Virgilio Cocianni
Remediation Manager

Schlumberger Technology Corporation
205 Industrial Boulevard
Sugar Land, Texas 77478
Tel: 281-285-4747
Fax: 281-285-7656

February 27, 2015

Alana Lee
Groundwater Remediation Project Manager
Superfund Division SFD-7-3
EPA Region IX
75 Hawthorne Street
San Francisco, CA 94105

Subject: **Pilot Study Implementation Report – Evandale Avenue Sources**
Middlefield-Ellis-Whisman Area
Regional Groundwater Remediation Program
Mountain View, California

Dear Ms. Lee:

Enclosed please find the Pilot Study Implementation Report for the *in situ* chemical oxidation (ISCO) pilot study that was implemented in 2014 at two locations along Evandale Avenue in Mountain View, California. The report is submitted on behalf of the Middlefield-Ellis-Whisman (MEW) Regional Groundwater Remediation Program (RGRP).

If you have any questions about the enclosed report, please feel free to contact me.

Very truly yours,

V. COCIANNI

Virgilio Cocianni
Remediation Manager

Enclosure

CC: MEW Distribution List

Prepared for

Schlumberger Technology Corporation
205 Industrial Boulevard
Sugar Land, Texas 77478

PILOT STUDY IMPLEMENTATION REPORT EVANDALE AVENUE SOURCES

MIDDLEFIELD-ELLIS-WHISMAN REGIONAL GROUNDWATER REMEDIATION PROGRAM MOUNTAIN VIEW, CALIFORNIA

Prepared by

Geosyntec consultants

engineers | scientists | innovators

1111 Broadway, 6th Floor
Oakland, California 94607

Project Number: WR1128C

27 February 2015

Pilot Study Implementation Report
Evandale Avenue Sources
Middlefield-Ellis-Whisman
Regional Groundwater Remediation Program
Mountain View, California

Prepared by

Geosyntec Consultants, Inc.
1111 Broadway, 6th Floor
Oakland, California 94607

REGISTERED PROFESSIONAL ENGINEER
ERIC J. SUCHOMEL
C 73410
Exp. 12/31/16
CIVIL
STATE OF CALIFORNIA

Eric J. Suchomel, Ph.D., P.E.
Senior Engineer

John D. Gallinatti, C.Hg.
Principal Hydrogeologist

Project Number: WR1128C
27 February 2015

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ACRONYMS AND ABBREVIATIONS

Cr(VI)	Hexavalent chromium
DO	Dissolved oxygen
EPA	United States Environmental Protection Agency
HASP	Health and Safety Plan
ISCO	In-Situ Chemical Oxidation
µg/L	micrograms per Liter
MCL	Maximum Contaminant Level
MEW	Middlefield-Ellis-Whisman
NFPA	National Fire Protection Association
ORP	Oxidation Reduction Potential
PID	photoionization detector
PPE	Personal Protective Equipment
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RGRP	Regional Groundwater Remediation Program
SCVWD	Santa Clara Valley Water District
TCE	Trichloroethylene
USA	Underground Service Alert
cVOCs	chlorinated volatile organic compounds

1. INTRODUCTION

This Pilot Study Implementation Report (Report) describes an in situ chemical oxidation (ISCO) pilot study conducted at two areas with elevated concentrations of chlorinated volatile organic compounds (cVOCs) that were identified along Evandale Avenue, west of the Middlefield-Ellis-Whisman (MEW) Study Area located in Mountain View, California (**Figure 1**). Geosyntec Consultants, Inc. (Geosyntec) has prepared this Report on behalf of Schlumberger Technology Corporation (Schlumberger) and Raytheon Company (Raytheon) based on a meeting with EPA in January 2013.

1.1 Purpose

In response to a request from the United States Environmental Protection Agency (EPA) (EPA, 2012) a grab-groundwater sampling program was implemented by the Regional Groundwater Remediation Program (RGRP) between November 2012 and February 2013. The sampling results were presented in the Grab-Groundwater Assessment and Proposed Well Installations Report (Geosyntec, 2013d). During implementation of the grab-groundwater sampling program, two locations on Evandale Avenue (referred to in this Report as the "CPT-15 Area" and "CPT-21 Area") were identified as containing elevated concentrations of cVOCs, in particular trichloroethene (TCE).

Because the distribution of cVOCs indicates that the elevated cVOCs along Evandale Avenue result from sources unrelated to releases to soil or groundwater at the former facilities of the MEW Companies, the CPT-15 and CPT-21 areas are collectively referred to as the Evandale Avenue Sources. Although it is the position of the RGRP that it is not responsible to remediate Evandale Avenue Sources, STC and Raytheon nonetheless agreed to voluntarily implement an ISCO pilot study to evaluate cVOC mass removal at the Evandale Avenue Sources, with an understanding that EPA would actively investigate other potentially responsible parties for the Evandale Avenue sources. EPA presented its initial position regarding additional potentially responsible parties for the Evandale Avenue Sources in a meeting of "all parties" associated with the MEW Site on 27 January 2015.

A Draft Pilot Study Design and Implementation Work Plan (Work Plan) for the ISCO pilot study was submitted to EPA on 15 August 2013 (Geosyntec, 2013c). EPA

provided comments on the draft Work Plan in a letter dated 13 September 2013 (EPA, 2013). The draft Work Plan was revised based on the EPA comments, finalized, and submitted to EPA on 14 November 2013 (Geosyntec, 2013e). EPA approved the final Work Plan on 12 December 2013 and this Report documents the implementation of the ISCO pilot study at the CPT-15 and CPT-21 areas.

1.2 Report Organization

The remainder of this Report is organized as follows:

- **Section 2**, *Background and Scope*, presents a description of the local hydrogeology and cVOC distribution at the CPT-15 and CPT-21 areas and summarizes the ISCO pilot study scope and objectives;
- **Section 3**, *Field Preparation*, describes field preparation activities conducted prior to ISCO injections and performance monitoring in the CPT-15 and CPT-21 areas;
- **Section 4**, *Temporary Performance Monitoring Well Installations and Baseline Sampling*, summarizes field activities, construction details, and baseline sampling results for the performance monitoring wells installed at the CPT-15 area;
- **Section 5**, *Sodium Permanganate Injections*, summarizes the ISCO injection events in the CPT-15 and CPT-21 areas;
- **Section 6**, *Performance Monitoring*, presents the sampling procedures and results of the performance monitoring; and
- **Section 7**, *Conclusions*, presents a summary of pilot study results and conclusions; and
- **Section 8**, *References*, provides the references cited in this Report.

Tables, figures, and appendices are provided at the end of this Report.

2. BACKGROUND AND SCOPE

This section of the Report briefly describes the local hydrogeology and cVOC distribution at the CPT-15 and CPT-21 areas and summarizes the scope and objectives of the ISCO pilot study. Full descriptions of the MEW conceptual site model are presented elsewhere (e.g., Geosyntec, 2008; Geosyntec, 2013b), and are not repeated herein.

2.1 Hydrogeology

The CPT-15 and CPT-21 areas were characterized by a series of cone penetration test (CPT) borings, direct-push borings, and grab-groundwater samples collected between November 2012 and April 2013. Results from borings advanced between November 2012 and February 2013 were reported in the Final Grab-Groundwater Assessment and Proposed Well Installations Report (Geosyntec, 2013d). In April 2013, additional borings were advanced as described in the Final Work Plan for Remedy Design Data Collection (Geosyntec, 2013a). The locations of borings advanced in the vicinity of the CPT-15 and CPT-21 areas are shown in **Figure 2**.

Approximately east-west and north-south trending cross-sections of the CPT-15 Area are presented in **Figure 3** and **Figure 4**, respectively. An approximately east-west trending cross-section of the CPT-21 Area is presented in **Figure 5**. The cross-sections include a simplified interpretation of soil lithology based on soil behavior type (SBT) values from CPT logs along with geologic logs from direct-push boring locations. The soil lithology interpretations are generalized into coarser-grained units (i.e., sand and silty sand) and finer-grained units (i.e., silt and clay).

The current groundwater flow direction in the CPT-15 and CPT-21 areas is generally to the northeast towards the groundwater extraction wells located in the central core of the MEW Study Area. Potentiometric surface contour maps and groundwater hydraulic gradients are presented in the MEW RGRP Annual Progress Reports (e.g., Geosyntec, 2013b).

2.2 cVOC Distribution

TCE analytical results are posted on the cross-sections (**Figure 3**, **Figure 4**, and **Figure 5**) for grab-groundwater samples collected at the CPT-15 and CPT-21 areas. cVOC analytical results for the grab-groundwater samples were tabulated in the Final

Grab-Groundwater Assessment and Proposed Well Installations Report (Geosyntec, 2013d) and are not repeated herein.

2.2.1 CPT-15 Area

The east-west trending cross-section A-A' (**Figure 3**) is approximately perpendicular to the regional hydraulic gradient and illustrates the lateral extent of TCE concentrations in the CPT-15 Area.

- The highest concentrations of TCE were detected at location CPT-15 at an approximate depth of 35 feet below ground surface (bgs).
- TCE concentrations decrease significantly to the immediate east and west of CPT-15.
    - To the west, TCE concentrations exceeding 1,000 micrograms per liter (µg/L) were not detected west of CPT-18.
    - To the east, TCE concentrations exceeding 1,000 µg/L were not detected east of CPT-14.
- TCE concentrations decrease with depth, although concentrations of up to 15,000 µg/L were detected at a depth of 56 to 60 feet bgs.

The north-south trending cross-section (**Figure 4**) illustrates the extent of TCE concentrations in the approximate direction of groundwater flow in the CPT-15 Area.

- Concentrations of TCE in groundwater at depths between approximately 25 and 35 feet bgs decrease downgradient of CPT-15, and concentrations of TCE exceeding 1,000 µg/L were not detected beyond CPT-31, approximately 100 feet north (downgradient) of CPT-15, indicating that the area with elevated TCE concentrations is constrained.
- TCE concentrations of 64,000 µg/L were detected at CPT-31 at a depth of 69 to 71 feet bgs. The RGRP groundwater extraction well REG-3B(1) is located downgradient of CPT-31 and screened from 57 to 72 feet bgs. Analysis of groundwater capture zones indicates that TCE in groundwater downgradient of CPT-15 at depths between 57 and 72 feet bgs has been and continues to be captured by this extraction well (e.g., Geosyntec, 2013b).

2.2.2 CPT-21 Area

The east-west trending cross-section C-C' (**Figure 5**) illustrates the lateral extent of TCE concentrations in the CPT-21 Area.

- TCE is either not present or only present at low concentrations (approximately 5 to 10 µg/L) in a thin coarse-grained unit present at approximately 15 feet bgs and representing first encountered groundwater.
- The highest concentrations of TCE were detected at CPT-21 at a depth of 19 to 23 feet bgs.
- TCE concentrations decrease significantly to the immediate east and west of CPT-21.
    - To the west, the TCE concentration at soil boring SB-5, located approximately 20 feet west of CPT-21 is 6.1 µg/L.
    - To the east, TCE was not detected at soil boring SB-6, located approximately 20 feet east of CPT-21.
- Samples collected from depth intervals beginning at approximately 40 feet bgs at boring locations CPT-09 and CPT-10 did not contain TCE at concentrations exceeding the Maximum Contaminant Level (MCL) of 5 µg/L.

2.3 <u>Pilot Study Objectives and Scope</u>

The objectives and scope of the ISCO pilot study were developed based on the conceptual site model described above for the CPT-15 and CPT-21 areas and are summarized below.

2.3.1 Pilot Study Objectives

The objective of the pilot study was to evaluate whether ISCO can be practicably implemented at CPT-15 and CPT-21 areas.

The pilot study implementation scope and performance monitoring program were developed in consideration that "rebound" in the cVOC concentrations may be observed following ISCO implementation as residual oxidant is depleted and geochemical conditions return to near baseline (ITRC, 2005). As a result of this phenomenon, observed cVOC concentrations may be low while oxidant is present in the subsurface,

even when cVOC mass remains present. These temporary decreases do not represent sustainable cVOC concentrations. As a result, the ISCO pilot study was evaluated based on observed cVOC concentrations once oxidant was depleted from the system.

2.3.2 Pilot Study Scope

The pilot study scope of work included the following elements:

- Field preparation activities;
- Installation, development, and baseline sampling of nine temporary performance monitoring wells located downgradient of the CPT-15 area and screened in the A- and B1-zones;
- Injection of sodium permanganate solution using temporary direct-push boring as follows:
    - CPT-15 Area: A total of three injection events, with solution injected at five locations over four depth intervals from 15 to 35 feet bgs;
    - CPT-21 Area: A total of two injection events, with solution injected at two locations over two depth intervals from 15 to 25 feet bgs; and
- Collection of performance monitoring samples following each injection event from the temporary performance monitoring wells located at the CPT-15 Area and grab-groundwater sampling points located at the CPT-21 Area.

A full description of the ISCO pilot study scope of work was included in the final Work Plan (Geosyntec, 2013e) and is not repeated herein. The remainder of this Report describes the work completed during implementation of the pilot study scope of work and summarizes the pilot study performance monitoring results.

3. FIELD PREPARATION

This section of the Report summarizes field preparation activities required to implement the ISCO pilot study scope of work.

3.1 Permitting and Notification

3.1.1 Well Construction Agreements and Permits

Prior to the start of field activities, an agreement was negotiated with the owner of the 277 Fairchild Drive property allowing installation and monitoring of the temporary performance monitoring wells located downgradient of the CPT-15 Area.

Well construction permits were obtained from the Santa Clara Valley Water District (SCVWD) for the nine temporary performance monitoring wells (permits 13W00600 – 13W00608). The SCVWD well construction permits are provided in **Appendix A**.

3.1.2 Injection and Performance Monitoring Permits

Excavation permits from the City of Mountain View were required for all work done in City right-of-ways, with separate permits required for each mobilization to the project site. As required, excavation permits were obtained for each oxidant injection event and grab-groundwater performance monitoring event. The specific permit numbers and issuance dates are summarized below.

- First injection event at CPT-15 Area: Permit number 2014-26, issued on 29 January 2014;
- Second injection event at CPT-15 Area: Permit number 2014-71, issued on 17 March 2014;
- Third injection event at CPT-15 Area and first injection event at CPT-21 Area: Permit number 2014-262, issued on 24 July 2014;
- First performance monitoring event at CPT-21 Area: Permit number 2014-321, issued on 11 September 2014;
- Second injection event at CPT-21 Area: Permit number 2014-262, issued on 6 October 2014; and

- Second performance monitoring event at CPT-21 Area: Permit number 2014-393, issued on 30 October 2014.

The working hours allowed under the standard conditions of City of Mountain View excavation permits are restricted to 7:30 AM to 4:00 PM, compared to a typical field day of 7:00 AM to 5:30 PM. Approval to extend the working hours to 7:30 AM to 5:00 PM was obtained from the City of Mountain View for the second injection event at CPT-15 Area and subsequent permits.

A hydrant meter use permit was obtained from the City of Mountain View for the use of hydrant water during the duration of the injection program.

Copies of the excavation and hydrant permits are provided in **Appendix A**.

3.1.3 Notification

Prior to the start of each injection event, the following parties were notified of the work:

- EPA;
- City of Mountain View Department of Public Works was notified two working days prior to conducting work, as required by the issued excavation permits;
- City of Mountain View Fire Department was notified one week prior to conducting injection work, as required by the issued excavation permits;
- Residents in the vicinity of the CPT-15 and CPT-21 areas were notified by EPA prior to the start of field activities. Informational flyers describing the proposed work and implementation schedule were prepared by EPA and distributed to the surrounding residents; and
- Prior to work in the City right-of-ways, “No Parking” signs were posted in the work area 72 hours prior to the start of work.

3.2 Health and Safety

The site-specific health and safety plan (HASP) was updated to include field activities associated with the ISCO pilot study implementation. The HASP contained procedures for hazard identification and mitigation, emergency response including a map to the nearest hospital and emergency contact information, incident reporting, use of

appropriate personal protective equipment (PPE), and breathing space monitoring procedures.

Prior to the start of field activities each day, a safety tailgate meeting was conducted that included a discussion of the field activities to be performed, safe work practices, identification of potential hazards, use of PPE, decontamination procedures, and emergency response protocols. In addition, an on-site health and safety meeting was held with the City of Mountain View Fire Department on 11 February 2014 to discuss planned work procedures and emergency response.

In addition to Geosyntec lead health and safety activities, Vironex, Inc. of Concord, California (Vironex, the oxidant injection subcontractor) notified Clean Harbors Environmental Services, Inc. of Benicia, California (Clean Harbors) prior to each injection event to develop an emergency response plan.

3.3 Utility Clearance

Boring locations for the temporary performance monitoring wells, injection points during each injection event, and grab-groundwater performance monitoring points following each monitoring event were marked with white paint and Underground Service Alert (USA) North 811 was contacted a minimum of two business days prior to commencement of any drilling activities.

In addition, a private utility locator was retained to perform geophysical surveys to identify potential utilities, pipelines, or other subsurface obstructions at the following locations:

- The temporary performance monitoring well locations on 3 January 2014;
- The CPT-15 Area ISCO injection points and grab-groundwater performance monitoring points on 30 January 2014; and
- The CPT-21 Area ISCO injection points and grab-groundwater performance monitoring points on 7 August 2014.

4. TEMPORARY PERFORMANCE MONITORING WELL INSTALLATION AND BASELINE SAMPLING

Prior to conducting the first ISCO injection event at the CPT-15 Area, a total of nine temporary performance monitoring wells were installed between 6 and 10 January 2014. The temporary performance monitoring well locations are shown in **Figure 6**.

4.1 Well Drilling and Installation

The temporary performance monitoring wells were installed by Gregg Drilling and Testing of Martinez, California (Gregg) under the oversight of Geosyntec field staff.

Prior to the well installation, a direct-push pilot boring was advanced at each well cluster location for the purpose of geologic logging. The direct-push borings were continuously cored for logging and advanced to the deepest well installation depth at each well cluster location. Geologic logging was conducted by field staff under the direction of a California Professional Geologist using the Unified Soil Classification System. The soil was field-screened for cVOCs using a photoionization detector (PID) and the readings were recorded on the boring logs. The boring logs are included in **Appendix B**. Since the wells in each cluster are co-located, the shallower well or wells were not logged separately and the geologic log from the deepest well was used for all wells in the cluster.

Following completion of the pilot borings, the temporary performance monitoring wells were installed using the hollow stem auger drilling method. Once the target depth was reached at each boring, the monitoring well was constructed through the hollow stem auger casing. The monitoring well casings consisted of 2-inch diameter, Schedule 40 PVC pipe, with 0.020-inch factory-cut, slotted well screen, flush-threaded joints, and a bottom cap. The annular space between the borehole wall and well screen for each well was filled with #3 filter pack sand to a depth of approximately 3 feet above the top of the well screen. Approximately 2 feet of bentonite pellets were placed above the sand pack and hydrated to provide a seal above the filter pack. The remainder of the borehole was tremie filled with Portland cement to the ground surface in accordance with SCVWD requirements. The surface completions consisted of flush-mounted, traffic-rated well boxes with expandable gasket well caps. The temporary performance monitoring well construction details are provided in **Table 1**. Well construction diagrams are included in **Appendix B**.

4.2 Well Development

Development of the temporary performance monitoring wells was conducted between 13 and 15 January 2014 and consisted of a combination of bailing, surging, and pumping. As described in the MEW Quality Assurance Project Plan (QAPP) (Canonie, 1991), the wells were developed to remove fine-grained materials from inside the filter pack and casing, to stabilize the filter pack around the well screen, and to produce representative water samples from the adjacent water-bearing zone. The well development field data sheets are included in **Appendix C**.

4.3 Baseline Groundwater Sampling

On 29 and 30 January 2014, baseline groundwater samples were collected from the temporary performance monitoring wells to establish baseline geochemical conditions prior to the oxidant injections.

4.3.1 Sampling Procedures

During baseline sampling, the temporary performance monitoring wells were purged a minimum of three casing volumes prior to collection of groundwater samples. The wells were purged using a submersible pump equipped with new disposable tubing. Water was pumped through an enclosed flow-through cell fitted with a multi-parameter groundwater meter. Temperature, pH, electrical conductivity, turbidity, dissolved oxygen (DO), and oxidation reduction potential (ORP) were measured and recorded during purging. Groundwater was purged until the field parameter values stabilized. Groundwater levels were monitored during purging to confirm that drawdown stabilized prior to sampling. Following stabilization of field parameters, groundwater samples were collected. The performance monitoring well sampling logs are included in **Appendix E**.

Groundwater samples were collected in laboratory-supplied sample containers and labeled with project identification, sample location, analytical parameters, time and date of sampling, and any preservative added to the sample. Samples were stored in an ice-cooled chest, for transport under chain-of-custody procedures to a State of California-certified laboratory for analysis.

The baseline groundwater samples were analyzed for the following compounds:

- cVOCs by EPA Method 8260B;
- Total dissolved solids (TDS) by Method SM 2540C;
- Chloride by EPA Method 300.0;
- Dissolved manganese, iron, and chromium by EPA Method 6010B; and
- Dissolved hexavalent chromium [Cr(VI)] by EPA Method 7199.[1]

Quality assurance/quality control (QA/QC) samples were collected for cVOC samples. In accordance with the MEW QAPP, one duplicate, one field blank and one equipment blank were collected during the baseline monitoring event. In addition, a laboratory provided trip blank was included with each cooler containing groundwater samples for cVOC analysis that was sent to the analytical laboratory.

4.3.2 Baseline Sampling Results

The baseline sampling analytical laboratory reports are included in **Appendix D** and the results are summarized in **Table 2A**. In addition to the baseline results from the temporary performance monitoring wells, cVOCs results collected in CPT-15 Area and CPT-21 Area during the grab-groundwater sampling program implemented by the RGRP between November 2012 and February 2013 (Geosyntec, 2013d) were also used as baseline results for the two ISCO injection areas. The baseline grab-groundwater sampling results from the CPT-15 and CPT-21 areas are included in **Tables 2A and 2B**, respectively.

4.4 Investigation Derived Waste Management

Soil cuttings were temporarily stored in a 20 cubic yard roll-off bin located at 277 Fairchild Drive. The soil profiled as non-hazardous waste and was removed for disposal on 4 April 2014. Water generated during the well installation, development, and baseline sampling was temporarily stored in 55-gallon drums prior to disposal at the RGRP South of 101 groundwater treatment system.

[1] EPA Method 7199 was used as an alternative to the method specified in the final Work Plan (EPA Method 7196) because it offers lower analytical method detection limits.

4.5 Well Survey

On 20 August 2014, the locations and elevations of the temporary performance monitoring wells were surveyed by Calvada Surveying Inc. of Corona, California (Calvada), a State of California licensed Surveyor. The surveyed well coordinates and elevations are provided in **Table 1**.

5. SODIUM PERMANGANATE INJECTIONS

This section of the Report summarizes activities related to the sodium permanganate injections that were completed during the ISCO pilot study.

5.1 Site Set Up, Control, and Public Safety

The following activities were performed during site setup for the purposes of site control and public safety:

- "No Parking" signs were placed on the street at least 72 hours prior to the start of work;
- Each morning of injection work days, traffic control signs and cones were set up around the work zone, including an informational sign with EPA contact information as shown in the photo log included in **Appendix G**;
- Within the work zone, the injection subcontractor delineated an exclusion zone with caution tape and cones, as shown in the photo log included in **Appendix G**; and
- At the end of injection work days, all traffic control was temporarily cleared from the street to allow overnight street parking by the residents.

Site setup and break down each injection work day was completed during the restricted working hours specified in the City of Mountain View excavation permit (7:30 AM to 5:00 PM).

5.2 Sodium Permanganate Materials Handling and Mixing

Sodium permanganate handling was conducted in general accordance with City of Mountain View Fire Department requirements and the *National Fire Protection Association (NFPA) 430: Code for the Storage of Liquid and Solid Oxidizers* (NFPA, 2004). The project team received onsite training in permanganate handling and emergency response prior to the start of injections. Emergency response supplies and equipment were staged near the work area and verified daily.

At the beginning of each injection work day, the following activities were conducted as part of the mixing equipment set up:

- Transport of permanganate to the work area. In accordance with Department of Transportation guidelines, only one drum or eight 5-gallon pails of sodium permanganate were transported at one time from the offsite permanganate storage facility to the work area (<0.5 mi);
- Establishment of site control areas (i.e., exclusion zone, decontamination zone, secondary containment, etc.);
- Confirmation of traffic and pedestrian controls around the proposed injection locations; and
- Staging of sodium permanganate in the onsite temporary secondary containment system.

Sodium permanganate was mixed with water prior to injection of the oxidant solution. The sodium permanganate batch mixing included the following activities:

- Checking safety supplies and donning PPE;
- Connecting to the water supply and filling the mixing tanks with water. The mixing tanks were located on the injection truck. The truck was parked in the exclusion zone within secondary containment and a restricted traffic area during the injections;
- Connecting the sodium permanganate drums to the mixing tanks (first CPT-15 Area injection event) or manually pouring the 5 gallon pails of sodium permanganate into the mixing tanks (subsequent injection events);
- Mixing the tank contents, using an electric tank mixer; and
- Calibrating flow meters on the manifold.

At the end of each injection work day, the following activities were conducted as part of the mixing equipment break down:

- Flushing of the entire injection system with water to remove residual sodium permanganate;
- Disconnecting the mixing tanks from the water supply; and
- Transporting any unused sodium permanganate container (drum or pail) to the offsite permanganate storage facility.

The restricted working hours required by the City of Mountain View excavation permits and significant site setup and breakdown at the start and end of each injection day resulted in active injection between 4 and 6 hours per injection day.

5.3 Injection Approach

Temporary borings for the ISCO injections were advanced using a direct-push drill rig. At each location, hollow steel direct-push rods were advanced to the target injection intervals. Injections were completed in a top-down manner over 5-foot vertical depth intervals at each injection location. The injection locations were manifolded together at the CPT-15 or CPT-21 areas during each injection event. All downhole equipment was decontaminated before use.

Sodium permanganate solution was injected from the above-ground mixing tanks located on the injection truck, through the manifolded injection lines connected to the hollow steel direct push rods. Prior to starting sodium permanganate injections, the injection lines were inspected for signs of damage and the connections were checked by injecting potable water. Observed leaks were repaired prior to injection of sodium permanganate solution. The injection lines were equipped with mechanical flow totalizers, flow meters, pressure gauges, and flow control valves to monitor the injection volumes, rates, and pressures. The maximum operational pressure during the injections was conservatively limited to 30 pounds per square inch (psi).

5.4 CPT-15 Area Injections

Three injection events were conducted at the CPT-15 Area between February and August 2014:

- First injection event: 11 through 21 February 2014;
- Second injection event: 14 through 22 April 2014; and
- Third injection event: 11 through 19 August 2014.

Injections at the CPT-15 Area were conducted at five locations (ISCO-1 through ISCO-5) over four 5-foot vertical depth intervals:

- 15 to 20 feet bgs;
- 20 to 25 feet bgs;
- 25 to 30 feet bgs; and
- 30 to 35 feet ft bgs.

The CPT-15 Area ISCO injection locations are shown in **Figure 6**. The first injection locations were aligned with the CPT locations from the previous grab-groundwater investigations. Subsequent injection locations were moved incrementally towards the sidewalk (**Figure 6**). Throughout all three injection events, the observed injection flow rates ranged from 0.5 to 3.5 gallons per minute (gpm), averaging 2.5 gpm, and injection pressures ranged from 5 to 20 psi, averaging 15 psi (**Appendix F**).

The concentration, mass, and volume of sodium permanganate solution injected at each depth interval during each injection event are provided in **Table 3A** and the total injected during each event are summarized below. Injection logs detailing injection pressures and flow rates are provided in **Appendix F**.

	Sodium Permanganate Mass	**Sodium Permanganate Solution Volume**	**Sodium Permanganate Solution Concentration**
CPT-15 First Event	3,745 lbs	17,700 gallons	25.4 g/L
CPT-15 Second Event	4,012 lbs	24,200 gallons	19.9 g/L
CPT-15 Third Event	4,013 lbs	21,900 gallons	22.0 g/L
CPT-15 Total	11,770 lbs	63,800 gallons	22.1 g/L

5.5 CPT-21 Area Injections

Two injection events were conducted at the CPT-21 Area between August and October 2014:

- First injection event: 20 through 25 August 2014; and
- Second injection event: 14 and 17 October 2014.

The CPT-21 Area ISCO injection locations are shown in **Figure 7**. Injections at the CPT-21 Area were conducted over two 5-foot vertical depth intervals:

- 15 to 20 feet bgs; and
- 20 to 25 feet bgs.

Injections were conducted at two locations (ISCO-1 and ISCO-2) during the first injection event. The number of injection points was increased to five for the second injection event (ISCO-1, through ISCO-5) in order to achieve the target injection volume within the City of Mountain View excavation permit working hour restrictions and considering the project restrictions on injection pressure (no more than 30 psi). Throughout both injection events, the observed flow rates ranged from 0.5 to 3.5 gpm, averaging 2.5 gpm, and pressures ranged from 5 to 30 psi, averaging 15 psi (**Appendix F**).

The concentration, mass, and volume of sodium permanganate solution injected at each depth interval during each injection event are provided in **Table 3B**, and the total injected during each event are summarized below. Injection logs detailing injection pressures and flow rates are provided in **Appendix F**.

	Sodium Permanganate Mass	**Sodium Permanganate Solution Volume**	**Sodium Permanganate Solution Concentration**
CPT-21 First Event	798 lbs	4,300 gallons	22.2 g/L
CPT-21 Second Event	798 lbs	4,800 gallons	19.9 g/L
CPT-21 Total	1,596 lbs	9,100 gallons	21.0 g/L

5.6 Surfacing and Preferential Pathway Monitoring

A surfacing and preferential pathway monitoring program was implemented during the injection events. Prior to the start of injections, storm sewer manholes and catch basins that could potentially be preferential pathways were identified. The identified potential pathways were visually monitored prior to and during the permanganate injections for a purple color indicative of the presence of permanganate.

No indications of preferential permanganate flow were observed in the storm sewer manholes or storm drain catch basins during the ISCO injection program.

5.6.1 Groundwater Level Monitoring

During each injection event, a temporary piezometer was installed between the injection points and the storm sewer to monitor that groundwater elevations during the ISCO injections remained below the storm sewer elevation. The locations of the temporary piezometers at CPT-15 and CPT-21 areas are shown in **Figures 6 and 7**, respectively.

Hollow steel direct-push rods equipped with a disposable tip and a 10-foot section of slotted polyvinyl chloride (PVC) screen was pushed to depths of 17 feet bgs (CPT-15 Area, first and second injection events), 18.5 feet bgs (CPT-15 Area, third injection event), or 15 feet bgs (CPT-21 Areas, first and second injection events). The steel rods were retracted approximately ten feet, leaving the stainless steel disposable tip in the ground and exposing the slotted PVC screen. The temporary piezometers were left in the ground throughout the duration of the injections and used to monitor groundwater elevation.

CPT-15 Area

Groundwater elevation at the piezometer was measured regularly throughout each injection event. Groundwater elevation measured in the piezometer remained well below the elevation of the storm sewer throughout all of the injection events. The groundwater elevation in the piezometer decreased quickly to near baseline conditions in the absence of active injections. In the closest temporary monitoring wells screened from 15 to 25 feet bgs (ETWC-4AS and ETWC-2AS), the groundwater elevations rose to between 0.5 and 0.7 feet during the injections. The following table summarizes the groundwater elevation monitoring at the CPT-15 Area during the injections.

	CPT-15 First Event	CPT-15 Second Event	CPT-15 Third Event
Elevation of Bottom of Storm Sewer (feet bgs)	6.4	6.4	6.4
Baseline Depth to Groundwater at Piezometer (feet btoc)	11.90	11.30	12.50
Maximum Groundwater Rise at Piezometer (feet)	2.70	2.25	2.35
Minimum Depth to Groundwater at Piezometer (feet btoc)	9.20	9.05	9.15

btoc = below top of casing

CPT-21 Area

Groundwater elevation at the piezometer was measured regularly throughout each injection event. Groundwater elevation measured in the piezometer remained well below the elevation of the storm sewer throughout all of the injection events. The groundwater elevation in the piezometer decreased quickly to near baseline conditions in the absence of active injections. The following table summarizes the groundwater elevation monitoring at the CPT-21 Area during the injections.

	CPT-21 First Event	CPT-21 Second Event
Elevation of Bottom of Storm Sewer (feet bgs)	4.5	4.5
Baseline Depth to Groundwater at Piezometer (feet btoc)	9.20	9.60
Maximum Groundwater Rise at Piezometer (feet)	0.80	1.85
Minimum Depth to Groundwater at Piezometer (feet btoc)	8.40	7.75

btoc = below top of casing

5.6.2 Surfacing Monitoring

During the first injection event at the CPT-15 Area, slight surfacing of permanganate was observed along the north side of Evandale Avenue near the curb in the vicinity of injection point ISCO-3 during injections into the 15 to 20 feet bgs depth interval on 13 February 2014. Upon observation of the surfacing, the injections were immediately stopped at all locations and the surface permanganate was neutralized using a solution of equal parts of 3% H_2O_2, household vinegar, and water. Nearby catch basins and sewer manholes were monitored and showed no evidence of permanganate.

Injection into the 15 to 20 feet bgs depth interval at the ISCO-3 location was terminated following observation of the surfacing. The other four injection locations were restarted at a lower flow rate, with careful monitoring of the surface conditions, groundwater elevations, and potential preferential pathways. After restarting injections at the ISCO-1, ISCO-2, ISCO-4 and ISCO-5 locations, no further surfacing of permanganate was observed. Prior to terminating the ISCO-3 injections over the 15 to 20 feet bgs depth interval, approximately 85% of the target total mass of sodium permanganate for the location and depth interval had been injected.

No permanganate surfacing was observed during any of the subsequent injection events at the CPT-15 and CPT-21 areas.

6. PERFORMANCE MONITORING

This section of the Report summarizes the ISCO pilot study performance monitoring.

6.1 Sampling Procedures

Field procedures employed during performance monitoring sampling are summarized below.

6.1.1 Permanganate Field Screening

Throughout the duration of the ISCO injection program, samples were periodically collected from the temporary piezometers using new disposable polyethylene tubing with a stainless steel check-ball placed on the end to visually monitor for the presence of permanganate. If permanganate was observed, a DR/890 Colorimeter was used to measure the permanganate concentration in the field.

6.1.2 Temporary Performance Monitoring Wells

During performance monitoring, the temporary performance monitoring wells were purged a minimum of three casing volumes prior to collection of groundwater samples. The wells were purged using a submersible pump equipped with new disposable tubing. Water was pumped through an enclosed flow-through cell fitted with a multi-parameter groundwater meter. Temperature, pH, electrical conductivity, turbidity, DO, and ORP were measured and recorded during purging. Groundwater was purged until the field parameter values stabilized. Groundwater levels were monitored during purging to confirm that drawdown stabilized prior to sampling. Following stabilization of field parameters, groundwater samples were collected. The performance monitoring well sampling logs are included in **Appendix E**.

The performance monitoring samples were analyzed for the following compounds:

- cVOCs by EPA Method 8260B;
- TDS by Method SM 2540C;
- Chloride by EPA Method 300.0;

- Dissolved manganese, iron, and chromium by EPA Method 6010B; and
- Dissolved hexavalent chromium [Cr(VI)] by EPA Method 7199.

6.1.3 Grab-Groundwater Samples

Grab-groundwater samples were collected from borings using a direct-push drill rig equipped with a Hydropunch® sampler or equivalent technology. At each location, hollow steel direct-push rods equipped with a disposable tip and a section of slotted polyvinyl chloride (PVC) screen was advanced to the sampling depth interval. Once the bottom of the sampling depth was reached, the rods were retracted approximately 3 to 5 feet, exposing the slotted PVC screen while the disposable tip remained stationary.

Groundwater samples were collected with new disposable polyethylene tubing with a stainless steel check-ball placed on the end. New tubing was used for the collection of each sample, and the stainless steel check-ball was decontaminated in between each sample collection.

The grab-groundwater samples were analyzed for cVOCs by EPA Method 8260B. In order to ensure that residual permanganate in the groundwater (if present) did not further oxidize the cVOCs between sample collection and laboratory analysis, cVOC samples were quenched in the field immediately following sample collection if a purple color was visually observed in the collected samples. The sample preparation for quenched cVOCs involved the addition of approximately 2 to 3 grams of anhydrous manganese sulfate ($MnSO_4$) to the groundwater sample in the field. The groundwater sample was allowed to react with the $MnSO_4$ for approximately ten minutes, after which time the sample was decanted into a laboratory-supplied container with hydrochloric acid preservative.

6.1.4 Temporary Piezometer Samples

Groundwater samples were collected from the temporary piezometers using new disposable polyethylene tubing with a stainless steel check-ball placed on the end. New tubing was used for the collection of each sample, and the stainless steel check-ball was decontaminated in between each sample collection.

The temporary piezometer samples were analyzed for cVOCs by EPA Method 8260B. In order to ensure that residual permanganate in the groundwater (if present) did not

further oxidize the cVOCs between sample collection and laboratory analysis, cVOC samples were quenched in the field immediately following sample collection if a purple color was visually observed in the collected samples. The sample preparation for quenched cVOCs involved the addition of approximately 2 to 3 grams of anhydrous $MnSO_4$ to the groundwater sample in the field. The groundwater sample was allowed to react with the $MnSO_4$ for approximately ten minutes, after which the sample was decanted into a laboratory-supplied container with hydrochloric acid preservative.

6.1.5 Sample Shipping and Quality Assurance/Quality Control

All performance monitoring samples were collected in laboratory-supplied sample containers and labeled with project identification, sample location, analytical parameters, time and date of sampling, and any preservative added to the sample. Samples were stored in an ice-cooled chest, for transport under chain-of-custody procedures to a State of California-certified laboratory for analysis.

QA/QC samples were collected for all cVOC samples. In accordance with the MEW QAPP, a minimum of one duplicate, one field blank, and one equipment blank were collected during each sampling event at a frequency of one QA/QC sample per 20 field samples. In addition, a laboratory provided trip blank was included with each cooler containing groundwater samples for cVOC analysis that was sent to the laboratory.

6.2 CPT-15 Area Performance Monitoring Results

In accordance with the final Work Plan, sampling of the nine temporary performance monitoring wells in the CPT-15 Area was conducted as follows:

- Following first ISCO injection event:
  - 10 and 11 March 2014;
  - 24 and 25 March 2014; and
  - 7 and 8 April 2014;
- Following second ISCO injection event:
  - 12 and 13 May 2014; and
  - 15 and 16 June 2014;
- Following third ISCO injection event on 15 and 16 September 2014.

Based on the performance monitoring results at the temporary performance monitoring wells following the first ISCO injection event (see **Section 6.2**), additional groundwater monitoring was performed as part of the second and third injection events. In addition to the performance monitoring outlined in the final Work Plan and summarized above, the following monitoring was conducted at the CPT-15 Area:

- Second ISCO injection event:
  - Sample collected from temporary piezometer on 14 April 2014, prior to the start of injections; and
  - Grab-groundwater samples collected at the end of the injection event (22 April 2014) from two locations in the vicinity of the previous CPT-7 and CPT-15 locations;
- Third ISCO injection event:
  - Sample collected from temporary piezometer on 11 August 2014, prior to the start of injections, and on 19 August 2014, at the end of the injection event; and
  - Grab-groundwater samples collected from two locations in the vicinity of the previous CPT-7 and CPT-15 locations on 11 August 2014, prior to the start of injections, and on 20 August 2014, at the end of the injection event;
- Grab-groundwater sample collected from one location in the vicinity of the previous CPT-15 location on 15 September 2014, one month after completion of the third and final injection event.

The grab-groundwater sample and piezometer locations are shown in **Figure 6**.

The CPT-15 Area performance monitoring results are summarized below.

6.2.1 Permanganate Monitoring Results

Table 4A includes a summary of the sodium permanganate field test results in the CPT-15 Area. The following observations were noted during implementation of the ISCO pilot study at the CPT-15 Area:

- **First Injection Event:** Visual evidence of permanganate (purple color) was observed in groundwater samples collected from the temporary piezometer after two days of injection. The maximum measured permanganate concentration was 3,700 mg/L.
- **Section Injection Event:** Visual evidence of permanganate (purple color) was observed in groundwater samples collected from the temporary piezometer after four days of injection. Visual evidence of permanganate was observed in grab groundwater samples collected at the end of the injection event.
- **Third Injection Event:** There was no visual evidence of permanganate (purple color) observed in groundwater samples collected from the temporary piezometer throughout the duration of the injections. Visual evidence of permanganate (purple color) was observed in a grab groundwater sample collected at the end of the injection event.

In addition, visual evidence of permanganate was not observed in the temporary performance monitoring wells, indicating that downgradient transport of permanganate was limited at the CPT-15 Area.

During the first injection event, the measured sodium permanganate concentrations at the end of each injection day and at the beginning of the following day were used to calculate the reaction half-lives for in-situ permanganate consumption, assuming first-order reaction kinetics.[2] The half-life increased from 0.30 days after the first day of injections to 2 days at the end of the first injection event. This latter value is consistent with the short-term half-lives estimated from bench-scale testing (half-lives between 2 and 4.6 days) and discussed in the final Work Plan (Geosyntec, 2013e).

6.2.2 Geochemistry Monitoring Results

Table 2A includes a summary of the geochemistry performance monitoring results for the CPT-15 Area. The analytical laboratory reports for the performance monitoring events are included in **Appendix D**.

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[2] The equation for estimating a reaction half-life assuming first order reaction kinetics is: $t_{1/2} = \frac{[t_1 - t_0]\ln 2}{\ln\left[{C_1}/{C_0}\right]}$, where C_1 is the concentration at time t_1 and C_0 is the concentration at time t_0.

The general findings of the geochemistry monitoring during implementation of the ISCO pilot study at the CPT-15 Area include the following:

- Concentrations of dissolved manganese, a by-product of sodium permanganate reaction with cVOCs or naturally occurring organic matter, increased at the downgradient temporary performance monitoring wells located nearest to the injection area and screened from 15 to 25 feet bgs. The concentrations of total dissolved manganese increased over the course of the ISCO injection program at ETWC-2AS from 0.14 to 0.40 mg/L and at ETWC-4AS from 0.046 to 0.41 mg/L. Concentrations of dissolved manganese remained stable at the other monitoring wells around baseline values.
- The concentrations of TDS also increased at ETWC-2AS and ETWC-4AS over the course of the pilot study. TDS increased from 710 to 1,000 mg/L at ETWC-2AS and from 690 to 880 mg/L at ETWC-4AS. Similar TDS concentration increases were observed at ETWC-2AI (from 610 to 850 mg/L), the temporary performance monitoring well co-located with ETWC-2AS and screened from 25 to 35 feet bgs and at ETWC-3AS (700 to 890 mg/L) and ETWC-1AS (710 to 840 mg/L), the two temporary performance monitoring wells located further downgradient the injection area and screened from 15 to 25 feet bgs.
- Electrical conductivity similarly increased at wells where increased TDS concentrations were observed.
- Finally a slight decrease in pH was observed at ETWC-2AI (7.59 to 7.06), ETWC-3AI (7.39 to 7.01) and ETWC-4AI (7.35 to 6.93), three temporary performance monitoring wells screened from 25 to 35 feet bgs.

The presence of these geochemical conditions downgradient of the pilot study area is consistent with downgradient flow of groundwater influenced by the oxidant injections toward the performance monitoring wells.

Hexavalent chromium [Cr(VI)] was either not detected in the temporary performance monitoring wells or not detected above baseline concentrations.

6.2.3 cVOC Monitoring Results

Table 2A includes a summary of the cVOC performance monitoring results for the CPT-15 Area. The analytical laboratory reports for the performance monitoring events are included in **Appendix D**.

TCE concentrations in grab-groundwater samples collected in the vicinity of the previous CPT-15 location decreased from 100,000 µg/L (baseline during the 2012 grab-groundwater investigation in the CPT-15 Area) to 28/43 µg/L immediately following the second injection event and from 32,000 µg/L to 44 µg/L immediately following the third injection event. Similarly, TCE concentrations in grab-groundwater samples collected in the vicinity of the previous CPT-7 location decreased from 9,600 µg/L (baseline during the 2012 grab-groundwater investigation) to 2,700 µg/L following the second injection event and from 48,000 µg/L to 10,000/14,000 µg/L following the third injection event.

TCE concentrations in grab-groundwater samples collected in the vicinity of the previous CPT-15 location rebounded from 28/43 µg/L immediately following the second injection event to 32,000 µg/L within four months of completion of the second event. Concentrations similarly increased from 44 µg/L immediately following the third injection event to 6,600 µg/L one month after completion of the third and final injection event at the CPT-15 Area. Similarly, TCE concentrations in grab-groundwater samples collected in the vicinity of the previous CPT-7 location rebounded from 2,700 µg/L following the second injection event to 48,000 µg/L four months after completion of the second event.

cVOC concentrations observed at the nearest downgradient performance monitoring wells (clusters ETWC-2 and ETWC-4) following ISCO injections were variable. TCE concentrations did not vary significantly from baseline conditions at ETWC-2AS and ETWC-4AI. TCE concentrations over the course of the pilot study decreased from 9,800 to 4,500 µg/L at ETWC-2AI and increased from 3,400 to 22,000 µg/L at ETWC-4AS. Varying trends were also observed for TCE concentrations at the further downgradient temporary performance monitoring wells. TCE decreased from 2,400 to 580 µg/L at ETWC-3AS. TCE concentrations did not vary significantly from baseline conditions at ETWC-3AI, and decreases in TCE concentrations were observed at ETWC-1AS (11,000 to 6,600 µg/L) and ETWC-1AI (1,500 to 450 µg/L). Increases in *cis*-1,2-dichloroethene (*cis*-1,2-DCE) concentrations were observed at ETWC-1AI

(from 300 to 1,900 µg/L) and at ETWC-2AI (from 4,700 to 8,400 µg/L) with concurrent decreases in TCE concentrations. Increases in *cis*-DCE concentrations were also observed at ETWC-4AS, concurrent with increased TCE concentrations. The observed increases in *cis*-DCE concentrations may be a result of enhanced biological reductive dechlorination of TCE to *cis*-DCE and lesser chlorinated compounds due to the presence of partially oxidized organic matter, or desorption of cVOCs in the injection areas following ISCO injections.

Based on the data described above and summarized in **Table 2A**, the following is the general findings with respect to cVOC concentrations during implementation of the ISCO pilot study at the CPT-15 Area:

- In grab-groundwater samples collected within the CPT-15 Area immediately following the second and third oxidant injection events, significant reductions in cVOC concentrations were observed, suggesting that the permanganate was effectively oxidizing cVOCs.
- Grab-groundwater samples collected following depletion of the oxidant showed significant cVOC concentration rebound within one to four months. Nonetheless, the grab-groundwater results from the CPT-15 Area suggest that the net result of the oxidation treatment and following rebound was up to one order-of-magnitude reduction in cVOC concentrations in the immediate vicinity of the ISCO injection points.
- Limited reductions in cVOC concentration were observed in the nearest downgradient performance monitoring wells. These results, coupled with the absence of permanganate in the performance monitoring wells, suggest that rapid and significant oxidant consumption in the area of injection caused depletion of the oxidant before advection could transport the oxidant into area of the performance monitoring wells.

6.3 CPT-21 Area Performance Monitoring Results

In accordance with the final Work Plan, the following performance monitoring events were conducted for the CPT-21 Area:

- On 15 September 2014 following the first ISCO injection event; and,
- On 13 November 2014 following the second ISCO injection event.

As described in the final Work Plan, performance monitoring samples in the CPT-21 Area were limited to collection of grab-groundwater samples at the locations shown in **Figure 7**. The CPT-21 Area performance monitoring results are summarized below.

6.3.1 Permanganate Monitoring Results

Table 4B includes a summary of the sodium permanganate field test results in the CPT-21 Area. The following observations were noted during implementation of the ISCO pilot study at the CPT-21 Area:

- **First Injection Event:** Visual evidence of permanganate (purple color) was observed in groundwater samples collected from the temporary piezometer after three days of injections. Visual evidence of permanganate (purple color) was not observed in grab groundwater samples collected at the end of the injection event. A summary of the sodium permanganate field test results is included in **Table 4B**. The maximum measured permanganate concentration was 1,400 mg/L.
- **Second Injection Event:** Visual evidence of permanganate (purple color) was observed in groundwater samples collected from the temporary piezometer after two days of injections. Visual evidence of permanganate (purple color) was also observed in grab groundwater samples collected at the end of the injection event. A summary of the sodium permanganate field test results is included in **Table 4B**. The maximum measured permanganate concentration was 20,900 mg/L.

6.3.2 cVOC Monitoring Results

Table 2B contains a summary of the performance monitoring results for the CPT-21 Area. The analytical laboratory reports for the performance monitoring events are included in **Appendix D**.

TCE concentrations in grab-groundwater samples collected in the vicinity of the previous CPT-21 location decreased over the course of the ISCO injection program from 5,500 µg/L prior to the first injection event to 3,500 µg/L one month after completion of the first injection event, 2,900 µg/L two months after completion of the first injection event, and to 2,100/1,800 µg/L one month after completion of the second and final injection event at the CPT-21 Area.

TCE concentrations in grab-groundwater samples collected in the vicinity of the ISCO-1 injection point were one to two orders of magnitude lower than concentrations observed in the vicinity of previous CPT-21 location. TCE concentrations collected at a depth interval of 15 to 18 feet bgs decreased from 100 µg/L prior to the start of the second injection event to 5.3 µg/L immediately following the second injection event, and to 15 µg/L one month after completion of the second and final injection event at the CPT-21 Area. TCE concentrations collected at a depth interval of 19 to 23 feet bgs remained relatively stable between 210 and 410 µg/L over the course of the ISCO injection program.

Based on the data described above and summarized in **Table 2A**, the following is the general finding with respect to cVOC concentrations during implementation of the ISCO pilot study at the CPT-21 Area:

- TCE concentrations in grab-groundwater samples collected near CPT-21 showed decreasing concentration trends over the course of the ISCO injection program, despite some concentration rebound following depletion of permanganate.

7. CONCLUSIONS

The scope of work for the ISCO pilot study at the CPT-15 and CPT-21 areas outlined in the final Work Plan (Geosyntec, 2013e) was completed with the installation, development, and baseline sampling of nine temporary performance monitoring wells downgradient of the CPT-15 Area, completion of three ISCO injection events at the CPT-15 Area and associated performance monitoring, and completion of two ISCO injection events at the CPT-21 Area and associated performance monitoring.

The pilot study performance monitoring results from the ISCO pilot study indicate the following:

- Significant TCE concentration decreases and rapid oxidant consumption immediately after each injection event provides evidence of cVOC mass removal in the subsurface by the injected oxidant;
- Observation of oxidant in monitoring points located inside the design radius of influence indicated that it was possible to achieve the design radius of influence;
- Geochemical changes indicating ISCO influenced groundwater were observed at the temporary performance monitoring wells downgradient of the CPT-15 Area injection locations (increase in electrical conductivity, manganese, and TDS concentration);
- Oxidant consumption following injections was rapid for all injection events, as indicated by the absence of residual oxidant during subsequent sampling events. This rapid consumption indicates significant ongoing oxidant demand due to either residual cVOC mass, presence of naturally occurring organic matter, or a combination of these two factors; and
- Advection of sodium permanganate was not observed downgradient of the CPT-15 Area injection locations, indicating very limited transport of the oxidant beyond the injection radius of influence (in contrast to secondary parameters).
- TCE concentrations in grab-groundwater samples collected near CPT-21 showed decreasing concentration trends over the course of the ISCO injection program at the CPT-21 Area, despite some concentration rebound following depletion of permanganate.

The following conclusions can be made regarding the implementability of ISCO injections at the CPT-15 and CPT-21 areas:

- The planned scope of work was completed as planned, indicating the following:
  - Oxidants can be injected safely at the CPT-15 and CPT-21 areas, without impacts to nearby utility corridors, and without public perception issues;
  - Injections could be sustained at all targeted depth intervals at or near the design rates (1.5 to 4 gpm per injection point) without excess injection pressures; and
  - The design oxidant volume and mass could be injected during each injection event, with the exception of the first event at the CPT-15 Area where the injected volume was decreased slightly due to time constraints.
- Although the ISCO injection events were completed as planned, a number of logistical constraints were encountered, suggesting that the ISCO pilot study scope of work represents the practical extent to which ISCO can be implemented at the CPT-15 and CPT-21 areas. Specific logistical constraints included:
  - Limited access and space to set up injection points due to above and below ground utilities;
  - Limited access and space to advance injection points in the street, while maintaining public use of the street;
  - No or limited possibility to increase production rate (injected volume per day and/or injection days per event) due to:
    - Significant setup and breakdown requirements each day due to the location of the injection points in the street;
    - The presence of significant drilling and injection infrastructure, closure of a traffic lane, traffic control, and limited parking, resulted in constraints on the duration of each event in order to minimize impacts to the community;
    - City of Mountain View excavation permit working hour restrictions; and

- Limitations on the injection flow rates and applied pressures due to the close proximity of a storm drain and sanitary sewer line to the injection locations.

As a result of these factors, the ISCO injection program at the CPT-15 or CPT-21 cannot be expanded within Evandale Avenue.

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TABLES

Table 1
Temporary Monitoring Well Construction Details
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Well Name	Date Installed	Coordinates		Elevation (TOC) (ft msl)	Well Casing	Well Diameter (in)	Well Depth (ft bgs)	Screen Slot Size (in)	Screen interval (ft bgs)	Filter Pack Interval (ft bgs)
		Northing (ft)	Easting (ft)							
ETWC- 1AS	1/6/2014	333169.87	1547752.16	39.38	Sch 40 PVC	2	25	0.020	15-25	12-25
ETWC- 1AI	1/6/2014	333171.12	1547748.89	39.34	Sch 40 PVC	2	35	0.020	25-35	21-35
ETWC-2AS	1/7/2014	333134.22	1547719.13	39.78	Sch 40 PVC	2	25	0.020	15-25	12-25
ETWC-2AI	1/7/2014	333133.45	1547722.03	39.72	Sch 40 PVC	2	35	0.020	25-35	22-35
ETWC-3AS	1/9/2014	333160.65	1547705.60	39.52	Sch 40 PVC	2	25	0.020	15-25	12-25
ETWC-3AI	1/9/2014	333161.73	1547703.89	39.68	Sch 40 PVC	2	35	0.020	25-35	22-35
ETWC-3B1	1/8/2014	333163.60	1547706.43	39.41	Sch 40 PVC	2	75	0.020	65-75	62-75
ETWC- 4AS	1/9/2014	333144.45	1547700.05	39.69	Sch 40 PVC	2	25	0.020	15-25	12-25
ETWC- 4AI	1/10/2014	333142.23	1547698.93	39.67	Sch 40 PVC	2	35	0.020	25-35	22-35

ft = feet
ft msl = feet mean sea level
ft bgs = feet below ground surface
in = inches
TOC = top of casing, elevation surveyed using NGVD 29
Northings and Eastings are reported in State Plane, NAD27, California Zone 3
Sch 40 PVC = Schedule 40 PVC

Table 2A
CPT-15 Area Baseline and Performance Monitoring Results
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Sampling Location	Screened Interval (ft bgs)	ISCO injection event	Sampling Event	Sampling Date	Field Parameters						VOCs 8260B (µg/L)								7199 (µg/L)	Dissolved Metals 6010B (mg/L)			Anions 300.0 (mg/L)	2540C (mg/L)	Field Measurement
					pH	Temp (°C)	EC (µS/cm)	ORP (mV)	Turbidity (NTU)	DO (mg/L)	PCE	TCE[1]	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride	1,1-DCA	Other VOCs	Chromium (VI)	Chromium	Iron	Manganese	Chloride	TDS	$NaMnO_4$ (mg/L)
Monitoring Wells																									
ETWC-1AS	15-25	Baseline		1/29/2014	6.95	20.0	1,038	133.7	75.6	0.97	**0.54/0.45**	**11,000/11,000**	**450/420**	**3.2/3.3**	**2.7/2.6**	**2.4/2.3**	**0.65/0.62**	ND / ND	ND<0.5	0.001*	0.079*	**0.22**	**39**	**710**	--
		1st Injection Event	1st Performance	3/10/2014	6.79	19.4	903	-56.1	108	0.18	ND<250	**9,200**	**330**	ND<250	ND<250	ND<250	ND<250	ND	ND<0.5	0.00078*	ND<0.2	**0.33**	**39**	**790**	--
			2nd Performance	3/24/2014	6.94	19.6	1,010	see note[4]	176	0.43	ND<250	**11,000**	**260**	ND<250	ND<250	ND<250	ND<250	ND	ND<0.5	0.0007*	0.048*	**0.32**	**40**	**740**	--
			3rd Performance	4/7/2014	6.82	19.2	1,211	125.6	14	0.29	ND<250	**13,000**	**400**	ND<250	ND<250	ND<250	ND<250	ND	0.29*	0.0011*	0.16*	**0.14**	**38**	**740**	--
		2nd Injection Event	4th Performance	5/12/2014	6.71	19.0	1,215	55.1	18	0.16	ND<25	**9,500**	**380**	ND<25	ND<25	ND<25	ND<25	ND	0.32*	ND<0.010	0.025*	**0.19**	**45**	**740**	--
			5th Performance	6/25/2014	6.71	19.0	1,163	-4.2	2	0.09	ND<25	**9,900**	**320**	ND<25	ND<25	ND<25	ND<25	ND	ND<0.5	0.001*	ND<0.2	**0.2**	**41**	**800**	--
		3rd Injection Event	6th Performance	9/15/2014	6.78	20.3	1,327	111.4	16	0.46	ND<100	**6,600**	**430**	ND<100	ND<100	ND<100	ND<100	ND	0.16*	ND<0.010	ND<0.50	**0.18**	**39**	**840**	--
ETWC-1AI	25-35	Baseline		1/29/2014	7.39	19.9	755	-10.8	639	1.16	0.49*	**1,500**	**300**	**8**	**5.9**	**1.4**	**4.9**	ND	ND<0.5	ND<0.01	0.12*	**0.22**	**38**	**560**	--
		1st Injection Event	1st Performance	3/10/2014	7.31	19.7	683	-138.0	>1000	0.14	ND<25 / ND<25	**1,200/1,000**	**670/760**	18*/22*	13*/15*	ND<25 / ND<25	ND<25 / ND<25	ND / ND	ND<0.5	ND<0.01	0.051*	**0.18**	**38**	**620**	--
			2nd Performance	3/24/2014	7.39	19.8	777	see note[4]	488	0.05	ND<25	**1,100**	**760**	13*	11*	ND<25	7.7*	ND	ND<0.5	ND<0.01	0.18*	**0.23**	**39**	**590**	--
			3rd Performance	4/7/2014	7.24	19.7	907	-100.9	44	0.19	ND<25	**1,400**	**1,700**	**27**	18*	ND<25	ND<25	ND	ND<0.5	ND<0.01	0.12*	**0.20**	**41**	**570**	--
		2nd Injection Event	4th Performance	5/12/2014	7.18	19.2	934	-115.9	649	0.23	ND<5	**790**	**1,200**	**18**	**12**	2.5*	**8.0**	ND	ND<0.5	ND<0.01	0.12*	**0.23**	**44**	**610**	--
			5th Performance	6/25/2014	7.16	19.4	811	-184.0	520	0.07	ND<5	**400**	**1,400**	**19**	**12**	3.7*	**7.2**	ND	ND<0.5	0.00083*	0.078*	**0.24**	**40**	**610**	--
		3rd Injection Event	6th Performance	9/15/2014	7.18	19.8	910	17.6	610	0.64	ND<25	**450**	**1,900**	**25**	14*	ND<25	11*	ND	ND<0.50	ND<0.010	ND<0.50	**0.24**	**36**	**620**	--
ETWC-2AS	15-25	Baseline		1/29/2014	6.81	19.4	997	73.2	638	0.40	0.26*	**3,200**	**2,100**	**11**	**7.3**	**3.8**	**4.4**	ND	0.44*	ND<0.01	ND<0.2	**0.14**	**39**	**710**	--
		1st Injection Event	1st Performance	3/11/2014	6.87	18.9	1,131	96.7	20	0.04	ND<50	**2,500**	**1,300**	ND<50	ND<50	ND<50	ND<50	ND	ND<0.5	ND<0.01	0.042*	**0.27**	**40**	**810**	--
			2nd Performance	3/25/2014	7.40	19.5	1,107	see note[4]	22	0.03	ND<50	**2,200**	**1,000**	ND<50	ND<50	ND<50	ND<50	ND	ND<0.5	0.00079*	ND<0.2	**0.26**	**38**	**800**	--
			3rd Performance	4/8/2014	6.70	19.0	1,291	40.6	3	1.90	ND<50	**2,100**	**1,100**	17*	ND<50	ND<50	ND<50	ND	ND<0.5	0.00092*	0.83*	**0.27**	**35**	**780**	--
		2nd Injection Event	4th Performance	5/13/2014	6.71	19.4	1,340	-37.5	60	0.06	ND<50	**2,100**	**1,300**	**12**	**9.4**	3.1*	3.1*	ND	ND<0.5	0.0013*	0.038*	**0.37**	**44**	**940**	--
			5th Performance	6/26/2014	6.73	19.9	1,434	-152.6	15	0.07	ND<5.0 / ND<25	**2,600/2,500**	**1,200/1,300**	**11/14***	**8.8**/ND<25	3.0*/ND<25	2.8*/ND<25	ND / ND	ND<0.5	0.00077*	ND<0.2	**0.35**	**40**	**900**	--
		3rd Injection Event	6th Performance	9/16/2014	6.64	21.6	1,583	21.1	4	0.06	ND<10	**3,500**	**1,600**	**11**	**13**	ND<10	2.9*	ND	ND<0.50	ND<0.010	ND<0.50	**0.40**	**37**	**1,000**	--
ETWC-2AI	25-35	Baseline		1/29/2014	7.59	19.0	797	-12.6	624	1.38	0.26*	**9,800**	**4,700**	**110**	**30**	**3.6**	**13**	ND	ND<0.5	0.0033*	**1.5**	**0.19**	**40**	**610**	--
		1st Injection Event	1st Performance	3/11/2014	7.56	18.5	839	-93.7	112	0.46	ND<100	**8,100**	**4,500**	97*	ND<100	ND<100	ND<100	ND	ND<0.5	ND<0.01	**0.22**	**0.15**	**41**	**620**	--
			2nd Performance	3/25/2014	7.80	18.8	811	see note[4]	155	0.40	ND<100	**9,000**	**5,400**	**110**	49*	ND<100	ND<100	ND	ND<0.5	ND<0.01	0.11*	**0.14**	**42**	**600**	--
			3rd Performance	4/8/2014	7.16	19.3	922	-138.0	34	0.34	ND<100	**8,300**	**4,400**	**110**	ND<100	ND<100	ND<100	ND	ND<0.5	0.00072*	**0.34**	**0.14**	**35**	**590**	--
		2nd Injection Event	4th Performance	5/13/2014	7.21	18.8	833	-125.0	901	0.16	ND<25	**9,200**	**5,500**	**130**	**41**	ND<25	16*	ND	ND<0.5	ND<0.01	**0.22**	**0.15**	**35**	**600**	--
			5th Performance	6/26/2014	7.41	19.5	899	-200.7	156	0.14	ND<25	**6,700**	**4,100**	**87**	**29**	ND<25	9.9*	ND	ND<0.5	ND<0.01	0.19*	**0.15**	**41**	**620**	--
		3rd Injection Event	6th Performance	9/16/2014	7.06	20.1	1,228	-157.0	8	0.04	ND<50 / ND<50	**4,000/4,500**	**8,100/8,400**	**120/120**	42*/39*	ND<50 / ND<50	12*/13*	ND / ND	ND<0.50	ND<0.010	0.27*	**0.18**	**42**	**850**	--
ETWC-3AS	15-25	Baseline		1/30/2014	6.89	19.8	941	70.8	258	0.12	ND<50	**2,400**	**270**	ND<50	ND<50	ND<50	ND<50	ND	0.36*	ND<0.01	0.063*	**0.097**	**37**	**700**	--
		1st Injection Event	1st Performance	3/10/2014	6.81	18.9	867	19.1	21	0.06	ND<10	**660**	**240**	ND<10	ND<10	ND<10	ND<10	ND	ND<0.5	ND<0.01	ND<0.2	**0.12**	**36**	**730**	--
			2nd Performance	3/24/2014	6.82	19.2	996	see note[4]	20	0.04	ND<10 / ND<10	**670/670**	**240/250**	3.3*/3.2*	ND<10 / ND<10	ND<10 / ND<10	ND<10 / ND<10	ND / ND	ND<0.5	ND<0.01	ND<0.2	**0.13**	**37**	**750**	--
			3rd Performance	4/7/2014	6.69	18.9	1,323	-21.3	5	0.09	ND<10	**910**	**310**	4.6*	4.1*	ND<10	ND<10	ND	ND<0.5	ND<0.01	ND<0.2	**0.16**	**41**	**830**	--
		2nd Injection Event	4th Performance	5/12/2014	6.61	18.7	1,305	-107.1	33	0.06	ND<5	**780**	**300**	**5.6**	4.7*	ND<5	2.8*	ND	ND<0.5	0.00078*	0.029*	**0.2**	**41**	**790**	--
			5th Performance	6/26/2014	6.31	18.7	1,366	-80.3	27	0.09	ND<5	**620**	**250**	4.9*	3.4*	ND<5	2.3*	ND	ND<0.5	ND<0.01	ND<0.2	**0.19**	**38**	**880**	--
		3rd Injection Event	6th Performance	9/15/2014	6.71	20.7	1,426	75.6	7	0.03	ND<10	**580**	**270**	**5.1**	3.8*	ND<10	2.4*	ND	ND<0.50	ND<0.010	ND<0.50	**0.17**	**34**	**890**	--
ETWC-3AI	25-35	Baseline		1/30/2014	7.39	19.4	777	12.2	18	0.03	ND<50	**3,500**	**1,300**	**71**	44*	ND<50	ND<50	ND	ND<0.5	ND<0.01	0.1*	**0.14**	**37**	**610**	--
		1st Injection Event	1st Performance	3/10/2014	7.17	19.2	706	-152.2	148	0.04	ND<50	**3,700**	**1,100**	**69**	35*	ND<50	ND<50	ND	ND<0.5	ND<0.01	0.043*	**0.14**	**38**	**640**	--
			2nd Performance	3/24/2014	6.81	19.4	763	see note[4]	89	0.08	ND<50	**4,100**	**1,000**	**60**	35*	ND<50	23*	ND	ND<0.5	ND<0.01	0.068*	**0.14**	**39**	**590**	--
			3rd Performance	4/7/2014	7.22	19.3	937	-126.3	68	0.05	ND<50 / ND<50	**4,100/3,500**	**1,100/950**	**68/56**	32*/29*	ND<50 / ND<50	ND<50 / ND<50	ND / ND	ND<0.5	ND<0.01	0.13*	**0.14**	**42**	**600**	--
		2nd Injection Event	4th Performance	5/12/2014	7.10	19.0	941	-170.1	933	0.10	ND<10	**3,500**	**1,400**	**77**	**30**	4.0*	**22**	ND	ND<0.5	ND<0.01	0.14*	**0.15**	**43**	**630**	--
			5th Performance	6/25/2014	7.15	18.6	834	-232.6	10	0.03	ND<10	**3,100**	**1,000**	**53**	**25**	ND<10	**16**	ND	ND<0.5	ND<0.01	0.11*	**0.14**	**39**	**620**	--
		3rd Injection Event	6th Performance	9/15/2014	7.01	19.6	893	-10.7	15	0.03	ND<25	**3,400**	**1,600**	**68**	**30**	ND<25	20*	ND	ND<0.50	ND<0.010	ND<0.50	**0.14**	**36**	**630**	--
ETWC-3B1	65-75	Baseline		1/30/2014	7.51	19.0	647	130.4	16	0.03	ND<50	**84,000**	**400**	**99**	**100**	ND<50	ND<50	Freon 113 = 14*	**0.56**	ND<0.01	ND<0.2	**0.028**	**37**	**500**	--
		1st Injection Event	1st Performance	3/10/2014	7.35	18.7	597	-30.1	25	0.03	ND<500	**84,000**	**520**	180*	ND<500	ND<500	ND<500	ND	**0.52**	ND<0.01	ND<0.2	**0.038**	**38**	**540**	--
			2nd Performance	3/24/2014	7.43	18.9	675	see note[4]	20	0.01	ND<500	**87,000**	310*	ND<500	ND<500	ND<500	ND<500	ND	**0.53**	0.00074*	0.053*	**0.042**	**39**	**520**	--
			3rd Performance	4/7/2014	7.29	18.7	798	-51.6	5	0.06	ND<500	**85,000**	320*	ND<500	ND<500	ND<500	ND<500	ND	**0.51**	ND<0.01	0.12*	**0.034**	**40**	**530**	--
		2nd Injection Event	4th Performance	5/12/2014	7.20	18.6	808	-58.2	14	0.09	ND<250	**77,000**	**490**	180*	170*	ND<250	ND<250	ND	**0.57**	ND<0.01	ND<0.2	**0.04**	**41**	**520**	--
			5th Performance	6/25/2014	7.19	18.3	714	-221.0	3	0.04	ND<250	**68,000**	**1,100**	110*	130*	ND<250	ND<250	ND	0.43*	0.00084*	ND<0.2	**0.04**	**39**	**550**	--
		3rd Injection Event	6th Performance	9/15/2014	7.21	18.9	794	79.3	47	0.03	ND<500	**78,000**	400*	ND<500	ND<500	ND<500	ND<500	ND	0.42*	ND<0.010	ND<0.50	**0.037**	**35**	**550**	--
ETWC-4AS	15-25	Baseline		1/30/2014	6.80	19.5	950	78.3	35	0.17	ND<50	**3,400**	**270**	ND<50	ND<50	ND<50	ND<50	ND	**0.53**	ND<0.01	ND<0.2	**0.046**	**37**	**690**	--
		1st Injection Event	1st Performance	3/11/2014	6.71	18.6	1,223	160.0	29	0.10	ND<100	**9,100**	**630**	ND<100	ND<100	ND<100	ND<100	ND	ND<0.5	ND<0.01	ND<0.2	**0.19**	**47**	**860**	--
			2nd Performance	3/25/2014	7.19	19.2	1,170	see note[4]	16	0.05	ND<100	**5,800**	**240**	ND<100	ND<100	ND<100	ND<100	ND	ND<0.5	ND<0.01	ND<0.2	**0.19**	**44**	**850**	--
			3rd Performance	4/8/2014	6.60	18.7	1,290	89.4	7	2.49	ND<100	**7,500**	**660**	ND<100	ND<100	ND<100	ND<100	ND	ND<0.5	ND<0.01	0.12*	**0.18**	**37**	**790**	--
		2nd Injection Event	4th Performance	5/13/2014	6.61	19.1	1,437	-44.9	24	0.08	ND<25 / ND<25	**15,000/15,000**	**1,000/970**	ND<50 / ND<50	ND<25 / ND<25	ND<25 / ND<25	ND<25 / ND<25	ND / ND	ND<0.5	0.00071*	0.025*	**0.25**	**58**	**880**	--
			5th Performance	6/26/2014	6.83	19.6	1,347	-171.2	10	0.04	ND<25	**14,000**	**1,200**	9.5*	ND<25	16*	ND<25	ND	0.033*	ND<0.01	ND<0.2	**0.21**	**45**	**860**	--
		3rd Injection Event	6th Performance	9/16/2014	6.66	21.6	1,413	30.6	8	0.08	ND<100	**22,000**	**1,600**	ND<100	ND<100	ND<100	ND<100	ND	ND<0.50	ND<0.01	ND<0.50	**0.41**	**43**	**880**	--
ETWC-4AI	25-35	Baseline		1/30/2014	7.35	19.3	756	3.0	31	0.02	ND<50	**5,800**	**3,400**	**130**	33*	ND<50	ND<50	ND	ND<0.5	ND<0.01	0.15*	**0.12**	**40**	**580**	--
		1st Injection Event	1st Performance	3/10/2014	7.19	19.1	688	-162.1	185	0.03	ND<50	**5,900**	**3,200**	**120**	32*	ND<50	ND<50	ND	ND<0.5	ND<0.01	0.13*	**0.12**	**39**	**610**	--
			2nd Performance	3/25/2014	7.75	19.8	785	see note[4]	19	0.05	ND<50	**6,100**	**3,600**	**110**	31*	ND<50	ND<50	ND	ND<0.5	ND<0.01	0.13*	**0.12**	**42**	**590**	--
			3rd Performance	4/7/2014	7.22	19.2	915	-139.8	35	0.05	ND<50	**6,600**	**3,800**	**120**	36*	ND<50	ND<50	ND	ND<0.5	ND<0.01	0.077*	**0.13**	**42**	**600**	--
		2nd Injection Event	4th Performance	5/13/2014	7.06	18.99	831	-118.1	44	0.08	ND<25	**8,000**	**4,900**	**160**	**41**	ND<25	18*	ND	ND<0.5	ND<0.01	0.16*	**0.13**	**39**	**600**	--
			5th Performance	6/26/2014	7.11	18.72	882	-236.7	59	0.04	ND<25	**5,300**	**3,100**	**110**	**27**	ND<25	12*	ND	ND<0.5	0.00071*	0.18*	**0.13**	**41**	**610**	--
		3rd Injection Event	6th Performance	9/16/2014	6.93	19.63	940	-20.6	16	0.06	ND<50	**5,000**	**5,300**	**150**	**34***	ND<50	15*	ND	ND<0.50	ND<0.010	ND<0.50	**0.14**	**37**	**620**	--

Table 2A
CPT-15 Area Baseline and Performance Monitoring Results
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Sampling Location	Screened Interval (ft bgs)	ISCO injection event	Sampling Event	Sampling Date	Field Parameters						VOCs 8260B (µg/L)								7199 (µg/L)	Dissolved Metals 6010B (mg/L)			Anions 300.0 (mg/L)	2540C (mg/L)	Field Measurement
					pH	Temp (°C)	EC (µS/cm)	ORP (mV)	Turbidity (NTU)	DO (mg/L)	PCE	TCE[1]	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride	1,1-DCA	Other VOCs	Chromium (VI)	Chromium	Iron	Manganese	Chloride	TDS	$NaMnO_4$ (mg/L)
Grab Groundwater																									
CPT-7 Area[2]	18-22	Baseline	18-22 ft bgs	11/28/2012	--	--	--	--	--	--	**0.92**	**9,600**	**38**	**2.2**	**2.0**	ND<0.50	ND<0.50	ND	--	--	--	--	--	--	--
		2nd Injection Event	18-22 ft bgs	4/22/2014	--	--	--	--	--	--	ND<10	**2,700**	**76**	ND<10	ND<10	ND<10	ND<10	Acetone = 1500	--	--	--	--	--	--	**233**
		3rd Injection Event	18-22 ft bgs	8/11/2014	--	--	--	--	--	--	ND<10	**48,000**	**2,100**	**30**	**32**	ND<10	ND<10	ND	--	--	--	--	--	--	NV
			18-22 ft bgs	8/20/2014	--	--	--	--	--	--	ND<10 / ND<0.50	**10,000/14,000**	**310/340**	ND<10 / 6.3	ND<10 / 4.1	ND<10 / 0.58	ND<10 / ND<0.50	ND / Chlororoform = 3.5	--	--	--	--	--	--	NV
CPT-15 Area[2]	20-23	Baseline	20-23 ft bgs	12/13/2012	--	--	--	--	--	--	**8.6**	**100,000**	**4100**	**46**	**23**	**6.6**	**2.3**	see note[3]	--	--	--	--	--	--	--
		2nd Injection Event	20-23 ft bgs	4/22/2014	--	--	--	--	--	--	ND<2.5 / ND<10	**28/43**	ND<2.5 / ND<10	ND<2.5 / ND<10	ND<2.5 / ND<10	ND<2.5 / ND<10	ND<2.5 / ND<10	Acetone = 1200/1400, Chloroform = 12 / ND<20	--	--	--	--	--	--	**6,100**
		3rd Injection Event	20-23 ft bgs	8/11/2014	--	--	--	--	--	--	ND<500 / ND<500	**32,000/32,000**	**1,100/1,100**	ND<500 / ND<500	ND<500 / ND<500	ND<500 / ND<500	ND<500 / ND<500	ND / ND	--	--	--	--	--	--	NV
			20-23 ft bgs	8/20/2014	--	--	--	--	--	--	ND<0.50	**44**	**0.79**	ND<0.50	ND<0.50	ND<0.50	**1.6**	Acetone = 550 MEK = 68 Chloroform = 8.1	--	--	--	--	--	--	**2,400**
			20-23 ft bgs	9/15/2014	--	--	--	--	--	--	ND<50	**6,600**	**390**	ND<50	ND<50	ND<50	ND<50	ND	--	--	--	--	--	--	NV
Piezometer	7-17	2nd Injection Event	7-17 ft bgs	4/14/2014	--	--	--	--	--	--	ND<0.50	**21**	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND	--	--	--	--	--	--	NV
	8.5-18.5	3rd Injection Event	8.5-18.5 ft bgs	8/11/2014	--	--	--	--	--	--	ND<0.50	**700**	**15**	ND<0.50	ND<0.50	ND<0.50	ND<500	Xylenes, Total: 2.6	--	--	--	--	--	--	NV
	8.5-18.5		8.5-18.5 ft bgs	8/19/2014	--	--	--	--	--	--	ND<2.5	**240**	**6.8**	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND	--	--	--	--	--	--	NV

Notes:
1. TCE was detected in the equipment blank sample (EB-140129) at 0.89 ug/L during the baseline event, in equipment blank sample (EB-140407) at 0.63 ug/L during the 3rd performance monitoring event, and in equipment blank sample (EB-140512) at 3.7 ug/L during the 4th performance monitoring event
2. Grab-groundwater samples
3. Other VOCs detected include 1,1,1-Trichloroethane=0.68 µg/L, Toluene=2.6 µg/L, Ethylbenzene=2.5 µg/L, Total Xylenes=1.4 µg/L, and 1,4-Dichlorobenzene= 1.7 µg/L
EC = Electrical Conductivity
ORP = Oxidation Reduction Potential
DO = Dissolved Oxygen
ft bgs = feet below ground surface
mg/L = milligram per liter
µg/L = microgram per liter
°C = Celsius
µS/m = microsiemens per meter
mV = millivolt
NTU = Nephelometric Turbidity Unit
4. The reported ORP values for 2nd performance monitoring event were considered unreliable and were occluded from the data set.
VOCs = volatile organic compounds
PCE = tetrachloroethene
TCE = trichloroethene
DCE = dichloroethene
DCA = dichloroethane
MEK = methyl ethyl ketone (2-Butanone)
ND = not detected
< indicates that the analyte was not detected above the reported detection limit
NV= Not Visible, purple color was not visible in the sample
* Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
-- Analyte not sampled for

Table 2B
CPT-21 Area Baseline and Performance Monitoring Results
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Sampling Location	ISCO injection event	Sampling Depth (ft bgs)	Date Sampled	VOCs 8260B (µg/L)								Field Measurement
				PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride	1,1-DCA	Other VOCs	$NaMnO_4$ (mg/L)
CPT-21 Area[1]	Baseline	19-23	12/18/2012	ND	**4,000**	**200**	ND	ND	ND	ND	ND	--
	1st Injection Event	19-23	8/20/2014	ND<0.5	**5,500**	**156**	**1.9**	**2.3**	**1.6**	ND<0.5	ND	--
		19-23	8/25/2014	ND<0.5	**4,400**	**181**	**4.1**	**4.4**	**2.1**	ND<0.5	ND	NV
	1st Performance Monitoring Event	19-23	9/15/2014	ND<50	**3,500**	**180**	ND<50	ND<50	ND<50	ND<50	ND	NV
	2nd Injection Event	19-23	10/14/2014	ND<25	**2,900**	**180**	ND<25	ND<25	ND<25	ND<25	Toluene: 28	NV
		19-23	10/17/2014	ND<25 / ND<25	**3,400/2,500**	**180/130**	ND<25 / ND<25	ND<25 / ND<25	ND<25 / ND<25	ND<25 / ND<25	ND / ND	NV
	2nd Performance Monitoring Event	19-23	11/13/2014	ND<25 / ND<25	**2,100/1,800**	**140/120**	ND<25 / ND<25	ND<25 / ND<25	ND<25 / ND<25	ND<25 / ND<25	ND / ND	NV/NV
ISCO 1 Area[1]	1st Performance Monitoring Event	15-18	9/15/2014	ND<5 / ND<5	**240/240**	**8.8/8.6**	ND<5 / ND<5	ND<5 / ND<5	ND<5 / ND<5	ND<5 / ND<5	ND / ND	NV
	2nd Injection Event	15-18	10/14/2014	ND<1	**100**	**190**	ND<1	ND<1	ND<1	ND<1	Acetone: 22	NV
		15-18	10/17/2014	ND<1	**5.3**	ND<1	ND<1	ND<1	ND<1	ND<1	Acetone: 290	**7,900**
	2nd Performance Monitoring Event	15-18	11/13/2014	ND<1	**15**	**8.2**	ND<1	ND<1	ND<1	ND<1	Benzene: 2.4, Ethylbenzene: 0.55, Toluene: 2.3, Trichloroethene: 15, Xylenes, Total: 2.0	NV
	1st Performance Monitoring Event	21-24	9/15/2014	ND<5	**210**	**88**	ND<5	ND<5	ND<5	ND<5	Acetone: 830	NV
	2nd Injection Event	21-24	10/14/2014	ND<2.5 / ND<2.5	**410/320**	**99/67**	**4.6/3.6**	ND<2.5 / ND<2.5	ND<2.5 / ND<2.5	ND<2.5 / ND<2.5	ND / ND	NV
		21-24	10/17/2014	ND<2.5	**210**	**78**	**3.3**	ND<2.5	ND<2.5	ND<2.5	ND	NV
	2nd Performance Monitoring Event	21-24	11/13/2014	ND<2.5	**370**	**140**	**4.9**	ND<2.5	ND<2.5	ND<2.5	ND	NV
Piezometer	1st Injection Event	5-15	8/25/2014	ND<0.5 / ND<0.5	ND<0.5 / ND<0.5	ND<0.5 / ND<0.5	ND<0.5 / ND<0.5	ND<0.5 / ND<0.5	ND<0.5 / ND<0.5	ND<0.5 / ND<0.5	Acetone: 110/150, Chloroform: 1.9/2.3	**1,400**
	2nd Injection Event	5-15	10/14/2014	ND<0.5	**2.6**	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	Acetone: 11, Benzene: 0.76, Ethylbenzene: 2.1, 4-Isopropyltoluene: 0.89, Toluene: 0.96, Xylenes, Total: 13	NV
		5-15	10/17/2014	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	Acetone: 260, Chloroform: 2.6, Xylenes, Total: 2.5	**2,400**

Notes:
1. Grab-groundwater samples
ft bgs = feet below ground surface
mg/L = milligram per liter
µg/L = microgram per liter
VOCs = volatile organic compounds
PCE = tetrachloroethene
TCE = trichloroethene
DCE = dichloroethene
DCA = dichloroethane
ND = not detected
< indicates that the analyte was not detected above the reported detection limit
NV= Not Visible, purple color was not visible in the sample
-- Analyte not sampled for

Table 3A
CPT-15 Area Injection Summary
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

	Target Depth Interval (ft bgs)	Start Date	Stop Date	Design Volume (gal)	Design $NaMnO_4$ Mass (lbs)	Actual Injected Volume (gal)	Actual Injected $NaMnO_4$ Mass (lbs)	Percent Complete (volume basis)	Percent Complete (mass basis)	Calculated $NaMnO_4$ concentration (g/L)
First Event										
Depth Interval	15-20	2/12/2014	2/13/2014	5,500	935	5,000	880	91%	94%	21.1
	20-25	2/14/2014	2/18/2014	5,500	935	4,600	961	84%	103%	25.0
	25-30	2/19/2014	2/12/2014	5,500	935	4,000	952	73%	102%	28.5
	30-35	2/20/2014	2/21/2014	5,500	935	4,100	952	75%	102%	27.8
All Intervals	15-35	2/12/2014	2/21/2014	22,000	3,740	17,700	3,745	80%	100%	25.4
Second Event										
Depth Interval	15-20	4/14/2014	4/15/2014	6,000	1,003	5,700	935	95%	93%	19.7
	20-25	4/16/2014	4/17/2014	6,000	1,003	6,300	1,072	105%	107%	20.4
	25-30	4/17/2014	4/18/2014	6,000	1,003	6,000	1,003	100%	100%	20.0
	30-35	4/21/2014	4/22/2014	6,000	1,003	6,200	1,003	103%	100%	19.4
All Intervals	15-35	4/14/2014	4/22/2014	24,000	4,013	24,200	4,012	101%	100%	19.9
Third Event										
Depth Interval	15-20	8/11/2014	8/13/2014	6,000	1,003	5,200	1,003	87%	100%	23.1
	20-25	8/14/2014	8/14/2014	6,000	1,003	4,900	1,003	82%	100%	24.5
	25-30	8/15/2014	8/18/2014	6,000	1,003	5,800	1,003	97%	100%	20.7
	30-35	8/18/2014	8/19/2014	6,000	1,003	6,000	1,003	100%	100%	20.0
All Intervals	15-35	8/11/2014	8/19/2014	24,000	4,013	21,900	4,013	91%	100%	22.0
All Events										
Depth Interval	15-20			17,500	2,941	15,900	2,818	91%	96%	21.2
	20-25			17,500	2,941	15,800	3,035	90%	103%	23.0
	25-30			17,500	2,941	15,800	2,958	90%	101%	22.4
	30-35			17,500	2,941	16,300	2,958	93%	101%	21.7
All Intervals	15-35			70,000	11,766	63,800	11,770	91%	100%	22.1

ft bgs = feet below ground surface
gal = gallons
lbs = pounds
g/L = grams per liter

Table 3B
CPT-21 Area Injection Summary
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

	Target Depth Interval (ft bgs)	Start Date	Stop Date	Design Volume (gal)	Design $NaMnO_4$ Mass (lbs)	Actual Injected Volume (gal)	Actual Injected $NaMnO_4$ Mass (lbs)	Percent Complete (volume basis)	Percent Complete (mass basis)	Calculated injected $NaMnO_4$ concentration (g/L)
First Event										
Depth Interval	15-20	8/20/2014	8/21/2014	2,400	399	2,400	388	100%	97%	19.4
	20-25	8/22/2014	8/25/2014	2,400	399	1,900	410	79%	103%	25.9
All Intervals	15-25	8/20/2014	8/25/2014	4,800	798	4,300	798	90%	100%	22.2
Second Event										
Depth Interval	15-20	10/15/2014	10/15/2014	2,400	399	2,300	388	96%	97%	20.2
	20-25	10/16/2014	10/16/2014	2,400	399	2,500	410	104%	103%	19.7
All Intervals	15-35	10/15/2014	10/16/2014	4,800	798	4,800	798	100%	100%	19.9
All Events										
Depth Interval	15-20			4,800	798	4,700	775	98%	97%	19.8
	20-25			4,800	798	4,400	821	92%	103%	22.4
All Intervals	15-35			9,600	1,596	9,100	1,596	95%	100%	21.0

ft bgs = feet below ground surface
gal = gallons
lbs = pounds
g/L = grams per liter

Table 4A
CPT-15 Area Permanganate Field Test Results
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Sampling Location	Screened Interval (ft bgs)	Depth Interval of Injections (ft bgs)	Sampling Date	Sampling Time	$NaMnO_4$ Concentration (mg/L)	Notes
First Injection Event (2/11/2014 - 2/21/2014)						
PZ	7-17	NA	2/12/2014	NA	NS	No injection on 2/12/2014
PZ	7-17	NA	2/12/2014	NA	NS	No injection on 2/12/2014
PZ	7-17	15-20	2/13/2014	NA	NS	Before starting injection
PZ	7-17	15-20	2/13/2014	14:45	NV	End of injection day
PZ	7-17	15-20	2/13/2014	10:55	160	Beginning of injections
PZ	7-17	15-20	2/13/2014	15:45	570	End of injection day
PZ	7-17	20-25	2/14/2014	9:00	110/110	Before starting injection
PZ	7-17	20-25	2/14/2014	11:10	210	midday
PZ	7-17	20-25	2/14/2014	14:15	3,700	End of injection day
PZ	7-17	20-25	2/18/2014	11:20	490	Before starting injection
PZ	7-17	20-25	2/18/2014	15:00	2,800	End of injection day
PZ	7-17	25-30	2/19/2014	9:00	2,200/2,000	Before starting injection
PZ	7-17	25-30	2/19/2014	16:00	3,600	End of injection day
PZ	7-17	30-35	2/20/2014	9:00	2,800	Before starting injection
PZ	7-17	30-35	2/20/2014	NA	NS	End of injection day
PZ	7-17	30-35	2/21/2014	9:00	1,100	Before starting injection
PZ	7-17	30-35	2/21/2014	NA	NS	End of injection day
Second Injection Event (4/14/2014 - 4/22/2014)						
PZ	7-17	15-20	4/14/2014	13:10	NV	Before starting injection
PZ	7-17	15-20	4/14/2014	16:20	NV	End of injection day
PZ	7-17	15-20	4/15/2014	7:50	NV	Before starting injection
PZ	7-17	15-20	4/15/2014	16:30	NV	End of injection day
PZ	7-17	20-25	4/16/2014	9:20	NV	Before starting injection
PZ	7-17	20-25	4/16/2014	16:15	NV	End of injection day
PZ	7-17	25-30	4/17/2014	8:05	NV	Before starting injection
PZ	7-17	25-30	4/17/2014	12:30	56	midday
PZ	7-17	25-30	4/17/2014	16:30	250	End of injection day
PZ	7-17	30-35	4/18/2014	8:40	NV	Before starting injection
PZ	7-17	30-35	4/18/2014	14:00	270/240	End of injection day
PZ	7-17	30-35	4/21/2014	8:50	NV	Before starting injection
PZ	7-17	30-35	4/21/2014	16:40	NV	End of injection day
PZ	7-17	30-35	4/22/2014	8:15	NV	Before starting injection
PZ	7-17	30-35	4/22/2014	11:30	NV	End of injection day
CPT-7 Area[1]	18-22	NA	4/22/2014	13:15	230	End of injection event
CPT-15 Area[1]	20-23	NA	4/22/2014	13:30	6,100	
Third Injection Event (8/11/2014 - 8/19/2014)						
CPT-7 Area[1]	18-22	NA	8/11/2014	9:30	NV	Before starting injection event
CPT-15 Area[1]	20-23	NA	8/11/2014	10:15	NV	
PZ	7-17	15-20	8/11/2014	12:05	NV	Before starting injection
PZ	7-17	15-20	8/11/2014	16:55	NV	End of injection day
PZ	7-17	15-20	8/12/2014	9:20	NV	Before starting injection
PZ	7-17	15-20	8/12/2014	16:30	NV	End of injection day
PZ	7-17	15-20	8/13/2014	7:45	NV	Before starting injection
PZ	7-17	15-20	8/13/2014	16:20	NV	End of injection day
PZ	7-17	20-25	8/14/2014	8:00	NV	Before starting injection
PZ	7-17	20-25	8/14/2014	16:20	NV	End of injection day
PZ	7-17	25-30	8/15/2014	8:00	NV	Before starting injection
PZ	7-17	25-30	8/15/2014	15:10	NV	End of injection day
PZ	7-17	25-30	8/18/2014	8:45	NV	Before starting injection
PZ	7-17	30-35	8/18/2014	16:30	NV	End of injection day
PZ	7-17	30-35	8/19/2014	8:35	NV	Before starting injection
PZ	7-17	30-35	8/19/2014	15:30	NV	End of injection day
CPT-7 Area[1]	18-22	NA	8/20/2014	8:15	NV	End of injection event
CPT-15 Area[1]	20-23	NA	8/20/2014	8:30	2,400	

Notes:

1. Grab-groundwater Sample

PZ : Piezometer, screened from 7 - 17 ft bgs (first and second events) or 8.5-18.5 ft bgs (third event)

mg/L = milligram per liter

ft bgs = feet below ground surface

$NaMnO_4$ = sodium permanganate

/ = indicated duplicate sample

NA = Not Applicable

NV= Not Visible, purple color was not visible in the sample

NS = Not Sampled

Table 4B
CPT-21 Area Permanganate Field Test Results
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Sampling Location	Screened Interval (ft bgs)	Depth Interval of Injections (ft bgs)	Sampling Date	Sampling Time	$NaMnO_4$ Concentration (mg/L)	Notes
First Injection Event (8/20/2014 - 8/25/2014)						
PZ	5-15	NA	8/20/2014	NA	NS	Before starting injection
PZ	5-15	NA	8/20/2014	17:00	NV	End of injection day
PZ	5-15	15-20	8/21/2014	9:30	NV	Before starting injections
PZ	5-15	15-20	8/21/2014	16:30	NV	End of injection day
PZ	5-15	20-25	8/22/2015	8:30	NV	Before starting injections
PZ	5-15	20-25	8/22/2014	15:30	170	End of injection day
PZ	5-15	20-25	8/25/2014	9:20	NV	Before starting injections
PZ	5-15	20-25	8/25/2014	15:15	1,400	End of injection day
CPT-21 Area[1]	19-23	NA	8/25/2014	16:55	NV	End of injection event
Second Injection Event (10/14/2014 - 10/16/2014)						
CPT-21 Area[1]	19-23	NA	10/14/2014	12:00	NV	Before starting injection event
ISCO Area[1]	15-18	NA	10/14/2014	12:50	NV	
ISCO Area[1]	21-24	NA	10/14/2014	13:20	NV	
PZ	5-15	NA	10/14/2014	14:50	NV	Before starting injections
PZ	5-15	NA	10/14/2014	NA	NS	No injection on 10/14/14
PZ	5-15	15-20	10/15/2014	NA	NS	Before starting injections
PZ	5-15	15-20	10/15/2014	15:30	3,800	End of injection day
PZ	5-15	20-25	10/16/2014	7:50	5,700	Before starting injections
PZ	5-15	20-25	10/16/2014	14:45	20,900	End of injection day
PZ	5-15	NA	10/17/2014	9:40	2,400	End of injection event
CPT-21 Area[1]	19-23	NA	10/17/2014	9:30	NV	
ISCO1 Area[1]	15-18	NA	10/17/2014	11:00	7,900	
ISCO1 Area[1]	21-24	NA	10/17/2014	11:50	NV	

Notes:

1. Grab-groundwater sample near ISCO 1, collected from 15-18 ft bgs

PZ : Piezometer, screened from 5 - 15 ft bgs

MnO_4 = permanganate

ft bgs = feet below ground surface

$NaMnO_4$ = sodium permanganate

mg/L = milligram per liter

NA = Not Applicable

NV= Not Visible, purple color was not visible in the sample

NS = Not Sampled

FIGURES

N

0 10 Miles

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

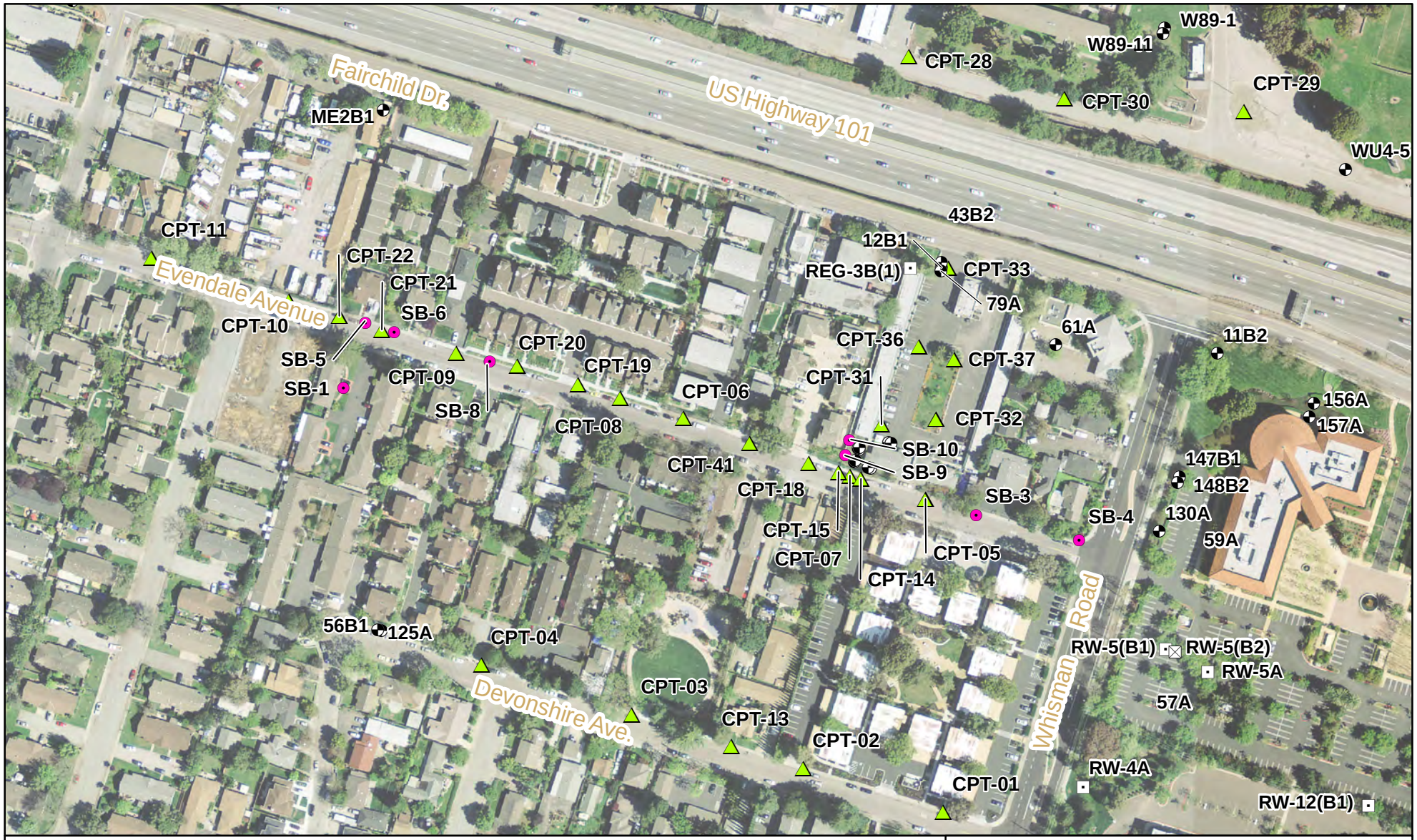
Site Location Map
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | February 2015

Figure **1**

\\Oakland-01\data\GIS\MEW\Project\Regional\2015_EvandaleISCO\Fig01_SiteLocation.mxd



Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well
- CPT and Grab-Groundwater Location (Geosyntec, 2013)
- Soil Boring and Grab-Groundwater Location (Geosyntec, 2013)

N

0 400 Feet

Note:
Aerial Source: USGS High Resolution Orthoimagery, April 2011

Site Investigation Map

CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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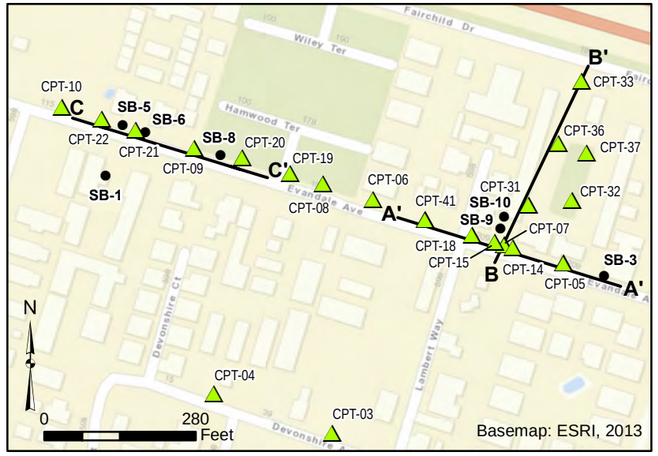
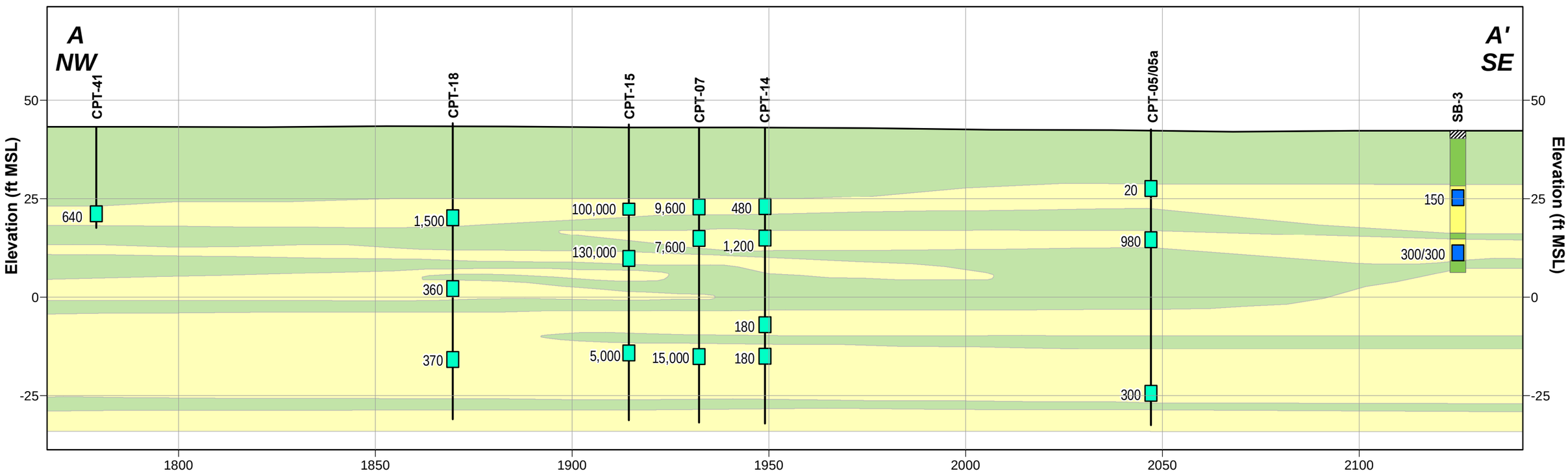
Figure 2

\\Oakland-01\data\GIS\MEW\Project\Regional\2015_EvandaleISCO\Fig02_SiteInvestMap.mxd





Legend

Lithology Interpretation

- Primarily Coarse-Grained (silty sands, sands, gravels)
- Primarily Fine-Grained (clays, silts)

SB-3 — Soil Boring

Soil Boring Lithology

- Coarse
- Fine
- No Recovery
- Grab Groundwater Sample (Geosyntec, 2013)

150 — TCE Concentration (ug/L)

CPT-41 — CPT or Soil Boring

640 — Grab Groundwater Sample (Geosyntec, 2013)

TCE Concentration (ug/L)

Notes:
Locations are approximate.
Interpretation of lithology based on CPT and soil boring data.
CPT = cone penetration test
TCE = trichloroethene
ug/L = micrograms per liter
ft = feet
ft MSL = feet above mean sea level

25 Feet 0

0 Feet 25

CPT-15 Area
Cross-Section A-A'
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

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Figure 3

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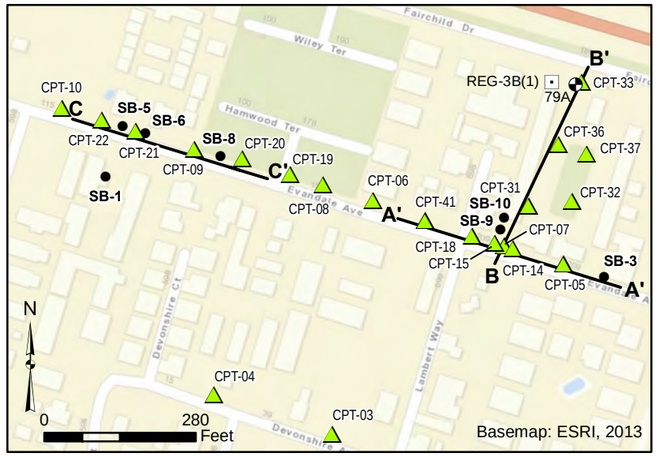

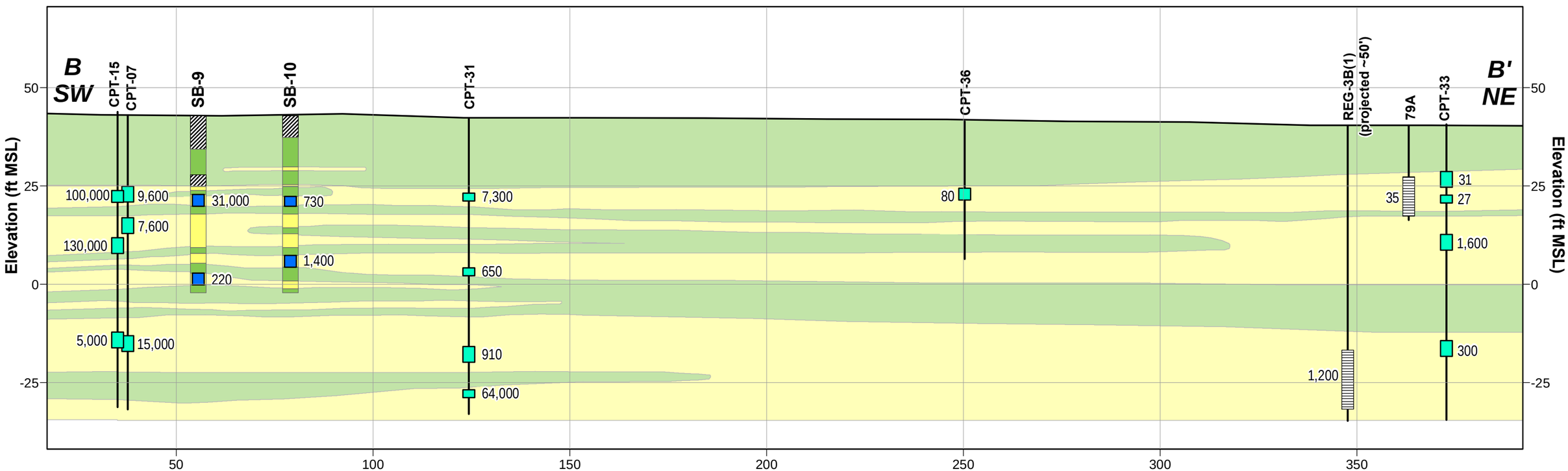

Legend

Lithology Interpretation

- Primarily Coarse-Grained (silty sands, sands, gravels)
- Primarily Fine-Grained (clays, silts)

SB-9 — Soil Boring

Soil Boring Lithology

- Coarse
- Fine
- No Recovery
- 220 — Grab Groundwater Sample (Geosyntec, 2013) — TCE Concentration (ug/L)

CPT-31 — CPT

- 910 — Grab Groundwater Sample (Geosyntec, 2013) — TCE Concentration (ug/L)

REG-3B(1) — Well Boring

- 1,200 — Well Screen — 2012 TCE Concentration (ug/L)

Notes:
Locations are approximate.
Interpretation of lithology based on CPT and soil boring data.
CPT = cone penetration test
TCE = trichloroethene
ug/L = micrograms per liter
ft = feet
ft MSL = feet above mean sea level

25 Feet 0 — 0 Feet 25

CPT-15 Area
Cross-Section B-B'
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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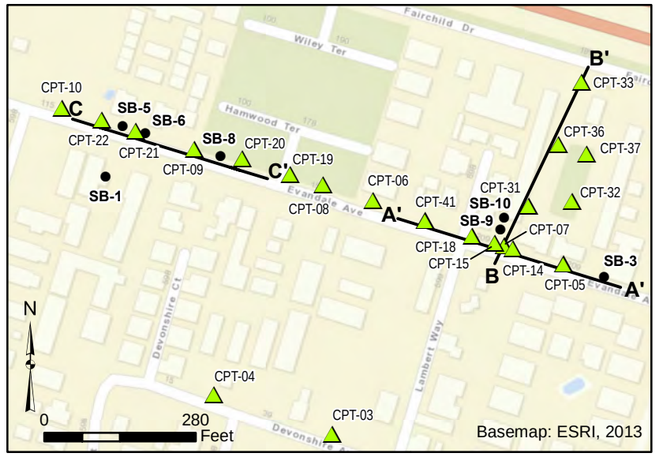
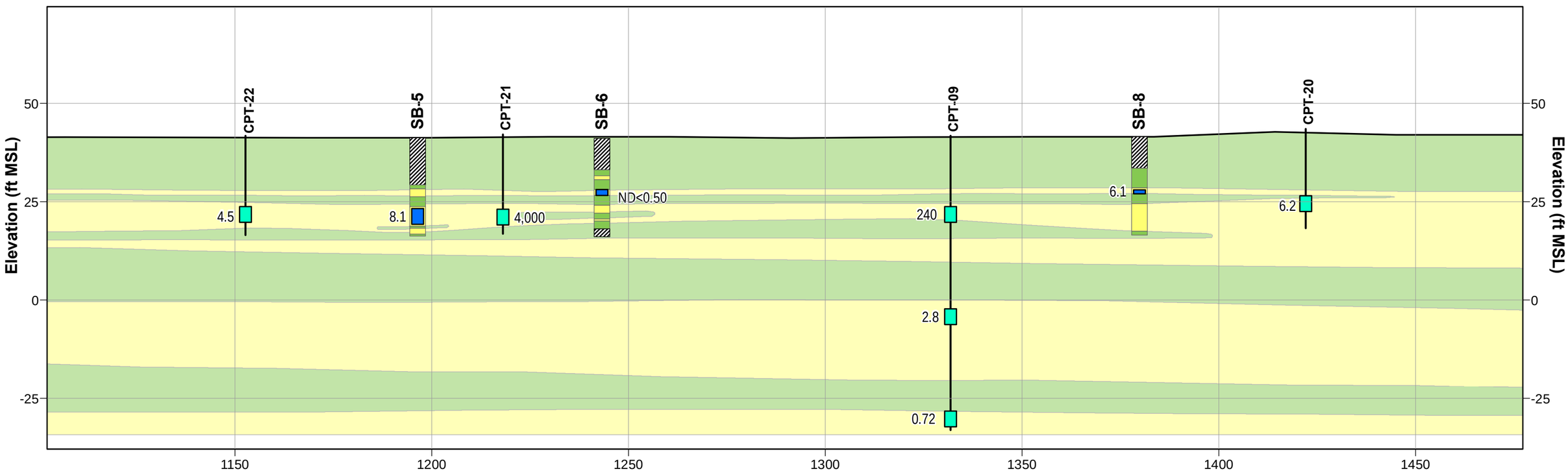
Figure 4

\\Oakland-01\data\GIS\MEW\Project\Regional\2015_EvandaleISCO\Fig04_SectionB.mxd





Legend

Lithology Interpretation

- Primarily Coarse-Grained (silty sands, sands, gravels)
- Primarily Fine-Grained (Clays, Silts)

SB-5 — Soil Boring

Soil Boring Lithology

- Coarse
- Fine
- No Recovery
- 8.1 Grab Groundwater Sample (Geosyntec, 2013) — TCE Concentration (ug/L)

CPT-22 — CPT

- 4.5 Grab Groundwater Sample (Geosyntec, 2013) — TCE Concentration (ug/L)

Notes:
Locations are approximate.
Interpretation of lithology based on CPT and soil boring data.
CPT = cone penetration test
TCE = trichloroethene
ug/L = micrograms per liter
ft = feet
ft MSL = feet above mean sea level

25 Feet 0 — 0 Feet 25

CPT-21 Area
Cross-Section C-C'

CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

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Figure 5

\\Oakland-01\data\GIS\MEW\Project\Regional\2015_EvandaleISCO\Fig05_SectionC.mxd

Legend

- Temporary Performance Monitoring Well
- CPT Location (Geosyntec, 2013)
- Soil Boring (Geosyntec, 2013)
- Extent of Injections
- 228/236 Evandale Avenue Property Limit
- Injection point (First Event)
- Injection point (Second Event)
- Injection point (Third Event)
- Temporary piezometer to monitor injection mounding (First Event)
- Temporary piezometer to monitor injection mounding (Second Event)
- Temporary piezometer to monitor injection mounding (Third Event)
- Grab-groundwater sample location (approximate)

Notes:
Locations are approximate.
Aerial Source: USGS High Resolution Orthoimagery, April 2011

N

20 10 0 20 Feet

CPT-15 Area
Injection Locations and Monitoring Well Network
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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Figure 6

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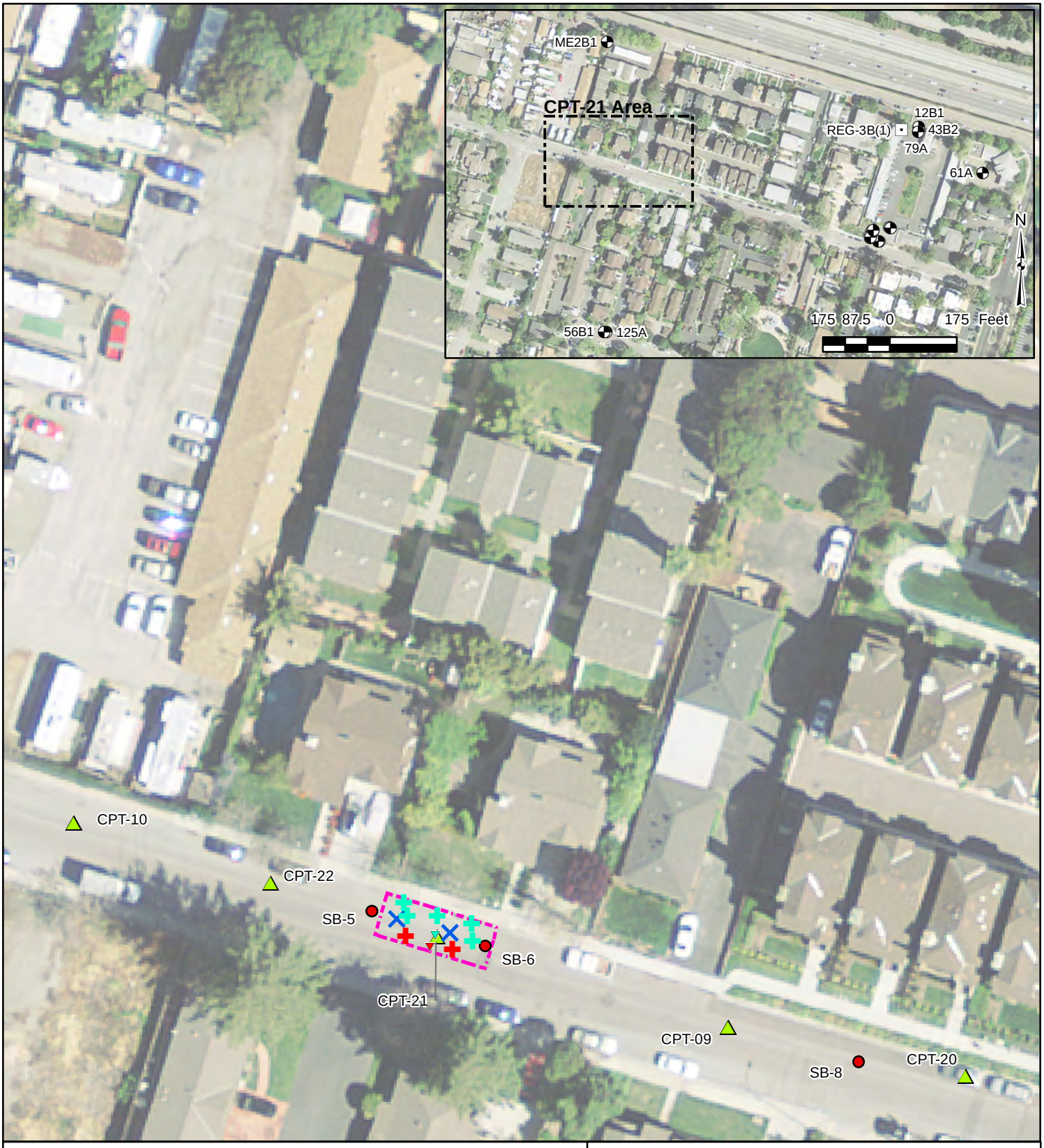

Legend

- Injection Point (First Event)
- Injection Point (Second Event)
- Extent of Injections
- Temporary Piezometer to Monitor Injection Mounding (First Event)
- Temporary Piezometer to Monitor Injection Mounding (Second Event)
- CPT Location (Geosyntec, 2013)
- Grab-groundwater sample location (approximate)
- Soil Boring (Geosyntec, 2013)

N

25 12.5 0 25 Feet

Notes:
Locations are approximate.
Aerial Source: USGS High Resolution Orthoimagery, April 2011

CPT-21 Area
Injection Locations and Monitoring Network
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

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Figure **7**

Oakland | February 2015

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APPENDIX A

Permits (SCVWD and City of Mountain View)

(This Appendix is being submitted as a separate file)

APPENDIX B

Temporary Performance Monitoring Well Boring Logs

Geosyntec consultants
1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

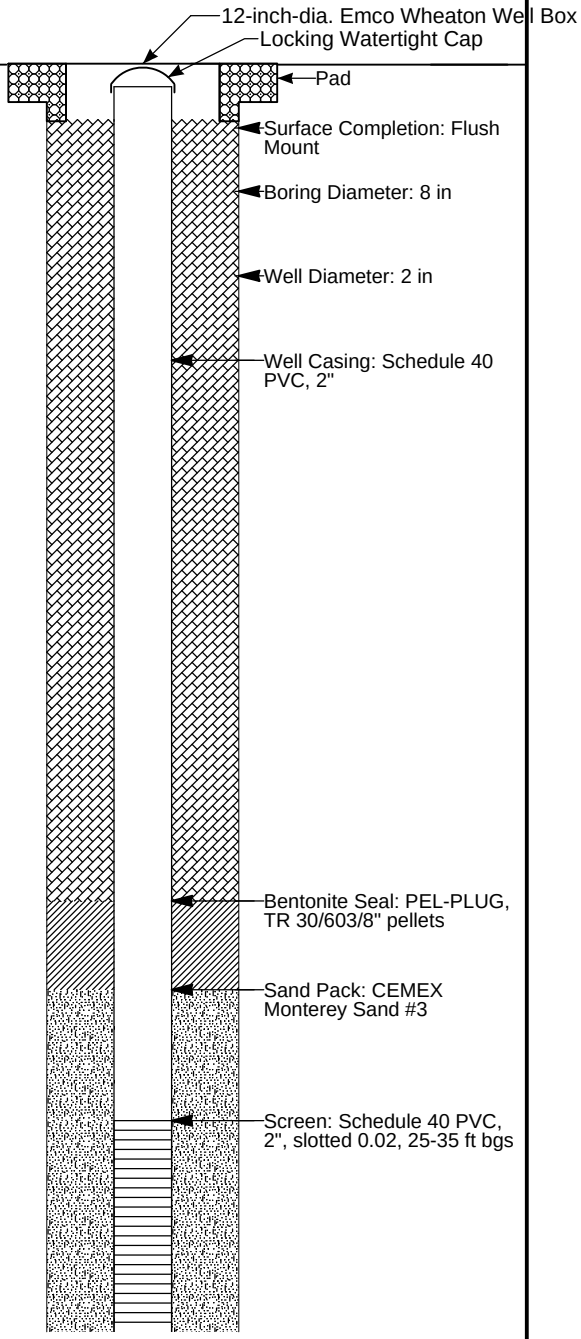
LOG OF ETWC-1Ai

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/6/2014 10:35:00 AM**	Finish Date	**1/6/2014 3:45:00 PM**	Total Depth Drilled (feet bgs)	**35.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			100	0		Lean CLAY (CL): dark reddish gray (2.5Y 3/1); moist; fine sand [0% gravel, 10% sand, 90% fines]; medium plasticity; firm
						Lean CLAY with sand (CL): brown (7.5R 4/8); moist; fine sand [0, 15, 85]; medium plasticity; firm
			100	0		Sandy lean CLAY (CL): brown (7.5R 4/8); moist; fine sand [0, 40, 60]; medium plasticity; firm
10						Lean CLAY (CL): dark gray (7.5R 4/1); moist; [0, 5, 95]; medium plasticity; firm
			0			No recovery
15						
			75			Clayey SAND (SC): dark gray (7.5R 4/1); moist; fine sand, medium plasticity fines [0, 80, 20]
				0.2		Lean CLAY with sand (CL): brown (7.5R 4/8); moist; fine sand [0, 15, 85]; medium plasticity; soft
20			100			Well-graded SAND (SW): very dark gray (7.5R 3/1); wet; fine to coarse sand [0, 95, 5]
						Fat CLAY (CH): dark grayish brown (10YR 4/2); wet; [0, 10, 90]; high plasticity; soft
				1.5		Well-graded SAND (SW): dark gray (10YR 4/1); wet; fine to coarse sand [0, 95, 5]
25			100	0.2		Clayey SAND (SC): dark grayish brown (10YR 4/2); wet; fine gravel, fine to coarse sand, medium plasticity fines [5, 60, 35]
				0.2		Silty SAND (SM): dark grayish brown (10YR 4/2); wet; fine sand, low plasticity fines [0, 70, 30]
			100	0.3 / 0.3		Well-graded SAND (SW): dark gray (10YR 4/1); wet; fine to coarse sand [0, 95, 5]
30						

WELL CONSTRUCTION



Template: GEOSYNTEC_WELL_FLUSHMOUNT_LZK; Proj ID: MEW_REGIONAL.GPJ; Printed: 2/6/2014; library

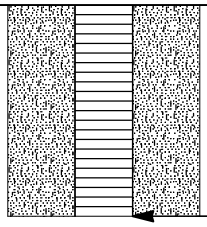
Geosyntec consultants
1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF ETWC-1Ai

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
30				1.9		Clayey SAND (SC): dark grayish brown (10YR 4/2); wet; fine gravel, fine to coarse sand, medium plasticity fines [5, 60, 35]
				0		Well-graded SAND (SW): very dark gray (10YR 3/1); wet; fine to coarse sand [0, 95, 5]
			80			Fat CLAY (CH): dark gray (2.5Y 4/1); wet; [0, 5, 95]; high plasticity; soft
				0.3		Silty SAND (SM): light olive brown (2.5 Y 5/4); wet; fine sand, low plasticity fines [0, 80, 20]
35						BOREHOLE TERMINATED. Total depth = 35 ft bgs
40						
45						
50						
55						
60						
65						

WELL CONSTRUCTION DIAGRAM



Bottom of Screen: 35 ft bgs,
Total Well Depth: 35 ft bgs

Template: GEOSYNTEC_WELL_FLUSHMOUNT_LZK; Proj ID: MEW_REGIONAL.GPJ; Printed: 2/6/2014; library

Geosyntec consultants
1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

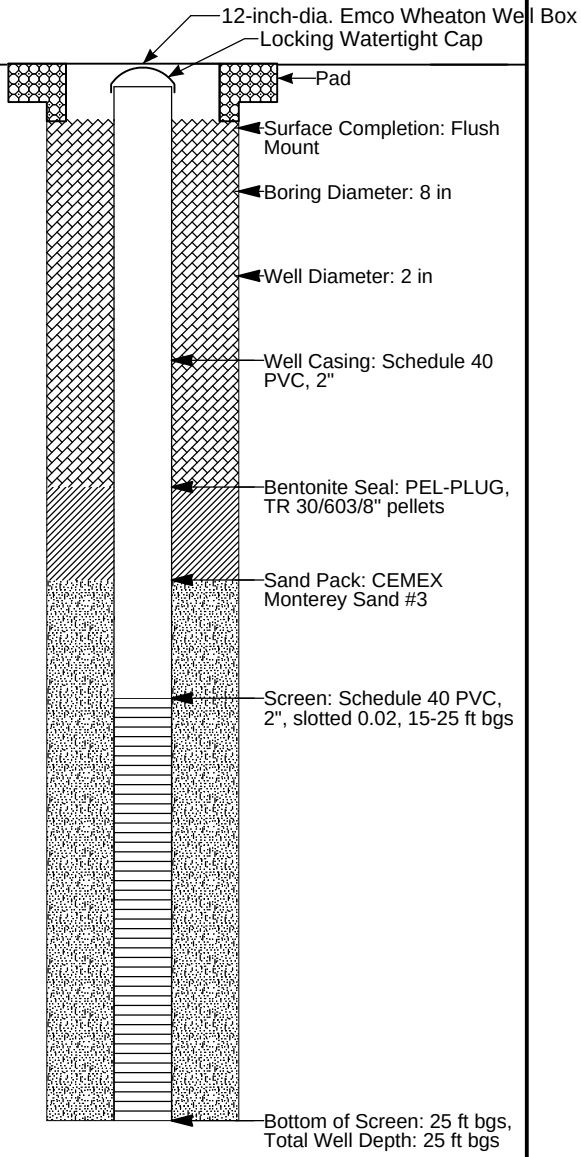
LOG OF ETWC-1As

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/6/2014 12:45:00 PM**	Finish Date	**1/6/2014 3:45:00 PM**	Total Depth Drilled (feet bgs)	**25.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			100	0		Lean CLAY (CL): dark reddish gray (2.5Y 3/1); moist; fine sand [0% gravel, 10% sand, 90% fines]; medium plasticity; firm
						Lean CLAY with sand (CL): brown (7.5R 4/8); moist; fine sand [0, 15, 85]; medium plasticity; firm
			100	0		Sandy lean CLAY (CL): brown (7.5R 4/8); moist; fine sand [0, 40, 60]; medium plasticity; firm
10						Lean CLAY (CL): dark gray (7.5R 4/1); moist; [0, 5, 95]; medium plasticity; firm
			0			No recovery
15						
			75			Clayey SAND (SC): dark gray (7.5R 4/1); moist; fine sand, medium plasticity fines [0, 80, 20]
				0.2		Lean CLAY with sand (CL): brown (7.5R 4/8); moist; fine sand [0, 15, 85]; medium plasticity; soft
20			100			Well-graded SAND (SW): very dark gray (7.5R 3/1); wet; fine to coarse sand [0, 95, 5]
						Fat CLAY (CH): dark grayish brown (10YR 4/2); wet; [0, 10, 90]; high plasticity; soft
				1.5		Well-graded SAND (SW): dark gray (10YR 4/1); wet; fine to coarse sand [0, 95, 5]
25						
30						

WELL CONSTRUCTION



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1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

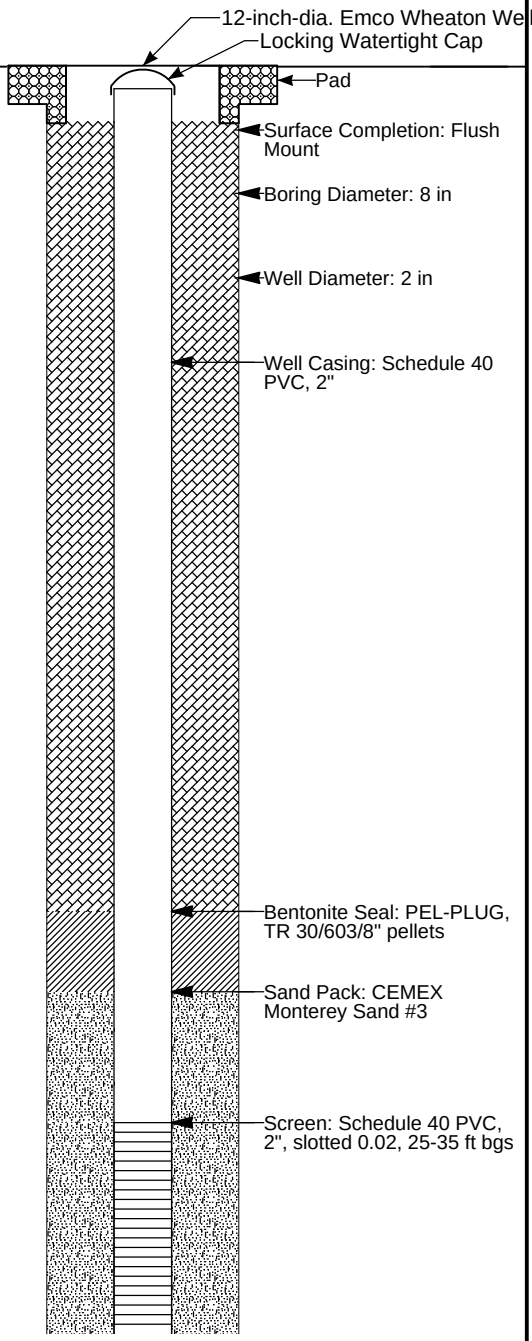
LOG OF ETWC-2Ai

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/7/2014 9:40:00 AM**	Finish Date	**1/7/2014 3:00:00 PM**	Total Depth Drilled (feet bgs)	**35.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			100	0		Lean CLAY with sand (CL): light yellowish brown (2.5Y 6/3); moist; fine sand, medium plasticity fines [0% gravel, 20% sand, 80% fines]; stiff
			100	0		Lean CLAY (CL): grayish brown (2.5Y 5/2); moist; [0, 5, 95]; medium plasticity; medium stiff
10			100	0		Fat CLAY (CH): very dark grayish brown (2.5Y 3/2); moist; high plasticity fines [0, tr, 100]; stiff
15			50	0		Clayey SAND (SC): olive gray (5Y 5/3); moist; well graded fine to medium sand, high plasticity fines [0, 60, 40]
				0.4		Clayey Sand (SW-SC): olive (5Y 4/3); wet; well-graded fine to coarse sand, high plasticity fines [0, 85, 15]
20			80	0.2		No recovery
				0.5		Sandy lean CLAY (CL): olive brown (2.5Y 4/3); moist; medium plasticity fines [0, 30, 70]; soft
				4.9		Well-graded SAND (SW): light olive brown (2.5Y 5/4); wet; well-graded fine to coarse sand [5, 90, 5]
25			60	2.7		Sandy lean CLAY (CL): dark olive brown (2.5Y 3/3); moist; fine sand [0, 35, 65]; medium plasticity; medium stiff
			100	0.5		Silty SAND (SM): light olive brown (2.5Y 5/4); wet; well-graded fine to coarse sand, low plasticity fines [0, 85, 15]
30						Clayey SAND (SC): grayish brown (2.5Y 5/2); wet; poorly graded fine sand, high plasticity fines [0, 60, 40]

WELL CONSTRUCTION



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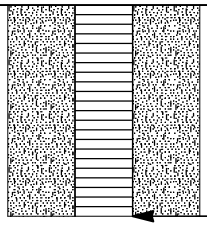
1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF ETWC-2Ai

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
30				12.2		Fat CLAY (CH): very dark greenish gray (5GY 3/1); moist; [0, 5, 95]; high plasticity; medium stiff
				14.3		Clayey SAND (SC): very dark greenish gray (5GY 3/1); moist; fine to coarse sand, high plasticity fines [5, 60, 35]
				7.8		
			80			Fat CLAY (CH): very dark greenish gray (5GY 3/1); moist; high plasticity fines [0, 5, 95]; medium stiff
				3.1		Silty SAND (SM): light olive brown (2.5Y 5/4); wet; fine to coarse sand, low plasticity fines [5, 75, 20]
				13.2		
35				0		Clayey SAND (SC): dark gray (N4); moist; fine to medium sand, high plasticity fines [0, 80, 20]
						BOREHOLE TERMINATED. Total depth = 35 ft bgs
40						
45						
50						
55						
60						
65						

WELL CONSTRUCTION DIAGRAM



Bottom of Screen: 35 ft bgs,
Total Well Depth: 35 ft bgs

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1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

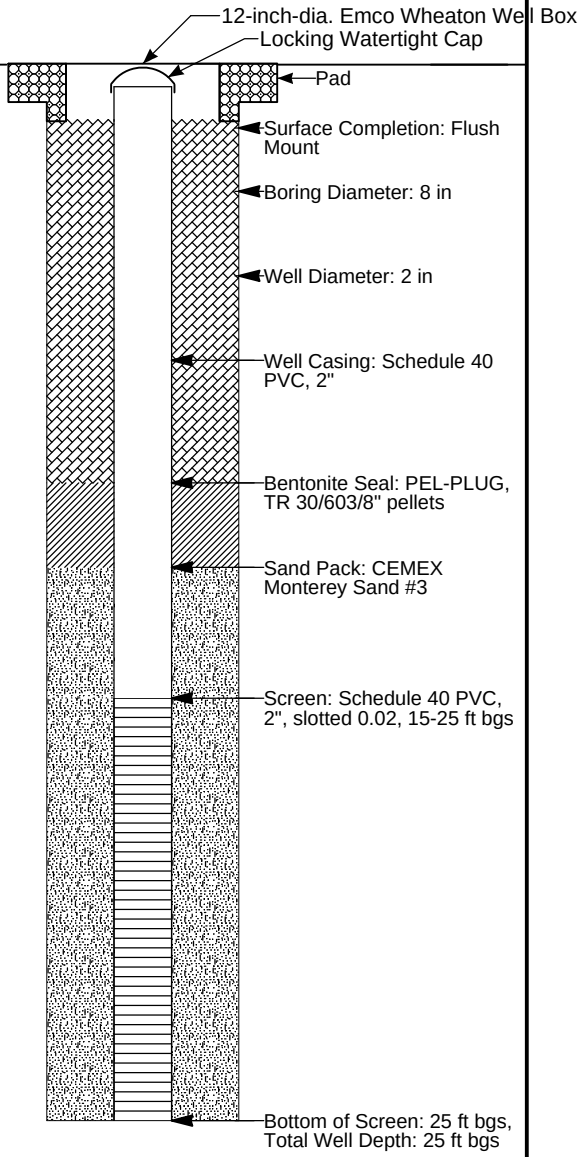
LOG OF ETWC-2As

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/7/2014 9:40:00 AM**	Finish Date	**1/7/2014 3:00:00 PM**	Total Depth Drilled (feet bgs)	**25.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			100	0		Lean CLAY with sand (CL): light yellowish brown (2.5Y 6/3); moist; fine sand, medium plasticity fines [0% gravel, 20% sand, 80% fines]; stiff
			100	0		Lean CLAY (CL): grayish brown (2.5Y 5/2); moist; [0, 5, 95]; medium plasticity; medium stiff
10			100	0		Fat CLAY (CH): very dark grayish brown (2.5Y 3/2); moist; high plasticity fines [0, tr, 100]; stiff
15			50	0		Clayey SAND (SC): olive gray (5Y 5/3); moist; well graded fine to medium sand, high plasticity fines [0, 60, 40]
				0.4		Clayey SAND (SC): olive gray (5Y 5/3); wet; fine to medium sand, high plasticity fines [0, 85, 15]
20			80	0.2		No recovery
				0.5		Sandy lean CLAY (CL): olive brown (2.5Y 4/3); moist; medium plasticity fines [0, 30, 70]; soft
25			60	4.9		Well-graded SAND (SW): light olive brown (2.5Y 5/4); wet; fine to coarse sand [5, 90, 5]
						Sandy lean CLAY (CL): dark olive brown (2.5Y 3/3); moist; fine sand [0, 35, 65]; medium plasticity; medium stiff
30						

WELL CONSTRUCTION



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Geosyntec consultants
1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

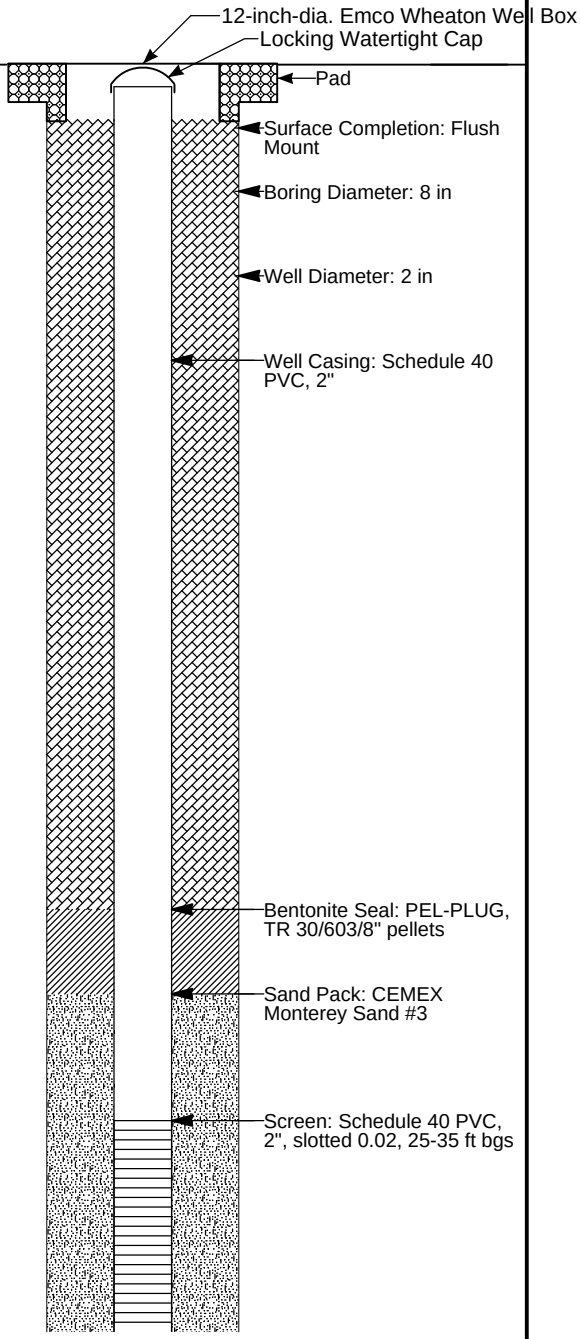
LOG OF ETWC-3Ai

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/9/2014 8:45:00 AM**	Finish Date	**1/9/2014 2:55:00 PM**	Total Depth Drilled (feet bgs)	**35.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			50			No recovery
				0		Lean CLAY (CL): olive brown (2.5Y 4/3); moist; [0% gravel, 10% sand, 90% fines]; medium plasticity; stiff
			50	0		Silty SAND (SM): dark gray (7.5Y 4/1); moist; fine sand, high plasticity fines [0, 65, 35]
10				0.4		No recovery
				0		Lean CLAY (CL): olive brown (2.5Y 4/4); moist; fine sand [0, 5, 95]; medium plasticity; medium stiff
			100			
				0		
15				0		Lean CLAY (CL): very dark gray (2.5Y 9/1); moist; [0, 0, 100]; medium plasticity; stiff
				0		Sandy fat CLAY (CH): gray (2.5Y 6/1); moist; fine sand [0, 35, 65]; high plasticity; soft
			75			No recovery
				0		Lean CLAY (CL): olive brown (2.5Y 4/4); moist; [0, 0, 100]; medium plasticity; medium stiff
20				0		Fat CLAY with sand (CH): light olive brown (1.5Y 5/4); moist; fine sand [0, 20, 80]; high plasticity; soft
			30	0		Sandy fat CLAY (CH): gray (2.5Y 5/1); moist; fine sand [0, 35, 65]; high plasticity; soft
				0		Silty SAND (SM): light olive brown (2.5Y 5/4); wet; fine sand, low plasticity fines [0, 80, 20]
				0.2		Well-graded SAND (SW): dark olive brown (2.5Y 3/3); wet; fine to medium sand [0, 100, 0]
25			100	0		Clayey SAND (SC): olive gray (5Y 4/2); moist; fine sand, high plasticity fines [0, 60, 40]
				0.3		Clayey SAND (SC): light olive brown (2.5Y 5/4); wet; fine sand, high plasticity fines [0, 80, 20]
				0.9		Poorly graded SAND with Silt (SP): light olive brown (2.5Y 5/4); wet; fine sand, low plasticity fines [0, 90, 10]
			80	3.9		Clayey SAND (SC): very dark gray (2.5Y 3/1); moist; fine sand, high plasticity fines [0, 55, 45]
30						

WELL CONSTRUCTION



Template: GEOSYNTEC_WELL_FLUSHMOUNT_LZK; Proj ID: MEW_REGIONAL.GPJ; Printed: 2/6/2014; library

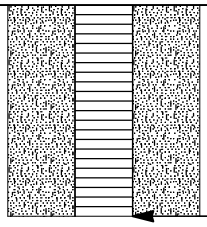
Geosyntec consultants
1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF ETWC-3Ai

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
30				1.3		Poorly graded SAND with Silt (SP): light olive brown (2.5Y 5/4); wet; fine sand, low plasticity fines [0, 90, 10]
				0		Fat CLAY (CH): dark gray (N3); moist; fine sand [0, 10, 90]; high plasticity; soft
			100			Silty SAND (SM): olive (5Y 4/3); wet; fine to coarse sand, low plasticity fines [0, 85, 15]
				4.2		Well-graded SAND (SW): dark gray (N3), moist; fine gravel, fine to coarse sand [5, 90, 5]
				0.9		
35						Well-graded SAND (SW): olive gray (5Y 4/2); wet; fine to medium sand [0, 100, 0]
40						
45						
50						
55						
60						
65						

WELL CONSTRUCTION DIAGRAM



Bottom of Screen: 35 ft bgs,
Total Well Depth: 35 ft bgs

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Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

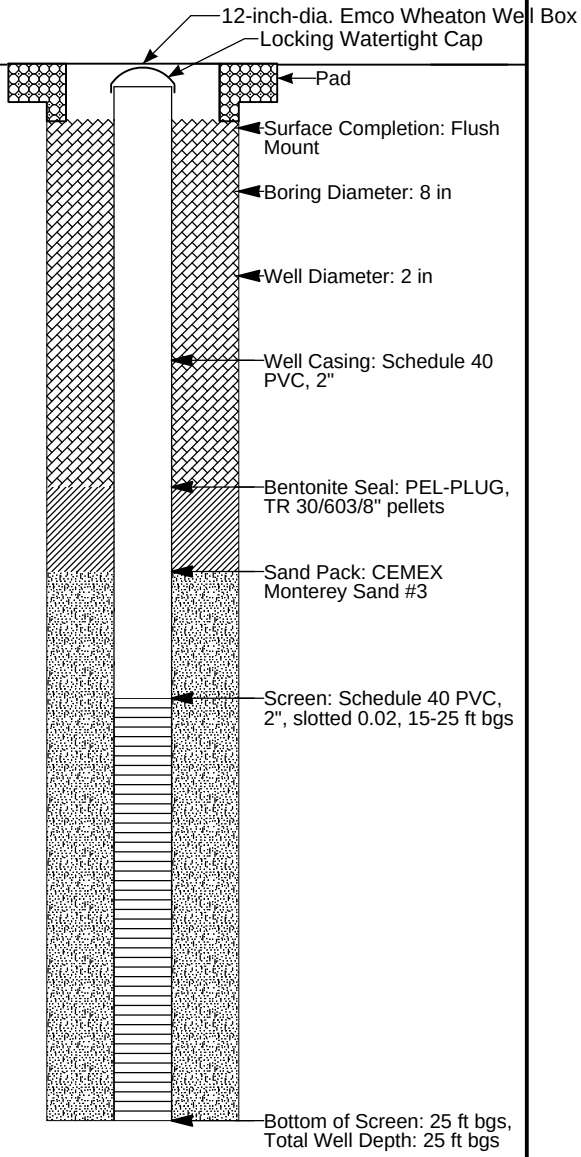
LOG OF ETWC-3As

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/9/2014 10:00:00 AM**	Finish Date	**1/9/2014 2:55:00 PM**	Total Depth Drilled (feet bgs)	**25.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			50			No recovery
				0		Lean CLAY (CL): olive brown (2.5Y 4/3); moist; [0% gravel, 10% sand, 90% fines]; medium plasticity; stiff
			50	0		Silty SAND (SM): dark gray (7.5Y 4/1); moist; fine sand, high plasticity fines [0, 65, 35]
10				0.4		No recovery
				0		Lean CLAY (CL): olive brown (2.5Y 4/4); moist; fine sand [0, 5, 95]; medium plasticity; medium stiff
			100			
				0		
15				0		Lean CLAY (CL): very dark gray (2.5Y 9/1); moist; [0, 0, 100]; medium plasticity; stiff
				0		Sandy fat CLAY (CH): gray (2.5Y 6/1); moist; fine sand [0, 35, 65]; high plasticity; soft
			75			No recovery
				0		
						Lean CLAY (CL): olive brown (2.5Y 4/4); moist; [0, 0, 100]; medium plasticity; medium stiff
20				0		Fat CLAY with sand (CH): light olive brown (1.5Y 5/4); moist; fine sand [0, 20, 80]; high plasticity; soft
			30	0		Sandy fat CLAY (CH): gray (2.5Y 5/1); moist; fine sand [0, 35, 65]; high plasticity; soft
				0		Silty SAND (SM): light olive brown (2.5Y 5/4); wet; fine sand, low plasticity fines [0, 80, 20]
				0.2		Well-graded SAND (SW): dark olive brown (2.5Y 3/3); wet; fine to medium sand [0, 100, 0]
25						
30						

WELL CONSTRUCTION



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1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

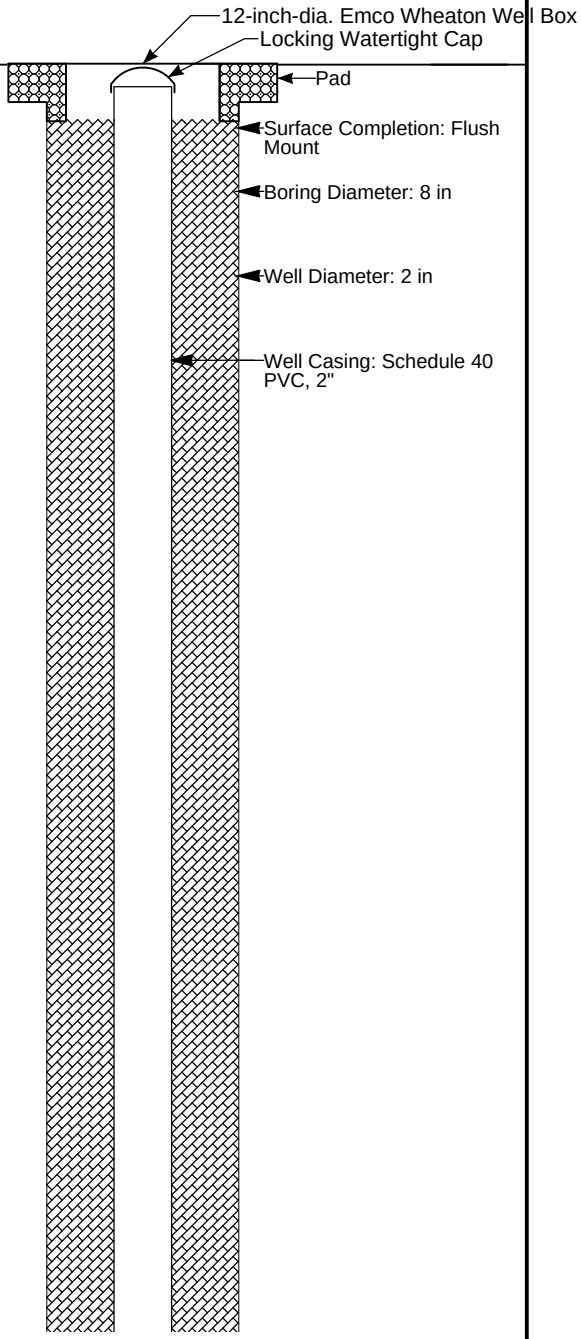
LOG OF ETWC-3B1

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/8/2014 9:30:00 AM**	Finish Date	**1/9/2014 2:55:00 PM**	Total Depth Drilled (feet bgs)	**75.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			50			No recovery
				0		Lean CLAY (CL): olive brown (2.5Y 4/3); moist; [0% gravel, 10% sand, 90% fines]; medium plasticity; stiff
			50	0		Silty SAND (SM): dark gray (7.5Y 4/1); moist; fine sand, high plasticity fines [0, 65, 35]
10				0.4		No recovery
				0		Lean CLAY (CL): olive brown (2.5Y 4/4); moist; fine sand [0, 5, 95]; medium plasticity; medium stiff
			100			
				0		
15				0		Lean CLAY (CL): very dark gray (2.5Y 9/1); moist; [0, 0, 100]; medium plasticity; stiff
				0		Sandy fat CLAY (CH): gray (2.5Y 6/1); moist; fine sand [0, 35, 65]; high plasticity; soft
			75			No recovery
				0		Lean CLAY (CL): olive brown (2.5Y 4/4); moist; [0, 0, 100]; medium plasticity; medium stiff
20				0		Fat CLAY with sand (CH): light olive brown (1.5Y 5/4); moist; fine sand [0, 20, 80]; high plasticity; soft
			30	0		Sandy fat CLAY (CH): gray (2.5Y 5/1); moist; fine sand [0, 35, 65]; high plasticity; soft
				0		Poorly graded SAND with Silt (SP): light olive brown (2.5Y 5/4); wet; fine sand, low plasticity fines [0, 80, 20]
				0.2		Well-graded SAND (SW): dark olive brown (2.5Y 3/3); wet; fine to medium sand [0, 100, 0]
25			100	0		Clayey SAND (SC): olive gray (5Y 4/2); moist; fine sand, high plasticity fines [0, 60, 40]
				0.3		Clayey SAND (SC): light olive brown (2.5Y 5/4); wet; fine sand, high plasticity fines [0, 80, 20]
				0.9		Silty SAND (SM): light olive brown (2.5Y 5/4); wet; fine sand, low plasticity fines [0, 90, 10]
			80	3.9		Clayey SAND (SC): very dark gray (2.5Y 3/1); moist; fine sand, high plasticity fines [0, 55, 45]
30						

WELL CONSTRUCTION



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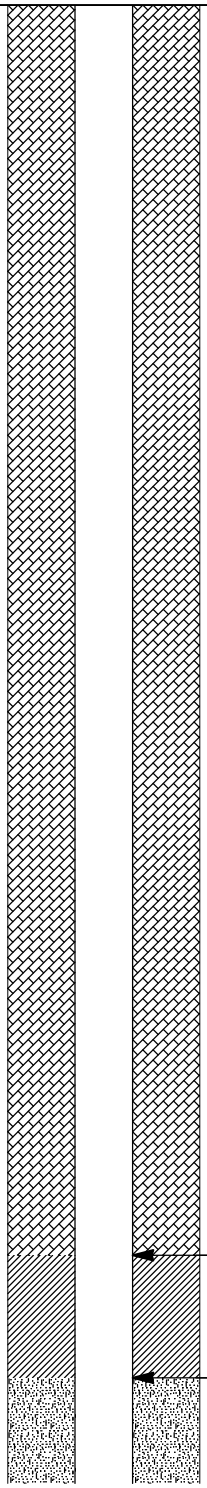
1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF ETWC-3B1

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
30				1.3		Poorly graded SAND with Silt (SP): light olive brown (2.5Y 5/4); wet; fine sand, low plasticity fines [0, 90, 10]
				0		Fat CLAY (CH): dark gray (N3); moist; fine sand [0, 10, 90]; high plasticity; soft
			100			Silty SAND (SM): olive (5Y 4/3); wet; fine to coarse sand, low plasticity fines [0, 85, 15]
				4.2		Well-graded SAND (SW): dark gray (N3), moist; fine gravel, fine to coarse sand [5, 90, 5]
35				0.9		Well-graded SAND (SW): olive gray (5Y 4/2); wet; fine to medium sand [0, 100, 0]
				1.7		Sandy fat CLAY (CH): olive (5Y 4/4); moist; fine sand [0, 30, 70]; high plasiticy; soft
			0	0.2		Color change to very dark gray (5Y 3/1) @ 36 ft bgs
						No recovery
40						
45			100	0.2		Well-graded SAND (SW): olive gray (5Y 4/2); wet; fine gravel, fine to coarse sand [5, 90, 5]
				0.3		Clayey SAND (SC): dark greenish gray (5GY 4/1); wet; fine to coarse sand, high plasticity fines [0, 60, 40]
				0		Sandy fat CLAY (CH): dark greenish gray (5GY 4/1); moist; fine to coarse sand, high plasticity fines [0, 35, 65]
						No recovery ;very watery
50			40	10:40		
			100	0		Well-graded GRAVEL with sand (GW): olive (5Y 4/4); wet; fine to coarse gravel, fine to medium sand [60, 40, 0]
				0		Sandy fat CLAY (CH): brown (2.5Y 4/6); wet; fine to coarse sand [0, 30, 70]; high plasticity; medium stiff
55			65	0		Poorly graded SAND (SP): olive brown (2.5Y 4/1); wet; fine sand [0, 100, 0]
				0		Poorly graded SAND with silt (SP-SM): light olive brown (2.5Y 5/4); wet; fine sand, low plasticity fines [0, 90, 10]
				0		Clayey SAND (SC): light olive brown (2.5Y 5/4); wet; fine sand, high plasticity fines [0, 60, 40]
			65	0		Well-graded SAND (SW): light olive brown (2.5Y 5/4); wet; fine gravel, fine to coarse sand [5, 90, 5]
				0.2		Well-graded GRAVEL with sand (GW): very dark grayish brown (2.5Y 3/2); wet; fine to coarse gravel, fine to coarse sand [70, 30, 0]
60			100			Sandy Fat CLAY (CH): yellowish brown (10YR 5/4); moist; fine to coarse sand [0, 45, 55]; high plasticity; soft
				0		Fat CLAY (CH): dark yellowish brown (10YR 4/4); moist; fine to coarse sand [0, 10, 90]; high plasticity; stiff
				0		
65						

WELL CONSTRUCTION DIAGRAM



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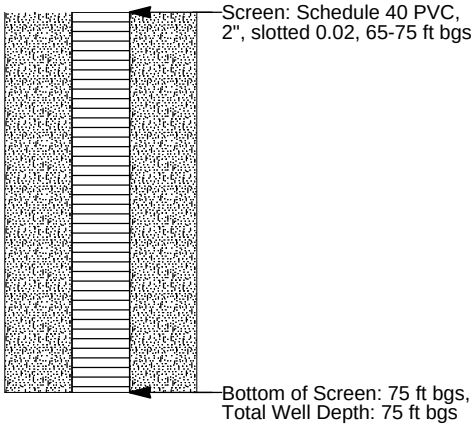
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF ETWC-3B1

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
65			100	0.4		Silty SAND (SM): light yellowish brown (2.5Y 6/3); wet; fine sand, low plasticity fines [0, 80, 20]
				1.3		Well-graded SAND with gravel (SW): light olive brown (2.5Y 5/3); wet; fine gravel, fine to coarse sand [20, 75, 5]
			100	2.1		Silty SAND (SM): olive brown (2.5Y 4/6); wet; fine sand, high plasticity fines [0, 80, 20]
				71.9		Well-graded SAND (SW): dark grayish brown (2.5Y 4/2); wet; fine gravel, fine to coarse sand [5, 95, 0]
70			100	1.2		Fat CLAY with sand (CH): dark yellowish brown (10YR 4/4); moist fine sand [0, 20, 80]; high plasticity; medium stiff
				2		Fat CLAY (CH): brown (10YR 5/3); wet; fine sand [0, 10, 90]; high plasticity; medium stiff
			100	3.6		Fat CLAY with sand (CH): brown (10YR 5/3); wet; fine gravel, fine to coarse sand [5, 20, 75]; high plasticity; soft
				1		Silty SAND (SM): olive brown (2.5Y 4/3); moist; fine to coarse sand, high plasticity fines [0, 80, 20]
75						BOREHOLE TERMINATED. Total depth = 75 ft bgs
80						
85						
90						
95						
100						

WELL CONSTRUCTION DIAGRAM



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1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

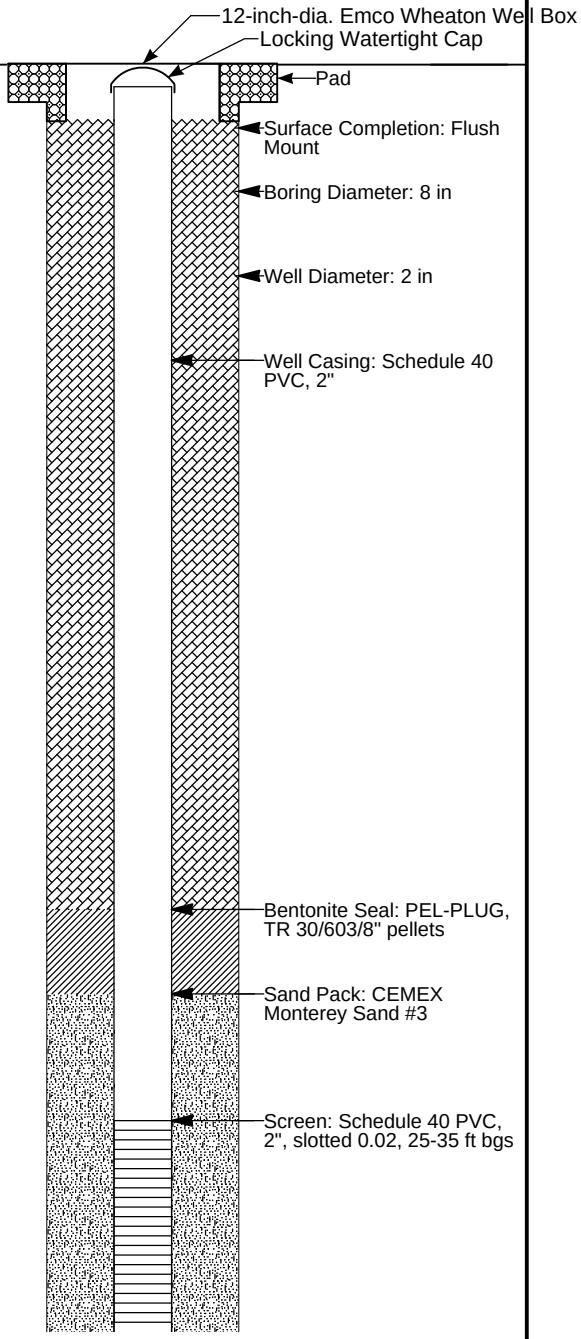
LOG OF ETWC-4Ai

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/10/2014 8:10:00 AM**	Finish Date	**1/10/2014 10:20:00 PM**	Total Depth Drilled (feet bgs)	**35.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			100	0		Silty SAND (SM): light olive brown (2.5Y 5/6); moist; fine sand, non-plastic fines [0% gravel, 60% sand, 40% fines]
			100	0		Lean CLAY (CL): olive brown (2.5Y 5/6); moist; fine sand [0, 10, 90]; medium plasticity; very stiff
10				0		
			0	0		Lean CLAY (CL): dark grayish brown (2.5Y 4/2); moist; [0, tr, 100]; medium plasticity; stiff
						No Recovery
15			75			
				0		Fat CLAY (CH): dark olive gray (5Y 3/2); moist; [0, 0, 100]; high plasticity; soft
				0		
				0.2		Sandy fat CLAY (CH): light olive gray (5Y 5/2); moist; fine sand [0, 40, 60]; high plasticity; soft
20				3.4		
			80	4.5		Clayey SAND (SC): olive gray (5Y 4/2); wet; fine sand, high plasticity fines [0, 80, 20]
						Sandy lean CLAY (CL): light olive gray (5Y 6/2); moist; fine gravel, fine sand [5, 35, 60]; high plasticity; soft
				2.4		Poorly graded SAND (SP): dark olive gray (5Y 3/2); moist; fine sand [0, 95, 5]
				20.5		Silty SAND (SM): olive gray (5Y 5/2); wet; fine sand, low plasticity fines [0, 85, 15]
25			50	5.1		Poorly graded SAND (SP): dark olive gray (5Y 3/2); moist; fine sand [0, 95, 5]
						Clayey SAND (SC): olive brown (2.5Y 4/4); moist; fine sand, high plasticity fines [0, 55, 45]
				11.8		Silty SAND (SM): dark grayish brown (2.5Y 4/2); wet; fine sand, low plasticity fines [0, 80, 20]
			20	22.4		Sandy CLAY (SC): dark grayish brown (2.5Y 4/2); wet; fine to medium sand [0, 40, 60]; high plasticity; soft
30						

WELL CONSTRUCTION



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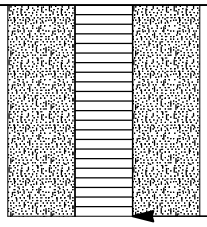
1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

LOG OF ETWC-4Ai

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
30				18.3		No Recovery
				2.1		Sandy CLAY (SM): dark greenish gray (5GY 4/1); moist; fine to medium sand [0, 30, 70]; high plasticity; soft
			100			Clayey SAND (SC): grayish brown (2.5Y 5/2); wet; fine to coarse sand, high plasticity fines [0, 80, 20]
				17.5		
				6.6		Well-graded SAND with silt (SW-SM): dark greenish gray (5GY 4/1); moist; fine gravel, fine to coarse sand, low plasticity fines [5, 85, 10]
35						BOREHOLE TERMINATED. TOTAL DEPTH = 35 ft bgs
40						
45						
50						
55						
60						
65						

WELL CONSTRUCTION DIAGRAM



Bottom of Screen: 35 ft bgs,
Total Well Depth: 35 ft bgs

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1111 Broadway. 6th Floor
Oakland, California 94607
Telephone: 510.836.3034
Fax: 510.836.3036

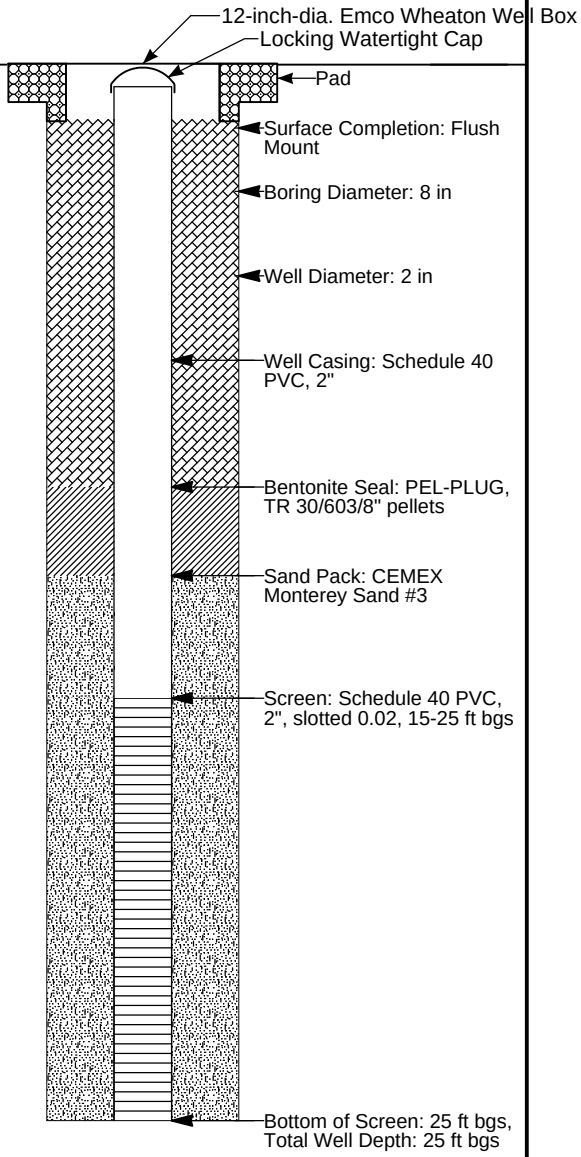
LOG OF ETWC-4As

Location: Mountain View **Project: MEW** **Project Number: WR1128B**

Start Date	**1/9/2014 12:40:00 PM**	Finish Date	**1/10/2014 10:26:00 AM**	Total Depth Drilled (feet bgs)	**25.0**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Gregg Drilling**	Ground Surface Elevation (feet MSL)	**Not Surveyed**
Drill Rig	**M5T**	Sampling Method	**DPT**	Top of PVC Casing Elevation (feet MSL)	**Not Surveyed**
Groundwater Observations		Hammer Data	**n/a**	Logger **JC**	Reviewer **NKG**
Coordinate Location	**Not surveyed**	Remarks			

Elevation, feet / Depth, feet	Sample Interval	Blows per 6 inches	Recovery, %	PID, ppm	Graphic Log	MATERIAL DESCRIPTION
0						Hand auger to 5'
5			100	0		Silty SAND (SM): light olive brown (2.5Y 5/6); moist; fine sand, non-plastic fines [0% gravel, 60% sand, 40% fines]
			100	0		Lean CLAY (CL): olive brown (2.5Y 5/6); moist; fine sand [0, 10, 90]; medium plasticity; very stiff
10				0		
				0		Lean CLAY (CL): dark grayish brown (2.5Y 4/2); moist; [0, tr, 100]; medium plasticity; stiff
			0			No Recovery
15			75			
				0		Fat CLAY (CH): dark olive gray (5Y 3/2); moist; [0, 0, 100]; high plasticity; soft
				0		
				0.2		Sandy fat CLAY (CH): light olive gray (5Y 5/2); moist; fine sand [0, 40, 60]; high plasticity; soft
20				3.4		
			80	4.5		Clayey SAND (SC): olive gray (5Y 4/2); wet; fine sand, high plasticity fines [0, 80, 20]
						Sandy lean CLAY (CL): light olive gray (5Y 6/2); moist; fine gravel, fine sand [5, 35, 60]; medium plasticity; soft
				2.4		Poorly graded SAND (SP): dark olive gray (5Y 3/2); moist; fine sand [0, 95, 5]
				20.5		Silty SAND (SM): olive gray (5Y 5/2); wet; fine sand, high plasticity fines [0, 85, 15]
				5.1		
25						Poorly graded SAND (SP): dark olive gray (5Y 3/2); moist; fine sand [0, 95, 5]
						Clayey SAND (SC): olive brown (2.5Y 4/4); moist; fine sand, high plasticity fines [0, 55, 45]
30						

WELL CONSTRUCTION



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APPENDIX C

Temporary Performance Monitoring Well Development Records

GREGG

MONITORING WELL DEVELOPMENT LOG

Page _____ of _____

All measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Sample ID _____

Qty. of Drilling Fluid Lost _____

Minimum Gal. to be Purged _____

Development Method _____

Purging Equipment _____

Water Level Equipment _____

pH/EC Meter _____

Turbidity Meter _____

Other _____

Well Number ETWC-1AS

Date 1-13-14

Time Start: 1110 End: 1310

Client GEOSYNTEC

Project Mountain View, CT

Job Number D2140003

Installation Date —

Well Diameter 2"

Borehole Diameter 8"

Screen Length 10FT

Measured Depth (pre-development) 24.70

Measured Depth (post-development) _____

Static Water Level (ft.) 11.75

Standing Water Column (ft.) 12.95

One Casing Volume (gal.) 2.2

One Annulus Vol. (gal.) 22.0

Time	Amount Purged (gal.)	Field Parameters Measured: pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM / W.L.	W.L	Comments	Field Tech.
12:40	25	8.30	1.21	790	—	19.89	.6	1/2	15.70	Bail - 6 gal.	
12:44	27	7.31	1.21	178		19.69	.6	1/2	15.81	Surge - 15 min	
12:48	29	7.14	1.22	165		19.66	.6	1/2	15.83	Bail - 8 gal	
12:52	31	6.98	1.21	125		19.91	.6	1/2	16.0	Surge - 5 min	
12:56	33	7.06	1.21	88		19.77	.6	1/2	15.80	Bail 7 gal	
1:00	35	7.20	1.22	78		19.86	.6	1/2	15.68	- Stop To Recharge -	
1:04	37	7.08	1.22	72		19.92	.6	1/2	15.64	Start pump @ 1227 ½ gpm	
1:08	39	7.07	1.21	47		19.90	.6	1/2	15.46		
1:12	41	6.91	1.21	20		20.22	.6	1/2	15.33		
1:16	43	6.95	1.21	13.5		19.88	.6	1/2	15.24		
1:20	45	6.93	1.21	11.5		19.81	.6	1/2	15.28		
FINAL FIELD PARAMETER MEASUREMENTS											
1:24	47										

GREGG

MONITORING WELL DEVELOPMENT LOG

All measurements taken from: ■ Top of Casing ☐ Protective Casing ☐ Ground Level

Well Number: ETWC-1A1
Date: 1-13-14
Time Start: 800 End:
Client: GEOSYNTEC
Project: Mountain View, CA
Job Number: D2140003
Installation Date: —
Well Diameter: 2"

Borehole Diameter: 8"
Screen Length: 10FT
Measured Depth (pre-development): 34.85
Measured Depth (post-development): 34.85
Static Water Level (ft.): 11.18
Standing Water Column (ft.): 23.67
One Casing Volume (gal.): 4.0239
One Annulus Vol. (gal.):

Sample ID: —
Qty. of Drilling Fluid Lost: —
Minimum Gal. to be Purged:
Development Method: Bail - Surge - Bail - pump
Purging Equipment: SSBailer - 2" pump
Water Level Equipment: Solinst
pH/EC Meter: Horiba U53
Turbidity Meter: Horiba U53
Other:

Time	Amount Purged (gal.)	Field Parameters Measured: pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM / W.L.	W.L.	Comments	Field Tech.
910	15	7.96	1.10	>1000	–	17.26	0.5	[illegible]	20.25	BAIL - 5 min	
914	17	7.30	.927	>1000	—	18.26	0.5	1/2	22.35	SURGE - 15 min	
918	19	7.06	.929	>1000		18.34	0.5	1/2	22.74	BAIL - 5 min	
922	23	7.01	.922	450		18.38	0.5	1/2	23.1		
927	27	6.97	.932	325		18.34	0.5	1/2	23.34		
931	30	7.00	.923	287		18.36	0.5	1/2	23.72		
935	34	7.03	.930	275		18.32	0.5	1/2	24.0		
940	37	6.97	.917	225		18.17	0.5	1/2	25.19		
10:00	52	7.28	.938	>1000		17.72	0.5	1/2	25.10		
10:04	56	7.00	.933	>1000		18.51	0.5	1/2	25.30		
10:08	55	6.96	.932	728		18.66	0.5	1/2	25.30		
FINAL FIELD PARAMETER MEASUREMENTS											
10:12	60	6.92	.922	350		18.84	0.5	1/2	25.0		

GREGG

MONITORING WELL DEVELOPMENT LOG

All measurements taken from: ☐ Top of Casing ☐ Protective Casing ☐ Ground Level

Well Number: ETWC - 1Ai
Date: 1-13-14
Time Start: 600 End: 1100
Client: CEO
Project: Mountain
Job Number: D214000
Installation Date: –
Well Diameter: 2"

Borehole Diameter: 8"
Screen Length: 10 Ft
Measured Depth (pre-development): 34.85
Measured Depth (post-development): 34.85
Static Water Level (ft.): 11.18
Standing Water Column (ft.): 23.67
One Casing Volume (gal.): 4.6239
One Annulus Vol. (gal.):

Sample ID:
Qty. of Drilling Fluid Lost:
Minimum Gal. to be Purged:
Development Method: Bail-Surge-Bail-pump
Purging Equipment: SS Bailer - 2" pump
Water Level Equipment: Solinst
pH/EC Meter: Horiba U53
Turbidity Meter: Horiba U52
Other:

Time	Amount Purged (gal.)	Field Parameters Measured: pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM 1/2 ~~Max~~	Comments W.L.	Field Tech.
10:16	62	6.92	.932	205	–	19.05	.5	1/2	25.0	
10:20	64	6.94	.932	210	–	18.91	.5	1/2	24.90	
10:24	66	6.90	.936	200		18.80	.5	1/2	25.0	
10:28	68	6.97	.933	170		19.10	.5	1/2	25.10	
10:32	70	6.92	.942	165		19.26	.5	1/2	25.21	
10:36	72	6.97	.939	150		19.42	.5	1/2	25.30	
10:40	74	6.92	.935	135		19.58	.5	1/2	25.30	
10:47	78	7.00	.929	110		20.46	.5	1/2	25.33	
10:52	80	7.01	.940	94		19.77	.5	1/2	25.50	

FINAL FIELD PARAMETER MEASUREMENTS

GREGG

MONITORING WELL DEVELOPMENT LOG

Page 1 of 1

All measurements taken from: ■ Top of Casing ☐ Protective Casing ☐ Ground Level

Sample ID —

Well Number ETCW-2AS
Date 1-13-14
Time Start: 140 End: 400
Client GEO SYNTEC
Project [illegible]
Job Number D2140003
Installation Date —
Well Diameter 2"

Borehole Diameter 8"
Screen Length 10FT
Measured Depth (pre-development) 24.70
Measured Depth (post-development) 24.70
Static Water Level (ft.) 11.80
Standing Water Column (ft.)
One Casing Volume (gal.)
One Annulus Vol. (gal.)

Qty. of Drilling Fluid Lost —
Minimum Gal. to be Purged
Development Method BAIL-SURGE. BAIL PUMP
Purging Equipment SS Dolphin 2" pump
Water Level Equipment Solinst
pH/EC Meter Horiba U53
Turbidity Meter Horiba U53
Other —

Time	Amount Purged (gal.)	Field Parameters Measured: pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM / ~~Wt.~~	W.L.	Comments	Field Tech.
250	15	7.95	1.21	228	—	20.42	0.6	1/2	12.30	Bail-5 GAL	
254	17	7.37	1.20	235	—	20.11	0.6	1/2	12.48	SURGE-15 MIN	
258	19	7.12	1.20	110		19.60	0.6	1/2	12.52	BAIL-6 GAL	
3:02	21	7.01	1.20	92		19.38	0.6	1/2	12.54		
3:06	23	7.10	1.20	77		19.30	0.6	1/2	12.10		
3:10	25	6.99	1.20	52		19.24	0.6	1/2	12.10		
3:14	27	6.86	1.20	22		19.18	0.6	1/2	12.12		
3:18	29	6.93	1.20	12		19.11	0.6	1/2	12.12		
3:22	31	6.89	1.20	9		19.14	0.6	1/2	12.10		

FINAL FIELD PARAMETER MEASUREMENTS

GREGG

MONITORING WELL DEVELOPMENT LOG

All measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Well Number: ET WC 2A1
Date: 1-14-14
Time Start: 800 End: 1200
Client:
Project:
Job Number:
Installation Date:
Well Diameter:

Borehole Diameter: 8"
Screen Length: 10 FT
Measured Depth (pre-development): 34.78
Measured Depth (post-development):
Static Water Level (ft.): 12.42
Standing Water Column (ft.): 22.28
One Casing Volume (gal.): 3.7876
One Annulus Vol. (gal.):

Sample ID:
Qty. of Drilling Fluid Lost:
Minimum Gal. to be Purged: 37.876
Development Method: Bail-Surge-Bail-pump
Purging Equipment: SS Bailer-2pump
Water Level Equipment: Solinst
pH/EC Meter: HORIBA U53
Turbidity Meter: Horiba U53
Other: Horiba U53

Time	Amount Purged (gal.)	Field Parameters Measured: pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM ~~W.L.~~	Comments W.L	Field Tech.
10:00A	20	7.90	1.05	>1000	–	15.69	0.5	1/2	21.78 Bail-5 bailer	
10:04	22	7.46	1.06	>1000	–	16.99	0.5	1/2	21.82 Surge 15min	
10:08	24	7.34	1.09	700		17.29	0.5	1/2	22.02 Bail-8 bailer	
10:12	26	7.32	1.05	550		17.45	0.5	1/2	26.62 W.L. 32.60 @	915
10:16	28	7.38	1.05	425		16.95	0.5	1/2	26.34 W.L. 26.31 @	930
10:20	30	7.37	1.02	247	–	17.26	0.5	1/2	26.04	
10:24	32	7.34	1.03	254	–	17.24	0.5	1/2	26.04	
10:28	34	7.24	1.01	222		17.63	0.5	1/2	25.33	
10:32	36	7.28	1.02	215		17.32	0.5	1/2	25.12	
10:36	38	7.21	1.03	206		17.12	0.5	1/2	24.81	
10:44	42	7.32	1.01	186		17.10	0.5	1/2	~~[illegible]~~ 24.4	

FINAL FIELD PARAMETER MEASUREMENTS

GREGG

MONITORING WELL DEVELOPMENT LOG

All measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Sample ID

Qty. of Drilling Fluid Lost

Well Number ETWC-2A1

Borehole Diameter 8"

Minimum Gal. to be Purged

Date 1/14/14

Screen Length 10FT

Development Method Bail - Surge - Bail - pump

Time Start: 800 End: 1200

Measured Depth (pre-development) 34.70

Client

Measured Depth (post-development) 34.70

Purging Equipment Submiker-2pump

Project

Static Water Level (ft.) 12.42

Water Level Equipment Solinst

Job Number

Standing Water Column (ft.) 22.28

pH/EC Meter Horiba U53

Installation Date

One Casing Volume (gal.) 3.78 7.6

Turbidity Meter Horiba U53

Well Diameter 2"

One Annulus Vol. (gal.)

Other

Time	Amount Purged (gal.)	Field Parameters Measured							Comments	Field Tech.
		pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM / W.L.		
10:50	45	7.28	1.02	220	—	17.20	0.5	1/2	24.2	
10:58	49	7.24	1.02	215	—	17.35	0.5	1/2	23.72	
11:02	51	7.22	1.03	205		17.18	0.5	1/2	23.15	
1106	53	7.24	1.02	213	-	17.20	0.5	1/2	23.1	
1110	54	7.30	1.04	165	—	17.22	0.5	1/4	23.1	
1114	55	7.31	.998	75.2	—	17.07	0.5	1/4	20.0	
1118	56	7.29	.999	25.5	-	17.10	0.5	1/4	18.55	
1128	59	7.26	.997	17.4	-	17.11	0.5	1/4		
1132	60	7.27	.969	11.2		17.29	0.5	1/4		
1140	62	7.25	.962	8.6		17.14	0.5	1/4	15.71	

FINAL FIELD PARAMETER MEASUREMENTS

GREGG

MONITORING WELL DEVELOPMENT LOG

Page _____ of _____

All measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Sample ID _____

Well Number ETWC-3AS

Date 1/15/14

Time Start: 1240 End: 2330

Client _____

Project _____

Job Number _____

Installation Date _____

Well Diameter 2"

Borehole Diameter 8"

Screen Length 10FT

Measured Depth (pre-development) 24.45

Measured Depth (post-development) 24.45

Static Water Level (ft.) 11.5

Standing Water Column (ft.) _____

One Casing Volume (gal.) _____

One Annulus Vol. (gal.) _____

Qty. of Drilling Fluid Lost _____

Minimum Gal. to be Purged _____

Development Method Bail - Surge. Bail - pump

Purging Equipment SS Bailer - 2 pump

Water Level Equipment Solinst

pH/EC Meter Horiba U53

Turbidity Meter Horiba U53

Other _____

Time	Amount Purged (gal.)	Field Parameters Measured: pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM / W.L.	W.L.	Comments	Field Tech.
130	38	7.40	1.13	98.6	–	19.72	0.6	1/2	12.55	Bail - 3 gal	
134	40	7.36	1.13	60.7	–	19.53	0.6	1/2	12.55	Surge - 5min	
138	42	7.16	1.11	49.3	–	19.60	0.6	1/2	12.55	Bail - 6 gal.	
142	44	6.95	1.14	38.6	–	19.84	0.6	1/2	12.55		
146	46	6.87	1.13	86.5	–	19.70	0.6	1/2	12.55		
150	48	6.89	1.13	71.8	–	19.71	0.6	1/2	12.55		
154	50	6.86	1.14	40.2	–	19.75	0.6	1/2	12.55		
158	52	6.84	1.16	31.9	–	19.74	0.6	1/2	12.55		
202	54	6.86	1.13	26.1	–	19.66	0.6	1/2	12.55		
206	56	6.89	1.16	14.3	–	19.67	0.6	1/2	12.55		
210	58	6.88	1.16	9.9	–	19.64	0.6	1/2	12.55		

FINAL FIELD PARAMETER MEASUREMENTS

GREGG

MONITORING WELL DEVELOPMENT LOG

Page 1 of 1

All measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Sample ID

Qty. of Drilling Fluid Lost

Well Number ETWC-3A1

Date 1-14-14

Time Start: 2:20 End: 430

Client Geosyntec

Project Mountain View, CA

Job Number D2140003

Installation Date

Well Diameter 2"

Borehole Diameter 8"

Screen Length 10 FT

Measured Depth (pre-development) 32.35

Measured Depth (post-development) 34.75

Static Water Level (ft.) 11.03

Standing Water Column (ft.) 21.32

One Casing Volume (gal.) 3.6244

One Annulus Vol. (gal.)

Minimum Gal. to be Purged 36.244

Development Method Bail-Surge-Bail-pump

Purging Equipment SS Bailer-2" pump

Water Level Equipment Solinst

pH/EC Meter Horiba U53

Turbidity Meter Horiba U53

Other

Time	Amount Purged (gal.)	Field Parameters Measured							Comments	Field Tech.
		pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM / ½ W.L.	W.L	
3:20	25	7.84	0.945	71000	—	19.04	0.5	1/2	15.71	Bail-
3:35	32	7.86	0.957	224		18.62	0.5	1/2	14.81	Surge-
3:40	35	7.67	0.955	75		18.42	0.5	1/2	14.86	Bail-
3:44	37	7.50	0.956	44.6		18.60	0.5	1/2	15.00	
3:48	39	7.55	0.954	23.2		18.50	0.5	1/2	14.92	
3:52	41	7.53	0.956	14.2		18.57	0.5	1/2	15.05	
3:56	43	7.52	0.954	8.4		18.52	0.5	1/2	15.02	

FINAL FIELD PARAMETER MEASUREMENTS

GREGG

MONITORING WELL DEVELOPMENT LOG

Page 1 of 1

All measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Sample ID _____

Well Number ETWC-381

Date 1/14/14

Time Start: 1210 End: 210

Client _____

Project _____

Job Number _____

Installation Date _____

Well Diameter 2"

Borehole Diameter 8"

Screen Length 10FT

Measured Depth (pre-development) 73.70

Measured Depth (post-development) 74.40

Static Water Level (ft.) 10.83

Standing Water Column (ft.) 62.87

One Casing Volume (gal.) 10.6879

One Annulus Vol. (gal.) _____

Qty. of Drilling Fluid Lost _____

Minimum Gal. to be Purged 106.879

Development Method Bail - Surge - Bail Pump

Purging Equipment SS Bailer

Water Level Equipment [illegible]

pH/EC Meter Horiba U53

Turbidity Meter Horiba U53

Other _____

Time	Amount Purged (gal.)	Field Parameters Measured							Comments	Field Tech.
		pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM / W.L.		
1:20	25	7.92	0.785	705	-	20.31	0.4	1	12.8	Bail - 5 min
1:40	45	7.86	0.770	274	-	19.44	0.4	1	14.3	Surge - 15 min
1:42	47	7.86	0.771	101		19.04	0.4	1	14.34	Bail - 6 min
1:47	52	7.88	0.771	12.8		18.94	0.4	1	14.15	
1:52	57	7.86	.773	7.3	-	18.90	0.4	1	14.20	
2:00	65	7.51	.780	7.2	-	18.28	0.4	1	14.23	

FINAL FIELD PARAMETER MEASUREMENTS

GREGG

MONITORING WELL DEVELOPMENT LOG

Page _____ of _____

All measurements taken from: ■ Top of Casing ☐ Protective Casing ☐ Ground Level

Sample ID _____

Qty. of Drilling Fluid Lost _____

Well Number ETWC-4AS

Date 1/15/14

Time Start: 745 End: 9:35

Client _____

Project _____

Job Number _____

Installation Date _____

Well Diameter 2"

Borehole Diameter 6"

Screen Length 10FT

Measured Depth (pre-development) 24.75

Measured Depth (post-development) 24.78

Static Water Level (ft.) 11.61

Standing Water Column (ft.) 13.14

One Casing Volume (gal.) 2.2338

One Annulus Vol. (gal.) _____

Minimum Gal. to be Purged 22.338

Development Method Bail - Surge - Bail - pump

Purging Equipment SS Bailer - 2" pump

Water Level Equipment Solinst

pH/EC Meter Horiba U53

Turbidity Meter Horiba U53

Other _____

Time	Amount Purged (gal.)	Field Parameters Measured						GPM / W.L.	Comments	Field Tech.
		pH	EC	Turbidity	D.O.	Temperature	SAL.			
8:50	30	7.83	1.25	243	–	14.58	0.6	1/2	W.L. 11.95 Bail - 5 GAL	5 GAL
8:54	32	7.67	1.22	223	–	16.38	0.6	1/2	12.01 Surge - 15 min	
8:58	34	7.55	1.21	182		16.01	0.6	1/2	11.80 Bail - 5 GAL	
9:02	36	7.56	1.20	148		15.86	0.6	1/2	11.72	
9:06	38	7.52	1.20	115		16.55	0.6	1/2	11.72	
9:10	40	7.58	1.22	52.5		16.20	0.6	1/2	11.78	
9:18	44	7.35	1.19	32.4		16.61	0.6	1/2	11.76	
9:22	46	7.31	1.20	18.2		16.76	0.6	1/2	11.80	
9:26	48	7.29	1.19	7.8		16.82	0.6	1/2	11.78	

FINAL FIELD PARAMETER MEASUREMENTS

GREGG

MONITORING WELL DEVELOPMENT LOG

Page _____ of _____

All measurements taken from: ☒ Top of Casing ☐ Protective Casing ☐ Ground Level

Sample ID _____

Qty. of Drilling Fluid Lost _____

Well Number E7WC-[illegible]

Date 1/15/14

Time Start: 9:45 End: 12:10

Client GEOSYNTEC

Project _____

Job Number _____

Installation Date _____

Well Diameter 2"

Borehole Diameter 8"

Screen Length 10 FT

Measured Depth (pre-development) 34.81

Measured Depth (post-development) _____

Static Water Level (ft.) 10.90

Standing Water Column (ft.) 23.91

One Casing Volume (gal.) 4.0647

One Annulus Vol. (gal.) _____

Minimum Gal. to be Purged 40.647

Development Method BAIL - SURGE - BAIL - PUMP

Purging Equipment 5.5 BAILER - 2 PUMP

Water Level Equipment SOLINST

pH/EC Meter HORIBA U53

Turbidity Meter HORIBA U53

Other _____

Time	Amount Purged (gal.)	Field Parameters Measured: pH	EC	Turbidity	D.O.	Temperature	SAL.	GPM / W.L.	W.L	Comments	Field Tech.
10:45	30	7.94	1.03	315	-	15.39	0.5	1/2	13.52	BAIL - 5 GAL	
10:49	32	7.59	0.986	305	-	16.74	0.5	1/2	13.55	SURGE 15 MIN	
10:53	34	7.56	0.975	272		17.01	0.5	1/2	13.28	BAIL 5 GAL	
11:00	38	7.56	0.984	203		16.34	0.5	1/2	13.12		
11:04	40	7.48	0.986	134		16.52	0.5	1/2	13.08		
11:08	42	7.43	0.980	42.6		16.61	0.5	1/2	13.16		
11:12	44	7.44	0.982	14.2		16.51	0.5	1/2	13.10		
11:16	46	7.44	0.979	9.1		16.49	0.5	1/2	13.12		
11:53	65	7.68	0.973	115		16.90	0.5	1/2	11.92		
12:10	75	7.70	0.970	40.2		16.92	0.5	1/2	11.25		
12:18	80	7.67	0.974	11.5	-	16.89	0.5	1/2	11.16		

FINAL FIELD PARAMETER MEASUREMENTS

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510 836 3034
FAX 510 836 3036

Well Development Field Form

Well ID: ETWC-1AS **Project Name:** MEW **Date:** 1/13/14 **Page** 1 **of** 1

Site Location: Mountain View
Project No: WR11288
Date Installed: 1/6/14
Screen Interval (ft): 15-25
Develop. Operator(s): Gregg Drilling
Field Supervisor: N. Carlsberg

Initial Depth to Water (DTW)(ft): 11.75
Initial Total Well Depth (ft BTOC): 24.65
Final Total Well Depth (ft BTOC): 24.70
Well Diameter (inch): 2
Calculated Casing Volume: 2.1
Total Volume removed (gal): 63

Pump Method:
Pump Type: submersible
Bailer Size: 1.79"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft. (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	~~ORP~~ EC	pH	~~DO~~ Sal.
Bail/Surge/Airlift/ Pumping/Recovery			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	~~mV~~	(-)	~~mg/L~~
Bail	11:15	11:25		7												
surge	11:25	11:36	15-25													
bail	11:38	11:50		10												
surge	11:52	12:00	15-25													
bail	12:00	12:13		17												
pumping	12:28	13:26		29			~0.5	15.28	3.53	0.142	24.70	11.5	19.81	1.21	6.93	0.6

Notes/Recommendations:

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510 836 3034
FAX 510 836 3036

Well Development Field Form

Well ID: ETWC-1Ai **Project Name:** MEW **Date:** 1/13/14 **Page** 1 **of** 1

Site Location: Mountain View
Project No: WR1128B
Date Installed: 1/6/14
Screen Interval (ft): 25-35
Develop. Operator(s): Greg
Field Supervisor: N. Gorberg

Initial Depth to Water (DTW)(ft): 11.18
Initial Total Well Depth (ft BTOC): 34.85
Final Total Well Depth (ft BTOC): 34.75
Well Diameter (inch): 2
Calculated Casing Volume: 3.85
Total Volume removed (gal): 72

Pump Method: submersible
Pump Type: "
Bailer Size: 1.79"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft. (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	EC ~~ORP~~	pH	SAL ~~DO~~
Bail/Surge/Airlift/ Pumping/Recovery			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	~~mV~~	(-)	mg/L
bail	7:55	8:03		4.5												
surge	8:03	8:15	25-35													
bail	8:18	8:45		7.5												
pumping	8:54	10:54		60			~0.5	25.50	14.32	0.035	34.75	94	19.77	0.940	7.01	0.5

Notes/Recommendations:

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036

Well Development Field Form

Well ID: ETWC-2AS **Project Name:** (UR1123B) MEW **Date:** 1/13/14 **Page** 1 **of** 1

Site Location: Mountain View
Project No: UR1123B
Date Installed: 1/7/14
Screen Interval (ft): 15-25
Develop. Operator(s): Gregg Drilling
Field Supervisor: Tyler Chamber

Initial Depth to Water (DTW)(ft): 12.80
Initial Total Well Depth (ft BTOC): 24.70
Final Total Well Depth (ft BTOC): 24.70.
Well Diameter (inch): 2
Calculated Casing Volume: 2.1
Total Volume removed (gal): 33.5

Pump Method:
Pump Type: submersible
Bailer Size: 1.79"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft. (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	EC ~~ORP~~	pH	Sal ~~DO~~
Bail/Surge/Airlift/ Pumping/Recovery			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	~~mV~~	(-)	mg/L
bail	14:10	14:15		3												
surge	14:15	14:25	15-25													
bail	14:26	14:37		10												
pumping	14:40	15:21		20.5			≈0.5	12.10	0.3	1.7	24.70	9	19.14	1.20	6.89	0.6

Notes/Recommendations:

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036

Well Development Field Form

Well ID: ETWC-2Ai **Project Name:** MEW **Date:** 1/14/14 **Page** 1 **of** 1

Site Location: Mountain View
Project No: WR1123B
Date Installed: 1/7/14
Screen Interval (ft): 25-35
Develop. Operator(s): Gregg Drilling
Field Supervisor: Julie Thomas

Initial Depth to Water (DTW)(ft): 12.42
Initial Total Well Depth (ft BTOC): 34.70
Final Total Well Depth (ft BTOC): 34.74
Well Diameter (inch): 2
Calculated Casing Volume: 3.64
Total Volume removed (gal): 78

Pump Method:
Pump Type: submersible
Bailer Size: 1.79"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft. (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method Bail/Surge/Airlift/ Pumping/Recovery	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	~~ORP~~ EC	pH	~~DO~~ Sal
			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	mV	(-)	mg/L
bail	8:05	8:16		6												
surge	8:18	8:29	25-35													
bail	8:30	9:10		20												
pumping	9:40	11:10		45			≈0.5	23.10	10.68	0.047						
pumping	11:10	11:40		7			≈0.25	15.75	3.33	0.075	34.74	8.6	17.14	0.162	7.25	0.5

Notes/Recommendations:

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036

Well Development Field Form

Well ID: ETWC-2AS **Project Name:** MEW **Date:** 1/15/14 **Page** 1 **of** 1

Site Location: Mountain View
Project No: WR1128B
Date Installed: 1/9/14
Screen Interval (ft): 15-25
Develop. Operator(s): Gregg Drilling
Field Supervisor: Julie Chamban

Initial Depth to Water (DTW)(ft): 11.5
Initial Total Well Depth (ft BTOC): 24.45
Final Total Well Depth (ft BTOC): 24.45
Well Diameter (inch): 2"
Calculated Casing Volume: 2.1
Total Volume removed (gal): 39

Pump Method:
Pump Type: submersible
Bailer Size: 1.79"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft. (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	EC ~~ORP~~	pH	SAL ~~DO~~
Bail/Surge/Airlift/ Pumping/Recovery			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	mV	(-)	mg/L
bail	12:52	12:55		3												
surge.	12:55	13:00	15-25													
bail	13:00	13:05		5												
pumping	13:10	14:10		30			≈0.5	12.55	1.05	0.48		9.9	19.64	1.16	6.88	0.6

Notes/Recommendations:

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036

Well Development Field Form

Well ID: ETWC-3A1 **Project Name:** MEW **Date:** 1/14/14 **Page** 1 **of** 1

Site Location: Mountainview
Project No: WR1174B
Date Installed: 1/9/14
Screen Interval (ft): 25-35
Develop. Operator(s): Greg Drilling
Field Supervisor: Jim

Initial Depth to Water (DTW)(ft): 11.03
Initial Total Well Depth (ft BTOC): 32.35
Final Total Well Depth (ft BTOC): 34.75
Well Diameter (inch): 2"
Calculated Casing Volume: 3.5
Total Volume removed (gal): 40

Pump Method:
Pump Type: submersible
Bailer Size: 1.79"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft. (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method Bail/Surge/Airlift/ Pumping/Recovery	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	EC ~~ORP~~	pH	SAL ~~DO~~
			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	mV	(-)	mg/L
bailing	14:30	14:39		7												
surge	14:40	14:50	25-35													
bail	14:52	15:02		10												
pumping	15:10	15:56		23			≈0.5	15.02	3.99	0.125	34.75	8.4	18.52	0.954	7.52	0.5

Notes/Recommendations:

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510.836.3034
FAX 510.836.3036

Well Development Field Form

Well ID: ETWC-3Bi **Project Name:** MEW **Date:** 1/14/13 **Page** 1 **of** 1

Site Location: Mountain View
Project No: WR1128B
Date Installed: 1/8/14
Screen Interval (ft): 65-75
Develop. Operator(s): Gregg Drilling
Field Supervisor: Julie Chambers

Initial Depth to Water (DTW)(ft): 10.83
Initial Total Well Depth (ft BTOC): 73.40
Final Total Well Depth (ft BTOC): 74.40
Well Diameter (inch): 2
Calculated Casing Volume: 10.25
Total Volume removed (gal): 74

Pump Method:
Pump Type: Submersible
Bailer Size: 1.79"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	EC ~~ORP~~	pH	sal ~~DO~~
Bail/Surge/Airlift/ Pumping/Recovery			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	mV	(-)	mg/L
Bail	12:10	12:20		7												
Surge	12:21	12:33	65-75													
Bail	12:35	12:45		7												
Pumping	13:02	14:02		60			≈1	14.23	3.50	0.29		7.2	18.28	0.780	7.51	0.4

Notes/Recommendations:

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510 836 3034
FAX 510 836 3036

Well Development Field Form

Well ID: ETWC-4AS **Project Name:** MEW **Date:** 1/15/14 **Page** 1 **of** 1

Site Location: Mountain View
Project No: WR1128B
Date Installed: 1/9/14
Screen Interval (ft): 15-25
Develop. Operator(s): Gregg Drilling
Field Supervisor: Julie Chamber

Initial Depth to Water (DTW)(ft): 11.61
Initial Total Well Depth (ft BTOC): 24.75
Final Total Well Depth (ft BTOC): 24.78
Well Diameter (inch): 2
Calculated Casing Volume: 2.14
Total Volume removed (gal): 39

Pump Method:
Pump Type: Submersible
Bailer Size: 1.75"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft. (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	EC ~~ORP~~	pH	SAL ~~DO~~
Bail/Surge/Airlift/ Pumping/Recovery			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	mV	(-)	mg/L
bail	08:00	08:07		5												
surge	08:10	08:20	15-25.													
bail	8:21	8:27		7												
pumping	8:35	9:30		27			≈0.5	11.78	0.17	2.94	24.78	7.8	16.82	1.19	7.29	0.6

Notes/Recommendations:

Geosyntec consultants

1111 Broadway, 6th Floor
Oakland, California 94607
PH 510 836 3034
FAX 510 836 3036

Well Development Field Form

Well ID: ETWC-4Ai **Project Name:** (WR1128B) MEW **Date:** 1/15/14 **Page** 1 **of** 1

Site Location: Mountain View
Project No: WR1128B
Date Installed: 1/9/14
Screen Interval (ft): 25-35
Develop. Operator(s): Gregg Drilling
Field Supervisor: Julie Oberman

Initial Depth to Water (DTW)(ft): 10.90
Initial Total Well Depth (ft BTOC): 34.81
Final Total Well Depth (ft BTOC): 34.83
Well Diameter (inch): 2
Calculated Casing Volume: 3.9
Total Volume removed (gal): 73

Pump Method:
Pump Type: Submersible
Bailer Size: 1.79"

Volume of Schedule 40 PVC Pipe Well Diameter (inches)	gal/linear ft. (4)
1.0	0.041
2.0	0.163
3.0	0.367
4.0	0.653
5.0	1.023
6.0	1.469

			Development Qualities					Observations								
			Bailing/Surging		Pumping / Hydraulic Testing			Water Levels			Well Depth	Water Quality				
Method	Time	Start/ Stop	Interval Surged/ Airlifted	Volume of Water Removed	Totalizer	*Calculated* Pump Rate	Flow Meter Pump Rate	Depth to Water	Drawdown	Specific Capacity	Total Well Depth	Turbidity	Temp	EC ~~ORP~~	pH	SAL ~~DO~~
Bail/Surge/Airlift/ Pumping/Recovery			Feet btoc	Gallons	Gallons	GPM	GPM	Feet btoc	Feet	GPM/ ft drawdown	Feet btoc	NTU	°C	mV	(-)	mg/L
bail	9.50	9.57		5												
surge	9.58	10:08	25-35													
bail	10:09	10:15		7												
pumping	10:25	12:25		60			≈0.5	11.16	0.26	1.92		10.5	16.99	0.974	7.67	0.5

Notes/Recommendations:

APPENDIX D
Laboratory Analytical Reports

(This Appendix is being submitted as a separate file)

APPENDIX E

Temporary Performance Monitoring Well Sampling Logs

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Baseline Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-1AS	1/29/2014	2.1	1010	12.85	6.90	19.79	1115	151.9	532	na
		4.2	1014	13.30	6.93	19.92	1082	152.5	162	na
		6.3	1017	13.58	6.94	19.94	1054	145.1	85.6	na
		8.4	1021	13.79	6.94	19.91	1042	137.1	72.9	na
		10.5	1025	13.82	6.95	19.97	1038	133.7	75.6	0.97*
ETWC-1AI	1/29/2014	3.5	1124	22.25	7.40	20.02	759	-17.5	675	na
		7.0	1128	24.49	7.40	19.85	758	-10.4	664	na
		10.5	1134	24.80	7.40	19.91	755	-11.4	656	na
		14.0	1139	25.40	7.39	19.92	755	-10.8	639	1.16*
ETWC-2AI	1/29/2014	3.6	1228	22.65	7.25	19.34	797	-16.2	653	0.70
		Well dewatered after purging 4 gallons, allowed to recover to 80% then sampled[2]								
		4.0	1245	17.85	7.59	18.99	797	-12.6	624	1.38
ETWC-2AS	1/29/2014	2.1	1316	13.10	6.83	19.30	1006	62.1	708	1.08
		4.2	1318	13.15	6.81	19.35	1007	66.4	671	0.39
		6.3	1320	13.17	6.80	19.34	1000	70.1	620	0.44
		8.4	1323	13.18	6.81	19.41	997	73.2	638	0.40
ETWC-3B1	1/30/2014	10.4	829	15.35	7.56	18.87	652	145.7	68	0.06
		20.8	836	16.36	7.54	18.85	657	139.0	44	0.03
		31.2	844	16.61	7.52	18.92	649	133.0	18	0.02
		41.6	849	16.70	7.51	18.88	647	131.7	17	0.02
		52.0	854	16.72	7.51	18.96	647	130.4	16	0.03
ETWC-3AI	1/30/2014	3.9	954	14.50	7.44	19.38	772	26.6	685	0.06
		7.8	957	14.90	7.42	19.40	776	18.5	189	0.07
		11.7	1001	15.25	7.40	19.42	776	20.7	41	0.05
		15.6	1006	15.43	7.40	19.41	776	19.6	19	0.03
		19.5	1009	15.69	7.40	19.41	775	12.9	17	0.02
		23.4	1012	15.85	7.39	19.41	777	12.2	18	0.03
ETWC-3AS	1/30/2014	2.1	1049	11.85	6.89	19.60	954	74.3	490	0.18
		4.2	1054	11.86	6.88	19.77	947	76.7	305	0.13
		6.3	1058	11.87	6.87	19.77	950	77.2	289	0.13
		8.4	1102	11.87	6.89	19.79	941	70.8	258	0.12
ETWC-4AI	1/30/2014	3.9	1139	14.50	7.32	19.27	760	23.6	426	0.03
		7.8	1144	15.85	7.33	19.27	754	11.6	90	0.03
		11.7	1149	15.97	7.33	19.26	766	7.1	41	0.03
		15.6	1154	16.01	7.34	19.26	758	-1.0	38	0.03
		19.5	1159	16.04	7.35	19.27	756	3.0	31	0.02

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Baseline Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-4AS	1/30/2014	2.1	1243	11.85	6.79	19.19	955	64.0	565	0.05
		4.2	1247	11.86	6.80	19.55	952	71.0	97	0.13
		6.3	1250	11.86	6.81	19.50	951	73.2	45	0.15
		8.4	1254	11.86	6.80	19.50	950	76.0	39	0.17
		10.0	1258	11.86	6.80	19.47	950	78.3	35	0.17

Notes
1. Field parameters and samples collected by Weiss Associates
gal = gallons
DTW = Depth to Water
ft = feet
EC = Electric Conductivity
ORP = Oxidation Reduction Potential
NTU = Nephelometric Turbidity Unit
DO = Dissolved Oxygen
na - not available
* DO was inadvertantly not measured during purging, a measurement was collected after sampling.
2. Following procedure in the MEW QAPP

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

1st Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-1AS	3/10/2014	2.2	744	12.10	6.76	19.34	906	-43.1	174	0.19
		4.4	748	13.76	6.78	19.39	907	-50.5	140	0.18
		6.6	751	13.92	6.79	19.40	903	-56.1	108	0.18
ETWC-1AI	3/10/2014	4.0	821	24.10	7.31	19.15	676	-135.9	>1000	1.23
		8.0	825	26.22	7.25	19.40	678	-147.9	>1000	0.05
		12.0	829	28.60	7.31	19.73	683	-138.0	>1000	0.14
ETWC-2AI	3/11/2014	4.0	905	18.90	7.39	18.89	839	-95.6	>1000	0.73
		Well dewatered after purging 6.5 gallons, allowed to recover to 80% then sampled[2]								
		6.5	924	15.58	7.56	18.48	839	-93.7	112	0.46
ETWC-2AS	3/11/2014	2.2	824	11.8	6.98	18.78	1069	100.8	36	0.06
		4.4	826	12.01	6.92	18.86	1104	98.9	23	0.05
		6.6	828	12.12	6.87	18.91	1131	96.7	20	0.04
ETWC-3B1	3/10/2014	10.5	954	15.91	7.40	18.66	598	-10.1	57	0.04
		21.0	959	16.88	7.39	18.70	598	-22.4	22	0.03
		31.5	1005	17.57	7.35	18.71	597	-30.1	25	0.03
ETWC-3AI	3/10/2014	4.0	1150	13.71	7.20	19.45	705	-129.1	667	0.03
		8.0	1159	14.00	7.16	19.27	705	-149.9	182	0.03
		12.0	1203	14.21	7.16	19.22	706	-152.3	154	0.04
		16.0	1207	14.50	7.17	19.23	706	-152.2	148	0.04
ETWC-3AS	3/10/2014	2.2	1038	11.81	6.84	18.76	867	35.3	27	0.05
		4.4	1040	12.00	6.81	18.86	867	23.2	24	0.05
		6.6	1042	12.10	6.81	18.85	867	19.1	21	0.06
ETWC-4AI	3/10/2014	4.0	1237	14.62	7.23	19.06	691	-141.5	680	0.04
		8.0	1242	14.79	7.15	19.09	688	-155.2	228	0.04
		12.0	1248	15.10	7.16	19.09	687	-160.1	204	0.03
		16.0	1255	15.24	7.19	19.14	688	-162.1	185	0.03
ETWC-4AS	3/11/2014	2.2	732	12.52	6.59	18.44	1205	202.0	922	0.11
		4.4	734	12.69	6.66	18.54	1214	175.0	37	0.07
		6.6	736	12.74	6.70	18.58	1219	168.0	32	0.09
		8.8	738	12.88	6.71	18.58	1223	160.0	29	0.10

Notes
1. Field parameters and samples collected by Weiss Associates
gal = gallons
DTW = Depth to Water
ft = feet
EC = Electric Conductivity
ORP = Oxidation Reduction Potential
NTU = Nephelometric Turbidity Unit
DO = Dissolved Oxygen
2. Following procedure in the MEW QAPP

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

2nd Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-1AS	3/24/2014	2.5	859	13.71	6.95	19.31	1023	-197.7	535	0.38
		5.0	902	14.70	6.98	19.44	1016	-288.1	291	0.38
		7.5	905	14.80	6.96	19.55	1014	-293.1	198	0.36
		10.0	908	15.01	6.94	19.57	1010	-286.7	176	0.43
ETWC-1AI	3/24/2014	4.0	946	24.80	7.39	19.58	777	-361.5	380	0.83
		8.0	949	25.40	7.35	19.70	781	-442.1	418	0.22
		12.0	952	28.01	7.32	19.73	780	-533.1	463	0.04
		16.0	955	30.17*	7.39	19.80	777	-526.1	488	0.05
ETWC-2AI	3/25/2014	1.5	1003	13.80	7.69	19.24	799	-697.7	348	0.14
		3.0	1006	17.97	7.75	19.48	809	-507.7	251	0.32
		4.5	1009	23.21	7.78	19.41	800	-461.3	138	0.57
		6.0	1012	24.70	7.81	19.55	807	-486.7	133	0.55
		7.5	1015	24.86	7.81	19.67	812	-526.0	124	0.46
		9.0	1018	25.73	7.82	19.75	808	-665.7	110	0.13
		10.5	1021	26.40	7.84	19.80	811	-718.1	178	0.07
		Well dewatered after purging 11 gallons, allowed to recover to 80% then sampled[2]								
		11.0	1039	15.01	7.80	18.77	811	-630.1	155	0.40
ETWC-2AS	3/25/2014	1.5	1105	13.04	7.29	19.04	1071	-680.1	521	0.15
		3.0	1108	13.19	7.37	19.40	1099	-690.4	72	0.05
		5.0	1111	13.2	7.38	19.46	1103	-690.5	44	0.02
		6.5	1114	13.24	7.39	19.45	1105	-686.6	25	0.03
		8.0	1117	13.26	7.40	19.45	1107	-686.2	22	na
ETWC-3B1	3/24/2014	10.5	1053	14.13	7.47	18.88	709	-580.1	>1000	0.02
		15.0	1056	16.81	7.46	18.88	713	-589.1	79	0.01
		21.0	1059	17.10	7.45	18.87	715	-574.2	64	0.01
		26.5	1102	17.12	7.44	18.89	690	-560.8	23	0.01
		31.5	1105	17.15	7.43	18.89	675	-552.3	20	0.01
ETWC-3AI	3/24/2014	3.0	1232	12.97	7.01	19.25	757	-711.1	>1000	0.12
		6.0	1235	14.10	6.93	19.52	760	-735.6	101	0.09
		9.0	1238	14.92	6.79	19.46	765	-740.1	94	0.11
		12.0	1241	15.09	6.81	19.39	763	-743.3	89	0.08
ETWC-3AS	3/24/2014	2.0	1130	11.84	7.00	18.98	936	-478.0	73	0.12
		5.0	1133	11.85	6.87	19.18	995	-567.7	87	0.03
		7.0	1136	11.85	6.82	19.20	994	-571.1	53	0.04
		9.5	1139	11.86	6.81	19.19	997	-588.4	29	0.04
		11.5	1142	11.85	6.82	19.20	996	-593.2	20	0.04
ETWC-4AI	3/25/2014	1.5	836	12.25	7.73	19.41	783	-707.1	>1000	0.07
		3.5	839	13.15	7.73	19.59	785	-710.2	836	0.06
		5.5	842	13.32	7.74	19.63	786	-712.9	205	0.06
		7.0	845	13.39	7.75	19.63	786	-714.6	59	0.05
		9.0	848	13.35	7.75	19.69	783	-716.0	29	0.05
		11.0	852	13.37	7.75	19.72	785	-718.0	22	0.05
		12.5	855	13.40	7.75	19.75	785	-719.6	19	0.05

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

2nd Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-4AS	3/25/2014	2.0	926	11.95	7.19	18.76	1163	-668.1	704	0.14
		4.0	929	12.01	7.20	19.07	1168	-682.8	106	0.04
		6.0	932	12.01	7.20	19.16	1169	-683.7	29	0.05
		8.0	935	12.01	7.20	19.18	1170	-684.1	18	0.05
		10.0	938	12.01	7.19	19.16	1170	-686.7	16	0.05

Notes
1. Field parameters and samples collected by Weiss Associates
gal = gallons
DTW = Depth to Water
ft = feet
EC = Electric Conductivity
ORP = Oxidation Reduction Potential
NTU = Nephelometric Turbidity Unit
DO = Dissolved Oxygen
*Pump lowered to 31'
2. Following procedure in the MEW QAPP
na = not available

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

3rd Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-1AS	4/7/2014	2.0	809	11.39	6.84	19.01	1221	191.7	357	0.31
		4.0	812	11.41	6.83	19.12	1218	180.1	127	0.40
		6.0	816	11.41	6.83	19.17	1213	157.3	36	0.44
		8.0	819	11.49	6.83	19.18	1213	134.6	20	0.41
		10.0	821	11.48	6.82	19.18	1211	125.6	14	0.29
ETWC-1AI	4/7/2014	2.0	855	16.61	7.25	19.32	900	-71.3	427	0.36
		4.0	859	17.91	7.25	19.63	902	-72.4	274	0.26
		5.0	902	17.98	7.25	19.79	903	-89.7	207	0.18
		6.0	905	18.15	7.25	19.81	903	-93.8	115	0.21
		6.5	908	19.09	7.25	19.73	904	-92.0	73	0.26
		7.0	911	21.26	7.24	19.48	903	-94.9	51	0.36
		8.0	914	22.85	7.25	19.61	904	-98.8	50	0.25
		9.5	917	23.32	7.23	19.68	905	-99.9	46	0.24
		12.0	920	23.76	7.24	19.69	907	-100.9	44	0.19
ETWC-2AI[2]	4/8/2014	2.0	1150	14.99	7.16	18.93	927	-141.8	969	0.53
		3.5	1153	15.55	7.15	19.08	927	-141.0	769	0.56
		4.5	1156	15.84	7.15	19.20	928	-142.0	305	0.57
		6.0	1159	16.06	7.15	19.21	927	-142.7	101	0.56
		7.0	1202	17.02	7.13	18.93	925	-135.4	58	0.40
		8.0	1205	19.14	7.14	18.97	926	-137.1	54	0.36
		10.0	1208	20.58	7.17	19.18	923	-131.5	68	0.39
		11.5	1211	21.15	7.17	19.24	927	-132.7	49	0.38
		13.0	1214	21.63	7.16	19.31	933	-135.8	36	0.34
		14.0	1217	21.87	7.16	19.34	922	-138.0	34	0.34
ETWC-2AS[2]	4/8/2014	2.0	1042	11.91	6.68	18.91	1295	55.9	123	4.95
		4.0	1045	11.91	6.69	18.99	1294	44.7	36	4.02
		6.0	1048	11.91	6.70	18.99	1292	42.9	21	3.72
		7.5	1051	11.92	6.70	19.00	1291	42.8	18	3.21
		9.0	1054	11.92	6.70	18.99	1291	42.2	13	2.88
		11.0	1057	11.92	6.70	18.99	1292	41.9	7	2.42
		12.5	1100	11.92	6.70	19.00	1291	41.0	6	2.18
		13.5	1103	11.92	6.70	19.01	1291	40.3	3	2.02
		15.0	1106	11.92	6.70	19.01	1291	40.6	3	1.90
ETWC-3B1[3]	4/7/2014	5.0	944	13.45	7.35	18.63	797	-32.0	375	0.06
		7.5	947	13.59	7.33	18.66	797	-54.2	110	0.13
		10.0	950	13.64	7.32	18.66	797	-47.1	57	0.06
		12.5	953	13.72	7.32	18.67	798	-45.4	36	0.06
		16.0	956	13.96	7.32	18.67	798	-66.8	20	0.11
		20.0	959	13.98	7.32	18.67	799	-58.0	16	0.05
		23.0	1002	13.99	7.31	18.69	799	-56.1	9	0.06
		26.0	1005	13.98	7.30	18.70	797	-49.7	7	0.05
		28.0	1008	13.98	7.30	18.71	800	-50.7	21	0.06
		31.0	1011	13.98	7.29	18.72	798	-51.6	5	0.06
ETWC-3AI	4/7/2014	2.5	1129	11.85	7.25	19.40	938	-94.8	700	0.06
		3.5	1132	11.98	7.23	19.43	939	-108.4	1188	0.05
		5.5	1135	12.09	7.24	19.45	934	-120.8	1112	0.06
		7.0	1139	12.17	7.24	19.46	931	-120.9	569	0.07
		8.0	1142	12.45	7.24	19.48	936	-124.2	269	0.06
		10.0	1145	12.82	7.22	19.38	938	-125.5	128	0.05
		12.0	1148	12.94	7.22	19.27	938	-126.4	74	0.05
		14.0	1151	12.94	7.22	19.26	937	-126.3	68	0.05
ETWC-3AS	4/7/2014	2.5	1050	11.45	6.79	19.71	1258	-37.9	222	0.15
		5.0	1053	11.21	6.71	19.00	1302	-28.8	38	0.13
		6.5	1056	11.24	6.69	18.92	1327	-21.4	23	0.10
		8.0	1059	11.22	6.69	18.91	1323	-21.3	5	0.09

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

3rd Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-4AI	4/7/2014	2.0	1255	12.83	7.20	19.27	919	-105.9	1234	0.05
		4.0	1258	13.00	7.19	19.26	921	-121.8	1134	0.10
		6.0	1301	13.11	7.22	19.26	919	-129.6	638	0.06
		8.0	1304	13.22	7.22	19.24	918	-134.4	194	0.05
		10.0	1307	13.32	7.22	19.24	918	-135.3	85	0.05
		12.0	1310	13.41	7.22	19.23	915	-136.3	53	0.05
		14.0	1313	13.47	7.22	19.22	916	-140.5	39	0.05
		16.0	1316	13.50	7.22	19.22	915	-139.8	35.0	0.05
ETWC-4AS[2]	4/8/2014	2.0	930	12.46	6.81	18.67	1288	108.9	78	7.18
		4.0	933	12.41	6.79	18.74	1289	106.1	35	6.36
		6.0	936	12.46	6.78	18.76	1290	101.9	24	5.32
		7.5	939	12.49	6.76	18.77	1290	97.5	11	4.70
		9.5	942	12.49	6.61	18.77	1290	103.2	11	4.28
		11.5	945	12.56	6.58	18.71	1290	93.8	7	2.63
		13.5	948	12.62	6.60	18.69	1290	89.4	7	2.49

Notes
1. Field parameters and samples collected by Weiss Associates
gal = gallons
DTW = Depth to Water
ft = feet
EC = Electric Conductivity
ORP = Oxidation Reduction Potential
NTU = Nephelometric Turbidity Unit
DO = Dissolved Oxygen
2. Meter turned off midway through purge.
3. Replacement meter on second day of sampling, DO readings did not stabilize and were not consistent with previous monitoring events.

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

4th Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-1AS	5/12/2014	1.5	823	12.30	6.77	18.69	1210	97.5	90	0.22
		3.0	826	12.33	6.73	18.89	1209	78.4	36	0.17
		4.5	829	12.35	6.72	18.95	1211	68.9	22	0.16
		6.0	832	12.37	6.71	18.98	1213	59.2	20	0.16
		7.5	835	12.38	6.71	19.02	1215	55.1	18	0.16
ETWC-1AI	5/12/2014	2.5	930	18.58	7.14	19.90	919	-103.4	790	0.23
		5.0	933	18.92	7.15	20.19	921	-117.3	690	0.16
		7.0	936	25.02	7.13	19.29	913	-110.3	338	0.33
		10.0	939	28.51	7.10	19.18	925	-125.2	NA*	0.15
		Well dewatered after purging 12 gallons, allowed to recover to 80% then sampled[2]								
		13.0	1000	15.90	7.18	19.17	934	-115.9	649	0.23
ETWC-2AI	5/13/2014	1.5	950	16.30	7.20	19.05	832	-82.3	792	0.18
		3.0	953	18.73	7.20	19.23	833	-95.6	987	0.26
		4.5	956	20.12	7.19	19.38	833	-117.7	622	0.05
		6.0	959	22.36	7.20	19.27	820	-119.1	980	0.09
		7.5	1002	23.31	7.23	19.14	840	-122.4	995	0.15
		9.0	1005	24.01	7.23	19.17	836	-120.6	960	0.19
		10.5	1008	24.50	7.22	19.01	834	-122.5	937	0.18
		12	1011	24.64	7.21	18.84	833	-125	901	0.16
ETWC-2AS	5/13/2014	1.5	916	12.59	6.78	19.26	1181	-18.8	427	0.24
		3.0	919	12.59	6.74	19.35	1208	-23.8	249	0.12
		4.5	922	12.64	6.74	19.40	1265	-29.6	99	0.07
		6.0	925	12.68	6.72	19.40	1320	-34.6	66	0.06
		7.5	928	12.7	6.71	19.40	1340	-37.5	60	0.06
ETWC-3B1	5/12/2014	5.0	1033	14.01	7.27	18.51	801	-5.5	503	0.07
		7.0	1036	14.08	7.21	18.59	810	-14.7	59	0.10
		10.0	1039	14.17	7.22	18.61	804	-26.3	35	0.06
		13.0	1042	14.24	7.21	18.58	809	-33.0	22	0.10
		16.0	1045	14.30	7.20	18.58	810	-38.9	24	0.07
		18.0	1048	14.31	7.19	18.58	809	-42.6	26	0.07
		21.0	1051	14.43	7.20	18.58	807	-49.3	17	0.13
		25.0	1054	14.54	7.20	18.57	809	-52.9	18	0.15
		28.0	1057	14.60	7.20	18.58	806	-55.8	16	0.09
		31.0	1100	14.63	7.20	18.59	808	-58.2	14	0.09
ETWC-3AI	5/12/2014	2.0	1201	12.78	7.12	19.24	948	-88.8	461	0.14
		3.0	1204	13.2	7.11	19.27	943	-124.2	1276	0.10
		5.0	1207	13.22	7.12	19.29	939	-137.5	659	0.13
		6.0	1210	14.6	7.13	19.61	938	-150.1	1112	0.11
		9.0	1213	16.26	7.11	19.03	943	-154.6	965	0.10
		12.0	1216	16.77	7.11	19.03	943	-163.0	943	0.08
		15.0	1219	17.05	7.10	19.01	941	-170.1	933	0.10
ETWC-3AS	5/12/2014	2.0	1242	12.08	6.71	18.99	1194	-104.5	964	0.08
		3.5	1245	12.11	6.66	18.77	1274	-103.1	285	0.07
		5.0	1248	12.16	6.63	18.72	1299	-104.0	62	0.06
		6.5	1251	12.18	6.62	18.72	1305	-105.7	36	0.06
		8.0	1254	12.20	6.61	18.71	1305	-107.1	33	0.06
ETWC-4AI	5/13/2014	2.0	806	13.10	7.10	18.94	844	-12.7	953	0.13
		4.0	809	14.14	7.01	18.96	841	-72.6	1192	0.11
		6.0	812	14.21	7.02	18.97	840	-92.1	845	0.09
		8.0	815	14.33	7.04	18.98	837	-103.7	185	0.09
		10.0	818	14.40	7.06	18.98	833	-112.6	83	0.09
		12.0	821	14.45	7.06	18.98	832	-114.1	49	0.08
		14.0	824	14.50	7.06	18.99	831	-118.1	44	0.08

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
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4th Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-4AS	5/13/2014	1.5	842	12.37	6.58	18.85	1408	-58.9	903	0.34
		3.0	845	12.41	6.59	18.99	1434	-51.9	136	0.23
		4.5	848	12.42	6.61	19.12	1432	-47.2	40	0.09
		6.0	851	12.44	6.61	19.13	1435	-45.3	27	0.08
		7.5	854	12.47	6.61	19.13	1437	-44.9	24	0.08

Notes
1. Field parameters and samples collected by Weiss Associates
gal = gallons
DTW = Depth to Water
ft = feet
EC = Electric Conductivity
ORP = Oxidation Reduction Potential
NTU = Nephelometric Turbidity Unit
DO = Dissolved Oxygen
NA = not available
* Turbidity meter not working, meter recalibrated before next reading.
2. Following procedure in the MEW QAPP

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
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5th Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-1AS	6/25/2014	1.5	923	12.53	6.85	18.66	1149	71.7	77	0.07
		3.5	926	12.54	6.76	18.78	1152	51.7	22	0.06
		5.5	929	12.54	6.73	18.84	1155	38.5	9	0.06
		7.5	932	12.54	6.72	18.88	1156	28.5	5	0.08
		9.5	935	12.55	6.72	18.84	1159	16.5	4	0.10
		12.0	938	12.55	6.71	18.86	1159	5.3	2	0.09
		14.0	941	12.55	6.71	18.88	1162	-1.1	2	0.09
		16.0	944	12.55	6.71	18.99	1163	-4.2	2	0.09
ETWC-1AI	6/25/2014	1.5	1020	16.55	7.22	19.31	811	-109.8	280	0.06
		2.5	1023	17.56	7.21	19.67	814	-128.1	270	0.06
		3.0	1026	17.11	7.21	20.05	816	-172.0	343	0.07
		5.0	1029	21.35	7.19	19.35	808	-177.2	219	0.17
		6.0	1032	22.09	7.19	19.47	810	-181.5	209	0.19
		7.5	1035	23.79	7.19	19.13	806	-169.0	214	0.40
		9.5	1038	24.79	7.18	19.15	807	-169.4	196	0.25
		11.5	1041	25.38	7.17	19.17	810	-178.0	439	0.09
		14.0	1044	26.15	7.16	19.26	810	-189.0	489	0.08
		17.5	1047	26.58	7.16	19.39	811	-184.0	520	0.07
ETWC-2AI	6/26/2014	1.5	1221	15.67	7.36	19.55	901	-168.5	319	0.21
		3.0	1224	18.02	7.30	19.29	897	-181.4	388	0.23
		4.5	1227	20.37	7.28	19.36	897	-194.2	184	0.37
		Well dewatered after purging 12 gallons, allowed to recover to 80% then sampled[2]								
		5.5	1240	14.00	7.41	19.51	899	-200.7	156	0.14
ETWC-2AS	6/26/2014	2.0	1135	12.73	7.15	19.60	1432	-126.1	403	0.12
		3.5	1138	12.73	6.86	19.78	1445	-128.3	105	0.05
		5.0	1141	12.72	6.77	19.82	1445	-141.3	49	0.05
		6.5	1144	12.73	6.75	19.86	1425	-144.0	35	0.06
		7.5	1147	12.73	6.73	19.85	1434	-148.2	16	0.07
		9.0	1150	12.73	6.73	19.86	1434	-152.6	15	0.07
ETWC-3B1	6/25/2014	2.5	1225	13.77	7.38	18.17	710	-193.1	378	0.04
		6.0	1228	13.95	7.28	18.35	716	-183.7	95	0.04
		8.0	1231	14.02	7.28	18.33	716	-190.2	31	0.04
		10.5	1234	14.27	7.27	18.34	717	-195.5	16	0.03
		16.0	1237	14.55	7.23	18.32	718	-202.1	14	0.03
		20.0	1240	14.56	7.22	18.32	716	-206.5	8	0.03
		22.5	1243	14.67	7.21	18.34	716	-212.7	5	0.03
		25.0	1246	14.64	7.21	18.35	714	-214.0	5	0.03
		27.0	1249	14.65	7.20	18.33	715	-219.1	3	0.04
		31.0	1252	14.65	7.19	18.31	714	-221.0	3	0.04
ETWC-3AI	6/25/2014	3.5	1324	14.29	7.25	19.12	829	-183.4	724	0.04
		7.0	1327	16.40	7.20	18.76	837	-210.0	529	0.04
		10.0	1330	16.09	7.15	18.67	833	-220.0	84	0.03
		14.0	1333	15.81	7.15	18.66	832	-225.4	29	0.03
		16.5	1336	15.87	7.15	18.65	832	-230.9	10	0.03
		20.0	1339	15.85	7.15	18.64	834	-232.6	10	0.03
ETWC-3AS	6/26/2014	1.5	735	12.16	6.20	18.67	1347	-30.7	537	0.30
		3.0	738	12.45	6.20	18.80	1360	-51.0	189	0.15
		5.0	741	12.47	6.23	18.69	1363	-64.8	59	0.11
		7.0	744	12.48	6.25	18.68	1365	-72.5	30	0.10
		9.5	747	12.50	6.31	18.68	1366	-80.3	27	0.09

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

5th Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-4AI	6/26/2014	2.0	810	13.50	7.22	18.78	889	-162.7	559	0.05
		5.0	813	15.26	7.16	18.63	887	-207.5	730	0.05
		7.0	816	15.04	7.12	18.69	887	-213.8	681	0.04
		10.0	819	15.20	7.11	18.69	884	-226.0	360	0.04
		12.0	822	15.26	7.11	18.70	883	-229.6	193	0.05
		14.5	825	15.38	7.11	18.71	883	-233.4	64	0.04
		17.0	828	15.44	7.11	18.72	882	-236.7	59	0.04
ETWC-4AS	6/26/2014	1.5	859	12.75	6.87	19.38	1350	-154.3	116	0.05
		3.0	902	12.76	6.84	19.59	1352	-160.2	47	0.05
		5.0	905	12.76	6.84	19.61	1351	-161.8	27	0.06
		7.0	908	12.76	6.84	19.59	1350	-164.5	16	0.05
		9.0	911	12.76	6.83	19.56	1350	-167.5	14	0.05
		11.0	914	12.76	6.83	19.57	1349	-169.1	10	0.04
		13.0	917	12.76	6.83	19.60	1347	-171.2	10	0.04

Notes
1. Field parameters and samples collected by Weiss Associates
gal = gallons
DTW = Depth to Water
ft = feet
EC = Electric Conductivity
ORP = Oxidation Reduction Potential
NTU = Nephelometric Turbidity Unit
DO = Dissolved Oxygen
2. Following procedure in the MEW QAPP

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

6th Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-1AS	9/15/2014	0.0	822	13.02	6.88	20.13	1326	131.0	875	0.62
		1.0	824	13.04	6.77	20.21	1301	123.8	283	0.67
		2.0	826	13.06	6.73	20.43	1319	120.4	221	0.60
		3.0	828	13.07	6.74	20.47	1326	117.2	78	0.57
		4.0	830	13.14	6.75	20.15	1326	114.2	82	0.67
		5.0	832	13.32	6.75	20.17	1330	113.5	144	0.59
		6.0	834	13.22	6.75	20.25	1327	113.2	159	0.50
		7.0	836	13.24	6.77	20.27	1326	112.0	68	0.46
		8.0	838	13.26	6.77	20.28	1326	112.0	28	0.46
		9.0	840	13.29	6.78	20.28	1327	111.4	16	0.46
ETWC-1AI	9/15/2014	0.0	916	16.14	7.27	19.68	905	21.5	578	0.12
		1.5	919	17.40	7.16	20.27	912	15.3	428	0.19
		3.0	922	19.02	7.10	20.09	903	15.0	224	1.10
		4.5	925	21.40	7.17	20.06	905	28.1	296	0.38
		6.0	928	23.87	7.14	20.05	904	29.5	194	0.86
		7.5	931	25.01	7.15	19.80	897	27.2	391	0.94
		9.0	934	25.87	7.11	19.67	911	30.1	623	0.90
		10.5	937	26.83	7.16	19.72	909	22.6	636	0.73
		12.0	940	27.62	7.18	19.80	910	17.6	610	0.64
ETWC-2AI	9/16/2014	0.0	1021	13.85	7.25	19.80	1168	-102.3	348	4.70
		1.5	1024	15.89	6.93	20.00	1172	-121.0	290	0.05
		3.0	1027	16.40	6.93	20.14	1211	-127.1	61	0.03
		4.5	1030	16.80	6.97	20.17	1234	-133.6	38	0.04
		6	1033	17.25	7	20.22	1235	-138.4	38	0.03
		7.5	1036	18.87	7.02	20.00	1201	-149.0	9	0.03
		9	1039	19.34	7.03	20.14	1214	-150.4	10	0.03
		10	1042	19.74	7.05	20.17	1212	-153.2	8	0.03
		11	1045	20.50	7.06	20.11	1223	-156.1	7	0.04
		12	1048	21.51	7.06	20.10	1228	-157.0	8	0.04
ETWC-2AS	9/16/2014	0.0	936	13.7	6.75	21.31	1513	22.9	80	0.24
		1.5	939	13.84	6.67	21.57	1547	21.7	26	0.10
		3.0	942	14.01	6.63	21.58	1555	20.9	14	0.08
		4.5	945	14.07	6.63	21.59	1568	21.2	8	0.07
		6.0	948	14.08	6.64	21.57	1582	21.7	4	0.07
		7.5	951	14.08	6.64	21.58	1577	21.2	4	0.07
		9.0	954	14.09	6.64	21.58	1583	21.1	4	0.06
ETWC-3B1	9/15/2014	0.0	1043	13.75	7.63	18.82	739	83.4	801	0.10
		3.0	1046	14.03	7.30	19.01	777	88.1	690	0.07
		6.0	1049	14.38	7.17	19.02	790	86.9	49	0.06
		9.0	1052	14.60	7.18	18.99	794	85.1	36	0.05
		12.0	1055	15.03	7.20	18.90	794	84.5	44	0.04
		18.0	1058	15.52	7.20	18.90	794	84.8	23	0.04
		24.0	1101	16.85	7.21	18.86	788	82.8	58	0.03
		30.0	1104	17.50	7.21	18.87	789	80.5	50	0.03
		36.0	1107	17.80	7.21	18.88	794	79.3	47	0.03
ETWC-3AI	9/15/2014	0.0	1145	15.22	6.95	19.97	905	20.3	133	0.04
		4.5	1148	15.32	6.93	19.52	890	10.7	235	0.05
		7.5	1151	15.25	6.93	19.57	889	4.6	64	0.04
		10.5	1154	15.3	6.93	19.57	892	1.6	34	0.04
		13.5	1157	15.35	6.95	19.55	888	-1.6	18	0.04
		16.5	1200	15.46	6.97	19.54	887	-6.8	15	0.04
		19.5	1203	15.49	6.99	19.53	887	-6.9	16	0.03
		22.5	1206	15.6	7.01	19.56	893	-10.7	15	0.03

Appendix E - Temporary Performance Monitoring Well Sampling Logs
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

6th Performance Monitoring - Field Parameters [1]										
Sampling Location	**Date sampled**	**Purge Volume (gal)**	**Time**	**DTW (ft)**	**pH**	**Temp (°C)**	**EC (µS/cm)**	**ORP (mV)**	**Turbidity (NTU)**	**DO (mg/L)**
ETWC-3AS	9/15/2014	0.0	1226	12.75	6.72	20.63	1286	71.2	409	0.11
		1.5	1229	12.93	6.69	20.76	1344	72.5	204	0.07
		3.0	1232	12.98	6.67	20.93	1400	74.6	111	0.05
		4.5	1235	12.99	6.69	20.74	1413	72.8	67	0.04
		6.0	1238	13.00	6.69	20.71	1417	75.4	23	0.06
		7.5	1241	13.00	6.69	20.68	1422	75.8	14	0.08
		9.0	1244	13.00	6.69	20.71	1424	75.5	8	0.03
		10.5	1247	13.00	6.70	20.71	1428	75.5	7	0.02
		12.0	1250	13.00	6.71	20.73	1426	75.6	7	0.03
ETWC-4AI	9/16/2014	0.0	755	12.45	6.64	19.41	936	54.0	759	0.16
		1.5	758	13.85	6.75	19.71	923	33.2	715	0.10
		3.0	801	13.92	6.80	19.72	868	17.1	696	0.09
		4.5	804	14.24	6.83	19.70	886	9.2	495	0.08
		6.0	807	14.38	6.86	19.62	732	6.8	246	0.07
		7.5	810	14.40	6.83	19.63	687	0.4	86.3	0.07
		9.0	813	14.44	6.87	19.64	516	-5.2	58	0.07
		10.5	816	14.48	6.87	19.65	543	-11.8	34	0.07
		12.0	819	14.60	6.92	19.62	940	-12.7	19	0.07
		13.5	822	14.61	6.93	19.64	941	-19.0	17	0.06
		15.0	825	14.61	6.93	19.63	940	-20.6	16	0.06
ETWC-4AS	9/16/2014	0.0	852	13.14	6.67	21.02	1311	47.9	625	0.22
		1.5	855	13.3	6.66	21.37	1339	43.8	206	0.10
		3.0	858	13.52	6.67	21.49	1363	40.2	63	0.09
		6.0	901	13.54	6.67	21.53	1377	36.1	32	0.07
		9.0	904	13.55	6.67	21.54	1389	32.1	15	0.10
		10.5	907	13.56	6.66	21.57	1401	30.4	9	0.08
		12.0	910	13.58	6.66	21.58	1404	29.1	7	0.08
		13.5	913	13.58	6.66	21.61	1413	30.6	8	0.08

Notes
1. Field parameters and samples collected by Weiss Associates
gal = gallons
DTW = Depth to Water
ft = feet
EC = Electric Conductivity
ORP = Oxidation Reduction Potential
NTU = Nephelometric Turbidity Unit
DO = Dissolved Oxygen

APPENDIX F

Injection Logs

Table F1 - ISCO Injection Summary - First Event CPT-15 Area
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Injection Point	Lift Height	Target Depth Interval	Start Date	Start Time	Stop Date	Stop Time	Total Inj. Volume (gal)	Total Injected NaMnO4 Mass (lbs)	Sustained Inj. Pressure (psi)	Avg. Flow Rate (gpm)	Design Volume (gal)	Design Mass NaMnO4	Percent Complete (volume basis)	Percent Complete mass basis)	Calculated $NaMnO_4$ concentration (g/L)
ISCO1	5	15-20	2/12/2014	9:50	2/13/2014	14:50	700	131	8	2.0	1,100	187	67%	70%	21.2
ISCO1	5	20-25	2/14/2014	9:45	2/18/2014	15:00	870	183	11	3.2	1,100	187	79%	98%	25.1
ISCO1	5	25-30	2/19/2014	9:05	2/12/2014	15:20	980	232	12	2.9	1,100	187	89%	124%	28.4
ISCO1	5	30-35	2/20/2014	10:35	2/21/2014	10:45	690	161	10	1.9	1,100	187	63%	86%	28.0
ISCO2	5	15-20	2/12/2014	9:50	2/13/2014	14:50	1,200	205	7	3.1	1,100	187	105%	109%	21.3
ISCO2	5	20-25	2/14/2014	9:45	2/18/2014	15:00	990	206	8	3.7	1,100	187	90%	110%	24.9
ISCO2	5	25-30	2/19/2014	9:05	2/12/2014	15:20	640	152	14	1.8	1,100	187	58%	81%	28.4
ISCO2	5	30-35	2/20/2014	10:35	2/21/2014	10:45	540	126	11	1.4	1,100	187	49%	67%	28.0
ISCO3	5	15-20	2/12/2014	9:50	2/13/2014	14:50	890	158	2	3.3	1,100	187	81%	84%	21.3
ISCO3	5	20-25	2/14/2014	9:45	2/18/2014	15:00	970	201	14	3.7	1,100	187	88%	108%	25.0
ISCO3	5	25-30	2/19/2014	9:05	2/12/2014	15:20	920	218	11	2.8	1,100	187	84%	117%	28.4
ISCO3	5	30-35	2/20/2014	10:35	2/21/2014	10:45	970	227	12	2.8	1,100	187	88%	121%	27.9
ISCO4	5	15-20	2/12/2014	9:50	2/13/2014	14:50	1,200	209	6	3.2	1,100	187	107%	112%	21.3
ISCO4	5	20-25	2/14/2014	9:45	2/18/2014	15:00	920	192	9	3.4	1,100	187	84%	103%	25.1
ISCO4	5	25-30	2/19/2014	9:05	2/12/2014	15:20	710	168	12	2.2	1,100	187	65%	90%	28.4
ISCO4	5	30-35	2/20/2014	10:35	2/21/2014	10:45	1,000	232	13	2.9	1,100	187	91%	124%	27.9
ISCO5	5	15-20	2/12/2014	9:50	2/13/2014	14:50	1,000	178	6	2.7	1,100	187	91%	95%	21.3
ISCO5	5	20-25	2/14/2014	9:45	2/18/2014	15:00	860	179	11	3.2	1,100	187	78%	96%	25.0
ISCO5	5	25-30	2/19/2014	9:05	2/12/2014	15:20	760	181	15	2.3	1,100	187	69%	97%	28.4
ISCO5	5	30-35	2/20/2014	10:35	2/21/2014	10:45	880	206	14	2.5	1,100	187	80%	110%	27.9
Total	5	15-20	2/12/2014	9:50	2/13/2014	14:50	5,000	880		2.8	5,500	935	90%	94%	21.3
Total	5	20-25	2/14/2014	9:45	2/18/2014	15:00	4,600	961		3.4	5,500	935	84%	103%	25.0
Total	5	25-30	2/19/2014	9:05	2/12/2014	15:20	4,000	952		2.4	5,500	935	73%	102%	28.4
Total	5	30-35	2/20/2014	10:35	2/21/2014	10:45	4,100	952		2.3	5,500	935	74%	102%	27.9
Total		15-35	2/12/2014	9:50	2/21/2014	10:45	17,700	3,745		2.7	22,000	3,740	80%	100%	25.4

ft bgs = feet below ground surface
gal = gallons
lbs = pounds
psi = pounds per square inch
gpm = gallons per minute
g/L = grams per liter

Table F2 - ISCO Injection Summary - Second Event CPT-15 Area
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Injection Point	Lift Height	Target Depth Interval	Start Date	Start Time	Stop Date	Stop Time	Total Inj. Volume (gal)	Total Injected NaMnO4 Mass (lbs)	Sustained Inj. Pressure (psi)	Avg. Flow Rate (gpm)	Design Volume (gal)	Design Mass NaMnO4	Percent Complete (volume basis)	Percent Complete mass basis)	Calculated $NaMnO_4$ concentration (g/L)
ISCO1	5	15-20	4/14/2014	13:30	4/15/2014	16:05	1,400	227	13	2.7	1,200	201	115%	113%	19.6
ISCO1	5	20-25	4/16/2014	9:25	4/17/2014	10:00	1,300	223	15	2.8	1,200	201	110%	111%	20.3
ISCO1	5	25-30	4/17/2014	11:00	4/18/2014	12:20	950	159	23	2.0	1,200	201	79%	79%	20.1
ISCO1	5	30-35	4/21/2014	9:30	4/22/2014	10:45	1,200	186	20	2.4	1,200	201	96%	92%	19.3
ISCO2	5	15-20	4/14/2014	13:30	4/15/2014	16:05	710	116	18	1.9	1,200	201	59%	58%	19.5
ISCO2	5	20-25	4/16/2014	9:25	4/17/2014	10:00	1,000	161	18	1.9	1,200	201	80%	80%	20.3
ISCO2	5	25-30	4/17/2014	11:00	4/18/2014	12:20	1,000	176	23	2.1	1,200	201	87%	88%	20.1
ISCO2	5	30-35	4/21/2014	9:30	4/22/2014	10:45	1,400	227	20	2.8	1,200	201	118%	113%	19.3
ISCO3	5	15-20	4/14/2014	13:30	4/15/2014	16:05	1,100	179	10	2.5	1,200	201	91%	89%	19.6
ISCO3	5	20-25	4/16/2014	9:25	4/17/2014	10:00	1,300	218	15	2.9	1,200	201	108%	109%	20.3
ISCO3	5	25-30	4/17/2014	11:00	4/18/2014	12:20	1,500	251	14	3.0	1,200	201	125%	125%	20.1
ISCO3	5	30-35	4/21/2014	9:30	4/22/2014	10:45	1,100	178	20	2.7	1,200	201	92%	89%	19.3
ISCO4	5	15-20	4/14/2014	13:30	4/15/2014	16:05	1,200	198	20	2.5	1,200	201	101%	99%	19.6
ISCO4	5	20-25	4/16/2014	9:25	4/17/2014	10:00	1,500	249	18	2.9	1,200	201	122%	124%	20.3
ISCO4	5	25-30	4/17/2014	11:00	4/18/2014	12:20	1,400	234	19	2.6	1,200	201	116%	117%	20.1
ISCO4	5	30-35	4/21/2014	9:30	4/22/2014	10:45	1,500	236	20	3.2	1,200	201	122%	118%	19.3
ISCO5	5	15-20	4/14/2014	13:30	4/15/2014	16:05	1,300	214	18	2.7	1,200	201	109%	107%	19.6
ISCO5	5	20-25	4/16/2014	9:25	4/17/2014	10:00	1,300	221	15	2.8	1,200	201	109%	110%	20.3
ISCO5	5	25-30	4/17/2014	11:00	4/18/2014	12:20	1,100	183	26	2.3	1,200	201	91%	91%	20.1
ISCO5	5	30-35	4/21/2014	9:30	4/22/2014	10:45	1,100	176	20	2.2	1,200	201	91%	88%	19.3
Total	5	15-20	4/14/2014	13:30	4/15/2014	16:05	5,700	935		2.4	6,000	1,003	95%	93%	19.6
Total	5	20-25	4/16/2014	9:25	4/17/2014	10:00	6,300	1,072		2.7	6,000	1,003	106%	107%	20.3
Total	5	25-30	4/17/2014	11:00	4/18/2014	12:20	6,000	1,003		2.4	6,000	1,003	100%	100%	20.1
Total	5	30-35	4/21/2014	9:30	4/22/2014	10:45	6,200	1,003		2.7	6,000	1,003	104%	100%	19.3
Total		15-35	4/14/2014	13:30	4/22/2014	10:45	24,200	4,012		2.5	24,000	4,013	101%	100%	19.8

ft bgs = feet below ground surface
gal = gallons
lbs = pounds
psi = pounds per square inch
gpm = gallons per minute
g/L = grams per liter

Table F3 - ISCO Injection Summary - Third Event CPT-15 Area
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Injection Point	Lift Height	Target Depth Interval	Start Date	Start Time	Stop Date	Stop Time	Total Inj. Volume (gal)	Total Injected NaMnO4 Mass (lbs)	Sustained Inj. Pressure (psi)	Avg. Flow Rate (gpm)	Design Volume (gal)	Design Mass NaMnO4	Percent Complete (volume basis)	Percent Complete mass basis)	Calculated $NaMnO_4$ concentration (g/L)
ISCO1	5	15-20	8/11/2014	12:55	8/13/2014	15:44	1,300	257	12	2.2	1,200	201	111%	128%	23.1
ISCO1	5	20-25	8/14/2014	9:40	8/14/2014	15:01	1,100	231	18	3.5	1,200	201	93%	115%	24.8
ISCO1	5	25-30	8/15/2014	10:20	8/18/2014	12:34	1,500	294	19	3.7	1,200	201	127%	146%	23.1
ISCO1	5	30-35	8/18/2014	13:50	8/19/2014	14:40	1,400	241	20	2.7	1,200	201	121%	120%	19.9
ISCO2	5	15-20	8/11/2014	12:55	8/13/2014	15:44	900	215	18	1.8	1,200	201	76%	107%	28.1
ISCO2	5	20-25	8/14/2014	9:40	8/14/2014	15:01	1,100	230	15	3.5	1,200	201	93%	115%	24.8
ISCO2	5	25-30	8/15/2014	10:20	8/18/2014	12:34	1,200	235	20	3.4	1,200	201	101%	117%	23.2
ISCO2	5	30-35	8/18/2014	13:50	8/19/2014	14:40	1,100	178	19	2.5	1,200	201	89%	89%	20.0
ISCO3	5	15-20	8/11/2014	12:55	8/13/2014	15:44	1,100	218	18	1.9	1,200	201	95%	109%	22.8
ISCO3	5	20-25	8/14/2014	9:40	8/14/2014	15:01	1,200	238	18	3.5	1,200	201	96%	119%	24.8
ISCO3	5	25-30	8/15/2014	10:20	8/18/2014	12:34	1,200	143	20	2.8	1,200	201	103%	71%	13.8
ISCO3	5	30-35	8/18/2014	13:50	8/19/2014	14:40	1,200	205	20	2.6	1,200	201	102%	102%	19.9
ISCO4	5	15-20	8/11/2014	12:55	8/13/2014	15:44	620	75	18	1.2	1,200	201	52%	37%	14.4
ISCO4	5	20-25	8/14/2014	9:40	8/14/2014	15:01	420	87	20	1.2	1,200	201	35%	43%	24.8
ISCO4	5	25-30	8/15/2014	10:20	8/18/2014	12:34	880	155	20	2.2	1,200	201	74%	77%	21.0
ISCO4	5	30-35	8/18/2014	13:50	8/19/2014	14:40	1,000	158	20	2.3	1,200	201	79%	79%	20.0
ISCO5	5	15-20	8/11/2014	12:55	8/13/2014	15:44	1,200	238	17	2.0	1,200	201	98%	119%	24.3
ISCO5	5	20-25	8/14/2014	9:40	8/14/2014	15:01	1,100	218	15	3.2	1,200	201	88%	108%	24.8
ISCO5	5	25-30	8/15/2014	10:20	8/18/2014	12:34	940	176	20	2.4	1,200	201	79%	88%	22.4
ISCO5	5	30-35	8/18/2014	13:50	8/19/2014	14:40	1,300	222	20	2.6	1,200	201	111%	110%	19.9
Total	5	15-20	8/11/2014	13:30	8/13/2014	15:44	5,200	1,003		1.8	6,000	1,003	87%	100%	23.1
Total	5	20-25	8/14/2014	9:40	8/14/2014	15:01	4,900	1,003		2.7	6,000	1,003	81%	100%	24.8
Total	5	25-30	8/15/2014	10:20	8/18/2014	12:34	5,800	1,003		2.4	6,000	1,003	97%	100%	20.7
Total	5	30-35	8/18/2014	13:50	8/19/2014	14:40	6,000	1,003		2.5	6,000	1,003	100%	100%	19.9
Total		15-35	8/11/2014	12:55	8/19/2014	14:40	21,900	4,013		2.3	24,000	4,013	91%	100%	22.0

ft bgs = feet below ground surface
gal = gallons
lbs = pounds
psi = pounds per square inch
gpm = gallons per minute
g/L = grams per liter

Table F4 - ISCO Injection Summary - First Event CPT-21 Area
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Injection Point	Lift Height	Target Depth Interval	Start Date	Start Time	Stop Date	Stop Time	Total Inj. Volume (gal)	Total Injected NaMnO4 Mass (lbs)	Sustained Inj. Pressure (psi)	Avg. Flow Rate (gpm)	Design Volume (gal)	Design Mass NaMnO4	Percent Complete (volume basis)	Percent Complete mass basis)	Calculated $NaMnO_4$ concentration (g/L)
ISCO1	5	15-20	8/20/2014	15:00	8/21/2014	16:30	1,600	257	25	3.4	1,200	200	130%	129%	19.8
ISCO1	5	20-25	8/22/2014	8:30	8/25/2014	14:55	1,200	257	30	1.5	1,200	200	97%	129%	26.4
ISCO2	5	15-20	8/20/2014	15:00	8/21/2014	16:30	800	131	25	2.4	1,200	200	66%	66%	19.8
ISCO2	5	20-25	8/22/2014	8:30	8/25/2014	14:55	800	153	30	1.0	1,200	200	64%	77%	23.8
Total	5	15-20	8/20/2014	15:00	8/21/2014	16:30	2,400	388		5.8	2,400	399	98%	97%	19.8
Total	5	20-25	8/22/2014	8:30	8/25/2014	14:55	1,900	410		2.5	2,400	399	81%	103%	25.4
Total		15-35	8/20/2014	15:00	8/25/2014	14:55	4,300	798		4.1	4,800	798	89%	100%	22.3

ft bgs = feet below ground surface
gal = gallons
lbs = pounds
psi = pounds per square inch
gpm = gallons per minute
g/L = grams per liter

Table F5 - ISCO Injection Summary - Second Event CPT-21 Area
CPT-15 and CPT-21 Areas
MEW Regional Groundwater Remediation Program
Mountain View, California

Injection Point	Lift Height	Target Depth Interval	Start Date	Start Time	Stop Date	Stop Time	Total Inj. Volume (gal)	Total Injected NaMnO4 Mass (lbs)	Sustained Inj. Pressure (psi)	Avg. Flow Rate (gpm)	Design Volume (gal)	Design Mass NaMnO4	Percent Complete (volume basis)	Percent Complete mass basis)	Calculated $NaMnO_4$ concentration (g/L)
ISCO1	5	15-20	10/15/2014	10:00	10/15/2014	15:15	520	86	18	2.2	480	80	108%	108%	19.88
ISCO1	5	20-25	10/16/2014	8:50	10/16/2014	14:45	0	0	0	0.0	480	80	0%	0%	Not Applicable
ISCO2	5	15-20	10/15/2014	10:00	10/15/2014	15:15	290	47	18	1.5	480	80	59%	59%	19.88
ISCO2	5	20-25	10/16/2014	8:50	10/16/2014	14:45	760	124	20	3.1	480	80	158%	155%	19.59
ISCO3	5	15-20	10/15/2014	10:00	10/15/2014	15:15	580	96	15	6.7	480	80	120%	120%	19.88
ISCO3	5	20-25	10/16/2014	8:50	10/16/2014	14:45	480	78	20	1.9	480	80	99%	98%	19.59
ISCO4	5	15-20	10/15/2014	10:00	10/15/2014	15:15	460	76	10	2.1	480	80	96%	96%	19.88
ISCO4	5	20-25	10/16/2014	8:50	10/16/2014	14:45	560	91	20	2.2	480	80	116%	114%	19.59
ISCO5	5	15-20	10/15/2014	10:00	10/15/2014	15:15	500	82	15	2.3	480	80	104%	103%	19.88
ISCO5	5	20-25	10/16/2014	8:50	10/16/2014	14:45	720	117	20	2.8	480	80	150%	147%	19.59
Total	5	15-20	10/15/2014	10:00	10/15/2014	15:15	2,300	388		15	2,400	399	97%	97%	19.88
Total	5	20-25	10/16/2014	8:50	10/16/2014	14:45	2,500	410		10	2,400	399	105%	103%	19.59
Total		15-35	10/15/2014	10:00	10/16/2014	14:45	4,800	798		12	4,800	798	101%	100%	19.73

ft bgs = feet below ground surface
gal = gallons
lbs = pounds
psi = pounds per square inch
gpm = gallons per minute
g/L = grams per liter

Injection Services Report

Prepared for:

Geosyntec consultants

engineers | scientists | innovators

Prepared by:

VIRONEX

Geosyntec | MEW | Sodium Permanganate

Mountain View, CA

February 10th through October 16th, 2014

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Project Summary

Project Name: Middlefield Ellis Whisman (MEW) Superfund Study Site.

Project Dates: February 10th through October 16th, 2014 (Four Events)

Project Manager: Andrew Punsoni
Lead Injection Operators: Scott Plachta/Jesse Taggart/Brett Battrup

Project Equipment: Enclosed injection truck with mounted mixing tanks, pumps, metering equipment and secondary containment.
Tertiary Containment
Track Mounted Geoprobe 6600DT
Hydrant Metering/Connections, Hose Ramps
Support Truck F350

Proposed Scope of Work:

- Provided mixing and injection of 2% $NaMnO_4$ solution at a total of twenty-two (22) temporary direct push (DPT) borings located on Evandale Ave over four events.
- Collected twelve (12) pre/post injection groundwater samples using a screenpoint 16 (hydropunch) sampler over four events.
- Targeted injection zones for the fifteen (15) points at 277 Evandale Rd. were approximately 15 feet (ft) below ground surface (bgs) to 35 ft bgs. Each point received approximately 4,800 gallons of 2% $NaMnO_4$ solution.
- Targeted injection zones for the seven (7) points at 158 Evandale Rd. were approximately 15-25ft bgs. Each point received approximately 2,400 gallons of 2% $NaMnO_4$ solution.
- Installed one (1) ¾-inch temporary pre-pack well, for the purpose of monitoring groundwater levels during each of the first two injection events at 277 Evandale Rd.
- Installed two (2) ¾-inch temporary pre-pack well during the third event at 227 Evandale Rd. and the two events at 158 Evandale Rd. These were for the purpose of monitoring groundwater levels during injections. One (1) pre-pack was install at each location at each location.
- Collected two (2) grab groundwater samples at 20-23 ft bgs and 18-22 ft bgs at 227 Evandale Rd. prior to injection and two (2) grab groundwater samples at same locations post injection.
- Prior to injection at 158 Evandale Rd. grabbed (2) groundwater samples at 19-23 ft bgs and two (2) ground water sample post injection.
- Transported chemicals by drums during the first injection event and 5 gallons buckets during the 2nd 3rd, and 4th injection events

Project Summary:

In 2013 Vironex implemented a Membrane Interface Probe (MIP) and High Resolution Injection Test (HRIT) study at the MEW site to help prepare for the injection events.

On February 10th Vironex mobilized injection equipment and a trained crew to 277 Evandale Rd in Mountain View California for the purpose of sodium permanganate injection. Vironex was able to support Geosyntec with daily chemical movement from an offsite facility to the injection area abiding by DOT regulations. Each day water tests were implemented to assure there were no leaks or flow issues.

Three injections took place at the 277 Evandale area detailed in the two rows of upper pictures on page 5. Two subsequent injections took place on April 14, August 11th and lasted six to eight days.

On August 20th Vironex mobilized a similar injection set-up to 158 Evandale Rd approximately 0.1 mile north west for the purpose of sodium permanganate injection. A second event was implemented on October 14th. They lasted four and three days respectively.

Injections utilized a diaphragm type pump with an average of gpm of 2.3 and above ground PSI averaging at 20 as per Geosyntec. The pressure did rise up to 40 PSI on a few occasions. No major surfacing of sodium permanganate was experienced though some air bubbling through the asphalt was observed. Five points at a time were injected upon during the 277 Evandale Rd injections and two to five points at a time were injected upon at 158 Evandale Rd. depending on how many points were in the ground.

Vironex took a number of safety precautions to assure successful implementation including tertiary containment, splash guards, Tyvek suits for anyone entering the exclusion zone, constant available hydration, and berms to cover all utility drains.

Injections took place in a moderately trafficked residential street near a major technology center. CalSafe was on hand during all injections to help with traffic control. Hose ramps were also used during the project to bring water from cross street hydrants.

Injections were safely and successfully implemented with all sodium permanganate injected. The first injection event had some alterations to the solution percentage due to high pressure causing low gpm. Praise was received from both the Fire Department and EPA on the presentable and orderly operation. Vironex looks forward to all further work with Geosyntec.

Site Map

277Evandale Ave

Mountain View, CA 94043

&

158 Evandale Ave

Mountain View, CA 94043

Injection Summary

Geosyntec - MEW NaMnO4 - Injection Summary

	Date	Time On-Site	Time Off-Site	Injection Points Completed	Total NaMnO4 (gal)	Total Water Injected (gal)	Total Solution Volume Injected (gal)
Tuesday	2/11/2014	7:30 AM	4:30 PM	0	0	0	0
Wednesday	2/12/2014	7:00 AM	4:30 PM	0	81	2,135	2,216
Thursday	2/13/2014	7:00 AM	4:30 PM	0	102	2,695	2,737
Friday	2/14/2014	7:00 AM	3:45 PM	0	93	2,466	2,559
Tuesday	2/18/2014	7:00 AM	4:45 PM	0	121	1,957	2,049
Wednesday	2/19/2014	7:00 AM	4:30 PM	0	208	3,805	4,013
Thursday	2/20/2014	7:00 AM	4:30 PM	0	160	2,980	3,140
Friday	2/21/2014	7:00 AM	4:30 PM	5	48	809	947
			Injected	5.00	813	16,847	17,661
Monday	4/14/2014	7:30 AM	5:30 PM	0.0	70	1,862.0	1,932
Tuesday	4/15/2014	7:30 AM	5:00 PM	0.0	135	3,587.0	3,722
Wednesday	4/16/2014	7:00 AM	5:00 PM	0.0	200	5,319.0	5,520
Thursday	4/17/2014	7:00 AM	5:30 PM	0.0	180	4,787.0	4,968
Friday	4/18/2014	7:00 AM	4:00 PM	0.0	75	1,995.0	2,070
Monday	4/21/2014	7:00 AM	5:00 PM	5.0	185	4,917.0	5,102
			Injected	5.00	845	22,467	23,314
Monday	8/11/2014	7:30 AM	5:30 PM	0.00	40	1,064	1,104
Tuesday	8/12/2014	7:00 AM	5:00 PM	0.00	65	1,700	1,794
Wednesday	8/13/2014	7:00 AM	5:30 PM	0.00	115	3,088	3,174
Thursday	8/14/2014	7:00 AM	4:30 PM	0.00	220	5,851	6,072
Friday	8/15/2014	7:00 AM	5:00 PM	0.00	150	3,990	4,140
Monday	8/18/2014	7:00 AM	5:00 PM	0.00	130	3,458	3,588
Tuesday	8/19/2014	7:00 AM	5:00 PM	5.00	160	4,256	4,416
Wednesday	8/20/2014	7:30 AM	5:00 PM	0.00	25	664	690
Thursday	8/21/2014	7:30 AM	5:00 PM	0.00	60	1,596	1,656
Friday	8/22/2014	7:00 AM	4:30 PM	0.00	45	1,197	1,242
Monday	8/25/2014	7:30 AM	5:30 PM	2.00	45	685	710
			Injected	7.00	1,055	27,549	28,586
	10/14/2014	7:00 AM	4:30 PM	0.00	-	-	-
	10/15/2014	7:00 AM	4:30 PM	0.00	85	2,251	2,336
	10/16/2014	7:00 AM	4:30 PM	5.00	90	2,418	2,510
			Injected	5.00	175	4,669	4,846
		Total Injected		22.00	2,888	71,532	74,407

Project Photographs

277 Evandale Ave

158 Evandale Ave

Appendix – Injection Logs

Project Name:	Geosyntec - Mountain View - Sodium Permanganate
Inj Rig Operator:	Scott Plachta
Original Injection Scope of work:	Inject a total of 4,800 gallons of a 2% Sodium Permanganate solution into each of 5 boring locations from 15 to 35 feet bgs.

VIRONEX

INJECTION FIELD LOG

Boring ID	Date	Start Time	End Time	Injection Interval	Sustained Pressure (PSI)	Average Flow Rate (GPM)	NaMnO4 Injected Gallons	Water Injected Gallons	Total Gallons Injected	Check If Reagent Surfaces	Field Notes
ISCO - 1	2/12/2014	9:50 AM	2:40 PM	15 to 20	10	0.71	8.0	199.0	207.0		**2/11- (2:05) - Drilling / Set up & all safety meetings complete - 2/11 - start water injection test. Project batching = 125.2 gal water mixed with 4.8gal sodium permaganate. Using (2) 150 gal stainless steel mixing tanks.**
	2/13/2014	10:11 AM	2:45 PM	15 to 20	10	1.95	19.0	515.0	534.0		Begin water test @09:40. Finished injection for the day @ 2:45
	2/14/2014	9:51 AM	12:45 PM	20 to 25	15	2.7	17.0	464.0	481.0		begin water test @ 09:19. Finished injection for the day @ 12:45 to move all eqiupment off site.
	2/18/2014	11:05 AM	2:05 PM	20 to 25	12	3	21.7	375.6	393.0		**Per Client: @ start of day on Tuesday 2/18/14 : Recipe change from (2%mix)4.8gal of Remox per 125gal water batching… to (2.97% mix) 7.1 gal Remox / 125gal water batching.** 2:05 - Per client: interval complete / Push all points 5ft
	2/19/2014	9:05 AM	3:20 PM	25 to 30	15	2.6	50.7	928.3	979.0		Per Client: recipe change-6.7 gallons of RemOx mixed with 125 gallons of water for 2.8% solution of permanganate for the remaining 2 deep intervals. Interval complete / Push 5ft tomorrow AM
	2/20/2014	10:35 AM	3:20 PM	30 to 35	20	2.3	26.4	492.6	519.0		
	2/21/2014	9:00 AM	10:45 AM	30 to 35	10	1.8	8.8	165.2	174.0		2/21 (10:45AM) - All injections complete / Start Decon / Grouting for inspection
ISCO - 2	2/12/2014	9:50 AM	2:40 PM	15 to 20	10	1.73	18.0	484.0	502.0		water test on 2/11 - begin product injection
	2/13/2014	10:11 AM	2:45 PM	15 to 20	5	2.4	24.0	629.0	653.0		Begin water test @ 09:40. Finished injection for the day @ 2:45
	2/14/2014	9:51 AM	12:45 PM	20 to 25	10	3.2	21.0	536.0	557.0		begin water test @ 09:19. Finished injection for the day @ 12:45 to move all eqiupment off site.
	2/18/2014	11:05 AM	2:05 PM	20 to 25	12	3	26.0	413.6	433.0		Per client: interval complete / Push 5ft
	2/19/2014	9:05 AM	3:20 PM	25 to 30	15	1.7	33.1	606.9	640.0		Per client: interval complete / Push 5ft tommorrow AM
	2/20/2014	10:35 AM	3:20 PM	30 to 35	20	1.9	22.4	417.0	440.0		
	2/21/2014	9:00 AM	10:45 AM	30 to 35	10	1.1	5.1	95.9	101.0		2/21 (10:45AM) - All injections complete / Start Decon / Grouting for inspection
ISCO - 3	2/12/2014	9:51 AM	2:40 PM	15 to 20	10	2	21.0	565.0	586.0		water test on 2/11 @ 2:46 flow at 15 psi sustained flow of 1.5 gpm
	2/13/2014	10:12 AM	12:20 PM	15 to 20	10	2.7	13.0	336.0	289.0	X	Begin water test @09:42. (12:20) Per client & PM, stop injection @ this location & continue on the other 4 locations, due to minor surfacing from sewer utilitiy trench. Injected a total volume of 875 gal
	2/14/2014	9:51 AM	12:45 PM	20 to 25	10	3.1	20.0	519.0	539.0		begin water test @ 09:19. Finished injection for the day @ 12:45 to move all eqiupment off site.
	2/18/2014	11:05 AM	2:05 PM	20 to 25	10	3	25.6	408.0	427.0		Per client: interval complete / Push 5ft
	2/19/2014	9:05 AM	3:20 PM	25 to 30	15	2.4	47.6	872.4	920.0		Per client: interval complete / Push 5ft tommorrow AM
	2/20/2014	10:35 AM	3:20 PM	30 to 35	15	3.3	37.9	707.0	745.0		
	2/21/2014	9:00 AM	10:45 AM	30 to 35	10	2.5	11.6	216.4	228.0		2/21 (10:45AM) - All injections complete / Start Decon / Grouting for inspection

ISCO - 4	2/12/2014	9:51 AM	2:40 PM	**15**	**to**	**20**	10	1.9	20.0	524.0	544.0		water test @ 2:21 - Achieved flow @ ~ 15 PSI sustained flow of 1. gpm1 gpm 10 gal total
	2/13/2014	10:13 AM	2:45 PM	**15**	**to**	**20**	12	2.3	23.0	609.0	632.0		Begin water test @ 09:40. Finished injection for the day @ 2:45
	2/14/2014	9:51 AM	12:45 PM	**20**	**to**	**25**	15	2.9	18.0	485.0	503.0		begin water test @ 09:19. Finished injection for the day @ 12:45 to move all eqiupment off site.
	2/18/2014	11:05 AM	2:05 PM	**20**	**to**	**25**	15	3	25.1	398.5	417.0		Per client: interval complete / Push 5ft
	2/19/2014	9:05 AM	3:20 PM	**25**	**to**	**30**	15	1.8	36.8	673.2	710.0		Per client: interval complete / Push 5ft tommorrow AM
	2/20/2014	10:35 AM	3:20 PM	**30**	**to**	**35**	15	3.3	38.4	715.6	754.0		
	2/21/2014	9:00 AM	10:45 AM	**30**	**to**	**35**	10	2.8	12.3	229.7	242.0		2/21 (10:45AM) - All injections complete / Start Decon / Grouting for inspection
ISCO - 5	2/12/2014	9:52 AM	2:40 PM	**15**	**to**	**20**	10	1.3	14.0	363.0	377.0		Achieved flow @ 17psi after 15min
	2/13/2014	10:14 AM	2:45 PM	**15**	**to**	**20**	10	2.3	23.0	606.0	629.0		Begin water test @ 09:40. Finished injection for the day @ 2:45
	2/14/2014	9:51 AM	12:45 PM	**20**	**to**	**25**	10	2.8	17.0	462.0	479.0		begin water test @ 09:19. Finished injection for the day @ 12:45 to move all eqiupment off site.
	2/18/2014	11:05 AM	2:05 PM	**20**	**to**	**25**	10	3	23.0	362.0	379.0		Per client: interval complete / Push 5ft
	2/19/2014	9:05 AM	3:20 PM	**25**	**to**	**30**	15	2.1	39.6	724.4	764.0		Per client: interval complete / Push 5ft tommorrow AM
	2/20/2014	10:35 AM	3:20 AM	**30**	**to**	**35**	15	3	34.7	647.3	682.0		
	2/21/2014	9:00 AM	10:45 AM	**30**	**to**	**35**	10	2.3	10.2	101.8	202.0		2/21 (10:45AM) - All injections complete / Start Decon / Grouting for inspection
								Page Total	**813**	**16847**	**17661**	**0**	

Project Name:	Geosyntec - Mountain View - Sodium Permanganate
Inj Rig Operator:	Scott Plachta
Original Injection Scope of work:	Inject a total of 4,800 gallons of a 2% Sodium Permanganate solution into each of 5 boring locations from 15 to 35 feet bgs.

VIRONEX

INJECTION FIELD LOG

Boring ID	Date	Start Time	End Time	Injection Interval	Sustained Pressure (PSI)	Average Flow Rate (GPM)	NaMnO4 Injected Gallons	Water Injected Gallons	Total Gallons Injected	Check If Reagent Surfaces	Field Notes
ISCO-5	4/14/2014	1:22 PM	4:10 PM	15 to 20	30	2.6	16.3	432.7	449.0		**ROUND 2 BATCHING INFO:** Mixing 133gal water with 5gal NaMno4 = 138gal batches. (16:10) - Finshed injection for the day. Start clean water flush / site breakdown
	4/15/2014	9:00 AM	4:05 PM	15 to 20	30	1.9	30.7	817.2	848.0		(0830) - water injection test. (09:00) Begin product injection (16:05) - Finished injection for the day / Start clean water flush
	4/16/2014	9:25 AM	4:10 PM	20 to 25	20	2.7	40.7	1084.0	1125.0		(08:55) - water injection test. (09:25) Begin product injection. (16:10) - Finished injection for the day / start clean water flush.
	4/17/2014	8:40 AM	10:00 AM	20 to 25	20	2.6	7.5	202.0	209.6		(08:05) - water injection test. / Un-mount and fix clogged flowmeter on ISCO 3 - (08:40) - Flowmeter back online begin product injection. (10:00) - Per Client: Interval complete / Push 5ft to next interval.
	4/17/2014	10:57 AM	4:26 PM	25 to 30	20	2.4	28.6	762.3	791.0		(10:40) - water injection test. (10:57) - Begin product injection.(16:26) - Finshed injection for the day / start clean water flush.
	4/18/2014	9:14 AM	12:20 PM	25 to 30	20	1.7	11.5	307.4	319.2		(12:20) - Interval complete / Start clean water flush / Push all rods 5ft to last interval
	4/21/2014	9:29 AM	4:27 PM	30 to 35	20	2.1	32.2	853.8	886.0		**4/18** - (13:20) - water injection test after pushing rods. Achieved flow @ 40psi. (13:45) - finish water test / finish injection for the week. Start site breakdown / site clean / Demob injection rig w/ secondary containment to staging area for the weekend. **4/21 -** (09:05) - water injection test. (09:20) - Begin product injection. (16:27) - Finished injection for the day /
ISCO - 4	4/14/2014	1:22 PM	4:10 PM	15 to 20	20	2.1	14.4	354.6	368.0		BATCHING INFO: Mixing 133gal water with 5gal NaMno4 = 138gal batches. (16:10) - Finshed injection for the day. Start clean water flush.
	4/15/2014	9:00 AM	4:05 PM	15 to 20	20	1.9	30.0	798.0	828.0		(0830) - water injection test. (09:00) Begin product injection (16:05) - Finished injection for the day / Start clean water flush
	4/16/2014	9:25 AM	4:10 PM	20 to 25	10	3.2	47.1	1253.0	1301.0		(08:55) - water injection test. (09:25) Begin product injection. (16:10) - Finished injection for the day / start clean water flush.
	4/17/2014	8:40 AM	10:00 AM	20 to 25	10	2.4	7.1	191.4	198.6		(08:05) - water injection test. / Un-mount and fix clogged flowmeter on ISCO 3 - (08:40) - Flowmeter back online begin product injection. (10:00) - Per
	4/17/2014	10:57 AM	4:26 PM	25 to 30	20	2.9	35.0	931.9	967.0		(10:40) - water injection test. (10:57) - Begin product injection.(16:26) - Finshed injection for the day / start clean water flush.
	4/18/2014	9:14 AM	12:20 PM	25 to 30	25	2.3	16.1	430.0	446.2		(12:20) - Interval complete / Start clean water flush / Push all rods 5ft to last interval
	4/21/2014	9:29 AM	4:27 PM	30 to 35	25	2.7	41.2	1096.7	1138.0		**4/18** - (13:20) - water injection test after pushing rods. Achieved flow @ 40psi. (13:45) - finish water test / finish injection for the week. Start site
ISCO-3	4/14/2014	1:22 PM	4:10 PM	15 to 20	20	2.2	13.5	358.5	372.0		BATCHING INFO: Mixing 133gal water with 5gal NaMno4 = 138gal batches. (16:10) - Finshed injection for the day. Start clean water flush.
	4/15/2014	9:00 AM	4:05 PM	15 to 20	20	1.6	25.7	685.2	711.0		(0830) - water injection test. (09:00) Begin product injection (16:05) - Finished injection for the day / Start clean water flush
	4/16/2014	9:25 AM	4:10 PM	20 to 25	20	2.7	39.9	1062.0	1102.0		(08:55) - water injection test. (09:25) Begin product injection. (16:10) - Finished injection for the day / start clean water flush.
	4/17/2014	8:40 AM	10:00 AM	20 to 25	20	2.7	7.8	210.6	218.6		(08:05) - water injection test. / Un-mount and fix clogged flowmeter on ISCO 3 - (08:40) - Flowmeter back online begin product injection. (10:00) - Per
	4/17/2014	10:57 AM	4:26 PM	25 to 30	20	3	36.5	972.4	1009.0		(10:40) - water injection test. (10:57) - Begin product injection.(16:26) - Finshed injection for the day / start clean water flush.
	4/18/2014	9:14 AM	12:20 PM	25 to 30	30	2.7	18.4	489.7	508.2		(12:20) - Interval complete / Start clean water flush / Push all rods 5ft to last interval
	4/21/2014	9:29 AM	4:27 PM	30 to 35	20	2.5	39.2	1041.8	1081.0		**4/18** - (13:20) - water injection test after pushing rods. Achieved flow @ 40psi. (13:45) - finish water test / finish injection for the week. Start site

ISCO-2	4/14/2014	1:22 PM	4:10 PM	**15**	**to**	**20**	20	1.8	11.5	305.5	317.0		BATCHING INFO: Mixing 133gal water with 5gal NaMno4 = 138gal batches. (16:10) - Finshed injection for the day. Start clean water flush.
	4/15/2014	9:00 AM	4:05 PM	**15**	**to**	**20**	30	1	13.9	370.0	384.0		(0830) - water injection test. (09:00) Begin product injection (16:05) - Finished injection for the day / Start clean water flush
	4/16/2014	9:25 AM	4:10 PM	**20**	**to**	**25**	20	2.1	30.8	821.1	852.0		(08:55) - water injection test. (09:25) Begin product injection. (16:10) - Finished injection for the day / start clean water flush.
	4/17/2014	8:40 AM	10:00 AM	**20**	**to**	**25**	20	1.6	4.8	127.7	132.6		(08:05) - water injection test. / Un-mount and fix clogged flowmeter on ISCO 3 - (08:40) - Flowmeter back online begin product injection. (10:00) - Per
	4/17/2014	10:57 AM	4:26 PM	**25**	**to**	**30**	30	2.1	26.1	692.9	719.0		(10:40) - water injection test. (10:57) - Begin product injection.(16:26) - Finshed injection for the day / start clean water flush.
	4/18/2014	9:14 AM	12:20 PM	**25**	**to**	**30**	30	1.8	12.6	335.5	348.2		(12:20) - Interval complete / Start clean water flush / Push all rods 5ft to last interval
	4/21/2014	9:29 AM	4:27 PM	**30**	**to**	**35**	20	2.6	40.2	1071.8	1112.0		**4/18** - (13:20) - water injection test after pushing rods. Achieved flow @ 40psi. (13:45) - finish water test / finish injection for the week. Start site breakdown / site clean / Demob injection rig w/ secondary containment to staging area for the weekend. **4/21 -** (09:05) - water injection test. (09:29) - Bejgin product injection. (16:27) - Finished injection for the day /

ISCO-1	4/14/2014	1:22 PM	4:10 PM	**15**	**to**	**20**	30	2.5	15.5	410.5	426.0		BATCHING INFO: Mixing 133gal water with 5gal NaMno4 = 138gal batches. (16:10) - Finshed injection for the day. Start clean water flush.
	4/15/2014	9:00 AM	4:05 PM	**15**	**to**	**20**	30	2.2	34.9	916.5	951.0		(0830) - water injection test. (09:00) Begin product injection (16:05) - Finished injection for the day / Start clean water flush
	4/16/2014	9:25 AM	4:10 PM	**20**	**to**	**25**	20	2.8	41.3	1098.6	1140.0		(08:55) - water injection test. (09:25) Begin product injection. (16:10) - Finished injection for the day / start clean water flush.
	4/17/2014	8:40 AM	10:00 AM	**20**	**to**	**25**	30	2.5	7.4	198.5	206.6		(08:05) - water injection test. / Un-mount and fix clogged flowmeter on ISCO 3 - (08:40) - Flowmeter back online begin product injection. (10:00) - Per
	4/17/2014	10:57 AM	4:26 PM	**25**	**to**	**30**	20	1.5	18.6	497.3	516.0		(10:40) - water injection test. (10:57) - Begin product injection.(16:26) - Finshed injection for the day / start clean water flush.
	4/18/2014	9:14 AM	12:20 PM	**25**	**to**	**30**	20	2.4	16.2	431.7	448.2		(12:20) - Interval complete / Start clean water flush / Push all rods 5ft to last interval
	4/21/2014	9:29 AM	4:27 PM	**30**	**to**	**35**	20	2.1	32.1	852.9	885.0		**4/18** - (13:20) - water injection test after pushing rods. Achieved flow @ 40psi. (13:45) - finish water test / finish injection for the week. Start site
								Page Total	**845**	**22466**	**23314**	**0**	

Project Name: Geosyntec - MEW - Sodium Permanganate (NaMnO4)

Inj Rig Operator: Jesse Taggart

VIRONEX

INJECTION FIELD LOG

Original Injection Scope of work: Inject 4,800 gallons of a 2% NaMnO4 solution into 5 wells from 15-35 ft bgs using a two foot tool and 2,400 gallons of a 2% NaMnO4 solution into 2 wells from 15 to 25 ft bgs.

Boring ID	Date	Start Time	End Time	Injection Interval			Sustained Pressure (PSI)	Average Flow Rate (GPM)	NaMnO4 Injected Gallons	Water Injected Gallons	Total Gallons Injected	Check If Reagent Surfaces	Field Notes
ISCO-1	8/11/2014	12:34 PM	3:19 PM	15	to	20	5	1.7	10.0	266.8	276.8		14:45: cease pumping to reattempt ISCO-2 w/ H2O 14:50 Resume. 15:19: cease pumping due to flow-meters reading inaccurately. Measuring flow meters into buckets to test. Will re-calibrate flow-meters in morning. Flushing water.
	8/12/2014	9:20 AM	4:10 PM	15	to	20	10	1.1	16.2	431.7	448.0		Paused injection at 11:20 for flow meter maintenance. Resume injection at 14:00.
	8/13/2014	9:00 AM	12:00 AM	15	to	20	10	0.0	25.9	690.0	716.0		
	8/14/2014	9:30 AM	3:00 PM	20	to	25	10	3.8	44.9	1196.0	1241.0		
	8/15/2014	10:15 AM	3:15 PM	25	to	30	20	3.4	36.9	982.4	1019.4		
	8/18/2014	9:30 AM	12:30 PM	25	to	30	15	3.1	20.1	535.8	556.0		
	8/18/2014	1:50 PM	4:15 PM	30	to	35	20	2.2	11.7	312.2	324.0		
	8/19/2014	9:10 AM	2:30 PM	30	to	35	20	3.5	41.0	1090.9	1132.0		
ISCO-2	8/11/2014	12:34 PM	3:19 PM	15	to	20	18	0.5	3.1	82.4	85.5	X	12:34:No flow @ 10 PSI, 12:40: increase to 12 PSI, no flow, 12:52: increase to 15 PSI, 13:00 No flow increase to 20 PSI, 13:15: no flow increase to 30 PSI. 13:35 No flow, pulling tool. 13:54: reattempt with new tool. 13:55: 10 PSI, no flow. 13:57: achieve flow. 14:00: surfacing around annulus. Abandoning hole, stepping over. Hit refusal on first step-out, step out again. 14:54: reattempt pumping. flow achieved .5 GPM @ 19 PSI 14:55: 1.0 GPM @ 18 PSI. 15:19: cease pumping due to flow-meters reading inaccurately. Measuring flow meters into buckets to test. Will re-
	8/12/2014	9:20 AM	4:10 PM	15	to	20	15	0.8	12.2	323.8	336.0		Paused injection at 11:20 for flow meter maintenance. Resume injection at 14:00. Paused injection at 15:00 for flow meter maintenance. Resume injection at 15:15.
	8/13/2014	9:00 AM	3:45 PM	15	to	20	20	1.5	21.7	577.3	599.0		
	8/14/2014	9:30 AM	3:00 PM	20	to	25	10	3.7	44.7	1190.2	1235.0		Paused injection at 13:30 for flow meter maintenance. Resume injection at 13:45.
	8/15/2014	10:15 AM	3:15 PM	25	to	30	20	2.7	29.6	786.8	816.4		
	8/18/2014	9:30 AM	12:30 PM	25	to	30	20	2.5	16.3	433.7	450.0		
	8/18/2014	1:50 PM	4:15 PM	30	to	35	20	2.4	12.5	331.5	344.0		
	8/19/2014	9:10 AM	2:30 PM	30	to	35	20	2.3	26.5	706.4	733.0		Paused injection at 11:50 for flow meter maintenance. Resume injection at 11:55. Paused injection at 12:50 for flow meter maintenance. Resume injection at 13:30.

ISCO-3	8/11/2014	12:34 PM	3:19 PM	**15**	**to**	**20**	15	1.7	9.9	264.8	274.8		14:45: cease pumping to reattempt ISCO-2 w/ H2O. 15:19: cease pumping due to flow-meters reading inaccurately. Measuring flow meters into buckets to test. Will re-calibrate flow-meters in morning. Flushing water.
	8/12/2014	9:20 AM	4:10 PM	**15**	**to**	**20**	15	0.8	11.5	305.5	317.0		Paused injection at 11:20 for flow meter maintenance. Resume injection at 14:00.
	8/13/2014	9:00 AM	3:45 PM	**15**	**to**	**20**	20	1.5	22.0	585.0	607.0		
	8/14/2014	9:30 AM	3:00 PM	**20**	**to**	**25**	10	3.7	44.3	1179.6	1224.0		
	8/15/2014	10:15 AM	3:15 PM	**25**	**to**	**30**	20	3.4	36.7	976.6	1013.4		
	8/18/2014	9:30 AM	12:30 PM	**25**	**to**	**30**	20	1.6	10.2	271.8	282.0		
	8/18/2014	1:50 PM	4:15 PM	**30**	**to**	**35**	15	2.3	11.9	316.1	328.0		
	8/19/2014	9:10 AM	2:30 PM	**30**	**to**	**35**	20	2.8	32.9	877.0	910.0		
ISCO-4	8/11/2014	12:34 PM	3:19 PM	**15**	**to**	**20**	20	1.2	7.4	196.4	203.8		14:45: cease pumping to reattempt ISCO-2 w/ H2O. 15:19: cease pumping due to flow-meters reading inaccurately. Measuring flow meters into buckets to test. Will re-calibrate flow-meters in morning. Flushing water.
	8/12/2014	9:20 AM	4:10 PM	**15**	**to**	**20**	15	0.8	11.3	299.7	311.0		Paused injection at 11:20 for flow meter maintenance. Resume injection at 14:00. Paused injection at 15:30 for flow meter maintenance. Resume injection at 15:45.
	8/13/2014	9:00 AM	3:45 PM	**15**	**to**	**20**	20	1.5	22.4	597.5	620.0		Paused injection at 14:30 for flow meter maintenance. Resume injection at 14:45
	8/14/2014	9:30 AM	3:00 PM	**20**	**to**	**25**	20	3.6	43.3	1151.6	1195.0		
	8/15/2014	10:15 AM	3:15 PM	**25**	**to**	**30**	20	2.1	23.0	612.3	635.4		Paused injection at 14:00 for flow meter maintenance. Resume injection at 14:10.
	8/18/2014	9:30 AM	12:30 PM	**25**	**to**	**30**	20	1.7	11.0	293.0	304.0		
	8/18/2014	1:50 PM	4:15 PM	**30**	**to**	**35**	20	2.2	11.4	304.5	316.0		
	8/19/2014	9:10 AM	2:30 PM	**30**	**to**	**35**	20	2.0	23.4	622.6	646.0		
ISCO-5	8/11/2014	12:34 PM	3:19 PM	**15**	**to**	**20**	10	1.6	9.5	253.7	263.3		Cease @ 12:40 due to small leak @ injection cap. 14:45: cease pumping to reattempt ISCO-2 w/ H2O. 15:19: cease pumping due to flow-meters reading inaccurately. Measuring flow meters into buckets to test. Cease injections for the day. Will re-calibrate flow-meters in morning. Flushing water.
	8/12/2014	9:20 AM	4:10 PM	**15**	**to**	**20**	15	0.9	12.7	339.2	352.0		
	8/13/2014	9:00 AM	3:45 PM	**15**	**to**	**20**	20	1.6	24.0	638.0	662.0		
	8/14/2014	9:30 AM	3:00 PM	**20**	**to**	**25**	10	3.6	42.6	1134.3	1177.0		
	8/15/2014	10:15 AM	3:15 PM	**25**	**to**	**30**	20	2.2	23.7	631.6	655.4		Paused injection at 14:30 for flow meter maintenance. Resume injection at 14:35
	8/18/2014	9:30 AM	12:30 PM	**25**	**to**	**30**	20	1.9	12.3	327.7	340.0		Paused injection at 12:00 for flow meter maintenance. Resume injection at 12:20.
	8/18/2014	1:50 PM	4:15 PM	**30**	**to**	**35**	20	2.4	12.5	331.5	344.0		
	8/19/2014	9:10 AM	2:30 PM	**30**	**to**	**35**	20	3.1	36.0	958.9	995.0		
ISCO-6	8/20/2014	2:50 PM	4:10 PM	**15**	**to**	**20**	20	4.3	12.4	330.5	343.0		
	8/21/2014	9:30 AM	4:00 PM	**15**	**to**	**20**	35	1.2	16.3	433.7	450.0		
	8/22/2014	8:30 AM	3:00 PM	**20**	**to**	**25**	40	1.4	19.6	521.4	541.0		
	8/25/2014	9:20 AM	3:10 PM	**20**	**to**	**25**	40	0.7	14.2	228.4	237.0		Increase concentration of NaMn04.
ISCO-7	8/20/2014	2:50 PM	4:10 PM	**15**	**to**	**20**	20	4.3	12.6	334.4	347.0		
	8/21/2014	9:30 AM	4:00 PM	**15**	**to**	**20**	35	3.1	43.7	1162.2	1206.0		
	8/22/2014	8:30 AM	3:00 PM	**20**	**to**	**25**	40	1.8	25.4	675.6	701.0		
	8/25/2014	9:20 AM	3:10 PM	**20**	**to**	**25**	40	1.4	31.2	455.8	473.0		Increase concentration of NaMn04.
								Page Total	**1055**	**27549**	**28586**	**0**	

Project Name: Geosyntec - MEW - Sodium Permanganate (NaMnO4)

Inj Rig Operator: Brett Baatrup

VIRONEX

INJECTION FIELD LOG

Original Injection Scope of work: Inject 4,800 gallons of a 2% NaMnO4 solution into 5 wells from 15-25 ft bgs using a 5 foot tool targeting form 15 to 25 feet bgs. Each injeciton location will receive 960 gallons of 2% NaMn04.

Boring ID	Date	Start Time	End Time	Injection Interval			Sustained Pressure (PSI)	Average Flow Rate (GPM)	NaMnO4 Injected Gallons	Water Injected Gallons	Total Gallons Injected	Check If Reagent Surfaces	Field Notes
ISCO-1	10/15/2014	10:05 AM	3:13 PM	15	to	20	10	1.7	18.8	498.9	517.9		
	10/16/2014	8:50 AM	2:15 PM	20	to	25	20	0.0	0.0	0.0	0.0		no flow per client, pump product on remaining points.
ISCO-2	10/15/2014	10:05 AM	3:13 PM	15	to	20	15	0.9	10.4	275.1	285.5		
	10/16/2014	8:50 AM	2:15 PM	15	to	20	15	2.3	27.6	730.3	758.0		
ISCO-3	10/15/2014	10:05 AM	3:13 PM	15	to	20	10	1.9	21.0	555.5	576.5		
	10/16/2014	8:50 AM	2:15 PM	20	to	25	20	1.5	17.3	458.6	476.0		
ISCO-4	10/15/2014	10:05 AM	3:13 PM	15	to	20	5	1.5	16.7	443.2	460.0		
	10/16/2014	8:50 AM	2:15 PM	20	to	25	15	1.7	20.3	537.6	558.0		
ISCO-5	10/15/114	10:05 AM	3:13 PM	15	to	20	15	1.6	18.1	478.2	496.3		
	10/16/2014	8:50 AM	2:15 PM	15	to	20	10	2.2	26.0	691.8	718.0		
								Page Total	**176**	**4669**	**4846**	**0**	

APPENDIX G

Photo Log

APPENDIX G – PHOTO LOG

SITE: Evandale Avenue Sources, Mountain View, California
SUBJECT: ISCO injections
DATES: February 2014 – October 2014

PHOTOGRAPH 1.

View: Looking West down Evandale Avenue from North Whisman Rd.

Subject: Photo shows Pilot Study sign used during each injection event with EPA contact information provided (February 2014)

PHOTOGRAPH 2.

View: Looking northwest

Photo shows Injection at CPT-15 Area. Rig is parked within a secondary containment area, caution tape and safety cones outline the exclusion zone of the injection area (February 2014)

Geosyntec consultants

APPENDIX G – PHOTO LOG

SITE: Evandale Avenue Sources, Mountain View, California
SUBJECT: ISCO injections
DATES: February 2014 – October 2014

PHOTOGRAPH 3.

View: Looking West, down Evandale Ave

Photo shows injection locations at CPT-15 Area, injection rods are approximately 4-5 feet above the asphalt. Blue screens and shop vac are precautionary in the event of any leak or spill (February 2014).

PHOTOGRAPH 4.

View: Next to injection locations

Photo shows groundwater collected from the piezometer. The purple color indicates the presence of sodium permanganate (February 2014)

Geosyntec consultants

PHOTOGRAPH 5.

View: looking north on Evandale Ave

Photo shows plastic sheets that were placed over storm drains, sand bags were used to hold plastic sheets in place (October 2014).

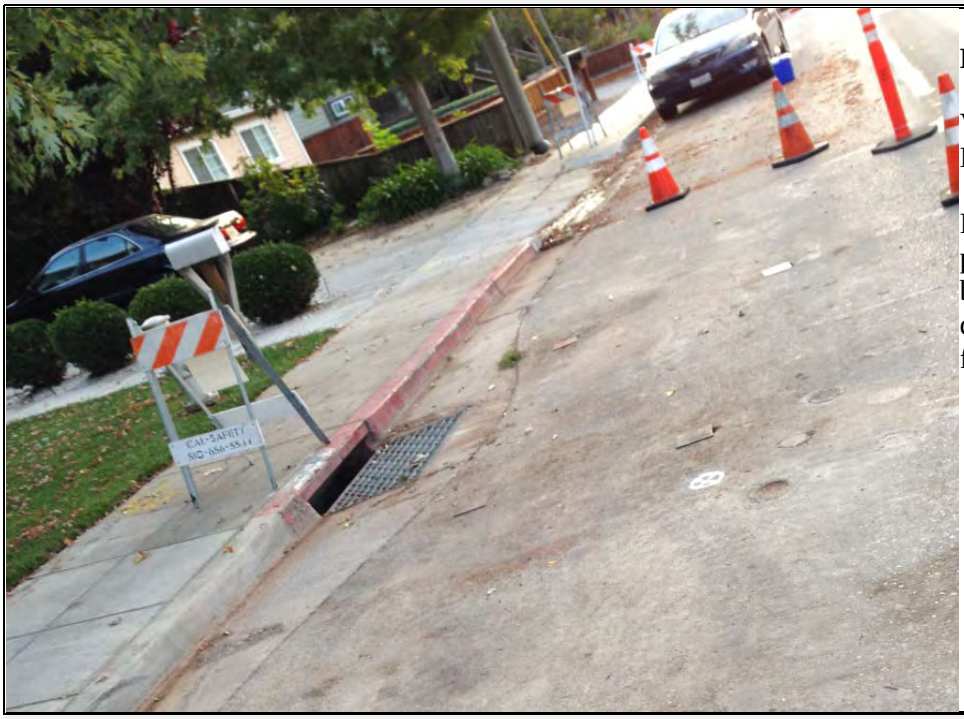
PHOTOGRAPH 6.

View: Looking West down Evandale Ave

Photo shows injection set up at CPT-21 Area (October 2014)

APPENDIX G – PHOTO LOG

SITE: Evandale Avenue Sources, Mountain View, California
SUBJECT: ISCO injections
DATES: February 2014 – October 2014



PHOTOGRAPH 7.

View: Looking East down Evandale Ave

Photo shows metal caps placed over the injection borings at the end of each day to allow street parking for residents overnight

PHOTOGRAPH 8.

View: Inside injection rig

Photo shows injection crew monitoring the injection manifold. All crew members and any other personal who enters the exclusion zone wear tyvek suites, safety glasses and hard hats for protection (modified Level D).

Geosyntec consultants