude (%/yr)**	**Magnitude (µg/L/y)**
Burn Pit Area												
MW-26	Decreasing	-2.2	-166.44	Probably Increasing	2.6	94.54	No Trend			Increasing	2.9	12.26
MW-60A	Increasing	23.7	1115.08	Increasing	4.9	17.74	Increasing	6.0	13.25	Increasing	4.9	5.42
MW-60B	Decreasing	-4.0	-56.21	Stable			Probably Increasing	1.5	0.18	Increasing	25.6	1.33
MW-61B	Stable			No Trend			No Trend			Increasing	2.7	12.59
MW-61C	No Trend			Increasing	13.0	12.96	Increasing	11.3	2.49	Increasing	4.9	0.29
MW-71B	No Trend			Probably Increasing	15.3	0.04	No Trend			Non-detect		
Rocket Motor Production Area												
IW-04	Decreasing	-67.5	-108.04	Increasing	21.9	3.29	Increasing	12.8	1.66	Stable		
MW-05	Decreasing	-5.1	-112.42	Stable			Probably Increasing	6.6	5.78	No Trend		
MW-07	No Trend			No Trend			No Trend			Increasing	6.6	0.04
MW-09	Non-detect			Non-detect			Non-detect			Probably Increasing	2.6	0.13
MW-19	Stable			Probably Increasing	1.2	0.33	No Trend			Stable		
MW-28	No Trend			Probably Increasing	7.7	1.38	No Trend			No Trend		
MW-68	Increasing	21.9	1489.20	Increasing	29.2	2.83	No Trend			Increasing	34.7	3.22
MW-88	Probably Increasing	56.6	735.48	Stable			No Trend			No Trend		
MW-91	Probably Increasing	12.2	256.78	No Trend			No Trend			Increasing	15.3	0.25
MW-98B	No Trend			Increasing	20.1	2.61	Increasing	16.1	3.69	No Trend		
Northern Potrero Creek Area												
MW-76A	Non-detect			Non-detect			Non-detect			Increasing	18.1	0.38
MW-103	Increasing	346.8	221.92	Not Available			Not Available			Stable		
Massacre Canyon Entrance Area												
F34-TW1	No Trend			No Trend			No Trend			Increasing	23.7	1.16
MW-70	No Trend			Decreasing	-27.4	-0.07	Decreasing	-13.3	-0.02	Probably Increasing	5.3	0.15
MW-93	Probably Increasing	45.6	1.92	Stable			Stable			Stable		

Notes:

Shading indicates locations where the magnitude of the increasing or probably increasing trend represents greater than a 20 percent change.

µg/L/yr - microgram per liter per year

%/yr - percent change per year

Burn Pit Area – The BPA is the primary source area for all of the Site's COPCs. Seven of the 21 locations with increasing trends identified were from monitoring wells located in this area. There were six wells with decreasing trends also. Relative to the mass of the contaminants present in the source area and the concentrations detected, the changes do not appear unusual. The results are consistent with a continuing source in an area of large groundwater level fluctuations that appears to be at near equilibrium conditions.

Rocket Motor Production Area - The RMPA is a secondary source area for the COPC perchlorate. Six of the 21 locations with increasing trends were monitoring wells located in this area. There were also eight wells with a decreasing trend. The results appear to be consistent with contaminants migrating from the BPA into the RMPA and with a continuing source of perchlorate in the RMPA that is at near equilibrium conditions.

Northern Potrero Creek Area – There are no known contaminant sources in the NPCA. Six of the 21 locations with increasing trends identified were from monitoring wells located in this area. There were also 13 wells with decreasing trends in the NPCA. The magnitudes of the trends are relatively small but the decreasing trends are generally larger than the increasing trends. The COPC plumes diminish significantly through this area both with respect to size and magnitude of the concentrations. It is believed that a significant amount of natural attenuation is occurring in the area. The results appear to be consistent with COPC plumes that are at near equilibrium or possibly decreasing conditions.

Massacre Canyon Entrance Area - The MCEA has secondary source areas for all the COPC's. Two of the 21 locations with increasing trends identified were from monitoring wells located in this area. There were nine wells with decreasing trends also. The magnitude of the trends is very small, all less than 2.0 µg/L per year. All of the Site's guard wells are located in this area. Guard wells MW-15, MW-18, MW-67, and MW-100 primarily displayed stable or decreasing COPC trends, with the exception of MW-15, in which a TCE trend could not be discerned, and MW-67 which had a 1,4-dioxane trend that could not be discerned. In 2010, F34-TW1 was the farthest downgradient well with an increasing trend. F34-TW1 had an increasing 1,4-dioxane trend with a magnitude of 1.16 µg/L/yr. The results appear to be consistent with COPC plumes that are at or near equilibrium conditions.

Possible reasons for the change in the number of increasing trend wells are: 1) With an increase in amount of data for the individual locations, the trends become more noticeable due to the ability to better define outliers, and 2) As additional time passes, potential influence from the former extraction system becomes less noticeable. In general, the plume morphology has not changed and the majority of the wells and the surface water locations are either non-detect for COPCs or display a stable trend or no trend.

4.7 PROPOSED CHANGES TO THE GROUNDWATER MONITORING PROGRAM

4.7.1 Groundwater Sampling Frequency

The sampling frequency of a monitoring well is based on the well's classification (i.e., function) (Tetra Tech, Inc., 2003b). Groundwater monitoring well classifications are based on the evaluation of the temporal trends, spatial distribution, and other qualitative criteria. There are seven potential well classifications. Because there are not currently any remedial actions, there are no wells designated as remedial monitoring wells. A summary of the sampling frequency by well classification is presented in Table 4-6.

Table 4-6 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

4.7.2 Proposed Changes

The groundwater monitoring program is reviewed and modified as necessary during the second quarter of each year in conjunction with the annual temporal trend analyses. Wells MW-103 through MW-109 were installed during the fourth quarter 2010 as part of the plant uptake study and will be sampled quarterly for four quarters for VOCs, 1,4-dioxane, and perchlorate. Following that, the sampling frequency for these wells will be reevaluated.

Contaminant attenuation parameter analyses will be discontinued pending the results of the Site-wide natural attenuation study, which is currently underway. Recommendations for future natural attenuation parameter sampling will be discussed in the upcoming natural attenuation study report. It is proposed to change the sampling frequency of wells sampled for contaminant attenuation parameters from semiannual to their previously approved sampling frequency.

The sampling frequency for wells with an increasing trend may be increased to semiannual if the magnitude of the trend and the well's location warrant an increased frequency. Typical laboratory standards for precision and accuracy allow for approximately 20 percent variability in laboratory data. As a result, any increasing trends with a magnitude less than 20 percent of the mean concentration of the data used in the trend determination will be considered minor and will not trigger an increase to semiannual sampling. The monitoring frequency of all other wells exhibiting an increasing trend will be evaluated on a case-by-case basis with particular attention given to the magnitude of the trend and the location of the well.

Based on the results of the temporal trend analysis and the magnitude of their trends, it is proposed that the frequency of sampling for increasing or probably increasing concentration trend wells MW-88 located in the RMPA, MW-103 located in the NPCA, and F34-TW1 and MW-93 located in the MCEA be increased from annual to semiannual. It is also proposed to continue semiannual sampling for increasing trend wells IW-04, MW-68, and MW-98B located in the RMPA, and for MW-60A and MW-60B located in the BPA.

Due to the limited magnitude of their trends, it is proposed that monitoring wells MW-26, MW-61B, MW-61C, and MW71B located in the BPA, that MW-05, MW-09, MW-19, MW-28, and MW-91 located in the RMPA, and that MW-70 located in the MCEA remain at their previously approved sampling frequencies and that monitoring well MW-07 located in the BPA return to its previously approved sampling frequency.

Monitoring well MW-90, located in the RMPA, and MW-76A, located in the NPCA, are no longer identified as increasing trend wells, and it is proposed to change the sampling frequency from semiannual to their previously approved sampling frequency.

MW-60A has been sampled for lead annually since lead concentrations were first detected above the MCL in July 2004. During this time the lead concentration have remained consistently just

above the MCL. It is proposed to change the lead sampling frequency from annual to biennial. No other changes to the number of wells being sampled or their frequency are proposed.

Surface water sampling is conducted semiannually and soon after a storm event, if possible. No changes to the sampling frequency for surface water sampling are proposed. A general summary of the current and proposed GMP is presented in Table 4-7.

Table 4-7 Summary of 2011 and Proposed 2012 Monitoring Program Well Sampling Status

Program Year	Semiannual Surface Water Samples	Quarterly Groundwater Samples	Semiannual Groundwater Samples	Annual Groundwater Samples	Biennial Groundwater Samples
2011	17	0	19	55	44
2012	17	7	13	60	45

No changes to the analytical program are proposed. All wells and surface water locations will continue to be tested for perchlorate, 1,4-dioxane, and VOCs. A detailed summary of the monitoring program proposed for 2011 is presented in Table 4-8. Figure 4-1 presents the sampling locations and the frequency of the 2011 proposed GMP.

Table 4-8 Groundwater Quality Monitoring Frequency Recommendations

Well	Formation Screened	Well Classification	Q2 2011	Q2 2012	Comments
F33-TW2	QAL	MNA Monitoring	Semiannual	Annual	Change in MNA monitoring schedule, F-33 - Large rocket motor washout area
F33-TW3	QAL	MNA Monitoring	Semiannual	Annual	Change in MNA monitoring schedule, F-33 - Large rocket motor washout area
F33-TW6	QAL	MNA Monitoring	Semiannual	Annual	Change in MNA monitoring schedule, F-33 - Large rocket motor washout area
F33-TW7	QAL	MNA Monitoring	Semiannual	Annual	Change in MNA monitoring schedule, F-33 - Large rocket motor washout area
MW-82	QAL	MNA Monitoring	Semiannual	Annual	Change in MNA monitoring schedule, F-33 - Large rocket motor washout area
MW-83	QAL	MNA Monitoring	Semiannual	Annual	Change in MNA monitoring schedule, F-33 - Large rocket motor washout area
EW-13	MEF	Plume Monitoring	Annual	Annual	
MW-02	MEF	Plume Monitoring	Annual	Annual	
MW-05	QAL	Plume Monitoring	Annual	Annual	Limited magnitude (probably) increasing trend (TCE) (1)
MW-07	QAL	Plume Monitoring	Semiannual	Annual	TCE and perchlorate concentrations are stable, decrease to annual. Limited magnitude increasing trend (1,4-dioxane) (1)
MW-09	QAL	Plume Monitoring	Annual	Annual	Limited magnitude (probably) increasing trend (1,4-dioxane) (1)
MW-13	QAL	Plume Monitoring	Annual	Annual	
MW-14	QAL	Plume Monitoring	Annual	Annual	
MW-17	QAL	Plume Monitoring	Annual	Annual	
MW-19	QAL	Plume Monitoring	Annual	Annual	Limited magnitude (probably) increasing trend (1,1-DCE) (1)
MW-22	QAL	Plume Monitoring	Annual	Annual	
MW-26	MEF	Plume Monitoring	Annual	Annual	Limited magnitude (probably) increasing trend (1,1-DCE), increasing trend (1,4-dioxane) (1)
MW-27	QAL	Plume Monitoring	Annual	Annual	
MW-28	QAL	Plume Monitoring	Annual	Annual	Limited magnitude (probably) increasing trend (1,1-DCE) (1)
MW-29	MEF	Plume Monitoring	Annual	Annual	
MW-34	QAL	Plume Monitoring	Annual	Annual	
MW-35	QAL	Plume Monitoring	Annual	Annual	
MW-36	QAL	Plume Monitoring	Annual	Annual	
MW-40	MEF	Plume Monitoring	Annual	Annual	
MW-45	QAL	Plume Monitoring	Annual	Annual	
MW-46	QAL	Plume Monitoring	Annual	Annual	
MW-47	QAL	Plume Monitoring	Annual	Annual	
MW-49	QAL	Plume Monitoring	Annual	Annual	
MW-53	QAL	Plume Monitoring	Annual	Annual	
MW-54	QAL	Plume Monitoring	Annual	Annual	
MW-56C	QAL	Plume Monitoring	Annual	Annual	
MW-59B	MEF	Plume Monitoring	Annual	Annual	
MW-61B	MEF	Plume Monitoring	Annual	Annual	Limited magnitude increasing trend (1,4-dioxane) (1)
MW-62A	QAL	Plume Monitoring	Annual	Annual	
MW-66	QAL	Plume Monitoring	Annual	Annual	
MW-69	QAL	Plume Monitoring	Annual	Annual	
MW-71B	QAL/MEF	Plume Monitoring	Annual	Annual	Limited magnitude (probably) increasing trend (1,1-DCE) (1)
MW-71C	MEF	Plume Monitoring	Annual	Annual	
MW-72B	MEF	Plume Monitoring	Annual	Annual	
MW-73B	MEF	Plume Monitoring	Annual	Annual	
MW-74C	MEF	Plume Monitoring	Annual	Annual	
MW-75B	QAL	Plume Monitoring	Annual	Annual	
MW-76B	QAL	Plume Monitoring	Annual	Annual	
MW-77B	MEF	Plume Monitoring	Annual	Annual	
MW-85B	MEF	Plume Monitoring	Annual	Annual	
MW-86B	QAL/MEF	Plume Monitoring	Annual	Annual	
MW-87B	MEF	Plume Monitoring	Annual	Annual	
MW-89	QAL	Plume Monitoring	Annual	Annual	
MW-90	QAL	Plume Monitoring	Semiannual	Annual	TCE concentrations are stable, decrease to annual
MW-91	MEF	Plume Monitoring	Annual	Annual	Limited magnitude increasing trend (1,4-dioxane), (probably) increasing trend (perchlorate) (1)
MW-92	MEF	Plume Monitoring	Annual	Annual	
MW-94	MEF	Plume Monitoring	Annual	Annual	
MW-95	MEF	Plume Monitoring	Annual	Annual	
MW-101	QAL	Plume Monitoring	Annual	Annual	
MW-102	QAL	Plume Monitoring	Annual	Annual	
OW-01	QAL	Plume Monitoring	Annual	Annual	
OW-02	QAL	Plume Monitoring	Annual	Annual	
P-02	QAL	Plume Monitoring	Annual	Annual	
P-03	QAL	Plume Monitoring	Annual	Annual	
P-05	QAL	Plume Monitoring	Annual	Annual	
MW-11	QAL	Plume Monitoring	Biennial	Biennial	Background well
MW-12	QAL	Plume Monitoring	Biennial	Biennial	Background well
MW-96	MEF	Plume Monitoring	Biennial	Biennial	Background well
MW-97	MEF	Plume Monitoring	Biennial	Biennial	Background well
OW-08	QAL	Plume Monitoring	Biennial	Biennial	Background well
MW-01	MEF	Vertical Distribution	Biennial	Biennial	
MW-03	MEF	Vertical Distribution	Biennial	Biennial	
MW-06	QAL	Vertical Distribution	Biennial	Biennial	
MW-08	QAL	Vertical Distribution	Biennial	Biennial	
MW-23	QAL	Vertical Distribution	Biennial	Biennial	
MW-31	Granite	Vertical Distribution	Biennial	Biennial	
MW-32	Granite	Vertical Distribution	Biennial	Biennial	
MW-43	QAL	Vertical Distribution	Biennial	Biennial	
MW-48	QAL	Vertical Distribution	Biennial	Biennial	
MW-55	QAL	Vertical Distribution	Biennial	Biennial	
MW-56A	MEF	Vertical Distribution	Biennial	Biennial	
MW-56B	QAL	Vertical Distribution	Biennial	Biennial	
MW-59A	MEF	Vertical Distribution	Biennial	Biennial	
MW-59D	MEF	Vertical Distribution	Biennial	Biennial	
MW-61A	MEF	Vertical Distribution	Biennial	Biennial	
MW-61C	MEF	Vertical Distribution	Biennial	Biennial	Limited magnitude increasing trend (TCE, 1,1-DCE, 1,4-dioxane) (1)
MW-71A	Granite	Vertical Distribution	Biennial	Biennial	
MW-72A	Granite	Vertical Distribution	Biennial	Biennial	
MW-72C	QAL	Vertical Distribution	Biennial	Biennial	
MW-73A	Granite	Vertical Distribution	Biennial	Biennial	
MW-73C	QAL	Vertical Distribution	Biennial	Biennial	
MW-74A	Granite	Vertical Distribution	Biennial	Biennial	
MW-74B	Granite	Vertical Distribution	Biennial	Biennial	
MW-75A	MEF	Vertical Distribution	Biennial	Biennial	

Notes:

(1) – Limited magnitude increasing or probably increasing trend refers to the change in the magnitude of the trend being less than 20% per year with respect to the sample mean.

QAL - Quaternary alluvium.

QAL/MEF - Quaternary alluvium / Mt Eden.

MEF - Mount Eden Formation.

NA - Not available

Table 4-8 Groundwater Quality Monitoring Frequency Recommendations (continued)

Well	Formation Screened	Well Classification	Q2 2011	Q2 2012	Comments
MW-75C	QAL	Vertical Distribution	Biennial	Biennial	
MW-76A	MEF	Vertical Distribution	Semiannual	Biennial	1,4-dioxane concentrations are stable, decrease to biennial. Limited magnitude increasing trend (1,4-dioxane)
MW-76C	QAL	Vertical Distribution	Biennial	Biennial	
MW-77A	MEF	Vertical Distribution	Biennial	Biennial	
MW-78	Granite	Vertical Distribution	Biennial	Biennial	
MW-79A	MEF	Vertical Distribution	Biennial	Biennial	
MW-79C	QAL	Vertical Distribution	Biennial	Biennial	
MW-80	MEF	Vertical Distribution	Biennial	Biennial	
MW-81	MEF	Vertical Distribution	Biennial	Biennial	
MW-84A	MEF	Vertical Distribution	Biennial	Biennial	Background well
MW-84B	MEF	Vertical Distribution	Biennial	Biennial	Background well
MW-85A	MEF	Vertical Distribution	Biennial	Biennial	
MW-86A	MEF	Vertical Distribution	Biennial	Biennial	
MW-87A	MEF	Vertical Distribution	Biennial	Biennial	
MW-98A	MEF	Vertical Distribution	Biennial	Biennial	
MW-99	MEF	Vertical Distribution	Biennial	Biennial	
MW-103	QAL	New Well	NA	Quarterly	New well - sample four quarters and evaluate. Increasing trend (perchlorate)
MW-104	QAL	New Well	NA	Quarterly	New well - sample four quarters and evaluate
MW-105	QAL	New Well	NA	Quarterly	New well - sample four quarters and evaluate
MW-106	QAL	New Well	NA	Quarterly	New well - sample four quarters and evaluate
MW-107	QAL	New Well	NA	Quarterly	New well - sample four quarters and evaluate
MW-108	QAL	New Well	NA	Quarterly	New well - sample four quarters and evaluate
MW-109	QAL	New Well	NA	Quarterly	New well - sample four quarters and evaluate
MW-15	QAL	Guard Well	Semiannual	Semiannual	
MW-18	QAL	Guard Well	Semiannual	Semiannual	
MW-67	QAL	Guard Well	Semiannual	Semiannual	
MW-70	QAL	MNA Monitoring	Semiannual	Semiannual	Change in MNA monitoring schedule, F-33 - Large rocket motor washout area, Limited magnitude (probably) increasing trend (1,4-dioxane) (1)
MW-100	Granite	Guard Well	Semiannual	Semiannual	
F34-TW1	QAL	Plume Monitoring	Annual	Semiannual	Increasing trend (1,4-dioxane)
MW-60B	MEF	Plume Monitoring	Semiannual	Semiannual	Increasing trend (1,4-dioxane), (probably) increasing trend (TCE)
MW-68	QAL	Plume Monitoring	Semiannual	Semiannual	Increasing trend (perchlorate, 1,1-DCE, 1,4-dioxane)
MW-88	QAL	Plume Monitoring	Annual	Semiannual	Probably increasing trend (perchlorate)
MW-93	MEF	Plume Monitoring	Annual	Semiannual	Probably increasing trend (perchlorate)
MW-98B	MEF	Plume Monitoring	Semiannual	Semiannual	Increasing trend (TCE, 1,1-DCE)
IW-04	QAL	Remedial Well	Semiannual	Semiannual	Increasing trend (TCE, 1,1-DCE)
MW-60A	MEF	Vertical Distribution	Semiannual	Semiannual	Increasing trend (TCE, 1,1-DCE, 1,4-dioxane, perchlorate) and sample for lead biennialy
EW-01	QAL	Remedial Well	Suspend	Suspend	Suspend pending GW remedial action
EW-02	QAL	Remedial Well	Suspend	Suspend	Suspend pending GW remedial action
EW-08	MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-09	MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-10	MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-11	MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-12	MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-14	QAL/MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-15	MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-16	MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-18	MEF	Redundant	Suspend	Suspend	Redundant with EW-13, MW-24, MW-61B
EW-19	QAL	Remedial Well	Suspend	Suspend	Suspend pending GW remedial action
IW-01	QAL	Remedial Well	Suspend	Suspend	Suspend pending GW remedial action
IW-02	QAL	Remedial Well	Suspend	Suspend	Suspend pending GW remedial action
IW-03	QAL	Remedial Well	Suspend	Suspend	Suspend pending GW remedial action
IW-05	QAL	Remedial Well	Suspend	Suspend	Suspend pending GW remedial action
MW-04	QAL	Redundant	Suspend	Suspend	Redundant with MW-34
MW-10	QAL	Redundant	Suspend	Suspend	Redundant with MW-27
MW-20	QAL	Redundant	Suspend	Suspend	Redundant with location MW-28
MW-21	QAL	Redundant	Suspend	Suspend	Well Destroyed 11/2009
MW-24	MEF	Redundant	Suspend	Suspend	Well Destroyed 11/2009
MW-30	QAL	Redundant	Suspend	Suspend	Redundant with MW-23
MW-37	QAL	Plume Monitoring	Suspend	Suspend	Well Destroyed 11/2009, replaced with MW-102
MW-38	MEF	Redundant	Suspend	Suspend	Redundant with OW-08, outside Plume Monitoring Area
MW-39	QAL	Redundant	Suspend	Suspend	Redundant with MW-56C
MW-41	MEF	Redundant	Suspend	Suspend	Redundant with MW-62A
MW-42	QAL	Plume Monitoring	Suspend	Suspend	Well Destroyed 11/2009, replaced with MW-101
MW-44	QAL	Redundant	Suspend	Suspend	Redundant with MW-66
MW-50	QAL	Redundant	Suspend	Suspend	Redundant with MW-53
MW-51	QAL	Redundant	Suspend	Suspend	Redundant with MW-58D
MW-52	QAL	Redundant	Suspend	Suspend	Redundant with MW-49
MW-56D	QAL	Redundant	Suspend	Suspend	Redundant with MW-56B and MW-56C
MW-57A	QAL	Redundant	Suspend	Suspend	Redundant with MW-56C
MW-57B	QAL	Redundant	Suspend	Suspend	Redundant with MW-56B
MW-57C	QAL	Redundant	Suspend	Suspend	Redundant with MW-56B
MW-57D	QAL	Redundant	Suspend	Suspend	Redundant with MW-56C
MW-58A	QAL	Redundant	Suspend	Suspend	Redundant with MW-56B and MW-56D
MW-58B	QAL	Redundant	Suspend	Suspend	Redundant with MW-56C
MW-58C	QAL	Redundant	Suspend	Suspend	Redundant with MW-56C
MW-58D	QAL	Redundant	Suspend	Suspend	Redundant with MW-56D
MW-59C	MEF	Redundant	Suspend	Suspend	Redundant with MW-59A
MW-61D	MEF	Redundant	Suspend	Suspend	Redundant, suspend pending GW remedial action
MW-62B	QAL	Redundant	Suspend	Suspend	Redundant with MW-62A
MW-63	QAL	Redundant	Suspend	Suspend	Redundant with MW-28
MW-64	QAL	Remedial Monitoring	Suspend	Suspend	Redundant, suspend pending GW remedial action
MW-65	QAL	Remedial Monitoring	Suspend	Suspend	Redundant, suspend pending GW remedial action
OW-03	QAL	Redundant	Suspend	Suspend	Redundant with MW-56A
OW-05	QAL	Redundant	Suspend	Suspend	Redundant with MW-12
OW-06	QAL	Redundant	Suspend	Suspend	Redundant with MW-08
OW-07	QAL	Redundant	Suspend	Suspend	Redundant with MW-08
P-04	QAL	Redundant	Suspend	Suspend	Redundant with MW-12
P-06D	QAL	Redundant	Suspend	Suspend	Suspend pending GW remedial action
P-06S	QAL	Redundant	Suspend	Suspend	Suspend pending GW remedial action

Notes:

(1) – Limited magnitude increasing or probably increasing trend refers to the change in the magnitude of the trend being less than 20% per year with respect to the sample mean.

QAL - Quaternary alluvium.

QAL/MEF - Quaternary alluvium / Mt Eden.

MEF - Mount Eden Formation.

NA - Not available

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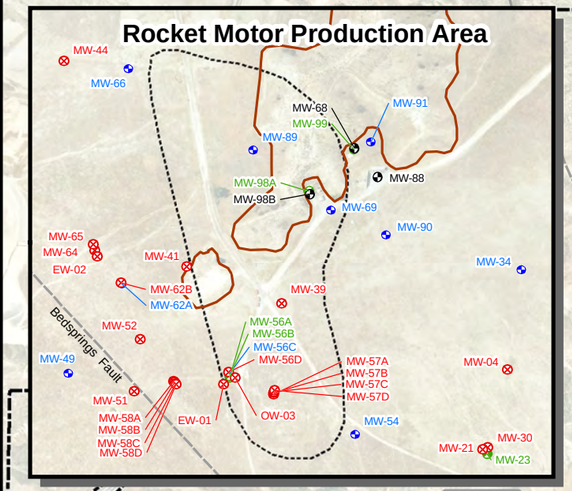

Adapted from: March 2007 aerial photograph.

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

LEGEND

- Surface Water Sample Location (sampled at a minimum semiannually)

Well Sampling Frequency

- Quarterly
- Semiannual
- Annual
- Biennial
- Redundant or Replaced (not sampled)
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Bedrock/Alluvium Surface Contact (Dashed where inferred)
- Historical Operational Area Boundary
- Potrero Canyon Unit Property Boundary (Lockheed Martin Beaumont Site 1)

Notes: Beaumont Site 1 property boundary is approximate.

Potrero Canyon Unit
(Lockheed Martin Beaumont Site 1)

Figure 4-1
Proposed 2011 Water Quality Monitoring Locations and Sampling Frequency

TETRA TECH

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