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April 15, 2014

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Subject: **2013 Annual Progress Report - Regional Groundwater Remediation Program**
Middlefield-Ellis-Whisman ("MEW") Area
Mountain View, California

Dear Ms. Reddy:

Attached please find the 2013 Annual Progress Report for the Regional Groundwater Remediation Program (RGRP), prepared by Geosyntec Consultants on behalf of Schlumberger Technology Corporation, the Project Coordinator for the MEW Area RGRP.

This annual progress report is being submitted in accordance with U.S. Environmental Protection Agency (EPA) Section XV of the Administrative Order for Remedial Design and Remedial Action (106 Order).

If you have any questions regarding this 2013 Annual Progress Report, please feel free to call me.

Very truly yours,

Virgilio Cocianni
Remediation Manager

Attachment

CC: MEW Distribution List

Prepared for

Schlumberger Technology Corporation
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2013 ANNUAL PROGRESS REPORT VOLUME 1: TEXT, TABLES, FIGURES

MIDDLEFIELD-ELLIS-WHISMAN REGIONAL GROUNDWATER REMEDIATION PROGRAM

MOUNTAIN VIEW, CALIFORNIA

Prepared by

Geosyntec consultants

engineers | scientists | innovators

1111 Broadway, 6th Floor
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Project Number WR1128B

15 April 2014

2013 Annual Progress Report
Middlefield-Ellis-Whisman
Regional Groundwater Remediation Program
Mountain View, California

Prepared by

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Project Number: WR1128B
15 April 2014

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ACRONYMS AND ABBREVIATIONS

106 Order	Section 106 Unilateral Administrative Order for Remedial Design and Remedial Action
BAAQMD	Bay Area Air Quality Management District
bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
Consent Decree	Section XI of the Consent Decree entered in Action No. 20275 (N.D. Cal.)
EPA	United States Environmental Protection Agency
Fairchild	Fairchild Semiconductor Corp.
FFA	Federal Facilities Agreement
former Building 18	644 National Avenue
ft/day	feet per day
ft^2	feet squared
GAC	granular activated carbon
Geosyntec	Geosyntec Consultants
GETS	groundwater extraction and treatment system
GSLIB	Geostatistical Software Library
GWFS	groundwater feasibility study
ISCO	in situ chemical oxidation
µg/L	micrograms per Liter
K	hydraulic conductivity
MEW	Middlefield-Ellis-Whisman
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NEC	NEC Electronics Inc.
North of 101	RGRP Treatment System at Corner of Wescoat Road and McCord Avenue, Moffett Field
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
O&M	operation and maintenance

PCE	tetrachloroethene
PDB	passive diffusion bag
PLC	programmable logic control
PRPs	potentially responsible parties
QA/QC	quality analysis and quality control
RGRP	Regional Groundwater Remediation Program
ROD	Record of Decision
RRWs	regional recovery wells
SCADA	supervisory control and data acquisition
SCVWD	Santa Clara Valley Water District
SCRWs	source control recovery wells
SMI	SMI Holding LLC
South of 101	RGRP Treatment System at 644 National Avenue
SUMCO	Sumitomo Mitsubishi Silicon America
TCE	trichloroethene
Vishay	Vishay General Semiconductor
VOCs	volatile organic compounds
VPC	vapor phase carbon
VC	vinyl chloride
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region
WDRs	Waste Discharge Requirements
Weiss	Weiss Associates

1. INTRODUCTION

This 2013 Annual Progress Report was prepared at the direction of Schlumberger Technology Corporation, the Project Coordinator for the Middlefield-Ellis-Whisman (MEW) Regional Groundwater Remediation Program (RGRP). The progress report was prepared by Geosyntec Consultants (Geosyntec) with assistance from Weiss Associates (Weiss).

This progress report, summarizing MEW RGRP activities from 1 January through 31 December 2013, is being submitted to United States Environmental Protection Agency (EPA) in accordance with:

- Section XV of the 1990 Administrative Order for Remedial Design and Remedial Action issued by EPA (106 Order);
- Section XI of the Consent Decree entered in Action No. 20275 (N.D. Cal.) in 1992 (Consent Decree); and
- EPA correspondence prescribing annual report contents (EPA, 2005,2011a, 2014).

The 106 Order and Consent Decree responded to the presence of volatile organic compounds (VOCs) in soil and groundwater.

1.1 Site Background

The MEW study area (Site), located in Mountain View, California (Figure 1), encompasses an approximately one square mile area, bisected by Interstate Highway 101 (Figure 2). South of Highway 101, the MEW Study Area includes three National Priority List (NPL) sites (Fairchild Semiconductor Corp. - Mountain View Superfund Site; Intel Corp. - Mountain View Superfund Site; and, Raytheon Company Superfund Site) and several non-Superfund sites within an approximately 100-acre area bounded by Middlefield Road on the south, Ellis Street on the east, Whisman Road on the west, and Highway 101 on the north. North of Highway 101, the MEW study area extends across portions of Former Naval Air Station (NAS) Moffett Field and the National Aeronautics and Space Administration (NASA) Ames Research Center and includes the Moffett Field Superfund Site.

Remedial actions for the MEW study area are specified in a 1989 Record of Decision (ROD) issued by the EPA and two subsequent Explanations of Significant Difference (EPA, 1989, 1990, 1996). The primary constituents of concern at the Site are trichloroethene (TCE) and its reductive dechlorination breakdown products, cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC).

As specified in the ROD, groundwater cleanup included initial actions (completed) and the current long-term remedial phase (EPA, 1989).[1]

The VOCs addressed in the MEW ROD are assigned to both facility-specific and regional responsibilities. Each of the MEW Companies is responsible for investigation, remediation, and source control for VOCs in soil and groundwater at their facility-specific properties south of Highway 101. The MEW Companies are jointly responsible, through the RGRP, for remediation of VOCs in groundwater that has bypassed the source control areas and is not being captured by the facility-specific source control systems or that cannot be attributed to a single source (EPA, 2004).

The MEW Companies are:

- **106 Order**: Fairchild Semiconductor Corporation, Schlumberger Technology Corporation, Renesas Electronics Corporation (Renesas, formerly NEC Electronics Inc.), Sumitomo Mitsubishi Silicon America (SUMCO, formerly Siltec Corporation), SMI Holding LLC (SMI), Vishay General Semiconductor (Vishay, formerly General Instrument Corporation), National Semiconductor Corporation, Tracor X-Ray, and Union Carbide (now known as Dow Chemical Company). National Semiconductor Corporation, Tracor X-Ray, and Union Carbide are not involved with the active investigation and cleanup of the MEW Site (EPA, 2004).
- **Consent Decree**: Raytheon Company, Intel Corporation.

Responsibility for VOCs in groundwater north of Highway 101 is allocated between the MEW RGRP, Navy, and NASA. Navy is regulated by EPA under a Federal Facilities Agreement (FFA).

[1] The soil cleanup goals have been met at all of the MEW Companies' properties (EPA, 2004).

1.2 Local Hydrology

The MEW study area is located in the Santa Clara Valley Groundwater Sub-basin, the northernmost of three interconnected groundwater basins within Santa Clara County (SCVWD, 2001). The groundwater flow direction is northerly, toward San Francisco Bay, and generally sub-parallel to the ground slope.

The MEW study area lies within the northern portion of the sub-basin, where the hydrostratigraphy is divided into upper and lower water-bearing zones, which are separated by an extensive regional aquitard (SCVWD, 1989).

The upper water-bearing zone is subdivided into two water-bearing zones: the A Zone and the B Zone. The B Zone is further subdivided into three zones (B1, B2, and B3 Zones). The lower water-bearing zone occurs below a depth of about 200 feet below ground surface (bgs). The lower water bearing zone is subdivided into the C Zone (which extends to about 240 feet bgs) and the Deep Zone. The aquitard separating the upper and lower water-bearing zones is represented as the B/C Aquitard and is the major confining layer beneath the Site.

Given the nearly two-mile length of the study area and the bay-margin geologic setting, the depth intervals of the hydrostratigraphic layers vary considerably from south to north. The following table provides a general range of depth intervals for the hydrostratigraphic layers; however, these ranges do not represent the depth intervals at any specific location within the study area.

Water-Bearing Zones	Approximate Depth Interval Below Ground Surface[1]
A/A1[2] Zone	2-60 feet
B1/A2[3] Zone	25-85 feet
B2 Zone	55-125 feet
B3 Zone	95-160 feet
C Zone	145 - 230 feet
Deep Zone	>225 feet

[1] The depth intervals of the water-bearing zones used to categorize wells is variable across the MEW Site.
[2] Navy and NASA refer to this zone as A1 north of Highway 101.
[3] Navy and NASA refer to this zone as A2 north of Highway 101.

The following table summarizes the estimated ranges of hydraulic conductivity (K), horizontal gradient, saturated thickness, and transmissivity for the A and B Zones.

Water-Bearing Zone	Estimated Hydraulic Conductivity (ft/day)		Approximate Horizontal Gradient	Saturated Thickness (ft)	Transmissivity (ft^2/day)	
	Low	High			Low	High
A-zone	6	480	0.004	15	44	4,400
B1-zone	20	260	0.003	25	150	2,600
B2-zone	0.4	5	0.002 to 0.005	35	2	230
B3-zone	0.5	5	0.001 to 0.002	40	5	130

Regionally, groundwater flow is generally toward the north in the A and B Zones under non-pumping conditions. Groundwater flow in the C Zone and Deep Zone is predominantly to the north-northwest. In general, the horizontal gradients are steeper in the southern portion of the Site and flatten to the north as the groundwater approaches San Francisco Bay. Because the MEW study area is near the northern discharge side of the groundwater basin, vertical gradients are generally upward.

Groundwater hydraulic gradients are locally modified by the operation of MEW groundwater recovery wells (both source control and regional recovery wells) and slurry walls, resulting in steeper gradients in the vicinity of pumping wells and overall gradients towards the central core of the MEW study area. Hydraulic capture resulting from the recovery wells is described in Section 2.4.

1.3 Description of Remedy and Summary of Remedial Action

As specified in the ROD, the current RGRP remedy consists of groundwater extraction and treatment. The RGRP groundwater extraction and treatment systems are designed to control and remove VOCs migrating beyond the source control recovery wells (SCRWs) that are operated by the potentially responsible parties (PRPs).

The RGRP remedy is designed to protect local water supplies and to remediate or control groundwater that contains elevated concentrations of chemicals, including control of discharge of such groundwater to surface water.[2,3] Groundwater cleanup

[2] The objectives of the groundwater remedy design are described in the ROD and the Feasibility Study (Canonie, 1988).

goals are 5 micrograms per liter (µg/L) for TCE in shallow groundwater (A and B Zones) and 0.8 µg/L for TCE in deep groundwater (C and Deep Zones).[4]

The RGRP extraction systems are summarized in Table 1. The regional plume north of Highway 101 is addressed by 15 regional recovery wells (RRWs) that convey groundwater to the North of 101 Treatment System located on the corner of Wescoat Road and McCord Avenue, Moffett Field. The regional plume south of Highway 101 is addressed by ten RRWs that convey groundwater to the South of 101 Treatment System, located at 331 Fairchild Drive, and five RRWs that convey groundwater to Fairchild facility-specific systems.

Effectiveness of the remedy is monitored using a network of RGRP monitoring wells (Tables 2a and 2b) that are currently monitored according to the schedule provided in Table 3. This regional information compliments the facility-specific chemical data and capture zone analyses provided in Annual Progress Reports submitted to the EPA by the individual MEW PRPs, NASA, and the Navy.

The groundwater remedy is operated according to the Operation and Maintenance (O&M) manuals for each system (Locus, 1999, 2000). Treated groundwater is discharged to Stevens Creek in compliance with National Pollutant Discharge Elimination System (NPDES) Permit CAG912003, Order No. R2-2009-0059. As discussed in Section 3.1, the North of 101 groundwater treatment system has a bypass valve that allows treated groundwater to be diverted for reuse by NASA when needed.

1.4 Summary of 2013 Site Activities and Deliverables

Ongoing site activities include:

- Groundwater monitoring and reporting;
- O&M of treatment systems;
- Sampling of treatment systems per the NPDES permit;

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[3] The ROD also contains a design objective for vadose soil that has been achieved and is not applicable to the RGRP.

[4] Groundwater cleanup goals are presented in the ROD.

- Assessment of remedial progress;
- Planning for future remedial activities; and
- Optimization of the pump and treat remedies as directed by EPA (Section 6).

Specific site activities and deliverables by month in 2013 are listed below.

February 2013

- 13 February – Submitted to the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) the Fourth Quarter and Annual 2012 Self-Monitoring Report under NPDES Discharge Permit No. CAG912003.

March 2013

- 21 March – Semi-annual groundwater elevation measurements in RGRP groundwater monitoring and extraction wells.
- 27 March – Submitted the Grab-Groundwater Assessment and Proposed Well Installations Report to EPA.

April 2013

- 12 April – Submitted the Work Plan for Remedy Design Data Collection for the the CPT-15 and CPT-21 areas along Evandale Avenue to EPA.
- 15 April – Submitted the 2012 Annual Progress Report for the RGRP to EPA.
- 17 April and 18 April – Implemented the Work Plan for Remedy Design Data Collection.

May 2013

- 3 May – Submitted to the Water Board the First Quarter 2013 Self-Monitoring Report under NPDES Discharge Permit No. CAG912003.
- 24 May through 18 June – Installation of a new section of discharge pipeline at the North of 101 treatment system as part of Moffett Field redevelopment activities, connection of the North of 101 treatment system to the new section of discharge pipeline, and abandonment in place of the section of discharge pipeline that was replaced.

- 30 May– Semi-annual sampling of monitoring well DW3-219

August 2013

- 2 August – Submitted to the Water Board the Second Quarter 2013 Self-Monitoring Report under NPDES Discharge Permit No. CAG912003.

- 16 August – Submitted the Draft Pilot Study Design and Implementation Work Plan for the in situ chemical oxidation (ISCO) Pilot Study at the CPT-15 and CPT-21 areas along Evandale Avenue to EPA.

September 2013

- 9 September through 30 October – Annual monitoring of RGRP groundwater monitoring and extraction wells.
- 12 September – Submitted the Final Grab Groundwater Assessment and Proposed Well Installations Report to EPA.
- 19 September – Semi-annual groundwater elevation measurements in RGRP groundwater monitoring and extraction wells.

November 2013

- 6 November – Submitted to the Water Board the Third Quarter 2013 Self-Monitoring Report under NPDES Discharge Permit No. CAG912003.
- 15 November – Submitted the Pilot Study Design and Implementation Work Plan for the ISCO Pilot Study at the CPT-15 and CPT-21 areas along Evandale Avenue to EPA.

The 2013 Annual Report Remedy Performance Checklist is provided in Appendix A.

2. GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

2.1 System Description

Two groundwater extraction and treatment systems (GETS) are associated with the RGRP. The RGRP GETS are referred to as the North of 101 and South of 101 treatment systems. Treated groundwater from the RGRP GETS is discharged under the requirements of Order No. R2-2009-0059, NPDES Permit No. CAG912003 (VOC General Permit). These systems receive groundwater extracted from 25 RRWs. There are five additional operational RRWs (and six RRWs that are currently not operating) treated by Fairchild GETS. Table 1 lists the RRWs and their associated groundwater zones and GETS.

2.1.1 North of 101

The North of 101 GETS is located near the corner of Wescoat Road and McCord Avenue at Moffett Field and is shown in Figure 3. The North of 101 GETS includes the following components:

- 15 RRWs;
- Conveyance piping;
- Sediment filters and housing (2);
- Anti-scaling compound storage and metering system;
- Two shallow-tray air-strippers in series;
- pH adjustment using sulfuric acid between air-stripper units;
- A knockout chamber and a duct heater to reduce the water content of the air stripper off-gas stream;
- Two 4,000-pound vapor-phase granular activated carbon (GAC) vessels in series to remove VOC from the air stripper off-gas; and
- Electrical distribution and control panels including:
    - A programmable logic controller (PLC);
    - Auto-dialer; and
    - A supervisory control and data acquisition (SCADA) computer.

2.1.2 South of 101

The South of 101 GETS is located at 331 Fairchild Drive and is shown in Figure 3. The South of 101 GETS includes the following components:

- 10 RRWs;
- Conveyance piping;
- Sediment filters and housing (4);
- Three 10,000-pound liquid-phase GAC vessels in series; and
- Electrical distribution and control panels including:
    - A PLC;
    - Auto-dialer; and
    - SCADA computer.

2.1.2.1 RGRP Wells Treated by Fairchild Treatment Systems

There are five operating RRWs connected to three of the Fairchild GETS (Table 1).[5] Groundwater is treated using liquid-phase GAC at the Fairchild GETS (Geosyntec, 2013a, b).

2.2 Operation and Maintenance

The North of 101 GETS removed 487 pounds of VOCs from 57.1 million gallons of groundwater during 2013. The South of 101 GETS removed 457 pounds of VOCs from 32.5 million gallons of groundwater in 2013. Table 4 summarizes the volume of groundwater treated, the influent total VOC concentrations, and the mass of VOC treated by each RGRP GETS per month during 2013. Figures 4 and 5 illustrate the cumulative volume of groundwater and VOC mass removal for each of the GETS systems since 1998. In total, approximately 21,500 pounds of VOCs in 1.6 billion gallons of groundwater have been treated by the RGRP GETS.

[5] Deep RRWs were last operated in 2002 (DW3-505R) and 2006 (DW3-219, DW3-244, DW3-334, DW3-364). B3-zone RRW 65B3 was shut down in September 2012 with approval from EPA (EPA, 2012).

Table 5 summarizes the VOC sampling results from the GETS NPDES compliance samples. TCE and cis-1, 2-DCE are detected at higher concentrations in GETS influent samples as compared to other detected VOCs. In 2013, TCE concentrations ranged from 670 to 1,300 µg/L in the North of 101 influent samples and from 880 to 2,000 µg/L in the South of 101 influent samples. Cis-1,2-DCE concentrations ranged from 190 to 380 µg/L in the North of 101 influent samples and from 46 to 90 µg/L in the South of 101 influent samples.

Table 6 presents target flow rates and 2013 average annual flow rates for RRWs associated with the North of 101 and South of 101 GETS. Target flow rates were established in August 2007 based on the 2006 RGRP Annual Progress Report (Weiss, 2006). Since that time, target rates for four RRWs (REG-7B(1), REG-10A, REG-3A, and REG-4A) have been adjusted.[6] Monthly average extraction rates in gallons per minute (gpm) for each RRW treated by an RGRP GETS are provided in Table 7. These rates were calculated by taking the volume of groundwater extracted by an RRW (gallons as reported by individual well totalizers) and dividing by the time (minutes) between meter readings.

In 2013, weekly average flow rates from each RRW were calculated and compared to the target rate for that RRW. Adjustments to the flow control valves were made at an RRW if the calculated average rate was less than the target rate. Table 6 shows that average flow rates from several of the North 101 recovery wells were below their target in 2013. Flow rates were below target due primarily to limitations in formation yield or well capacity. Target flow rates for the wells will be reevaluated as part of system optimization activities in 2014.

Non-routine GETS operation and maintenance activities in 2013 are summarized in Tables 8a and 8b. Notifications to the EPA and Water Board are required for extraction well and system down-time events as follows:

- EPA: The owner and/or operator of the RGRP/Fairchild treatment system will make a best effort to orally notify EPA within 24 hours of a RRW or system shutdown that occurs for more than 72 consecutive hours (N101 and S101 O&M Manuals).

[6] See Table 6 notes.

- Water Board: If the treatment system is shut down for more than 72 consecutive hours after the start-up period (maintenance, repair, violations, etc.) the reason(s) for shut down, proposed corrective action(s), and estimated start-up date shall be orally reported to the Water Board within five days of shut down and a written submission shall also be provided within 15 days of shut down (Order No.R2-2009-0059, VOC General NPDES Permit No. CAG912003, expires September 2014).

As demonstrated by GETS downtime events listed in Tables 8a and 8b, EPA was notified of one well shut down event during 2013, due to a low flow alert at well REG-4A on 17 June. No other notifications were required. From 1 January through 31 December, 2013, North of 101 ran 96.2% of the time,[7] and South of 101 ran 97.8% of the time. [8]

In addition, the following O&M compliance activities were conducted during this reporting period:

- Submitted monthly statements of groundwater volumes extracted from North of 101 and South of 101 RRWs to the Santa Clara Valley Water District (SCVWD);
- Disposed of spent carbon from the North of 101 and South of 101 systems as hazardous waste. The spent carbon was regenerated at the Siemens Water Technologies (now Evoqua Water Technologies) facility in Parker, Arizona. Disposed of spent sediment filters from the North of 101 system as non-hazardous waste at US Ecology in Beatty, Nevada

2.3 Groundwater Level Monitoring

Groundwater levels are measured semi-annually (Table 2) in approximately 900 wells for the purpose of monitoring the hydraulic performance of RGRP and facility-specific groundwater remedies in the MEW study area. Some MEW companies also measure site-specific groundwater levels quarterly in March, May, September, and November as part of slurry wall evaluation activities.

[7] Of the N101 downtime, approximately 36.2% was due to planned system shutdowns.

[8] Of the S101 downtime, approximately 56.3% was due to planned system shutdowns.

Table 9 summarizes the construction details for RGRP monitoring and extraction wells included in the water level monitoring program. Groundwater levels were measured on 21 March and 19 September 2013. Water levels measured in RGRP wells during 2013 are included in Appendix J.

Hydrographs of selected monitoring wells are presented in Figures 6 and 7. Figure 6 includes A Zone hydrographs from wells along a north-south axis through the MEW regional study area. These hydrographs indicate that the magnitude of seasonal and long-term water level fluctuations in the A Zone is very small relative to water level variations across the study area. Figure 7 presents hydrographs from a series of well clusters wherein adjacent wells are screened in different hydrostratigraphic zones. These hydrographs provide a measure of vertical hydraulic gradients between zones.

The measured groundwater elevations were used to construct groundwater elevation contour maps of the five monitored water-bearing zones (A/A1, B1/A2, B2, B3 and C/Deep) for the March and September monitoring periods. Groundwater elevations from monitoring wells and from piezometers installed in the filter pack of extraction wells were used in contouring. The groundwater elevation contour maps were created using KT3D_H2O version 3.0, a geostatistical software package (Tonkin and Larson, 2002).[9] As opposed to most interpolation programs that require a choice between linear and logarithmic kriging, this version of KT3D allows for linear-log ordinary kriging using linear kriging in areas distant from recovery wells and point logarithmic kriging in the vicinity of recovery wells. The measured flow rates from the extraction wells were input to the program in order to allow for a variable radial distance of transition from linear to logarithmic kriging. A spherical variogram was specified with grid spacing of 30 feet.

Ten groundwater elevation contour maps are presented in Figures 8 through 17 (the capture zones included on the figures are discussed below in Section 2.4). Appendix B includes the ten contour maps, presented at a larger scale with posted groundwater elevation data and without the estimated capture zones. Groundwater elevation contours and captures zones from March and September show that while there is minor

[9] The KT3D software package was developed as part of the Geostatistical Software Library (GSLIB) at Stanford University and was subsequently modified by S.S. Papadopulos and Associates, Inc. to include well drift (Deutsch and Journal, 1998, Tonkin and Larson, 2002).

seasonal fluctuation in groundwater elevations, there is no significant seasonal change in groundwater flow or capture across the study area.

2.4 Hydraulic Control and Capture Zone Analysis

The water level monitoring described in Section 2.3 provides the basis for evaluating the hydraulic performance of the RGRP and facility-specific groundwater remedies. The hydraulic capture area achieved by one or more recovery wells cannot be directly measured, but rather requires analysis and interpretation of the measured water levels and extraction rates. The following discussion summarizes the basis for estimating the capture zones.

2.4.1 Methodology

In evaluating groundwater capture for RGRP wells, consideration was given to the EPA guidance document *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems* (EPA, 2008). The following steps were used to perform the hydraulic evaluation of the groundwater remedy.

- The Site conceptual model, remedy objectives, slurry wall locations, and target capture zones were available from previous studies and prior annual monitoring reports;[10]
- Water level measurements from March and September 2013 were interpolated to generate groundwater elevation contour maps as described in Section 2.3;
- Pumping rates from RRWs and SCRWs were compiled from available sources;
- Hydraulic capture from each RRW and SCRW was estimated based on graphical flow-net analysis of the contour maps, guided by backward particle tracking and analytical flow solutions (Section 2.4.2);
- A water balance calculation was used to check the total width of capture estimated from the graphical analysis;

[10] For example, EPA Second 5-Year Review (EPA, 2009) and 2012 Annual Progress Report (Geosyntec, 2013b).

- Water level data from well clusters were analyzed for the distribution of vertical gradients; and
- VOC time-series trends in monitoring wells were reviewed for confirming evidence of hydraulic capture (Section 2.5).

2.4.2 Estimated Extraction Well Capture

Estimated capture zones for the SCRWs and RRWs in March and September 2013 are shown in Figures 8 through 17. The capture zones were estimated by graphical flow-net analysis, using the groundwater elevation contour maps (Section 2.3) and individual extraction well flow rates.[11] The graphical analysis was guided by backward particle tracking using TransientTracker in KT3D_H20 and calculated distances to the stagnation point and capture zone width based on the analytical solution of Javandel and Tsang (1986). The KT3D_H20 particle tracking method and analytical calculations assume homogeneous, two-dimensional groundwater flow with a single regional estimated value of transmissivity. These methods were used as supporting lines of evidence to evaluate capture together with the groundwater elevation contour maps. The final capture zones as presented in Figures 8 through 17 are based on professional judgment in consideration of the above analyses, known Site conditions, and experience with similar sites.

2.4.3 Capture Width Based on Combined Flow Rate Analysis

The capture zone analysis described in 2.4.2 above was developed on a well-by-well basis. However, the net result of the combined capture zones from all RRWs is an area of hydraulic capture significantly wider than the distribution of VOCs in groundwater. An independent check of the capture zones presented in Figures 8 through 17 was developed by using the combined 2013 groundwater extraction rates for all RRWs and SCRWs to estimate the total capture width in each zone (A, B1, and B2). The estimated capture widths were then compared to the distribution of TCE in groundwater (Section 2.5) measured in map view for each zone. If the estimated width of capture is greater

[11] Capture zones are estimated based on actual flow rates reported for each SCRW and calculated for each RRW during March and September 2013. Target flow rates (Table 6) are not used for capture zone analysis.

than the trans-gradient width of the TCE distribution in groundwater, then hydraulic containment of the plume is indicated.

The calculations of capture width for each zone based on the total extraction rate, regional hydraulic gradient, hydraulic conductivity, and zone thickness are shown in Table 10.

The results indicate that the predicted capture width based on the total extraction rate is greater than the measured transgradient width of TCE in groundwater, thereby providing an additional line of evidence that hydraulic containment is achieved.

2.4.4 Vertical Gradients

Hydrographs for selected Site wells showing vertical gradients are shown in Figure 7. The vertical gradients depicted in the hydrographs are summarized as follows.

- South of Highway 101 and north of the Raytheon Slurry wall: the vertical gradients are upward between all zones (Graph 1 on Figure 7);
- South of Highway 101 and east of the Fairchild Building 1-4 Slurry wall: the vertical gradients are downward between the A and B1 Zones and upward between the B1 and B2 Zones (Graph 2 on Figure 7);
- North of Highway 101 (approximately 1,500 feet): the vertical gradients are variable between the A, B1 and B2 Zones. The hydrograph in Graph 3 of Figure 7 shows a downward gradient from A to B1 and upward gradient from B2 to B1, but a near-by well pair (85A, 50B1, and 45B2, not shown on Figure 7) shows an upward gradient from B1 to A and downward gradient from B1 to B2; and,
- North of Highway 101 (approximately 5,000 feet): the vertical gradient is neutral to upward between the A and B1 Zones (Graph 4 on Figure 7).

2.5 Groundwater Quality Monitoring

The 2013 annual groundwater quality monitoring event was conducted in September and October 2013. Groundwater samples were collected from the RGRP wells and were analyzed for VOCs in compliance with the MEW monitoring schedule and O&M manuals (Table 2). A total of 234 RGRP wells were sampled in 2013. Of these wells,

223 were sampled as part of the required monitoring schedule[12] and 11 were sampled voluntarily. Sampling included an additional six wells that were added to the RGRP in 2013 based on recommendations made in the Final Grab-Groundwater Assessment and Proposed Well Installations Report (Geosyntec, 2013c). VOC concentration versus time graphs for all the RGRP wells are included in Appendix D.

Chemical analytical results, including historical results for the last five years (2009 to 2013), are presented in Appendix E and Appendix F, and the analytical reports are included in Appendix G.

Text and tables summarizing the sampling and analysis quality assurance and quality control (QA/QC) parameters for RGRP groundwater samples collected in 2013 along with the QA/QC acceptance criteria for VOC analytical methods and results are presented in Appendix H.

2.5.1 Isoconcentration Contour Maps

TCE, cis-1,2-DCE, VC, and tetrachloroethene (PCE) isoconcentration contour maps were created for the 2013 annual sampling event for the A Zone, B1 Zone, B2 Zone, B3 Zone, and C Zone and are presented in Appendix C. The TCE maps for the five zones are also presented at a smaller scale without posted data in Figures 18 through 22. The 2013 contour maps were based on the previous 2012 isoconcentration contour maps (Geosyntec, 2013c) with contours modified as needed to reflect decreases or increases in concentrations from 2012 to 2013. In addition to data from the annual sampling event, VOC concentrations from grab-groundwater samples collected to address issues identified in the Second Five-Year Review Report for MEW (Section 3.4; Geosyntec, 2013b), data collected as part of the design investigation scope of work for the in situ chemical oxidation (ISCO) pilot study for the CPT-15 and CPT-21 Areas along Evandale Avenue (Section 3.5; Geosyntec, 2013d), data collected as part of the Building 9 Pilot Study Data Collection field work (detailed further in the Building 1-4,9,18 Annual Progress Report; Geosyntec, 2014a), and data collected as part of the 350 Ellis Street optimization work (Haley & Aldrich, 2014) were included in the isoconcentration contouring. Further information on data collected in these areas is provided in the Grab-Groundwater Assessment and Proposed Well Installations

[12] Required well R24A was not sampled in 2013 because the well was obstructed.

(Geosyntec, 2013a), the Pilot Study Design and Implementation Work Plan for the CPT-15 and CPT-21 Areas (Geosyntec, 2013d), a draft report summarizing the pilot study data collection findings at 401 National Avenue that was submitted to EPA on 12 December 2013 (Geosyntec, 2013e), and the Supplemental Investigation Report for 350 Ellis Street submitted to EPA on 2 April 2014 (Haley & Aldrich, 2014).

2.5.2 Other Samples Collected This Reporting Period

DW3-219 was sampled semi-annually in 2013 (May and October) because TCE concentrations in this well have fluctuated near the cleanup goal of 0.8 µg/L for TCE in deep groundwater. TCE concentrations in DW3-219 in 2013 were 0.72 µg/L in both May and October.

Seven wells are sampled annually for selected metals per the schedules in the O&M manuals for the RGRP: 22A and 10B2 (arsenic), 42A (antimony, cadmium), 54A (cadmium), SIL12A (antimony), and RW-1(B1) and RW-2(B1) (lead). Current and historical results are provided in Appendix E.

2.5.3 Remedy Performance

In conjunction with the hydraulic analysis described in Section 2.4, the VOC monitoring data provides an additional line of evidence for assessing remedy performance.

In the 2013 annual monitoring event, 99% of the RGRP wells sampled had TCE concentrations that were within or below historical ranges.[13]

VOCs versus time graphs are presented in Appendix D. Based on Mann-Kendall statistical analysis the TCE concentrations are decreasing, stable, or have no trend in 95% of the RGRP wells.[14] Approximately 38% of the RGRP wells display decreasing TCE concentration trends and 57% show no statistical trend or are stable. Twenty-seven

[13] In 2013, RGRP wells 79B1, 173A, W89-13B1-R, and R13B1 had TCE concentrations of 14, 50, 13, and 7.5 µg/L, respectively, exceeding the TCE concentrations historically observed at those wells.

[14] A Mann-Kendall statistical analysis was performed on all RGRP wells using the TCE concentration data from 2004 to 2013 to evaluate the concentration trends.

of the thirty RRWs operational in 2013 display decreasing TCE concentration trends, and the TCE concentration trends at wells REG-3B(1), REG-8B1, and REG-1B2 are statistically stable.

In 2012, EPA approved the shutdown of the recovery well operating in the B3 Zone (well 65B3, Figure 26) because TCE concentrations in all B3 Zone wells were below the cleanup goal of 5 µg/L, and no other VOCs had been detected in B3 Zone monitoring wells between 2007 and 2011 (EPA, 2012). Sampling results from 2012 indicate that TCE concentrations in all B3 Zone wells remained below the cleanup goal of 5 µg/L (Figure 21).[15]

The small number of wells that have increasing TCE concentration trends include the following:

- A-Zone: W89-9, 14E14A, and II9A;
- B1-Zone: 47B1, 79B1, 103B1, NEC8B1, R13B1, and W89-13B1-R;
- B2-Zone: 36B2; and
- Deep-Zone: DW3-334.

Two of these wells (II9A and 47B1) had TCE concentrations below the cleanup goal of 5 µg/L in 2013 and the increasing trends observed in the remaining wells have not resulted from an expansion or migration of the plume.

In addition to Mann-Kendall statistical analysis, the VOC time series graphs were reviewed to evaluate whether any large increases in TCE concentrations had occurred over a shorter time period than the 10 year period considered in the statistical trend analysis (Appendix D). Two wells, W89-12 and 154B1 were identified to have concentration increases of greater than two orders of magnitude over the past two to three years. Geosyntec reviewed groundwater gradients, concentrations of VOCs in adjacent aquifers, and pumping rates of nearby wells to evaluate possible causes for these increases in TCE concentration which revealed the following:

[15] In 2013 the only other VOCs (cDCE, VC, PCE) detected in the B3 zone were cDCE and VC in monitoring well 133B3 at concentrations of 1.0 µg/L and 0.78 µg/L, respectively.

- W89-12 – Between installation of W89-12 in 1994 and 2002, TCE concentrations decreased from approximately 10,000 µg/L to 2,000 µg/L and the TCE concentration observed in 2013 (1,200 µg/L) is consistent with the downward trend observed between 1994 and 2002. However, this long term trend was interrupted by a sharp decrease in TCE concentrations between 2002 and 2012. The observed increase between 2012 and 2013 reflects a return to the previously observed long term trend. The temporary decrease in concentrations may have been due to a localized shift in groundwater gradient direction or other localized heterogeneities near W89-12.
- 154B1 – At well 154B1 the TCE concentration increased from 26 to 2,100 µg/L between 2011 and 2013. The concentration measured in 2013 is consistent with the concentrations observed prior to 2009. Well 154B1 is located in close proximity (80 feet) to, and within the capture zone of, recovery well REG-9B1 and therefore the concentrations observed in 154B1 are indicative of groundwater being captured by REG-9B1.

The VOC time series data and Mann-Kendall statistical analysis described above indicate that the combined MEW remedies are performing as designed to control or remediate VOCs in groundwater.

The spatial distribution of VOC monitoring data can also be used to assess remedy performance. Figures 23 through 25 present maps of the A Zone, B1 Zone, and B2 Zone, respectively, with the September 2013 hydraulic capture zones (Section 2.4, Figures 9, 11, and 13,) overlain on the September/October 2013 TCE isoconcentration maps. These figures show depictions of the capture for extraction wells within a given zone and do not depict the vertical capture across zones. As discussed in the 2008 optimization evaluation (Geosyntec, 2008) there is a vertical component to the groundwater flow throughout most of the Site, which often results in capture that crosses between zones. For example, forward particle tracking done as part of the optimization evaluation demonstrated that in the B2 zone north of 101 there were a significant number of particle paths that were captured by wells in the overlying zones (Geosyntec, 2008). Figures 26, 27 and 28 present the target area of the MEW RGRP groundwater remedy.[16,17]

[16] North of Highway 101 the areas of responsibility have been allocated between the MEW parties, the Navy, and NASA based on negotiated allocation agreements.

The following two wells located within the area of RGRP responsibility are shown on the TCE concentration and estimated capture zone figures as being downgradient of the hydraulic capture zones for the extraction wells located within their zone and have TCE concentrations above the cleanup goal of 5 µg/L in 2013:

- WU4-19 (B1/A2 Zone): The TCE concentration was 38 µg/L and the concentration trend is stable over the last 10 years based on Mann-Kendall analysis.
- 51B2 (B2 Zone): The TCE concentration was 29 µg/L and the concentration shows no trend over the last 10 years based on Mann-Kendall analysis (Appendix D).

Capture zones are only one line of evidence for plume containment. The stability of the TCE plume provides an additional line of evidence that containment is achieved and that capture is adequate in the area of RGRP responsibility. TCE concentrations for both wells discussed above are statistically stable, indicating that the current remedies are effective in these areas despite the apparent gap in the capture zone overlay.

2.6 Compliance

The two RGRP GETS discharge treated groundwater to the local storm drain systems under an NPDES permit (CAG912003/Order No. R2-2009-0059) effective 1 October 2009 through 30 September 2014. All field measurements and samples required under the NPDES were collected and permit compliance reports were issued quarterly to the Water Board (Weiss, 2013a,b,c,d,e,f and 2014,a,b).

Both systems operated within the effluent limits established by the NPDES permits for the entire period. Sampling results for VOC and Metals collected during 2013 for NPDES compliance are summarized in Table 5.

NPDES permit CAG912003 includes "trigger" effluent criteria that are not discharge criteria, but which require additional sampling and evaluation of GETS influent and

[17] Areas of newly identified sources on Evandale Avenue are not the responsibility of the MEW RGRP however, the RGRP has agreed to incorporate these areas into its groundwater remedy while EPA works to identify the responsible party(s).

treatment processes if exceeded. Selenium was sampled quarterly for the North of 101 system in 2013.[18]

The North of 101 system operated in compliance with Bay Area Air Quality Management District (BAAQMD) Permit to Operate #11384.

[18] Samples from the North of 101 system exceeded effluent "trigger" for selenium in November 2009. As a result, monthly effluent samples were collected in the first quarter of 2010 in accordance with Provision VI, C of permit CAG912003. Since the trigger was exceeded again during the first quarter 2010 sampling, the treatment system effluent was sampled quarterly for selenium for the remainder of 2010 and the entirety of 2011, 2012, and 2013. The general Waste Discharge Requirements (WDRs) recognize that some inorganic compounds, including selenium, are in treatment system effluent primarily due to background concentrations in the extracted groundwater. In 2007, an evaluation of selenium in the MEW study area concluded that selenium detections in the system effluent are the result of ambient background groundwater conditions. The Water Board has determined that the Bay-wide loading of inorganic compounds from VOC-cleanup discharges will cause no impairment of beneficial uses or potential exceedance of inorganic compound objectives in receiving waters.

3. OTHER ACTIVITIES

3.1 Water Reuse

The MEW ROD specifies that extracted groundwater should be reused to the maximum extent feasible. Currently, treated water from the RGRP North of 101 groundwater treatment system is designated for reuse by NASA or discharge to Stevens Creek. The North of 101 system has a bypass valve that allows treated groundwater to be diverted, further treated by microfiltration and reverse osmosis, and then reused by NASA's Unitary Wind Tunnel Cooling Tower or Arc Jet Facilities when needed.

3.2 Air/Vapor Intrusion

The EPA issued a ROD amendment on 16 August 2010 to address vapor intrusion. The MEW parties continued to work with EPA and local entities to implement the ROD amendment during 2013. In accordance with the Statement of Work for the Vapor Intrusion ROD Amendment, an annual report summarizing the status of the vapor intrusion remedy will be submitted under separate cover (Haley and Aldrich, 2014).

3.3 Settlement Survey

A survey has been conducted at the Site since 1998 to monitor soil settlement elevations. The survey was conducted annually through 2011, then biennially after 2011 with EPA approval (EPA, 2012). The purpose of these measurements is to evaluate whether survey data and associated groundwater elevation data indicate that there has been soil settlement associated with the MEW groundwater withdrawal.

Kier and Wright Civil Engineers & Surveyors, Inc. surveyed the Settlement Measurement Points (SMPs) in February 2014[19] using the City of Mountain View vertical control benchmark No. 111-46. The results of the survey are presented in Appendix I.

[19] The planned December 2013 survey was delayed until early 2014 due to contractor availability. Future settlement surveys will occur in December of odd-numbered years (e.g., December 2015) and project controls will be put in place to prevent future contractor delays.

Geosyntec reviewed the historical settlement and water level elevation data and concluded that the small amplitude ground elevation fluctuations do not appear to be related to groundwater extraction operations.

3.4 Grab Groundwater Assessment and Monitoring Well Installations

In order to address issues of hydraulic capture and stability of the VOC groundwater plume identified in the Second Five-Year Review Report for MEW (EPA, 2009) a grab-groundwater sampling program was conducted by the MEW RGRP between 26 November 2012 and 15 February 2013. A final report summarizing the findings of the grab-groundwater sampling and providing a work plan for monitoring well installations was submitted to EPA on 12 September 2013 (Geosyntec, 2013c). On 29 October 2013 EPA approved the work plan to install the new monitoring wells (EPA, 2013a). A well installation report will be submitted to EPA following completion of the monitoring well installations in 2014.

3.5 Evandale Avenue Pilot Study Design

During implementation of the grab-groundwater sampling program described in Section 3.4, two locations on Evandale Avenue (the CPT-15 and CPT-21 areas) were identified as containing elevated concentrations of VOCs, in particular TCE. Because the distribution of VOCs indicate that the elevated VOCs result from sources unrelated to VOC releases at the former facilities of the MEW Companies, the CPT-15 and CPT-21 areas are collectively referred to as the Evandale Avenue Sources. It is the position of the RGRP that it is not responsible to remediate Evandale Avenue Sources. However, the RGRP has agreed to address the Evandale Avenue Sources provided that the EPA actively investigates other potentially responsible parties.

In response to the Evandale Avenue Sources, an ISCO pilot study is being conducted beginning in 2014. Supplemental soil and grab groundwater sampling for the pilot study design was conducted on 17 and 18 April 2013 and the results were included in the Pilot Study Design and Implementation Work Plan submitted to EPA on 14 November 2013 (Geosyntec, 2013d). EPA approved the ISCO pilot study design and implementation work plan on 12 December 2013 (EPA, 2013b).

4. PROBLEMS ENCOUNTERED

Section 2.2 summarizes the non-routine O&M events that occurred at the North of 101 and South of 101 treatment systems. No other problems related to operation of the treatment systems were encountered.

5. TECHNICAL ASSESSMENT

The following assessment of the groundwater remedy performance was made based on data collected through 2013.

- The remedy is functioning as intended. An Annual Remedy Performance Checklist and summary of recommendations from the 2009 Five Year Remedy Review is included in Appendix A.
- Capture zones are adequate. Groundwater elevations, graphical flow net analysis, capture zone width calculations, vertical gradients, and VOC concentration trends provide converging lines of evidence that the Site extraction wells are achieving adequate horizontal and vertical capture of the regional plume.
- VOC concentrations are decreasing over time. Most RGRP wells have stable or decreasing TCE concentrations (Appendix D).
- Vertical gradients are consistent with historical trends.

While concentrations within the core of the TCE plume have historically decreased by an order of magnitude or more, the perimeter extent of TCE concentrations has largely stabilized and treatment system influent concentrations have generally declined.

6. OPTIMIZATION PROGRESS

In 2013 EPA requested that the MEW PRPs proceed with optimization of existing facility-specific and regional groundwater remedies. EPA's stated objective for remedy optimization is to increase the rate of VOC mass removal from the individual MEW sites.

It is expected that remedy optimization for the RGRP will include adjustments to the groundwater extraction remedy to increase the rate of VOC mass removal. In support of the planned remedy optimization, a regional groundwater flow model is being developed in 2014 for evaluation of alternative groundwater extraction scenarios.

In addition to the above optimization activities for the RGRP remedy, an ISCO pilot study is being implemented along Evandale Avenue (Section 3.5) to rapidly address the areas of elevated VOC concentration that were discovered during grab-groundwater sampling in 2012 and 2013.

7. CONCLUSIONS AND RECOMMENDATIONS

During 2013, the RGRP treatment systems removed a total of 944 pounds of VOCs from 89.7 million gallons of extracted groundwater. From 1 January through 31 December, 2013, N101 ran 96.2% of the time, and S101 ran 97.8% of the time. No significant problems related to the system operations were noted in 2013.

The technical assessment concludes that the groundwater remedy is performing as intended. Vapor intrusion is being addressed as described in Section 3.2.

Groundwater elevations, graphical flow net analysis, capture zone width calculations, and VOC concentration trends provide converging lines of evidence that the Site extraction wells are achieving adequate horizontal and vertical capture of the regional plume.

Groundwater elevation contour and capture zone maps from March and September show that there is no significant seasonal change in groundwater flow or extraction well capture across the study area. Therefore, it is recommended that the frequency of groundwater level monitoring be reduced from semi-annual to annual, coincident with the September/October sampling event.

Trend analyses indicate stable or decreasing concentrations in 95% of the RGRP wells. Changes of concentrations within the core and perimeter extent of MEW TCE Plume are generally minimal when observed on an annual basis.

8. UPCOMING WORK IN 2014 AND PLANNED FUTURE ACTIVITIES

Installation of groundwater monitoring wells along the western boundary of the MEW plume will be conducted in 2014. The planned activities and schedule for this work is included in the Grab Groundwater Assessment and Proposed Well Installations report (Geosyntec, 2013c).

Implementation of the ISCO pilot study to address the Evandale Avenue Sources will also be conducted in 2014. The planned activities and schedule for this work is included in the Pilot Study Design and Implementation Work Plan (Geosyntec, 2013d).

Planned activities for 2014 related to the routine treatment system O&M and groundwater monitoring are as follows:

January	• Pump and Treat System O&M • System effluent sampling (NPDES)
February	• Pump and Treat System O&M • Submit 4th Quarter and Annual NPDES report • System effluent sampling (NPDES)
March	• Pump and Treat System O&M • System effluent sampling (NPDES) • Groundwater level measurements
April	• Pump and Treat System O&M • Submit Annual Progress Report to EPA • System effluent sampling (NPDES)
May	• Pump and Treat System O&M • Submit 1st Quarter NPDES report • System effluent sampling (NPDES) • Semi-annual sampling of well DW3-219
June	• System effluent sampling (NPDES) • Pump and Treat System O&M
July	• Pump and Treat System O&M • System effluent sampling (NPDES)
August	• Pump and Treat System O&M • Submit 2nd Quarter NPDES report

	• System effluent sampling (NPDES)
September	• Pump and Treat System O&M • System effluent sampling (NPDES) • Annual Groundwater sampling Groundwater level measurements
October	• Pump and Treat System O&M • Annual Groundwater sampling • System effluent sampling (NPDES)
November	• Pump and Treat System O&M • Submit 3rd Quarter NPDES report • System effluent sampling (NPDES)
December	• Pump and Treat System O&M • System effluent sampling (NPDES)

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TABLES

Table 1
Regional Recovery Wells and Associated Treatment Systems
MEW Regional Groundwater Remediation Program
Mountain View, California

Treatment System	Regional Recovery Wells By Aquifer				
	A	**B1**	**B2**	**B3**	**C/Deep**
Regional Remediation Program Treatment Systems					
North of 101	REG-2A REG-3A REG-4A REG-5A REG-6A REG-7A REG-8A REG-9A	REG-5B(1) REG-6B(1) REG-7B(1) REG-8B(1) REG-9B(1) REG-10B(1) REG-12B(1)			
South of 101	REG-1A REG-10A REG-11A REG-12A	REG-1B(1) REG-2B(1) REG-3B(1) REG-11B(1)	REG-1B(2) REG-3B(2)		
Fairchild Treatment Systems					
System 1			38B2		
System 3	RW-9A	RW-9(B1)	RW-9(B2)		
System 19		REG-4B(1)		65B3 [1]	DW3-219 [2] DW3-244 [3] DW3-334 [3] DW3-364 [3] DW3-505R [4]

Notes:
1. Well was turned off with EPA approval in 2012.
2. Well was originally turned off in 2002, operated temporarily from 29 July 2005 through 19 June 2006, and has remained off since that time with EPA approval.
3. Well was turned off with EPA approval in November 2006.
4. Well was turned off with EPA approval in 2002.

Table 2a
2013 RGRP Wells North of 101 Listed by Owner
MEW Regional Groundwater Remediation Program
Mountain View, California

Owner: Fairchild (North of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
65A	46B1	17B2			
72A	47B1	51B2			
73A	48B1	54B2			
74A	49B1	82B2			
75A	50B1	123B2			
81A	68B1				
82A	78B1				
88A	79B1				
89A	81B1				
92A [1]	83B1				
93A	87B1				
95A	139B1				
	154B1 [1]				
	155B1 [1]				

Owner: MEW RGRP (North of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
REG-2A	REG-5B(1)				
REG-3A	REG-6B(1)				
REG-4A	REG-7B(1)				
REG-5A	REG-8B(1)				
REG-6A	REG-9B(1)				
REG-7A	REG-10B(1)				
REG-8A	REG-12B(1)				
REG-9A					

Owner: NASA (North of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
14D02A					
14D09A					
14D13A					
14E14A					
15H05A					

Owner: Navy (North of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
W9-16	W9-17				
W9-38	W9-25				
W12-6	W9-41				
W14-3	W9SC-20				
W60-2	W14-5				
W89-1	W89-11				
W89-2	W89-12				
W89-5	W89-14				
W89-7	WNB-14				
W89-8	WU4-2				
W89-9	WU4-4				
WT14-1	WU4-5				
WU4-1	WU4-6				
WU4-3	WU4-7				
WU4-16	WU4-12				
WU4-18	WU4-13				
W89-03A-R	WU4-19				
W89-04A-R	W89-13B1-R				

Notes:
[1] Voluntary well included in RGRP in 2013.

Table 2b
2013 RGRP Wells South of 101 Listed by Owner
MEW Regional Groundwater Remediation Program
Mountain View, California

Owner: Fairchild (South of 101)					
A	**B1**	**B2**	**B3**	**C**	**Deep**
1A	8B1	6B2	28B3	6C	DW3-551
20A	13B1	15B2	30B3	8C	
21A	14B1	16B2	44B3	9C	
23A	26B1	36B2	133B3	10C	
26A	32B1	37B2		11C	
29A	33B1	40B2		DW2-234	
45A	56B1	43B2			
61A [1]	67B1 [1]	62B2			
62A	74B1	75B2			
77A	77B1	76B2			
78A	91B1	89B2			
79A	92B1	113B2			
99A	98B1	125B2			
107A [2]	103B1	129B2			
109A	105B1	132B2			
125A [2]	112B1	134B2			
134A [1]	119B1				
142A	122B1				
144A	124B1				
145A [2]	140B1				
146A [2]	143B1				
153A	RW-2(B1)				
162A	RW-4(B1) [1]				
173A					

Owner: Intel (South of 101)					
A	**B1**	**B2**	**B3**	**C**	**Deep**
IM9A	I9B1				
II9A [2]	IM5B(1)				
	IM9B(1)				

Owner: MEW RGRP (South of 101)					
A	**B1**	**B2**	**B3**	**C**	**Deep**
REG-1A	ME1B1	38B2	65B3	DW3-219	DW3-244
REG-10A	ME2B1	NEC8B2			DW3-334
REG-11A	NEC8B1	NEC18B2			DW3-364
REG-12A	NEC14B1	REG-1B(2)			DW3-505R
REG-MW-1A	NEC18B1	REG-3B(2)			
REG-MW-2A	REG-1B(1)	REG-MW-1B(2)			
RW-9A	REG-2B(1)	RW-9(B2)			
	REG-3B(1)				
	REG-4B(1)				
	REG-11B(1)				
	REG-MW-1B(1)				
	REG-MW-2B(1)				
	RW-9(B1)R				

Owner: Raytheon (South of 101)					
A	**B1**	**B2**	**B3**	**C**	**Deep**
R22A	R6B1	R13B2	R5B3	DW1-230	
R24A	R13B1	R30B2	R9B3	R4C	
R25A	R16B1	R40B1(B2)	R27B3		
R29A	R22B1	R41B2	R54B3		
R31A	R46B1	R50B2	R56B3		
R32A	RP22B	R52B2	R61B3		
R43A		R55B2			
R45A [2]					
R46A					
R57A					
R59A					

Owner: Siltec (South of 101)					
A	**B1**	**B2**	**B3**	**C**	**Deep**
SIL4A [1]					
SIL12A [1]					

Owner: Silva (South of 101)					
A	**B1**	**B2**	**B3**	**C**	**Deep**
	RW-13B(1) [1]			RW-1C [1]	

Notes:
[1] Voluntary well included in RGRP in 2013.
[2] Well added in 2013 based on recommendations made in the Final Grab-Groundwater Assessment and Proposed Well Installations Report (Geosyntec, 2013).

Table 3
2013 Monitoring and Reporting Schedule
MEW Regional Groundwater Remediation Program
Mountain View, California

System / Wells	Analysis[1]	Frequency
Wells		
Wells	Water Level	March, September
Wells	VOCs by EPA Method 8260B	September or October[2]
Wells	Standard Observations (pH, Temperature, Specific Conductivity)	September or October
Wells	Sampling for Selected Metals[3]	September or October
North of 101 Treatment System		
System Influent (before AS 1)[4]	VOCs by EPA Method 8260B	Monthly
System Influent (before AS 1)	pH, Temp, Specific Conductivity	Monthly
System Influent (before AS 1)	1,4-Dioxane by EPA Method 8270C SIM	5 Times in 2013
System Midpoint (AS 1&2)	VOCs by EPA Method 8260B	Monthly
System Midpoint (AS 1&2)	pH, Temp, Specific Conductivity	Monthly
System Effluent (after AS 2)	VOCs by EPA Method 8260B	Monthly
System Effluent (after AS 2)	pH, Temp, Specific Conductivity	Monthly
System Effluent (after AS 2)	1,4-Dioxane by EPA Method 8270C SIM[5]	6 Times in 2013
System Effluent (after AS 2)	Metals[6] by EPA Method US EPA Method 200.8	Every 3 years
System Effluent (after AS 2)	Cyanide by EPA Method SM20-4500-CN	Every 3 years
System Effluent (after AS 2)	Fish Toxicity, 96-Hr by US EPA-821-R-02-012 Test, Method 2019.0	November
System Effluent (after AS 2)	Turbidity by EPA Method 180.1	November
South of 101 Treatment System		
System Influent (before GAC 1)[7]	VOCs by EPA Method 8260B	Quarterly
System Influent (before GAC 1)	pH, Temp, Specific Conductivity	Quarterly
Midpoint 1 (GAC 1&2)	VOCs by EPA Method 8260B	Monthly
Midpoint 1 (GAC 1&2)	pH,Temp, Specific Conductivity	Monthly
Midpoint 2 (GAC 2&3)	VOCs by EPA Method 8260B	Monthly
Midpoint 2 (GAC 2&3)	pH,Temp, Specific Conductivity	Monthly
System Effluent (after GAC 3)	VOCs by EPA Method 8260B	Monthly
System Effluent (after GAC 3)	pH, Temp, Specific Conductivity	Monthly
System Effluent (after GAC 3)	Fish Toxicity, 96-Hr by US EPA-821-R-02-012 Test, Method 2019.0	November
System Effluent (after GAC 3)	Turbidity by EPA Method 180.1	November

Notes:
1 EPA Methods used reflect transition from Order No. R2-2004-055 to Order No. R2-2009-0059, NPDES Permit No. CAG912003
2 RRW DW3-219 was sampled in May and October 2013 (bi-annually per criteria for Silva RRW shut-down).
3 Metals analyzed at following wells locations:
Arsenic (As) = 22A, 10B2
Antimony (Sb) = 42A, SIL12A
Cadmium (Cd) = 42A, 54A
Lead (Pb) = RW-1(B1), RW-2(B1)
4 AS = Air Stripper
5 SIM = selective ion mode
6 Se analysis was performed quarterly in 2013
7 GAC = Granular Activated Carbon
EPA = Environmental Protection Agency
VOCs = Volatile Organic Compounds

Table 4
2013 Monthly VOC Mass Removal
MEW Regional Groundwater Remediation Program
Mountain View, California

	Total Groundwater Extracted[1] (gallons)	Influent VOC Concentration[2] (mg/L)	Total VOC Mass Removed[3] (pounds)
North of 101			
January	5,918,652	0.92	45.2
February	4,212,335	0.90	31.5
March	4,463,774	0.96	35.7
April	5,514,629	1.05	48.1
May	4,249,737	0.94	33.4
June	4,632,564	0.97	37.4
July	5,121,789	1.01	43.1
August	4,141,274	0.99	34.1
September	4,089,906	1.18	40.2
October	5,594,938	0.92	42.9
November	4,073,127	0.93	31.4
December	5,125,500	1.50	64.2
2013 Cumulative[4]	57,138,228		487.4
South of 101			
January	3,143,080	1.51	39.6
February	2,318,690		29.2
March	2,929,860		36.9
April	2,678,313	2.17	48.3
May	2,569,230		46.3
June	2,748,470		49.6
July	3,003,890	1.38	34.6
August	2,362,670		27.2
September	2,372,870		27.3
October	3,079,940	2.07	53.0
November	2,368,990		40.8
December	2,963,540	0.97	23.8
2013 Cumulative[4]	32,539,543		456.7

Notes:

1. Total groundwater extracted each month was obtained from the NPDES quarterly reports.
2. Influent VOC concentrations were obtained from the NPDES quarterly reports. System influent samples are analyzed monthly for North of 101 System and quarterly for South of 101 System.
3. Total VOC Mass Removed was obtained from the NPDES quarterly reports and is calculated by multiplying Total Groundwater Extracted (gallons) by the influent VOC concentration (mg/L) and a Unit Conversion factor of 0.00000833, based on 3.785 L/gal and $2.2X10^{-6}$ lbs/mg.
4. Cumulative values were obtained from the NPDES quarterly reports.

mg/L = milligrams per liter
lbs/mg = pounds per milligram
L/gal = liters per gallon
NPDES = National Pollutant Discharge Elimination System
VOC = Volatile Organic Compound

Table 5
2013 Treatment System VOC and Metals Sampling Results
MEW Regional Groundwater Remediation Program
Mountain View, California

Well	Date	Constituent (concentration in µg/L and method is 8260B)													
		Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,4-Dioxane[1]	Freon 113	Methylene Chloride	PCE	1,1,1-TCA	TCE	Vinyl Chloride	Selenium[2]
North 101															
Air Stripper I Influent	1/18/2013	<20	<10	<10	7.3	210	2.1		7.4	<100	<10	<10	690	<10	
Air Stripper I Influent	2/6/2013	<1	4.7	<0.5	6.9	220	2.7	2.4	7.5	<5	1.6	0.92	800	0.9	
Air Stripper I Influent	2/6/2013	<20	<10	<10	8.8	190	2.7	2.1	7.7	<100	<10	<10	690	<10	
Air Stripper I Influent	3/8/2013	<10	5	<5	8.1	220	3		8.3	<50	<5	<5	750	<5	
Air Stripper I Influent	3/8/2013	<20	<10	<10	8.5	210	2.9		8	<100	<10	<10	730	<10	
Air Stripper I Influent	4/17/2013	<10	4.8	<5	8.5	210	2.8		9.3	<50	<5	<5	800	<5	
Air Stripper I Influent	4/17/2013	<20	<10	<10	8.6	220	<10		9.2	<100	<10	<10	820	<10	
Air Stripper I Influent	5/17/2013	<20	4.2	<10	8.3	220	3.1	2.7	8.8	<100	<10	<10	700	<10	
Air Stripper I Influent	6/7/2013	<10	4.7	<5	8	220	2.6		7.4	<50	<5	<5	750	<5	
Air Stripper I Influent	6/7/2013	<20	<10	<10	7.9	210	<10		7.2	<100	<10	<10	720	<10	
Air Stripper I Influent	7/10/2013	<10	4.6	<5	8.7	210	3.5		8.1	<50	<5	<5	780	<5	
Air Stripper I Influent	7/10/2013	<20	4.7	<10	9.6	210	3.9		7.5	<100	<10	<10	770	<10	
Air Stripper I Influent	8/8/2013	<20	<10	<10	8.5	200	2.8	23	8.3	<100	<10	<10	770	<10	
Air Stripper I Influent	8/26/2013							2.3							
Air Stripper I Influent	9/6/2013	<10	4.7	<5	8	210	2.7		8.3	15	<5	<5	800	<5	
Air Stripper I Influent	9/6/2013	<20	6.1	<10	10	260	3.2		10	45	<10	<10	980	<10	
Air Stripper I Influent	10/9/2013	<10	4.8	<5	7.7	230	2.4		7.8	<50	<5	<5	670	<5	
Air Stripper I Influent	10/9/2013	<20	4.7	<10	7.5	220	<10	1.5	8.2	<100	<10	<10	680	<10	
Air Stripper I Influent	11/11/2013	<20	4.9	<10	8.6	210	4	2.1	9	<100	<10	<10	690	<10	
Air Stripper I Influent	12/4/2013	<10	5.6	<5	11	280	2.3		11	<50	2.2	<5	980	<5	
Air Stripper I Influent	12/4/2013	<20	7.7	<10	15	380	<10		14	<100	<10	<10	1300	<10	
Air Stripper 2 Influent	1/18/2013	<1	<0.5	<0.5	<0.5	0.98	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
Air Stripper 2 Influent	2/6/2013	<1	<0.5	<0.5	<0.5	0.28	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
Air Stripper 2 Influent	3/8/2013	<1	<0.5	<0.5	<0.5	0.38	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
Air Stripper 2 Influent	4/17/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
Air Stripper 2 Influent	5/17/2013	<1	<0.5	<0.5	<0.5	0.37	<0.5		<0.5	<5	<0.5	<0.5	0.23	<0.5	
Air Stripper 2 Influent	6/7/2013	<1	<0.5	<0.5	<0.5	0.65	<0.5		<0.5	<5	<0.5	<0.5	0.52	<0.5	
Air Stripper 2 Influent	7/10/2013	<1	<0.5	<0.5	<0.5	0.36	<0.5		<0.5	<5	<0.5	<0.5	0.32	<0.5	
Air Stripper 2 Influent	8/8/2013	<1	<0.5	<0.5	<0.5	0.45	<0.5		<0.5	<5	<0.5	<0.5	0.62	<0.5	
Air Stripper 2 Influent	9/6/2013	<1	<0.5	<0.5	<0.5	0.08	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
Air Stripper 2 Influent	10/9/2013	<1	<0.5	<0.5	<0.5	0.08	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
Air Stripper 2 Influent	11/11/2013	<1	<0.5	<0.5	<0.5	0.35	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
Air Stripper 2 Influent	12/4/2013	<1	<0.5	<0.5	<0.5	0.2	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	1/18/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	1/18/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	2/6/2013														5.9
System Effluent	2/6/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5	2.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	5.5
System Effluent	3/8/2013	<1	<0.5	<0.5	<0.5	0.41	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	4/17/2013	<1	<0.5	<0.5	<0.5	0.15	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	5/17/2013							2.3							5.9
System Effluent	5/17/2013	<1	<0.5	<0.5	<0.5	0.2	<0.5	2.1	<0.5	<5	<0.5	<0.5	<0.5	<0.5	5.3
System Effluent	6/7/2013	<1	<0.5	<0.5	<0.5	0.25	<0.5		<0.5	<5	<0.5	<0.5	0.32	<0.5	
System Effluent	7/10/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	

Table 5
2013 Treatment System VOC and Metals Sampling Results
MEW Regional Groundwater Remediation Program
Mountain View, California

Well	Date	Constituent (concentration in µg/L and method is 8260B)													
		Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,4-Dioxane[1]	Freon 113	Methylene Chloride	PCE	1,1,1-TCA	TCE	Vinyl Chloride	Selenium[2]
North 101															
System Effluent	8/8/2013														5.6
System Effluent	8/8/2013	<1	<0.5	<0.5	<0.5	0.25	<0.5	13	<0.5	<5	<0.5	<0.5	0.36	<0.5	5.3
System Effluent	8/26/2013							2.4							
System Effluent	9/6/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	0.48	<0.5	
System Effluent	10/9/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5	0.94	<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	11/11/2013							2.6							
System Effluent	11/11/2013	<1	<0.5	<0.5	<0.5	0.12	<0.5	1.9	<0.5	<5	<0.5	<0.5	<0.5	<0.5	5.7
System Effluent	12/4/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
South 101															
System Influent	2/8/2013	<1	1.1	<0.5	2.7	57	0.91		49	<5	1.1	1.1	1400	<0.5	
System Influent	5/17/2013	<1	1.2	<0.5	3.4	79	2.1		73	<5	1.5	1	2000	<0.5	
System Influent	5/17/2013	<20	<10	<10	5.1	86	<10		80	<100	<10	<10	2000	<10	
System Influent	8/8/2013	0.23	1.7	<0.5	4.7	63	1.6		77	<5	1.3	1.3	1200	<0.5	
System Influent	8/8/2013	<10	<5	<5	3	61	<5		49	<50	<5	<5	1300	<5	
System Influent	11/11/2013	<50	<25	<25	<25	79	<25		68	<250	<25	<25	1800	<25	
System Influent	11/11/2013	<1	1.5	<0.5	4.5	90	2.3		88	<5	1.4	1.1	2000	<0.5	
System Influent	12/31/2013	<10	<5	<5	2.4	46	<5		37	<50	<5	<5	880	<5	
System Midpoint I	1/18/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	2/8/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	3/8/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	4/23/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	5/17/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	6/7/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	7/10/2013	<1	0.43	<0.5	<0.5	0.21	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	8/8/2013	<1	1.1	<0.5	<0.5	3.4	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	9/5/2013	0.22	1.8	<0.5	<0.5	15	<0.5		<0.5	1.5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	10/10/2013	0.41	2.5	<0.5	<0.5	43	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	11/11/2013	0.6	3.3	<0.5	0.24	90	0.52		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint I	12/31/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	1/18/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	2/8/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	3/8/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	4/23/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	5/17/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	6/7/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	0.21	
System Midpoint 2	7/10/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	8/8/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	9/5/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	1.7	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	10/10/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Midpoint 2	11/11/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	0.23	
System Midpoint 2	12/31/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	1/18/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	2/8/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	

Table 5
2013 Treatment System VOC and Metals Sampling Results
MEW Regional Groundwater Remediation Program
Mountain View, California

Well	Date	Constituent (concentration in µg/L and method is 8260B)													
		Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,4-Dioxane[1]	Freon 113	Methylene Chloride	PCE	1,1,1-TCA	TCE	Vinyl Chloride	Selenium[2]
South 101															
System Effluent	3/8/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	4/23/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	5/17/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	6/7/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	7/10/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	8/8/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	9/5/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	10/10/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	
System Effluent	11/11/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	0.2	
System Effluent	12/31/2013	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<5	<0.5	<0.5	<0.5	<0.5	

Notes:
[1]1,4-dioxane analyzed by method 8270C SIM
[2]Selenium concentrations exceeded the NPDES trigger levels during the October 2009 triennial sampling for North 101. The treatment system influent and effluent were sampled three times during the first quarter of 2010, during which time, the trigger level was exceeded again. A 2007 evaluation concluded the selenium detections were the result of ambient background conditions; However, the treatment system effluent is now sampled quarterly for selenium. Selenium is analyzed using USEPA Method 200.8 and reported in units of milligrams per liter.
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
1,1-DCE = 1,2-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene
µg/L = Micrograms per Liter

Table 6
Target and 2013 Average Recovery Well Flow Rates
MEW Regional Groundwater Remediation Program
Mountain View, California

Extraction Wells	Target Flow Rate[1] (gpm)	Average 2013 Flow Rate[2] (gpm)
North of 101		
REG-2A	10.6	7.0
REG-3A	7.0	5.5
REG-4A	9.0	6.8
REG-5A	19.3	18.6
REG-8A	6.9	6.5
REG-5B(1)	17.3	14.5
REG-6B(1)	8.0	4.7
REG-7B(1)	12.0	12.1
REG-6A	4.9	3.2
REG-7A	12.8	4.8
REG-9A	7.7	7.7
REG-8B(1)	11.3	5.6
REG-9B(1)	5.3	5.5
REG-10B(1)	12.8	7.9
REG-12B(1)	10.4	7.7
South of 101		
REG-1A	11.4	10.1
REG-10A	3.0	5.1
REG-11A	4.5	5.0
REG-2B(1)	3.5	4.0
REG-3B(1)	6.0	7.9
REG-11B(1)	5.2	5.4
REG-3B(2)	4.5	5.2
REG-12A	10.0	11.6
REG-1B(1)	15.4	15.2
REG-1B(2)	3.5	1.9

Notes:

1. Target flow rates were assigned in August 2007 based on the January 2006 average flow rates (Weiss, 2006). Since that time, target flow rates for four wells have been adjusted based on well yield. Target rates for REG-7B(1) and REG-10A were increased in October 2008 to reduce required maintenance. Target rates for wells REG-3A and REG-4A were decreased in October 2008 because the yield from these wells had decreased despite redevelopment.

2. Average 2013 flow rate was calculated by dividing the total volume of groundwater recovered by the time in minutes between the totalizer readings. The North of 101 and South of 101 totalizer readings were recorded between 26 December 2012 and 30 December 2013.

gpm = gallons per minute

Table 7
2013 Monthly Average Recovery Well Flow Rates
MEW Regional Groundwater Remediation Program
Mountain View, California

Extraction Well	2013 Average Monthly Flow Rate[1] (gpm)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
North of 101												
REG-2A	7.2	7.2	7.2	7.2	6.6	6.7	6.9	6.6	6.5	7.3	7.0	7.1
REG-3A	5.7	5.7	5.7	5.7	5.2	5.3	5.4	5.3	5.2	5.7	5.5	5.6
REG-4A	7.2	7.1	7.1	7.1	6.6	5.1	6.8	6.6	6.5	7.1	6.9	7.0
REG-5A	19.4	19.3	19.2	19.3	17.4	17.8	18.3	17.7	17.5	19.4	18.6	19.0
REG-8A	7.3	7.3	7.3	7.3	6.6	6.7	6.7	5.4	5.5	6.1	5.9	6.0
REG-5B(1)	15.9	15.6	15.3	15.1	14.1	14.4	14.1	13.5	13.1	14.6	13.9	14.1
REG-6B(1)	4.9	4.8	4.8	4.8	4.4	4.5	4.6	4.5	4.4	4.9	4.5	4.8
REG-7B(1)	12.6	12.6	12.5	12.6	11.4	11.6	11.7	11.5	11.4	12.6	12.1	12.3
REG-6A	3.9	4.0	3.4	3.1	3.1	2.9	2.9	2.9	2.8	3.2	3.0	3.1
REG-7A	6.1	5.9	5.6	5.2	4.3	4.3	4.4	4.2	4.2	4.6	4.4	4.6
REG-9A	8.0	8.0	8.0	8.0	7.3	7.4	7.6	7.4	7.3	8.0	7.7	7.9
REG-8B(1)	6.0	5.7	5.7	5.6	5.4	5.4	5.7	5.4	5.4	5.8	5.5	5.5
REG-9B(1)	5.8	5.8	5.7	5.7	5.2	5.3	5.4	5.2	5.2	5.7	5.5	5.6
REG-10B(1)	8.2	8.2	8.2	8.2	7.4	7.6	7.8	7.6	7.4	8.2	7.9	8.0
REG-12B(1)	8.1	8.2	8.1	8.1	7.4	7.4	7.6	7.3	7.3	7.9	7.6	7.6
South of 101												
REG-1A	9.6	9.2	9.4	8.9	9.3	9.5	9.4	10.3	10.7	11.8	11.6	11.2
REG-10A	5.2	5.1	5.5	5.2	5.5	5.4	5.3	5.1	4.7	5.0	4.9	4.7
REG-11A	4.2	4.4	5.4	5.2	5.3	5.2	5.1	5.3	4.7	5.2	5.0	4.8
REG-2B(1)	4.2	3.9	4.2	3.9	3.9	3.5	3.9	3.9	3.7	4.2	4.1	4.3
REG-3B(1)	7.9	7.6	7.9	7.6	8.1	8.2	8.3	8.1	7.3	8.1	8.0	7.7
REG-11B(1)	5.5	5.4	5.6	5.2	5.4	5.4	5.4	5.3	4.8	5.1	5.6	6.3
REG-3B(2)	5.3	4.9	5.2	5.0	5.3	5.4	5.4	5.3	4.8	5.3	5.3	5.1
REG-12A	11.5	11.3	12.0	11.3	12.3	12.5	12.4	12.0	10.7	11.2	11.2	10.8
REG-1B(1)	11.6	12.2	16.2	15.2	16.0	16.3	16.7	16.8	15.9	13.9	15.5	16.1
REG-1B(2)	2.0	1.8	1.9	2.0	2.0	1.9	1.8	1.8	1.9	2.0	1.8	1.8

Notes:

1. Monthly average extraction well flow rate for each well was calculated by dividing the volume of groundwater extracted by the time (minutes) between the effluent totalizer readings (generally taken last Wednesday of each month).

gpm = gallons per minute

Table 8a
Summary of 2013 Non-Routine Operation and Maintenance Activities North of 101
MEW Regional Groundwater Remediation Program
Mountain View, California

Date	Component	Off-line Time	Event/Alert	Diagnosis and Response	Regulatory Notification[1]
January 2 - 3, 2013	Treatment System	4 hours	Planned manual shutdown.	The system was shut down for non-routine maintenance on the acid pump. System was restarted.	Not Required
February 4, 2013	Treatment System	<1 hour	Planned manual shutdown.	System was shut down to clean an air release valve. System was restarted.	Not Required
February 14, 2013	Treatment System	<1 hour	Planned manual shutdown.	System was shut down for non-routine maintenance on the carbon vessels. System was restarted.	Not Required
March 12 - 13, 2013	REG-7A	13 hours	Low flow alert.	Flow meter and check valve were cleaned, and well was restarted.	Not Required
April 1, 2013	Treatment System	4 hours	Planned manual shutdown.	System was shut down for preventative maintenance on the acid injection system. System was restarted.	Not Required
April 24, 2013	Treatment System	1 hour	Multiple alerts.	The transfer pump for air stripper AS-2 was failing. System was restarted. Transfer pump was rebuilt on May 1, 2013.	Not Required
May 1, 2013	Treatment System	7 hours	Planned manual shutdown.	System was shut down to rebuild the transfer pump for air stripper AS-2. System was restarted.	Not Required
May 3, 2013	REG-8A	3 hours	Low flow alert.	Flow meter fouled. The flow meter was cleaned and well was restarted.	Not Required
May 4 - 6, 2013	Treatment System	39 hours	Multiple alerts.	The cooling fan for the VFD that controls a transfer pump failed. The cooling fan was replaced and system was restarted.	Not Required
May 7, 2013	Treatment System	7 hours	Multiple alerts.	Pressure transducer line for air stripper AS-1 flooded. The line was dewatered and the system was restarted.	Not Required
May 7 - 8, 2013	Treatment System	14 hours	Multiple alerts.	Sump float switch assembly came loose. Float switch assembly was secured and the system was restarted.	Not Required
May 13, 2013	Treatment System, REG-5B(1)	2 hours	Planned manual shutdown.	System was shut down for a pump change at REG-5B(1). System was restarted.	Not Required
May 14, 2013	Treatment System, REG-6A	2 hours	Planned manual shutdown.	System was shut down for a pump change at REG-6A. System was restarted.	Not Required
May 17, 2013	Treatment System, REG-7A	2 hours	Planned manual shutdown.	System was shut down for a pump change at REG-7A. System was restarted.	Not Required
May 20, 2013	Treatment System, REG-6A	3 hours	Vault high level alert.	Alert set off by irrigation water. Water was pumped out and vault was sealed and system was restarted.	Not Required
June 1 - 3, 2013	REG-4A	33 hours	Multiple pump fault alerts.	The VFD was reset and the well was restarted.	Not Required
June 15 - 21, 2013	REG-4A	147 hours	Low flow alert.	The pump failed and the VFD malfunctioned. The communication card in the VFD was reprogrammed and replaced on June 20, 2013 and the pump was replaced on June 21, 2013. Well was restarted.	EPA notification was made on June 17, 2013
June 17 - 18, 2013	Treatment System	23 hours	Planned manual shutdown.	System was shut down for construction activities around the effluent pipeline. System was restarted.	Not Required
June 20, 2013	Treatment System, REG-4A	2 hours	Planned manual shutdown.	System was shut down to allow the automation engineer to troubleshoot REG-4A. System was restarted.	Not Required
June 21, 2013	Treatment System, REG-4A	3 hours	Planned manual shutdown.	System was shut down for a pump change at REG-4A. System was restarted.	Not Required
June 27 - 28, 2013	Treatment System, LDV-B3	17 hours	Leak detect high level alert.	Float switch was adjusted and the system was restarted.	Not Required
July 1, 2013	Treatment System, REG-6A	<1 hour	Vault high level alert.	Alert set off by irrigation water. The water drained from the vault and the system was restarted.	Not Required

Table 8a
Summary of 2013 Non-Routine Operation and Maintenance Activities North of 101
MEW Regional Groundwater Remediation Program
Mountain View, California

Date	Component	Off-line Time	Event/Alert	Diagnosis and Response	Regulatory Notification[1]
July 3, 2013	Treatment System	6 hours	Planned manual shutdown.	System was shut down to exchange the air stripper AS-1 blower for preventative maintenance purposes. System was restarted.	Not Required
July 10 - 11, 2013	Treatment System	24 hours	Planned manual shutdown.	The system was shut down to replace the air stripper AS-2 transfer pump. System was restarted.	Not Required
July 15, 2013	Treatment System	2 hours	Planned manual shutdown.	The system was shut down to troubleshoot the PLC programming for air stripper AS-2. System was restarted.	Not Required
July 26 - 27, 2013	REG-8A	8 hours	Low flow alert.	Well was restarted.	Not Required
August 4 - 6, 2013	Treatment System	45 hours	Multiple alerts.	Wires in the underground conduit were faulty. Sections of wire were replaced and the system was restarted.	Not Required
August 14, 2013	Treatment System	5 hours	Planned manual shutdown.	System was shut down to allow for development contractor's work on the effluent pipeline. System was restarted.	Not Required
August 16, 2013	Treatment System	6 hours	Multiple air stripper level alerts.	The air stripper AS-1 transfer pump failed. The pump was removed for repairs. A replacement pump was installed and the system was restarted.	Not Required
August 23, 2013	Treatment System LDV-B1 LDV-B2	<1 hour	Multiple alerts.	A fuse in the field box for LDV-B1 and LDV-B2 was blown. The fuse was replaced and the system was restarted.	Not Required
August 23 - 24, 2013	REG-8A	16 hours	Low flow alert.	Well was restarted.	Not Required
August 27, 2013	Treatment System	2 hours	Planned manual shutdown.	System was shut down to reinstall the repaired AS-1 transfer pump. System was restarted.	Not Required
September 7 - 9, 2013	Treatment System LDV-E5 LDV-E6 LDV-E7 LDV-E8 LDV-H3 LDV-H4	41 hours	Multiple LDV high level alerts.	Fuses in the field box for the LDVs were blown. The fuses were replaced and the system was restarted.	Not Required
September 13, 2013	REG-7A	2 hours	Pump fault alert.	VFD was reset and well was restarted.	Not Required
September 21 - 22, 2013	Treatment System	18 hours	Sump high level alert.	Alert was set off by rain. The sump was pumped down and the system was restarted.	Not Required
September 27, 2013	Treatment System	2 hours	Air stripper 1 high level alert.	Wires in the blower motor enclosure were burned and a wire nut was damaged. The wires were repaired and the system was restarted.	Not Required
October 21 - 22, 2013	Treatment System	1 hour, non-consecutive	Multiple planned manual shutdowns.	System was shut down for maintenance on the duct heater. System was restarted.	Not Required
November 7 - 8, 2013	Treatment System	26 hours	Planned manual shutdown.	System was shut down for the scheduled cleaning of air stripper AS-1. System was restarted.	Not Required

Table 8a
Summary of 2013 Non-Routine Operation and Maintenance Activities North of 101
MEW Regional Groundwater Remediation Program
Mountain View, California

Date	Component	Off-line Time	Event/Alert	Diagnosis and Response	Regulatory Notification[1]
November 27, 2013	Treatment System	2 hours	Planned manual shutdown.	System was shut down for maintenance on well REG-7A. System was restarted	Not Required
December 23 - 24, 2013	Treatment System	15 hours	Multiple alerts.	Blower B-1 failed. A replacement unit was installed and the system was restarted.	Not Required

Notes:

1 = The EPA is required to be notified if the treatment system or an extraction well is shut down for 72 consecutive hours. The Water Board is required to be notified if the treatment system is shut down for more than 120 consecutive hours.

gpm = gallons per minute
MEW = Middlefield-Ellis-Whisman
O&M = operation and maintenance
PLC = Programmable Logic Controller
VFD = Variable Frequency Drive
LDV = Leak Detection Vault
< = less than

Table 8b
Summary of 2013 Non-Routine Operation and Maintenance Activities South of 101
MEW Regional Groundwater Remediation Program
Mountain View, California

Date	Component	Off-line Time	Event/Alert	Diagnosis and Response	Regulatory Notification[1]
January 13 - 14, 2013	Treatment System	22 hours	Multiple alerts.	System shut down due to a power failure. Power was restored, and system was restarted.	Not Required
January 15 - 16, 2013	REG-2B(1)	9 hours	Multiple alerts.	The flow was adjusted and well was restarted.	Not Required
February 7 - 8, 2013	REG-10A	27 hours	Low flow alert.	Motor failed. Pump and motor were replaced and well was restarted.	Not Required
February 20 - 21, 2013	Treatment System	28 hours	Planned manual shutdown.	System was shut down as a safety precaution for the nearby construction work. System was restarted.	Not Required
February 27 - 28, 2013	Treatment System	6 hours	Planned manual shutdown.	System was shut down to dewater a Baker tank on the construction site. System was restarted.	Not Required
March 13, 2013	REG-1A, REG-2B(1), REG-3B(1), REG-3B(2), REG-10A, REG-11A, REG-11B(1)	5 hours	Vault high level alert.	A vault high level alert at REG-2B(1) shut down the wells connected to the original air stripper system. The wire nuts for the float switch were replaced, and the wells were restarted.	Not Required
April 9, 2013	Treatment System	7 hours	Planned manual shutdown.	System was shut down as a safety precaution for the nearby construction work. System was restarted.	Not Required
April 10 - 12, 2013	Treatment System	19 hours, non-consecutive	Planned manual shutdown.	System was shut down as a safety precaution for the nearby construction work. System was restarted.	Not Required
April 15 - 16, 2013	Treatment System	24 hours	Planned manual shutdown.	System was shut down to replace discharge meter. System was restarted.	Not Required
April 16 - 17, 2013	Treatment System	21 hours	Sump high level alert.	Sump pump was not on. Sump pump was turned on and system was restarted.	Not Required
May 2 - 3, 2013	Treatment System	1 hour, non-consecutive	Planned manual shutdown.	System was shut down for maintenance on the effluent meter. System was restarted.	Not Required
May 9, 2013	Treatment System	8 hours	Planned manual shutdown.	System was shut down for maintenance on the effluent pipeline. System was restarted.	Not Required
June 24 - 26, 2013	REG-2B(1)	44 hours, non-consecutive	Multiple low flow alerts.	Pump failed. Pump and motor were replaced on June 26, 2013. Well was restarted.	Not Required
July 19, 2013	Treatment System	<1 hour	Multiple alerts.	Alerts caused by a power glitch. System was restarted.	Not Required
August 12, 2013	REG-1A	3 hours	Planned manual shutdown.	Well was shut down to replace the pump. Well was restarted.	Not Required
September 7 - 9, 2013	Treatment System	40 hours	Emergency stop alert.	Alert was caused by a power glitch. System was restarted.	Not Required
September 17, 2013	Treatment System	6 hours	Planned manual shutdown.	System was shut down for development contractor's work on the nearby electrical infrastructure. System was restarted.	Not Required
September 22, 2013	Treatment System	6 hours	Planned manual shutdown.	System was shut down for PG&E's work on the nearby electrical infrastructure. System was restarted.	Not Required
September 25, 2013	Treatment System	2 hours	Planned manual shutdown.	System was shut down to perform repairs on electrical infrastructure that was damaged by redevelopment activities. System was restarted.	Not Required
September 25 - 30, 2013	REG-1B(1)	101 hours, non-consecutive	Well cycled off without alert multiple times.	Pump saver was replaced and well was restarted.	Not Required

Table 8b
Summary of 2013 Non-Routine Operation and Maintenance Activities South of 101
MEW Regional Groundwater Remediation Program
Mountain View, California

Date	Component	Off-line Time	Event/Alert	Diagnosis and Response	Regulatory Notification[1]
October 7, 2013	Treatment System	1 hour	Planned manual shutdown.	System was shut down to collect a carbon sample. System was restarted.	Not Required

Notes:

1 = The EPA is required to be notified if the treatment system or an extraction well is shut down for 72 consecutive hours. The Water Board is required to be notified if the treatment system is shut down for more than 120 consecutive hours.

gpm = gallons per minute
MEW = Middlefield-Ellis-Whisman
O&M = operation and maintenance
PLC = Programmable Logic Controller
< = less than

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Year Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
A/A1 Zone								
65A	1982	Fairchild (North of 101)	28.04	4	29	19 - 29	7 - 29	MW
72A	1985	Fairchild (North of 101)	32.82	4	27	20 - 25	15 - 27	MW
73A	1985	Fairchild (North of 101)	21.62	4	27	15 - 25	9 - 27	MW
74A	1985	Fairchild (North of 101)	27.96	4	27	15 - 25	9 - 27	MW
75A	1985	Fairchild (North of 101)	29.97	4	30	18 - 28	16 - 30	MW
81A	1985	Fairchild (North of 101)	21.89	4	25	13 - 23	11 - 25	MW
82A	1985	Fairchild (North of 101)	27.69	4	33	15 - 30	13 - 33	MW
88A	1986	Fairchild (North of 101)	20.21	4	32	20 - 30	16 - 32	MW
89A	1986	Fairchild (North of 101)	17.20	4	30	18 - 28	16 - 30	MW
92A	1986	Fairchild (North of 101)	6.67	4	35	18 - 33	16 - 35	MW
93A	1986	Fairchild (North of 101)	5.90	4	30	18 - 28	16 - 30	MW
95A	1986	Fairchild (North of 101)	6.65	4	30	18 - 28	16 - 30	MW
1A	1982	Fairchild (South of 101)	58.55	4	40	20 - 40	10 - 40	MW
20A	1982	Fairchild (South of 101)	51.37	2	30	15 - 30	15 - 30	MW
21A	1982	Fairchild (South of 101)	53.72	2	30	14 - 30	12 - 30	MW
23A	1982	Fairchild (South of 101)	50.56	2	30	14 - 30	14 - 30	MW
26A	1982	Fairchild (South of 101)	47.20	2	30	12 - 30	10 - 30	MW
29A	1982	Fairchild (South of 101)	46.08	2	30	15 - 30	10 - 30	MW
45A	1982	Fairchild (South of 101)	43.70	2	25	13 - 25	13 - 25	MW
61A	1982	Fairchild (South of 101)	37.18	2	31	16 - 31	10 - 31	MW
62A	1982	Fairchild (South of 101)	37.88	2	30	10 - 30	10 - 30	MW
77A	1985	Fairchild (South of 101)	52.59	4	30	23 - 28	21 - 30	MW
78A	1985	Fairchild (South of 101)	46.44	4	34	22 - 32	18.5 - 34	MW
79A	1985	Fairchild (South of 101)	36.61	4	24	13 - 23	10 - 24	MW
99A	1986	Fairchild (South of 101)	48.26	4	29	9.5 - 24.5	8 - 29	MW
107A	1986	Fairchild (South of 101)	55.08		50	23 - 48	15 - 50	MW
109A	1986	Fairchild (South of 101)	41.61	4	28	12 - 27	7.5 - 28	MW
125A	1986	Fairchild (South of 101)	42.17		34	22 - 32	17 - 34	MW
134A	1986	Fairchild (South of 101)	53.44	4	32	20 - 30	18 - 32	MW
142A	1986	Fairchild (South of 101)	57.27	4	29	22 - 27	20 - 29	MW
144A	1986	Fairchild (South of 101)	59.41	4	40	23 - 38	20 - 40	MW

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Year Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
A/A1 Zone								
145A	1986	Fairchild (South of 101)	47.04		32	15 - 30	13 - 32	MW
146A	1988	Fairchild (South of 101)	48.93			35 - 55	33 - 56	MW
153A	1991	Fairchild (South of 101)	45.70	4	23	13 - 23	12 - 25	MW
162A	2000	Fairchild (South of 101)	36.47	4	28	8 - 28	7 - 31	MW
173A	2002	Fairchild (South of 101)	50.83		30.0	19 - 29		MW
II9A	1982	Intel (South of 101)	71.28		45	32.5 - 42.5	23.5 - 45	MW
IM9A	1986	Intel (South of 101)	64.66		44.7	27.8 - 37.8	26 - 39.8	MW
REG-2A	1998	MEW RGRP (North of 101)	32.33	6	25	10 - 25	9 - 27	RW
REG-3A	1998	MEW RGRP (North of 101)	24.26	6	28	13 - 28	12 - 30.5	RW
REG-4A	1998	MEW RGRP (North of 101)	25.22	6	31	16 - 31	14 - 33	RW
REG-5A	1998	MEW RGRP (North of 101)	29.40	6	29	14 - 29	13 - 30.5	RW
REG-6A	1998	MEW RGRP (North of 101)	13.45	6	29	24 - 29	21 - 31	RW
REG-7A	1998	MEW RGRP (North of 101)	17.11	6	27	12 - 27	11 - 28.5	RW
REG-8A	1998	MEW RGRP (North of 101)	28.72	6	31	21 - 31	18 - 34	RW
REG-9A	1998	MEW RGRP (North of 101)	24.14	6	27	17 - 27	15 - 28.5	RW
REG-1A	1997	MEW RGRP (South of 101)	35.60	6	42	22 - 42	19 - 45	RW
REG-10A	1997	MEW RGRP (South of 101)	34.83	6	40	15 - 40	12 - 42	RW
REG-11A	1997	MEW RGRP (South of 101)	35.15	6	49	29 - 49	26 - 50	RW
REG-12A	1997	MEW RGRP (South of 101)	38.04	6	28	12 - 27	11 - 30	RW
REG-MW-1A	1997	MEW RGRP (South of 101)	41.00	6	36	20 - 35	17 - 37	MW
REG-MW-2A	1997	MEW RGRP (South of 101)	38.11	6	29.5	18.5 - 28.5	15.5 - 29.5	MW
RW-9A	1997	MEW RGRP (South of 101)	37.83	6	25	13 - 23	10 - 25	RW
14D02A	1988	NASA (North of 101)	10.15	8	25	5 - 25	5 - 25	MW
14D09A	1990	NASA (North of 101)	15.81	8	16.5	6 - 15	5 - 10.5	MW
14D13A	1991	NASA (North of 101)	13.19	8	17	7 - 17	6 - 17	MW
14E14A	1990	NASA (North of 101)	21.64	8	21.5		7 - 19	MW
15H05A	1988	NASA (North of 101)	18.69	8	31.5		5 - 31	MW
R22A	1985	Raytheon (South of 101)	73.00		47.5	27 - 47	25 - 47.5	MW
R24A	1985	Raytheon (South of 101)	70.05		38	17 - 37	15 - 38	MW
R25A	1985	Raytheon (South of 101)	59.20		34	14 - 34	12 - 34	MW

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Year Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
A/A1 Zone								
R29A	1985	Raytheon (South of 101)	36.00		26	6 - 26	4 - 26	MW
R31A	1985	Raytheon (South of 101)	34.00		24	14 - 24	12 - 24	MW
R32A	1985	Raytheon (South of 101)	35.61		29	9 - 29	7 - 29	MW
R43A	1985	Raytheon (South of 101)	46.00		31	10 - 30	7 - 31	MW
R45A	1986	Raytheon (South of 101)	62.00		50	25 - 48	23 - 48.5	MW
R46A	1987	Raytheon (South of 101)	73.00		45	32 - 41	29 - 43	MW
R57A	1987	Raytheon (South of 101)	53.71		33	20.5 - 32	18.5 - 33	MW
R59A	1987	Raytheon (South of 101)	54.69		27.3	14.5 - 26	12.5 - 27.3	MW
SIL4A	1985	Siltec (South of 101)	44.15		27	12 - 27	6 - 27	MW
SIL12A	1985	Siltec (South of 101)	43.25		36	16 - 36	13 - 36	MW
W9-16		U.S. Navy (North of 101)	22.42	4	30.5	19 - 29	17 - 30	MW
W9-38		U.S. Navy (North of 101)	22.59	4	28.7	13 - 23	9 - 23	MW
W12-6		U.S. Navy (North of 101)	7.5	4	30	20 - 25		MW
W14-3	1988	U.S. Navy (North of 101)	31.37	4	35	15 - 30	13 - 33	MW
W60-2		U.S. Navy (North of 101)	31.42	4	35.5	20 - 35.5		MW
W89-1	1990	U.S. Navy (North of 101)	33.57	12	30	17.5 - 27.5	15.5 - 30	MW
W89-2	1990	U.S. Navy (North of 101)	30.98	12	30	17 - 27	15 - 30	MW
W89-03A-R		U.S. Navy (North of 101)	33.23					MW
W89-04A-R		U.S. Navy (North of 101)	33.25					MW
W89-5	1990	U.S. Navy (North of 101)	25.61	12	25	15 - 25	13 - 25	MW
W89-7	1990	U.S. Navy (North of 101)	24.15	12	25	15 - 25	13 - 25	MW
W89-8	1990	U.S. Navy (North of 101)	21.77	12	27	17 - 27	15 - 27	MW
W89-9	1990	U.S. Navy (North of 101)	21.78	12	25	14.5 - 24.5	12.5 - 24.5	MW
WT14-1	1990	U.S. Navy (North of 101)	24.80	10	18	7.8 - 17.8	6 - 0	MW
WU4-1		U.S. Navy (North of 101)	34.97	4	30	18.8 - 28.8		MW
WU4-3		U.S. Navy (North of 101)	25.21	4	31	25.5 - 30.5		MW
WU4-16		U.S. Navy (North of 101)	13.89	4	27.5	17 - 27.5		MW
WU4-18		U.S. Navy (North of 101)	8.17	4	24.5	9 - 24		MW
A2/B1 Zone								
46B1	1985	Fairchild (North of 101)	22.13	4	50	38 - 48	35.5 - 50	MW
47B1	1985	Fairchild (North of 101)	21.51	4	64	57 - 62	53 - 64	MW

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Year Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
A2/B1 Zone								
48B1	1985	Fairchild (North of 101)	28.07	4	55	48 - 53	46 - 55	MW
49B1	1985	Fairchild (North of 101)	27.89	4	71	64 - 68	62 - 71	MW
50B1	1985	Fairchild (North of 101)	27.79	4	83	72 - 82	70 - 83	MW
68B1	1985	Fairchild (North of 101)	29.85	4	52	46 - 51	44 - 52	MW
78B1	1986	Fairchild (North of 101)	20.64	4	51	39 - 49	37 - 51	MW
79B1	1986	Fairchild (North of 101)	17.08	4	54	42 - 52	38 - 54	MW
81B1	1986	Fairchild (North of 101)	9.20	4	50	38 - 48	35.5 - 50	MW
83B1	1986	Fairchild (North of 101)	5.80	4	58	46 - 56	37.5 - 58	MW
87B1	1986	Fairchild (North of 101)	25.10	4	57	45 - 55	43 - 57	MW
139B1	1988	Fairchild (North of 101)	7.06	4	70	55 - 70	51 - 73	MW
154B1	2001	Fairchild (North of 101)	12.78	2	42	32 - 42	31 - 44	MW
155B1	2001	Fairchild (North of 101)	19.74	2	62			MW
8B1	1982	Fairchild (South of 101)	40.96	4	78	68 - 78	50 - 78	MW
13B1	1985	Fairchild (South of 101)	34.80	4	69	62 - 67	55.5 - 69	MW
14B1	1985	Fairchild (South of 101)	35.68	4	64	51 - 61	47.5 - 64	MW
26B1	1985	Fairchild (South of 101)	52.61	4	65	58 - 63	56.5 - 65	MW
32B1	1985	Fairchild (South of 101)	38.03	4	76	64 - 74	59 - 76	MW
33B1	1985	Fairchild (South of 101)	46.30	4	70		54 - 70	MW
56B1	1985	Fairchild (South of 101)	42.14	4	60	56 - 59	52 - 60	MW
67B1	1985	Fairchild (South of 101)	36.93	4	67	56 - 62	52 - 67	MW
74B1	1986	Fairchild (South of 101)	51.84	4	68	56 - 66	53 - 68	MW
77B1	1986	Fairchild (South of 101)	40.96	4	60.5	53 - 58	50 - 60.5	MW
91B1	1986	Fairchild (South of 101)	48.44	4	60	48 - 58	43 - 60	MW
92B1	1986	Fairchild (South of 101)	46.99	4	68	55 - 65	50 - 68	MW
98B1	1986	Fairchild (South of 101)	54.10	4	68	57 - 66	46 - 68	MW
103B1	1986	Fairchild (South of 101)	55.20	4	82	70 - 80	67 - 82	MW
105B1	1986	Fairchild (South of 101)	40.88	4	72	60 - 70	57 - 72	MW
112B1	1986	Fairchild (South of 101)	46.00	4	69	62 - 67	60 - 69	MW
119B1	1986	Fairchild (South of 101)	42.96		64	52 - 62	50 - 64	MW
122B1	1986	Fairchild (South of 101)	59.53	4	71	64 - 69	62 - 71	MW
124B1	1986	Fairchild (South of 101)	46.91	4	64	57 - 62	54 - 64	MW

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Year Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
A2/B1 Zone								
140B1	1986	Fairchild (South of 101)	48.91	4	85	65 - 85	63 - 86	MW
143B1	1986	Fairchild (South of 101)	38.88	4	70	60 - 70	56 - 76	MW
RW-2(B1)	1986	Fairchild (South of 101)	48.18	6	59	46 - 56	45 - 59	RW
RW-4(B1)	1985	Fairchild (South of 101)	42.61	6	63	50 - 60	49 - 63	RW
I9B1	1984	Intel (South of 101)	70.92		80	56 - 80	56 - 80	MW
IM5B(1)	1986	Intel (South of 101)	60.16		62.2	49 - 59	47.2 - 62.2	MW
IM9B(1)	1986	Intel (South of 101)	65.04		71	58 - 68	55.5 - 71	MW
REG-5B(1)	1998	MEW RGRP (North of 101)	33.20	6	47	37 - 47	34 - 50	RW
REG-6B(1)	1998	MEW RGRP (North of 101)	24.65	6	59	49 - 59	46 -60.5	RW
REG-7B(1)	1998	MEW RGRP (North of 101)	24.32	6	58	48 - 58	47 - 60	RW
REG-8B(1)	1998	MEW RGRP (North of 101)	20.03	6	54	34 - 54	31 - 56	RW
REG-9B(1)	1998	MEW RGRP (North of 101)	13.60	6	42	32 - 42	31 - 44	RW
REG-10B(1)	1998	MEW RGRP (North of 101)	19.64	6	52	32 - 52	29 - 53.5	RW
REG-12B(1)		MEW RGRP (North of 101)	32.38	6		60 - 65		RW
ME1B1	1985	MEW RGRP (South of 101)			79	69 - 74	65.3 - 79	MW
ME2B1	1985	MEW RGRP (South of 101)			79	64 - 74	61.2 - 79	MW
NEC8B1	1983	MEW RGRP (South of 101)	42.68	2	58	38 - 58	37 - 58	MW
NEC14B1	1989	MEW RGRP (South of 101)	46.82	4	71	59 - 69	57 - 71	MW
NEC18B1	1989	MEW RGRP (South of 101)	59.87	4	70.5	63 - 67	61 - 70.5	MW
REG-1B(1)	1997	MEW RGRP (South of 101)	38.15	6	76	59 - 74	56 - 76	RW
REG-2B(1)	1997	MEW RGRP (South of 101)	35.15	6	64	39 - 64	36 - 66	RW
REG-3B(1)	1996	MEW RGRP (South of 101)	34.17	18	75	57 - 72	54 - 75	RW
REG-4B(1)		MEW RGRP (South of 101)	37.70	6				RW
REG-11B(1)	1997	MEW RGRP (South of 101)	35.65	6	68	58 - 68	55 - 68	RW
REG-MW-1B(1)	1997	MEW RGRP (South of 101)	40.81	6	74	53 - 73	50 - 74.5	MW
REG-MW-2B(1)		MEW RGRP (South of 101)	41.43			57 - 67		MW
RW-9(B1)R	1986	MEW RGRP (South of 101)	38.59	6	69	59 - 69	58 - 71.5	RW
R6B1	1985	Raytheon (South of 101)	46.00		67	54 - 65	36 - 67	MW
R13B1	1985	Raytheon (South of 101)	35.00		48	38 - 48	36 - 48	MW
R16B1	1985	Raytheon (South of 101)	47.00		64	58 - 64	56 - 64	MW
R22B1	1986	Raytheon (South of 101)	62.73		73	52 - 70	50 - 73	MW

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Year Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
A2/B1 Zone								
R46B1	1987	Raytheon (South of 101)	58.00		66	56 - 65	54 - 66	MW
RP22B	1985	Raytheon (South of 101)	63.5		57	54 - 56	52 - 57	MW
RW-13B(1)		Silva (South of 101)	53.20					RW
W9-17		U.S. Navy (North of 101)	19.31	4	36	33 - 38	31 - 40	MW
W9-25		U.S. Navy (North of 101)	15.26	4	42	29.5 - 39.5	27.5 - 42	MW
W9-41		U.S. Navy (North of 101)	22.56	4	54.5	34 - 44	32 - 46	MW
W9SC-20	1995	U.S. Navy (North of 101)	22.20	2	52.3	41.8 - 51.8		MW
W14-5	1988	U.S. Navy (North of 101)	31.25	4	58.7	44.9 - 49.9	43 - 52	MW
W89-11	1990	U.S. Navy (North of 101)	33.26	10	63	52 - 62	50 - 63	MW
W89-12	1990	U.S. Navy (North of 101)	31.23	10	65	54 - 64	51 - 65	MW
W89-13B1-R		U.S. Navy (North of 101)	33.19					MW
W89-14	1990	U.S. Navy (North of 101)	25.58	10	61	50 - 60	48 - 61	MW
WNB-14	1992	U.S. Navy (North of 101)	12.35	12	61	24 - 29	22 - 61	MW
WU4-2		U.S. Navy (North of 101)	32.55	4	60.8	54.5 - 59.5		MW
WU4-4		U.S. Navy (North of 101)	25.21	4	59	54 - 59		MW
WU4-5		U.S. Navy (North of 101)	33.88	4	60	53.5 - 58.5		MW
WU4-6		U.S. Navy (North of 101)	28.46	4		59 - 64		MW
WU4-7		U.S. Navy (North of 101)	24.00	4	54	48.5 - 53.5		MW
WU4-12		U.S. Navy (North of 101)	21.88	4		34.5 - 44.5		MW
WU4-13		U.S. Navy (North of 101)	22.68	4	45	34.5 - 44.5		MW
WU4-19		U.S. Navy (North of 101)	11.39	4	41.5	36 - 41		MW
B2 Zone								
17B2	1985	Fairchild (North of 101)	27.96	4	94	87 - 92	85.5 - 94	MW
51B2	1985	Fairchild (North of 101)	22.07	4	99	92 - 97	88 - 99	MW
54B2	1985	Fairchild (North of 101)	28.00	4	86	79 - 84	77 - 86	MW
82B2	1986	Fairchild (North of 101)	6.56	4	88	71 - 86	67 - 88	MW
123B2	1986	Fairchild (North of 101)	15.46	4	96	84 - 94	79 - 96	MW
6B2	1982	Fairchild (South of 101)	58.83	4	91	71 - 91	63 - 91	MW
15B2	1985	Fairchild (South of 101)	70.70	4	101	90 - 100	88.3 - 101	MW
16B2	1985	Fairchild (South of 101)	47.18	4	87	79 - 84	77 - 87	MW
36B2	1985	Fairchild (South of 101)	37.65	4	92.5	86 - 91	81.5 - 92.5	MW

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Year Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
B2 Zone								
37B2	1985	Fairchild (South of 101)	52.57	4	95	88 - 95	85.5 - 95	MW
40B2	1985	Fairchild (South of 101)	54.59	4	93	87 - 92	83.5 - 93	MW
43B2	1985	Fairchild (South of 101)	36.28	4	93.5	85.5 - 91	84 - 93.5	MW
62B2	1985	Fairchild (South of 101)	34.93	4	91	80 - 90	78 - 91	MW
75B2	1986	Fairchild (South of 101)	46.59	4	89	82 - 87	77 - 89	MW
76B2	1986	Fairchild (South of 101)	55.12	4	102	90 - 100	86.5 - 102	MW
89B2	1986	Fairchild (South of 101)	48.43	4	92	80 - 90	77 - 92	MW
113B2	1986	Fairchild (South of 101)	39.01		86	69 - 84	67 - 86	MW
125B2	1986	Fairchild (South of 101)	46.74	4	101	94 - 99	91 - 101	MW
129B2	1987	Fairchild (South of 101)	56.87	4	112	95 - 110	92 - 112	MW
132B2	1987	Fairchild (South of 101)	49.21	4	91	79 - 89	78 - 91	MW
134B2	1987	Fairchild (South of 101)	47.85	4	90	83 - 88	78 - 90	MW
38B2	1985	MEW RGRP (South of 101)	44.09	4	90	78 - 88	71 - 90	RW
NEC8B2	1985	MEW RGRP (South of 101)	42.50	4	107	98.2 - 103	96 - 107	MW
NEC18B2	1989	MEW RGRP (South of 101)	59.87	4	97.5	90 - 95	88 - 97.5	MW
REG-1B(2)		MEW RGRP (South of 101)	38.20	6	92	82 - 92	80 - 93	RW
REG-3B(2)		MEW RGRP (South of 101)	34.84	6	85	75 - 85	72 - 88	RW
REG-MW-1B(2)		MEW RGRP (South of 101)	40.89	6	90	79 - 89	78 - 90	MW
RW-9(B2)	1985	MEW RGRP (South of 101)	37.88	6	95	82.6 - 92.6	80 - 95	RW
R13B2	1985	Raytheon (South of 101)	35.00		82	65 - 82	63 - 82	MW
R30B2	1986	Raytheon (South of 101)	63.00		101.5	78 - 100.5	76 - 101.5	MW
R40B1(B2)	1986	Raytheon (South of 101)	54.06		85	74.5 - 84.5	73 - 85	MW
R41B2	1987	Raytheon (South of 101)	57.00		92.5	82 - 92.5	79 - 92.5	MW
R50B2	1987	Raytheon (South of 101)	60.00		123	118 - 122.5	116 - 123	MW
R52B2	1987	Raytheon (South of 101)	64.24		111	100 - 109.5	98 - 111	MW
R55B2	1987	Raytheon (South of 101)	64.21		124.5	116.5 - 123	114 - 124.5	MW
B3 Zone								
28B3	1985	Fairchild (South of 101)	46.85	4	134	122 - 132	120 - 134	MW
30B3	1985	Fairchild (South of 101)	58.18	4	132	120 - 130	118.5 - 132	MW
44B3	1985	Fairchild (South of 101)	37.62	4	147	129 - 144	123 - 147	MW
133B3	1987	Fairchild (South of 101)	49.26		134	127 - 132	122 - 134	MW

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Year Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
B3 Zone								
65B3	1985	MEW RGRP (South of 101)	43.36	4	133	111 - 131	108 - 133	RW
R5B3	1986	Raytheon (South of 101)	50.20		136	125 - 135	122 - 136	MW
R9B3	1985	Raytheon (South of 101)	69.64		163	137 - 162	134 - 163	MW
R27B3	1986	Raytheon (South of 101)	51.37		141	121.5 - 134	119 - 134	MW
R54B3	1987	Raytheon (South of 101)	64.52		148	145 - 147.5	143 - 148	MW
R56B3	1987	Raytheon (South of 101)	64.13		155	149 - 153.5	146.5 - 155	MW
R61B3	1987	Raytheon (South of 101)	58.41		138.5	131.5 - 137	129.5 - 138.5	MW
C Zone								
6C	1985	Fairchild (South of 101)	38.65	4	220	174.5 - 210	188 - 208	MW
8C	1986	Fairchild (South of 101)	55.03	4	219	193 - 213	187 - 219	MW
9C	1986	Fairchild (South of 101)	60.21	4	218	189.8 - 214.8	185 - 218	MW
10C	1986	Fairchild (South of 101)	59.44	4	218	201 - 216	195 - 218	MW
11C	1987	Fairchild (South of 101)	49.21	4	216	209 - 214	204 - 216	MW
DW2-234	1986	Fairchild (South of 101)	59.79	4	234	200 - 230	195 - 234	MW
DW3-219	1986	MEW RGRP (South of 101)	48.67	4	219	185 - 215	181 - 219	RW
DW1-230	1985	Raytheon (South of 101)	62.38	4	230	194 - 229	187 - 230	MW
R4C	1986	Raytheon (South of 101)	72.00		221	200 - 220	193 - 221	MW
RW-1C		Silva (South of 101)	53.20					RW
Deep Zone								
DW3-551	1988	Fairchild (South of 101)	47.14	6	549	544 - 549	539 - 551.5	MW
DW3-244	1986	MEW RGRP (South of 101)	48.29	4	244	230 - 240	226 - 244	RW
DW3-334	1986	MEW RGRP (South of 101)	48.69	4	334	315 - 330	311 - 334	RW
DW3-364	1986	MEW RGRP (South of 101)	48.39	4	364	350 - 360	345.5 - 364	RW
DW3-505R	1997	MEW RGRP (South of 101)	48.92	6	503	490 - 500	488 - 505	RW

Notes:
TOC = Top of Casing
ft msl = Feet Mean Sea Level
ft bgs = Feet Below Ground Surface
MW = Monitoring Well
RW = Recovery Well

Table 10
Calculation of Predicted Capture Widths Based on Combined Flow Rate
MEW Regional Groundwater Remediation Program
Mountain View, California

Parameter	A/A1 Zone	A2/B1 Zone	B2 Zone
Q = Combined pumping rate (gpm)	167	164	35
b = saturated aquifer thickness (ft)	15	25	35
i = regional hydraulic gradient (ft/ft)	0.004	0.003	0.004
K = hydraulic conductivity (ft/day)	40	40	5
Calculated Capture Width (ft) = Q/(K x b x i)	13,400	10,600	9,600
Measured plume width at widest point (ft)	2,500	2,700	2,300

Notes:

gpm = gallons per minute; ft = feet

The combined pumping rate equals the summed average 2013 flow rates of all extraction wells located within the RGRP target capture area that are outside the slurry walls

Hydraulic conductivity values used for each aquifer zone are from the numerical model included as Appendix B to the 2008 Optimization Report

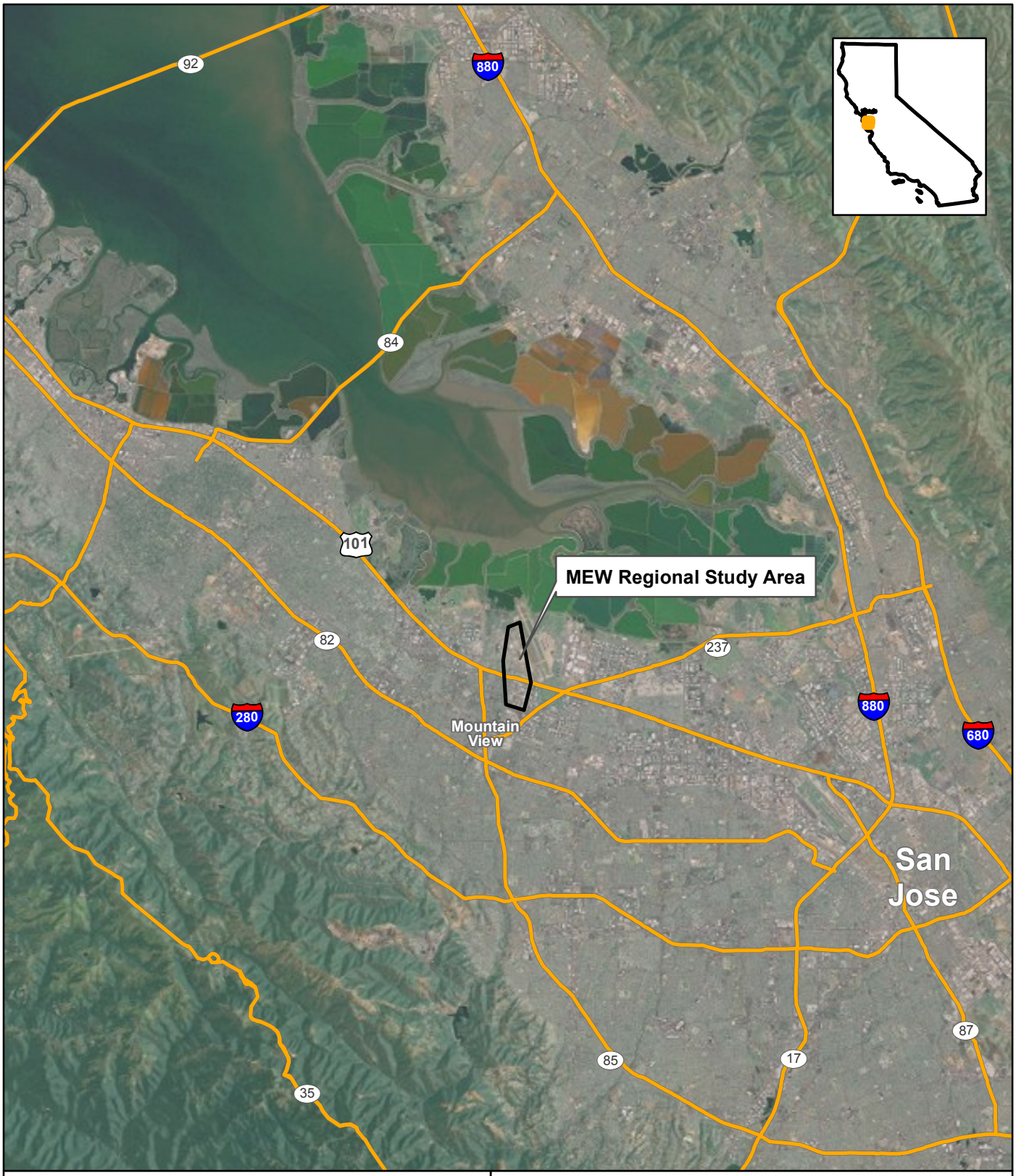
1 cubic foot = 7.48 gallons

1 day = 1440 minutes

Assumptions:

1. Homogeneous, isotropic, confined aquifer of infinite extent
2. Uniform regional horizontal hydraulic gradient
3. No net recharge (or net recharge is accounted for in the regional hydraulic gradient)
4. Uniform aquifer thickness
5. Fully penetrating extraction well
6. Steady-state flow
7. Negligible vertical gradient

FIGURES



N

0 10 Miles

Basemap Sources: USGS, ESRI, TANA, AND, DeLorme, NPS

Site Location Map

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure 1

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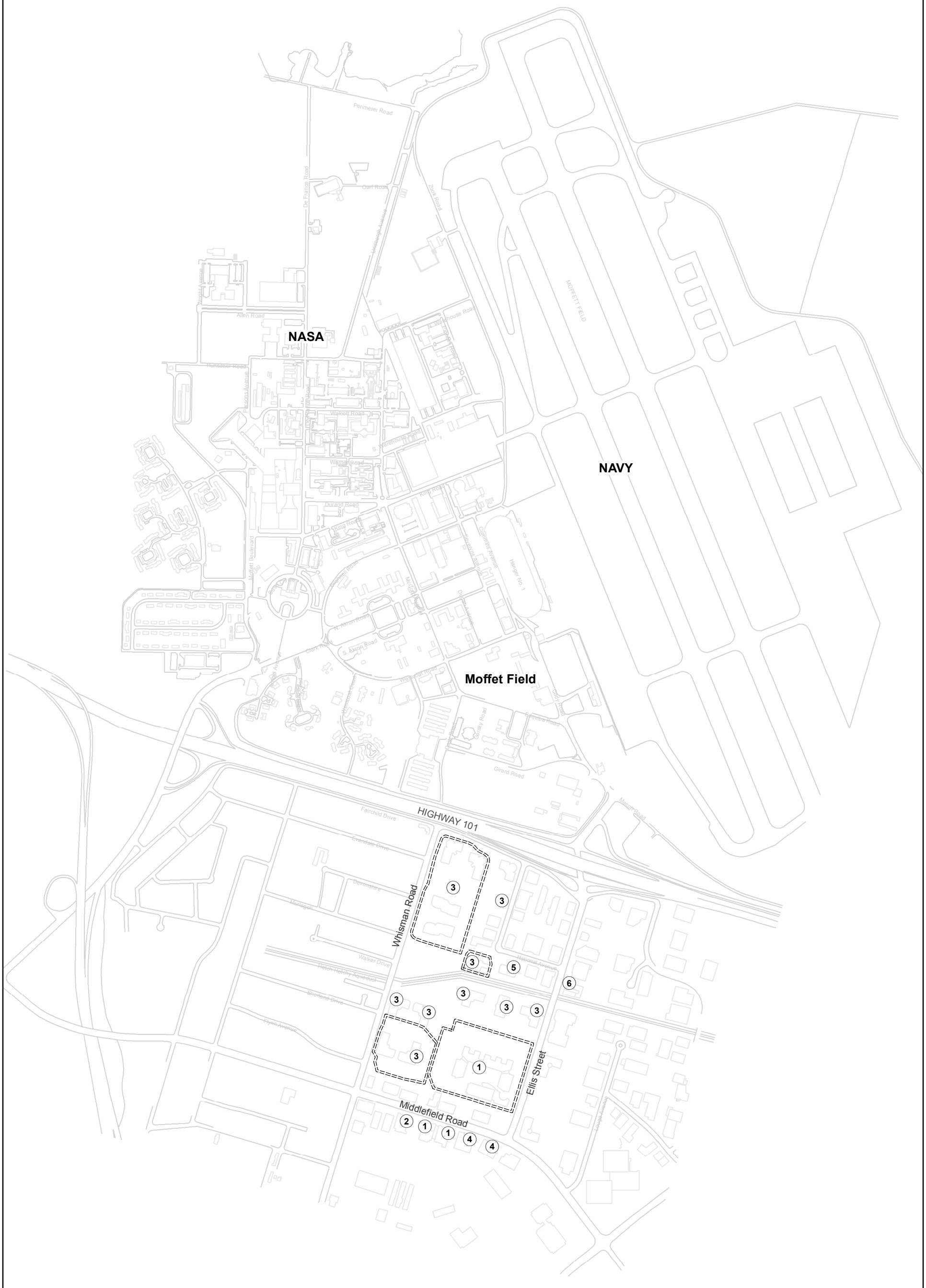


Legend

==== Slurry Wall

Building

Road

MEW Sites

1. Former Raytheon Company
2. Former Intel Corporation
3. Former Fairchild Semiconductor Corporation
4. SMI Holding; LLC
5. Vishay GSI, Inc, Inc/Sumco Phoenix Corporation
6. Renesas Electronics Corporation (formerly NEC)

N

1,000 500 0 1,000 Feet

Locations of the MEW Sites

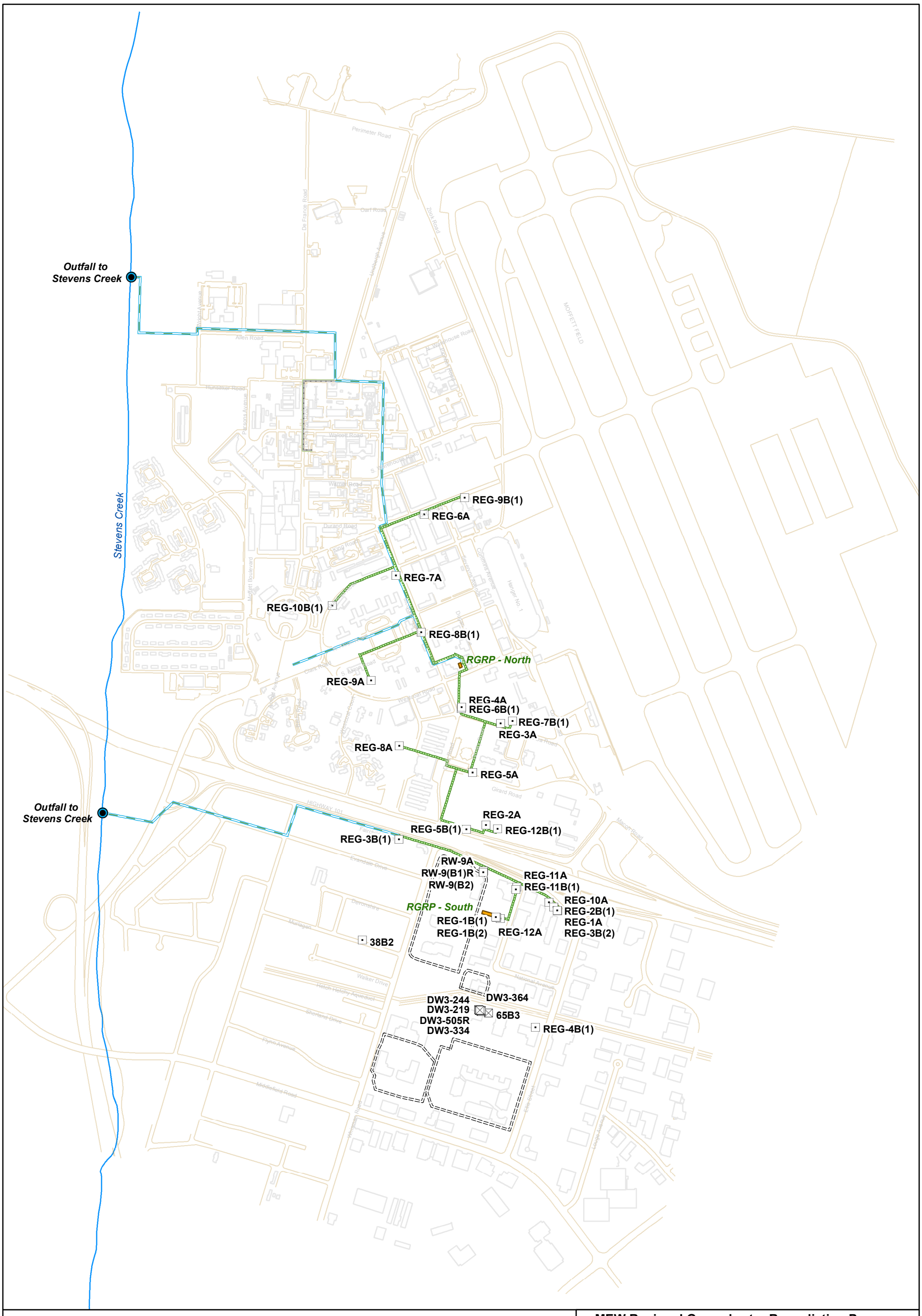
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **2**

P:\GIS\MEW\Project\Regional\2013_AR\Fig02_MtnViewSites.mxd



Legend

- Recovery Well On
- Recovery Well Off
- Groundwater Treatment Plant
- Regional System Treatment Pipeline
- Regional System Discharge Pipeline
- NASA Reuse Pipeline
- Storm Drain, Approximately Located
- ==== Slurry Wall
- Building
- Road
- Stevens Creek

N

1,000 500 0 1,000 Feet

MEW Regional Groundwater Remediation Program
Groundwater Treatment Systems
North and South of Highway 101

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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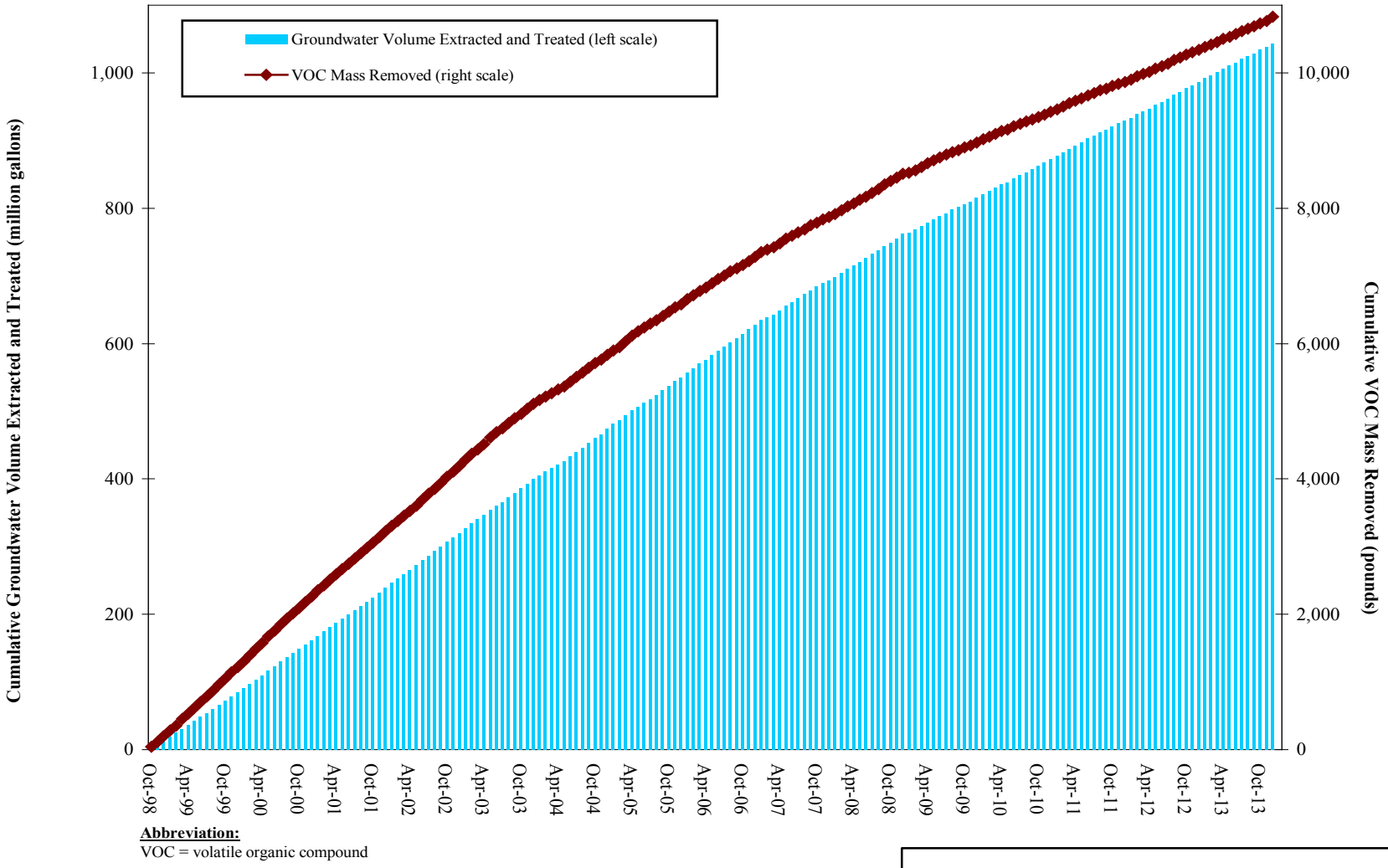
Figure **3**

P:\GIS\MEW\Project\Regional\2013_AR\Fig03_TreatmentSystems.mxd



Abbreviation:
VOC = volatile organic compound

Source: Fourth Quarter and Annual 2013 Self-Monitoring Report, MEW RGRP Treatment System, North 101 (Weiss, 2014a)

Cumulative Groundwater Extracted and VOC Mass Removed, North of 101

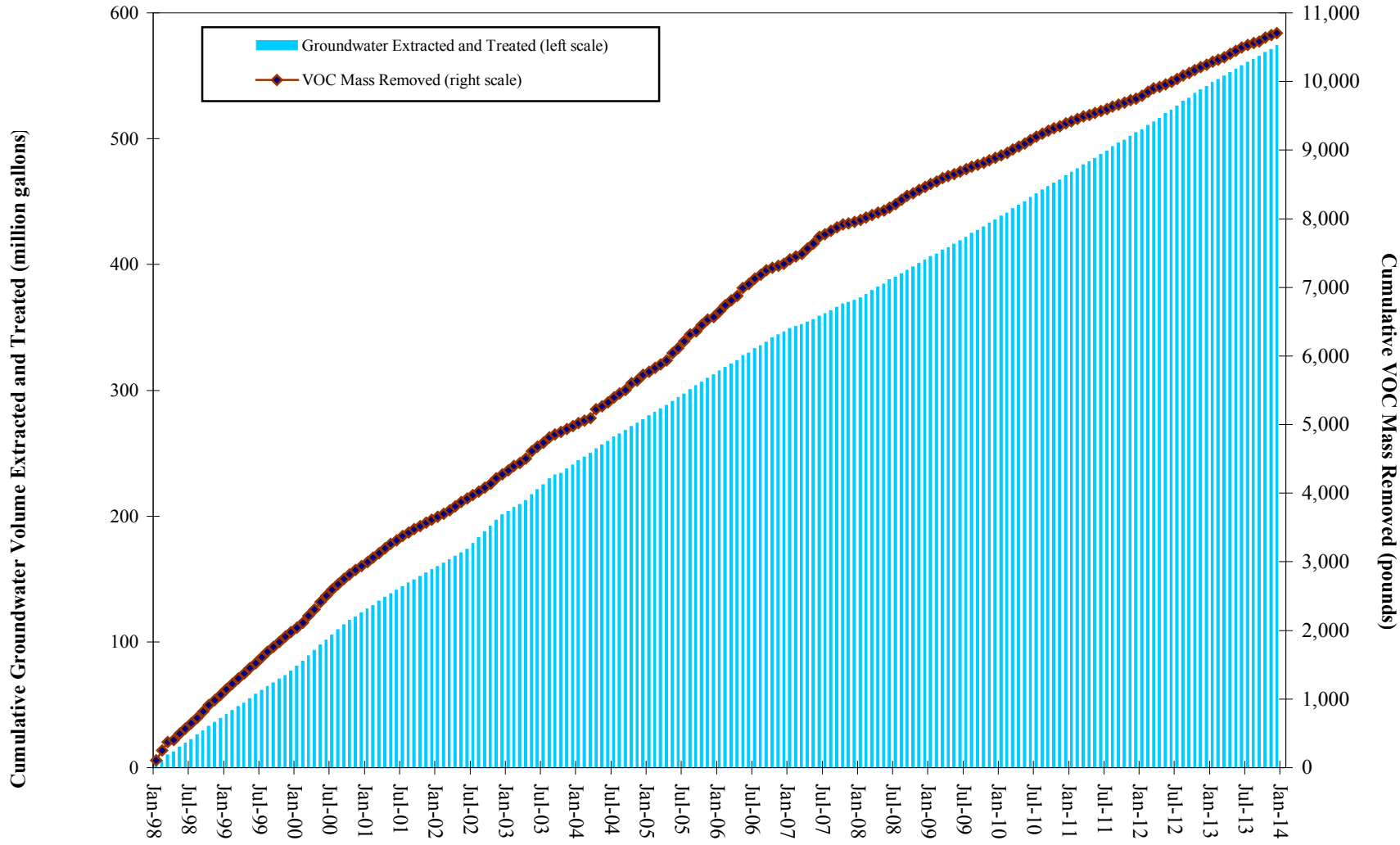
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure 4

P:\GIS\MEW\AI\Regional\2012_AR\Figure4.ai



Abbreviation:
VOC = volatile organic compound

Source: Fourth Quarter and Annual 2013 Self-Monitoring Report, MEW RGRP Treatment System, South 101 (Weiss, 2014b)

Cumulative Groundwater Extracted and VOC Mass Removed, South of 101

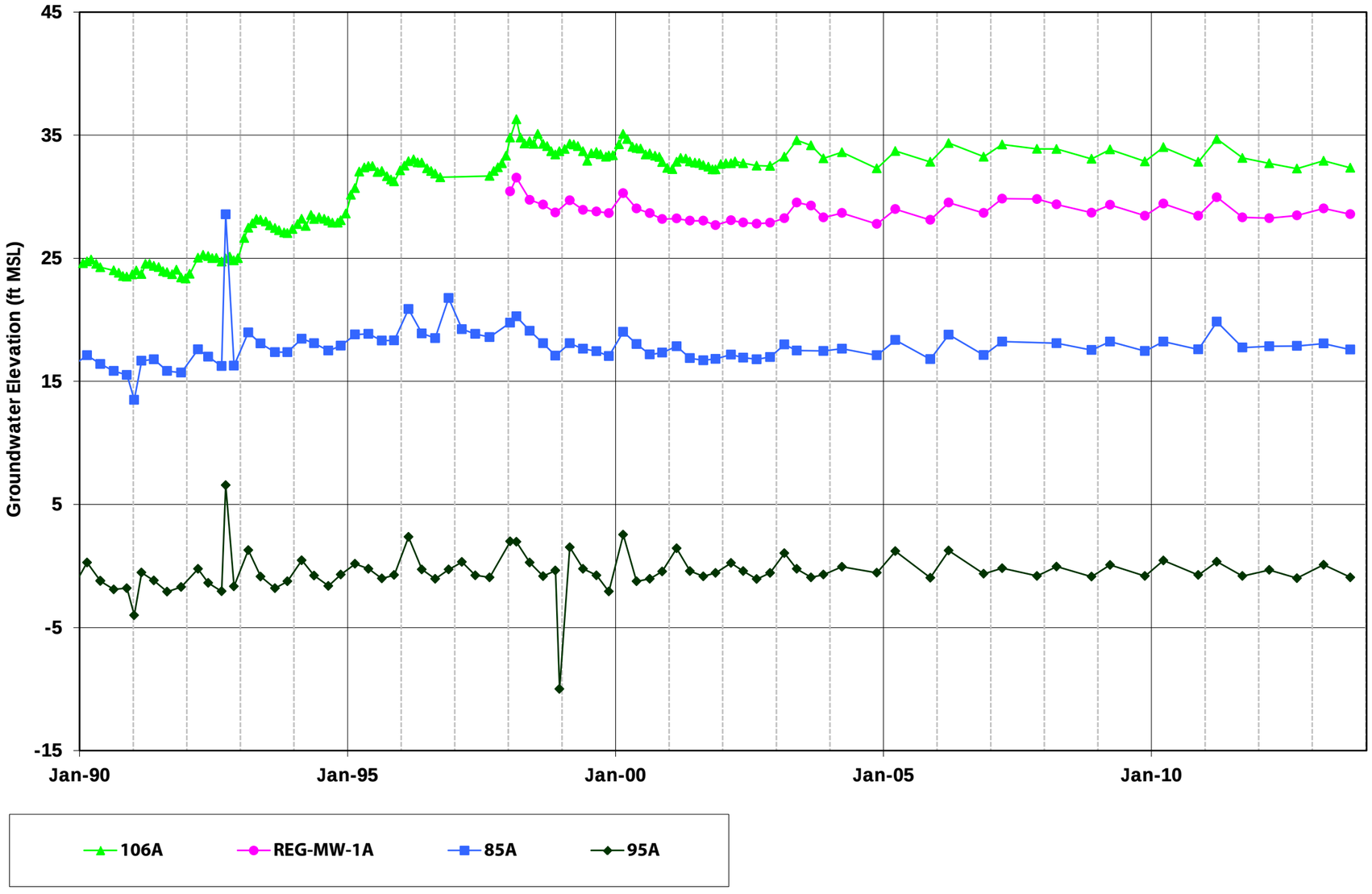
MEW Regional Groundwater Remediation Program
Mountain View, California

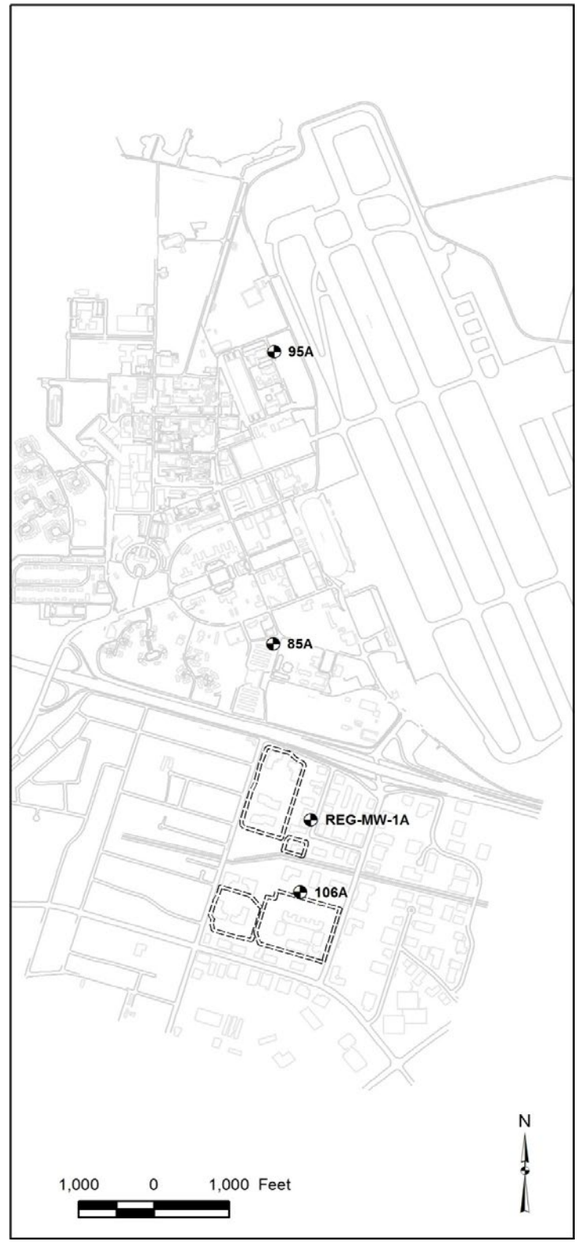
Geosyntec consultants

Oakland | April 2014

Figure 5

P:\GIS\MEW\AI\Regional\2012_AR\Figure5.ai





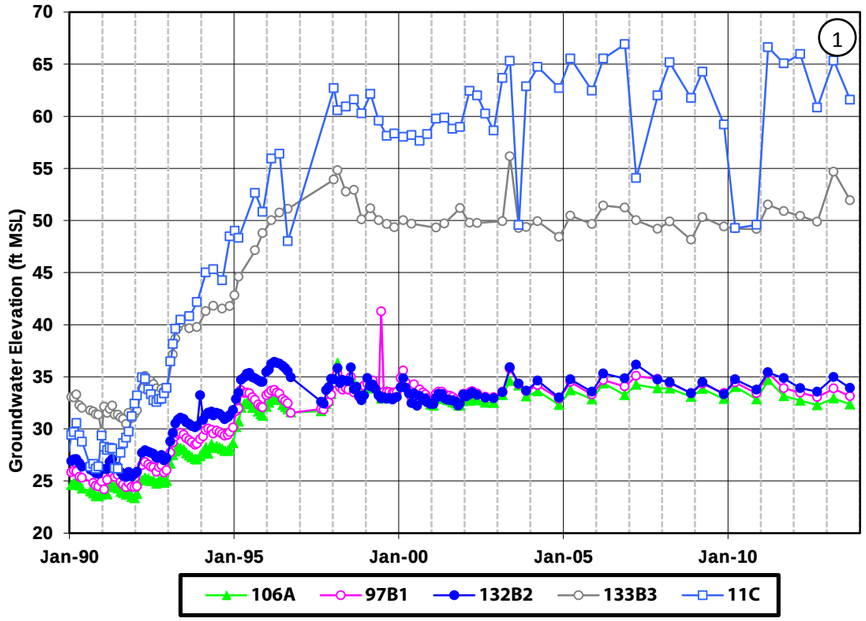
Hydrographs of Selected A Zone Wells
January 1990 through December 2013
MEW Regional Groundwater Remediation Program
Mountain View, California

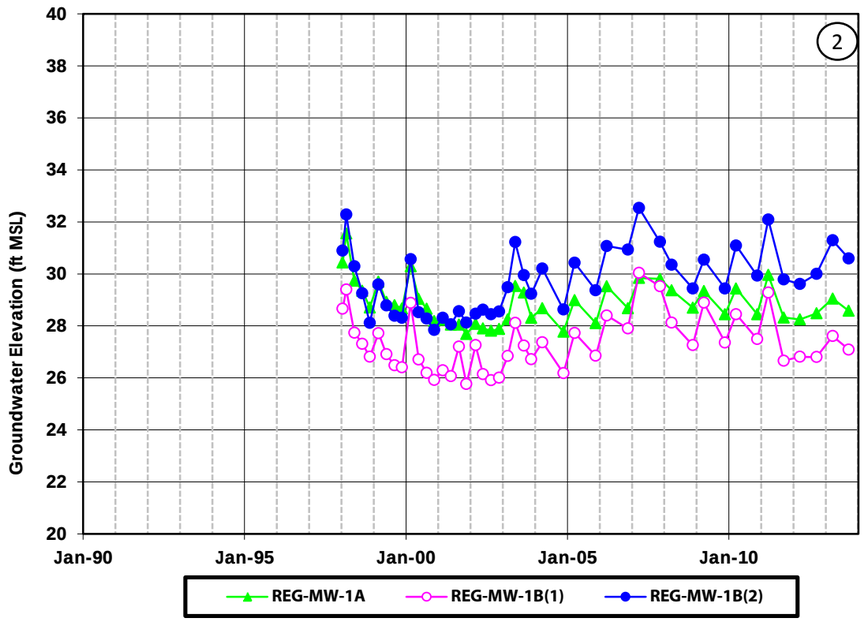
Geosyntec consultants

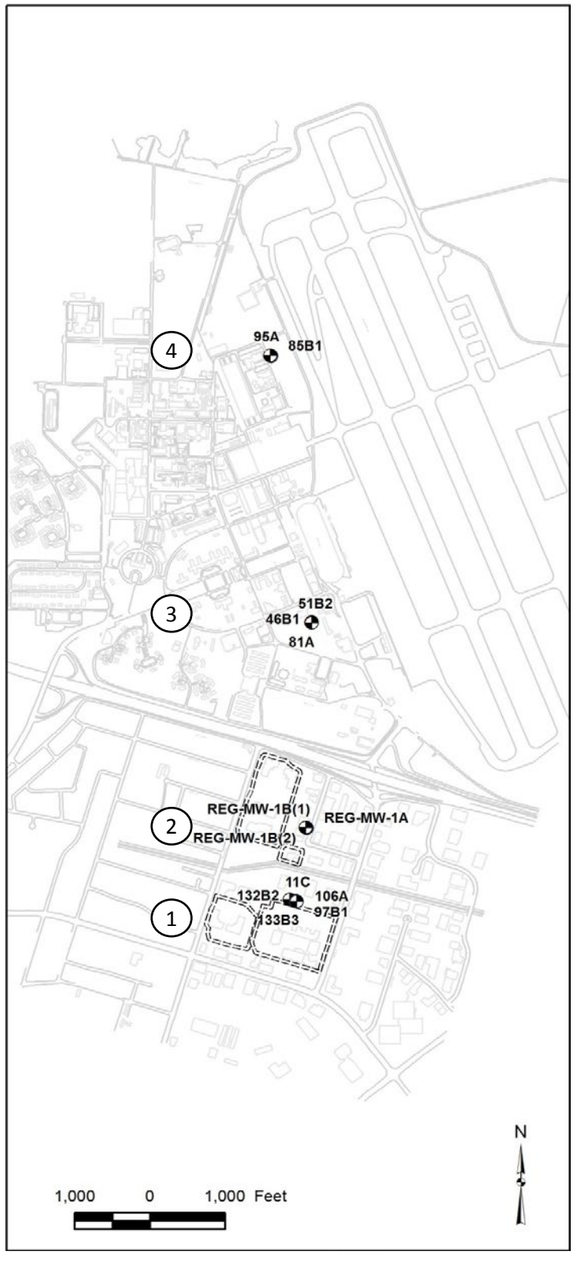
Figure 6

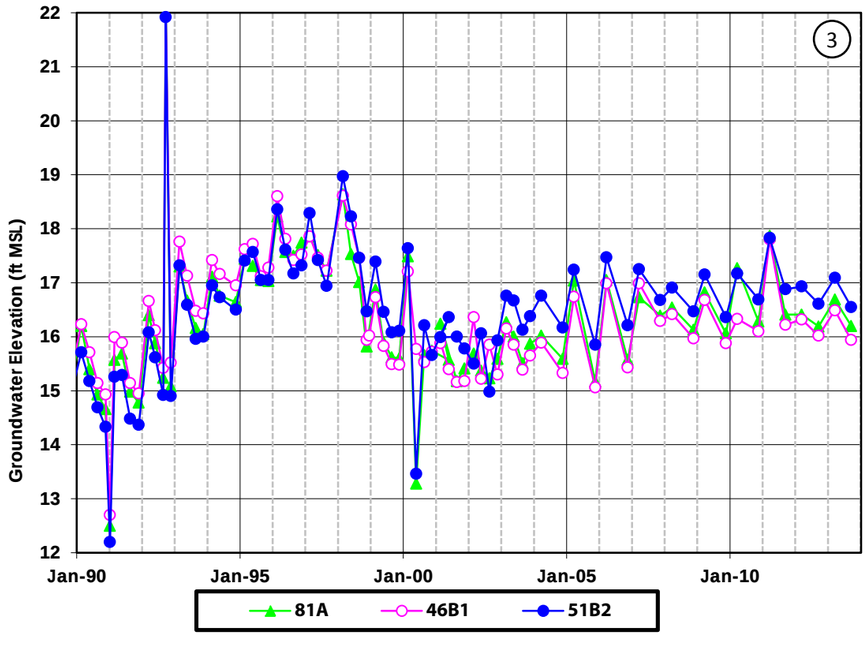
Oakland | April 2014

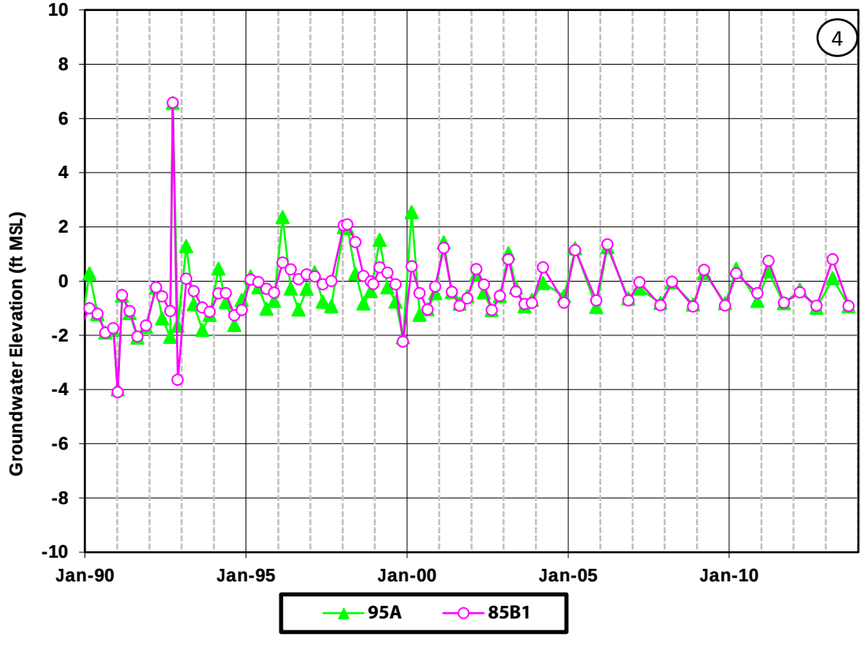
P:\GIS\MEW\Excel\Regional\2013_AR\TimeSeries\[Fig06_A_GWE_Timeseries.xlsx]











Hydrographs of Selected Wells Across Water-Bearing Zones
January 1990 through December 2013

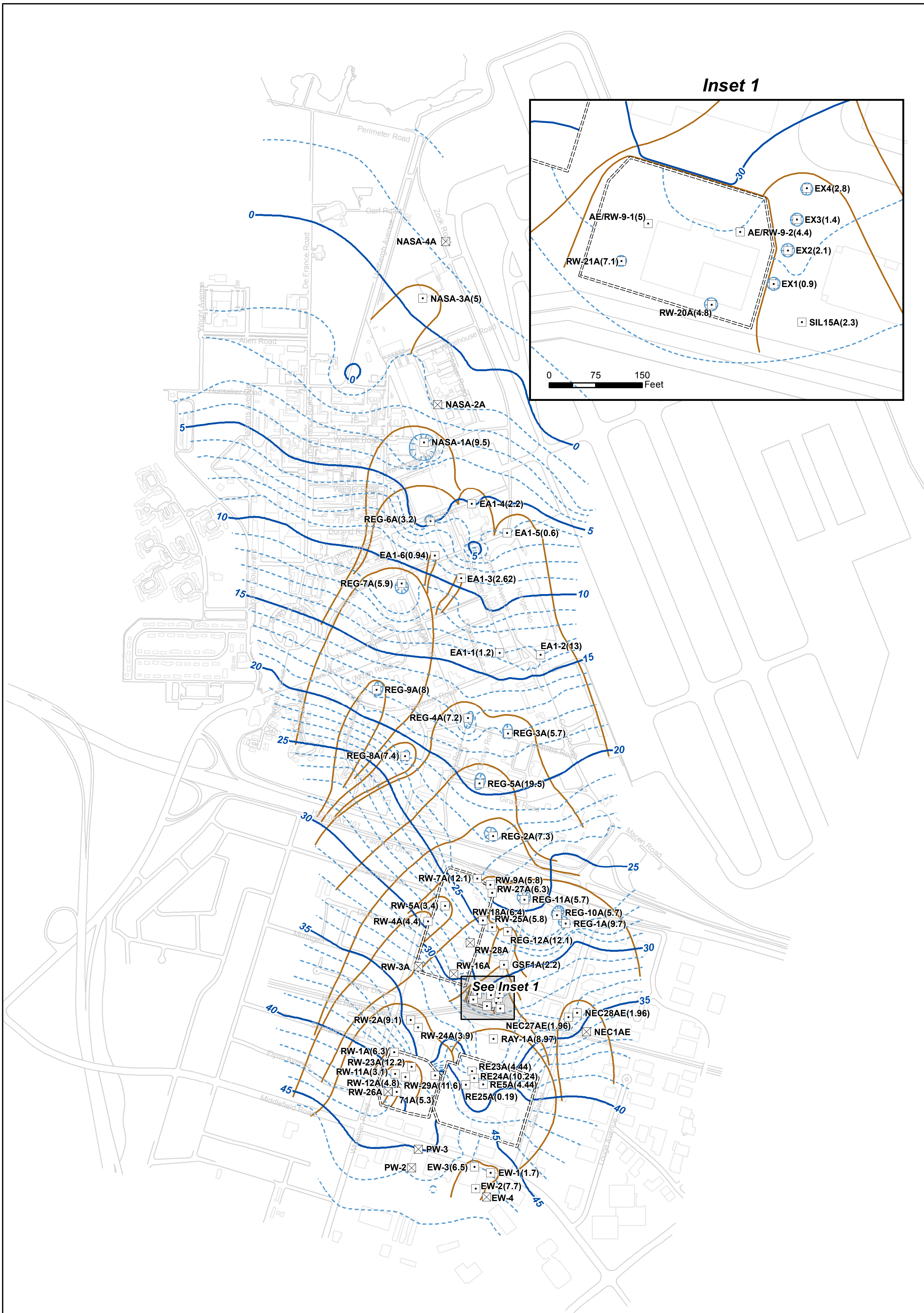
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **7**

P:\GIS\MEW\Excel\Regional\2013_AR\TimeSeries\[Fig07_Vertical_GWE_Timeseries.xlsx]



Legend

⊡ Recovery Well On; Active	**Groundwater Elevation Contours**		Estimated Capture Zone
⊠ Recovery Well Off; Inactive	1 foot interval		Slurry Wall
	5 foot interval		Building
			Road

RW-25A(5.8) Well ID with Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 15 March 2013

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

N

A/A1 Zone Groundwater Elevation Contours and Estimated Capture Zones 21 March 2013

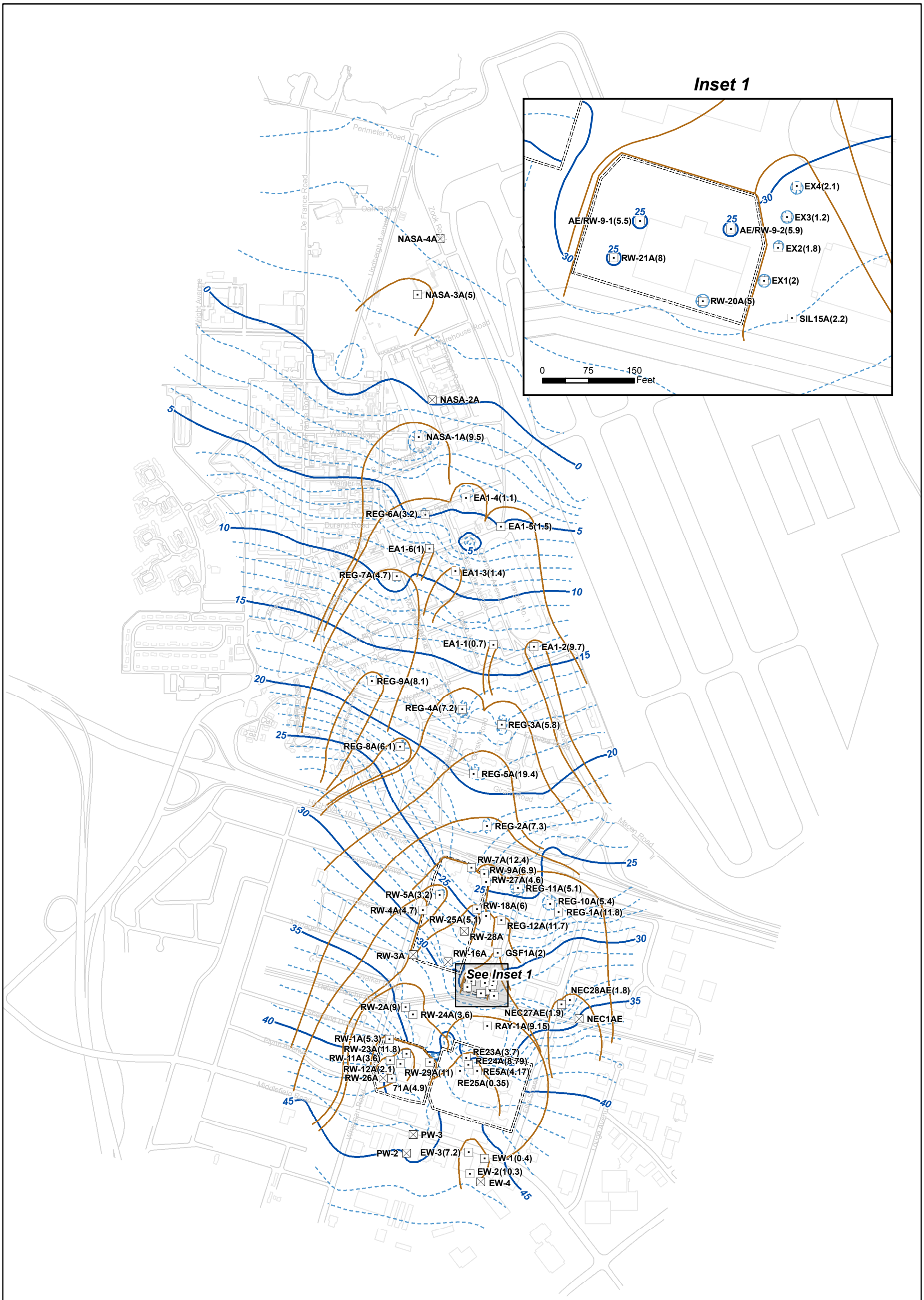
MEW Regional Groundwater Remediation Program Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure 8

P:\GIS\MEW\Project\Regional\2013_AR\Fig08_GW_AA1_Mar_CZ.mxd | 4/10/2014 1:50:07 PM



Legend

- Recovery Well On
- Recovery Well Off

Groundwater Elevation Contours

- 1 foot interval
- 5 foot interval
- Estimated Capture Zone
- Slurry Wall
- Building
- Road

RW-25A(5.1) Well ID with Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 19 September 2013

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

N

A/A1 Zone Groundwater Elevation Contours and Estimated Capture Zones 19 September 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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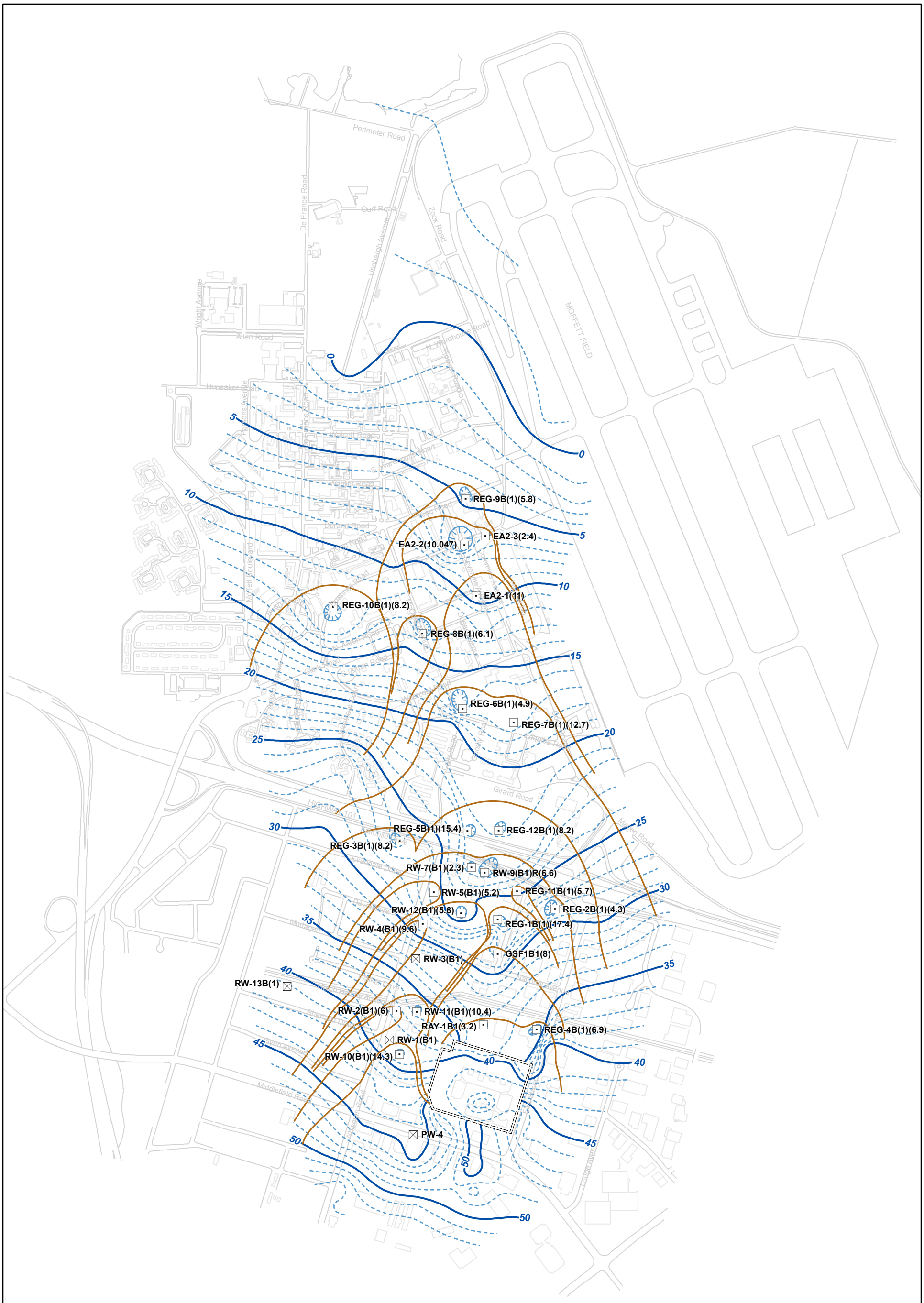
Figure **9**

P:\GIS\MEW\Project\Regional\2013_AR\Fig09_GW_AA1_Sept_CZ.mxd | 4/10/2014 1:51:28 PM



Legend

- Recovery Well On; Active
- Recovery Well Off; Inactive

Groundwater Elevation Contours

- 1 foot interval
- 5 foot interval

- Estimated Capture Zone
- Slurry Wall
- Building
- Road

RAY-1B1(3.2) Well ID with Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 21 March 2013

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

N

1,000 500 0 1,000 Feet

B1/A2 Zone Groundwater Elevation Contours and Estimated Capture Zones 21 March 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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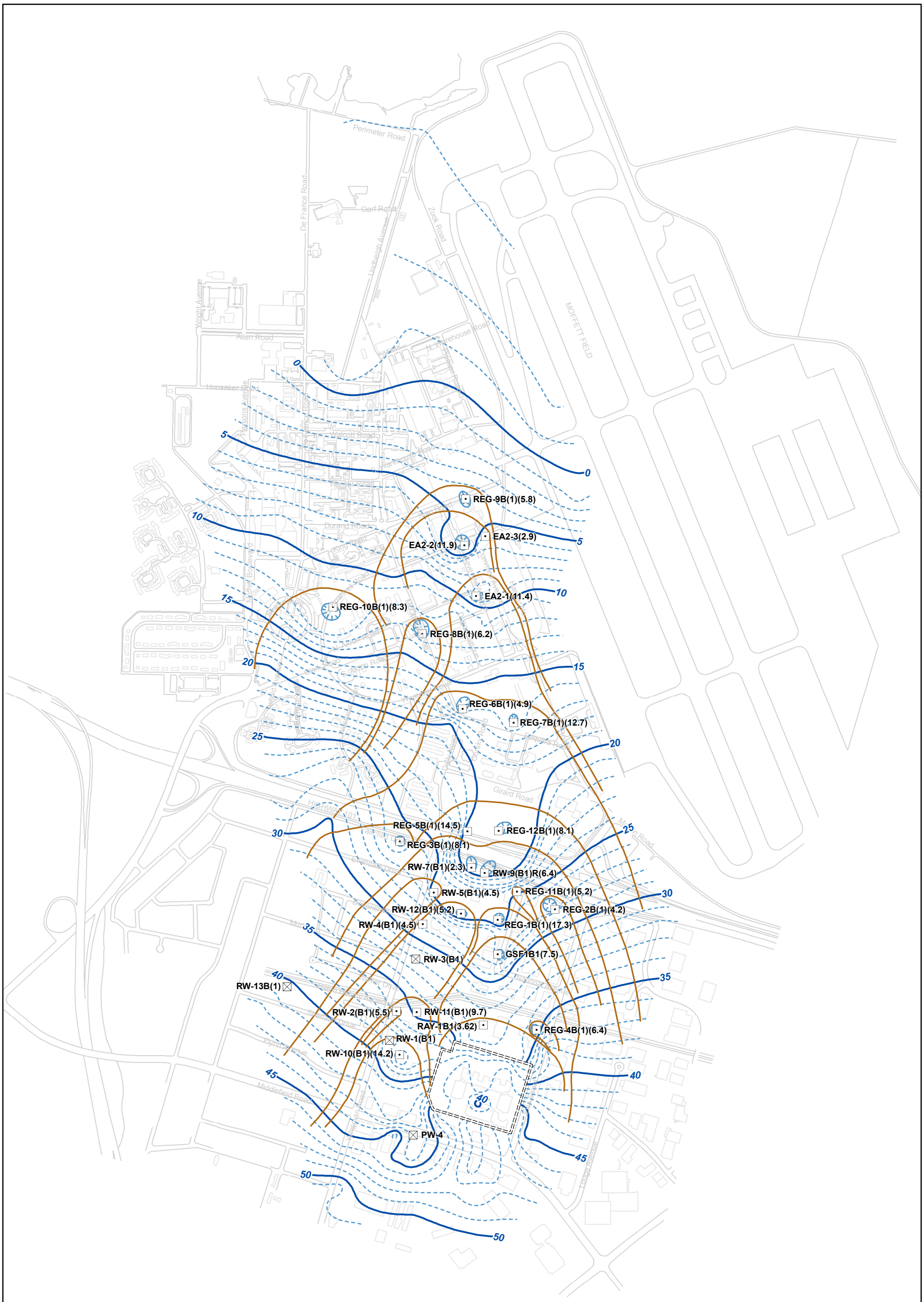
Figure **10**

P:\GIS\MEW\Project\Regional\2013_AR\Fig10_GW_B1_Mar_CZ.mxd | 4/10/2014 1:52:29 PM



Legend

- Recovery Well On; Active
- Recovery Well Off; Inactive
- **Groundwater Elevation Contours**
  - 1 foot interval
  - 5 foot interval
- Estimated Capture Zone
- Slurry Wall
- Building
- Road

RAY-1B1(3.62) Well ID with Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 19 September 2013

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

N

1,000 500 0 1,000 Feet

B1/A2 Zone Groundwater Elevation Contours and Estimated Capture Zones 19 September 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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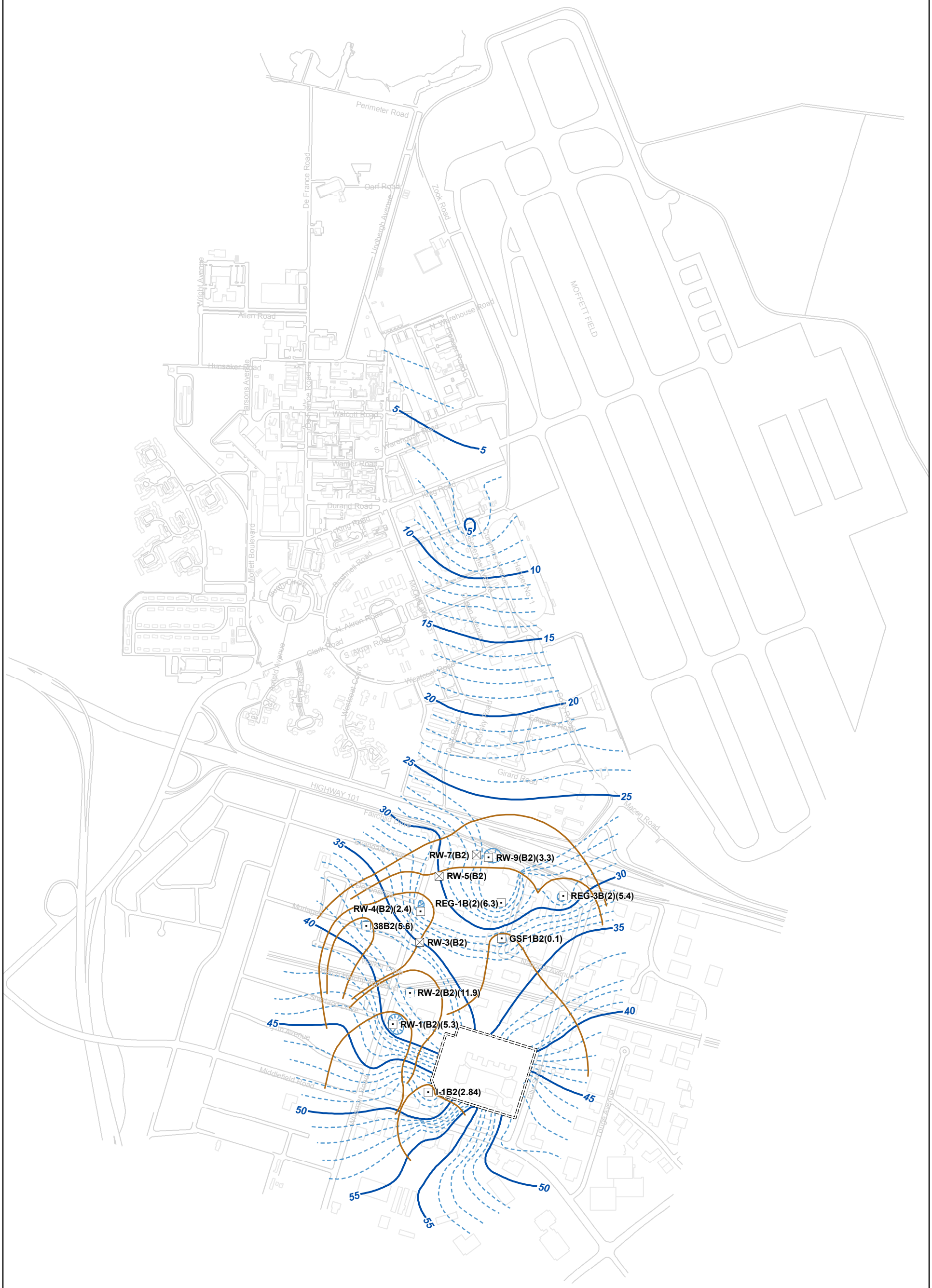
Figure **11**

P:\GIS\MEW\Project\Regional\2013_AR\Fig11_GW_B1_Sept_CZ.mxd | 4/10/2014 1:53:17 PM



Legend

- Recovery Well On; Active
- Recovery Well Off; Inactive

Groundwater Elevation Contours

- 1 foot interval
- 5 foot interval
- Estimated Capture Zone
- Slurry Wall
- Building
- Road

RW-1(B2)(5.3) Well ID with Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 15 March 2013

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

N

B2 Zone Groundwater Elevation Contours and Estimated Capture Zones 21 March 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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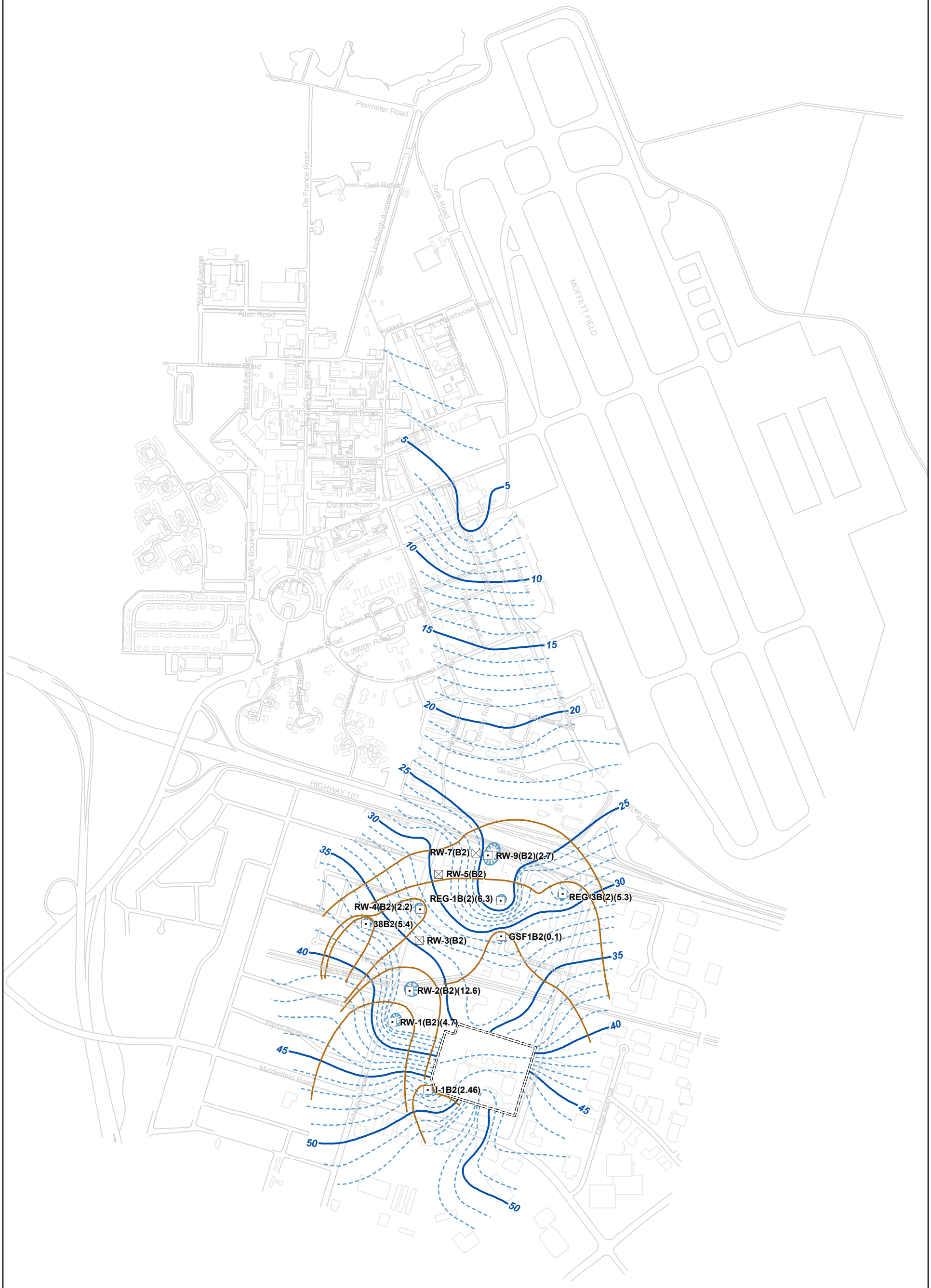
Figure **12**

P:\GIS\MEW\Project\Regional\2013_AR\Fig12_GW_B2_Mar_CZ.mxd | 4/10/2014 1:54:05 PM



Legend

- Recovery Well On; Active
- Recovery Well Off; Inactive

Groundwater Elevation Contours

- 1 foot interval
- 5 foot interval

- Estimated Capture Zone
- Slurry Wall
- Building
- Road

RW-1(B2)(4.7) Well ID with Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 19 September 2013

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

N

1,000 500 0 1,000 Feet

B2 Zone Groundwater Elevation Contours and Estimated Capture Zones 19 September 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **13**

P:\GIS\MEW\Project\Regional\2013_AR\Fig13_GW_B2_Sept_CZ.mxd | 4/10/2014 1:54:55 PM

Legend

- ☒ Recovery Well Off; Inactive
- **65B3** Well ID

Groundwater Elevation Contours

- 1 foot interval
- 5 foot interval

- Building
- Road

N

1,000 500 0 1,000 Feet

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

B3 Zone Groundwater Elevation Contours
21 March 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **14**

P:\GIS\MEW\Project\Regional\2013_AR\Fig14_GW_B3_Mar_CZ.mxd | 4/10/2014 1:55:55 PM

Legend

- ☒ Recovery Well Off; Inactive
- **65B3** Well ID

Groundwater Elevation Contours

- 1 foot interval
- 5 foot interval

Building

Road

N

1,000 500 0 1,000 Feet

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

B3 Zone Groundwater Elevation Contours
19 September 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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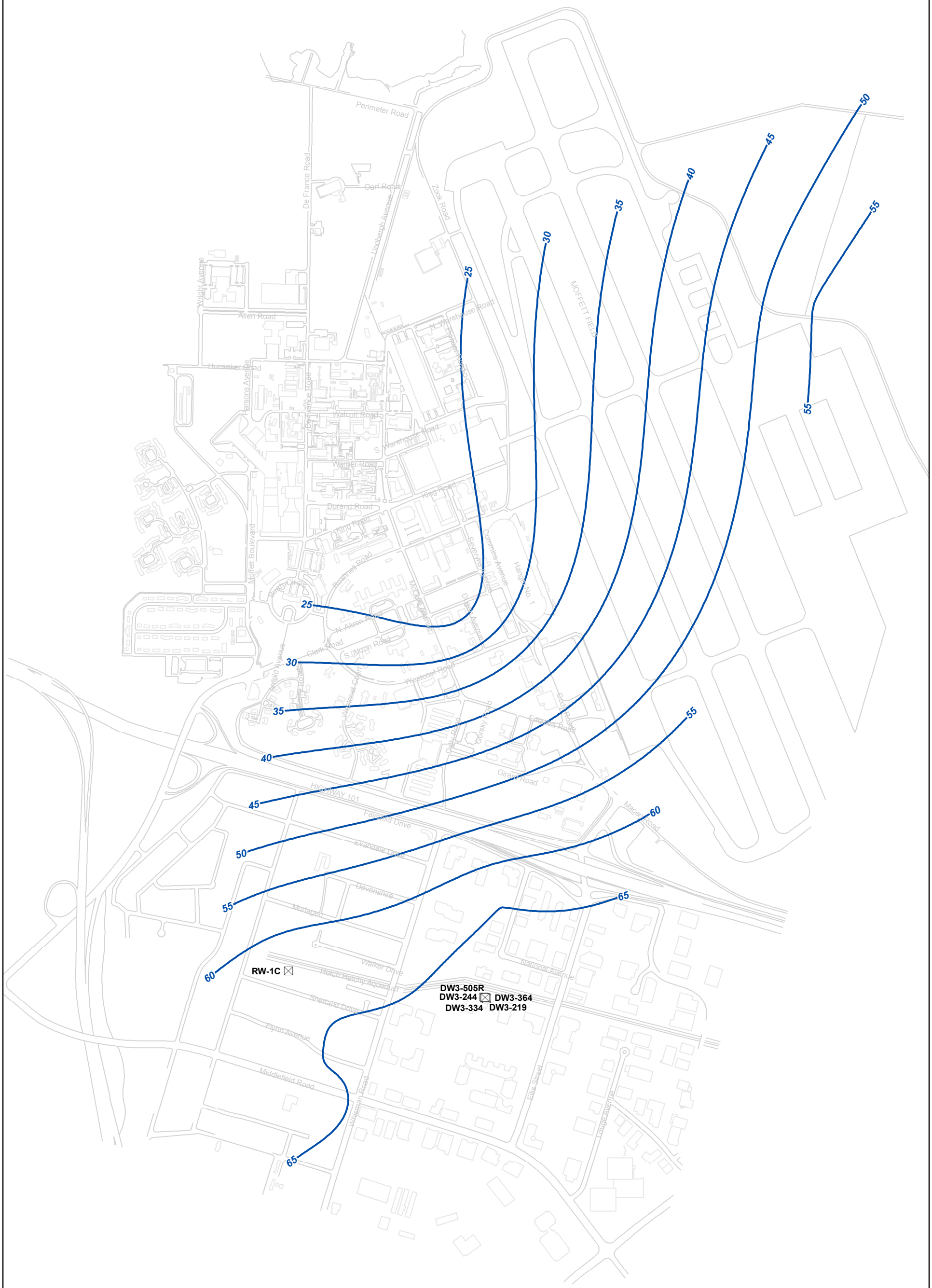
Figure **15**

P:\GIS\MEW\Project\Regional\2013_AR\Fig15_GW_B3_Sept_CZ.mxd | 4/10/2014 1:57:32 PM



Legend

- Recovery Well Off; Inactive
- RW-1C Well ID

Groundwater Elevation Contours

- 1 foot interval
- 5 foot interval
- Building
- Road

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

N

C and Deep Zone Groundwater Elevation Contours 21 March 2013

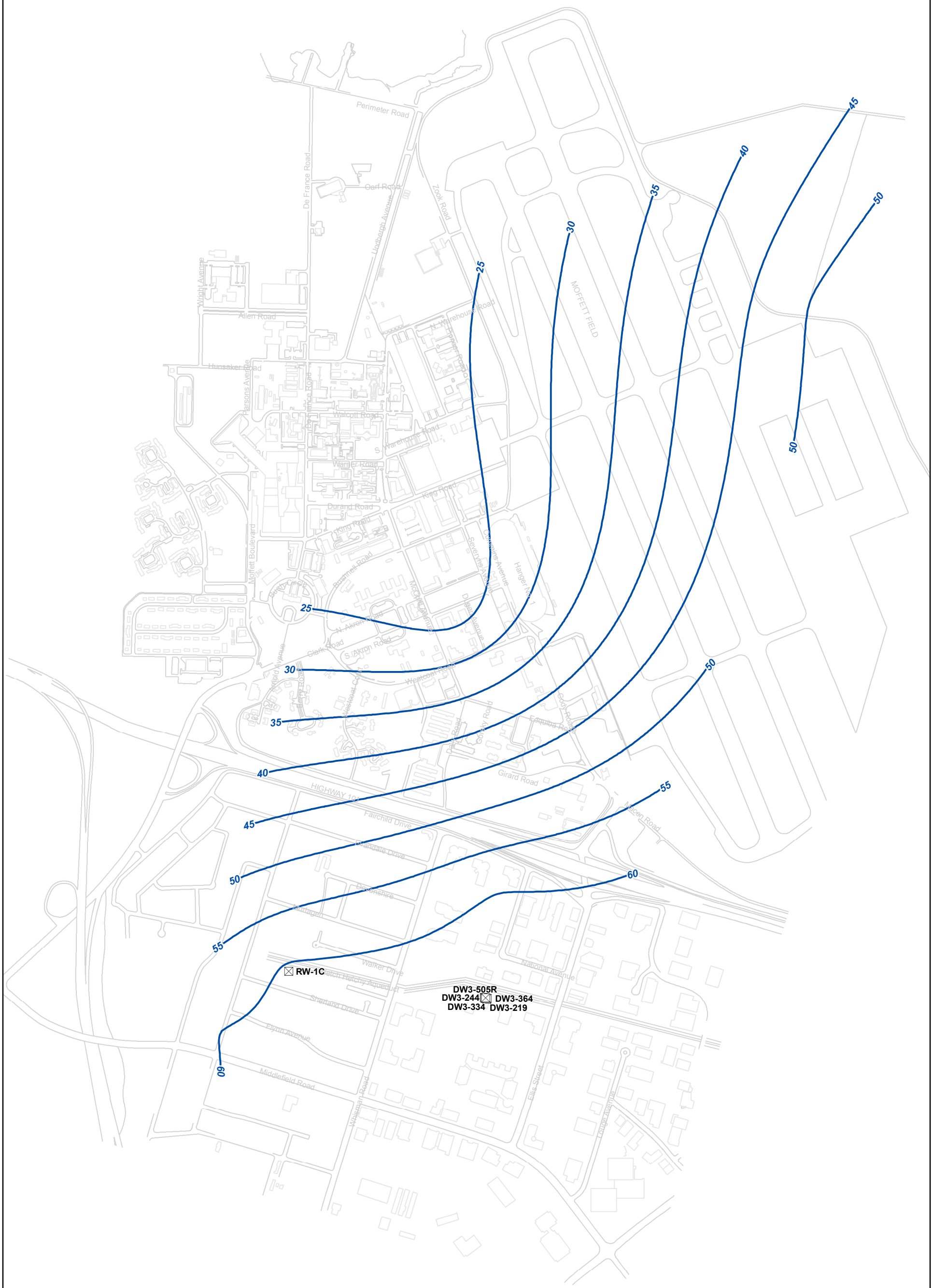
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **16**

P:\GIS\MEW\Project\Regional\2013_AR\Fig16_GW_CDeep_Mar_CZ.mxd | 4/10/2014 1:58:47 PM



Legend

- ☒ Recovery Well Off
- **Groundwater Elevation Contours**
  - 1 foot interval
  - 5 foot interval
- Building
- Road
- **RW-1C** Well ID

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

N

C and Deep Zone Groundwater Elevation Contours
19 September 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

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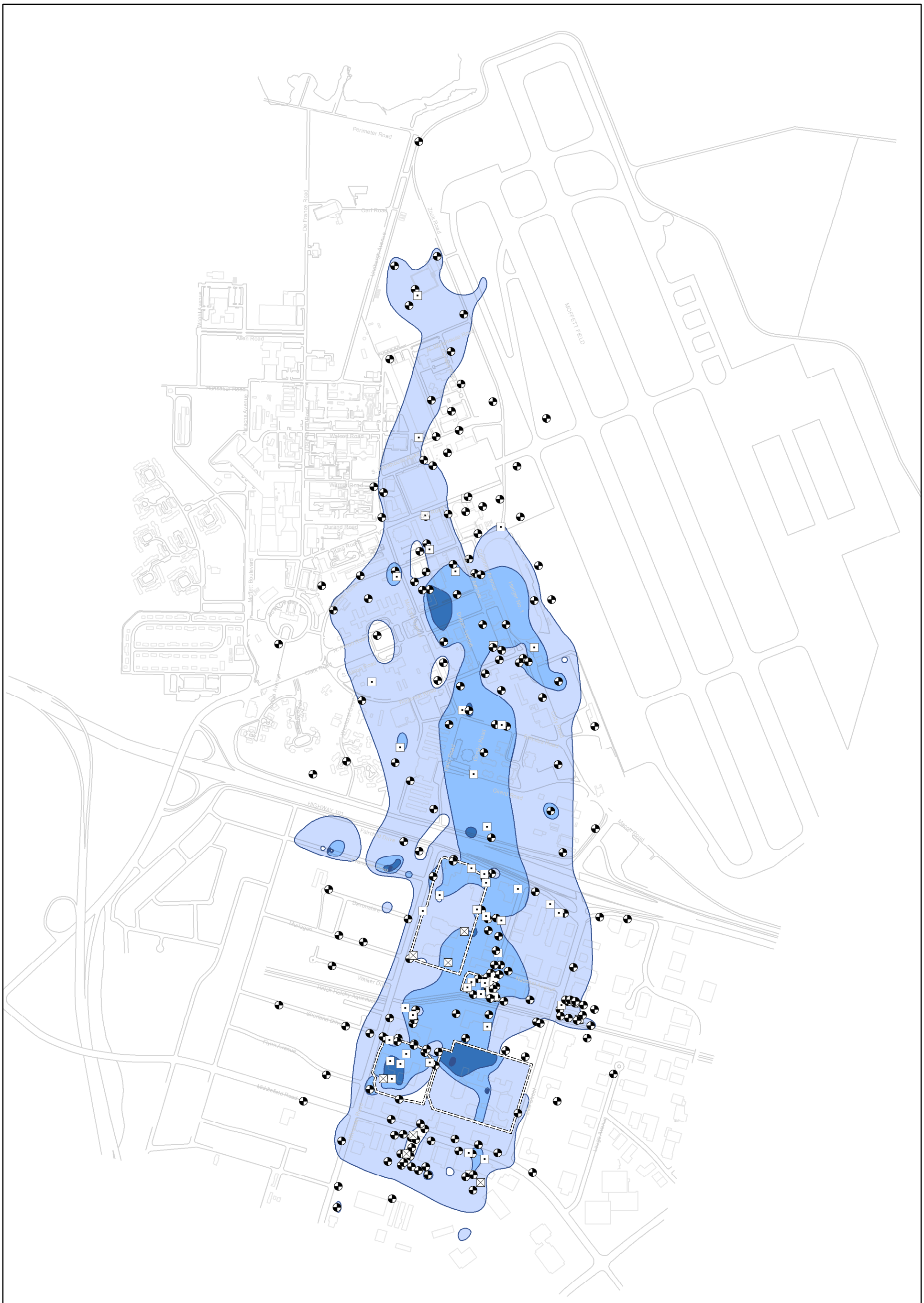
Figure **17**

P:\GIS\MEW\Project\Regional\2013_AR\Fig17_GW_CDeep_Sept_CZ.mxd | 4/10/2014 2:00:03 PM



Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well

TCE Concentration

- 5 - 100 µg/L
- 100 - 1,000 µg/L
- 1,000 - 10,000 µg/L
- Greater than 10,000 µg/L

==== Slurry Wall

Building

Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
µg/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.
Figure shows only those wells sampled in 2013.

A/A1 Zone TCE Concentrations September/October 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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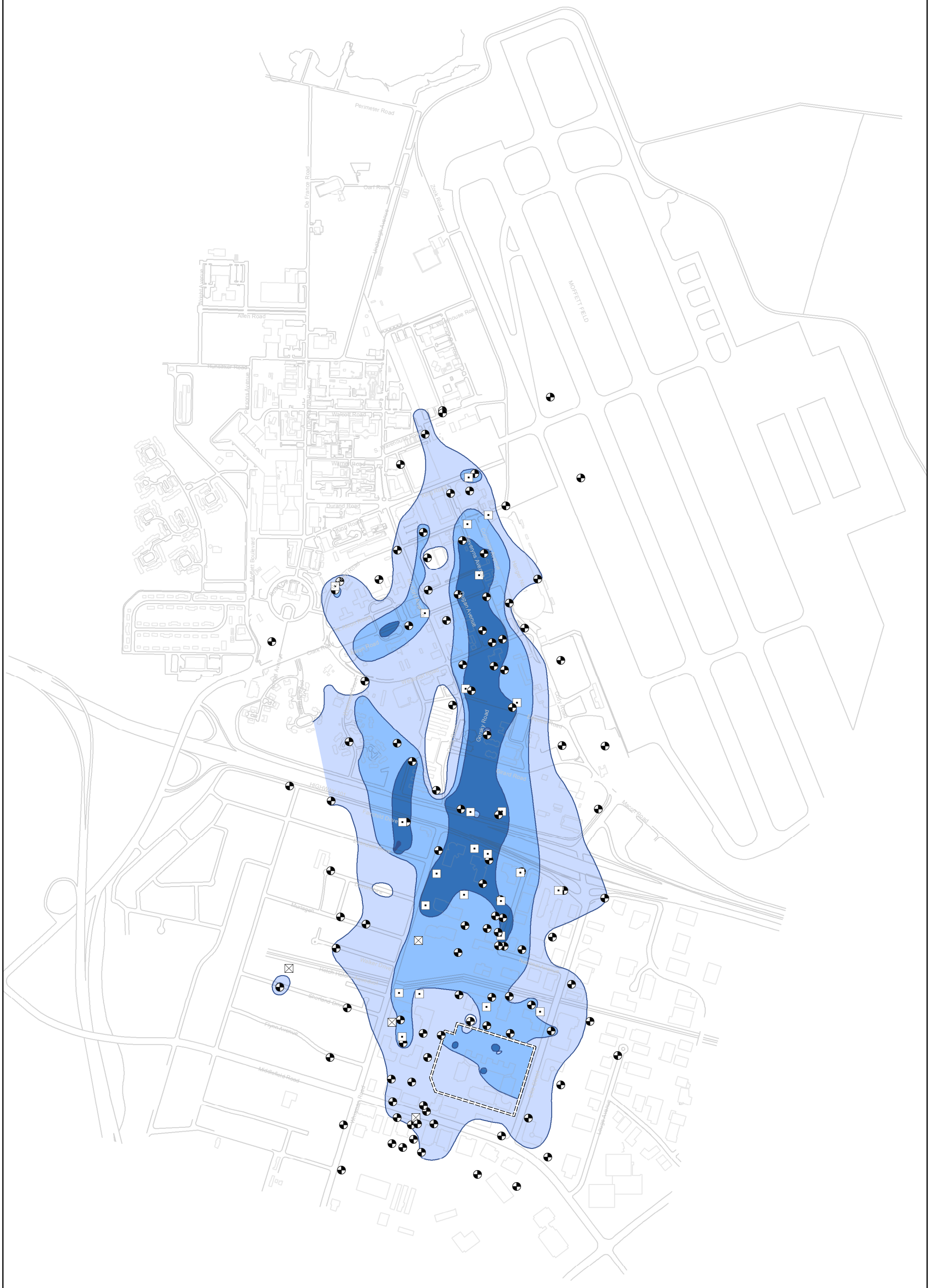
Figure **18**

P:\GIS\MEW\Project\Regional\2013_AR\Fig18_TCE_AA1_Sept.mxd | 4/10/2014 2:00:36 PM



Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well

TCE Concentration

- 5 - 100 µg/L
- 100 - 1,000 µg/L
- 1,000 - 10,000 µg/L
- Greater than 10,000 µg/L

==== Slurry Wall
Building
Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
µg/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.
Figure shows only those wells sampled in 2013.

B1/A2 Zone TCE Concentrations
September/October 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **19**

P:\GIS\MEW\Project\Regional\2013_AR\Fig19_TCE_B1A2_Sept.mxd | 4/10/2014 2:00:58 PM

Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well

TCE Concentration

- 5 - 100 µg/L
- 100 - 1,000 µg/L
- 1,000 - 10,000 µg/L
- Greater than 10,000 µg/L

- ==== Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
µg/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.
Figure shows only those wells sampled in 2013.

B2 Zone TCE Concentrations
September/October 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **20**

P:\GIS\MEW\Project\Regional\2013_AR\Fig20_TCE_B2_Sept.mxd | 4/10/2014 2:01:18 PM

Notes:
TCE = Trichloroethene
µg/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.
Figure shows only those wells sampled in 2013.

B3 Zone TCE Concentrations
September/October 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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Figure **21**

P:\GIS\MEW\Project\Regional\2013_AR\Fig21_TCE_B3_Sept.mxd | 4/10/2014 2:01:36 PM

Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well

TCE Concentration

- 5 - 100 µg/L
- 100 - 1,000 µg/L
- 1,000 - 10,000 µg/L
- Greater than 10,000 µg/L

- ==== Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
µg/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.
Figure shows only those wells sampled in 2013.

C and Deep Zone TCE Concentrations September/October 2013

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **22**

P:\GIS\MEW\Project\Regional\2013_AR\Fig22_TCE_CDeep_Sept.mxd | 4/10/2014 2:01:57 PM

Legend

- Recovery Well On
- Recovery Well Off

TCE Concentration

- 5 - 100 µg/L
- 100 - 1,000 µg/L
- 1,000 - 10,000 µg/L
- Greater than 10,000 µg/L

- Estimated Capture Zone
- ==== Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
µg/L = micrograms per liter

A/A1 Zone TCE Concentrations and Estimated Capture Zones September/October 2013

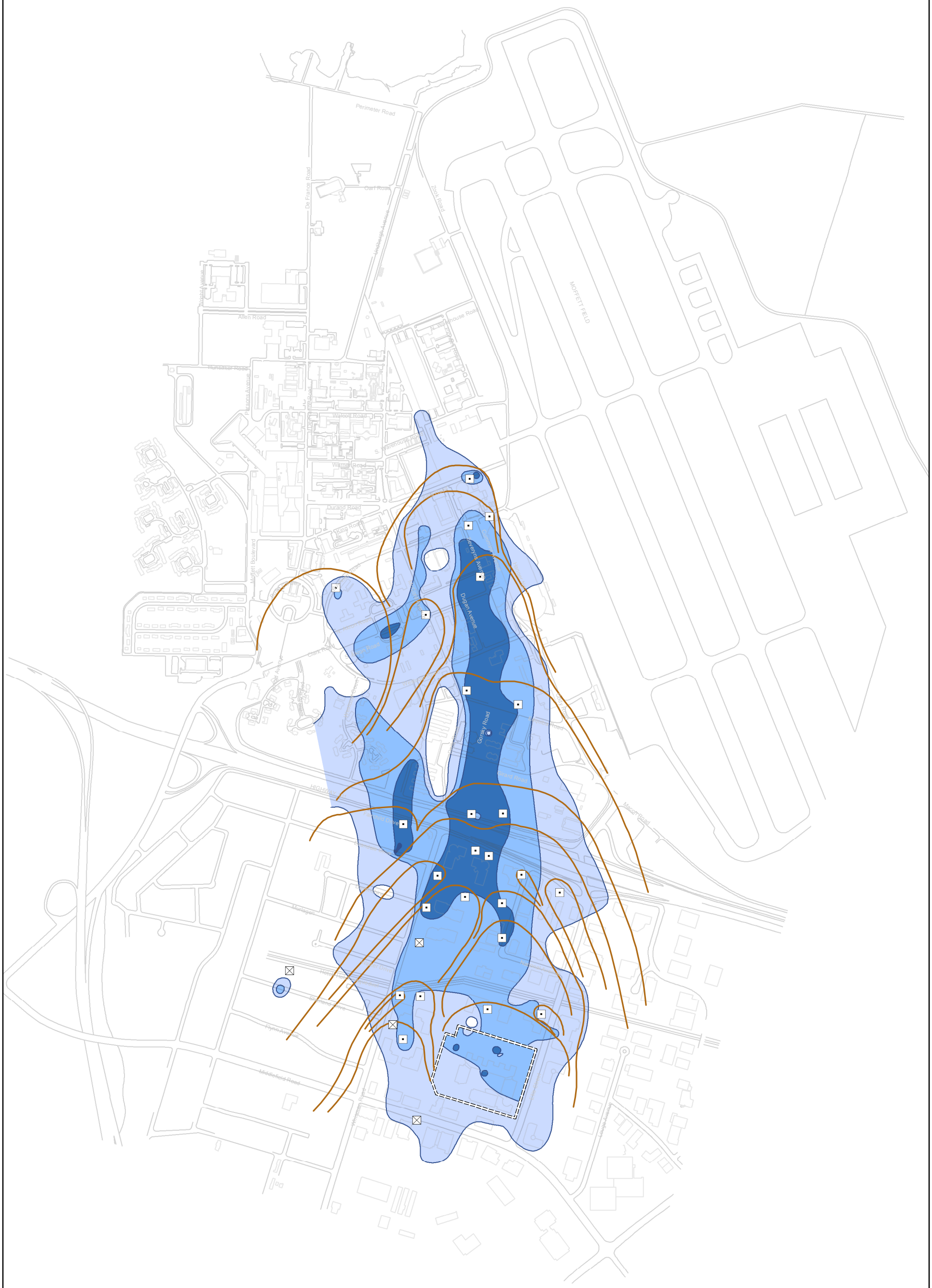
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **23**

P:\GIS\MEW\Project\Regional\2013_AR\Fig23_TCE_AA1_Sept_CZ.mxd | 4/10/2014 2:02:16 PM



B1/A2 Zone TCE Concentrations and Estimated Capture Zones September/October 2013

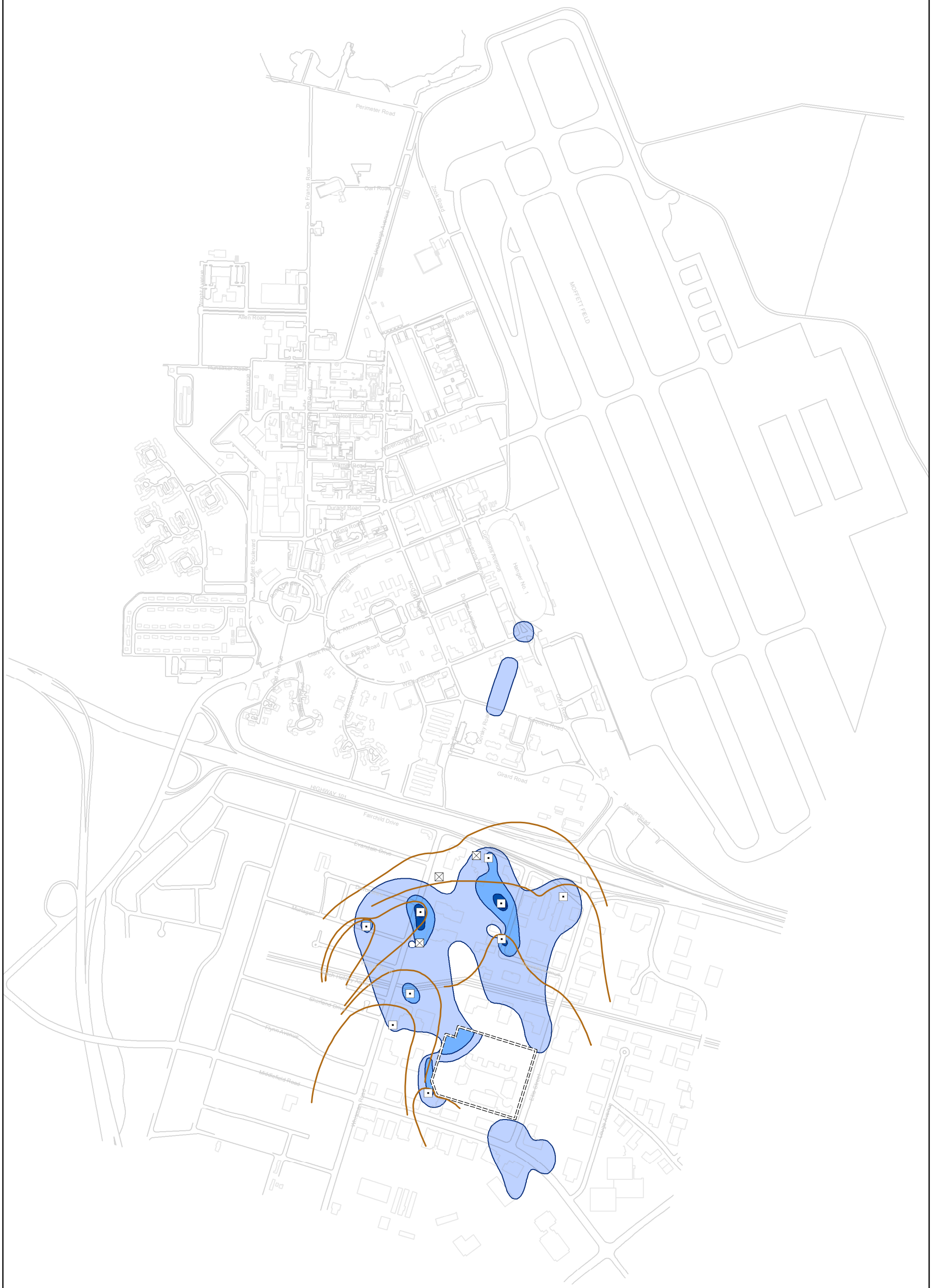
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **24**

P:\GIS\MEW\Project\Regional\2013_AR\Fig24_TCE_B1A2_Sept_CZ.mxd | 4/10/2014 2:02:36 PM



Legend

- Recovery Well On
- Recovery Well Off

TCE Concentration

- 5 - 100 µg/L
- 100 - 1,000 µg/L
- 1,000 - 10,000 µg/L
- Greater than 10,000 µg/L

- Capture Zone
- Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
µg/L = micrograms per liter

B2 Zone TCE Concentrations and Estimated Capture Zones September/October 2013

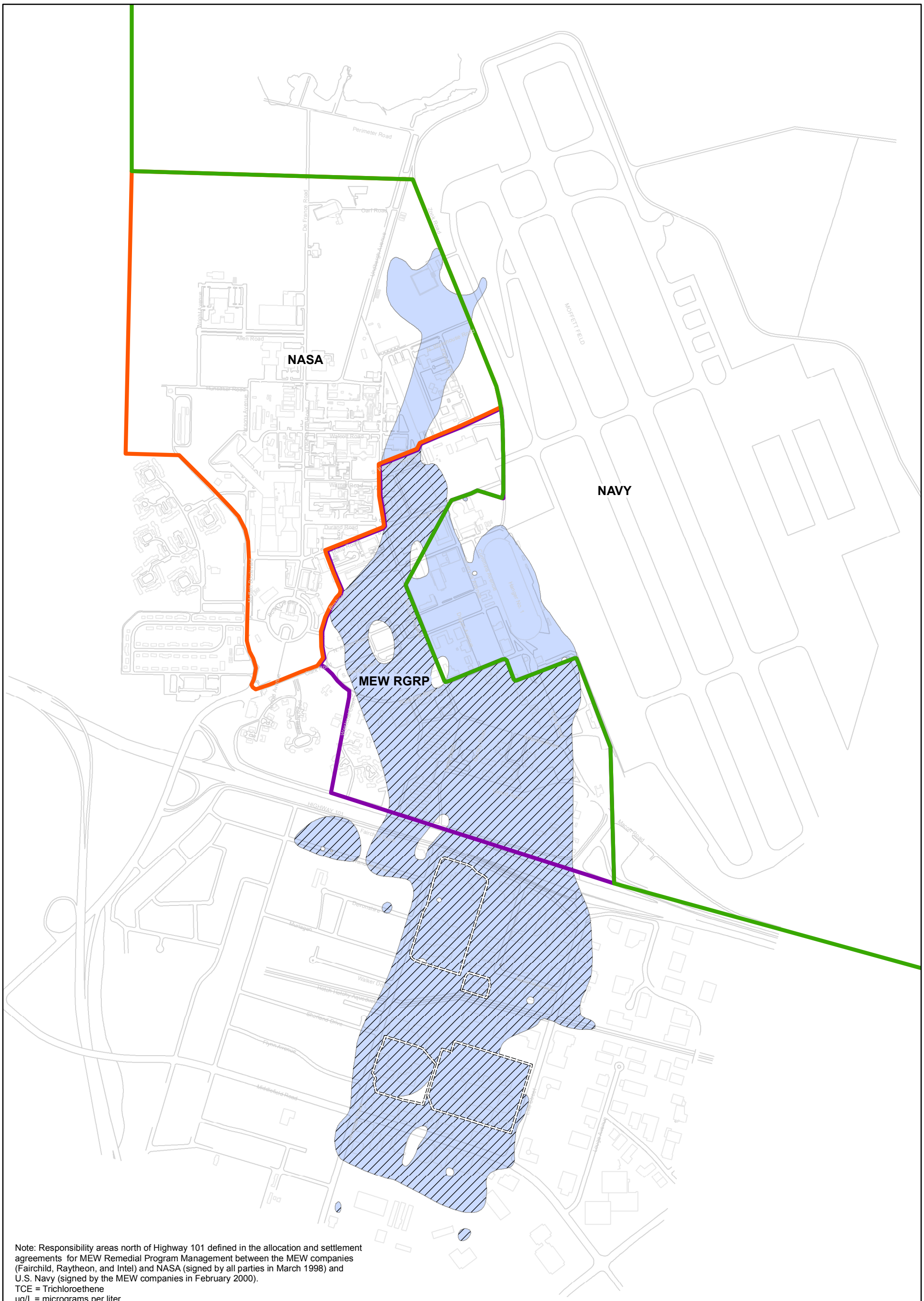
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | April 2014

Figure **25**

P:\GIS\MEW\Project\Regional\2013_AR\Fig25_TCE_B2_Sept_CZ.mxd | 4/10/2014 2:02:57 PM



Note: Responsibility areas north of Highway 101 defined in the allocation and settlement agreements for MEW Remedial Program Management between the MEW companies (Fairchild, Raytheon, and Intel) and NASA (signed by all parties in March 1998) and U.S. Navy (signed by the MEW companies in February 2000).
TCE = Trichloroethene
µg/L = micrograms per liter

Legend

- NASA Area of Responsibility
- U.S. Navy Area of Responsibility
- MEW RGRP (North of 101) Area of Responsibility
- MEW RGRP Target Capture Area
- 5 µg/L TCE Concentration Boundary
- ==== Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Target Capture Area, A/A1 Zone

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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Figure **26**

P:\GIS\MEW\Project\Regional\2013_AR\Fig26_Target_Capture_AA1.mxd

NASA

NAVY

MEW RGRP

Note: Responsibility areas north of Highway 101 defined in the allocation and settlement agreements for MEW Remedial Program Management between the MEW companies (Fairchild, Raytheon, and Intel) and NASA (signed by all parties in March 1998) and U.S. Navy (signed by the MEW companies in February 2000).
TCE = Trichloroethene
µg/L = micrograms per liter

Legend

- NASA Area of Responsibility
- U.S. Navy Area of Responsibility
- MEW RGRP (North of 101) Area of Responsibility
- MEW RGRP Target Capture Area
- 5 µg/L TCE Concentration Boundary
- ==== Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Target Capture Area, B1/A2 Zone

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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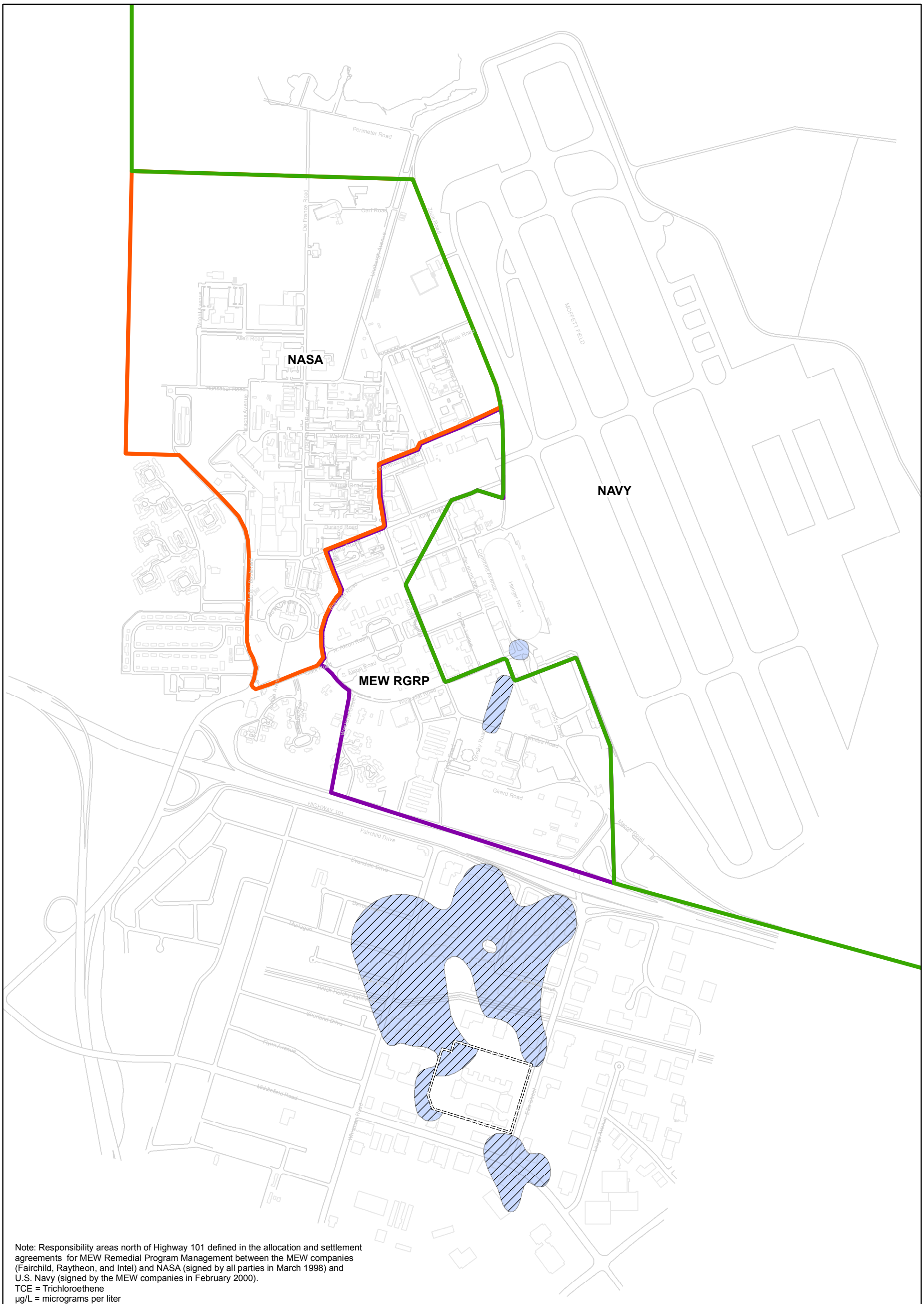
Figure **27**



Note: Responsibility areas north of Highway 101 defined in the allocation and settlement agreements for MEW Remedial Program Management between the MEW companies (Fairchild, Raytheon, and Intel) and NASA (signed by all parties in March 1998) and U.S. Navy (signed by the MEW companies in February 2000).
TCE = Trichloroethene
µg/L = micrograms per liter

Legend

- NASA Area of Responsibility
- U.S. Navy Area of Responsibility
- MEW RGRP (North of 101) Area of Responsibility
- MEW RGRP Target Capture Area
- 5 µg/L TCE Concentration Boundary
- ==== Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Target Capture Area, B2 Zone

MEW Regional Groundwater Remediation Program
Mountain View, California

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Figure **28**