CORNERSTONE EARTH GROUP

Date:	December 9, 2019
Project No.:	118-91-1
Prepared For:	Mr. Connor Tutino **DAVID J. POWERS & ASSOCIATES** 1736 Franklin Street, Suite 300 Oakland, California 94612
Re:	Environmental Summary Letter Proposed Commercial Development 3215 Porter Drive Palo Alto, California

Dear Mr. Tutino:

Per your request, Cornerstone Earth Group (Cornerstone) is pleased to present this letter summarizing our review of selected environmental information pertaining to the proposed commercial development at 3215 Porter Drive in Palo Alto, California (Site). This letter was prepared for David J. Powers & Associates (DJPA) in accordance with our October 18, 2019 agreement. We understand that DJPA is preparing an Initial Study associated with the proposed development. The purpose of this letter is to summarize the environmental setting of the Site and assist DJPA in developing mitigation measures for the project.

Project Description

The planned development of the approximately 1.7 acre Site will include the construction of a new two-story, steel-frame office building overlying a one level below-grade parking garage. The current design also includes pedestrian walkways, pavers, appurtenant utilities, landscaping and other improvements necessary for Site development.

Scope of Work

As presented in our Agreement, the scope of work performed for this study included the following:

- A cursory review of readily available documents obtained from the state Geotracker (http://geotracker.waterboards.ca.gov) and Envirostor (http://www.envirostor.dtsc.ca.gov) databases was performed. Geotracker is a database and geographic information system (GIS) that provides online access to environmental data. It tracks regulatory data about leaking underground storage tank (LUST), Department of Defense, Site Cleanup Program and Landfill sites. The Envirostor database is maintained by the Department of Toxic Substances Control (DTSC) and contains information on investigation, cleanup, permitting, and/or corrective actions that are planned, being conducted or have been completed under DTSC's oversight. The Envirostor database includes the following site types: Federal Superfund sites; State Response sites; Voluntary Cleanup sites; and School sites.

- Preparation of a written report summarizing our findings and recommendations.

Site History and Prior Studies

Based on the information reviewed, a summary of the Site history and environmental setting is presented below. Copies of selected documents reviewed during this study are presented in Attachment A. A more detailed discussion of the Site background is available in documents available on the Envirostor website (www.envirostor.dtsc.ca.gov).

Hillview-Porter Region

The Site is located within the Hillview-Porter Region of the Stanford Research Park. The Hillview-Porter Region consists of nine properties located within the Stanford Research Park, along with the Hillview-Porter Regional Study Area, which consists of the Veterans Administration Hospital Property (VAHP); the portion of Barron Park Neighborhood (BPN) bounded by El Camino Real, Arastradero Road, Miranda Avenue, and the southern property boundary of Varian Associates; and the stretch of Matadero Creek between Foothill Expressway and El Camino Real.

Chemical releases from nine facilities in the Hillview-Porter Region with addresses along Hillview Avenue and Porter Drive are suspected of contributing to an area of groundwater that is impacted predominantly by volatile organic compounds (VOCs), mainly trichloroethene (TCE). The 3215 Porter Drive Site is one of the nine properties.

Site History

The Site was formerly part of a larger parcel that previously was developed with a commercial building that was occupied by Hewlett-Packard (HP), known as Building 15. Hewlett-Packard occupied Building 15 since approximately 1964 through a lease with Stanford. The building was used for circuit board and small transformer manufacturing purposes. Between 1965 and 1973, acidic wastes were neutralized in a series of concrete lined pits located within the building, prior to discharge to the sanitary sewer. These pits are collectively referred to as the chemical dilution pit. Transformer manufacturing ceased in 1973. In 1974, the interior of Building 15 was extensively remodeled to accommodate increased production of printed circuit boards, and a chemical storage bunker was installed off-Site to the north of Building 15. In 1975, an on-Site chemical storage shed was removed and replaced with a waste treatment facility to treat chemical wastes generated at the Site. Manufacturing activities reportedly ceased in 1987. In 1988, the former chemical storage bunker, waste treatment facility, and associated pipeline trench were demolished. In 1990, the chemical dilution pit and surrounding concrete flooring located inside the northwest corner of Building 15 were excavated and removed. Through 1991, the building was renovated for use as a television studio/office complex.

Chemicals used in the manufacturing of printed circuit boards between 1964 and 1973 can be divided into three general classes: 1) solvents, 2) metals, and 3) corrosives. The primary solvent used to manufacture printed circuit boards was TCE. The primary chemicals used between 1974 and 1987 were acids, metals and solvents. TCE was not used during this period. Four tanks within the former chemical storage bunker were used to store 1,1,1-trichloroethane (1,1,1-TCA), methylene chloride and sulfuric acid. After 1980, chlorinated solvents were replaced by aqueous solutions consisting of butyl cellosolve/potassium hydroxide and sodium carbonate. Investigations of soil and groundwater began at the Site in 1987 in response to requests from the Department of Health Services (DHS) (now the DTSC).

Since the late 1980s, numerous investigations have been conducted at the Site. These investigations identified the presence of VOCs in on-Site soil, soil vapor and groundwater. Three

source areas of VOCs were identified including the former chemical dilution pit, the former chemical storage shed, and the former chemical storage bunker. In 1989, Hewlett-Packard was issued a Remedial Action Order (Docket # HSA 88/89-024 [amended July 1995]) by DTSC.

Several remedial actions have been conducted at the Site under DTSC oversight that included excavation of impacted soil, soil vapor extraction, groundwater extraction and treatment, and in-situ treatment technologies (*e.g.*, chemical oxidation using potassium permanganate [$KMnO_4$]). In 2009, the on-Site groundwater treatment system was upgraded to remove hexavalent chromium, which was identified at elevated concentrations in groundwater at the Site; the hexavalent chromium was reported to be a by-product of the implemented in-situ groundwater treatment measures.

In 2017, Building 15 and two commercial buildings located on adjacent parcels to the southwest (3181-3183 and 3221 Porter Drive) were demolished. The southwest (off-Site) portion of the former Building 15 location and these two adjacent parcels subsequently were redeveloped with a new commercial building with a below grade parking garage. To facilitate this adjacent off-Site development, a Vapor Intrusion[1] Evaluation was completed (Haley & Aldrich, 2017) that included collection of soil vapor samples from the southwesterly adjacent parcels, as well as from the Site. TCE was detected in on-Site soil vapor at up to 120,000 micrograms per cubic meter ($\mu g/m^3$); similar concentrations were detected on the southwesterly adjacent parcels. For comparison, the Water Board's Tier 1 Environmental Screening Level (ESL[2]) for TCE in soil vapor is 16 $\mu g/m^3$. Haley & Aldrich recommended that vapor intrusion mitigation measures be incorporated into the design of the southwesterly adjacent building, including a spray-applied vapor barrier and a passive sub-slab venting (SSV) system that may be converted to an active system should conditions warrant such a conversion. In a May 30, 2017 letter, the DTSC concurred with these recommendations. Haley & Aldrich subsequently prepared a Vapor Intrusion Mitigation System Design, which was approved by the DTSC in a June 13, 2017 letter.

Historically, two groundwater treatment systems (GTS) were located on the 3215 Porter Drive parcel that were housed in separate compound structures situated side-by-side along the northwestern parcel boundary. One GTS, referred to as the HP GTS, was owned and operated by HP and treated groundwater extracted from the HP Building 15 parcel, the Teledyne MEC property (3165/3181/3221 Porter Drive), and the 3300 Hillview Avenue property. A second GTS, referred to as the Hillview-Porter (HVP) GTS, was owned and operated by HVP responsible parties and treated groundwater extracted by HVP regional extraction wells. In preparation for construction of the recently completed southwesterly adjacent building, these two systems were combined into a single GTS that is located on the northwestern portion of the Site. Several groundwater extraction and monitoring wells and associated conveyance piping additionally remain on-Site.

The Site remains under DTSC oversight for ongoing operation and maintenance activities, which include continued groundwater extraction and treatment, groundwater monitoring and reporting.

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[1] Vapor intrusion is the movement of chemical vapors from contaminated groundwater or soil into a nearby building. Vapors primarily enter through openings in the building's foundation, such as cracks in the concrete slab and gaps around utility lines. It is also possible for vapors to pass through concrete, which is naturally porous. Once inside the building, vapors may be inhaled posing potential health risks.

[2] Environmental Screening Levels (ESLs) established by the San Francisco Bay, Regional Water Quality Control Board (January 2019) are used to screen sites for potential human health concerns where releases of hazardous chemicals have occurred. ESLs are risk-based concentrations derived from standardized equations combining exposure information assumptions with toxicity data. Under most circumstances, the presence of a chemical at concentrations below the corresponding screening level can be assumed not to pose a significant health risk.

Conclusions and Recommendations

Based on the above summary, Cornerstone concludes and recommends the following:

- Due to the identified VOCs in soil vapor at the Site, we recommend that vapor intrusion mitigation measures be incorporated into the design of the planned development. A Vapor Intrusion Mitigation Plan should be prepared that describes the measures to be implemented to prevent exposure of Site occupants to VOCs as a result of vapor intrusion. The Vapor Intrusion Mitigation Plan should require that proposed occupied spaces be designed with appropriate structural and engineering features to reduce risk of vapor intrusion into buildings. At a minimum, this design should include passive sub-slab ventilation with an underslab membrane system that is protective against vapor intrusion, and the ability to convert the system from passive to active ventilation if warranted. The Vapor Intrusion Mitigation Plan should also describe the performance monitoring that will be performed to help demonstrate the passive or active system is operating as designed. The Vapor Intrusion Mitigation Plan must be prepared by an Environmental Professional and submitted to the DTSC for review. DTSC approval should be obtained prior to commencing construction activities. As described above, similar measures were approved by the DTSC in 2017 for the recently completed southwesterly adjacent building.

  A completion report should be submitted to the DTSC upon completion of construction of the mitigation system including final as-built design drawings. A Long-Term Operations, Maintenance, and Monitoring Plan (OMMP) also should be submitted for DTSC approval that presents the actions to be taken following construction to maintain and monitor the vapor intrusion mitigation system, and a contingency plan should the vapor mitigation system fail. A financial assurance mechanism should additionally be established (*i.e.*, proof that adequate funds are available for long-term maintenance and monitoring of the vapor intrusion mitigation system) and described in the OMMP.

- Prior to conducting earthwork activities at the Site, a Site Management Plan (SMP) and Health and Safety Plan (HSP) should be prepared. The purpose of these documents will be to establish appropriate management practices for handling impacted soil, soil vapor and groundwater that may be encountered during construction activities. Based on the history of the Site, areas of impacted soil, soil vapor and/or groundwater likely will be encountered during construction activities, which may require special monitoring, handling and/or disposal. The SMP should be submitted to the DTSC for review, and DTSC approval should be obtained prior to commencing earthwork activities at the Site.

- A groundwater treatment system, along with several groundwater extraction and monitoring wells and associated conveyance piping remain on-Site. These features should be protected during Site redevelopment activities or properly removed prior to redevelopment. This work should be coordinated with the DTSC and Hewlett-Packard, and, if warranted, with other affected responsible parties within the Hillview-Porter Region. Any well destruction activities should be conducted under permit from the Santa Clara Valley Water District (Valley Water).

Limitations

Cornerstone Earth Group, Inc. performed this investigation to support DJPA in the evaluation of the proposed development at 3215 Porter Drive in Palo Alto, California. This study is inherently limited because findings are developed based on information obtained from others. Cornerstone does not accept liability for deficiencies, errors, or misstatements that have resulted from inaccuracies in the publicly available information or from information published by others. Cornerstone reviewed and relied on the information presented in selected available reports and cannot be responsible for their accuracy. This letter, an instrument of professional service, was prepared for the sole use of DJPA and may not be reproduced or distributed without written authorization from Cornerstone. Cornerstone makes no warranty, expressed or implied, except that our services have been performed in accordance with the environmental principles generally accepted at this time and location.

We thank you for this opportunity to work with you on this important development. Should you have any questions, please contact us at your convenience.

Sincerely,

Cornerstone Earth Group, Inc.



Kurt M. Soenen, P.E.
Principal Engineer

CORNERSTONE EARTH GROUP

ATTACHMENT A: SELECTED PRIOR REPORTS AND ASSOCIATED DOCUMENTS

STATE OF CALIFORNIA
HEALTH AND WELFARE AGENCY
DEPARTMENT OF HEALTH SERVICES
TOXIC SUBSTANCES CONTROL DIVISION

In the Matter of:	)	Docket #HSA 88/89-024
	)	
3215 Hillview Avenue	)	REMEDIAL ACTION ORDER
Palo Alto, CA	)	
AKA: Hewlett-Packard	)	Health and Safety Code
Building #15	)	Sections 25355.5(a)(1)(B)
	)	205, 206, 25358.3(a)(1)

To: Hewlett-Packard Company, a California Corporation; and Leland Stanford, Jr. University, a California Corporation.

I. INTRODUCTION

1.1. Parties. The State Department of Health Services (Department) issues this Remedial Action Order (Order) to the following parties (Respondents):

1.1.1. Hewlett-Packard Company, a California Corporation with offices at 1501-T Page Mill Road, Palo Alto, California 94304.

1.1.2. Leland Stanford Jr. University, a California Corporation, Lands Management, 857 Serra Street, Stanford, California 94305-6225.

1.2. Site. The Site which is the subject of this Order is located at 3215 Hillview Avenue, Palo Alto, California. A map of the Site is attached as Exhibit 1.

1.3. Jurisdiction. Section 25355.5(a)(1)(B) of the Health and Safety Code authorizes the Department to issue an Order establishing a schedule for removing or remedying a release of a hazardous substance at a site, or for correcting the conditions that threaten the release of a hazardous substance. The Order

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STD. 113 (REV. 8-72)

85 34769

includes, but is not limited to, requiring specific dates by which the nature and extent of a release shall be determined and the Site adequately characterized, a remedial action plan prepared and submitted to the Department for approval, and a removal or remedial action completed.

1.3.1. Health and Safety Code Sections 205 and 206 authorize the Department to take action necessary to abate nuisances.

1.3.2. Health and Safety Code 25358.3(a) authorizes the Department to take specified action when it determines that there may be an imminent or substantial endangerment.

1.4. Exhibits. All Exhibits attached to this Order are incorporated herein by this reference.

II. FINDINGS AND DETERMINATIONS

2.1 Hewlett Packard, 1501-T Page Mill Road, Palo Alto, California, 94304 and Stanford University, 857 Serra Street, Stanford, California 94305-6225, are the responsible parties as defined by Health and Safety Code Sections 25319, 25323.5, 25360 and 25385.1(g).

2.2. Stanford University is the owner of the property known as the Stanford Research Park on which the facility is located.

2.3. Since 1965, Hewlett-Packard has leased the Site from Stanford University.

2.4. The Site is located within the Hillview Porter Site area as described in the "Expenditure Plan for the Hazardous Substance Cleanup Bond Act of 1984" (January 1989).

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STD. 113 (REV. 8-72)

85 34769

2.5. The Hillview Porter site is a regional groundwater contamination problem located in and around the Stanford Research Park.

2.6. Hewlett-Packard manufactured electronic transformers and printed circuit boards at the Site from 1965 to December 1987.

2.7. The Department has determined that there are releases and/or threatened releases of hazardous substances at or from the Site to soil, surface water and/or groundwater. The substances found at the Site are "hazardous substances" as defined by Health and Safety Code Section 25316 and the past, present or potential migration of these hazardous substances from the Site into the soil, surface water and/or groundwater constitutes an actual or threatened "release" as defined in Health and Safety Code Section 25320.

2.8. During the years of the plant operation, the facility consisted of a large building used for manufacturing (Building #15), a waste treatment facility, and a chemical storage bunker (Exhibit 2).

2.9. Building #15 was divided into three use areas, based upon facility operations (Exhibit 3). The southwestern one-third of the building was used for metal plating and was the area in which the largest quantities of acids, metals and solvents were used. In the wet floor plating process, printed circuit board parts were manually submersed in acid holding tanks and were plated with metals such as nickel. The central portion of the building was used for transformer manufacturing.

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STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

Solvents were used in this process but there is no evidence of use of polychlorinated biphenols (PCBs). The northeastern one-third of the building was used primarily for cable manufacturing. Relatively inert materials were used for this process; chemicals were generally not used.

2.10. A solvent waste pit, four shallow acid pits, a chemical dilution pit, trichloroethylene and methylene chloride stills, and a gold recovery system, all located within Building #15, were used to manage wastes prior to 1975. In 1975, the waste treatment facility was built. Chemical wastes from process areas in Building #15 were conveyed to the waste treatment facility by piping contained in a concrete lined trench. The treated waste stream was discharged to the sanitary sewer in compliance with discharge permits issued by the City of Palo Alto.

2.11. A chemical storage bunker was installed in 1974 on a hillside approximately 200 feet north of Building #15 (Exhibit 2).

2.12. The chemical storage bunker was used as a bulk storage area for chemicals used for operations at the facility. Chemicals were conveyed via pipelines to Building #15.

2.13. Four tanks within the bunker stored 1,1,1-trichloroethane, methylene chloride, sulfuric acid, and alkaline etch.

2.14. The manufacturing plant ceased operations in December 1987, and the building is currently undergoing renovation.

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STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

2.15. Technical reports submitted to the Department indicate chemicals found in soils and groundwater beneath and downgradient of the facility have been used onsite and that chemical spills have occurred onsite in the past. Investigations by Hewlett-Packard have determined that Site soils are contaminated and may be contributing in part to contaminated groundwater beneath and downgradient of the property.

2.16. Technical reports and chemical use reports submitted to the Department reveal that Hewlett-Packard has used trichloroethylene (TCE), tetrachloroethylene (PCE), trichloroethane (TCA), and other solvents in processes onsite (Exhibit 4 - excerpted from "Hewlett-Packard Building #15 Initial Site Characterization Report" November 1987).

SAMPLING RESULTS

2.17. In December 1985, Stanford University sampled water from seven private wells in the Barron Park neighborhood downgradient from the Hillview-Porter plume area.

TCE was detected in one well at a concentration of 9.5 ppb, which is in excess of the Department's 5.0 ppb Action Level for TCE in drinking water (Exhibit 5).

2.18. Hewlett-Packard initiated an investigation of soil and groundwater at the Site in July 1987 and conducted a review of records to identify potential sources of contamination.

2.19. Three phases of the investigation have been performed to date. The Phase I investigation included the drilling of twenty soil borings and four monitoring wells on the Site.

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STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

2.20. TCE, dichloromethane (DCM), TCA, and styrene were detected in soils at maximum concentrations of 25,000 ppb, 2,700 ppb, 4,800 ppb, and 800 ppb, respectively (Exhibit 6).

2.21. TCE, 1,1-DCE, and chloroform were detected in groundwater at concentrations as high as 900 ppb, 22 ppb, and 6.4 ppb, respectively (Exhibit 7).

2.22. In December 1987, Hewlett-Packard initiated a Phase II investigation to determine groundwater flow direction, gradient, and quality and to further define the extent of soil and groundwater contamination. Five additional soil borings and eight groundwater monitoring wells were drilled.

2.23. Bromomethane, acetone, TCE, PCE, TCA, and 2-butanone were detected in soil at concentrations of 1,700 ppb, 3,300 ppb, 7,200 ppb, 590 ppb, 4,800 ppb, and 4,000 ppb, respectively (Exhibit 8).

2.24. TCE, 1,1-DCE, 1,2-dichloroethylene (1,2-DCE), 1,1,1-TCA, toluene, ethylbenzene, xylenes, benzene, freon, and chloroform were detected in groundwater. TCE, 1,1-DCE, chloroform, and benzene were detected at concentrations of 11,000 ppb, 180 ppb, 7.3 ppb, and 10 ppb, respectively. Reference Exhibit 8 for soil and groundwater results excerpted from the "Phase II Site Characterization Report" April 1988.

2.25. The Phase III soil investigation was conducted on September 1988. Soil samples were collected beneath the former waste treatment facility, former chemical storage bunker and pipe trench. The investigation included the drilling of three additional monitoring wells and 33 soil borings.

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STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

2.26. Results of soil analyses indicate eleven volatile organic compounds (VOCs) in the vicinity of the waste treatment facility. TCE was the most commonly detected with concentrations as high as 31 ppm.

2.27. Ten VOC's were detected in soil samples in the vicinity of the chemical storage bunker. 1,1,1-TCA and methylene chloride were the only compounds detected at concentration greater than 1 ppm.

2.28. TCE was the primary chemical detected beneath the pipe trench, with concentrations as high as 1.8 ppm. Reference Exhibit 9 for soil results excerpted from "Results of Phase III Soil Investigation, Soil Sampling During Demolition Activities" December 1988.

2.29. TCE, 1,1-DCE, 1,2-DCE, 1,1,1-TCA, chloroform, xylene were detected in groundwater at concentration as high as 4,200 ppb, 8 ppb, 9.6 ppb, 8.2 ppb, 6.0 ppb, 6 ppb respectively. See Exhibit 10 for groundwater results excerpted from "Results of Phase III Groundwater Investigation" October 1988.

2.30. The direction of groundwater flow determined from Site investigations is from an easterly and southeasterly direction (Exhibit 11).

2.31. Hydrogeologic investigations have identified two separate aquifer zones within 60 feet of the surface. The first aquifer is at a depth of approximately 15-25 feet. The second aquifer is at a depth of approximately 40 feet.

2.32. The facility is located within the Palo Alto City limits. The nearest Palo Alto Municipal supply well is located

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STD. 113 (REV. 8-72)

85 34769

within one mile of the Site, and a total of three municipal and seven private wells are located within a 1.5-mile radius of the Site. The seven private wells are located in the Barron Park neighborhood, which is directly downstream and downgradient of the facilities. These wells are generally used intermittently for non-drinking domestic water supply. 1,1,1-TCA, TCE, PCE, PCA, and chloroform have been detected in the privately owned wells. TCE was detected in one well at levels above the Department's Action Level for protection of drinking water; all other values detected are below the Department's Action Levels.

HEALTH RISK

2.33. The primary public health risk posed by the site (as a portion of the Hillview Porter Site) is associated with exposure to contaminated groundwater and surface water. The City of Palo Alto, population 55,225, uses Hetch Hetchy Reservoir as a primary municipal water source. The City also maintains 10 wells as a backup system for municipal supply should the Hetch Hetchy water supply become unavailable.

2.34. The Hillview-Porter are is located within the Palo Alto City limits. The nearest Palo Alto municipal supply well (Matadero well) and seven private wells are located in Barron Park neighborhood. A total of three municipal wells (Matadero, Fernando, and Park) are located within a 1.5-mile radius of the intersection of Hillview Avenue and Porter Drive. The private wells are generally used intermittently for nondrinking water supply. 1,1,1-TCA, TCE, PCE, PCA, and chloroform have been detected in the privately owned wells. TCE was detected in one

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STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

well at levels above the Department's Action Level for protection of drinking water; all other values detected are below the Department's Action Levels.

2.35. Matadero Creek passes through the Barron Park neighborhood. Children from the neighborhood play in and near the creek. This activity may pose a health risk to children from the neighborhood. Humans have been observed harvesting nuts and grasses from the creekbed for purposes of consumption.

EXPOSURE PATHWAYS

2.36. The contaminants addressed in this Order have been found onsite in soil and groundwater, and in offsite groundwater and surface water.

2.37. The main exposure pathways are ingestion of contaminants in water or dermal adsorption of contaminants through surface and groundwater. Worker exposure may occur during excavation activities associated with interim remedial activities or during well installation, development and sampling activities.

2.38. All soil contaminants are potential sources of groundwater contamination. Vertical infiltration of surface waters (rainfall or surface runoff) may cause vertical migration of hazardous substances to the groundwater.

POTENTIAL HEALTH RISKS OF SUBSTANCES

2.39. Acetone. Acetone has been detected in soil at concentrations of 3,300 ug/kg at the Site. Human exposure to acetone is via ingestion, inhalation, and skin or eye contact. Acetone may cause irritation to eyes, nose and throat.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

Headaches, dizziness, and dermatitis may occur at sufficiently high exposure levels. Acetone is listed as a hazardous material (22 CCR 66680) and as a hazardous waste (40 CFR 261.33(f)).

2.40. Benzene. Benzene has been detected at concentrations as high as 10 ppb in groundwater at the Site. The primary toxicological effects of short-term exposure to benzene through inhalation and ingestion are on the central nervous system. At sufficiently high exposure levels, inhalation or ingestion may cause headache, dizziness, drowsiness, and nausea which may progress to convulsions, respiratory paralysis, and death with high vapor concentrations (Arthur D. Little, Inc., 1985). The International Agency for Research on Carcinogens (IARC) lists benzene as a Group I carcinogen (sufficient evidence of human carcinogenicity) (Gilbert et al., 1980). Benzene is listed as a hazardous material in 22 CCR 66680 and as a hazardous waste under 40 CFR 261.33(f). The Department's Action Level for benzene in drinking water is 0.7 ppb. The EPA Maximum Contaminant Level (MCL) goal for benzene is zero. Benzene was listed under the Safe Drinking Water and Toxics Enforcement Act of 1986 (Proposition 65) in September 1987.

2.41. Bromomethane. Bromomethane has been detected in soils at concentrations of 1,700 ug/kg at the Site. Human exposure to bromomethane is through inhalation, percutaneous absorption, ingestion, and eye contact. Bromomethane can be irritating to the eyes, skin, and mucous membranes of the upper respiratory tract. Mild exposure can result in dermatitis,

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

severe exposure may cause burns. Bromomethane attacks the central nervous system and respiratory track. High concentrations can cause lung irritation, headaches, vertigo, nausea, vomiting, and tremors. Extreme exposure may result in death. Chronic affects are limited to the central nervous system. Bromomethane is listed as a hazardous material (22 CCR 66680) and hazardous waste (40 CFR 261.33(f)).

2.42. 2-butanone (methyl ethyl ketone, MEK). 2-butanone has been detected in soil at concentrations of 4,000 ug/kg at the Site. Human exposure to 2-butanone is through inhalation, ingestion, and contact with eyes and skin. 2-butanone attacks the central nervous system. Sufficient levels of exposure may cause irritation to the eyes and nose, headaches, dizziness, and vomiting. 2-butanone is a hazardous material (22 CCR 66680) and a hazardous waste (40 CFR 261.33(f)).

2.43. Chloroform (Trichlormethane). Chloroform has been detected at concentrations as high as 7.3 ppb in monitoring wells at the Site. Humans may be exposed to chloroform through inhalation, ingestion, and dermal contact. Chloroform is a central nervous system depressant and at sufficiently high exposure levels may cause kidney and liver damage (Sax, 1984). There is evidence that suggests chloroform induces mutagenic activity in animals, while conflicting data exist for linking chloroform with tetratogenic disorders (U.S. EPA, 1985b). IARC lists chloroform as a Group I carcinogen. Chloroform is listed as a hazardous material (22 CCR 66680) and as a hazardous waste under 40 CFR 261.33(f). The EPA Primary MCL for drinking water

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

for chloroform is 100 ppb. Chloroform was listed under Proposition 65 in October 1987.

2.44. 1,1-Dichloroethylene (1,1-DCE). 1,1-DCE has been detected at concentrations as high as 180 ppb in groundwater at the Site. Short-term exposures to high vapor concentrations of 1,1-DCE can result in central nervous system depression, which may progress to unconsciousness with prolonged exposure. The liquid is moderately irritating to the eyes, causing pain, conjuntival irritation, and possible transient injury. The liquid is irritating to the skin after only a few minutes contact (Clayton and Clayton, 1981). Long-term effects include damage to the liver and kidneys. 1,1-DCE is a hazardous waste listed in 40 CFR 261.33(f). The Department's Action Level for 1,1-DCE in drinking water is 6 ppb.

2.45. 1,2-Dichloroethylene (1,2-DCE). 1,2-DCE has been detected at concentrations as high as 5 ppb in groundwater at the Site. It has anesthetic properties at high concentrations. Humans inhaling high concentrations of the compound may display symptoms of nausea, vomiting, weakness, tremor and cramps, followed by unconsciousness (U.S. EPA, 1985). No data are available to determine the compound's teratogenic and carcinogenic effects. 1,2-DCE is a listed hazardous material in 22 CCR 66680 and a hazardous waste under 40 CFR 261.33(f). The Department's Action Level for 1,2-DCE in drinking water is 16 ppb.

2.46. Dichloromethane (DCM, methylene chloride). DCM was found in soils in concentrations of 2,700 ug/kg at the Site.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

Human exposure to DCM is through inhalation of vapors, percutaneous absorption of liquid ingestion, and contact with eyes and skin. Repeated contact with skin may cause dermatitis. Liquid and vapor may irritate eyes and upper respiratory tract. At high concentrations, DCM is a mild narcotic; exposure at sufficient concentration may cause headache, giddiness, and numbness. In extreme cases, death may result. DCM is a hazardous material (22 CCR 66680) and a hazardous waste (40 CFR 261).

2.47. Ethylbenzene. Ethylbenzene has been detected at concentrations of 5.2 ppb in groundwater at the Site. At sufficient vapor concentrations, ethylbenzene can induce irritation of the eyes, nose, throat and skin in humans. At extremely high concentrations, narcosis can occur. Animal data indicate liver and kidney damage upon ingestion of concentrations averaging 500 mg/kg/day over a short-term exposure period (U.S. EPA, 1985). Recent studies indicate the potential for reproduction effects, although the compound does not appear to be teratogenic (U.S. EPA, 1985). Ethylbenzene is a listed hazardous material in 22 CCR 66680 and a hazardous waste under 40 CFR 261.33(f). The Department's Primary Action Level for ethylbenzene in drinking water is 680 ppb.

2.48. Styrene (vinyl benzene). Styrene was detected in soils at concentrations of 800 ug/kg at the Site. Human exposure may be through inhalation, ingestion, and contact with eyes and skin. Liquid and vapor are irritating to eyes, nose, throat, and skin. Styrene attacks the central nervous system.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

Sufficient concentrations may cause reduced manual dexterity. Acute long-term exposure to sufficiently high concentrations may cause respiratory system paralysis. Styrene is listed as hazardous substance under 22 CCR 66680. The maximum contaminant level (MCL) goal for styrene in drinking water is 140 ppb.

2.49. Tetrachlorethylene (PCE, Perchloroethylene). PCE has been detected at concentrations as high as 590 ppb in soil at the Site. Short-term exposure to PCE through ingestion and inhalation may cause nausea, vomiting, headache, dizziness, drowsiness, and tremors. Skin contact with liquid causes irritation and blistering. Both liquid and vapor are irritating to the eyes (Plunkett, 1976). Liver and kidney toxicity are potential chronic of exposure to PCE effects. PCE is a listed hazardous material in 22 CCR 66680 and a hazardous waste under 40 CFR 261.33(f). The Department's Action Level for PCE in drinking water is 4.0 ppb.

2.50. Trichlorethene (TCE). TCE has been detected at concentrations as high as 11,000 ppb in groundwater and 2,500 ppb in soil at the Site. Acute exposure to sufficient concentrations of TCE may depress the central nervous system, causing headache, dizziness, vertigo, tremors, irregular heartbeat, fatigue, nausea, vomiting, and blurred vision. The vapors and liquid may cause irritation of the skin, eyes, nose and throat (Sittig, 1985). Long-term effects may include liver and kidney injury. TCE is a listed hazardous material under 22 CCR 66680 and a hazardous waste under 40 CFR 261.33(f). The

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

Department's Action Level for TCE in drinking water is 5 ppb. TCE was listed under Proposition 65 in April 1988.

2.51. 1,1,1-Trichloroethane (1,1,1-TCA). 1,1,1-TCA has been detected at concentrations of 29 ppb in monitoring wells and 4,800 ppb in soil at the Site. Acute exposure to sufficient concentrations of 1,1,1-TCA may lead to dizziness, drowsiness, lack of coordination, increased reaction time, and irregular heartbeat. Both liquid and vapor may be irritating to the eyes. Skin contact may produce dermatitis (Mackison et al., 1981; Sittig, 1981). The primary long-term effect of significant exposure to 1,1,1-TCA is liver toxicity. 1,1,1-TCA is a hazardous waste listed in 40 CFR 261.33(f). The Department's Action Level for 1,1,1-TCA in drinking water is 100 pbb.

2.52. Toluene. Toluene has been detected at concentrations as high as 41 ppb in groundwater under the Site. Acute exposure to high concentrations of toluene may result in central nervous system depression. Liquid splashed in the eyes may cause irritation and corneal damage. Prolonged or repeated skin contact may cause drying and dermatitis (Sittig, 1981). Long-term adverse effects have not been reported. Toluene is a listed hazardous material under 22 CCR 66680. The Department's Action Level for toluene in drinking water is 100 ppb.

2.53. Xylene. Xylene has been detected at concentrations as high as 32 ppb in groundwater under the Site. Inhalation of xylene vapors by humans may produce central nervous system disorders, with symptoms of dizziness, nausea, vomiting, drowsiness, abdominal pain, and loss of appetite. Liquid xylene

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

and high concentration xylene vapors may cause eye irritation with possible damage to the cornea. Liquid aspiration of the compound may cause chemical pneuomonitis, pulmonary edema, and hemorrhage in the lungs. Chronic effects are similar to acute effects but are potentially irreversible (Sax, 1984). Xylene is a listed hazardous material under 22 CCR 66680 and a hazardous waste under 40 CFR 261.33(f). The Department's Action Level for xylene in drinking water is 620 ppb.

2.54. Freon. The term "freon" is used to represent a group of chemical constituents commonly used as refrigerants. Concentrations of the numerous constituents in the group of chemicals are commonly listed as total freon. The specific freon group constituent that has been identified during preliminary investigations onsite is Freon 113 (trifluorotrichloroethane). Freon concentrations at the Site were 52 ppb in groundwater. The freon group of chemicals affect the cardiovascular system and can cause dizziness, tremors, unconsciousness, and cardiac arrhythmia and arrest. Freons may be irritating to the throat and skin. Dichlorodifluoromethane is a hazardous waste under 40 CFR 261. The Department's Action Level for trichlorofluoromethane is 3,400 pbb, and 18,000 pbb for trichlorotrifluoroethane.

REFERENCES

2.55. Arthur D. Little, Inc. 1985. The Installation Restoration Program Toxicology Guide, Volume 1. Produced for the Biochemical Toxicology Branch, Toxic Hazards Division, Harry

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

G. Armstrong Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio.

Clayton, G.D., and F.E. Clayton, eds. 1981. Patty's Industrial Hygiene and Toxicology. 3rd edition, Vol. 2A, 2B, Toxicology. New York: John Wiley and Sons, Inc.

Gilbert, D., M. Goyer, W. Lyman, G. Magil, P. Walker, D. Wallace, A. Wechsler, and J. Yee. 1980. An Exposure and Risk Assessment for Tetrachloroethylene. EPA Report 440/4-85-015. Washington, D.C.: U.S. Environmental Protection Agency, Office of Water Regulations and Standards. PB85-221497/AS.

Mackinson, F.W., R.S., Stricoff, and L.J. Partridge Jr. 1981. NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards. Washington, D.C.: U.S. GPO DHHS (NIOSH) Publication No. 81-123.

Plunkett, E.R. 1976. Handbook of Industrial Toxicology. New York: Chemical Publishing Company.

Sax, N.I. 1984. Dangerous Properties of Industrial Materials. 6th ed. New York: Van Nostrand Reinhold Co.

Sittig, M. 1981. Handbook of Toxic and Hazardous Chemicals. Park Ridge, New Jersey: Noyes Publications.

U.S. Environmental Protection Agency. 1985. Chemical, Physical, and Biological Properties of Compounds Present at Hazardous Waste Sites. Final Report. Office of Waste Enforcement, Office of Solid Waste and Emergency Response, Washington, D.C.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

III. ORDER

3. Based on the foregoing FINDINGS AND DETERMINATIONS, IT IS HEREBY ORDERED THAT Respondents conduct the following response activities in the manner specified herein and in accordance with a schedule specified by the Department as follows:

3.1. Within 10 days of the effective date of this Order, Respondents shall submit a written notice of their intent to comply with the terms of the Order.

3.2. Interim Measures.

3.2.1. Ground Water Monitoring. Respondents shall continue interim groundwater monitoring. Groundwater level measurements shall be conducted the first Monday of each month; groundwater sampling shall be conducted on a quarterly basis commencing the first week of May. Subsequent sampling shall be conducted the first weeks of August, November and February.

3.2.2. Respondents shall prepare and submit to the Department for review and approval a proposal for interim groundwater and soil treatment. The proposal shall be submitted to the Department 30 days after Phase IV investigation is completed.

3.2.3. Respondents shall undertake additional IRMs if, during the course of the remedial investigation, the Department determines that they are necessary to mitigate the release of hazardous substances at or emanating from the site. The Department may require Respondents to submit an IRM Work Plan,

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

including an implementation schedule, and may establish a schedule for submittal of the IRM Work Plan.

3.3. Remedial Investigation and Feasibility Study (RI/FS)

3.3.1. RI/FS Workplan Submission. Within (45) days of the effective date of this Order, Respondents shall prepare and submit to the Department for review and approval a detailed RI/FS Workplan and implementation schedule which covers all the activities necessary to conduct a complete remedial investigation and feasibility study of the Site and any off-site areas where there is a release or threatened release of hazardous substances from the Site. Information obtained during Phase I, II, III, and IV Site investigations, may be incorporated in developing the RI workplan. Any information not obtained from previous investigations, that will aid in identifying the source and extent of contamination migrating from the Site, must be addressed in the RI workplan. The workplan and activities under it shall, at a minimum, be based on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 U.S.C. 9601 et seq.), as amended, the National Contingency Plan (40 CFR Part 300), as amended, and the most current U.S. Environmental Protection Agency's "Guidance on Remedial Investigation under CERCLA" and "Guidance on Feasibility Studies under CERCLA", as well as State laws and regulations, as amended. The RI/FS workplan shall be designed to meet the objectives of paragraph 3.3.2 and shall, at a maximum, cover all of the elements described in Exhibit 12.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

3.3.2. RI/FS Objectives. The objectives of the RI/FS are to: (a) Determine the nature and full extent of hazardous substance contamination of soil, surface water and ground water at the Site and contamination from the Site, including offsite areas affected by the Site;

(b) Identify all existing and potential migration pathways, including the direction, rate and dispersion of contaminant migration;

(c) Determine the magnitude and probability of actual or potential harm to public health, safety or welfare or to the environment posed by the threatened or actual release of hazardous substances at or from the Site;

(d) Identify and evaluate appropriate response measures to prevent or minimize future releases and mitigate any releases which have already occurred; and

(e) Collect and evaluate the information necessary to prepare a Remedial Action Plan (RAP) in accordance with the requirements of Health and Safety Code Section 25356.1. The minimum requirements of the RI/FS are outlined in Exhibit 12.7.

3.3.3. RI/FS Workplan Implementation. Respondents shall implement the RI/FS Workplan as approved by the Department in accordance with the approved schedule.

3.4. Community Relations Plan. Hewlett-Packard will continue the development and submittal of site specific fact sheets to the Department when key milestones are projected and/or completed or when specifically requested by the

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

Department. Hewlett-Packard will be responsible for distribution of such upon Departmental approval. The above is valid only if Respondents comply with the Hillview Porter RAO #HSA 88/89-016. If Respondents fail to comply with Hillview Porter RAO #HSA 88/89-016, Respondents shall, within 30 days after the final determination of noncompliance has been issued, or, upon the Department's request, prepare and submit for Department review and approval a community relations plan which describes how, under the Order, the public and the adjoining community will be kept informed of activities conducted at the Site and how Respondents will be responding to inquiries from concerned citizens. The community relations plan must be developed in accordance with Exhibit 13.

3.5. Remedial Action Plan.

3.5.1. Draft Remedial Action Plan. No later than 30 days after Department approval of the Feasibility Study Report, Respondents shall prepare and submit to the Department for review and approval a draft Remedial Action Plan which is based on the approved Remedial Investigation and Feasibility Study Reports. The draft RAP shall set forth in detail appropriate steps to remedy soil, surface water and ground water contamination at the Site and adjacent areas. The RAP shall be prepared in accordance with the standards and requirements set forth in Health and Safety Code Section 25356.1. In addition, the RAP shall contain a schedule for implementation of all proposed removal and remedial actions.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

3.5.2. Preparation of Remedial Design (RD) and Implementation Plan (IP). Within 90 days after Department approval of the final RAP and in accordance with Health and Safety Code Section 25356.1, Respondents shall submit to the Department for review and approval a detailed Remedial Design and Implementation Plan (RDIP) containing technical and operational plans and engineering designs for implementation of the approved remedial or removal action alternative(s), and a schedule for implementing the construction phase. The Workplan shall also describe the nature and design of the construction equipment to be employed, a site specific hazardous waste transportation plan (if necessary), the identity of any contractors, transporters and other persons conducting the removal and remedial activities for the Site, post remedial sampling and monitoring procedures for air, soil, surface water and ground water, operation and maintenance procedures and schedules, and shall cover all of the subjects described in Exhibit 12, paragraphs 3.2.3 (a),(c),(d), (e) and (f) as they pertain to the removal, remedial and operation and maintenance activities. The schedule submitted with the workplan shall provide that all approved removal or remedial actions excluding operation and maintenance shall be completed by no later than one year from finalization of the RDIP.

3.5.3. Implementation of Final RAP. Upon Department approval of the RD Plan and schedule, Respondents shall implement the final RAP as approved in accordance with the approved Remedial Design and schedule.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

3.5.4. Operation and Maintenance. Respondents shall be responsible for all operation and maintenance requirements in accordance with the final RAP and approved Remedial Design Workplan.

3.5.5. Changes During Implementation of the Final RAP. During the implementation of the final RAP and Remedial Design Workplan, the Department may specify such additions, modifications and revisions to the Remedial Design and Implementation Plan as deemed necessary to protect public health and safety or the environment or to implement the RAP.

3.5.6. Discontinuation of Remedial Technology. Any remedial technology employed in implementation of the final RAP shall be left in place and operated by Respondents until and except to the extent that the Department authorizes Respondents in writing to discontinue, move or modify some or all of the remedial technology because Respondents have met the criteria specified in the final RAP for its discontinuance or because the modifications would better achieve the goals of the final RAP.

3.6. Project Coordinator. Within 10 days of the effective date of this Order, Respondents shall submit to the Department in writing the name, address and telephone number of a Project Coordinator whose responsibilities will be to receive all notices, comments, approvals and other communications from the Department to Respondents.

3.7. Project Engineer/Geologist. The work performed pursuant to this Order shall be under the direction and supervision of a qualified professional engineer or a registered

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

geologist in the State of California with expertise in hazardous waste site cleanup. Within fifteen (15) calendar days of the effective date of this Order, Respondents must submit: a) The name and address of the project engineer or geologist chosen by the Respondents; and (b) in order to demonstrate expertise in hazardous waste cleanup, the resume of the engineer or geologist and the statement of qualifications of the consulting firm responsible for the work.

3.8. Monthly Summary Reports. Within 30 days of the effective date of this Order and monthly thereafter, Respondents shall submit a Monthly Summary Report of its activities under the provisions of this Order. The report shall describe: a) specific actions taken by or on behalf of Respondents during the previous month; b) actions expected to be undertaken during the current month; c) all planned activities for the next month, any requirements under this Order that were not completed and any problems or anticipated problems in complying with this Order; and d) all results of sample analyses, tests and other data generated or received by Respondents under this Order. The Monthly Summary Report shall be received by the Department by the 15th day of the month.

3.9. Quality Control/Quality Assurance. All sampling and analysis conducted by Respondents under this Order shall be performed in accordance with quality control/quality assurance procedures submitted by Respondents and approved by the Department pursuant to this Order.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

3.10. Submittals. All submittals and notifications from Respondents required by this Order shall be sent simultaneously to:

Howard K. Hatayama, Chief
Region 2
Toxic Substances Control Division

and

Miguel Parra
Waste Management Engineer
Region 2
Toxic Substances Control Division

By Mail:

2151 Berkeley Way, Annex 7
Berkeley, CA 94704

By Courier:

5850 Shellmound Street, Suite 100
Emeryville, CA 94608

Mark Wilson
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607

EPA, Region IX
Attn: Gerald Clifford, Superfund Program Manager
215 Fremont Street
San Francisco, CA 94105

Lee Esquibel
Santa Clara County Department of Environmental Health
2220 Moorpark Avenue
San Jose, CA 95128

3.11. Communications. All approvals and decisions of the Department made regarding submittals and notifications will be communicated to Respondents in writing by the Section Chief, Toxic Substances Control Division, Department of Health Services

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

or his/her designee. No informal advice, guidance, suggestions or comments by the Department regarding reports, plans specifications, schedules or any other writings by Respondents shall be construed to relieve Respondents of the obligation to obtain such formal approvals as may be required.

3.12. Department Review and Approval. If the Department determines that any report, plan, schedule or other document submitted for approval pursuant to this Order fails to comply with this Order or fails to protect public health or safety or the environment, the Department may:

a) modify the document as deemed necessary and approve the document as modified or; b) return the document to Respondents with recommended changes and a date by which Respondents must submit to the Department a revised document incorporating the recommended changes or; c) in cases where the document fails to comply with this Order, make a determination of noncompliance pursuant to Health and Safety Code Section 25355.5(a)(92).

3.13. Compliance with Applicable Laws. Respondents shall carry out this Order in compliance with all applicable State, and Federal requirements, including but not limited to, requirements to obtain permits and to assure worker safety.

3.14. Endangerment During Implementation. In the event that the Department determines that any circumstances or activities (whether or not pursued in compliance with this order) are creating an imminent or substantial endangerment to the health or safety of people on the Site or in the surrounding area or to the environment, the Department may order Respondents

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

to stop further implementation of this Order for such period of time as needed to abate the endangerment. Any deadline in this Order directly affected by a Stop Work Order under this section shall be extended for the term of the Stop Work Order.

3.15. Liability. Nothing in this Order shall constitute or be construed as a satisfaction or release from liability for any conditions or claims arising as a result of past, current or future operations of Respondents. Nothing in this Order is intended or shall be construed to limit the rights of any of the parties with respect to claims arising out of or relating to the deposit or disposal at any other location of substances removed from the Site. Nothing in this Order is intended or shall be construed to limit or preclude the Department from taking any action authorized by law to protect public health or safety or the environment and recovering the cost thereof. Notwithstanding compliance with the terms of this Order, Respondents may be required to take further actions as are necessary to protect public health or the environment.

3.16. Site Access. Access to the Site and laboratories used for analyses of samples under this Order shall be provided at all reasonable times to employees, contractors and consultants of the Department. Nothing in this paragraph is intended or shall be construed to limit in any way the right of entry or inspection that the Department or any other agency may otherwise have by operation of any law. The Department and its authorized representatives shall have the authority to enter and move freely about all property at the Site at all reasonable

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

times for purposes including, but not limited to: inspecting records, operating logs, sampling and analytic data, and contracts relating to this Site; reviewing the progress of Respondents in carrying out the terms of this Order; conducting such tests as the Department may deem necessary; and verifying the data to the Department by Respondents.

3.17. Sampling, Data and Document Availability. Respondents shall permit the Department and its authorized representatives to inspect and copy all sampling, testing, monitoring or other data generated by Respondents or on Respondents behalf in any way pertaining to work undertaken pursuant to this Order. Respondents shall inform the Department at least five days in advance of all field sampling under this Order and shall allow the Department and its authorized representatives to take duplicates of any samples collected by Respondents pursuant to this Order. All such data, reports and other documents shall be preserved by Respondents for a minimum of six years after the conlusion of all activities under this Order. If the Department requests that some or all of these documents be preserved for a longer period of time, Respondents shall either comply with that request or deliver the documents prior to destruction. Respondents shall notify the Department in writing at least six months prior to destroying any documents prepared pursuant to this Order.

3.18. Government Liabilities. The State of California shall not be liable for any injuries or damages to persons or property resulting from acts or omissions by Respondents, or

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

related parties specified in paragraph 3.27 in carrying out activities pursuant to this Order, nor shall the State of California be held as party to any contract entered into by Respondents or its agents in carrying out activities pursuant to this Order.

3.19. Additional Enforcement Actions. By issuance of this Order, the Department does not waive the right to take any further enforcement actions.

3.20. Incorporation of Plans and Reports. All plans, schedules, reports, specifications and other documents that require Department approval and are submitted by Respondents pursuant to this Order are incorporated in this Order upon approval by the Department and shall be implemented by Respondents as approved. Any noncompliance with such documents shall be a noncompliance with this Order.

3.21. Extension Requests. If Respondents are unable to perform any activity or submit any document within the time required under this Order, Respondents may, prior to expiration of the time, request an extension of the time in writing. The extension request shall include a justification for the delay. All such requests shall be in advance of the date on which the activity or document is due.

3.22. Extension Approvals. If the Department determines that good cause exists for an extension it will grant the request and specify in writing a new schedule. Respondents shall comply with the new schedule.

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

3.23. Cost Recovery. Respondents are liable for any costs of oversight by the Department of Respondents' activities under this Order. In addition, failure or refusal of Respondents to comply with this Order may make Respondents liable for any governmental costs incurred, including those payable from the Hazardous Substance Account or the Hazardous Substance Cleanup Fund for any response action at the Site, as provided in Section 25360 of the Health and Safety Code and other applicable provisions of law. These costs include the Department's direct costs and administrative overhead costs. Cost recovery may also be pursued by the Department under CERCLA.

3.24. Severability. The requirements of this Order are severable, and Respondents shall comply with each and every provision hereof notwithstanding the effectiveness of any other provision.

3.25. Modifications. The Department reserves the right to unilaterally modify this Order. Any modification to this Order shall be effective upon issuance and deemed incorporated in this Order.

3.26. Time Periods. Unless otherwise specified, time periods begin from the effective date of this Order and "days" means calendar days. The effective date of this Order is the date of issuance by the Department.

3.27. Parties Bound. This Order applies to and is binding upon Respondents and its officers, directors, agents, employees, contractors, consultants, receivers, trustees, successors and assignees, including but not limited to, individuals, partners

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

and subsidiary and parent corporations and upon any successor agency of the State of California that may have responsibility for and jurisdiction over the subject matter of this Order.

Date of Issuance 3/21/07

C. David Willis
Deputy Director
Toxic Substances Control
Division
Department of Health Services

COURT PAPER
STATE OF CALIFORNIA
STD. 113 (REV. 8-72)

85 34769

EXHIBIT 1

SITE LOCATION MAP

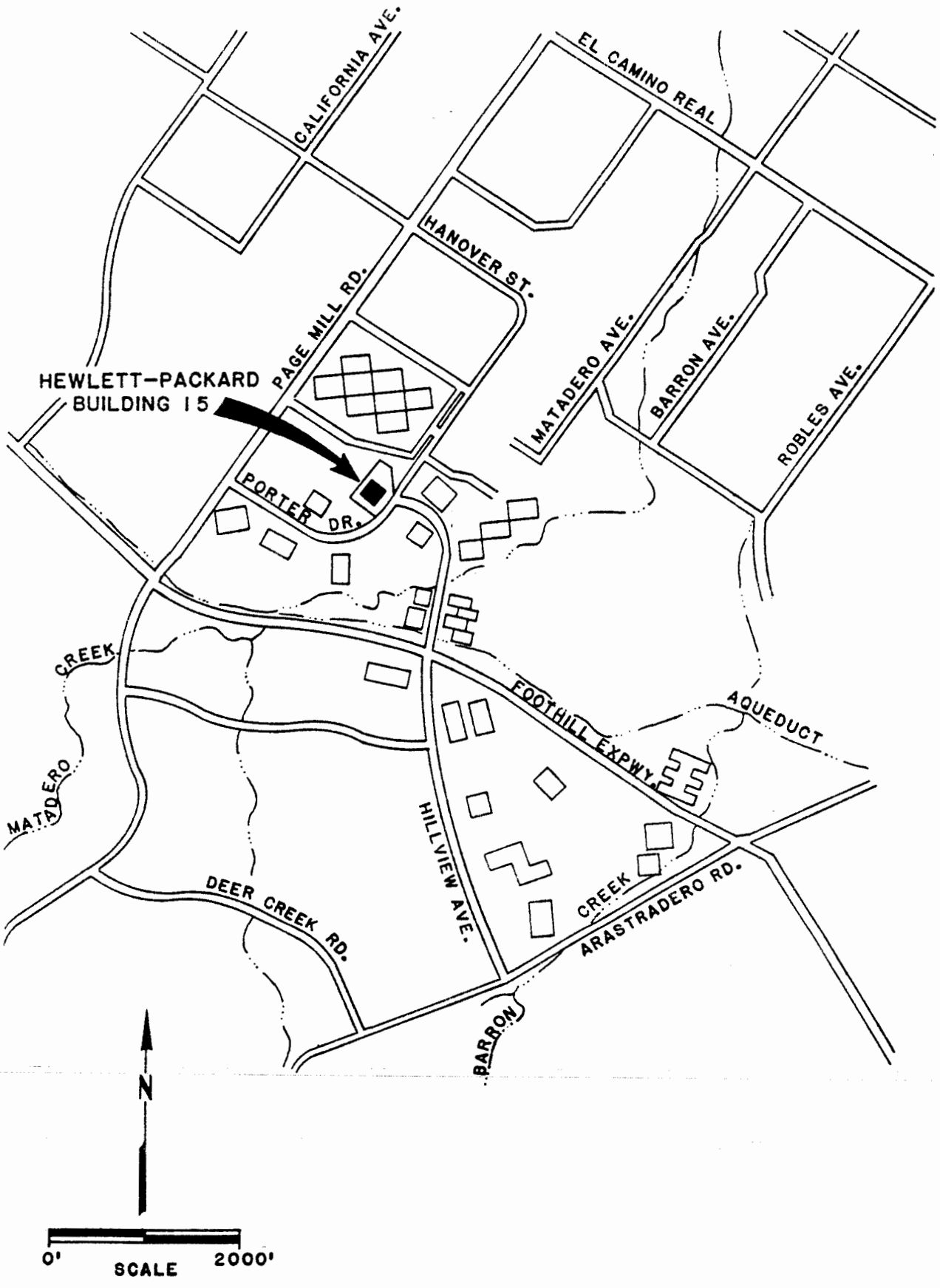


EXHIBIT 2

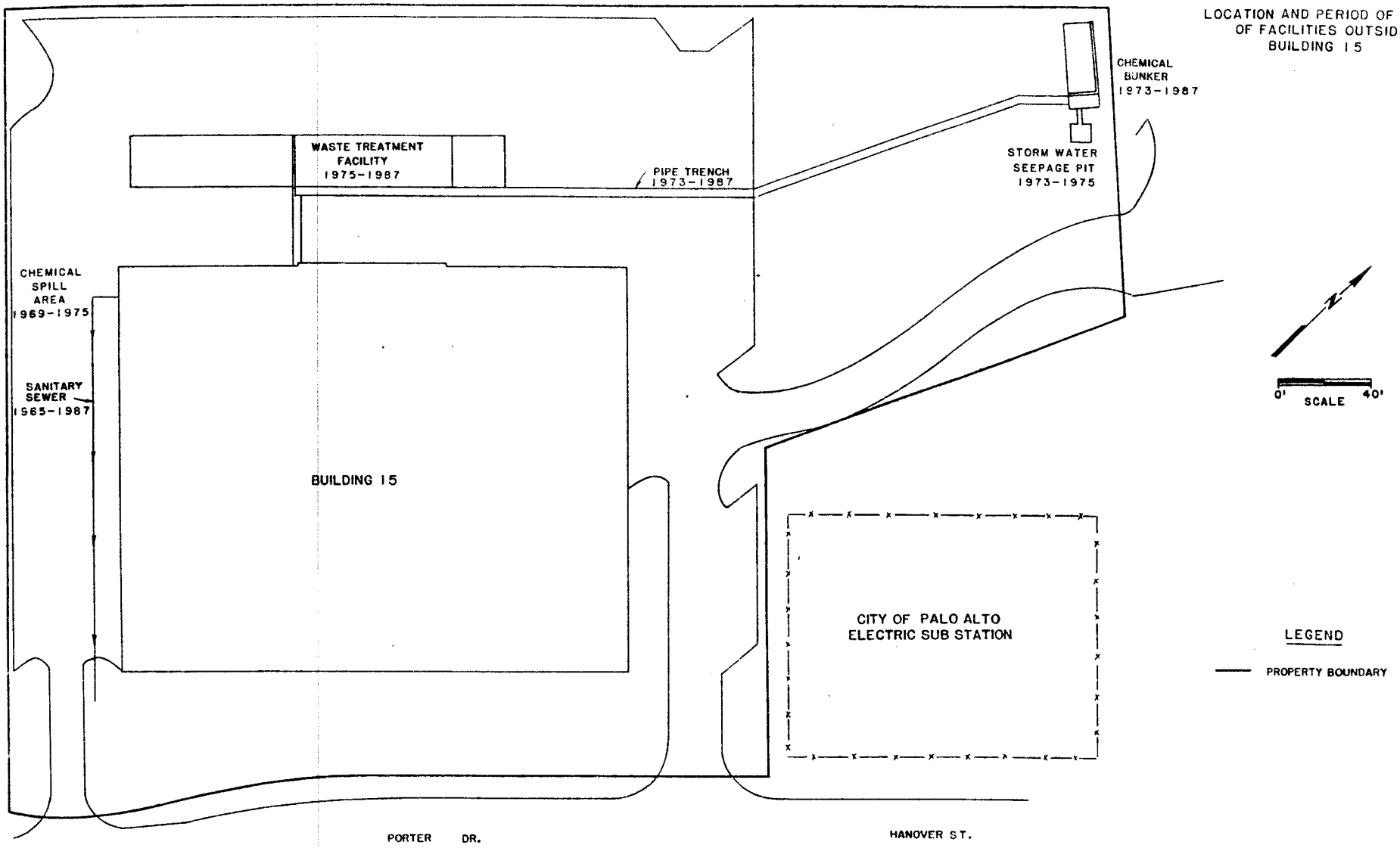

LOCATION AND PERIOD OF USE
OF FACILITIES OUTSIDE
BUILDING 15
CHEMICAL
BUNKER
1973-1987
STORM WATER
SEEPAGE PIT
1973-1975
WASTE TREATMENT
FACILITY
1975-1987
PIPE TRENCH
1973-1987
CHEMICAL
SPILL
AREA
1969-1975
SANITARY
SEWER
1965-1987
BUILDING 15
CITY OF PALO ALTO
ELECTRIC SUB STATION
N
0'
SCALE
40'
LEGEND
PROPERTY BOUNDARY
PORTER DR.
HANOVER ST.

EXHIBIT 3

LOCATION AND PERIOD OF USE
OF POTENTIAL SOURCE AREAS
INSIDE BUILDING 15

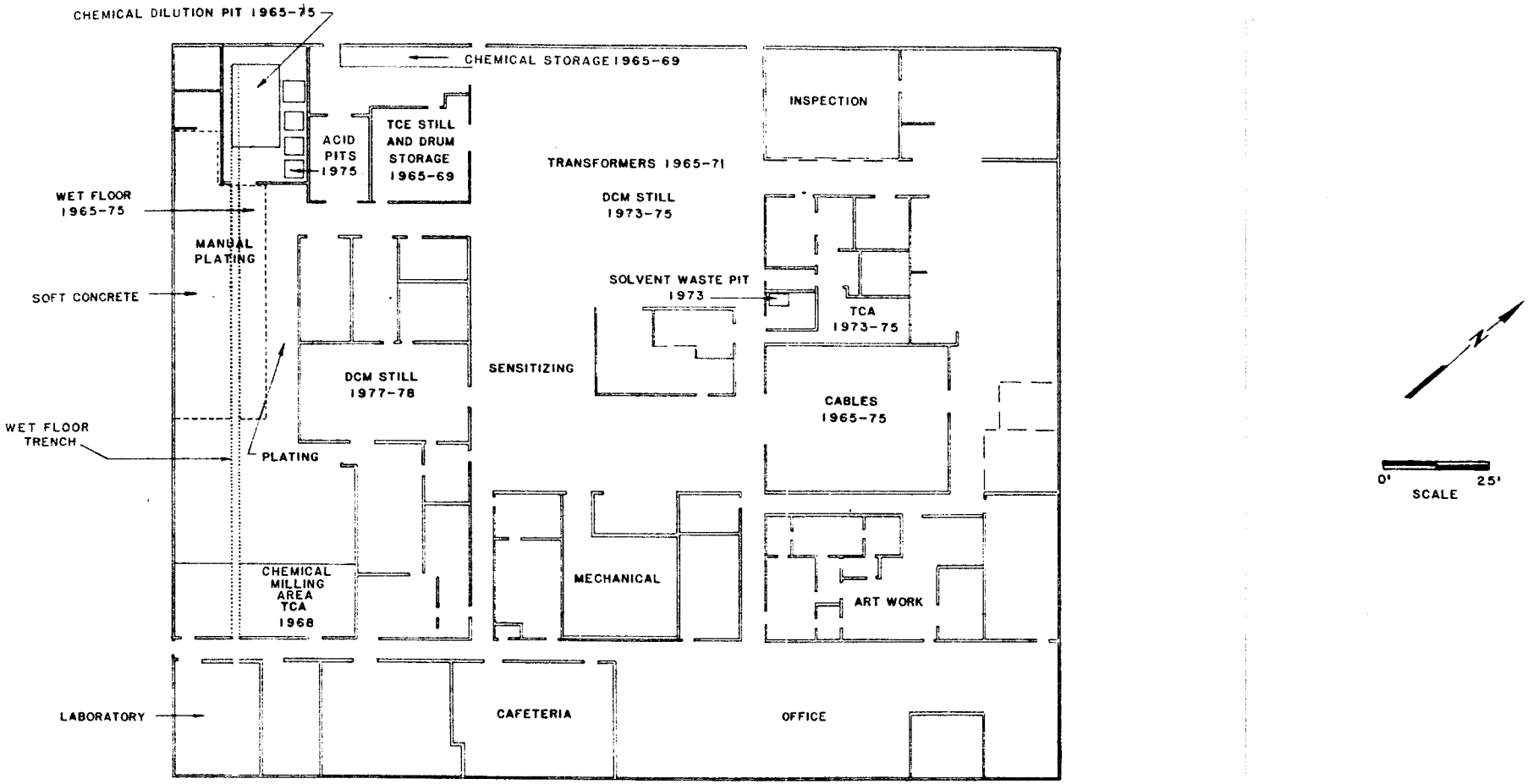


EXHIBIT 4

CHEMICALS USED AT BUILDING 15 FROM 1973 TO 1980

Acetic Acid

Cadmium Compounds

Calcium Hydroxide

Carbon Tetrachloride

Chloroform

Chromium Compounds

Ferrous Sulfate

Formaldehyde

Freon 113

Lead

Maleic Anhydride

Manganese

Mercury

Methylene Chloride

Nickel Compounds

Nitric Acid

Nitrobenzene

o,m,p Xylene

Phenol

Phosphoric Acid

Sodium Hydroxide

Sulfuric Acid

Tetrachloroethylene

Trichloroethylene

1,1,1-Trichloroethane

EXHIBIT 5

SEQUOIA Analytical Laboratory
2549 Middlefield Road
Redwood City, CA 94063 • (415) 364-9222

Wahler Associates
1023 Corporation Way
Palo Alto, CA 94303
Attn: Joel Lindsay

Date Sampled: 09/16/86
Date Received: 09/16/86
Date Extracted: 10/10/86
Date Reported: 10/13/86
Project No. STU111A

Sample Number	Sample Description
6090983	3775 El Centro, Water

PRIORITY POLLUTANTS

VOLATILE ORGANIC COMPOUNDS
results in ppb

Acrolein	<100	trans-1,2-Dichloroethene	< 0.5
Acrylonitrile	<100	1,2-Dichloropropane	< 0.5
Benzene	< 0.5	1,3-Dichloropropene	< 0.5
Bromomethane	< 0.5	Ethylbenzene	< 0.5
Bromodichloromethane	< 0.5	Methylene chloride	< 0.5
Bromoform	< 0.5	1,1,2,2-Tetrachloroethane	< 0.5
Carbon tetrachloride	< 0.5	Tetrachloroethene	< 0.5
Chlorobenzene	< 0.5	1,1,1-Trichloroethane	0.54
Chloroethane	< 0.5	1,1,2-Trichloroethane	< 0.5
2-Chloroethylvinyl ether	< 0.5	Trichloroethene	9.5
Chloroform	< 0.5	Toluene	< 0.5
Chloromethane	< 0.5	Vinyl chloride	< 0.5
Dibromochloromethane	< 0.5	1,2-Dichlorobenzene	< 0.5
1,1-Dichloroethane	< 0.5	1,3-Dichlorobenzene	< 0.5
1,2-Dichloroethane	< 0.5	1,4-Dichlorobenzene	< 0.5
1,1-Dichloroethene	< 0.2		

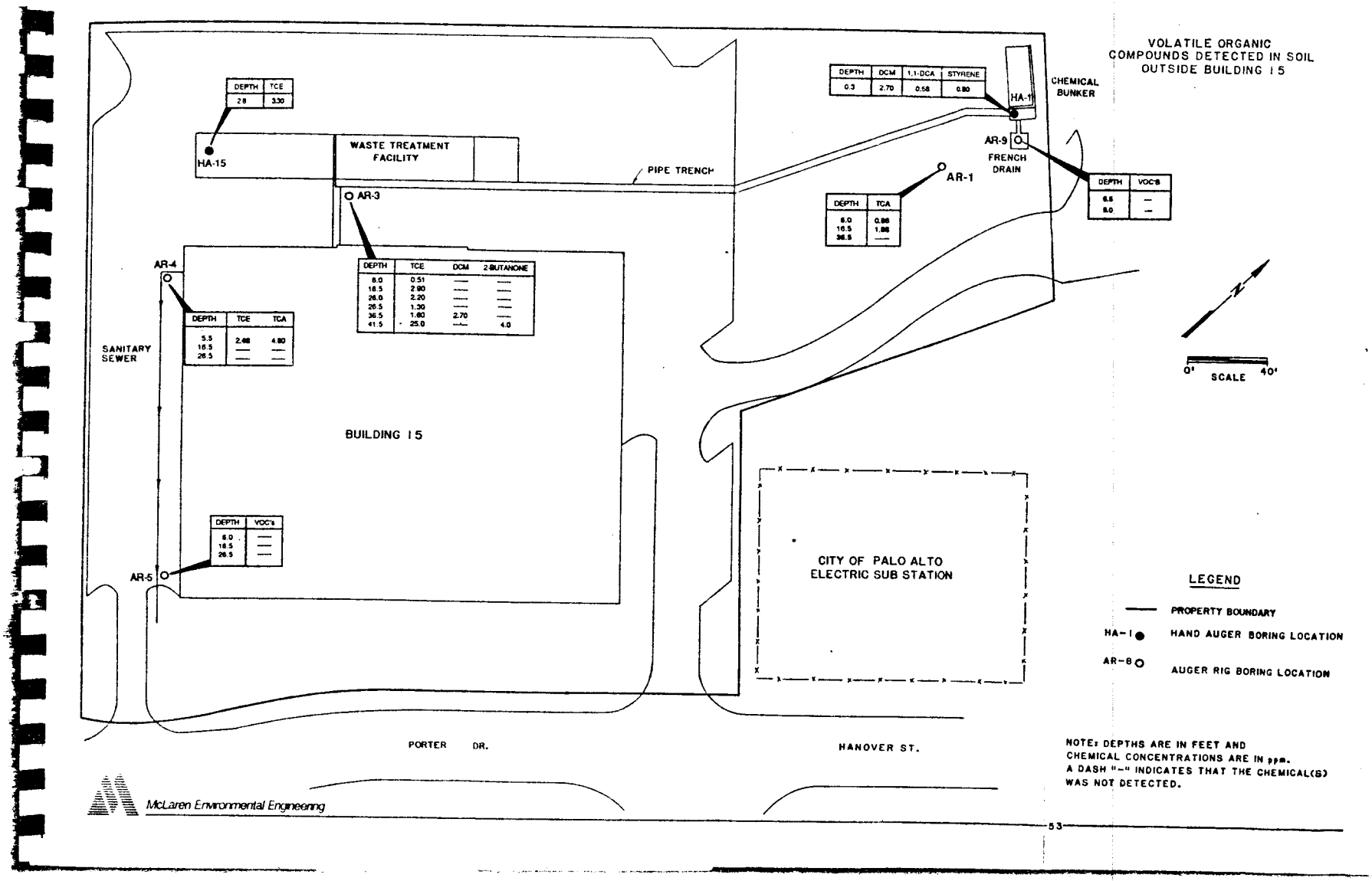
SEQUOIA ANALYTICAL LABORATORY

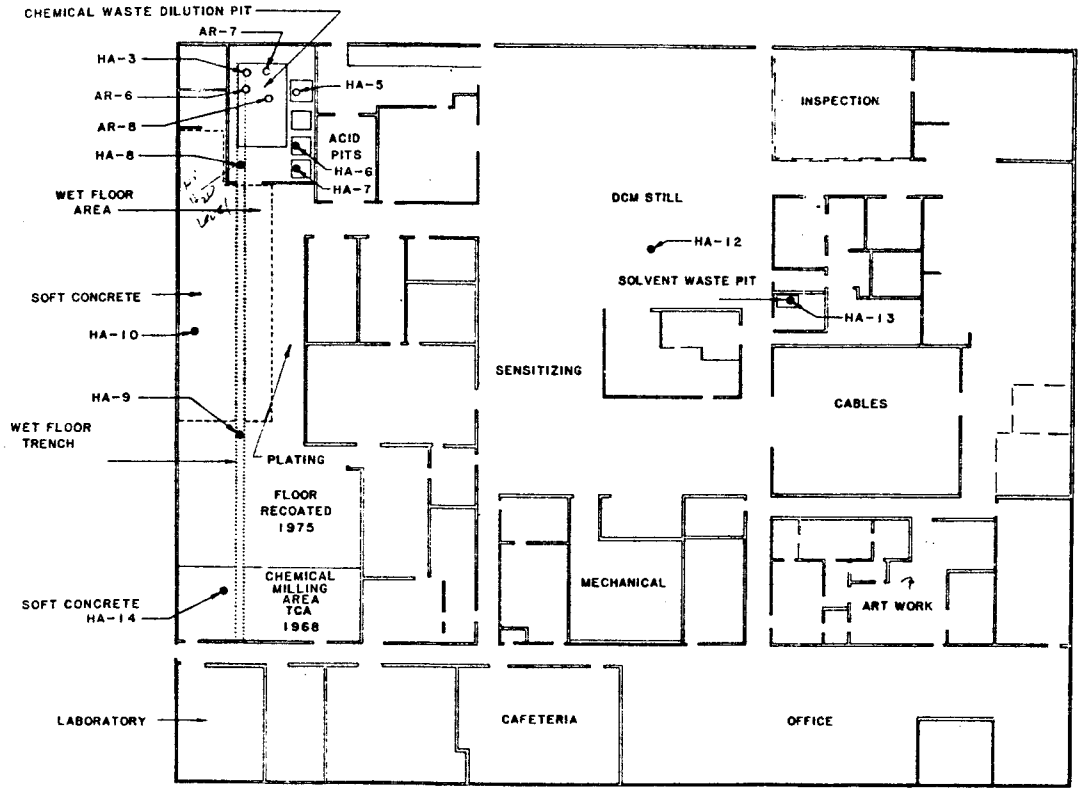
Arthur G. Burton
Laboratory Director

sls

NOTE: Method 601 & 602 of the EPA was used for this analysis.

EXHIBIT 6


VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL OUTSIDE BUILDING 15
HA-15
DEPTH | TCE
2.0 | 330
WASTE TREATMENT FACILITY
PIPE TRENCH
AR-3
DEPTH | TCE | DCM | 2-BUTANONE
8.0 | 0.51 | — | —
16.5 | 2.90 | — | —
26.0 | 2.20 | — | —
26.5 | 1.30 | — | —
36.5 | 1.60 | 2.70 | —
41.5 | 25.0 | — | 4.0
AR-4
DEPTH | TCE | TCA
5.5 | 2.40 | 4.80
16.5 | — | —
26.5 | — | —
SANITARY SEWER
BUILDING 15
DEPTH | VOC's
6.0 | —
16.5 | —
26.5 | —
AR-5
DEPTH | DCM | 1,1-DCA | STYRENE
0.3 | 2.70 | 0.58 | 0.80
HA-1
CHEMICAL BUNKER
AR-9
FRENCH DRAIN
DEPTH | VOC'S
6.5 | —
8.0 | —
AR-1
DEPTH | TCA
6.0 | 0.86
16.5 | 1.86
36.5 | —
CITY OF PALO ALTO ELECTRIC SUB STATION
0' SCALE 40'
LEGEND
PROPERTY BOUNDARY
HA-1 HAND AUGER BORING LOCATION
AR-8 AUGER RIG BORING LOCATION
NOTE: DEPTHS ARE IN FEET AND CHEMICAL CONCENTRATIONS ARE IN ppm. A DASH "—" INDICATES THAT THE CHEMICAL(S) WAS NOT DETECTED.
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McLaren Environmental Engineering



LOCATIONS OF SOIL
BORINGS INSIDE BUILDING 15

N

0' 25'
SCALE

LEGEND

- ● HAND AUGER (HA) BORING LOCATIONS
- ○ AUGER RIG (AR) BORING LOCATIONS

EXHIBIT 6 cont.

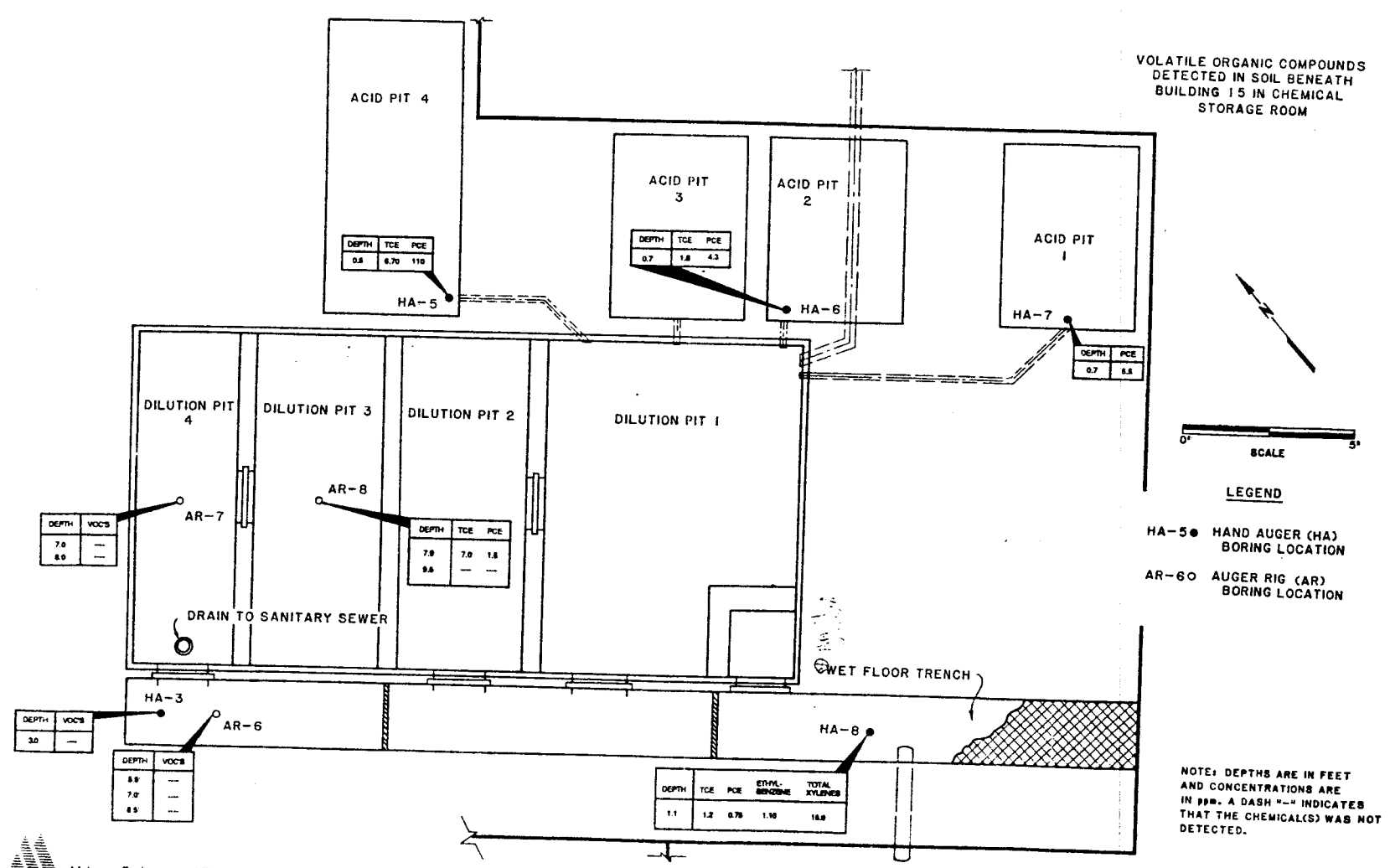
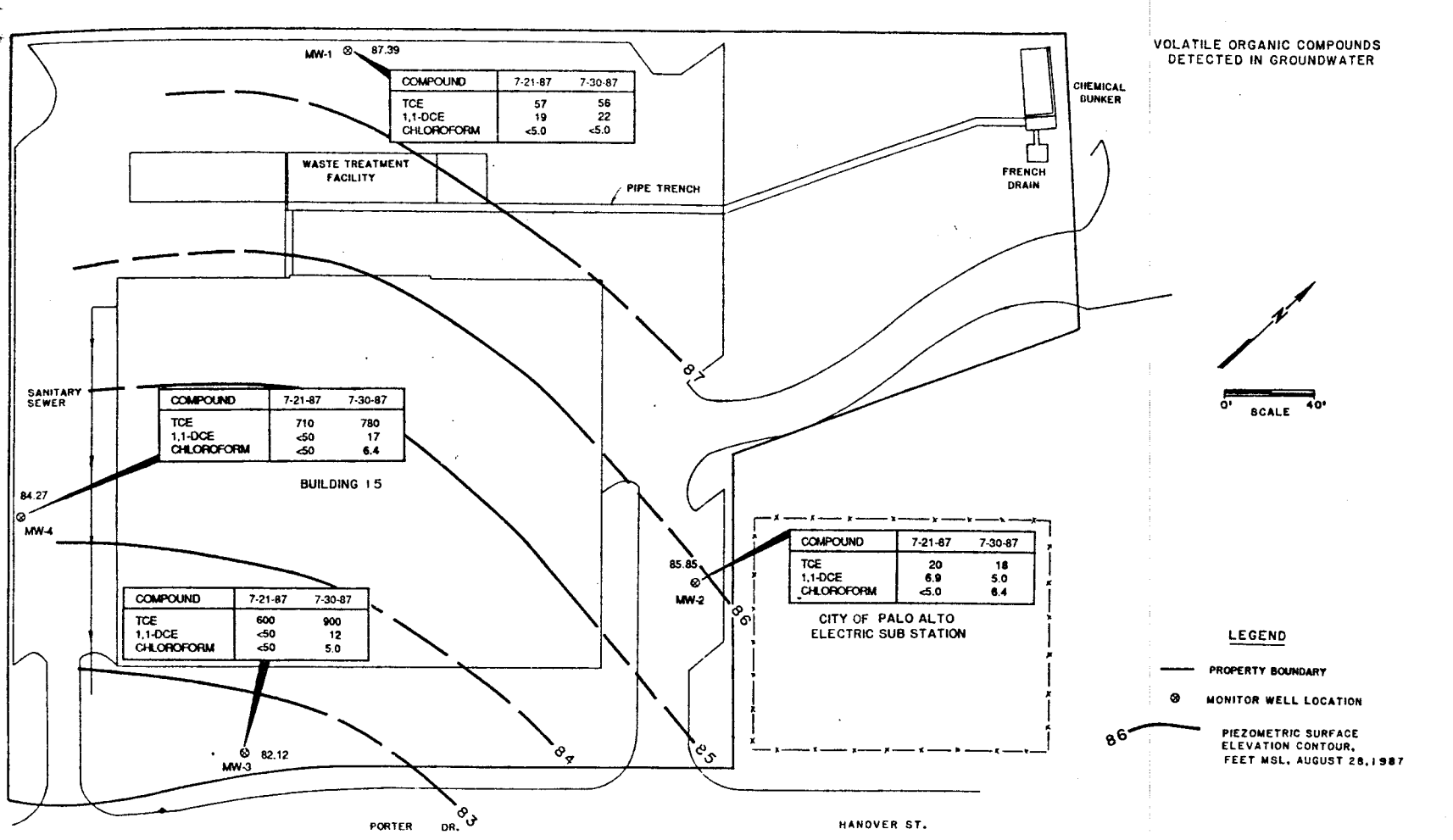


EXHIBIT 7



New m.w.s

EXHIBIT 8

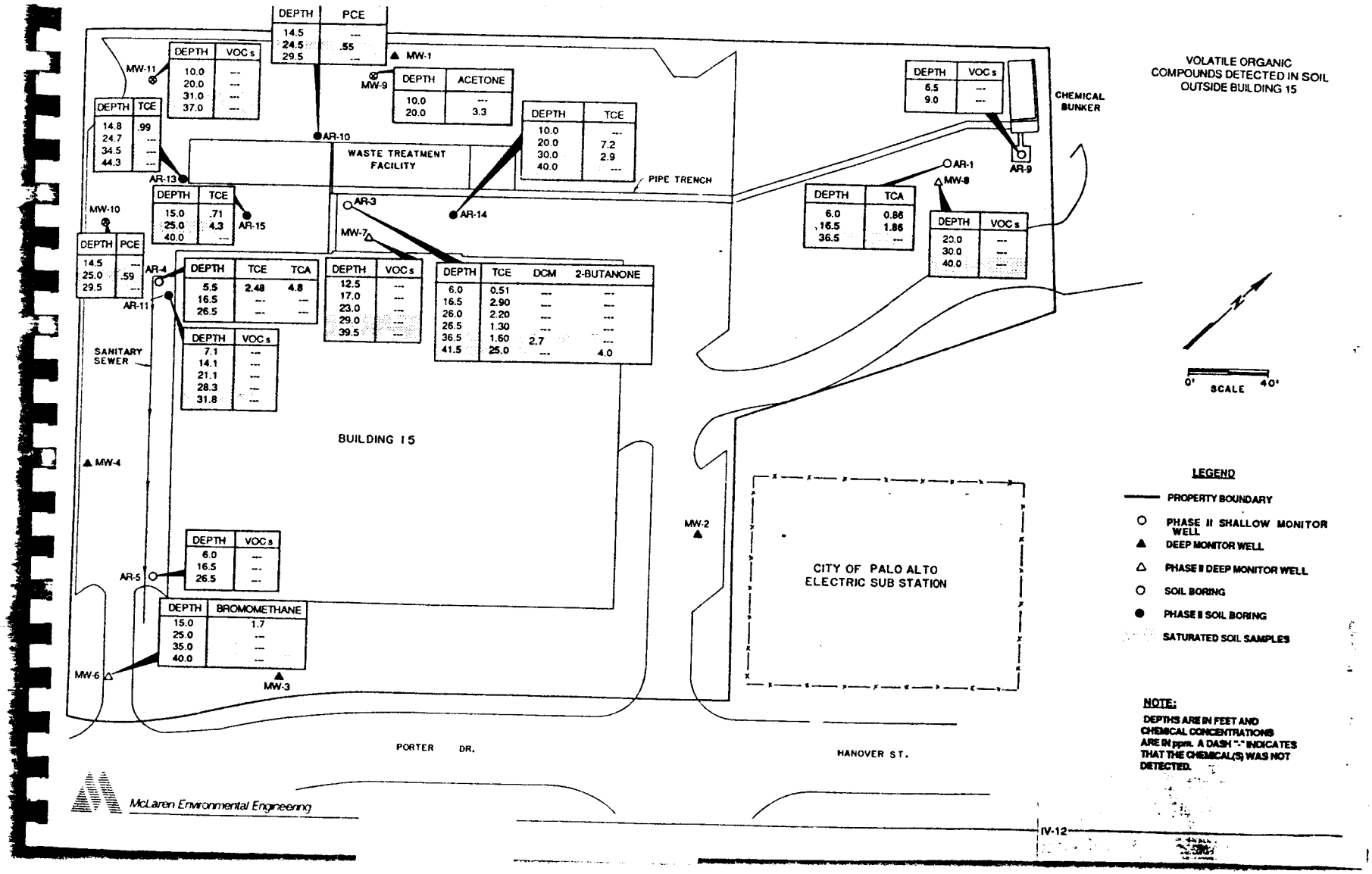

VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL OUTSIDE BUILDING 15
DEPTH PCE
14.5 ---
24.5 .55
29.5 ---
MW-1
MW-11
DEPTH VOCs
10.0 ---
20.0 ---
31.0 ---
37.0 ---
MW-9
DEPTH ACETONE
10.0 ---
20.0 3.3
DEPTH TCE
14.8 .99
24.7 ---
34.5 ---
44.3 ---
AR-10
WASTE TREATMENT FACILITY
DEPTH TCE
10.0 ---
20.0 7.2
30.0 2.9
40.0 ---
PIPE TRENCH
AR-13
AR-14
DEPTH TCE
15.0 .71
25.0 4.3
40.0 ---
AR-15
AR-3
MW-7
MW-10
DEPTH PCE
14.5 ---
25.0 .59
29.5 ---
AR-4
AR-11
DEPTH TCE TCA
5.5 2.48 4.8
16.5 --- ---
26.5 --- ---
DEPTH VOCs
12.5 ---
17.0 ---
23.0 ---
29.0 ---
39.5 ---
DEPTH TCE DCM 2-BUTANONE
6.0 0.51 --- ---
16.5 2.90 --- ---
26.0 2.20 --- ---
26.5 1.30 --- ---
36.5 1.60 2.7 ---
41.5 25.0 --- 4.0
DEPTH VOCs
7.1 ---
14.1 ---
21.1 ---
28.3 ---
31.8 ---
SANITARY SEWER
BUILDING 15
MW-4
DEPTH VOCs
6.0 ---
16.5 ---
26.5 ---
AR-5
DEPTH BROMOMETHANE
15.0 1.7
25.0 ---
35.0 ---
40.0 ---
MW-6
MW-3
MW-2
CITY OF PALO ALTO ELECTRIC SUB STATION
DEPTH VOCs
6.5 ---
9.0 ---
CHEMICAL BUNKER
AR-9
AR-1
MW-8
DEPTH TCA
6.0 0.86
16.5 1.86
36.5 ---
DEPTH VOCs
20.0 ---
30.0 ---
40.0 ---
0' SCALE 40'
LEGEND
PROPERTY BOUNDARY
PHASE II SHALLOW MONITOR WELL
DEEP MONITOR WELL
PHASE II DEEP MONITOR WELL
SOIL BORING
PHASE II SOIL BORING
SATURATED SOIL SAMPLES
NOTE:
DEPTHS ARE IN FEET AND CHEMICAL CONCENTRATIONS ARE IN ppm. A DASH "-" INDICATES THAT THE CHEMICAL(S) WAS NOT DETECTED.
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EXHIBIT 8 cont.

SOIL ANALYTICAL RESULTS

(PPM)

SOIL BORING	DEPTH (feet)	BROMOMETHANE	ACETONE	TRICHLOROETHENE	TETRACHLOROETHENE
AR-10					
	14.5	ND[1]	ND	ND	ND
	24.5	ND	ND	ND	0.55
	29.5	ND	ND	ND	ND
AR-11 acid pits (slant boring) ok →	7.5	ND	ND	ND	ND
	14.1	ND	ND	ND	ND
	21.1	ND	ND	ND	ND
	28.3	ND	ND	ND	ND
	31.8	ND	ND	ND	ND
AR-12 ?? Mresult					
AR-13 (slant boring)					
	14.8	ND	ND	0.99	ND
	24.5	ND	ND	ND	ND
	34.5	ND	ND	ND	ND
	44.5	ND	ND	ND	ND

[1]ND - Not Detected

AL4/052488

EXHIBIT 8 cont.

SOIL ANALYTICAL RESULTS

(PPM)

SOIL BORING	DEPTH (feet)	BROMOMETHANE	ACETONE	TRICHLOROETHENE	TETRACHLOROETHENE
AR-14					
	10.0	ND	ND	ND	ND
	20.0	ND	ND	7.2	ND
	30.0	ND	ND	2.9	ND
	40.0	ND	ND	ND	ND
AR-15					
	15.0	ND	ND	0.71	ND
	25.0	ND	ND	4.3	ND
	40.0	ND	ND	ND	ND
MW-6					
	15.0	1.7	ND	ND	ND
	25.0	ND	ND	ND	ND
	35.0	ND	ND	ND	ND
	40.0	ND	ND	ND	ND
MW-7					
	12.5	ND	ND	ND	ND
	17.0	ND	ND	ND	ND
	23.0	ND	ND	ND	ND
	29.0	ND	ND	ND	ND
	39.5	ND	ND	ND	ND
MW-8					
	20.0	ND	ND	ND	ND
	30.0	ND	ND	ND	ND
	40.0	ND	ND	ND	ND

EXHIBIT 8 cont.

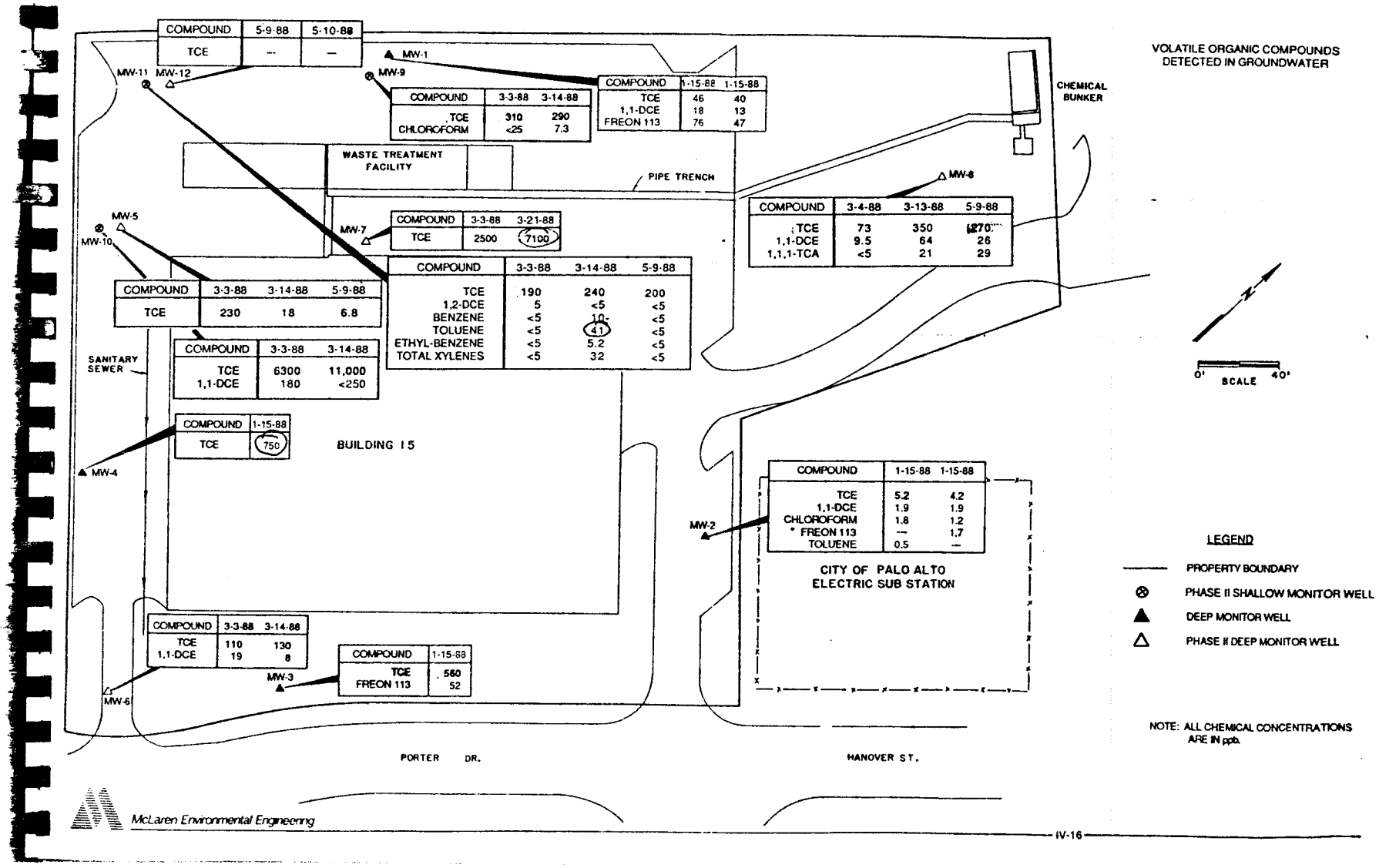
I

SOIL ANALYTICAL RESULTS

(PPM)

SOIL BORING	DEPTH (feet)	BROMOMETHANE	ACETONE	TRICHLOROETHENE	TETRACHLOROETHENE
MW-9					
	10.0	ND	ND	ND	ND
	20.0	ND	3.3	ND	ND
MW-10					
	14.5	ND	ND	ND	ND
	25.0	ND	ND	ND	0.59
	29.5	ND	ND	ND	ND
MW-11					
	10.0	ND	ND	ND	ND
	20.0	ND	ND	ND	ND
	31.0	ND	ND	ND	ND
	37.0	ND	ND	ND	ND

EXHIBIT 8 cont.



COMPOUND	5-9-88	5-10-88
TCE	--	--

COMPOUND	3-3-88	3-14-88
TCE	310	290
CHLOROFORM	<25	7.3

COMPOUND	1-15-88	1-15-88
TCE	46	40
1,1-DCE	18	13
FREON 113	76	47

COMPOUND	3-3-88	3-21-88
TCE	2500	7100

COMPOUND	3-4-88	3-13-88	5-9-88
TCE	73	350	270
1,1-DCE	9.5	64	26
1,1,1-TCA	<5	21	29

COMPOUND	3-3-88	3-14-88	5-9-88
TCE	230	18	6.8

COMPOUND	3-3-88	3-14-88	5-9-88
TCE	190	240	200
1,2-DCE	5	<5	<5
BENZENE	<5	10	<5
TOLUENE	<5	41	<5
ETHYL-BENZENE	<5	5.2	<5
TOTAL XYLENES	<5	32	<5

COMPOUND	3-3-88	3-14-88
TCE	6300	11,000
1,1-DCE	180	<250

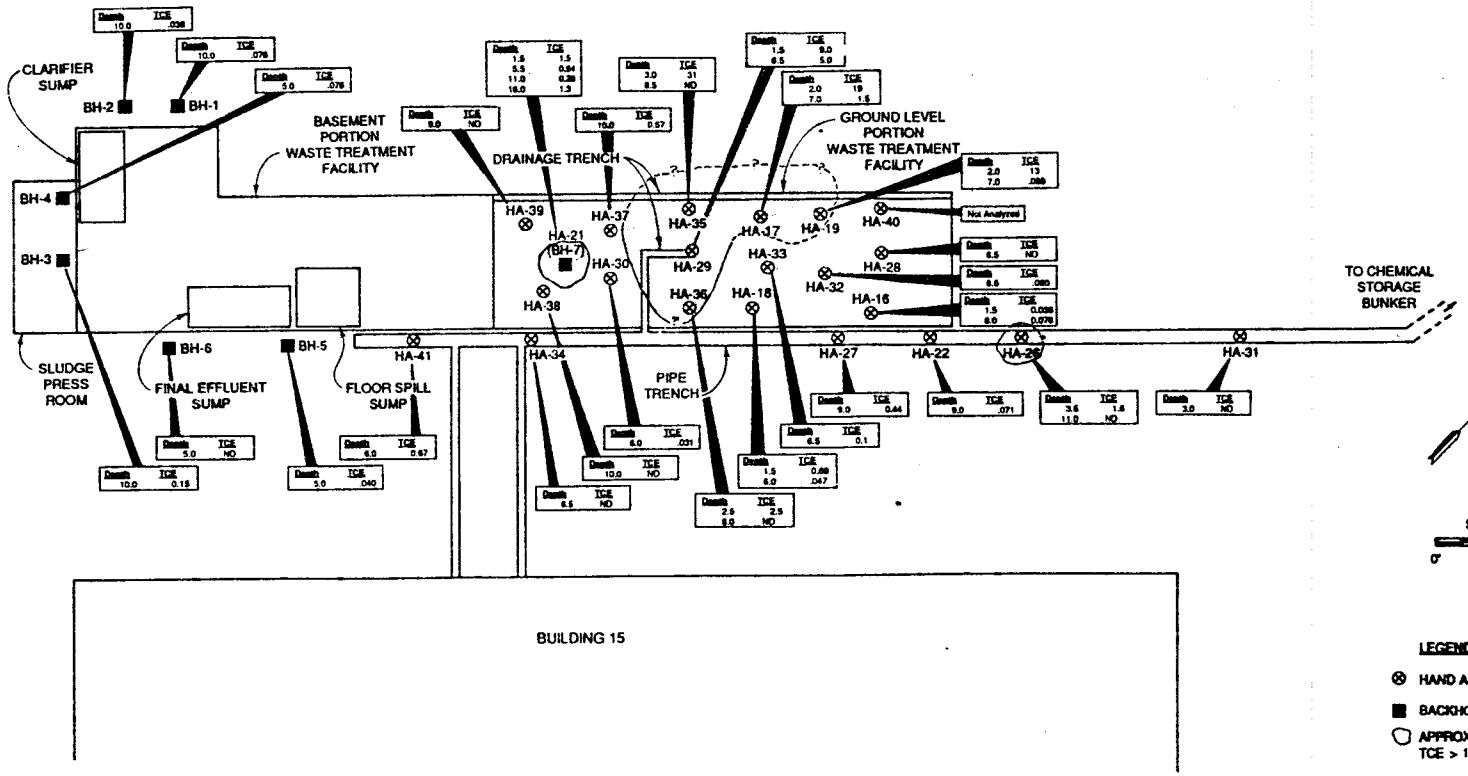
COMPOUND	1-15-88
TCE	750

COMPOUND	1-15-88	1-15-88
TCE	5.2	4.2
1,1-DCE	1.9	1.9
CHLOROFORM	1.8	1.2
* FREON 113	--	1.7
TOLUENE	0.5	--

COMPOUND	3-3-88	3-14-88
TCE	110	130
1,1-DCE	19	8

COMPOUND	1-15-88
TCE	560
FREON 113	52

EXHIBIT 9



WASTE TREATMENT FACILITY
AND PIPE TRENCH
SOIL SAMPLE LOCATIONS
AND TCE CONCENTRATIONS

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED IN THE VICINITY OF THE WASTE TREATMENT FACILITY (ppm)

Compound	Boring:	HA-16		HA-17		HA-18		HA-19	
	Depth* (feet):	1.5	6.0	2.0	7.0	1.5	6.0	2.0	7.0
1,1-Dichloroethane		---[a]	---	0.039	---	----	---	0.064	---
1,2-Dichloroethene (total)		0.84	---	0.45	0.052	0.9	0.011	0.45	---
1,1,1-Trichloroethane		---	---	---	---	---	---	---	---
4-Methyl-2-pentanone		---	---	0.17	0.061	---	---	0.66	0.17
Acetone		---	---	---	---	---	---	---	---
Chlorobenzene		---	---	---	---	---	---	0.05	---
Tetrachloroethene		---	---	0.020	---	---	---	---	---
Tetrahydrofuran		---	---	---	---	---	---	---	---
Toluene		---	---	0.19	---	---	---	---	---
Trichloroethene		0.036	0.078	19	1.5	0.69	0.047	13	.088
Xylenes (total)		---	---	0.046	---	---	---	0.03	---

[a] Indicates below reporting limit

* Indicates top of 0.5 foot sample interval

EXHIBIT 9 cont.

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED IN THE VICINITY OF THE WASTE TREATMENT FACILITY (ppm)

Compound	Boring:	BH-7/HA-21				HA-28	HA-29		HA-30
	Depth* (feet):	1.5	5.5	11.0	16.0	6.5	1.5	6.5	6.0
1,1-Dichloroethane		---[a]	---	---	---	---	---	---	---
1,2-Dichloroethene (total)		0.086	---	---	---	---	0.14	0.025	---
1,1,1-Trichloroethane		---	---	---	---	---	---	0.025	---
4-Methyl-2-pentanone		---	---	---	0.3	---	---	---	---
Acetone		6.1	---	---	---	---	---	---	---
Chlorobenzene		---	---	---	---	---	---	---	---
Tetrachloroethene		0.05	---	---	---	---	0.028	0.31	---
Tetrahydrofuran		---	---	---	0.25	---	---	---	---
Toluene		0.074	---	---	---	---	0.16	0.11	---
Trichloroethene		1.5	0.94	0.28	1.3	---	9.0	5.0	0.031
Xylenes (total)		---	---	---	---	---	---	---	---

[a] Indicates below reporting limit

* Indicates top of 0.5 foot sample interval

EXHIBIT 9 cont.

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED IN THE VICINITY OF THE WASTE TREATMENT FACILITY (ppm)

Compound	Boring: HA-32	HA-33	HA-35		HA-36		HA-37	HA-38
Depth* (feet):	6.5	6.5	3.0	8.5	2.5	8.0	10.0	10.0
1,1-Dichloroethane	---[a]	---	---	---	---	---	---	---
1,2-Dichloroethene (total)	---	---	0.55	---	0.65	---	---	---
1,1,1-Trichloroethane	---	---	---	---	---	---	---	---
4-Methyl-2-pentanone	---	---	---	---	---	---	---	---
Acetone	---	---	---	---	---	---	---	---
Chlorobenzene	---	---	---	---	---	---	---	---
Tetrachloroethene	---	---	---	---	---	---	---	---
Tetrahydrofuran	---	---	---	---	---	---	---	---
Toluene	---	---	---	---	---	---	---	---
Trichloroethene	0.090	0.1	31	---	2.5	---	0.57	---
Xylenes (total)	---	---	---	---	---	---	---	---

[a] Indicates below reporting limit
* Indicates top of 0.5 foot sample interval

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL SAMPLES COLLECTED IN THE VICINITY OF THE WASTE TREATMENT FACILITY (ppm)

Compound	Boring: HA-39	BH-1	BH-2	BH-3	BH-4	BH-5	BH-6
Depth* (feet):	9.0	10.0	10.0	10.0	5.0	5.0	5.0
1,1-Dichloroethane	---[a]	---	---	---	---	---	---
1,2-Dichloroethene (total)	---	---	---	---	---	---	---
1,1,1-Trichloroethane	---	---	---	---	---	---	---
4-Methyl-2-pentanone	---	---	---	---	---	---	---
Acetone	---	---	---	---	---	---	---
Chlorobenzene	---	---	---	---	---	---	---
Tetrachloroethene	---	---	0.047	---	---	---	---
Tetrahydrofuran	---	---	---	---	---	---	---
Toluene	---	0.033	0.025	---	0.026	0.15	---
Trichloroethene	---	0.076	0.038	0.15	0.076	0.040	---
Xylenes (total)	---	---	---	---	---	---	---

[a] Indicates below reporting limit
* Indicates top of 0.5 foot sample interval
1128ADG3.tbl

CHEMICAL STORAGE BUNKER
SOIL SAMPLE LOCATIONS

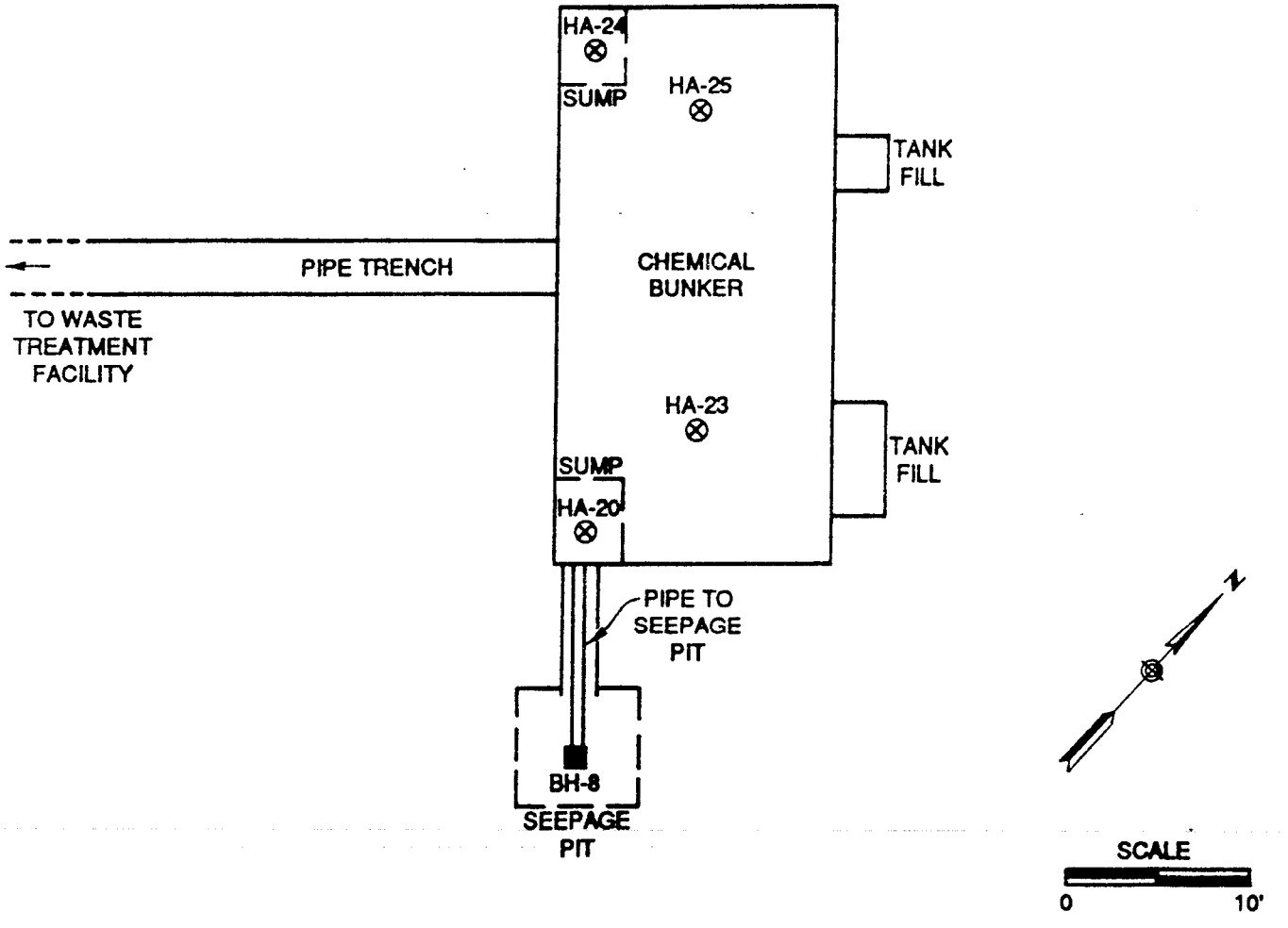


EXHIBIT 9 cont.

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED (ppm) AND pH RESULTS IN SOIL SAMPLES COLLECTED IN THE VICINITY OF THE CHEMICAL STORAGE BUNKER

Parameter	Boring:	HA-20	HA-23	HA-24	HA-25	BH-8	
	Depth* (feet):	6.5	9.0	6.5	10.0	7.0	14.0
1,1-Dichloroethane		0.034	0.64	0.041	0.32	0.030	---[a]
1,2-Dichloroethane		---	0.027	---	---	---	---
1,1-Dichloroethene		---	0.047	---	---	0.035	---
1,2-Dichloroethene (total)		---	---	0.031	0.11	---	---
1,1,1-Trichloroethane		0.0064	2.5	---	---	0.86	0.088
1,1,2,-Trichloroethane		---	---	---	---	0.065	---
Acetone		0.68	---	---	---	---	0.280
Methylene Chloride		---	19	---	---	0.89	1.0
Trichloroethene		---	0.069	---	---	0.085	0.038
Toluene		---	0.16	0.46	0.084	0.52	0.26
pH		9.6	7.2	7.4	6.9	4.4	7.7

[a] Indicates below reporting limit.

* Indicates top of 0.5 foot sample interval

SUMMARY OF VOLATILE ORGANIC COMPOUNDS DETECTED (ppm) AND pH RESULTS IN SOIL SAMPLES COLLECTED IN THE VICINITY OF THE PIPE TRENCH

Compound	Boring: Depth* (feet):	HA-22	HA-26		HA-27	HA-31	HA-34	HA-41	BKGD-3[a]
		9.0	3.5	11.0	9.0	3.0	6.5	6.0	3.5
Trichloroethene		0.071	1.8	---[b]	0.44	---	---	0.67	---
Toluene		---	---	---	---	---	---	0.11	0.45
pH		NA[c]	NA	NA	NA	NA	7.5	7.9	6.5

a Background Soil Sample - Phase III
b Indicates below reporting limit.
c Not analyzed
* Indicates top of 0.5 foot sample interval

1128ADG3.tbl

EXHIBIT 9 cont.

SUMMARY OF CAM METALS DETECTED IN SOIL SAMPLES COLLECTED IN THE VICINITY OF THE PIPE TRENCH
(ppm)

Parameter	Boring: HA-34 Depth[d] (feet): 6.5	HA-41 6.0	BKGD-1[a] 0.1	BKGD-2[a] 0.7	BKGD-3[b] 3.5	Regulated Limits[c] TTLC	STLC
Arsenic	---[e]	1.6	---	---	1.8	500	5.0
Antimony	---	5.8	---	---	---	500	15
Barium	81	64	22	120*	110*	10,000	100
Chromium III	92	22	NA[f]	NA	---	2,500	560
Chromium VI	---	---	NA	NA	0.80	500	5.0
Chromium (Total)	---	---	23*	81*	63*	500	5.0
Cobalt	---	---	11	17	---	8,000	80
Copper	26*	240*	28*	24	21	2,500	25
Lead	---	720*	6.7*	5.4*	23*	1,000	5.0
Mercury	---	---	0.53*	---	---	20	0.2
Nickel	71*	71*	18	59*	28*	2,000	20
Vanadium	63*	29*	55*	74*	58*	2,400	24
Zinc	34	60	57	31	41	5,000	250

a Background Soil Sample Phase I
b Background Soil Sample Phase III
c Regulated limits: Total Threshold Limit Concentration (TTLC) and Soluble Threshold Limit Concentrations (STLC)
d Indicates top of 0.5 foot sample interval
e Indicates below reporting limit
f Indicates not analyzed
* Above STLC below TTLC

EXHIBIT 10

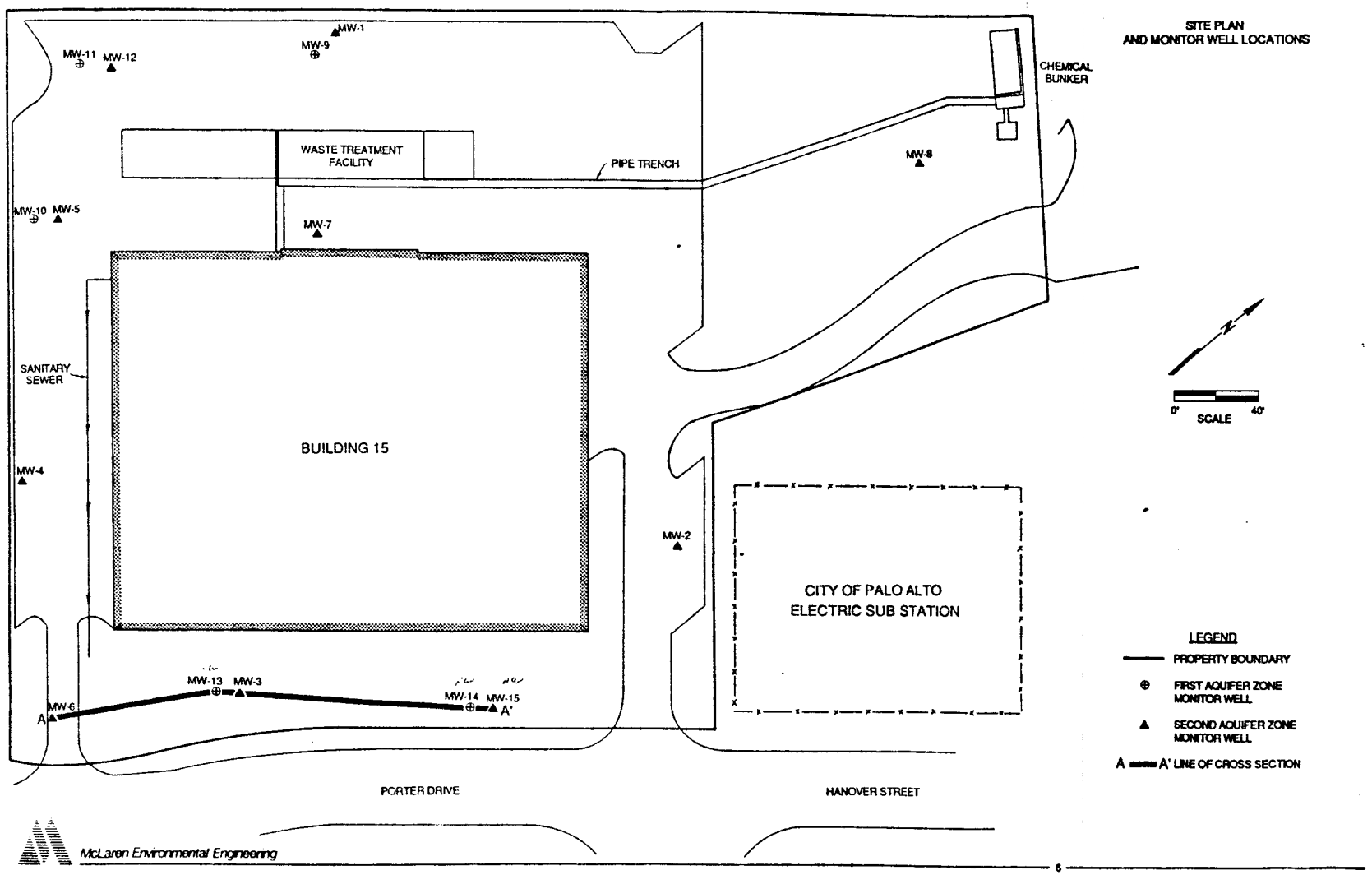

SITE PLAN
AND MONITOR WELL LOCATIONS
MW-1
MW-9
MW-11
MW-12
CHEMICAL
BUNKER
WASTE TREATMENT
FACILITY
PIPE TRENCH
MW-8
MW-10
MW-5
MW-7
SANITARY
SEWER
BUILDING 15
MW-4
MW-2
CITY OF PALO ALTO
ELECTRIC SUB STATION
MW-13
MW-3
MW-14
MW-15
MW-6
A
A'
0'
40'
SCALE
LEGEND
PROPERTY BOUNDARY
FIRST AQUIFER ZONE
MONITOR WELL
SECOND AQUIFER ZONE
MONITOR WELL
A A' LINE OF CROSS SECTION
PORTER DRIVE
HANOVER STREET
McLaren Environmental Engineering
6

EXHIBIT 10 cont.

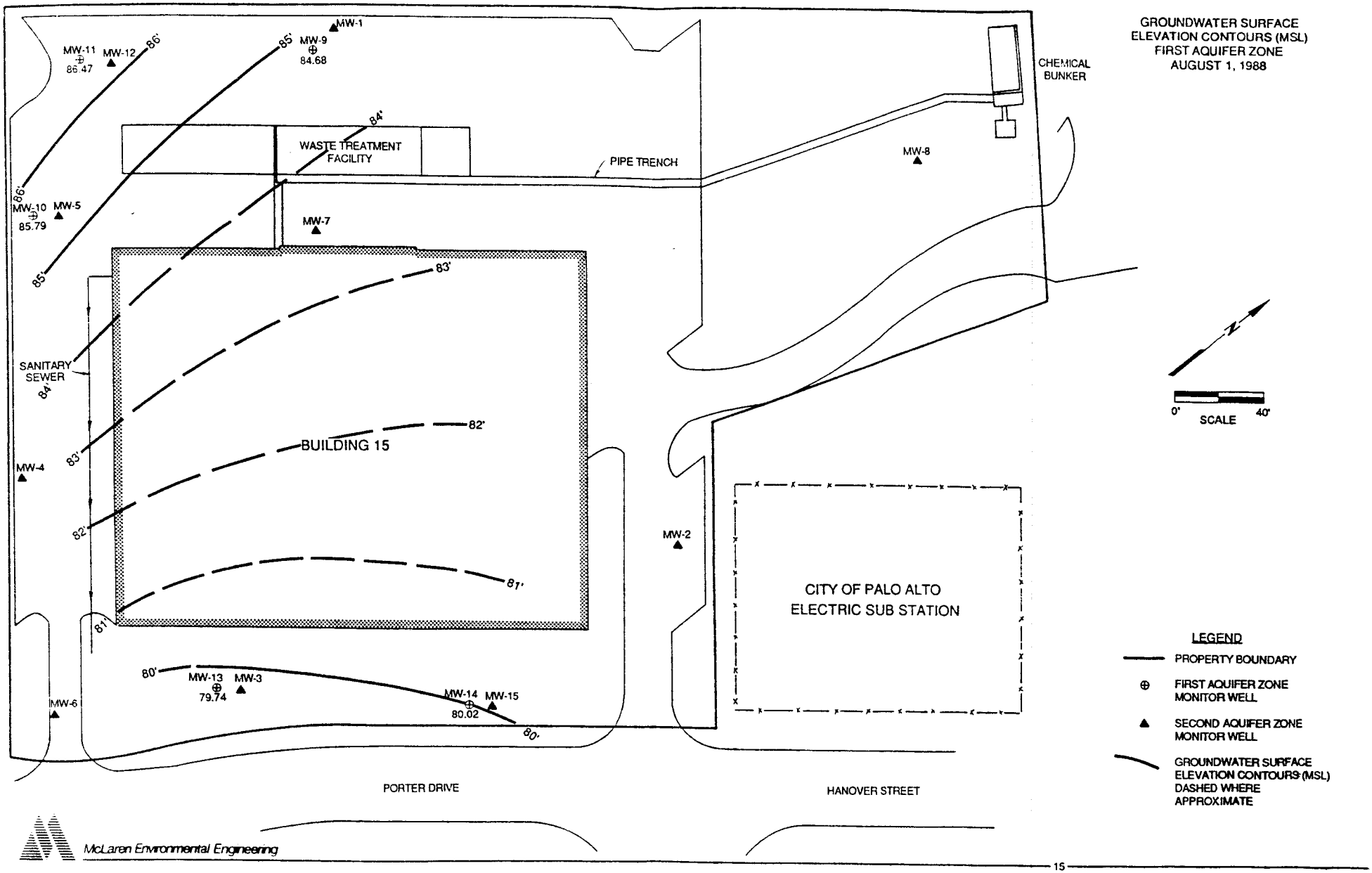
WATER QUALITY TEST RESULTS FOR MW-13, MW-14, AND MW-15, PARTS PER BILLION

Well	MW-13		MW-14		MW-15	
Sample Date	7-29-88	8-5-88	7-29-88	8-5-88	8-1-88	8-5-88
Compound						
1,1,1-Trichloroethane	--[a]	--	--	8.2	--	--
1,1-Dichloroethene	--	--	--	8.0	--	--
1,2-Dichloroethene (total)	--	--	--	9.6	--	--
Chloroform	--	--	--	60	--	--
Trichloroethene	450	390	3,700	4,200	--	--
Xylene (total)	--	--	--	--	--	6

[a] Not Detected

E:8/16/88

EXHIBIT 11



McLaren Environmental Engineering

APPENDIX G

_____ - RI/FS WORKPLAN REQUIREMENTS

3.2.3 RI/FS Workplan Contents. The RI/FS Workplan shall be designed to meet the objectives in paragraph 3.2.2 of the Order and shall cover, at a minimum, each of the following elements:

a. Project Management Plan. A Project Management Plan which describes how the project will be managed by Respondent and its contractors, subcontractors and consultants including an organization chart with the names and titles of key personnel and a description of their individual responsibilities;

b. Scoping Document. A Scoping Document which consists of an evaluation of existing data and identification of the data needs and investigation tasks for the RIFS including, at a minimum, the following information:

(1) A map and description of known site characteristics, including topography, hydrogeology, buildings and structures and all other characteristics relevant to an evaluation of hazardous substance sources, pathways and receptors and potential impacts on health and the environment;

(2) A description of hazardous substance characteristics including:

(A) a list of all hazardous substances, materials or wastes which were disposed, discharged, spilled, treated, stored, transferred, transported, handled or used at the Site and a description of their estimated volumes, concentrations and characteristics;

(B) a description of all manufacturing processes which are or were related to each hazardous substance, material or waste or which produced any hazardous waste; and

(C) past disposal practices;

(3) A summary of all existing data including air, soil, surface water, and ground water data that has been previously generated and the QA/QC procedures which were followed;

(4) A description of the nature and extent of the release and/or threatened release, including a summary of actual and potential on-site and off-site health and environmental effects;

(5) A description of any previous response actions;

(6) An identification of the general types of response actions which will be evaluated in the feasibility study;

(7) An identification of all data gaps;

(8) Recommendations for all additional work needed to eliminate any data gaps.

(c) Sampling Plan. A Sampling Plan which describes the activities which will be undertaken to develop a complete profile of on-site and off-site air, soil, surface water and ground water contamination attributable to operations at the Site including, at a minimum, the following information:

(1) The objectives of the investigation;
(2) Identification of all chemical parameters which will be analyzed or tested;
(3) A description of the types of samples which will be taken;
(4) A map showing all locations which will be sampled;
(5) A description of the depth and frequency of sampling at each location;
(6) The engineering specifications for all sampling installations such as ground water monitoring wells, soil borings and piezometers;
(7) Identification of all analytical procedures to be used; and
(8) Provisions for obtaining access to and obtaining samples from adjacent properties, where appropriate;

(d) Quality Control/Quality Assurance (QA/QC) Plan. A QA/QC Plan which describes the procedures for the collection, identification, preservation and transport of samples, the calibration and maintenance of instruments, and the processing, verification, storage and reporting of data, and including chain of custody procedures, identification of qualified person(s) conducting the sampling and of a laboratory certified or approved by the Department pursuant to Health and Safety Code Section 25198;

(e) Data Management Plan. A Data Management Plan which describes how the data obtained pursuant to this Order will be managed and preserved by Respondent in accordance with paragraph 3.16;

(f) Health and Safety Plan. A Site Health and Safety Plan which describes the specific personnel, procedures and equipment and covers all measures including contingency plans which will be taken during field activities to protect the health and safety of the workers at the Site, authorized representatives of the Department, and the general public from exposure to hazardous wastes, substances or materials.

(g) Public Health and Environmental Evaluation Plan. A Public Health and Environmental Evaluation Plan which describes how the magnitude and probability of actual or potential harm to public health and welfare and the environment by the threatened and/or actual release of a hazardous substance will be determined and which describes the activities necessary to accomplish this task including:

(1) an evaluation of the results of the site investigation showing the actual and potential amounts and concentrations of hazardous substances in all relevant environmental media (air, water, soil, sediment and biota) at the conclusion of the remedial investigation and projected in the future;
(2) an assessment of the environmental fate and transport mechanisms for each hazardous substance within the relevant environmental media;
(3) identification of the hazardous and toxicological properties and relevant human health and environmental standards

and criteria for the hazardous substance(s) found in the site investigation;

(4) identification of all exposure pathways and the extent of actual and/or potential exposure;

(5) identification of the population(s) at risk; and

(6) an evaluation of the extent of expected harm and the likelihood of such harm occurring.

(h) Feasibility Study Plan. A Feasibility Study Plan which describes how the Feasibility Study will identify, develop and evaluate remedial action alternatives with respect to technical, public health, environmental, institutional, and cost considerations, and including, at a minimum, the following information:

(1) A summary of the existing and potential hazards for which corrective action may be required;

(2) A description of the alternative remedial actions which will be evaluated;

(3) A list of the technologies which will be screened for each alternative remedial action described in (2) above;

(4) A description of the public health, environmental and cost factors and criteria which will be considered in screening and analyzing each alternative remedial action technology, including, but not limited to, effectiveness, reliability, timeliness of implementation, unit cost, availability, operation and maintenance costs and conformity with applicable laws and regulations; and

(5) A description of all pilot studies, bench tests or other activities which will be performed to evaluate each alternative remedial action technology;

(6) A description of the federal and state environmental and public health requirements to be considered in developing the remedy.

(i) Other Activities. A description of any other significant activities not already addressed in the RI/FS Workplan and necessary to perform the RI/FS and submit the Remedial Investigation Report and Feasibility Study Report in compliance with paragraphs 3.2.4 and 3.2.5 of this Exhibit;

(j) Schedule. A schedule which provides specific time frames and dates for completion of each activity and report conducted or submitted under the RI/FS Workplan.

3.2.4. Remedial Investigation Report. The remedial investigation report shall be prepared and submitted by Respondent to the Department for review and approval in accordance with the approved RI/FS workplan schedule. The remedial investigation report shall summarize the results of the remedial investigation including reduction, presentation and interpretation of all data and information generated and/or compiled during the remedial investigation. The remedial investigation report shall cover the following subjects relating to the site:

a. Introduction
   1. Overview of Report
   2. Site Background Information
   3. Nature and Extent of Problem(s)
   4. Remedial Investigation Summary
b. The Site Features Investigation
   1. Demography
   2. Land Use
   3. Natural Resources
   4. Climatology
c. Hazardous Substance Investigation
   1. Waste Types
   2. Waste Component Characteristics and Behavior
d. Hydrogeologic Investigation
   1. Soils
   2. Geology
   3. Ground Water
e. Surface Water Investigation
   1. Surface Water
   2. Sediments
   3. Flood Potential
   4. Drainage
f. Air Investigation
g. Biota Investigation
   1. Flora
   2. Fauna
h. Public Health and Environmental Evaluation Concerns
   1. Potential Receptors
   2. Public Health Impacts
   3. Environmental Impacts

3.2.5. Feasibility Study Report. The Feasibility Study Report shall be prepared and submitted by respondent to the Department for review and approval in accordance with the approved RI/FS workplan schedule. The Feasibility Study Report shall summarize the results of the feasibility study including reduction, presentation and interpretation of all data and information generated and/or compiled during the feasibility study. The feasibility study shall cover the following subjects relating to the Site.

a. Description of Current Situation
   1. The Site Background Information
   2. Nature and Extent of Release
   3. Objective of Remedial Action(s)
b. Description of Remedial Action Technologies
   1. Pilot Studies
   2. Bench Tests
c. Screening of Remedial Action Technologies
   1. Technical Criteria
   2. Remedial Action Alternatives Developed
   3. Environmental and Public Health Criteria

4. Other Screening Criteria
5. Cost Criteria

d. Analysis of Remedial Action Alternatives
   1. Technical Feasibility
   2. Environmental Evaluation
   3. Institutional Requirements
   4. Public Health Evaluation
   5. Cost Analysis

e. Recommended Remedial Action.

EXHIBIT 13

OPP #86-20
APPENDIX H

COMMUNITY RELATIONS PLAN PREPARATION

1. The plan will be prepared on the basis of a file review, site visit and in-person community interviews. The following types of individuals should be considered for interviewing:

   a. Persons who have expressed interest in the site or may be directly affected by site problems (e.g., persons who have previously contacted DHS because of complaints about the site, nearby residents, property owners, etc.);

   b. Local and state elected officials, such as the mayor, council members, county supervisors or state legislators;

   c. Representatives of ad hoc citizen groups organized because of site issues;

   d. Local business representatives (e.g., Chamber of Commerce), civic groups, neighborhood associations and local chapters of national environmental groups that have expressed interest in the site;

   e. State or federal staff, such as environmental protection or natural resources department officials;

   f. Staff at Congressional or State Legislators' District Offices;

   g. County planning and health officials involved with the site.

2. Information obtained from these interviews will be used to develop the Community Relations Plan. The nature and level of citizen concern at the site will be evaluated by considering the presence or absence of the following six characteristics;

   a. Children's health--whether families in the community believe their children's health may be affected by hazardous substances;

   b. Economic loss--whether local homeowners or businesses believe that the site has caused or will cause them economic loss;

   c. Agency credibility--whether DHS's performance and statements are viewed by the public as competent and credible;

d. Involvement--whether an active, vocal group leader(s) has emerged from the community and whether the group leader has a substantial local following;

e. Media--whether events at the site have received substantial coverage by local, state, regional or national media;

f. Number affected--approximately how many households perceive themselves as affected by the site.

If several of these characteristics describe the affected community, assume that community interest and involvement at the site are likely to be high.

3. The DHS project manager or community relations coordinator must approve the list of persons to be interviewed and must be offered the opportunity to be present at any or all of the interviews. In contacting individuals, the Contractor must stress that the purpose of the interview is to assess the level and nature of community concerns so a community relations program appropriate to those concerns can be developed. Interviews should be conducted at the convenience of interviewees. Prior to the interviews, DHS will provide the Contractor with a list of interview questions to be asked during the discussions. These questions may include, but not be limited to the following:

a. When did you first become aware of the presence of hazardous substances at the site?

b. How would you characterize the problems at the site?

c. What are your major concerns related to the site?

d. What contacts have you had with local, state, federal and other officials about the site?

e. What activities have you participated in, sponsored or organized concerning the site?

f. How would you like to be involved in the cleanup process?

g. How can DHS best provide you with information concerning response activities? Would you like to be included on a mailing list?

h. What kind of information would be most useful to you (e.g., technical information or status reports on cleanup activities)? How frequently would you like to receive a progress report or fact sheet?

i. What local or regional media best cover the area? What coverage have they given the site?

j. Is there anything you wish to mention that we have not yet discussed?

k. Can you suggest other individuals or groups that DHS should contact for additional information or to identify other types of concerns?

4. Draft plans will be submitted to the DHS project manager or community relations coordinator within _____ working days of the effective date of this order/task order. A final plan, incorporating DHS' review comments, will be prepared within _____ working days of the receipt of the comments.

OUTLINE OF PLAN

A. Introduction (1-2 pages). This section will include:

1. Purpose of the Community Relations Plan (CRP);

2. The roles of the public and CRP's in the remediation process;

3. Which agencies have oversight responsibilities;

4. How information was obtained (e.g., interviews, file review, etc.); note that a list of persons interviewed during plan preparation is included in Appendix A;

5. How the plan is structured.

B. Community Relations Background (3 to 7 pages). This section will include:

1. Site description, including area and site maps.

2. Site history or background (basic historical and technical detail to clarify why the site was listed on the State Expenditure Plan list).

a. Site location and proximity to community and geographic landmarks (e.g., homes, schools, playground, businesses, lakes, streams);

b. History of site use and ownership;

c. Date and type of hazardous substance release(s);

d. Nature of threat to public health and the environment;

e. History of inspections and studies conducted at the site;

f. Current status.

3. History of Community Involvement

a. Description of any past or ongoing community activities at the site.

b. Description of interested citizens, groups and local officials their affiliations, addresses and phone numbers. See Appendix A of this section for list information.

c. Concerns and issues identified by citizens, groups and local officials.

d. Evaluation of the level of citizen concern.

e. Brief description of any media coverage.

f. Description of any other inquiries or concerns.

4. Potential issues and community concerns.

C. Objectives of the Community Relations Program (1 page).

This section will include objectives specific to public participation during the remedial response and special circumstances the plan will address.

D. Community Relations Techniques. This section will characterize the strategy for the community relations program at the site. Topics to be covered include:

1. Description of methods of communication or activities to be conducted;

2. Timing of these activities in relation to technical milestones; include a planning matrix at the end of this subsection (see item G);

3. Responsibility for implementation of these activities (DHS, Contractors, PRP's, etc.);

4. Resources to be used in the community relations program (e.g., local organizations, meeting places);

5. Areas of special sensitivity that must be considered when implementing this plan.

E. Minimum Community Relations Requirements (California Health and Safety Code, Section 25356.1). At a minimum, the following techniques are required:

1. Identify an information repository to provide public access to reports, fact sheets and other project documents;

2. Provide direct mail notification to contiguous property owners and affected local and state agencies of actions proposed in draft Remedial Action Plan (RAP);

3. Provide a 30-day public comment period on the RAP;

4. Publish notice of draft RAP availability for public review in a newspaper of general circulation in the area affected by the site;

5. Hold one or more public meetings on the draft RAP;

6. Post notices in the location of the proposed removal or remedy;

7. Revise the draft RAP based on public comment.

F. Staffing Plan and Budget. This section details the labor hours required for implementation of each activity by the responsible agency or organization and the expenses to be incurred. Expense estimates for travel, telephone, postage, reprographics, printing, display ad placement, word processing and graphics supplies will be included.

G. Schedule. This will be a one-page matrix that relates timing of community relations activities to technical milestones for the site.

H. Appendix A, Mailing List. The list will include names, titles, addresses and telephone numbers of all officials and group representatives contacted during the community interviews (indicated with asterisks *) and others who should receive regular information about site developments. Because the community relations plan is a public document, the telephone numbers and addresses of non-officials and non-affiliated individuals contacted for interviews will not be included as part of the plan that is made publicly available. The contacts identified in the appendix should include the following:

1. Contiguous property owners;

2. Federal, state and local elected officials (include county and city or township);

3. Environmental and citizens groups;

4. DHS officials (include all departments involved in the remedial process, e.g., Sanitary Engineering Branch, Epi Studies, Community Relations);

5. Local, state and federal environmental officials;

6. Local health department officials;

7. Press contacts (newspapers, radio, television).

I. Appendix B. Meeting Locations and Information Repositories. This appendix will identify suitable locations for holding public meetings and making public information easily accessible to community members.

Repository hours and contact names for both repositories and meeting places should also be included.

STATE OF CALIFORNIA — ENVIRONMENTAL PROT ON AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

REGION 2
700 HEINZ AVE., SUITE 200
BERKELEY, CA 94710-2737
(510) 540-3724

July 31, 1995

CERTIFIED MAIL

Ms. Kathy Herzing
Hewlett-Packard Company
1501 Page Mill Road, M/S 5U-E
Palo Alto, California 94304

Ms. Paula Kakimoto
The Board of Trustees for the
Leland Stanford Junior University
c/o Stanford Management Company
2770 Sand Hill Road
Menlo Park, California 94025

Dear Ms. Herzing and Ms. Kakimoto:

HEWLETT PACKARD BUILDING 15 SITE, ORDER NO. HSA 88/89-024
3215 PORTER DRIVE, PALO ALTO, CALIFORNIA - AMENDMENT

As the Site is entering into the Operation and Maintenance phase, it is necessary to update the Site Order. This letter serves to modify the subject Order to include the Department's requirements for Operation and Maintenance activities at the Site and to update/clarify sections in the existing Order.

1. Section 1.2 of the Order is replaced with the following: "1.2. Site. The Site which is the subject of this Order is located at 3215 Hillview Avenue, Palo Alto, California. The Study Area includes the Site and downgradient affected areas. The downgradient extent of the Study Area includes areas impacted by the Site that are not subject to Orders issued to other adjacent Sites. A map of the Site and 3215 Porter Drive Study Area is attached as Attachment 1."

2. Sections 3.2, 3.2.1, 3.2.2, 3.2.3, and Sections 3.3, 3.3.1, 3.3.2 and 3.3.3 of the Order are deleted.

Printed on Recycled Paper

3. Section 3.4 is replaced with the following:

"3.4 Public Participation.

3.4.1. The Respondents shall work cooperatively with the Department in ensuring that the affected public and community continue to be involved in the Department's decision-making process for the Site. Any such public participation activities shall be conducted in accordance with the February 1992 Public Participation Plan for the Hillview Porter site or subsequent amendments as approved by the Department, the Department's Public Participation Policy and Guidance Manual, and with the Department's review and approval.

3.4.2. Respondents shall develop and submit site-specific fact sheets to the Department when required under the Public Participation Plan for the Site or when specifically requested by the Department. Respondents will be responsible for distribution of fact sheets using the approved mailing list upon Department approval. In addition, Respondents will be responsible for submittal of documents to the information repositories listed in the above Public Participation Plan. Public notices and meetings may be required based on community needs and site activities."

4. Section 3.5.4 of the Order is replaced with the following:

"3.5.4. Implementation of Operation and Maintenance Manual. Respondents shall implement the Operation and Maintenance Manual (O&MM) dated October 31, 1994, as revised on May 31, 1995 and any approved modifications thereto. This implementation will include the operation and maintenance of the approved final remedial actions for the Site."

5. Section 3.5.5 of the Order is replaced with the following:

"3.5.5. Changes During Operation and Maintenance of the Final RAP

3.5.5.1 Respondents shall give the Department at least sixty (60) days advance written notice prior to the intended date of any significant or non-routine proposed modification, discontinuation or disruption of the groundwater extraction, conveyance and treatment system and/or the air injection and soil vapor extraction, conveyance and treatment system. Significant actions are actions which will have a significant effect on the system, such as expansion of the system, deletion of components

from the system, pulsed pumping, or cessation of pumping from selected wells. Minor adjustments to system flow rates are not significant actions. The written notice shall be sent to the Department at the address set out in Paragraph 3.10 of this Order in a manner that produces a record of the sending of the notice such as certified mail, overnight delivery service, facsimile transmission or courier hand delivery service. The written notice to the Department shall include: a detailed description of the work to be done or modifications to be made; a map showing the exact location of the proposed work; and the reasons for the proposed modification, disruption or discontinuation. The provisions of this Paragraph 3.5.5.1 shall not apply to modifications, discontinuances or other disruptions of the above systems which are undertaken by the Respondents in compliance with Paragraph 3.8.5 or 3.14, which are authorized by the Department under Paragraph 3.5.6, or which are required by the Department under Paragraph 3.5.5.2.

3.5.5.2 The Department may require modification, replacement, or additions to the remediation facilities if those facilities are not achieving remediation objectives or protecting public health and safety or the environment. The Department may require additional evaluations, designs and the construction and operation of the remediation facilities to achieve these objectives."

6. Section 3.5.6 of the Order is replaced with the following:

3.5.6. Discontinuation of Remedial Technology. The groundwater extraction, conveyance and treatment system and the air injection, soil vapor extraction and treatment system shall be left in place and operated by Respondents until and except to the extent that the Department authorizes Respondents in writing to discontinue, move or modify some or all of the systems because the Respondents have met the cleanup goals for the site, or because the modification would better achieve the cleanup goals, or because the remediation system could not achieve the cleanup goals and other cleanup methods will be implemented or it has been demonstrated, to the Department's satisfaction, that the maximum achievable cleanup has occurred. Tables of the cleanup levels for the volatile organic compounds (VOCs) in groundwater and soil set forth in the RAP are attached as Attachment 2."

7. Section 3.8 of the Order is replaced with the following:

"3.8 Reporting Requirements.

3.8.1. Quarterly Summary Reports. Respondents shall submit Quarterly Summary Reports of its activities under the provisions of this Order. The report shall describe a) specific actions taken by or on behalf of Respondents during that quarter; b) all planned activities for the next quarter; c) any requirements under this Order that were scheduled for completion during the quarter that were not completed; d) any problems encountered or anticipated in complying with this Order; and e) analytical result (laboratory reports) from samples required by the Department which are not a part of the routine quarterly monitoring or NPDES sampling for the Site. Additionally, the quarterly report must contain information required in the Department's letter of February 6, 1995, as amended by the Department for the Site (see Attachment 3). The reporting timeframes for the quarterly reports will be as follows: December through February, March through May, June through August, and September through November. The quarterly reports shall be received by the Department by the last working day of the month following the end of the quarter. For those quarters where semiannual reports are submitted, the quarterly reports may be incorporated into the semiannual report. During years when an annual report is required, the quarterly report summarizing the last quarter of the year may be submitted concurrent with the annual report.

3.8.2. Semiannual Reports. Respondents shall submit Semiannual Reports of its activities under the provisions of this Order on January 15 and June 30. The January 15 semiannual report may be combined with the annual report. This report shall include a) the information required in the quarterly reports; b) discussion of sample results; c) isoconcentration maps; and d) all field sampling forms, chain-of-custody forms and laboratory analysis reports. Additionally the semiannual reports must contain information required in the Department's February 6, 1995 letter (as amended by the Department for the Site)(see Attachment 3).

3.8.3. Annual Reports. Respondents shall submit an annual report which includes a performance review for the remedial actions implemented documenting progress towards achieving remediation goals. This report must contain the information required in the Department's letter of June 10, 1994 (Attachment 4). The annual report shall be due annually on January 15 and shall cover activities for the previous year.

3.8.4. Five Year Review. Respondents shall review and reevaluate the remedial action after a period of five (5) years from the completion of construction and startup and every 5 years thereafter. The review and reevaluation shall be conducted pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, Pub. L. 99-499. Within ninety (90) calendar days before the end of the 5 year period, Respondents shall submit a remedial action review workplan to the Department for review and approval. Upon the Department's approval of the workplan, Respondents shall submit a report of the results of the remedial action review within the time set out in the approved workplan. The report shall analyze the results of sample analyses, test and other data generated or received by Respondents and evaluate the adequacy of the implemented remedy in protecting public health and safety and the environment. The first five-year review report is due on January 15, 1999.

3.8.5. Emergency Response Action/Notification. In the event of any emergency action or occurrence (such as a fire, earthquake, explosion, or human exposure to hazardous substances caused by the release or threatened release of a hazardous substance) during the course of this Order, Respondents shall immediately take all appropriate action to prevent, abate, or minimize such emergency, release, or immediate threat of release and shall immediately notify the Project Manager. Respondents shall take such action in consultation with the Project Manager and in accordance with all applicable provisions of this Order. Within seven days of the onset of such an event, Respondents shall furnish a report to the Department, signed by Respondents' Project Coordinator, setting forth the events which occurred and the measures taken in response thereto. In the event that Respondents fail to take appropriate response and the Department takes the action instead, Respondents shall be liable to the Department for all costs of the response action to the extent authorized by law. Nothing in this section shall be deemed to limit any other notification requirement to which the Respondents may be subject.

3.8.6. Other Agency Requirements. Respondents shall also comply with applicable permit reporting requirements issued by other agencies."

8. Section 3.10 of the Order is replaced with the following:

"3.10. Submittals. All submittals and notifications from Respondents that are required by this Order shall be sent simultaneously to:

Ms. Barbara J. Cook, P.E.
Regional Branch Chief
Attn: Janet Naito (2 copies)
Site Mitigation Branch
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, California 94710

Mr. Steven Ritchie
Executive Officer
Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

Mr. Tom Iwamura
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

9. Section 3.11 of the Order is replaced with the following wording:

"3.11. Communications. All approvals and decisions of the Department made regarding submittals and notifications will be communicated in writing by the Site Mitigation Branch Chief, Department of Toxic Substances Control or his/her designee. No informal advice, guidance, suggestions or comments by the Department regarding reports, plans, specifications, schedules or any other writings by Respondents shall be construed to relieve Respondents of the obligation to obtain such formal approvals as may be required. Confirmation of a designation shall be provided in writing by the Department in order to validate any approvals or decisions made by a Branch Chief's designee."

10. Section 3.12 of the Order is replaced with the following:

"3.12 Department Review and Approval. (a) If the Department determines that any report, plan, schedule or other document submitted to the Department for approval pursuant to this Order fails to comply with this Order or fails to protect public health and safety or the environment, the Department may: (1) modify the document as

deemed necessary and approve the document as modified; or (2) return comments to Respondents with recommended changes and a date by which Respondents must submit to the Department a revised document incorporating the recommended changes. (b) Any modifications, comments or other directive issued pursuant to (a) above, are incorporated into this Order. Any noncompliance with these modifications or directives shall be deemed a failure or refusal to comply with this Order."

11. Section 3.13 of the Order is replaced with the following wording to require compliance with local laws and regulations:

"3.13 Compliance with Applicable Laws. Respondents shall carry out this Order in compliance with all applicable local, state, and federal legal and regulatory requirements, including, but not limited to, requirements to obtain permits and to assure worker safety."

12. Section 3.14 of the Order is replaced with the following:

"3.14 Stop Work Order. In the event that the Department determines that any circumstances or activities (whether or not pursued in compliance with this Order) may pose an imminent or substantial endangerment to the health and safety of people on the site or in the surrounding area or to the environment, the Department may order Respondents to stop further implementation of this Order for such period of time as is needed to abate the endangerment. In the event that the Department determines that any activities (whether or not pursued in compliance with this Order) are proceeding without Department authorization, the Department may order Respondents to stop further implementation of this Order or of such activities for such period of time as is needed to obtain Department authorization, if such authorization is appropriate. Any deadline in this Order directly affected by a Stop Work Order, under this section, shall be extended for the term of the Stop Work Order."

13. Section 3.17. Sampling, Data and Document Availability. This section is modified to 1) require 7 days (instead of 5) advance notification of any non-routine field sampling; and 2) require preservation of all data, reports, and other documents by Respondents for a minimum of ten years (instead of six) after the conclusion of all activities under this Order.

14. Section 3.20 of the Order is revised as follows:

"3.20. Incorporation of Plans and Reports. All plans, schedules, reports, specification and other documents that are submitted by Respondents pursuant to this Order are incorporated in this Order upon the Department's approval or as modified pursuant to Paragraph 3.12, Department Review and Approval, and shall be implemented by Respondents. Any noncompliance with such documents shall be a noncompliance with this Order."

15. Section 3.22 of the Order is revised to replace the last sentence with the following language: "Respondents shall comply with the new schedule, which is incorporated in this Order."

16. Section 3.23 of the Order is replaced with the following:

"3.23 Cost Recovery. Respondents are liable for all of the Department's costs incurred in responding to the contamination at the Site (including costs of overseeing response work performed by Respondents) to the extent authorized by law. Cost recovery may be pursued by the Department under CERCLA, Health and Safety Code section 25360, or any other applicable state or federal statute or common law."

If you have any questions, please contact Janet Naito at (510) 540-3833 or Mr. Derek Van Hoorn, Esq. at (916) 324-9930.

Sincerely,

Barbara J. Cook

Barbara J. Cook, P.E., Chief
Site Mitigation Branch

Certified Mail #P006762794
Certified Mail #P006762795

cc: See next page

cc: Assemblyman Byron Sher
c/o Ms. Betsy Shotwell
702 Marshall Street, #290
Redwood City, California 94041

Supervisor Dianne McKenna
c/o Ms. Alice Sicular
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San Jose, California 95110

Mr. Lee Esquibel
Santa Clara County
Dept./Environmental Health
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San Jose, California 95159-6070

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Barron Park Association Fdn.
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Palo Alto, California 94306

Mr. Bruce Scarborough
SEACOR
90 New Montgomery Street #620
San Francisco, California 94105

Mr. Tom Iwamura
Santa Clara Valley Water Dist.
5750 Almaden Expressway
San Jose, California 95118

Ms. Doris Maez
City of Palo Alto
250 Hamilton Avenue
Palo Alto, California 94301

Dr. Inge Harding-Barlow
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Palo Alto, California 94306

Ms. Marie Lacey
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco, California 94105

Mr. David Chalton, President
Barron Park Association
3875 El Centro
Palo Alto, California 94306

Ms. Paula Kakimoto
Leland Stanford Jr. University
c/o Stanford Lands Management
2770 Sand Hill Road
Menlo Park, California 94025

ATTACHMENT 1

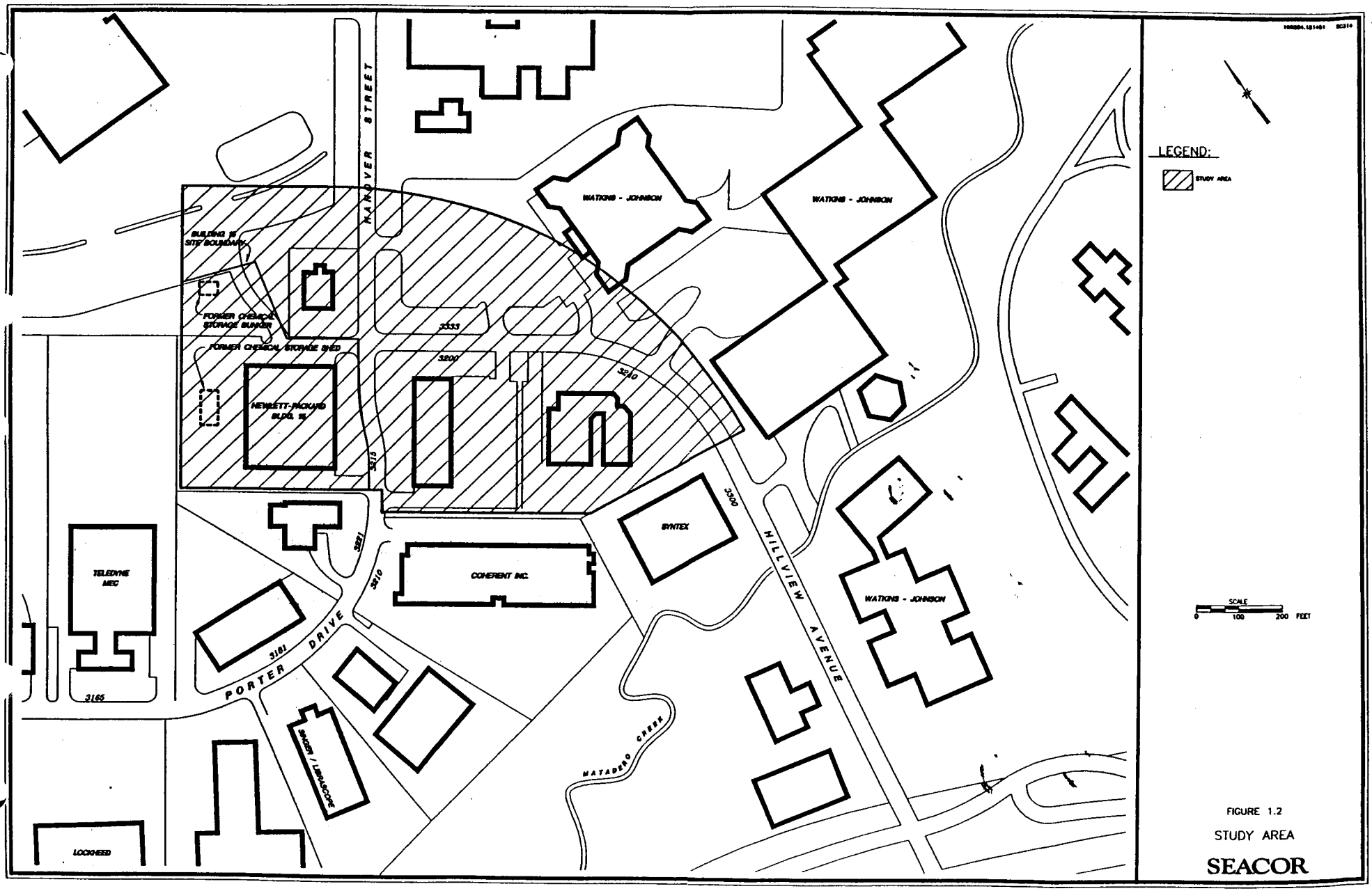


FIGURE 1.2

STUDY AREA

SEACOR

ATTACHMENT
2

TABLE 2.1

GROUNDWATER REMEDIAL GOALS FOR THE STUDY AREA[1]

COMPOUND	CALIFORNIA MCL (ug/L)	FEDERAL MCL (ug/L)
BENZENE	1	5
CARBON TETRACHLORIDE	.5	5
CHLOROBENZENE	30	100
CHLOROFORM	100	100
1,1-DICHLOROETHANE	5	
1,1-DICHLOROETHYLENE	6	7
1,2-DICHLOROETHYLENE (TOTAL)	6*	-
1,2-DICHLOROPROPANE	5	-
ETHYL BENZENE	680	-
FREON 113	1200	
METHYLENE CHLORIDE	-	5
TETRACHLOROETHYLENE	5	5
TOLUENE	100**	-
1,1,1-TRICHLOROETHANE	200	200
TRICHLOROETHYLENE	5	5
XYLENES	1750	-

Source: California MCLs from 22 CCR 6444.5.
Federal MCLs from Federal Register 55:30865, July 27, 1990.
and Federal Register 57:31776, July 1992.

Note:
[1] The groundwater remedial goal is the more stringent of state and federal MCLs.
* Drinking water standards for 1,2-dichloroethylene are for the cis isomer, the state and federal MCL for the trans isomer is 10 ppb.
** Toluene has no MCL. California Action Level listed here from DHS Technology and Risk Assessment Unit, July 1991.
- Indicates that no standard has been established.

TABLE 2.2

SOIL REMEDIATION GOALS[1]

CHEMICALS	LOCATION SPECIFIC SOIL REMEDIATION GOALS	
	Chemical Storage Bunker (mg/kg)	Chemical Storage Shed (mg/kg)
ACETONE	64	21.39
CHLOROBENZENE	-[2]	>0.037[3]
1,1-DICHLOROETHANE	0.299	0.078
1,1-DICHLOROETHYLENE	0.48	0.2
1,2-DICHLOROETHYLENE	0.427	0.167
METHYL ISOBUTYL KETONE	-	11.54
METHYLENE CHLORIDE	3.61	0.363
TETRACHLOROETHYLENE	-	>0.047[3]
TOLUENE	19000	3050
1,1,1-TRICHLOROETHANE	401	367
TRICHLOROETHYLENE	2.22	0.96

Notes: [1] Soil remediation goals were derived from MYGRT2, which is a modelling tool used to predict transport of chemicals from soil to groundwater.

[2] Chemical compound not detected at this location.

[3] The soil cleanup value presented is greater than the average of maximum concentrations detected in soil at this location. Based on this soil concentration, the concentration on groundwater at the property boundary will be approximately zero.

TABLE 4.1

SOIL REMEDIATION GOALS[1]

CHEMICALS	CHEMICAL DILUTION PIT SOIL REMEDIATION GOALS
	Chemical Dilution Pit (mg/kg)
ACETONE	318.32
CHLOROBENZENE	-[2]
1,1-DICHLOROETHANE	-
1,1-DICHLOROETHYLENE	-
1,2-DICHLOROETHYLENE	-
METHYL ISOBUTYL KETONE	-
METHYLENE CHLORIDE	0.21
TETRACHLOROETHYLENE	61.1
TOLUENE	154
1,1,1-TRICHLOROETHANE	-
TRICHLOROETHYLENE	1.26

Notes: [1] Soil remediation goals were derived from MYGRT2, which is a modelling tool used to predict transport at chemicals from soil to groundwater.

[2] Chemical compound not detected at this location.

ATTACHMENT
3

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

REGION 2
700 HEINZ AVE., SUITE 200
BERKELEY, CA 94710-2737
(510) 540-3724

March 28, 1995

COPY

Ms. Kathy Herzing
Hewlett-Packard Company
1501 Page Mill Road, M/S 5U-E
Palo Alto, California 94304

Dear Ms. Herzing:

HEWLETT-PACKARD BUILDING 15 SITE, ORDER NO. HSA 88/89-024
HEWLETT-PACKARD BUILDINGS 28 A,B,C SITE, ORDER NO. HSA 90/91-007

DTSC has completed review of SECOR's February 27, 1995 letter proposing amendments to the proposed groundwater monitoring plan. Hewlett-Packard Company has requested the following modifications to the groundwater monitoring plan, consistent with DTSC's February 6, 1995 letter regarding the Hillview Porter Regional coordinated sampling program. These changes are approved.

1. Measurement of water levels in all wells on a quarterly basis, instead of monthly. These measurements shall be taken the first Monday of February, May, August and November. If Monday is a holiday, the water level elevations shall be measured on the Tuesday directly following. As adjacent Sites have not completed implementation of their final remedial actions, access should be provided to wells if these Sites need water elevation or chemistry data more frequently than collected by the Hewlett-Packard Building 15 or Buildings 28 A,B,C sites. DTSC may increase the sounding frequency in response to proposed changes to the final remedial action(s) or in response to changing Site conditions.

2. Modification of the reporting requirements to submit the information required in the quarterly reports on a semiannual basis. These reports shall be combined with the semiannual report to be submitted the last working day of June and with the annual report to be submitted by January 15.

3. Quarterly status reports, containing the information required in the monthly reports, shall be submitted quarterly by the last day of the months of March, June, and September and by January 15.

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Hewlett-Packard Company has also requested modification of the sampling objectives for the quarterly, semiannual and annual groundwater sampling events. The Department concurs with these modifications. The primary objective of the quarterly sampling event will be to assess the potential concentrations changes or trends in the areas of highest trichloroethene (TCE) concentration within each respective flow zone. The additional objectives of the semiannual sampling event will be 1) to provide an adequate number of monitoring locations to enable the preparation of isoconcentration contour maps for each respective flow zone; 2) assess potential changes in plume boundaries; and 3) assess concentration trends in the interior portions of the 1,1-DCE plume in the saturated alluvium at the Building 15 Site. The additional objective of the annual sampling event will be to provide a comprehensive picture of the VOC distribution on an annual basis within each respective flow zone. The change in sampling objectives changed the sampling frequency established for many of the wells at each Site. The approved changes are outlined below by Site:

Hewlett-Packard Buildings 28 A,B,C Site

MW-4, MW-7, MW-8, MW-17, MW-74, MW-75, MW-107, and AL-10 will be sampled on a quarterly basis. If a sample cannot be collected from MW-4, extraction well AL-15 will be sampled quarterly.

MW-3, MW-9, MW-106, AL-13, SC1-13, and SC1-15 will be sampled on a semiannual basis. If a sample cannot be collected from MW-9, extraction well AL-14 will be sampled semiannually.

MW-5, MW-6, MW-10, MW-13, MW-14, MW-15, MW-82, MW-83, AL-11, AL-12, AL-14, AL-15, SC1-12, and SC1-14 will be sampled on an annual basis. If a sample cannot be collected from MW-10, MW-12 will be sampled annually.

MW-1, MW-2, MW-11, MW-12, and MW-108 will be eliminated from the sampling program, although MW-12 will be sampled if a sample cannot be collected from MW-10 as part of the annual sampling event. Water elevation measurements will still be collected from these wells as part of the sounding program. MW-2 has been consistently dry since December 1993 and cannot be sampled. The remaining wells are eliminated as VOC levels have consistently either been non-detect or well below cleanup goals (MCLs) and there are other nearby wells which will provide water quality data at the plume boundaries.

Hewlett-Packard Building 15 Site

MW-10, EW-17, MW-18, MW-24, MW-25, MW-36, MW-50, MSC1-2, MSC2-1, AL-2, AL-5, SC1-3, SC1-10, SC1-11, SC2-3, and SC2-5 will be sampled on a quarterly basis.

MW-1, MW-2, MW-6, MW-8, MW-11, MW-16, MW-28, MW-33, MW-34, MW-40, MW-46, MSC1-1, AL-3, AL-6, AL-7, AL-8, AL-9, SC1-1, SC1-2, SC1-6, SC1-7, SC1-8, SC1-17, SC1-18, and SC2-1 will be sampled on an semiannual basis.

MW-4, MW-5, MW-9, MW-12, MW-15, MW-19, MW-20, MW-21, MW-22, MW-23, MW-26, MW-29, MW-31, MW-32, MW-35, MW-39, MW-41, MW-43, MW-48, MW-49, MSC1-3, AL-1, SC1-4, SC1-5, SC1-9, SC1-16, SC2-2, and SC2-4 will be sampled on an annual basis.

MW-14, MW-30, MW-42, MW-47, and MW-76 will be eliminated from the sampling program, but will continue to be part of the sounding program. MW-47 and MW-30 have been consistently dry and cannot be sampled. MW-22 will provide water quality data for the area monitored by MW-14. MW-76 and MW-42 have VOC levels consistently either non-detect or well below cleanup goals (MCLs) and are not needed to define plume boundaries.

If you have any questions, please contact me at (510) 540-3833.

Sincerely,

Janet Naito
Unit Chief
Site Mitigation Branch

cc: See next page

cc: Assemblyman Byron Sher
c/o Betsy Shotwell
702 Marshall Street #290
Redwood City, California 94063

Supervisor Dianne McKenna
c/o Alice Sicular
70 West Hedding Street
San Jose, California 95110

Mr. Lee Esquibel
Santa Clara County
Dept./Environmental Health
P.O. Box 26070
San Jose, California 95159-6070

Mr. John Joynt
Barron Park Association Fdn.
3589 Laguna Avenue
Palo Alto, California 94306

Dr. Inge Harding-Barlow
Barron Park Association
3717 Laguna Avenue
Palo Alto, CA 94306

Mr. Haptemarian Kifle
S.F. Bay RWQCB
2101 Webster Street, #500
Oakland, California 94612

Mr. Tom Iwamura
Santa Clara Vly Water
5750 Almaden Expressway
San Jose, California 95118

Ms. Doris Maez
City of Palo Alto
250 Hamilton Avenue
Palo Alto, California 94301

Ms. Paula Kakimoto
Stanford Management Company
2770 Sand Hill Road
Menlo Park, California 94025

Mr. Will Beckett, President
Barron Park Association
4189 Baker Avenue
Palo Alto, California 94306

Ms. Marie Lacey
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco, CA 94105

Mr. Bruce Scarborough
SECOR
90 New Montgomery Street #620
San Francisco, California 94105

FILE COPY

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

REGION 2
700 HEINZ AVE., SUITE 200
BERKELEY, CA 94710-2737
(510) 540-2122

February 6, 1995

SAME LETTER SENT TO ATTACHED LIST

REVISED REPORTING REQUIREMENTS FOR SITES WITHIN THE HILLVIEW-PORTER REGION

The Department of Toxic Substances Control (DTSC) is providing the following guidance for the coordinated creek and groundwater monitoring programs being conducted at sites within the Hillview-Porter Region of the Stanford Research Park (SRP) in Palo Alto. This guidance applies to individual sites within the SRP, as well as to the Regional Site monitoring program. As these sites have or soon will have implemented final remedial actions, this guidance was developed to ensure consistency in the sampling and analysis procedures and reporting practices among sites. This letter supersedes and replaces the Department's April 13, 1990, letter.

The reporting timeframes for the quarterly reports will continue the current schedule as follows: December through February, March through May, June through August, and September through November.

The DTSC recognizes that each of the SRP sites, and the Regional site, may have specific issues related to data collection that will allow the use of schedules other than as outlined in the following sections. For instance, it may be appropriate for water levels to be collected on a quarterly basis, instead of a monthly basis, in some locations where the density of data collection points or where the data is sufficient to warrant variation from monthly monitoring. The following schedule will serve as the default monitoring program schedule unless DTSC has approved an alternative schedule for a particular site or the Regional program.

MONITORING REQUIREMENTS

All well locations and benchmarks in Matadero Creek used to measure surface water levels should be surveyed to the Santa Clara Valley Water District benchmark TBM-SYNTEX ("Square cut in

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upstream headwall, Matadero Creek and Hillview Avenue; elevation 85.01 MSL"). Well elevations, groundwater levels and surface water levels shall be presented in reports as relative to mean sea level (MSL). MSL is currently equivalent to NGVD, which is the datum used to survey all of the Santa Clara Valley Water District benchmarks.

Surface water elevations, if part of existing monitoring and/or Operation and Maintenance requirements, and groundwater elevations in all monitoring wells, extraction wells, and piezometers associated with each site investigation and the regional program shall be measured on the first Monday of each month, unless an alternative schedule has been approved by DTSC. If Monday is a holiday, the elevations shall be measured on the Tuesday directly following.

Designated monitoring and extraction wells shall be sampled quarterly unless DTSC has approved an alternative sampling schedule. This quarterly sampling shall take place during and be completed by the end of the first full week of the following four months February, May, August and November. Quarterly sampling performed as part of the Regional Program shall be completed by the end of the second week of each of the four months in which sampling occurs.

Designated monitoring and extraction wells must be sampled and analyzed using EPA Method 8010, modified to include analysis for cis- and trans-1,2-dichloroethene, and Freon 113 unless DTSC has approved an alternate analyze list. Additional analyses may be required by the Department, as appropriate. Additionally, the responsible parties (RPs) for all sites shall notify DTSC if the above sampling and analysis is inadequate to detect all known chemicals of concern for the site; additional analytical methods should be recommended/used to detect additional chemicals.

REPORTING REQUIREMENTS

Monthly Reports

Monthly summary reports shall be submitted to DTSC by the fifteenth day of the month following the month in which the work was accomplished. However, for those months where quarterly monitoring is reported, monthly reports may be incorporated into the quarterly reports. The monthly report shall include the following information:

1. Specific actions taken by or on behalf of the RPs during the previous month, actions expected to be undertaken during the current month, and planned activities for the next month.

2. A discussion regarding operation of the final remedial action. This should include a discussion of problems encountered and how they were resolved. This should also include a discussion of operating parameters, such as extraction rates, flow rates, etc. Significant maintenance items must also be discussed.

3. Any requirements of the Order scheduled to be completed during the month that were not completed and any problems, or anticipated problems, with complying with the Order.

4. Boring logs for any soil borings, and well completion forms for wells installed.

5. Analytical results (laboratory reports) from any samples required by DTSC which were not a part of the routine quarterly monitoring, BAAQMD or NPDES sampling requirements.

Six months following the date of the Department's approval of the report documenting implementation and full operation of the final remedial action, the RP may request that the Department modify this reporting requirement to submit this information on a quarterly, rather than a monthly basis. This request must be in writing and provide sufficient documentation to demonstrate that the final remedial action is operating in a manner which would not require monthly reporting. If the Department determines that it is appropriate, the monthly reporting requirements may be modified to require this information on a quarterly basis and may be combined with the quarterly reports, as discussed below.

If the Department approves the quarterly submittal of this report, the Department will require implementation of the following procedures for reporting problems with the final remedial action implemented. Significant problems encountered should be discussed in the report required under this section. Generally, if the problem is repaired within 24 hours after discovery, no additional reporting will be required. The exception to this rule would be any break in the secondary containment, or a release from any component of the treatment system. If these problems occur or if any component of the extraction and/or treatment system will not be operating for greater than 24 hours after discovery, the RPs must notify the Department within 24 hours after discovery with the following information:

1. The type of problem and when it occurred
2. Steps taken to rectify the problem
3. The length of time required to resolve the problem
4. Steps taken to prevent reoccurrence

5. A schedule for bringing the component or system back on-line.

In the event of permit violations, the Department should be notified at the same time as the permitting agency.

QUARTERLY REPORTS

Quarterly reports shall be submitted to DTSC by the last day of the month following the month in which quarterly sampling was performed. The reports for the Regional monitoring program will be due 15 days following these dates. However, for those quarters when semi-annual reports are submitted, the quarterly reports may be incorporated into the semi-annual reports. The quarterly report for the November sampling event may be incorporated into the semi-annual/annual report.

The quarterly reports shall, at a minimum, contain the following information:

1. The information required for monthly reports, unless the monthly report is submitted separately.

2. Creek and monitoring well measurements. This shall include a table with the following information:

   - o Well number or stream measurement point number
   - o Top of casing elevation
   - o Screened interval/depth
   - o Zone screened (e.g., Qal, Qsc, shallow vs. deep, etc.)
   - o Date and time water level measurement was taken
   - o Depth to groundwater
   - o Groundwater and creek elevations
   - o Well volume calculation
   - o Time and date well or creek location was sampled
   - o Amount of water removed (identify whether well was dewatered)
   - o Record of parameters monitored during purging (i.e., pH, temperature, conductivity, turbidity).

3. Tables compiling sample results of all groundwater and surface water samples.

4. A very brief discussion of the sampling and analysis methodology and quality assurance/quality control measures taken.

5. Any deviations from the Quality Assurance Project Plan (QAPP) during this sampling event should be noted, along with the rationale for the change.

6. A brief discussion of the sample results. Any significant changes from previous sampling should be noted.

7. A brief discussion of significant trends noted in the groundwater elevations. Vertical and horizontal gradients should be discussed.

8. Groundwater contour maps for water bearing units beneath the site as specified by DTSC for the previous quarter. This will include maps for only the month in which chemical sampling occurred, unless otherwise required by DTSC. These groundwater contour maps should include data from adjacent sites, as appropriate.

9. A map showing all well and creek sampling locations.

10. A discussion of the influent and effluent monitoring data (including groundwater and/or vapor sample results) from the treatment systems collected as part of the final remedial action.

11. A section summarizing any violations of the NPDES requirements for those sites operating treatment systems with NPDES permits or interim authorization letters. This should include a table summarizing sample results for sampling conducted as part of NPDES permit violation corrective actions.

Following two quarters of sampling after the Department's approval of the report documenting implementation and full operation of the final remedial action, the RP may request that the Department modify this reporting requirement to submit this information on a semi-annual, rather than a quarterly basis. This request must be in writing and provide sufficient documentation to demonstrate that the final remedial action is operating in a manner which would not require quarterly reporting. If the Department determines that it is appropriate, the quarterly reporting requirements may be modified to require this information on a semi-annual basis, and may be combined with the semi-annual reports, as discussed below.

Semi-Annual Reports

Semi-annual reports shall be submitted on January 15 and June 30. The January 15 semi-annual report may be incorporate in the annual report (discussed below). The Regional semi-annual reports will be due January 30 and July 15. The following information is to be included in the semi-annual report:

1. All information required in the quarterly report.

2. A brief discussion of sample results, including significant changes from previous sampling episodes as well as significant trends noted. This discussion is not intended to be an evaluation of the effectiveness of remediation.

3. Isoconcentration maps for key chemicals and water bearing units beneath the site as specified by DTSC. The isoconcentration and groundwater contour maps (as specified for quarterly reports) must include data from adjacent sites, as appropriate. Isoconcentration maps will be generated for the most recent sampling event.

4. All field sampling forms, chain-of-custody forms and laboratory analysis reports should be included as appendices.

Annual Reports

The Department will require that each site conduct an annual performance review for their respective groundwater extraction and treatment systems. Annual reports shall be submitted to DTSC annually on January 15th, to allow incorporation of the November groundwater sampling data. The Regional annual reports shall be due January 30th. These reports may be combined with the November quarterly sampling report, as appropriate. A specific annual performance review will not be required every fifth year, as the above elements will be required, included and expanded upon in the mandatory five-year review. The need for annual reviews will be evaluated as part of the five-year review. The annual report must include the following information:

1. All information required in the semi-annual report.

2. An annual performance review for each site which has groundwater extraction and treatment systems, or other remedial systems. This review must include, at a minimum, the following information:

   - An introduction which describes 1) the purpose of the report; 2) the location of the site and 3) a brief summary of the site history.
   - A description of the remedial action(s) implemented.
   - A description of significant problems encountered and significant adjustments made to the system(s) during the past year.
   - Tables containing all of the required sampling and monitoring results for the year being reported, along

with a table containing the historical analytical data and figures(s) showing the monitoring and sampling locations.

- A summary of the flow rates and operating pressures for each groundwater extraction well. The capture zones achieved by the groundwater extraction system should also be included.

- Tables and/or figures illustrating the effectiveness of the treatment system (e.g., figures or tables showing carbon usage and the time for breakthrough).

- A summary of documents submitted to other agencies to comply with permit requirements of the Regional Water Quality Control Board (RWQCB) or the Bay Area Air Quality Management District (BAAQMD). Any permit violations which occurred during the past year must be discussed, along with a description of the steps taken to return to compliance.

- A description of any trends noted and significant anomalies identified should be included. Progress toward achieving remediation goals, including pounds of VOCs removed, should be reported. Data from the adjacent sites should be included and evaluated, as appropriate.

- A description of the rationale for any proposed modifications to the system or the operation of the system, along with a proposed schedule for implementation of these modifications.

Regional Data Compilation and Evaluation Reports

The Hillview-Porter Regional Site Data Compilation and Evaluation (DC/E) Reports will be required once a year, to be submitted on April 15th. The DC/E report will be based on November sampling data and will be presented in the approved format for DC/E reports. The DC/E report may be incorporated into the Regional quarterly report that is due April 15th.

Data Distribution and Coordination

The RPs shall provide summary tables of the confirmed data generated from the water level measurements and from the sample analyses to each other within 5 working days upon request. In addition, copies of each site's quarterly, semi-annual, and annual reports shall be submitted to the regional consultant

responsible for preparing the DC/E report at the same time of submittal of these reports to DTSC.

We appreciate your cooperation in this manner. If you have any questions, please contact the DTSC project manager for your site.

Sincerely,

for Barbara J. Cook, P.E.,
Branch Chief
Site Mitigation Branch

cc: See Next Page

cc: Supervisor Dianne McKenna
c/o Ms. Alice Sicular
70 West Hedding Street
San Jose, CA 95110

Mr. Lee Esquibel
Santa Clara County
Department of Environmental Health
P.O. Box 26070
San Jose, CA 95159-6070

Mr. Habtemariam Kifle
Regional Water Quality Control Board
2101 Webster Street, #500
Oakland, CA 94612

Dr. Inge Harding-Barlow
3717 Laguna Avenue
Palo Alto, CA 94306

Mr. John Joynt
Barron Park Association Fdn.
3589 Laguna Avenue
Palo Alto, CA 94306

Ms. Marianne Strickfaden
P.O. Box 3043
Stanford, CA 94309

Stanford Management Company
2770 Sand Hill Road
Menlo Park, California 94025
Attn: Paula Kakimoto

Mr. Tom Iwamura
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Ms. Doris Maez
City of Palo Alto
250 Hamilton Avenue
Palo Alto, CA 94301

Ms. Marie Lacey
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco, CA 94105

Mr. Arthur Bayce
1029 Paradise Way
Palo Alto, CA 94306

Mr. Will Beckett,
President
Barron Park Association
4189 Baker Avenue
Palo Alto, CA 94306

Assemblyman Byron Sher
c/o Ms. Betsy Shotwell
702 Marshall St. #290
Redwood City, CA 94063

SAME LETTER SENT TO THE FOLLOWING LIST

Coherent, Inc. Site, 3210 Porter Drive, Palo Alto, California - Order No. I/S&E 90/91-995

Coherent, Inc.
5100 Patrick Henry Drive
P.O. Box 54980
Santa Clara, California 95056-0980
Attn: Gregory M. Geary

Forensic Management Associates, Inc.
400 South El Camino Real
Suite 1050, 10th Floor
San Mateo, California 94402

Hewlett-Packard Building 15 Site, 3215 Porter Drive, Palo Alto, California - Order No. HSA 88/89-024

Hewlett Packard Company
1501 Page Mill Road, M/S 5U-E
P.O. Box 10151
Palo Alto, California 94303-0889
Attn: Kathy Herzing

Hewlett Packard Buildings 28ABC Site, Corner of Page Mill Road and Porter Drive, Palo Alto, California - Order No. HSA 89/90-007

Hewlett Packard Company
1501 Page Mill Road, M/S 5U-E
P.O. Box 10151
Palo Alto, California 94303-0889
Attn: Kathy Herzing

Kaiser Aerospace & Electronics Corporation
2710 Orchard Parkway
San Jose, California 95134
Attn: John Balkwill

Hillview-Porter Site, Palo Alto, California - Order No. HSA 88/89-012 (Amended December 19, 1994)

Mr. Peter Johnson
Johnson Associates
900 Galvin Drive
El Cerrito, California 94530

Lockheed Building 255 Site, 3170 Porter Drive, Palo Alto, California - Consent Order No. HSA 90/91-020

Lockheed Missiles & Space Company, Inc.
1111 Lockheed Way, 0/47-10, B/101
Sunnyvale, California 94089-3504
Attn: Melissa Henck

SmithKline and French Laboratories Site, 3400 Hillview Avenue, Palo Alto, California - Order No. HSA 88/89-005

General Instrument Corporation of Delaware
181 West Madison Avenue, 49th Floor
Chicago, Illinois 60602
Attn: Susan M. Meyer, Esq.

Gould, Inc.
35129 Curtis Boulevard
East Lake, Ohio 44095
Attn: Craig Bush

Monsanto Company
800 N. Lindbergh Boulevard, G4WM
St. Louis, Missouri 63167
Attn: Mike Foresman

SmithKline Beecham Corporation
709 Swedeland Road
P.O. Box 1539
King of Prussia, Pennsylvania 19406
Attn: Monica Harper Alston

Syntex Site, 3300 Hillview Avenue, Palo Alto, California - Order No. HSA 90/91-003

HM Holdings, Inc.
c/o Lempres & Wulfsberg
Kaiser Center
300 Lakeside Drive, 24th Floor
Oakland, California 94612-3524
Attn: Mathew D. Lempres, Esq.

Syntex (U.S.A.) Inc. (representing Syntex (U.S.A.) & Syva Co.)
3401 Hillview Avenue, M/S A6-ELAW
P.O. Box 10850
Palo Alto, California 94303
Attn: William D. Jeffery, Esq.

Xerox Corporation
3333 Coyote Hill Road
Palo Alto, California 94304
Attn: David Ham

Teledyne MEC Site, 3165 Porter Drive, Palo Alto, California - Order No. HSA 90/91-004

Teledyne MEC
1274 Terra Bella Avenue
P.O. Box 7127
Mountain View, California 94039-7127
Attn: Phil Atkinson

Teledyne-Singer Site, 3176 Porter Drive, Palo Alto, California - Order No. HSA 86/87-012EO (Amended November 1991)

Loral Librascope Corporation
3501 Jamboree Boulevard, Suite 500
Newport Beach, California 92660
Attn: Sal Molina

Watkins-Johnson Company Site, 3333 Hillview Avenue, Palo Alto, California - Order No. HSA 89/90-012

Watkins Johnson Company
3333 Hillview Avenue
Palo Alto, California 94304
Attn: Mark Reedy

ATTACHMENT 4

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

REGION 2
700 HEINZ AVE., SUITE 200
BERKELEY, CA 94710-2737

June 10, 1994

Ms. Kathy Herzing
Hewlett-Packard Company
1501 Page Mill Road, M/S 5U-E
Palo Alto, California 94304

Dear Ms. Herzing:

HEWLETT-PACKARD BUILDING 15 SITE, ORDER NO. HSA 88/89-024
HEWLETT-PACKARD BUILDINGS 28 A,B,C SITE, ORDER NO. HSA 90/91-007-
ANNUAL PERFORMANCE REVIEWS

As discussed with your consultant, Mr. Ken Hoffman, SEACOR, in April 1994, the Department will require submittal of an annual performance review for the air injection/soil vapor extraction and treatment system at the Hewlett-Packard Building 15 Site and for the groundwater extraction and treatment system at the Hewlett-Packard Buildings 15 and 28 A, B,C Sites. The performance reviews for these systems may be combined into one document, if desired.

This report must include the following information:

- An introduction which describes 1) the purpose of the report; 2) the location of the Site and 3) a brief summary of the Site history.
- A description of the remedial action(s) implemented.
- A description of any problems encountered and significant adjustments made to the system(s) during the past year.
- Tables containing all of the required sampling and monitoring results for the year being reported, along with a table containing the historical analytical data and figure(s) showing the monitoring and sampling locations. Data from adjacent sites should be evaluated and included, as appropriate, to verify that the remedial action is meeting the goals stated in the final Remedial Action Plan.
- A summary of the flow rates and operating pressures for the air injection wells and for each soil vapor extraction well and the groundwater extraction wells. Verify that injected air is being captured by the extraction system should be included for the air

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injection/soil vapor extraction and treatment system. The capture zones achieved by the groundwater extraction and treatment system should be included for the groundwater extraction system.

- Tables and/or figures showing carbon usage and the time for breakthrough should be included.

- A summary of documents submitted to other agencies to comply with permit requirements and requirements of the Regional Water Quality Control Board (RWQCB) interim authorization should be included. Any violations of permit conditions or interim authorization conditions which occurred during the past year must be discussed, along with the steps taken to return to compliance.

- A description of any trends noted in the data and any anomalies noted should be included. Progress toward achieving remediation goals, including pounds of VOCs removed, should be reported.

- A description of and the rationale for any proposed modifications to the system or to the operation of the system, along with a proposed schedule for implementation of these modifications. Examples of potential modifications are expansion of the groundwater extraction system, modification of flow rates, or pulse pumping of the vapor extraction system.

The first annual performance review will be due no later than December 30, 1994, to allow the incorporation of the November groundwater sampling data. Subsequent reports will be required annually, the last working day in December. A specific annual performance review will not be required every fifth year, as the above elements will be required, included and expanded upon in the mandatory CERCLA five-year review.

If you have any questions, please contact Janet Naito at (510) 540-3833.

Sincerely,

Barbara Coler
Unit Chief
Site Mitigation Branch

cc: See next page

2017 Consolidated Annual Monitoring Report for Hillview-Porter Region

Stantec PN: 185703621



Prepared for:
Submitted on Behalf of Hillview-Porter Responding Parties

Prepared by:
Stantec Consulting Services Inc.
1340 Treat Boulevard
Suite 300
Walnut Creek, California 94597

January 31, 2018

Stantec

January 31, 2018

Ms. Jovanne Villamater
California Environmental Protection Agency
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, California 94710-2721

RE: 2017 Consolidated Annual Monitoring Report for Hillview-Porter Region

Dear Ms. Villamater:

Enclosed is the 2017 Consolidated Annual Monitoring Report for the Hillview-Porter Region. This submittal is made on behalf of the Responding Parties for nine participating sites within the Hillview-Porter Region (all sites except 3170 Porter Drive). The enclosed report presents a semi-annual status report, findings of the November 2017 monitoring event, and an annual performance review for each of the nine participating sites.

Please do not hesitate to contact me at (925) 296-2115 if you have any questions or require any additional supporting information.

Respectfully submitted,

STANTEC CONSULTING SERVICES INC.

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Table of Contents

TABLE OF CONTENTS ..... **I**

LIST OF ATTACHMENTS ..... **IV**

ABBREVIATIONS AND ACRONYMS ..... **VI**

CERTIFICATIONS ..... **VIII**

1.0 INTRODUCTION **1.1**
1.1 BACKGROUND 1.1
1.2 OVERVIEW OF REGION-WIDE VERSUS SITE-SPECIFIC HYDROGEOLOGIC DESIGNATIONS 1.2
1.3 REPORT FORMAT AND CONTENTS 1.2

2.0 SEMI-ANNUAL STATUS REPORT **2.1**

3.0 MONITORING ACTIVITIES CONDUCTED DURING REPORTING PERIOD **3.1**

4.0 3165 PORTER DRIVE (TELEDYNE MEC SITE) **4.1**
4.1 GROUNDWATER FLOW 4.1
4.2 GROUNDWATER AND SURFACE WATER QUALITY 4.2
4.3 ANNUAL PERFORMANCE REVIEW 4.3
4.3.1 Description of Remedial Systems 4.3
4.3.2 Operational and Compliance Information 4.4
4.3.3 Plume Capture Evaluation 4.5
4.3.4 Progress Made Towards Achieving Cleanup Goals 4.5
4.4 PROPOSED MODIFICATIONS 4.6

5.0 3215 PORTER DRIVE (HP BUILDING 15 SITE) **5.1**
5.1 GROUNDWATER FLOW 5.1
5.2 GROUNDWATER AND SURFACE WATER QUALITY 5.3
5.3 ANNUAL PERFORMANCE REVIEW 5.5
5.3.1 Description of Remedial Systems 5.5
5.3.2 Operational and Compliance Information 5.7
5.3.3 Plume Capture Evaluation 5.7
5.3.4 Progress Made Towards Achieving Cleanup Goals 5.8
5.4 PROPOSED MODIFICATIONS 5.9

6.0 CORNER OF PAGE MILL ROAD AND PORTER DRIVE (HP BUILDING 28 SITE) **6.1**
6.1 GROUNDWATER FLOW 6.1
6.2 GROUNDWATER AND SURFACE WATER QUALITY 6.2
6.3 ANNUAL PERFORMANCE REVIEW 6.3
6.3.1 Description of Remedial Systems 6.3

Table of Contents – continued

6.3.2 Operational and Compliance Information 6.3
6.3.3 Plume Capture Evaluation 6.3
6.3.4 Progress Made Towards Achieving Cleanup Goals 6.4
6.4 PROPOSED MODIFICATIONS 6.4

7.0 3300 HILLVIEW AVENUE 7.1
7.1 GROUNDWATER FLOW 7.1
7.2 GROUNDWATER AND SURFACE WATER QUALITY 7.2
7.3 VAPOR INTRUSION ASSESSMENT 7.4
7.4 ANNUAL PERFORMANCE REVIEW 7.10
7.4.1 Description of Remedial Systems 7.10
7.4.2 Operational and Compliance Information 7.10
7.4.3 Plume Capture Evaluation 7.10
7.4.4 Progress Made Towards Achieving Cleanup Goals 7.10
7.5 PROPOSED MODIFICATIONS 7.11

8.0 3210 PORTER DRIVE 8.1
8.1 GROUNDWATER FLOW 8.1
8.2 GROUNDWATER AND SURFACE WATER QUALITY 8.2
8.3 ANNUAL PERFORMANCE REVIEW 8.4
8.3.1 Description of Remedial Systems 8.4
8.3.2 Operational and Compliance Information 8.5
8.3.3 Plume Capture Evaluation 8.6
8.3.4 Progress Made Towards Achieving Cleanup Goals 8.6
8.4 PROPOSED MODIFICATIONS 8.6

9.0 3400 HILLVIEW AVENUE 9.1
9.1 GROUNDWATER FLOW 9.1
9.2 GROUNDWATER AND SURFACE WATER QUALITY 9.1
9.3 ANNUAL PERFORMANCE REVIEW 9.5
9.3.1 Description of Remedial Systems 9.5
9.3.2 Operational and Compliance Information 9.5
9.3.3 Plume Capture Evaluation 9.6
9.3.4 Progress Made Towards Achieving Cleanup Goals 9.6
9.4 PROPOSED MODIFICATIONS 9.8

10.0 3176 PORTER DRIVE 10.1
10.1 GROUNDWATER FLOW 10.1
10.2 GROUNDWATER AND SURFACE WATER QUALITY 10.1
10.3 ANNUAL PERFORMANCE REVIEW 10.6
10.3.1 Description of Remedial Systems 10.6
10.3.2 Operational and Compliance Information 10.6

Table of Contents – continued

10.3.3 Plume Capture Evaluation 10.7
10.3.4 Progress Made Towards Achieving Cleanup Goals 10.8
10.4 PROPOSED MODIFICATIONS 10.8

11.0 3333 HILLVIEW AVENUE 11.1
11.1 GROUNDWATER FLOW 11.1
11.2 GROUNDWATER AND SURFACE WATER QUALITY 11.2
11.3 ANNUAL PERFORMANCE REVIEW 11.3
11.3.1 Description of Remedial Systems 11.3
11.3.2 Operational and Compliance Information 11.5
11.3.3 Plume Capture Evaluation 11.5
11.3.4 Progress Made Towards Achieving Cleanup Goals 11.5
11.4 PROPOSED MODIFICATIONS 11.6

12.0 HILLVIEW-PORTER REGIONAL SITE 12.1
12.1 GROUNDWATER FLOW 12.1
12.2 GROUNDWATER AND SURFACE WATER QUALITY 12.4
12.3 ANNUAL PERFORMANCE REVIEW 12.6
12.3.1 Description of Remedial Systems 12.6
12.3.2 Operational and Compliance Information 12.7
12.3.3 Plume Capture Evaluation 12.8
12.3.4 Progress Made Towards Achieving Cleanup Goals 12.8
12.4 PROPOSED MODIFICATIONS 12.9

List of Attachments

LIST OF TABLES

Table 1	Site Status Summary
Table 2	Flow Zone Correlation Chart
Table 3	Semi-Annual Status Report
Table 4	O&M Issue and Corrective Action Log
Table 5	Monitoring Activities Conducted in November 2017
Table 6	Well Construction Details and Groundwater Elevation Data for November 2017
Table 7	Summary of Chemical Testing Results for November 2017
Table 8	Summary of Extraction System Flow Data
Table 9	Summary of Groundwater Treatment System Operational Data

LIST OF FIGURES

Figure 1	Hillview-Porter Region Map
Figure 2	Hillview-Porter Region Well and Creek Monitoring Locations
Figure 3	Groundwater Potentiometric Map – First-Encountered Groundwater – November 2017
Figure 4	Groundwater Potentiometric Map – First Groundwater Zones in Santa Clara Formation and Unnamed Sandstone – November 2017
Figure 5	Groundwater Potentiometric Map – Deeper Groundwater Zones – November 2017
Figure 6	Groundwater Potentiometric Map – Hillview-Porter Regional Site Zones B through H – November 2017
Figure 7	Vertical Gradients – November 2017
Figure 8	PCE Isoconcentration Map – First-Encountered Groundwater – November 2017
Figure 9	TCE Isoconcentration Map – First-Encountered Groundwater – November 2017
Figure 10	1,1-DCE Isoconcentration Map – First-Encountered Groundwater – November 2017
Figure 11	Hexavalent Chromium Isoconcentration Map – First-Encountered Groundwater – November 2017
Figure 12	PCE Isoconcentration Map – First Groundwater Zones in Santa Clara Formation and Unnamed Sandstone – November 2017
Figure 13	TCE Isoconcentration Map – First Groundwater Zones in Santa Clara Formation and Unnamed Sandstone – November 2017
Figure 14	1,1-DCE Isoconcentration Map – First Groundwater Zones in Santa Clara Formation and Unnamed Sandstone – November 2017

List of Attachments – continued

Figure 15 Hexavalent Chromium Isoconcentration Map – First Groundwater Zones in Santa Clara Formation and Unnamed Sandstone – November 2017
Figure 16 PCE Isoconcentration Map – Deeper Groundwater Zones – November 2017
Figure 17 TCE Isoconcentration Map – Deeper Groundwater Zones – November 2017
Figure 18 1,1-DCE Isoconcentration Map – Deeper Groundwater Zones – November 2017
Figure 19 PCE Isoconcentration Maps – Hillview-Porter Regional Site Zones B through H – November 2017
Figure 20 TCE Isoconcentration Maps – Hillview-Porter Regional Site Zones B through H – November 2017
Figure 21 1,1-DCE Isoconcentration Maps – Hillview-Porter Regional Site Zones B through H – November 2017

Note: Tables and Figures appear at end of report.

LIST OF APPENDICES

(Submitted electronically [refer to CD])

Appendix A Water Quality Sampling Records
Appendix B Historical Water Quality Summary Tables
Appendix C Laboratory Reports and Chain-of-Custody Records
Appendix D Time-Series Plots
Appendix E Quality Assurance/Quality Control Summary Tables

Abbreviations and Acronyms

AECOM	AECOM Technical Services, Inc.
AL-Zone	Alluvium Zone
APR	Annual Performance Review
Arcadis	Arcadis US Inc.
bgs	below ground surface
BPN	Barron Park Neighborhood
BTS	Blaine Tech Services
CalEPA	California Environmental Protection Agency
COC	chemical of concern
DCA	dichloroethane
DCE	dichloroethene
DCDFMe	dichlorodifluoromethane
DSC	Deeper Santa Clara
DTSC	Department of Toxic Substances Control
e.g.,	exempli gratia, meaning “for example” (Latin)
EISB	Enhanced *In Situ* Bioremediation
EPA	Environmental Protection Agency
EPC	exposure point concentration
ERD	enhanced reductive dechlorination
FRA	Final Remedial Action
Freon 12	dichlorodifluoromethane
Freon 113	trichlorotrifluoroethane
ft/ft	feet per foot
GAC	granular activated carbon
g/cm^3	grams per cubic centimeter
gpm	gallons per minute
GSU	Geological Services Unit
GWEDS	groundwater extraction and discharge system
GWETS	groundwater extraction and treatment system
HP	Hewlett-Packard
HS	HydraSleeve™
i.e.,	id est, meaning “that is” (Latin)
IRM	Interim Remedial Measure
IRZ	*in situ* reactive zone
ISCO	*in situ* chemical oxidation
J&E	Johnson and Ettinger
$KMnO_4$	potassium permanganate
LRL	laboratory reporting limit
MCL	maximum contaminant level
msl	mean sea level

Abbreviations and Acronyms – continued

NPDES	National Pollutant Discharge Elimination System
O&M	operation and maintenance
OM&M	Operations, Maintenance, and Monitoring Program
PARWQCP	Palo Alto Regional Water Quality Control Plant
PCE	tetrachloroethene
PDB	passive diffusion bag
PID	photoionization detector
ppmv	parts per million by volume
RAO	Remedial Action Order
RI	Remedial Investigation
RME	reasonable maximum exposure
RPs	Responding Parties
SC1-Zone	Santa Clara Formation Zone 1
SC2-Zone	Santa Clara Formation Zone 2
SC3-Zone	Santa Clara Formation Zone 3
SCD-Zone	Santa Clara Formation Deep Zone
SCS-Zone	Santa Clara Formation Shallow Zone
SCVWD	Santa Clara Valley Water District
SGI	Source Group, Inc.
SRP	Stanford Research Park
SVET	soil vapor extraction treatment
TCE	Trichloroethene
TCH	thermal conductive heating
µg/L	micrograms per liter
µg/m^3	microgram per cubic meter
UV/Ox	ultraviolet oxidation
VAHP	Veterans Administration Hospital Property
VC	vinyl chloride
VOC	volatile organic compound
ZVI	zero valent iron

Certifications

All hydrogeologic and geologic information, conclusions, and recommendations in this document regarding the 3165 Porter Drive Site have been prepared under the supervision of and reviewed by the certified professional whose signature appears below.

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01/30/18
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1.0 INTRODUCTION

1.1 BACKGROUND

This 2017 Consolidated Annual Monitoring Report for the Hillview-Porter Region (Consolidated Annual Monitoring Report) presents a status report, monitoring results from November 2017, and an annual performance review (APR) for nine sites located within the area referred to as the Hillview-Porter Region, City of Palo Alto, California. The Hillview-Porter Region consists of nine sites located within the Stanford Research Park (SRP) and the Hillview-Porter Regional Site, which consists of the Veterans Administration Hospital Property (VAHP); the portion of Barron Park Neighborhood (BPN) bounded by El Camino Real, Arastadero Road, Miranda Avenue, and the southern property boundary of Varian Associates; and the stretch of Matadero Creek between Foothill Expressway and El Camino Real (see Figure 1, Hillview-Porter Region Map).

Given the contiguous nature of the sites and the desire to evaluate monitoring and remediation efforts on a region-wide basis, eight of the nine sites in the SRP and the Hillview-Porter Regional Site submitted a proposal to the Department of Toxic Substances Control (DTSC) dated September 19, 2001, to consolidate the annual reporting requirements into a single region-wide report. The proposal for a consolidated report was approved by DTSC in a letter dated October 26, 2001.

This 2017 Consolidated Annual Monitoring Report is submitted to the DTSC on behalf of the Responding Parties or RPs for eight of the nine sites within the SRP and the Hillview-Porter Regional Site. The RPs for the SRP site located at 3170 Porter Drive elected not to participate. Sites participating in this Consolidated Annual Monitoring Report and the RPs named in the corresponding site-specific Remedial Action Orders (RAOs) issued by DTSC are identified below.

- 3165 Porter Drive: (Teledyne Electronic Technologies and the Board of Trustees of the Leland Stanford Jr. University [Stanford]);
- 3215 Porter Drive (HP Building 15 Site): (HP Inc. or HP [formerly Hewlett-Packard Company] and Stanford);
- Corner of Page Mill Road and Porter Drive (HP Building 28 Site): (HP [formerly Hewlett-Packard Company], Kaiser Aerospace and Electronics, and Stanford);
- 3300 Hillview Avenue: (Xerox Corporation, Millennium Holdings LLC. [formerly HM Holdings Inc.], Roche Palo Alto LLC [representing Syntex (U.S.A.) Inc. and Syva Co.], Coherent Inc. [Coherent], and Stanford);
- 3210 Porter Drive: (Coherent Inc., Millennium Holdings [formerly HM Holdings Inc.], and Stanford);
- 3400 Hillview Avenue: (GlaxoSmithKline Corporation [formerly SmithKline Beecham Corporation], Gould Electronics [Formerly Gould, Inc.], Pharmacia LLC (f/k/a Monsanto Company) formerly Solutia Inc., Vishay GSI, Inc. [formerly General Semiconductor], and Stanford);
- 3176 Porter Drive: (Teledyne Electronic Technologies, Lockheed Martin Corporation [formerly Loral Librascope Corporation], and Stanford);

- 3333 Hillview Avenue: (Triquint Semiconductor [formerly Watkins Johnson Company] and Stanford); and

- Hillview-Porter Regional Site: Coherent, Inc., Vishay GSI, Inc. [formerly General Semiconductor, Inc.] Gould Electronics Inc. [Formerly Gould Inc.], Millennium Holdings LLC. [formerly HM Holdings Inc.], HP [formerly Hewlett-Packard Company], Kaiser Aerospace & Electronics Corporation, Lockheed Martin Corporation, Missiles and Space, Lockheed Martin Librascope Corporation [formerly Loral Librascope Corporation], Pharmacia LLC (f/k/a Monsanto Company) formerly Solutia Inc., GlaxoSmithKline Corporation [formerly SmithKline Beecham Corporation], Roche Palo Alto, LLC (Representing Syntex (U.S.A.) Inc. and Syva Co.), Teledyne Electronic Technologies, Stanford, Watkins Johnson Company, and Xerox Corporation.

A profile for each participating SRP site and the Hillview-Porter Regional Site is provided in Table 1. Table 1 identifies the parties named by DTSC in the site-specific RAOs, type of contamination (e.g., chemicals detected in soil and groundwater), cleanup activities undertaken, and a brief description of the remediation and monitoring status for each participating site. For a more detailed description and history of each participating site, the reader is referred to the DTSC-approved site-specific Remedial Action Plan prepared for each site.

1.2 OVERVIEW OF REGION-WIDE VERSUS SITE-SPECIFIC HYDROGEOLOGIC DESIGNATIONS

Groundwater flow and contaminant distribution interpretations included in this Consolidated Annual Monitoring Report are presented on a region-wide basis versus a site-specific basis. Groundwater elevation and chemical testing results for the 3170 Porter Drive site are included in the data tables and interpretive figures, but the results are not discussed in this report. An overview of the hydrogeologic zonal designation scheme used in this report is described below.

This Consolidated Annual Monitoring Report presents region-wide interpretations of groundwater flow patterns and contaminant distributions for three groundwater flow zone designations: (1) First-Encountered Groundwater, (2) First-Groundwater Zones in Santa Clara Formation and Unnamed Sandstone, and (3) Deeper Groundwater Zones. These flow zone designations are the same designations historically mapped in the region-wide interpretations. These flow zone designations facilitate mapping of groundwater flow patterns and groundwater contaminant distribution across the SRP sites and the shallow-most groundwater zone (Alluvium Zone A) underlying the Hillview-Porter Regional Site. Table 2 correlates the site-specific flow zones mapped at each of the SRP sites and the Hillview-Porter Regional Site with the three region-wide flow zone designations adopted for this report. A region-wide base map showing well and creek sampling locations for all SRP sites and the Hillview-Porter Regional Site is included as Figure 2.

Except for selected wells at the 3333 Hillview Avenue Site, deeper groundwater flow zones identified for the Hillview-Porter Regional Site (Zones B through H) have not been correlated with SRP site flow zones, and therefore, are not included on the region-wide maps. Potentiometric and isoconcentration maps for the Hillview-Porter Regional Site flow zones B through H are presented separately.

1.3 REPORT FORMAT AND CONTENTS

This Consolidated Annual Monitoring Report is organized as follows:

Section 2.0: Presents a Status Report for each participating site for the reporting period June 1 through November 30, 2017 (summarized on Tables 3 and 4).

Introduction
January 31, 2018

Section 3.0: Presents a summary of monitoring activities conducted at each participating site in November 2017 (summarized on Table 5).

Section 4.0 through Section 12.0: Describes the monitoring results and an APR for each participating site. The APR includes a brief description of the groundwater remediation systems including any significant modifications made during 2017 (2017 is defined as December 1, 2016 through November 30, 2017), a summary of 2017 operational data and compliance status, a plume capture evaluation, a discussion of progress made towards achieving groundwater cleanup goals, and proposed modifications.

Tables and Figures: Well construction details, depth-to-groundwater, and groundwater elevation data collected during the November 2017 monitoring event are presented in Table 6. Figures 3 through 5 present region-wide groundwater potentiometric maps for First-Encountered Groundwater, First-Groundwater Zones in Santa Clara Formation and Unnamed Sandstone, and Deeper Groundwater Zones, respectively. Figure 6 presents groundwater potentiometric maps for flow zones B through H underlying the Hillview-Porter Regional Site. Figure 7 presents the direction and magnitude of calculated vertical gradients at selected well pairs that screen distinctly different flow zones.

Table 7 summarizes chemical testing results for groundwater and surface water samples analyzed during the November 2017 monitoring event. Table 7 presents results for nine VOCs that have historically been detected in groundwater and/or surface water within the Hillview-Porter Region. Tetrachloroethene (PCE), trichloroethene (TCE), and 1,1-dichloroethene (DCE) are the chemicals most frequently detected in the Hillview-Porter Region. Monitoring for hexavalent chromium, a by-product of *in situ* chemical oxidation (ISCO), is being conducted at the following three participating sites: (1) 3165 Porter Drive, (2) 3215 Porter Drive, and (3) 3333 Hillview Avenue. Chemical isoconcentration maps for PCE, TCE, and 1,1-DCE for each of the three region-wide flow zones and the Hillview-Porter Regional Site Zones B through H and hexavalent chromium isoconcentration maps for two region-wide flow zones are presented in Figures 8 through 21.

Table 8 presents groundwater extraction volumes and average extraction rates for individual extraction wells and the combined extraction system (where operational) during 2017. Table 9 presents performance data for the groundwater treatment systems (where operational), including volume of water extracted, influent and effluent concentration data, and the estimated total VOC mass removed.

Two sites (3333 Hillview Avenue and the Corner of Page Mill Road and Porter Drive) do not operate groundwater extraction and treatment systems (GWETS). Three sites (3165 Porter Drive, 3215 Porter Drive, and 3300 Hillview Avenue) operate a groundwater extraction system, but do not operate a treatment system. Groundwater extracted from these sites was historically conveyed and treated at the HP groundwater treatment plant located at 3215 Porter Drive. In January 2017, the HP groundwater treatment plant was shut down and decommissioned to facilitate property redevelopment. Groundwater conveyance piping and associated control systems for the 3215 Porter Drive (HP Building 15), 3165 Porter Drive (Teledyne MEC), 3300 Hillview Avenue, and Hillview-Porter Regional Sites were re-routed to the Hillview-Porter Regional Site treatment plant at 3215 Porter Drive. The retrofitted Hillview-Porter Regional Site treatment plant came back on-line in late April 2017.

Introduction
January 31, 2018

Appendices: Submitted electronically on enclosed CD.

Appendix A contains water quality sampling records with detailed sampling information and field parameter measurements, where applicable.

Appendix B contains summary tables with historical water quality data.

Appendix C contains complete laboratory reports and chain-of-custody records for the November 2017 monitoring event.

Appendix D contains time-series plots for key chemical(s) of concern in key wells.

Appendix E contains quality assurance/quality control summary tables.

Semi-Annual Status Report
January 31, 2018

2.0 SEMI-ANNUAL STATUS REPORT

A semi-annual status report is summarized in Table 3. Table 3 includes the following information for each participating site:

- Actions completed during reporting period;
- Actions anticipated during next reporting period; and
- Reports submitted to other agencies during reporting period.

Monitoring activities conducted at each participating site during the reporting period is described in Section 3. Monitoring results for each participating site are discussed in Sections 4 through 12. Seven of the nine participating sites within the Hillview-Porter Region are currently implementing groundwater extraction and treatment as their groundwater remedy. The remaining two participating sites within the Hillview-Porter Region (3333 Hillview Avenue and Corner of Page Mill Road and Porter Drive) historically operated groundwater extraction and treatment systems. Groundwater extraction systems at these two sites are currently shut down with DTSC approval.

Operational information for the active groundwater extraction and treatment systems is provided in the APR for each participating site. An operation and maintenance (O&M) log for those sites where groundwater remediation systems operated during the reporting period is provided on Table 4. The O&M log describes incidents that occurred during the reporting period resulting in planned or unplanned downtime to one or more system components and the corrective actions taken. The O&M log is not intended to be a comprehensive record of routine O&M activities conducted at the participating sites, but provide details on significant incidents or maintenance occurring during the reporting period.

Innovative *in situ* treatment technologies to treat volatile organic compound (VOC)-affected groundwater have been implemented at several Hillview-Porter Region sites. ISCO using potassium permanganate ($KMnO_4$) was implemented at the 3215 Porter Drive and 3165 Porter Drive sites between 2001 and 2005. ISCO was also implemented at the 3333 Hillview Avenue site in 2006. Pilot studies to evaluate enhanced *in situ* bioremediation (EISB) were implemented at 3333 Hillview Avenue in 2014 and 2016 and at 3215 Porter Drive in 2015 and 2016. At 3176 Porter Drive, an *in situ* reactive zone (IRZ) technology utilizing enhanced reductive de-chlorination (ERD) to supplement groundwater extraction and treatment was implemented from 2001 through June 2009. In 2014, a pilot test to evaluate thermal conductive heating (TCH) technology for removal of contaminant mass from saturated soils was implemented at 3176 Porter Drive. ERD pilot test activities have also been conducted since 2014 at the 3400 Hillview Avenue Site in concert with the ongoing groundwater extraction and treatment.

3.0 MONITORING ACTIVITIES CONDUCTED DURING REPORTING PERIOD

The monitoring activities undertaken at each participating site during the November 2017 monitoring event are summarized on Table 5. Table 5 includes the following information for each participating site:

- Number of wells sounded for groundwater elevation and date performed;
- Wells and surface water locations sampled and date performed;
- Sampling methods used for each well (e.g., bailer, Well Wizard®, passive diffusion bag [PDB] active extraction well, etc.);
- Analysis methods used for each sample location; and
- Comment field describing any deviations, irregularities, or qualifiers to the DTSC-approved routine monitoring schedule or methods for each participating site.

A region-wide base map showing well and creek sampling locations for all SRP sites and the Hillview-Porter Regional Site is included as Figure 2. Water quality sampling records containing sampling information and field parameter measurements collected during sampling are included in Appendix A.

3165 Porter Drive (Teledyne MEC site)
January 31, 2018

4.0 3165 PORTER DRIVE (TELEDYNE MEC SITE)

4.1 GROUNDWATER FLOW

Depth-to-groundwater in all accessible monitoring wells, piezometers, and extraction wells was measured on November 6, 2017. Wells at the 3165 Porter Drive Site (also referred to as Teledyne MEC Site) are screened within multiple flow zones with the following site-specific designations: Alluvium Zone (AL-Zone), Santa Clara Formation Zone 1 (SC1-Zone), Santa Clara Formation Zone 2 (SC2-Zone), Santa Clara Formation Shallow Zone (SCS-Zone), Santa Clara Formation Deeper Zone (SCD-Zone), and the Deeper Santa Clara Formation Zone (DSC). Most wells are screened across either the SC1-Zone or SC2-Zone. Depth-to-groundwater and groundwater elevations calculated for the November 2017 event are presented on Table 6. Groundwater elevations recorded this period remain within recent historical ranges.

Nine monitoring and extraction wells (EW-S1, EW-S5, EW-S7, MW-S2, MW-S4, MW-S9, MW-S10, MW-S14, and P-3) were decommissioned in November 2016 and January 2017 to accommodate property redevelopment. Four monitoring wells (MW-S11, MW-S12, MS-S13, and MW-S15) were capped and buried in 2017 to protect them during redevelopment. Accordingly, depth-to-water in these wells was not measured in November 2017. These wells will be restored and completed at final grade after redevelopment is complete.

As depicted on Figure 5, regional groundwater flow within the SC2-Zone is directed towards the east and southeast. A regional groundwater gradient of 0.009 ft/ft was calculated using groundwater elevations between wells MW-7 (83.08 feet msl) located at 3165 Porter Drive and SC2-2 (74.87 feet msl) located at 3333 Hillview Avenue. As with the SC1-Zone, groundwater flow is locally affected by pumping from extraction wells SC2-3 and SC2-5. Extraction creates localized depressions in the groundwater surface near the extraction well and groundwater flow is directed towards the well.

As depicted on Figure 5, regional groundwater flow within the SC2-Zone is directed towards the east and southeast. A regional groundwater gradient of 0.007 ft/ft was calculated using groundwater elevations between wells P-1 (81.98 feet msl) located at 3165 Porter Drive and SC2-2 (74.87 feet msl) located at 3333 Hillview Avenue. As with the SC1-Zone, groundwater flow is locally affected by pumping from the 3215 Porter Drive Site extraction wells SC2-3 and SC2-5. Extraction creates localized depressions in the groundwater surface near the extraction well and groundwater flow is directed towards the well.

Vertical groundwater gradients between adjacent water-bearing zones for the November 2017 monitoring event were calculated using the groundwater elevation measurements of co-located well pairs with screens in the different water-bearing zones. To determine the vertical gradient at well location pairs, the groundwater elevation of the lower unit was subtracted from the groundwater elevation of the upper unit, and divided by the distance between the mid-screen elevations of the two wells.

Vertical gradient potentials calculated for selected well pairs that screen distinctly different flow zones are listed in the table below and shown on Figure 7. The well pair MW-S11 and MW-S12 could not be accessed during this monitoring period because they are buried for protection during property redevelopment activities. The vertical gradients calculated for this monitoring period are consistent with previous results.

Well Cluster	Hydraulic Zone	Calculated Vertical Hydraulic Gradient (ft/ft)
		November 2017
MW-13	Upper Alluvium Zone	---
P-2	Lower Alluvium Zone	0.028
MW-S12	Santa Clara Zone 1	---
MW-S11	Santa Clara Zone 2	NM

Notes:
Positive numbers reflect an upward gradient; negative numbers reflect a downward gradient.
Depths of screened intervals and groundwater elevations are presented in Table 6.
Gradients calculated using elevation difference between well screen mid-points.
NM – groundwater elevation data was not available as these wells were buried for protection during Site redevelopment.

4.2 GROUNDWATER AND SURFACE WATER QUALITY

Groundwater samples were collected from two monitoring wells (P-3R and MW-16) and four active extraction wells (EW-2, EW-3, EW-S5R, and EW-S13R) on November 6, 2017. Samples for hexavalent chromium were collected from extraction wells EW-2 and EW-3 on December 13, 2017, due to a miscommunication. All samples were analyzed for VOCs by United States Environmental Protection Agency (EPA) Method 8260B. Samples from wells EW-2 and EW-3 were also analyzed for hexavalent chromium using EPA Method 7199A. The method used to sample each well in November 2017 is identified on Table 5.

VOC Results

Consistent with historical results, TCE and 1,1-DCE are the VOCs detected in groundwater beneath the 3165 Porter Drive Site at the highest frequency and greatest concentration. VOC results from November 2017 for each VOC-affected zone is discussed below.

Five SC1-Zone wells (EW-2, EW-3, EW-S5R, EW-S13R, and MW-16) and one SC2-Zone well (P-3R) were sampled in November 2017. TCE was detected in all five SC1-Zone wells, with concentrations ranging from 2.3 micrograms per liter (µg/L) in EW-S5R to a maximum of 58 µg/L in EW-S13R. TCE concentrations reported in most SC1-Zone wells are consistent with recent historical data. Results judged to be significantly different or indicative of a trend are described below.

- The TCE concentration in MW-16 in November 2017 was the lowest reported to date at 6.9 µg/L.
- The TCE concentration in extraction well EW-2 has remained less than 20 µg/L since November 2014.
- The TCE concentration in extraction well EW-3 increased from November 2015 and November 2014, but has remained less than 50 µg/L since November 2014.

1,1-DCE was detected in two SC1-Zone wells sampled during the November 2017 monitoring event (EW-3 and EW-S13R) and SC2-Zone well P-3R, with concentrations ranging 0.69 µg/L in EW-3 to 3.1 µg/L in EW-S13R. The 1,1-DCE concentrations in all wells sampled were below the cleanup goal of 6 µg/L.

Other VOCs detected in one or more of the wells sampled in November 2017 were cis-1,2-DCE, dichlorodifluoromethane (Freon 12), trichlorotrifluoroethane (Freon 113), and chloroform. All detected concentrations were below established cleanup goals.

Hexavalent Chromium Results

Hexavalent chromium was detected in extraction wells EW-2 and EW-3 in November 2017 at concentrations of 41 µg/L and 2,300 µg/L, respectively. Hexavalent chromium results are described below.

- EW-2 – The hexavalent chromium concentration was 41 µg/L in November 2017 which is a slight increase from November 2016 (37 µg/L), but still a decrease from November 2015 (49 µg/L). Hexavalent chromium in this well has shown an overall decline in concentration since October 2007.
- EW-3 – The hexavalent chromium concentration was 2,300 which is an increase from November 2016. The November 2016 hexavalent chromium concentration of 1,700 µg/L was the lowest concentration reported since first sampled in November 2008. The maximum hexavalent chromium concentration reported for EW-3 was 28,000 µg/L in May 2009.

4.3 ANNUAL PERFORMANCE REVIEW

4.3.1 Description of Remedial Systems

The groundwater remedy for the Teledyne MEC Site includes groundwater extraction and treatment. The extraction system was installed between October 1993 and January 1994. Groundwater extraction began on January 31, 1994. As constructed, the groundwater extraction system included six extraction wells installed in the SC1-Zone and the SC2-Zone. Extracted groundwater was conveyed via subsurface piping to the groundwater treatment plant located at 3215 Porter Drive (HP treatment plant). Extracted groundwater was treated using three liquid-phase granular activated carbon (GAC) vessels connected in series. Treated groundwater was then discharged to the local storm drain system, which ultimately discharged to Matadero Creek under the requirements of a National Pollutant Discharge Elimination System (NPDES) Permit (NPDES No. CAG912002, Order No. R2-2012-0012).

ISCO treatment was performed adjacent to four SC1-Zone wells (EW-2, EW-3, EW-S7, and MW-S9) in June 2005. Post-injection monitoring was subsequently performed on a weekly basis for one month, a monthly basis for two months, and a quarterly basis from November 2005 to February 2009. Approximately 2,500 gallons of $KMnO_4$–bearing groundwater was pumped from off-line extraction wells EW-3 and EW-S7 during late October/Early November 2007 to remove groundwater containing elevated hexavalent chromium concentration levels. Two of the off-line extraction wells were placed back into service in August 2006 (SC1-Zone well EW-2 and SC2-Zone well EW-S1). The remaining two off-line extraction wells (EW-3 and EW-S7) were placed back into service after a chromium pre-treatment system was installed at the HP treatment plant in July 2009.

3165 Porter Drive (Teledyne MEC site)
January 31, 2018

As described in the DTSC-approved *"Groundwater Remediation Facility Reconfiguration Work Plan, 3181/3221/3215 Porter Drive, Palo Alto, California" (Work Plan),* dated June 2, 2016, and the *"Addendum to the Groundwater Remediation Facility Reconfiguration Work Plan, 3181/3221/3215 Porter Drive, Palo Alto, California" (Work Plan Addendum),* dated August 2, 2016, the 3215 Porter Drive (HP Building 15) and 3165 Porter Drive (Teledyne MEC) Sites remediation facilities were reconfigured to accommodate property redevelopment. The HP groundwater treatment plant was decommissioned in January 2017. Groundwater conveyance piping and associated control systems for the 3215 Porter Drive, 3165 Porter Drive, 3300 Hillview Avenue, and Hillview-Porter Regional Sites were re-routed to the Hillview-Porter Regional Site treatment plant at 3215 Porter Drive.

The remediation facility reconfiguration project included removing four Teledyne MEC extraction wells (EW-S1, EW-S5, EW-S7, and EW-S13) from service and installing two new Teledyne MEC SC1-Zone extraction wells (EW-S5R and EW-S13R) and one monitoring well (MW-S15) on the adjacent 3221 Porter Drive parcel. Extraction and monitoring well installation and testing was documented in the November 16, 2016, "*Extraction Well Installation and Hydraulic Assessment Report."* The groundwater extraction system was shut down on January 4, 2017 to complete the facility reconfiguration. The reconfigured groundwater remediation facilities came on-line in late April 2017. The reconfigured extraction system consists of four extraction wells (EW-2, EW-3, EW-S5R, and EW-S13R) screened in the SC1-Zone. Extracted groundwater is now conveyed and treated at the Hillview-Porter Regional Site treatment plant.

Six monitoring wells (MW-S2, MW-S4, MWS-9, MW-S10, MW-S14, and P-3) and three extraction wells (EW-S1, EW-S5, and EW-S7) were decommissioned to accommodate the redevelopment. One former extraction well (EW-S13) was converted to a monitoring well and renamed MW-S13. SC2-Zone monitoring well P-3 was decommissioned and a replacement well (P-3R) was installed on the 3165 Porter Drive property in September 2017.

Monitoring wells that will remain for future monitoring use were capped and buried to protect them during construction. Four wells on the 3181 Porter Drive parcel (MW-S11, MW-S12, MW-S13, and MW-S15) were capped and buried for protection during property redevelopment. These wells will be restored and completed at final grade after redevelopment construction is complete.

4.3.2 Operational and Compliance Information

As described in Section 4.3.1, the Teledyne MEC Site extraction system was shut down on January 4, 2017, to accommodate the DTSC-approved facility reconfiguration associated with property redevelopment. The HP groundwater treatment plant was subsequently decommissioned in January 2017. The reconfigured groundwater extraction facilities came on-line in late April 2017.

Following startup in April 2017, the reconfigured groundwater extraction system operated throughout the annual reporting period, except for downtime incidents noted in Table 4, those presented in the report entitled "*May 2017 Semi-Annual Groundwater Extraction Monitoring Report, Former Teledyne MEC Site, 3165 Porter Drive, Palo Alto, California*," dated June 23, 2017, and minor shutdowns (less than 24 hours) for system maintenance and/or repairs.

Between November 7, 2016 and December 13, 2017, an estimated 806,284 gallons of groundwater, as metered at the individual wells, was extracted (see Table 8). The combined average flow rate for the extraction system during this timeframe was estimated at 1.93 gallons per minute (gpm). No significant problems with the extraction system were encountered during the reporting period.

3165 Porter Drive (Teledyne MEC site)
January 31, 2018

Prior to HP treatment plant shutdown and decommissioning in January 2017, groundwater extracted at the Teledyne MEC Site was conveyed and treated at the HP treatment plant. After facility reconfiguration, extracted groundwater from the Teledyne MEC Site was conveyed and treated at the Hillview-Porter Regional Site treatment plant. The total VOCs removed via groundwater extraction during the reporting period was estimated to be 0.148 pound (see Table 9), with a cumulative total of approximately 19 pounds since startup.

4.3.3 Plume Capture Evaluation

VOC-impacted groundwater in the SC1-Zone is captured by Teledyne MEC extraction wells EW-2, EW-3, EW-S5R, and EW-S13R. As depicted on Figure 4, extraction from Teledyne MEC Site wells and HP Building 15 Site extraction wells create a laterally extensive capture area within the SC1-Zone. Groundwater extraction from wells EW-2 and EW-3 continue to provide effective capture of VOC-impacted groundwater in the former source area at 3165 Porter Drive. The newly-installed SC1-Zone extraction wells located along the west side of Porter Drive (Teledyne MEC wells EW-S13R and EW-S5R and HP well SC1-20) in concert with existing HP extraction wells SC1-2 and SC1-19 on the east side of Porter Drive provide effective capture of VOC-impacted groundwater originating from the 3165 Porter Drive and 3215 Porter Drive Sites. Groundwater extraction from the SC2-Zone (former extraction well EW-S1) at the Teledyne MEC Site was discontinued in January 2017 as contaminant concentrations declined to below the established cleanup goals.

4.3.4 Progress Made Towards Achieving Cleanup Goals

The primary chemical present in groundwater underlying the Teledyne MEC Site is TCE. TCE concentrations have declined over the past 23 years, but remain above the cleanup goal in the SC1-Zone. Two wells with initial elevated TCE concentrations (EW-3 and EW-S7), have declined significantly since remediation efforts began in 1994. The TCE concentrations in EW-3 and EW-S7 in 1993 was 7,000 µg/L and 7,500 µg/L, respectively. The TCE concentrations in EW-3 and EW-S7 in May 2005, the last sampling event before ISCO injections, were 720 µg/L and 790 µg/L, respectively. Since the resumption of extraction in July 2009, the TCE concentration in EW-3 rebounded from non-detect to a high of 100 µg/L in November 2010. Since that time, the TCE concentration has steadily declined, reaching a concentration of 39 µg/L in November 2017. During this same post-injection time period, the TCE concentration in EW-S7 rebounded to a high of 940 µg/L in November 2010, and subsequently declined to 510 µg/L, when the well was last sampled in November 2016. Well EW-S7 was decommissioned in 2017 to accommodate property redevelopment.

In addition to wells EW-3 and EW-S7, four other wells were located within the ISCO treatment zone (EW-2, MW-S9, MW-29, and MW-30). Three of these four wells (MW-S9, MW-29, and MW-30) were decommissioned in 2017 to accommodate property redevelopment. Prior to decommissioning, TCE concentrations remained above the cleanup goal. The TCE concentration in extraction well EW-2, which never displayed visual evidence of $KMnO_4$ solution, has remained below the pre-injection concentration of 47 µg/L. In November 2017, a TCE concentration of 15 µg/L was reported in EW-2. TCE concentrations in SC1-Zone wells located down gradient from the ISCO treatment zone have been stable or declining.

Chemical concentrations in SC2-Zone wells have declined to below the cleanup goals and groundwater remediation in this zone is considered complete.

4.4 PROPOSED MODIFICATIONS

No modifications to the current DTSC-approved monitoring and reporting program are proposed.

3215 Porter Drive (HP Building 15 Site)
January 31, 2018

5.0 3215 PORTER DRIVE (HP BUILDING 15 SITE)

5.1 GROUNDWATER FLOW

Depth-to-groundwater in all accessible extraction wells, monitoring wells, and piezometers were measured on November 6, 2017. Wells at the 3215 Porter Drive site are screened within multiple flow zones with the following site-specific designations: AL-Zone, SC1-Zone, SC2-Zone, and Santa Clara Formation Zone 3 (SC2-Zone 3).

Thirteen monitoring and extraction wells (MW-4, MW-5, MW-10, MW-11, MW-12, MW-20, MW-26, MW-29, MW-30, SC1-6, SC1-8, SC1-11, and SC2-1) were decommissioned in November 2016 and January 2017 to accommodate property redevelopment. Twenty-two monitoring wells (MW-1, MW-2, MW-6, MW-9, MW-14 through MW-19, MW-21, MW-28, MW-31, MW-39, MW-41, MW-47, MW-50, MW-77 through MW-80, and PSC1-3) and three former extraction wells (AL-6, SC1-7, and SC1-16) were capped and buried in 2017 to protect them during redevelopment. Accordingly, depth-to-water in these wells was not measured in November 2017. These wells will be restored and completed at final grade after redevelopment is complete.

Depth-to-groundwater and groundwater elevations calculated from the November 2017 sounding event are presented on Table 6. Water levels increased in most monitoring wells when compared to water levels observed in November 2016. A description by flow zone is provided below.

- AL-Zone – Water levels increased in 5 of 9 monitoring wells sounded by up to 1.34 feet and decreased in four monitoring wells by up to 0.89 feet;
- SC1-Zone – Water levels increased in 8 of 12 monitoring wells sounded by up to 1.49 feet and decreased in four wells by up to 0.73 feet;
- SC2-Zone – Water levels increased in 3 of 4 monitoring wells sounded by up to 0.96 feet and decreased in one well by 0.25 feet; and
- SC3-Zone – Water level increased by 2.06 feet in the single well monitored.

As depicted on Figures 3 through 5, groundwater flow at and down gradient from 3215 Porter Drive is directed towards the east and southeast. Extraction creates localized depressions in the groundwater surface near the extraction well and groundwater flow near the well is directed towards the well. Groundwater flow patterns observed in November 2017 are similar to those interpreted in previous monitoring events.

Well clusters located at and down gradient from 3215 Porter Drive provide water-level measurement data usable for calculating vertical hydraulic gradients. Vertical hydraulic gradients were calculated using the difference between the well filter pack mid-points in well clusters. These well clusters screen the AL-Zone and Santa Clara Formation Zones. The calculated vertical hydraulic gradients for selected well clusters are listed in the table below and shown on Figure 7. Vertical gradients in November 2017 are similar to those observed in November 2016.

3215 Porter Drive (HP Building 15 Site)
January 31, 2018

Well Cluster	Hydraulic Zone	Calculated Vertical Hydraulic Gradient (ft/ft)
		November 2017
At 3215 Porter Drive		
MW-17	Alluvium Zone	---
MW-18	Santa Clara Zone-1	NM
MW-41	Santa Clara Zone-1	NM
MW-50	Santa Clara Zone-2	NM
MW-16	Alluvium Zone	---
MW-2	Santa Clara Zone-1	NM
MW-11	Santa Clara Zone-1	---
MW-12	Santa Clara Zone-2	NM
Down gradient of 3215 Porter Drive		
MW-22	Alluvium Zone	---
MW-24	Santa Clara Zone-1	-0.009
SC2-5 (ext)	Santa Clara Zone-2	-0.047
MW-49	Santa Clara Zone-3	0.103
MW-34	Alluvium Zone	---
MW-35	Santa Clara Zone-1	-0.007
MW-40	Alluvium Zone	---
MW-43	Santa Clara Zone-1	0.011

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Notes:

(ext) active extraction well – note that gradients calculated in well clusters containing an active extraction well may not represent area-wide conditions.

Positive numbers reflect an upward gradient; negative numbers reflect a downward gradient.

Depths of screened intervals and groundwater elevations are presented in Table 6.

Gradients calculated using elevation difference between well filter pack mid-points.

NM – groundwater elevation data was not available as these wells were buried for protection during Site redevelopment.

5.2 GROUNDWATER AND SURFACE WATER QUALITY

In November 2017, 29 wells were sampled and analyzed for VOCs (EPA Method 8260B) and 20 wells were sampled and analyzed for hexavalent chromium (EPA Method 7199A). Active extraction wells AL-5 and SC1-20 were additionally analyzed for dissolved arsenic and manganese by EPA Method 6010B.

Samples were collected using one of three methods: (1) directly from a dedicated sample port at the wellhead (active extraction wells only), (2) purged and sampled conventionally using a dedicated bailer, or (3) sampled using a no-purge PDB sampler for VOCs and a no-purge HydraSleeve (HS) sampler for hexavalent chromium. Groundwater sample collection with a PDB sampler is only appropriate for volatile constituents; therefore, a HS sampler was used to collect samples for non-volatile constituents (hexavalent chromium). Monitoring wells MW-77 and MW-78 continue to be sampled conventionally (purge and sampled with bailer) as testing with the PDB method in 2007 and 2008 yielded results notably lower than results obtained using the conventional sampling method. The sampling method employed to sample each well in November 2017 is identified on Table 5.

VOC Results

TCE and 1,1-DCE are the two chemicals detected in groundwater beneath and down gradient of 3215 Porter Drive at the highest frequency and greatest concentration. In November 2017, TCE, 1,1-DCE, and cis-1,2-DCE (TCE breakdown product) were detected in one or more wells above their respective cleanup goals. Historically, the highest TCE concentrations occur in source area wells located on the northwest side of Building 15. In November 2017, monitoring wells on the 3215 Porter Drive parcel, which include source area wells, were not sampled as these wells are currently buried and inaccessible during property redevelopment.

The November 2017 results are described below.

AL-Zone

Twelve AL-Zone wells were sampled in November 2017. TCE concentrations ranged from 5 µg/L to a maximum of 140 µg/L in extraction well AL-1. TCE concentrations reported in wells sampled in November 2017 are generally consistent with recent historical data and trends. Overall, TCE concentrations are declining to stable in most wells. Significant concentration changes and trends are described below.

- TCE concentrations in extraction well AL-3 and monitoring well MW-23 declined to historical low values of 16/16 µg/L (duplicate pair) and 5 µg/L, respectively in November 2017.
- The TCE concentration in monitoring well MW-22 increased from 8.9 µg/L in November 2016 to 23 µg/L in November 2017. This is the highest concentration reported in this well since 2007, but remains well below the historical high for this well.
- The TCE concentration in monitoring well MW-40 increased from 38 µg/L in November 2016 to 130 µg/L in November 2017. This is the highest concentration reported in this well since 2010, but remains well below the historical high for this well.

1,1-DCE concentrations ranged from below the laboratory reporting limit (LRL) to a maximum of 47 µg/L in extraction well AL-9. 1,1-DCE concentrations are consistent with recent historical monitoring data and trends. 1,1-DCE concentrations are declining to stable in most wells.

Other chemicals detected in one or more AL-Zone wells and the maximum concentration value in November 2017 are PCE (1.3 µg/L in AL-2), 1,1-dichloroethane or 1,1-DCA (2.9 µg/L in AL-9), Freon 113 (6.4 µg/L in MW-8), chloroform (3.7 µg/L in MW-34), and cis-1,2-DCE (5.9 µg/L in AL-7). Concentrations for all these chemicals were below their respective cleanup goal.

SC1-Zone

Thirteen SC1-Zone wells were sampled in November 2017. TCE concentrations ranged from below the LRL to a maximum concentration of 450 µg/L in monitoring well MSC1-1. TCE concentrations reported in November 2017 are generally consistent with recent historical data and trends. Overall, TCE concentrations are declining to stable in most wells. Significant concentration changes and trends are described below.

- TCE concentrations in extraction wells SC1-3 and SC1-10 declined to historical low values of 50 µg/L and 52 µg/L, respectively in November 2017.
- The TCE concentration in extraction well SC1-2 continues to decline with a recent historical low value of 110/110 µg/L (duplicate pair) in November 2017.
- The TCE concentration in monitoring well MW-33 declined from 84 µg/L in November 2016 to 50 µg/L in November 2017. This is the lowest concentration reported in this well since 1994.
- The TCE concentration in monitoring well MW-24 increased from 2.7 µg/L in November 2016 to 19 µg/L in November 2017. This is the highest concentration reported in this well since November 2014.
- The TCE concentration in newly-installed extraction well SC1-20 in November 2017 was 280 µg/L. This represents a slight concentration decline when compared to the initial sampling result of 340 µg/L in September 2016.

1,1-DCE concentrations in November 2017 ranged from below the LRL to a maximum of 390 µg/L in monitoring well MSC1-1. 1,1-DCE concentrations reported in November 2017 are consistent with recent historical monitoring data and trends, with most wells exhibiting stable or declining trends.

Other chemicals detected in one or more SC1-Zone wells and the maximum concentration value in November 2017 are PCE (0.92 µg/L in SC1-3), 1,1-DCA (1.1 µg/L in SC1-17 and SC1-18), Freon 113 (7.9 µg/L in SC1-2), chloroform (2.7 µg/L in SC1-17), and cis-1,2-DCE (6.8 µg/L in MSC1-1). With the exception of a single cis-1,2-DCE detection (MSC1-1), concentrations for these chemicals were below their respective cleanup goal.

SC2-Zone

Four SC2-Zone wells were sampled in November 2017. TCE concentrations ranged from below the LRL to 97 µg/L in extraction well SC2-3. As depicted on Figure 17, groundwater containing TCE above the cleanup goal of 5 µg/L is limited to an area east of Porter Drive in the vicinity of active extraction wells SC2-3 and SC2-5 and monitoring well

MSC2-1. 1,1-DCE concentrations in November 2017 were all below the cleanup goal of 6 µg/L, with a maximum concentration of 5.6 µg/L in extraction well SC2-5. TCE and 1,1-DCE concentrations reported in SC2-Zone wells in November 2017 are consistent with recent historical data and trends. No other VOCs were detected in SC2-Zone wells above cleanup goals.

SC3-Zone

In November 2017, no SC3-Zone wells were sampled. The single SC3-Zone well located on the Site is sampled biennially (every other year).

Hexavalent Chromium Results

The highest hexavalent chromium concentrations historically occurred within the former ISCO treatment zone on the northwest side of Building 15. However, since beginning EISB treatment in 2015, hexavalent chromium concentrations in source area wells declined to below the LRL. These rapid concentration declines were expected as the addition of carbon produces reducing redox conditions favorable for chemical reduction of hexavalent chromium to trivalent chromium. As previously noted, source area wells were not accessible for sampling in November 2017 due to the ongoing property redevelopment.

Hexavalent chromium was detected above the LRL in 1 of the 20 wells sampled in November 2017. The single hexavalent chromium detection was in AL-5 (11 µg/L), which is an active AL-Zone extraction well located on the down gradient boundary of the 3215 Porter Drive parcel. The hexavalent chromium concentration reported in AL-5 slightly exceeds the cleanup goal of 10 µg/L and is consistent with recent data from this well. Hexavalent chromium was not detected above the LRL in wells located hydraulically down gradient (southeast) of Porter Drive.

Site Boundary Extraction Well Monitoring Results

During redevelopment, active extraction wells AL-5 and SC1-20, located on the down gradient boundary of the 3215 Porter Drive parcel, are monitored semi-annually to assess potential contaminant and EISB by-product migration from the source area. The November 2017 results for AL-5 and SC1-20 reveal no evidence that increased contaminant mass (VOCs and hexavalent chromium) or EISB by-products (dissolved arsenic and manganese) are migrating from the source area to the down gradient parcel boundary.

5.3 ANNUAL PERFORMANCE REVIEW

5.3.1 Description of Remedial Systems

The groundwater remedy for the 3215 Porter Drive Site includes groundwater extraction and treatment. Given the proximity of the two Sites, the GWETS for the 3215 Porter Drive and Corner of Page Mill Road and Porter Drive Sites were designed and constructed as a single system that became operational in 1993. As constructed, the groundwater extraction system at and down gradient of 3215 Porter Drive included 21 extraction wells installed in one of the following three groundwater zones: (1) the AL-Zone, (2) the SC1-Zone, and (3) the SC2-Zone. Extracted groundwater was conveyed via subsurface piping to a central groundwater treatment plant located at 3215 Porter Drive (HP treatment plant). Extracted groundwater was treated using three liquid-phase GAC vessels connected in series. Treated groundwater was then discharged to the local storm drain system, which ultimately discharged to Matadero

Creek under the requirements of a NPDES Permit (NPDES No. CAG912002, Order No. R2-2012-0012). Groundwater extracted from the following two nearby sites was also conveyed to and treated at the HP treatment plant: (1) 3165 Porter Drive (Teledyne MEC Site) and (2) 3300 Hillview Avenue Site.

Between 2001 and 2003, HP pilot tested ISCO to treat residual VOC contaminant mass (source). In October 2004, supplemental $KMnO_4$ injections into the AL-Zone and SC1-Zone were completed within the source area. Four extraction wells (AL-6, SC1-7, SC1-8, and SC1-16) located within the source area were temporarily shut down with DTSC approval between 2001 and 2003 to facilitate ISCO. In May and June 2006, AL-Zone extraction well AL-5 and SC1-Zone extraction well SC1-11 were also shut down after sampling results revealed the presence of hexavalent chromium. Hexavalent chromium is a by-product of the ISCO treatment.

In 2009, a hexavalent chromium pre-treatment system was installed at the HP treatment plant so that groundwater extraction could be resumed. The pre-treatment system was designed to remove hexavalent chromium by the addition of chemical reductants (sodium sulfide and ferrous sulfate). Construction and startup of the pre-treatment system was completed in July 2009. Extraction wells AL-5, AL-6, SC1-7, SC1-8, and SC1-16 were restarted in July 2009 following startup of the pre-treatment system. Groundwater extracted at the adjacent Teledyne MEC Site was also conveyed and treated for hexavalent chromium at the HP treatment plant.

In February 2015, HP began a pilot study to assess EISB as a treatment technology for the 3215 Porter Drive source area. The EISB pilot study included injecting carbon substrate solution and dechlorinating microbes into source area using temporary direct-push injection points. Performance monitoring was conducted for a 12-month period following injections. Based on favorable pilot study results and Stanford's redevelopment plans, HP implemented an expanded pilot study in August 2016. The expanded pilot study included high pressure emplacement of carbon substrate, dechlorinating microbes, and microscale zero valent iron (ZVI) into both the AL-Zone and SC1-Zone.

As described in the DTSC-approved *"Groundwater Remediation Facility Reconfiguration Work Plan, 3181/3221/3215 Porter Drive, Palo Alto, California" (Work Plan),* dated June 2, 2016, and the *"Addendum to the Groundwater Remediation Facility Reconfiguration Work Plan, 3181/3221/3215 Porter Drive, Palo Alto, California" (Work Plan Addendum),* dated August 2, 2016, the 3215 Porter Drive (HP Building 15) and 3165 Porter Drive (Teledyne MEC) Sites remediation facilities were reconfigured to accommodate property redevelopment. The HP groundwater treatment plant was decommissioned in January 2017. Groundwater conveyance piping and associated control systems for the 3215 Porter Drive, 3165 Porter Drive, 3300 Hillview Avenue, and Hillview-Porter Regional Sites were re-routed to the Hillview-Porter Regional Site treatment plant at 3215 Porter Drive.

The remediation facility reconfiguration project included removing six HP extraction wells (AL-6, SC1-6, SC1-7, SC1-8, SC1-11, and SC1-16) from service and installing one new HP SC1-Zone extraction well (SC1-20) on the down gradient 3215 Porter Drive parcel boundary. Extraction well installation and testing was documented in the November 16, 2016, "*Extraction Well Installation and Hydraulic Assessment Report."* The groundwater extraction system and HP treatment plant were shut down on January 6, 2017 to complete the facility reconfiguration. The reconfigured remediation facilities came on-line in late April 2017. The current extraction system consists 15 extraction wells extracting from the AL-Zone, SC1-Zone, and SC2-Zone. Extracted groundwater is now conveyed and treated at the Hillview-Porter Regional Site treatment plant.

Thirteen Building 15 Site monitoring and extraction wells were decommissioned to accommodate the redevelopment. Three Building 15 Site extraction wells (AL-6, SC1-7, and SC1-16) were converted to monitoring wells. Monitoring

wells that will remain for future monitoring use were capped and buried to protect them during construction. Twenty-two wells at 3215 Porter Drive (MW-1, MW-2, MW-6, MW-9, MW-14 through MW-19, MW-21, MW-28, MW-31, MW-39, MW-41, MW-47, MW-50, MW-77 through MW-80, and PSC1-3) and three former extraction wells (AL-6, SC1-7, and SC1-16) were capped and buried. These wells will be restored and completed at final grade after redevelopment construction is complete.

5.3.2 Operational and Compliance Information

As described in Section 5.3.1, the 3215 Porter Drive GWET system was shut down on January 6, 2017, to accommodate the DTSC-approved facility reconfiguration associated with property redevelopment. The HP groundwater treatment plant was subsequently decommissioned in January 2017. The reconfigured groundwater extraction facilities came on-line in late April 2017.

Following startup in April 2017, the reconfigured extraction system operated continuously, except for downtime incidents noted in Table 4, those presented in the report entitled *"Combined Semi-Annual Status Report and Monitoring Report,"* dated June 30, 2017, and minor shutdowns (less than 24 hours) for system maintenance and/or repairs. Between November 21, 2016 and November 28, 2017, an estimated 4,254,482 gallons of groundwater, as metered at the individual wells, was extracted by the extraction well network at and down gradient from 3215 Porter Drive (see Table 8). The combined average flow rate for the extraction system during this timeframe was estimated at approximately 11 gpm. No significant problems with the extraction system were encountered during the annual reporting period.

Prior to HP treatment plant shutdown and decommissioning in January 2017, extracted groundwater was conveyed and treated at the HP treatment plant. Following facility reconfiguration, extracted groundwater was conveyed and treated at the Hillview-Porter Regional Site treatment plant at 3215 Porter Drive. Details regarding the Hillview-Porter Regional Site treatment plant operation are provided in Section 12 of this report.

Between November 22, 2016 and January 6, 2017, an estimated 894,711 gallons of groundwater was treated at the HP treatment plant and subsequently discharged to a City of Palo Alto storm drain tributary to Matadero Creek. This total includes groundwater produced from the 3215 Porter Drive Site (HP Building 15), the 3165 Porter Drive Site (Teledyne MEC), and the 3300 Hillview Avenue Site. An additional 9,465 gallons of rain water and residual water drained from the GAC vessels was processed through the HP treatment plant between January 6 and 27, 2017. Total VOCs treated prior to decommissioning was estimated to be 0.53 pounds. There were no violations of the NPDES requirements while the HP treatment plant was operational.

5.3.3 Plume Capture Evaluation

The newly-configured groundwater extraction system at 3215 Porter Drive includes 15 active extraction wells pumping groundwater from the following three VOC-impacted flow zones: AL-Zone – 7 extraction wells; SC1-Zone – 6 extraction wells; and SC2-Zone – 2 extraction wells. Estimated hydraulic capture areas created by these extraction wells are depicted graphically on Figures 3 through 5, respectively. Plume containment performance was also assessed by evaluating chemical concentration changes in monitoring wells down gradient and outside the extraction system influence. Plume capture evaluation for each flow zone is discussed below.

AL-Zone

Estimated capture areas created by AL-Zone extraction wells at and down gradient from 3215 Porter Drive are depicted on Figure 3. As depicted on Figure 3, well-established cones of depression are evident around all seven active AL-Zone extraction wells. The extraction well network effectively captures VOC-impacted groundwater within the saturated alluvial wedge underlying and down gradient of 3215 Porter Drive. EISB in lieu of pumping from former source area extraction well AL-6 does appear to be effectively controlling contaminant flux from the source area. Monitoring well DH-3 located on the north side of Matadero Creek at 3333 Hillview Avenue (former Watkins-Johnson site) monitors groundwater quality down gradient of the AL-Zone extraction well network. The TCE concentration in well DH-3 has declined since pumping began from a high of 830 µg/L in 1995 to 19 µg/L in November 2017.

SC1-Zone

Estimated capture areas created by SC1-Zone extraction wells at and down gradient from 3215 Porter Drive are depicted on Figure 4. As depicted on Figure 4, well-established cones of depression are evident around all six active SC1-Zone extraction wells. The three newly-installed SC1-Zone extraction wells located along the west side of Porter Drive (HP well SC1-20 and Teledyne MEC wells EW-S13R and EW-S5R) in concert with existing HP extraction wells SC1-2 and SC1-19 on the east side of Porter Drive provide effective capture of VOC-impacted groundwater originating from 3215 Porter Drive and 3165 Porter Drive. Further down gradient, three HP extraction wells (SC1-3, SC1-17, and SC1-18) provide hydraulic containment of the commingled VOC plume. EISB in lieu of pumping from former source area extraction wells SC1-8, SC1-11, SC1-7, and SC1-16 does appear to be effectively controlling contaminant flux from the source area. SC1-Zone monitoring well MSC1-2 monitors groundwater quality down gradient of the SC1-Zone extraction well network. The TCE concentration in monitoring well MSC1-2 has declined since pumping began from a high of 720 µg/L in 2000 to below 18 µg/L in November 2017.

SC2-Zone

Estimated capture areas in the SC2-Zone are depicted on Figure 5. As depicted on Figure 5, a large cone of depression is evident around the two active extraction wells operating at 3200 Hillview Avenue down gradient from the 3215 Porter Drive parcel. Pumping from extraction wells SC2-3 and SC2-5 provides capture of the TCE plume within the SC2-Zone as depicted on Figure 17. SC2-Zone monitoring well MSC2-1 monitors groundwater quality down gradient of the SC2-Zone extraction well network. Over the past seven years (2009-2016), the TCE concentration in MSC2-1 has been near the cleanup goal, with values ranging from 4.9 µg/L to 6.3 µg/L. A TCE value of 5.3 µg/L was reported in MSC2-1 in November 2017.

5.3.4 Progress Made Towards Achieving Cleanup Goals

Groundwater extraction and treatment over the past 24 years has substantially reduced VOC concentrations and effectively contained VOC plumes originating at both the 3215 Porter Drive and Corner of Page Mill Road and Porter Drive Sites (HP Building 15 and 28). TCE and 1,1-DCE concentrations have declined substantially since 1993.

From startup in September 1993 until its decommissioning in January 2017, approximately 240 million gallons of groundwater have been extracted and treated, resulting in removal of an estimated 642 pounds of VOCs. These totals include groundwater and VOCs from the 3215 Porter Drive and Corner of Page Mill Road and Porter Drive Sites and groundwater and VOCs conveyed to the HP treatment plant from the 3300 Hillview Avenue, 3165 Porter

Drive, and 3210 Porter Drive Sites. Beginning in April 2017, groundwater extracted from the 3215 Porter Drive Site is now conveyed and treated at the Hillview-Porter Regional Site treatment plant. Operational information for the Hillview-Porter Regional Site treatment plant is provided in Section 12 of this report.

The chemical removal rate from groundwater extraction has diminished substantially since startup as chemical concentrations have declined. Groundwater extraction effectiveness is dependent on hydrogeologic properties, including the heterogeneity of the affected media and physical properties of the chemicals and subsurface. TCE sorbs and desorbs from soil particles, and relatively low contaminant concentrations in fine-grained strata within an aquifer can present an ongoing source of dissolved contaminants above drinking water standards for a long time. Hence, while progress towards achieving the cleanup goals has been made, reaching the cleanup goals via groundwater extraction alone is expected to take many more years.

As concluded in the *"Fourth Five-Year Remedial Action Status and Effectiveness Evaluation Report"* (Five-Year Review Report), dated February 14, 2014, the current groundwater remedy is protective of human health and the environment and continues to make progress towards attaining the cleanup goals. Attaining the cleanup goals using groundwater extraction alone is predicted to take many more years. Based on this assessment, HP evaluated remedial enhancement technologies that are capable of depleting residual sorbed-phase VOC mass within the source area. Further reductions in source area mass are expected to in turn enable the existing pump-and-treat system and natural attenuation processes to further reduce contaminant concentrations and reduce the overall time to complete remediation.

In 2015 and 2016, HP conducted EISB pilot studies to assess whether this *in situ* technology can accelerate source area remediation. Performance monitoring data obtained to date suggest EISB can effectively destroy in place. Based on the initial pilot study findings, an expanded pilot study using EISB combined with ZVI was recommended and initiated with DTSC approval in August 2016. Preliminary performance monitoring data for the EISB/ZVI pilot study was collected in November 2016. Future performance monitoring to assess the long-term efficacy of EISB/ZVI is planned once redevelopment is complete.

5.4 PROPOSED MODIFICATIONS

No modifications to the current DTSC-approved monitoring and reporting program are proposed.

Corner of Page Mill Road and Porter Drive (HP Building 28 site)
January 31, 2018

6.0 CORNER OF PAGE MILL ROAD AND PORTER DRIVE (HP BUILDING 28 SITE)

6.1 GROUNDWATER FLOW

Depth-to-groundwater in all accessible monitoring wells and piezometers were measured on November 6, 2017. Wells at the Corner of Page Mill Road and Porter Drive site are screened within multiple flow zones with the following site-specific designations: AL-Zone, SC1-Zone, and DSC. Depth-to-groundwater and groundwater elevations calculated from the November 2017 sounding event are presented on Table 6. Between November 2016 and November 2017, water levels rose in all 35 of 36 wells monitored by up to 8.29 feet. AL-Zone monitoring well MW-13 remained dry.

As depicted on Figures 3 through 5, groundwater flow is directed towards the east and southeast. Groundwater flow patterns in November 2017 are similar to those interpreted in previous monitoring events. Pursuant to the DTSC-approved shutdown which began in 1997, groundwater extraction wells were not operational during this reporting period.

Well clusters provide water-level measurement data usable for calculating vertical hydraulic gradients. Vertical hydraulic gradients were calculated using the difference between the well filter pack mid-points in well clusters. These well clusters screen the AL-Zone and Santa Clara Formation Zones. The calculated vertical hydraulic gradients are listed in the following table below and shown on Figure 7. The vertical gradient from the SC1-Zone to the overlying AL-Zone is upwards at both well clusters monitored. The vertical gradient from the DSC to the overlying SC1-Zone is also upwards at both well clusters monitored. Vertical gradients observed in November 2017 are similar to those historically observed at the Site.

Corner of Page Mill Road and Porter Drive (HP Building 28 site)
January 31, 2018

Well Cluster	Hydraulic Zone	Calculated Vertical Hydraulic Gradient (ft/ft)
		November 2017
MW-4	Alluvium Zone	---
MW-7	Santa Clara Zone-1	0.004
MW-15	Deeper Santa Clara Zone	0.086
MW-82	Alluvium Zone	---
MW-106	Santa Clara Zone-1	0.040
MW-107	Deeper Santa Clara Zone	0.046

Notes:
Positive numbers reflect an upward gradient; negative numbers reflect a downward gradient.
Depths of screened intervals and groundwater elevations are presented in Table 6.
Gradients calculated using elevation difference between well filter pack mid-points.

6.2 GROUNDWATER AND SURFACE WATER QUALITY

In November 2017, 16 wells were sampled and analyzed for VOCs (EPA Method 8260B). Well MW-83 located at the adjacent HP 1501 Page Mill Road site (1501 PMR Site) was sampled for VOCs in August 2017 as part of the 1501 Page Mill Road Site monitoring program. One monitoring well scheduled to be sampled was not sampled because it was dry (MW-13). As noted on Table 5, all groundwater samples were collected using a PDB sampler.

Consistent with historical results, TCE is the chemical detected at the highest frequency and greatest concentration in groundwater. In November 2017, TCE and cis-1,2-DCE were the only VOCs detected above their respective cleanup goals. The November 2017 results for each VOC-affected zone are described below.

AL-Zone

Seven AL-Zone wells were sampled in November 2017. TCE concentrations ranged from 19 µg/L to a maximum of 160 µg/L (MW-82). TCE concentrations in 5 of 7 AL-Zone wells monitored in November 2017 are higher than concentrations reported in November 2016, but in each case, remain well below their historical high values. For example, the TCE concentration in AL-11 increased from 9.3 µg/L in November 2016 to 19 µg/L in November 2017; however, the 2017 TCE concentration remains below the historical maximum concentration of 75 µg/L in March 1993. Wells MW-74 and MW-82 have historically been dry and were last sampled in 2012 and 2013, respectively. TCE concentrations in both of these wells were higher when compared to the last sampling event, but remain well below their historical high values. The only other VOC detected above cleanup goals was cis-1,2-DCE, which was detected at a maximum concentration of 29 µg/L in MW-74.

SC1-Zone

Eight SC1-Zone wells were sampled in November 2017. TCE concentrations ranged from below the LRL to a maximum of 160/160 µg/L (duplicate pair from SC1-15). TCE concentrations in SC1-Zone wells monitored in November 2017 are similar to recent results, with the following exception. TCE was detected in MW-6 (1.9 µg/L) for the first time since 1994. The only other VOC detected above cleanup goals was cis-1,2-DCE, which was detected at a maximum concentration of 20 µg/L in MW-106.

Deeper Santa Clara Zone

One DSC Zone well was sampled in November 2017 (MW-107). Between 2008 and 2015, the TCE concentration in MW-107 steadily increased from below the cleanup goal to a maximum of 24 µg/L in November 2015. Given the upward vertical gradients and the lower and declining TCE concentrations observed in the overlying SC1-Zone and AL-Zone wells MW-106 and MW-82, the source of the increasing trend in MW-107 appears to be related to lateral migration of VOC-affected groundwater from an up gradient source. In November 2017, the TCE concentration in MW-107 declined to 18 µg/L, suggesting a reversal of the increasing concentration trend.

6.3 ANNUAL PERFORMANCE REVIEW

6.3.1 Description of Remedial Systems

The remedy for Corner of Page Mill Road and Porter Drive Site (HP Building 28) included groundwater extraction and treatment from two VOC-affected zones. The GWETS was designed and constructed as a single system in conjunction with 3215 Porter Drive (Building 15 Site) and became operational in 1993. From 1993 to 1997, groundwater was extracted from ten extraction wells completed in two hydrogeologic zones: the AL-Zone and the SC1-Zone. Extracted groundwater was conveyed via subsurface piping to the HP groundwater treatment plant located 3215 Porter Drive. In 1997, the DTSC approved a trial shutdown of the groundwater extraction system. The groundwater extraction system remained shut down throughout this reporting period.

In July and August 2017, eight former Building 28 inactive extraction wells (AL-11 through AL-15, and SC1-12, through SC1-14) were converted to groundwater monitoring wells. Additionally, one intermediate valve station (IVS-4) and six electrical pull boxes were decommissioned during this same period. Extraction well conversion activities were documented in the November 17, 2017, *"Implementation Report for Extraction Well Conversions, 3145 Porter Drive (Former HP Building 28 Site, Palo Alto), California"* submitted to the DTSC.

6.3.2 Operational and Compliance Information

The extraction wells did not operate during 2017 pursuant with the trial shutdown approved by the DTSC in a letter dated April 15, 1997. As noted above, eight of the ten extraction wells were converted to monitoring wells in July and August 2017.

6.3.3 Plume Capture Evaluation

A capture area evaluation was not performed, as groundwater extraction has not occurred since 1997. Groundwater migrating from this site is captured down gradient by the extraction well network operating at 3215 Porter Drive.

Corner of Page Mill Road and Porter Drive (HP Building 28 site)
January 31, 2018

6.3.4 Progress Made Towards Achieving Cleanup Goals

Groundwater extraction did occur from 1993 to 1997. A DTSC-approved trial shutdown began in 1997. Since cessation of extraction in 1997, VOC concentrations have declined or remained stable, except in well MW-107. The TCE concentration increase observed in MW-107 between 2008 and 2015 is attributed to migration from an up gradient source. Based on recent sampling results, the increasing TCE concentration trend in MW-107 appears to be reversing. As noted in Section 6.2, the TCE concentration in AL-11 increased from 9.3 µg/L in November 2016 to 19 µg/L in November 2017. While this increase is notable, the 2017 TCE concentration in AL-11 remains below the pre-shut down level of 32 µg/L in 1997 and the historical maximum concentration of 75 µg/L in March 1993. Resuming groundwater extraction is not expected to accelerate cleanup. VOC-affected groundwater is captured further down gradient by the 3215 Porter Drive (Building 15 Site) extraction well network.

Cessation of extraction was also recommended to ensure adequate water is available for down gradient extraction wells at 3215 Porter Drive, where VOC concentrations are significantly higher. Continued cessation of pumping from wells at the Corner of Page Mill Road and Porter Drive site is recommended to ensure adequate water available remains available for down gradient extraction wells.

6.4 PROPOSED MODIFICATIONS

No modifications to the current DTSC-approved monitoring and reporting program or the groundwater remediation system are proposed.

3300 Hillview Avenue
January 31, 2018

7.0 3300 HILLVIEW AVENUE

7.1 GROUNDWATER FLOW

Water levels were measured on November 6, 2017. Groundwater elevations in monitored wells are presented in Table 6. Figure 3 shows that First-Zone groundwater flow during November 2017 was generally toward the northeast. Groundwater elevations in First-Zone monitoring wells were consistent with recent historical data. On average, groundwater elevations in the upper zone (Zone 1) decreased approximately 0.3 feet between November 2016 and November 2017.

Figure 4 shows that Second-Zone groundwater flow during November 2017 was generally toward the northeast with local variations.

Vertical hydraulic gradients calculated from water-level measurements at well pairs that screen distinctly different zones were downward in well pairs MW-E/EB and upward in well pairs MW-G/GB during November 2017. The calculated vertical hydraulic gradients are listed in the table below and shown on Figure 7.

Well Cluster	Hydraulic Zone	Calculated Vertical Hydraulic Gradient (ft/ft)
		November 2017
MW-E	First-Zone	---
MW-EB	Second-Zone	-0.076
MW-G	First-Zone	---
MW-GB	Second-Zone	0.018

Notes:

Positive numbers reflect an upward hydraulic gradient; negative numbers reflect a downward hydraulic gradient.

Depths of screened intervals and groundwater elevations are presented in Table 6.

Gradients calculated using elevation difference between well screen mid-points.

Well pairs MW-E and MW-EB are within 40 feet of well CEW-3, an extraction well associated with the 3210 Porter Drive site. As noted in Section 8.3.2, the 3210 Porter Drive groundwater extraction system was operating at the time of the monitoring event; therefore, the hydraulic gradients reflect pumping conditions.

7.2 GROUNDWATER AND SURFACE WATER QUALITY

On November 6 and 7, 2017, groundwater samples were collected from all 13 site monitoring wells, including wells MW-10 and MW-9B, which were sampled by 3210 Porter Drive as part of their monitoring activities. Well MW-EB was initially sampled on November 6, 2017, and resampled on November 27, 2017. The initial sample was collected above the well screen; with a resulting concentration of VOCs reported below their respective LRL, with the exception of TCE, which was detected at a concentration below recent historical averages. The November 27, 2017 resample was collected at the midpoint of the wells screen. All groundwater samples, with the exception of the sample collected from extraction well MW-FB (sampled at the extraction well sample port), were collected using a portable bladder pump with dedicated tubing and micro purge controller. A new bladder was used for each well to facilitate equipment decontamination and minimize the risk of cross-contamination. In addition, one sample, TBM-Syntex, was collected from Matadero Creek at the location shown on Figure 2. The groundwater samples were analyzed for VOCs using EPA Method 8260B.

Chemical analytical results for groundwater samples collected from wells are generally consistent with previous data. TCE, PCE, 1,1-DCE, Freon 113, chloroform, cis-1,2-DCE, vinyl chloride (VC), and dichlorodifluoromethane (DCDFMe) were detected in groundwater at the site. In addition, xylene was detected at low concentrations in well MW-GB. VOC concentrations have been generally decreasing since startup of remedial activities in the region and the site in the 1990s (see Appendix B).

Analytical results are presented in Table 7 and are summarized below by groundwater zone.

First-Zone Wells

During the November 2017 sampling event, TCE was detected in the First-Zone wells, at concentrations ranging from 3.2 µg/L in well MW-D to 54 µg/L in well MW-G. The results are generally consistent with historical analytical results.

First-Zone wells MW-A, MW-C, MW-F, MW-G, and MW-10, exceeded the TCE maximum contaminant level (MCL) of 5 µg/L. PCE was not detected in any well at concentrations above its MCL of 5 µg/L. Time-series plots for First-Zone wells that exceed MCLs are included in Appendix D and results are discussed below.

- MW-A: TCE and PCE were detected above the LRL. The TCE concentration was 6.3 µg/L, which is generally consistent with the concentration detected in 2016. The PCE concentration was 3.6 µg/L, which is generally consistent with the concentration detected in 2016.
- MW-B: TCE, PCE, and chloroform were detected above the LRL. The TCE concentration was 4.8 µg/L, which is a decrease from the concentration detected in 2016. PCE was detected at 1.0 µg/L, which is generally consistent with the concentration detected in 2016. Chloroform was detected at 1.8 µg/L.
- MW-C: TCE, PCE, and 1,1-DCE were detected above the LRL. TCE was detected at a concentration of 21 µg/L in the primary sample and 22 µg/L in the duplicate sample. TCE concentrations in well MW-C have increased slightly since the 2016 sampling event. PCE was detected at a concentration of 0.89 µg/L in the primary sample and 0.96 µg/L in the duplicate sample. 1,1-DCE was detected at a concentration of 0.52 µg/L in the primary sample and below LRLs in the duplicate sample.

- MW-D: TCE and PCE were detected above the LRL. TCE was detected at a concentration of 3.2 µg/L and PCE was detected at a concentration of 0.56 µg/L. Concentrations of both compounds increased slightly since the 2016 sampling event. A time-series plot of TCE concentrations in well MW-D is included in Appendix D.

- MW-E: TCE and PCE were detected above the LRL. TCE and PCE were detected at concentrations of 4.2 µg/L and 1.9 µg/L, respectively. Both compounds are below their respective MCLs.

- MW-F: TCE and PCE were detected above the LRL. TCE and PCE were detected at concentrations of 8.4 µg/L and 0.55 µg/L, respectively. TCE has been decreasing in concentration since spiking at 45 µg/L in 2010.

- MW-G: TCE, PCE, and 1,1-DCE were detected above the LRL. TCE and PCE were detected at concentrations of 54 µg/L and 1.7 µg/L, respectively. MW-G TCE concentrations show more variability than most other wells sampled on this site, but continue the decreasing trend present since monitoring began in 1994. PCE has been below the MCL since 2004. 1,1- DCE was detected at a concentration of 0.81 µg/L.

- MW-10: TCE, cis-1,2-DCE, and VC were detected above the LRL. The TCE concentration was 21 µg/L in the primary sample and 21 µg/L in the duplicate sample. Well MW-10 TCE concentrations have exhibited variability over the entire monitoring period since 1991, with the sporadic concentration peaks showing an overall decreasing trend. PCE was not reported above the LRL. Cis-1,2-DCE was detected at a concentration of 4.0 µg/L in the primary sample and 3.9 µg/L in the duplicate sample. Cis-1,2-DCE detections from this well have fluctuated historically, peaking in 2011. VC was detected at a concentration of 0.65 µg/L in the primary sample and 0.98 µg/L in the duplicate sample, exceeding the VC MCL of 0.5 µg/L. The presence of cis-1,2-DCE and VC suggests reductive de-chlorination is occurring. It is expected to see an increase in cis-1,2-DCE and VC as the TCE concentration decreases.

- Freon 113 was detected in the First-Zone wells MW-C, MW-D, MW-F, and MW-G. None of these First-Zone wells exceeded the Freon 113 MCL of 1,200 µg/L. Freon 113 results are generally consistent with recent historical analytical results.

- Freon 12 was detected in the First-Zone wells MW-C, MW-F, and MW-G. No MCL value has been established for Freon 12.

Second-Zone Wells

- During the November 2017 sampling event, TCE was detected in wells MW-EB, MW-FB, and MW-9B at concentrations of 220 µg/L, 55 µg/L, and 6.2 µg/L, respectively. TCE concentrations in these wells remain consistent with historical trends. Elevated TCE concentrations were initially observed in well MW-EB in November 2005. This well is located at the northwest corner of the 3300 Hillview Avenue property, hydraulically the most up gradient part of the site. Historical records have not identified this location as a source of TCE or any other VOCs. As previously reported, the data indicates that an up gradient source or sources are contributing to the TCE concentration increases observed in well MW-EB. In November 2017, well MW-EB was sampled twice, initially by Blaine Tech Services (BTS) on November 6, 2017, and resampled by BTS on November 27, 2017. The initial sample collected by BTS reported a TCE

concentration of 1.6 µg/L, which is not consistent with the historical concentration trend in well MW-EB. The sample collected on November 27, 2016, had a TCE concentration of 220 µg/L, which is consistent with historical TCE concentrations. As described above, the BTS sample was collected outside the screened portion of the well and was not representative of formation water entering the well.

- PCE was detected in the sample collected from extraction well MW-FB at a concentration of 1.7 µg/L, below its MCL of 5 µg/L. This concentration is generally consistent with recent historical analytical results. Samples from the other Second-Zone monitoring wells were below LRLs for PCE.

- 1,1-DCE was detected in the sample collected from well MW-FB at 1.6 µg/L, below the MCL of 6 µg/L. This concentration is consistent with recent historical analytical results. Samples from the other Second-Zone monitoring wells were below LRL for 1,1-DCE.

- Freon 113 was detected in the primary sample collected from well MW-EB at a concentration of 8.0 µg/L and the duplicate sample at 7.1 µg/L. Well MW-FB reported a Freon 113 concentration of 4.0 µg/L. These concentrations are below the Freon 113 MCL of 1,200 µg/L, and are generally consistent with recent historical analytical results. Samples from the other Second-Zone monitoring wells were below LRLs for Freon 113.

- Freon 12 was detected in the sample collected from well MW-FB at a concentration of 3.9 µg/L. The concentration in well MW-FB is consistent with recent historical analytical results. Samples from the other Second-Zone monitoring wells were below LRLs. No MCL has been established for Freon 12.

- Xylene was detected in the sample collected from well MW-GB at a concentration of 2.1 µg/L. Xylene has never been detected in well MW-GB at concentrations above LRLs and is not considered a chemical of concern (COC) for the Site. The presence of xylene in the sample is suspected to be the result of cross-contamination from sampling equipment used by BTS. The presence of xylene will be verified during subsequent sampling events.

Third-Zone Well

- The sample from well MW-FC did not have any VOC detections above the LRL.

Matadero Creek

No VOCs were reported above LRLs for sample TBM-Syntex, which was collected from Matadero Creek.

7.3 VAPOR INTRUSION ASSESSMENT

As requested by DTSC in their letter dated August 31, 2017, Apex completed a vapor intrusion exposure assessment using groundwater data from the November 2017 sampling event. The methods used to conduct this evaluation are consistent with California Environmental Protection Agency (CalEPA) DTSC *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (DTSC 2011). The CalEPA DTSC modified version of the EPA Johnson and Ettinger (J&E) model (DTSC 2014) was used to estimate potential indoor air concentrations and associated health risks from vapor intrusion into indoor air.

The CalEPA DTSC J&E model estimates vapor concentrations in indoor air directly from concentrations in groundwater, accounting for advection and diffusion in the vadose zone and building foundation and mixing in the building interior. A more detailed description of the equations and input parameters used in this model are provided in the User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings (USEPA 2004). The following sections discuss the input parameters used in the fate and transport modeling for vapor migration from groundwater to indoor air.

Source Concentrations

Vapor emissions were modeled for the Site using source concentrations from groundwater (Cgw) for the indoor commercial/industrial worker exposure scenario. As shown in Table A, source concentrations in groundwater (i.e., groundwater exposure point concentrations [EPCs]) represent the maximum detected VOC concentrations in the uppermost water-bearing zone from the November 2017 groundwater sampling event. These data are tabulated and included in Appendix B.

Site-Specific Properties

Site-specific soil properties were not evaluated at the Site. Based on previous site investigations and boring logs, the vadose zone above the water table from 10 to 19 feet below ground surface (bgs) is generally composed of fine- to very fine-grained sand and silt with traces of clay. Consequently, the conservative default soil properties for loam (L), as provided by the CalEPA DTSC J&E model, were used. The default soil dry bulk density is 1.59 grams per cubic centimeter (g/cm^3). The default total and water-filled porosities are 0.399 and 0.148, respectively. The air-filled porosity is equal to the total porosity minus the water-filled porosity. Therefore, an air-filled porosity of 0.251 was used in the model.

Chemical-Specific Properties

The values for the dimensionless Henry's Law constant, organic carbon-water partition coefficient (Koc), and molecular diffusion coefficients in air and water, Di and Dw, for each COC were obtained from DTSC (DTSC 2014). Based on 2017 groundwater gauging data from monitoring wells located at the Site, groundwater varies between a depth of approximately 13.5 to 26 feet bgs. Therefore, as a conservative measure, 13.5 feet bgs (411 centimeters) was used as the depth below grade to water table.

Building Properties

The following table summarizes the soil and building properties input into the models for vapor migration from groundwater to indoor air.

Equation Variables – Vapor Migration from Groundwater to Indoor Air		
Properties	**Symbol**	**Assumed Value**
Depth Below Grade to Bottom of Enclosed Space Floor	L_F	15 cm
Depth Below Grade to Water Table	L_{WT}	411 cm (13.5 feet)
SCS Soil Type Directly Above Water Table Vadose Zone SCS Soil Type	- -	Loam (L)
Average Soil/Groundwater Temperature (DTSC default)	T_s	24°C
Average Vapor Flow Rate into Building (DTSC default)	Q_{Soil}	5 L/m
Indoor Air Exchange Rate (DTSC default)	E_b	1 per hour
Vadose Zone SCS Soil Type	- -	Loam (L)
Vadose Zone Soil Dry Bulk Density (DTSC default)	ρ_b	1.59 g/cm^3
Vadose Zone Soil Total Porosity (DTSC default)	θ_T	0.399
Vadose Zone Soil Water-filled Porosity (DTSC default)	θ_w	0.148
Vadose Zone Soil Air-filled Porosity (DTSC default)	θ_a	0.251

The following Section provides a discussion of uncertainties, which may have influenced the estimation of indoor air EPCs and corresponding health risks.

Uncertainty Analysis

The procedures used in evaluating vapor migration and estimating indoor air EPCs are subject to various degrees of uncertainty. A significant amount of conservatism has been incorporated into the fate and transport modeling process to address this uncertainty. Specifically, the J&E (1991) model employs a series of simplified, analytical solutions to chemical transport, often resulting in overestimation of indoor air EPCs. The conservatism inherent to the formulation of these models is supplemented by additional conservatism associated with selection of model input data and conceptualization of Site conditions imposed by model users. As a result of this multilevel conservatism, actual indoor air EPCs and corresponding health risks are likely to be significantly lower than were estimated by the model for the inhalation exposure pathway. These conservative aspects of the fate and transport modeling process are further discussed below.

The conservative aspects of the vapor migration models include simplified representation or complete omission of the following processes that affect transport, for example:

- Loss mechanisms – The absence of loss mechanisms such as biodegradation and vapor-phase adsorption result in overestimation of vapor emissions to ambient air, yielding higher indoor air EPCs.

- Depleting contaminant source – The use of a nondepleting, constant source results in an unlimited supply of contaminated vapor and an overestimation of vapor emissions to ambient air, yielding higher indoor air EPCs.
- Water movement – The assumed absence of water (and dissolved chemical) movement through unsaturated soil results in an overestimation of chemical mass in vapor-phase available for transport to ambient air, yielding higher indoor air EPCs.
- Neutral or positive pressurization – The assumption of continuously under-pressurized buildings neglects significant periods where neutral or positive pressurized conditions exist, thereby over-estimating advective transport of contaminated vapors to ambient air, yielding higher indoor air EPCs.
- One-dimensional transport – The assumption of vapor transport under a single (vertical) dimension ignores the potential for vapor migration in multiple directions away from the source area, resulting in an overestimation of vapor emissions and higher indoor air EPCs.

Under actual field conditions, the combined effect of these processes typically results in significantly lower EPCs than those estimated in this risk assessment.

Various model input data characterizing soil physical properties and building parameters used in this analysis correspond to conservative default values adopted by DTSC. Use of conservative default values for the above-mentioned parameters also likely results in overestimation of vapor emissions to ambient air, maximizing estimates of indoor air EPCs.

Site conditions were generalized to create a simplified conceptual model for simulation of vapor emissions. As a result, many components of this conceptualization are based on highly conservative assumptions, including:

- Indoor points of exposure (buildings) are assumed to directly overlie locations of sources in groundwater.
- COCs are assumed to be uniformly distributed in groundwater, with no spatial and temporal changes in concentrations.
- Averaging times for estimation of EPCs were 25 years for the hypothetical indoor commercial/industrial worker exposure scenario.

As a result of this conservative conceptualization, estimated vapor emissions to indoor air are maximized, yielding higher indoor air EPCs than would result from a less conservative approach.

Summary and Conclusions

The estimated concentrations of VOCs in indoor air ($C_{building}$) arising from groundwater at the Site for the hypothetical indoor commercial/industrial exposure scenario are summarized in Table A.

The resulting indoor air concentration ($C_{building}$) was coupled with exposure intake assumptions for the hypothetical indoor commercial/industrial worker receptor and toxicity values to estimate noncancer adverse health effects (expressed as the hazard index) and excess cancer risks. The methods used to characterize risk are consistent with EPA and DTSC guidance.

The hazard index and excess cancer risks were estimated using the following equations:

Noncarcinogenic Effects

$$Hazard\,Quotient = \frac{C_{building} \times EF \times ED \times ET \times \left(\frac{1}{RfC}\right)}{ATn}$$

Carcinogenic Effects

$$Excess\,Cancer\,Risk = \frac{C_{building} \times EF \times ED \times ET \times IUR}{ATc}$$

where:

$C_{building}$	=	EPC in indoor air (microgram per cubic meter [µg/m^3]);
EF	=	Exposure frequency (days/year);
ED	=	Exposure duration (years);
ET	=	Exposure time (hours/day);
RfC	=	Inhalation reference concentration (µg/m^3);
IUR	=	Inhalation unit risk factor (µg/m^3)$^{-1}$; and
AT	=	Averaging time (hours).

The exposure intake assumptions and toxicity values are obtained from DTSC (2014).

The hazard index and excess cancer risk estimates for VOCs detected in First-zone groundwater are presented in the following table. The EPCs in groundwater (i.e., Cgw; maximum detected concentrations in First-zone groundwater for November 2017) are also listed in the table for reference. EPA guidance on risk and exposure levels considered protective of human health is presented to provide context for interpretation of the estimates of noncancer hazard and excess cancer risk presented herein. Hazard indices are compared to the USEPA and CalEPA recommended target hazard index of one (1). Lifetime excess cancer risks are compared to the CalEPA's risk management range of 1 x 10-6 to 1 x 10-4. The CalEPA threshold value of one-in-one million (1 x 10-6) represents the lower end (most stringent) of the CalEPA risk management range and is the point of departure for risk management decisions for all receptors.

Table A

Summary of J/E Modeling Results			
VOCs Detected in Groundwater November 2017	**C_{gw} (µg/L)**	**Hazard Index (HI)**	**Excess Cancer Risk**
PCE	3.6	2×10^{-4}	2×10^{-8}
TCE	22	2×10^{-2}	6×10^{-8}
1,1-DCE	0.52	4×10^{-5}	- -
Freon 113	6.4	1×10^{-5}	- -
Freon 12	1.2	8×10^{-4}	- -
Chloroform	1.8	1×10^{-5}	1×10^{-8}
cis-1,2-DCE	4.0	6×10^{-4}	- -
VC	0.98	7×10^{-5}	2×10^{-7}
TOTAL		**2×10^{-2}**	**3×10^{-7}**

Notes:

C_{gw} = maximum concentration in groundwater, November 2017

µg/L = microgram per liter.

- - = not available. Toxicity values (e.g., inhalation reference concentration or inhalation unit risk factor) were not available. Therefore, a hazard index or cancer risk was not estimated.

As shown in the above table, the hazard index estimates are less than the USEPA recommended target level of 1 and the excess cancer risk estimates are less than the CalEPA risk management range of 1 x 10-6 to 1 x 10-4. Therefore, the VOCs detected in First-zone groundwater do not pose a risk to the hypothetical indoor commercial/industrial worker receptor.

All hypothetical human receptors were evaluated under a conservative reasonable maximum exposure (RME) scenario only. RME scenarios are conducted to account for potential impacts to the most (chemically) sensitive individuals within a hypothetical population. As a result, estimated health impacts presented in this evaluation may exaggerate the actual adverse noncancer health effects and excess cancer risks. The inherent conservativeness of this risk assessment is a direct result of using conservative and upper-bound input values to yield maximum, health-conservative estimates.

This evaluation was performed using the analytical results from the groundwater monitoring event conducted in November 2017 and standard DTSC vapor intrusion assessment methodology. The results indicate that the VOCs detected in First-zone groundwater do not pose a risk to the hypothetical indoor commercial/industrial worker receptor. The current land use is commercial offices, and there are no known plans to change the land use from commercial to residential.

7.4 ANNUAL PERFORMANCE REVIEW

7.4.1 Description of Remedial Systems

A groundwater extraction system, consisting of First-Zone extraction well MW-D and Second-Zone extraction well MW-FB, associated conveyance piping, a transfer tank, and a transfer pump was installed at the site in November and December 1994. Groundwater extraction from two extraction wells was initiated on December 5, 1994. The extracted groundwater is conveyed to the HP groundwater treatment facility at 3215 Porter Drive. Currently, extraction well MW-FB is operating. The DTSC approved the shutdown of extraction well MW-D in February 2000.

7.4.2 Operational and Compliance Information

The groundwater extraction system operated normally during 2017, with the exception of shutdowns related to HP treatment system shutdowns. The average flow rate for extraction well MW-FB during this reporting period was approximately 0.23 gpm (see Table 8). A total of approximately 61,174 gallons of groundwater was pumped from extraction well MW-FB during this reporting period. A total of approximately 98,624 gallons of groundwater was pumped from extraction well MW-FB during this annual reporting period, resulting in removal of approximately 0.08 pounds of VOCs (see Table 9). The volume of groundwater extracted during this annual reporting period (98,624) decreased relative to the previous reporting year (238,860 gallons; November 2015 to November 2016). The decrease in groundwater extracted was due to the shutdown of the HP treatment system between January 6, 2017 and May 10, 2017.

7.4.3 Plume Capture Evaluation

Figure 4 shows a groundwater depression in the vicinity of on-site Second-Zone extraction well MW-FB. The depicted groundwater capture zone is similar to previous years. The groundwater elevation contour map shows that the direction of groundwater flow in the Second-Zone is generally to the northeast with local variations. Due to the historic absence of constituents exceeding MCLs, extraction well MW-D was shut down; capture of First-Zone groundwater by extraction wells on the 3300 Hillview Avenue site is no longer warranted (see Section 7.4.4 below for further discussion).

7.4.4 Progress Made Towards Achieving Cleanup Goals

The trial shutdown of extraction well MW-D has had no apparent negative effect on chemical concentrations within the other First-Zone wells monitored, including MW-A, MW-B, MW-C, MW-E, MW-F, MW-G, and MW-10. When extraction well MW-D was shut down on February 9, 2000, it was expected that VOC concentrations would continue to decline in the First-Zone wells. Using TCE as the reference, concentrations in seven of the remaining wells (MW-A, MW-B, MW-C, MW-E, MW-F, MW-G, and MW-10) have experienced an overall decline since the shutdown of extraction well MW-D in February 2000, though fluctuations have occurred.

Generally, TCE concentrations in well MW-D have shown a gradual decreasing trend since operation began in December 1994. The TCE concentration in well MW-D was below its respective MCL in November 2017. It is anticipated that the overall declining trend in TCE concentration will continue.

Since November 2007, TCE concentrations in well MW-10 have fluctuated from a low of 2.1 µg/L (November 2016) to a high of 530 µg/L (May 2011); prior depth-discrete sampling results (May 2005) indicate that a portion of this variation may be associated with vertical stratification. Wells MW-C, MW-F, and MW-D, which are located approximately 300 feet down gradient from well MW-10, have shown generally decreasing TCE concentrations over time. These data indicate that the occurrence of elevated TCE concentrations in First-Zone groundwater in the vicinity of well MW-10 are not laterally extensive, and that groundwater with elevated TCE concentrations does not appear to be migrating from this area.

Overall, chemical concentrations have remained relatively stable or decreasing in the First-Zone wells and concentrations have shown a decreasing trend in the Second- and Third-Zones.

A cumulative total VOC mass of approximately 6.18 pounds has been removed (extraction wells MW-D and MW-FB) since operation began in December 1994. TCE concentrations in well MW-FB have been generally stable. It should be noted that the TCE concentrations evidenced in well MW-FB are likely influenced by the continuing migration of TCE onto the 3300 Hillview Site from off-site up gradient sources. The relationship between up gradient VOC sources and the 3300 Hillview Site has been previously explored.

Data for cumulative removal (see Table 9) indicate that extraction Second-zone well MW-FB continues to remove minimal VOCs. The groundwater extraction system continues to remove VOC mass while the TCE concentrations in well MW-FB remain stable indicates that TCE mass in Second-Zone groundwater extracted by MW-FB is migrating from off-site properties. While the extraction rate in MW-FB is very low (0.5 gpm), the operation of extraction well MW-FB creates a groundwater depression in the down gradient area of the Site (see Figure 4). This depression may influence the migration of impacted groundwater to flow on-site from an off-site source.

TCE, cis-1,2-DCE, and VC was reported at concentrations of 21 µg/L, 4.0 µg/L, and 0.98 µg/L, respectively in samples collected from well MW-10. As previously discussed, the presence of cis-1,2-DCE and VC suggests reductive de-chlorination is occurring. It is expected to see an increase in cis-1,2-DCE and VC as the TCE concentration decreases.

7.5 PROPOSED MODIFICATIONS

No modifications to the current DTSC-approved monitoring and reporting program or the groundwater remediation system are proposed.

3210 Porter Drive
January 31, 2018

8.0 3210 PORTER DRIVE

8.1 GROUNDWATER FLOW

On November 6, 2017, water levels were measured in the site wells. Groundwater elevations in wells completed in the Alluvium Zone wells ranged from 74.42 feet msl measured in well MW-5 to 75.93 feet msl measured in well MW-11. The groundwater flow pattern beneath the site remained similar to previous years. The predominant flow direction of the Alluvium Zone groundwater was to the northeast (see Figure 3).

Four wells (MW-2B, MW-4, MW-9B, and MW-14) monitor groundwater at the base of the alluvium and/or upper portion of the Santa Clara Formation (Santa Clara Zone). In some areas on the site, the shallow Alluvium Zone overlies the Santa Clara Formation. For this reason, wells completed in the Santa Clara Formation can be considered either shallow zone or deep zone depending on whether or not the Alluvium Zone is present or not. Groundwater elevations in these four Santa Clara Zone wells ranged from 74.94 feet msl measured in well MW-4 to 78.94 feet msl measured in well MW-14. Groundwater in the Santa Clara Zone flows generally northeast (see Figure 4).

Water-level measurements for well clusters screening the Alluvium and Santa Clara Zones were used to calculate vertical hydraulic gradients. The direction and magnitude of vertical gradients calculated in November 2017 are consistent with vertical gradients observed during previous groundwater monitoring events. The calculated vertical hydraulic gradients are listed in the following table and shown on Figure 7.

Well Cluster	Hydraulic Zone	Calculated Vertical Hydraulic Gradient (ft/ft)
		November 2017
MW-2A	Alluvium	---
MW-2B	Santa Clara Formation	0.030

Notes:
Positive numbers reflect an upward hydraulic gradient; negative numbers reflect a downward hydraulic gradient.
Depths of screened intervals and groundwater elevations are presented in Table 6.
Gradients calculated using elevation difference between well screen midpoints.

Well pairs MW-2A and MW-2B are within 25 feet of extraction well CEW-1. As noted in Section 8.3.2, the groundwater extraction system was operating at the time of the monitoring event; therefore, the hydraulic gradient reflects pumping conditions.

8.2 GROUNDWATER AND SURFACE WATER QUALITY

Groundwater samples were collected from 12 monitoring wells on November 6 and 7, 2017. Each well was sampled using a portable bladder pump with dedicated tubing and micro purge controller. A new bladder was used for each well to facilitate equipment decontamination and minimize the risk of cross-contamination. Groundwater samples were collected from sample ports at extraction wells CEW-1, CEW-2, and CEW-3. All groundwater samples were analyzed for VOCs using EPA Method 8260B.

Chemical analytical results for groundwater samples collected from wells at this site are generally consistent with previous data. TCE and PCE were the VOCs detected most frequently in groundwater at the site. In addition, 1,1-DCE, Freon 113, chloroform, cis-1,2-DCE, VC, and Freon 12 were also detected in one or more of the samples collected.

Alluvium Zone Wells

The TCE plume, historically moving onto the property from 3176 Porter Drive, appears to have been essentially eliminated. TCE concentrations in wells MW-2A and MW-3 have been below 2 µg/L since November 2000. Up gradient off-site source reduction and on-site groundwater extraction and treatment have accomplished the elimination of this plume.

Remediation of the TCE/PCE plume emanating from the area of the former "outdoor chemical storage area" is ongoing. Well MW-7 is located near the former chemical storage area. The TCE concentration in groundwater from well MW-7 (below the LRL in November 2016) has been consistently below the MCL of 5 µg/L since the May 2001 sampling event. PCE was detected in well MW-7 at a concentration of 6.4 µg/L in November 2017. A PCE time-series plot for well MW-7 is included in Appendix D.

Well MW-13A is located along the eastern side of the site building, within an area that historically exhibited elevated concentrations of PCE. The concentrations of TCE and PCE in samples from well MW-13A have shown a general decline between the period of November 2002 and November 2017 sampling events. A TCE and PCE time-series plot for well MW-13A is included in Appendix D.

The TCE concentration in well MW-5 has decreased from 130 µg/L (November 2011) to 110 µg/L (November 2017). Recently, the concentrations of TCE, PCE, Freon-113, and 1,1-DCE have increased between the November 2016 sampling event and the November 2017 sampling event. VOC concentration trends will be evaluated during the next sampling event scheduled for November 2018. A TCE time-series plot for well MW-5 is included in Appendix D.

Off-site migration of the PCE and TCE plume has been controlled by operation of extraction wells CEW-1, CEW-2, and CEW-3. PCE concentrations in well CEW-1 decreased from 15 µg/L in November 2016 to 9.8 µg/L in November 2017. TCE concentrations in well CEW-1 have been below the LRL since May 2011. TCE and PCE concentrations in well CEW-2 are currently 2.9 µg/L and 6.7, µg/L, respectively. TCE and PCE concentrations in well CEW-3 are 24 µg/L and 5.5 µg/L, respectively. These results indicate the following:

- Well CEW-1 appears to be capturing groundwater associated with the on-site PCE plume.

- Wells CEW-2 and CEW-3 appear to be capturing groundwater associated with the off-site TCE plume northeast of the site as well as groundwater associated with an on-site TCE/PCE plume.

In addition to PCE and TCE, 1,1-DCE, Freon 113, chloroform, cis-1,2-DCE, VC, and Freon 12 were detected in Alluvium Zone wells at concentrations above LRL. Details are discussed below.

- 1,1-DCE was detected in well MW-5 at a concentration of 0.57 µg/L. 1,1-DCE was not detected above LRLs in November 2016. Samples from the other First-Zone monitoring wells were below LRLs. None of the Alluvium Zone wells sampled exceeded the 1,1-DCE MCL of 6 µg/L.

- Freon 113 was detected in wells CEW-3, MW-5, and MW-13A at concentrations of 2.2 µg/L, 5.9 µg/L, and 0.63 µg/L, respectively. These concentrations are generally consistent with recent historical analytical results. Samples from the other First-Zone monitoring wells were below LRLs. None of the Alluvium Zone wells sampled exceeded the Freon 113 MCL of 1,200 µg/L.

- Chloroform was detected in well MW-5 at a concentration of 5.3 µg/L. Samples from other First-Zone monitoring wells were below LRLs.

- Cis-1,2-DCE was detected in wells MW-10 and MW-13A at concentrations of 4.0 µg/L and 2.9 µg/L, respectively. Samples from the other Alluvium Zone wells were below LRLs. None of the Alluvium Zone wells sampled exceeded the cis-1,2-DCE MCL of 6 µg/L.

- VC was detected in well MW-10 at a concentration of 0.65 µg/L in the primary sample and 0.98 µg/L in the duplicate sample, exceeding the VC MCL of 0.5 µg/L. This is a decrease from the November 2015 sample concentration of 110 µg/L, and is similar to historical trends of low-to-non-detect concentrations. Samples from the other Alluvium-zone wells were below LRLs. With the exception of well MW-10, none of the Alluvium Zone wells sampled exceeded the VC MCL of 0.5 µg/L.

Santa Clara Zone Wells

TCE and PCE were detected in the Santa Clara Zone during the November 2017 monitoring event. TCE was detected in wells MW-4 and MW-9B at concentrations of 1.6 µg/L and 6.2 µg/L, respectively. PCE was detected in wells MW-2B, MW-4, and MW-9B at concentrations of 0.75 µg/L, 7.6 µg/L, and 4.3 µg/L, respectively.

In addition to TCE and PCE, Freon 113 and Freon 12 were detected in Santa Clara Zone wells. Details are discussed below.

- Freon 113 was detected in well MW-4 at a concentration of 0.57 µg/L, below its MCL of 1,200 µg/L. Samples from the other Santa Clara Zone wells were below LRLs.

- Freon 12 was detected in wells MW-4 and MW-14 at concentration of 2.8 µg/L and 0.69 µg/L, respectively. Samples from the other Santa Clara Zone wells were below LRLs. No MCL has been established for Freon 12.

8.3 ANNUAL PERFORMANCE REVIEW

8.3.1 Description of Remedial Systems

The GWETS is designed for extraction from the Alluvium Zone beneath the site. Well CEW-1 was initially activated in 1992, followed by wells CEW-2 and CEW-3 in 1995. Well CEW-1 was shut down in March 2002 with approval of the DTSC due to low influent concentrations, and subsequently reactivated on October 28, 2004, at the request of DTSC to address the rebound of PCE concentrations in the well. During initial operations, extracted groundwater was routed through a subsurface groundwater conveyance line to an off-site groundwater treatment facility at 3215 Porter Drive (HP Building 15 Treatment System). In July 2010, a groundwater treatment system was installed on-site and the groundwater conveyance line leading to the off-site treatment facility was capped at the "Off-site" vault location. Groundwater was then redirected to the new on-site treatment system. Groundwater is treated on-site using GAC and then discharged to the storm drain system under a NPDES permit (NPDES Permit No. CAG912003).

A soil vapor extraction and treatment (SVET) system was installed at the Site in 1995 to address elevated concentrations of PCE in soil vapor at the Site comprised of seven soil vapor wells located underneath the central portion of the on-site building. PCE was removed from the soil vapor by two carbon vessels arranged in series. The treated soil vapor was then discharged to the atmosphere under permit from the Bay Area Air Quality Management District; permit number 4360). The system was first activated in 1995 and remained in operation until 1997 when, with DTSC approval, it was shut down due to low influent VOC concentrations. The SVET system was restarted in 2002 to address the rise of PCE concentrations in groundwater apparently moving out from beneath the building. Due to low influent VOC concentrations, the system was shut down again in 2008, with DTSC approval. The SVET system is currently shut down.

In February 2012, the SVET system underwent a 6-day rebound test. Based on the findings of the 6-day rebound test, The Source Group, Inc. (SGI) determined that continued operation of the SVET system was not warranted. Additional information regarding the rebound test can be found in SGI's semi-annual report entitled *"2012 Semi-Annual Report, Former Coherent Inc., Facility,"* dated June 30, 2012. Comments regarding the rebound test were provided by DTSC's Geological Services Unit (GSU) in a memorandum dated October 31, 2012, including a recommendation for continued monitoring of soil gas to ensure that VOC concentrations continue to decrease through time. Responses to GSU's October 31, 2012, memorandum were provided by SGI in a letter dated April 18, 2013, including a recommendation for annual sampling of the SVET system.

On November 6, 2017, the SVET system was run for approximately 25 minutes and samples were collected from each extraction well as well as the influent port of the treatment system. During operations, a vacuum of approximately 46 inches of water was applied and the vapor flow rate was 105 standard cubic feet per minute. The vapor stream at the system influent, between GAC vessels and effluent, and at individual wells was monitored using a photoionization detector (PID). Following collection of vapor samples, the SVET system was shut down.

A total of eight vapor samples were collected for chemical analysis during the sampling event. Vapor samples consisted of vapor well samples (V-1 through V-7), and the system influent. Vapor well sample results for the November 2017 sampling event are presented in the table below. Vapor well sample results for November 2015 and 2016 sampling events are also presented for comparison.

3210 Porter Drive
January 31, 2018

Soil Vapor Sample Results													
ID	Well Screen Interval (feet bgs)	PID (ppmv)			PCE (µg/L)			TCE (µg/L)			Freon 113 (µg/L)		
	Date	2015	2016	2017	2015	2016	2017	2015	2016	2017	2015	2016	2017
V-1	5-20	0.0	0.0	0.0	0.36	ND	4.5	ND	ND	ND	0.13	ND	ND
V-2	5-20	0.0	0.0	0.0	0.22	0.26	3.6	ND	ND	ND	ND	ND	ND
V-3	5-20	0.0	0.0	0.0	ND	ND	3.5	0.35	0.48	0.97	0.17	ND	ND
V-4	5-21	0.0	0.0	0.0	0.51	12	4.8	ND	0.41	ND	5.0	11	6.5
V-5	5-21	0.0	0.0	0.0	ND	1.0	3.6	ND	ND	ND	0.13	0.35	0.65
V-6	5-15	0.3	0.0	0.0	0.41	1.6	1.8	0.51	1.7	0.88	1.7	2.7	4.0
V-7	5.5-15.5	0.3	0.0	0.0	0.83	12	4.1	0.35	0.53	0.60	1.5	1.7	2.3

Legend:

ND = Analyte not detected at or above the noted laboratory reporting limit

bgs = feet below ground surface

PID = Photoionization detector

ppmv = parts per million by volume

Chemical Abbreviations:

PCE = Tetrachloroethene

TCE = Trichloroethene

Freon 113 = 1,1,2-Trichloro-1,2,2-trifluoroethane

Notes:

Vapor samples collected on November 6, 2017, in 1-liter Tedlar® bags

All chemical concentrations reported in micrograms per liter (µg/L).

Samples analyzed using EPA Method 8260B.

PCE was reported in samples collected from vapor extraction wells V-1, V-2, V-3, V-4, V-5, V-6, and V-7 at concentrations ranging from 1.8 µg/L (V-6) to 4.8 µg/L (V-4). TCE was reported in samples collected from vapor extraction wells V-3, V-6, and V-7 at concentrations ranging from 0.60 µg/L (V-7) to 0.97 µg/L (V-3). Freon 113 was reported in samples collected from vapor extraction wells V-4, V-5, V-6, and V-7 at concentrations ranging from 0.65 µg/L (V-5) to 6.5 µg/L (V-4). No other EPA Method 8260 target list compounds were reported in the vapor extraction wells. PCE and Freon 113 were reported in the influent sampling port at concentrations of 3.4 µg/L and 1.6 µg/L, respectively.

8.3.2 Operational and Compliance Information

The GWETS operated normally during 2017. A total of approximately 1,220,855 gallons of groundwater was pumped from extraction wells CEW-1, CEW-2, and CEW-3 during this reporting period. A total of approximately 1.93 million gallons of groundwater was pumped from extraction wells CEW-1, CEW-2, and CEW-3 during this annual reporting period, resulting in removal of approximately 0.50 pounds of VOCs calculated using total VOC concentrations for the

influent sample collected in November 2016, April 2017, and November 2017 (see Table 9). The average flow rate during this reporting year was 1.81 gpm, 0.27 gpm, and 1.61 gpm for wells CEW-1, CEW-2, and CEW-3, respectively.

Generally, the total volume of groundwater extracted by the GWETS was similar between 2016 and 2017. Well CEW-1 had an average flow rate of 1.81 gpm in 2017 compared to 1.73 gpm in 2016, resulting in 944,186 gallons of groundwater pumped in 2017 versus 916,790 gallons in 2016. Well CEW-2 averaged 0.27 gpm in 2017 compared to 0.48 gpm in 2016, resulting in 154,594 gallons of groundwater pumped in 2017. Well CEW-3 had an average flow rate of 1.61 gpm in 2017 compared to 1.31 gpm in 2016, resulting in approximately 829,809 gallons of groundwater pumped in 2017. Overall, the GWETS extracted approximately 315,000 more gallons of groundwater in 2017 than in 2016.

8.3.3 Plume Capture Evaluation

Figure 3 shows a groundwater depression in the vicinity of on-site Alluvium zone extraction wells CEW-1, CEW-2, and CEW-3. The groundwater elevation contour map shows that the direction of groundwater flow in the Alluvium zone is generally to the northeast with local variations.

Groundwater capture zones for wells CEW-1, CEW-2, and CEW-3 remained similar to previous years (see Figure 3). Average pumping rates for all three wells were similar to previous years. Wells CEW-1, CEW-2, and CEW-3 continue to provide capture for TCE and PCE-impacted groundwater underlying the site. Review of analytical results for well MW-A, which is located immediately down gradient, indicates generally stable PCE and TCE concentrations, suggesting plume capture.

8.3.4 Progress Made Towards Achieving Cleanup Goals

The GWETS has limited the down gradient migration and lateral extent of VOC-affected groundwater and reduced the overall mass of VOCs in the Alluvium Zone. In November 2017, TCE concentrations were below its MCL of 5 µg/L in wells CEW-1, CEW-2, MW-2A, MW-2B, MW-3, MW-4, MW-6, MW-7, MW-11, and MW-14. PCE concentrations were below its MCL of 5 µg/L in wells MW-2B, MW-3, MW-6, MW-9B, MW-10, MW-11, and MW-14. A cumulative total VOC mass of approximately 39.4 pounds has been removed by the extraction system since operation began in December 1992.

8.4 PROPOSED MODIFICATIONS

No modifications to the current DTSC-approved monitoring and reporting program or the groundwater remediation system are proposed.

3400 Hillview Avenue
January 31, 2018

9.0 3400 HILLVIEW AVENUE

9.1 GROUNDWATER FLOW

Groundwater levels in the monitoring wells, extraction wells, and piezometers were measured on November 6, 2017. Groundwater elevations were calculated using monitoring well, extraction well, and piezometer elevation data surveyed to the Santa Clara Valley Water District (SCVWD) elevation benchmark located on the western side of Hillview Avenue at Matadero Creek.

Elevations for Zone-1, Zone-2, and Zone-3 groundwater were calculated and are presented in Table 6. Contours constructed from data collected during the November 2017 sampling event are illustrated on Figures 3, 4, and 5, respectively.

Water-level measurement data collected in November 2017 indicate that some groundwater is present in on-site, undifferentiated Zone-1/Zone-2 wells LF-1, LF-3, and PZ-4 and inactive extraction wells EX-1, LF-2, EX-3, EX-4, EX-5 and EX-6. Historically, the lack of groundwater in on-site undifferentiated Zone-1/Zone-2 wells has been observed since late 2006 until May 2017. The presence of groundwater in some of the on-site, undifferentiated Zone-1/Zone-2 wells in May and November 2017 was likely due to the significant precipitation received in the area during the 2016/2017 winter season. An absence of groundwater was still noted in on-site Zone-1/Zone 2 monitoring well LF-4A. In addition, Zone-1/Zone-2 monitoring well PZ-2 could not be located in the field during the November 2017 monitoring event; thus, a groundwater elevation measurement was not collected at this well.

More than 29 years (since late 1987) of historical groundwater elevation data have conclusively shown that the general direction of groundwater flow in on-site, undifferentiated Zone-1/Zone-2, as well as in Zone 2 and Zone 3, is to the northeast, with some local variations in flow direction. The groundwater elevation data collected in November 2017 are consistent with historical observations.

The vertical hydraulic gradient, measured between wells LF-2 and LF-2B, is upward approximately 0.043 ft/ft. The vertical hydraulic gradient for well pair LF-4A/LF-4B was not calculated because the Zone 1 well (LF-4A) was dry. In addition, the vertical hydraulic gradients were not calculated at well pairs LF-20B/LF-20C and LF-20C/LF-20D because these well pairs consist of at least one active extraction well (LF-20C) and the corresponding vertical hydraulic gradient calculations would not reflect the ambient hydraulic relationship between the water-yielding intervals. However, historical vertical gradient measurements/calculations have indicated a general upward gradient between deeper (Zone 3) wells and shallow wells.

9.2 GROUNDWATER AND SURFACE WATER QUALITY

Groundwater samples for VOC analysis were collected using the PDB sampling method (ten wells) or a disposable bailer (seven wells) for the November 2017 sampling event. Active extraction wells EX-1B, EX-2B, LF-20C, and LF-20D were sampled directly from the wellhead sample port. Arcadis US Inc. (Arcadis) began collecting samples using PDB samplers in May 2005 after performing a DTSC-mandated comparison of results from samples collected using PDBs and those collected using more routine methods. Based on the results of the comparative sampling, the DTSC subsequently approved the use of PDB samplers at the site.

A lack of sufficient groundwater for sampling has been observed in most of the on-site, undifferentiated Zone-1/Zone-2 wells from late 2006 until May 2017. However, as discussed in Section 9.1, groundwater was recently observed in these wells (wells EX-1, EX-3, EX-4, EX-5, EX-6, LF-2, LF-1, and PZ-4) following the 2016/2017 winter season precipitation events. Accordingly, the Zone-1/Zone-2 wells were sampled in November 2017 per the DTSC-approved monitoring plan.

Chemical analytical results for groundwater samples are generally consistent with previous data and indicate that TCE is detected most frequently and at greater concentrations than other VOCs in groundwater at the site. VOC concentrations have decreased significantly since GWETS startup in August 1991 (see Appendix B). Notable analytical results and/or observations for wells sampled in November 2017 are summarized by groundwater zone below.

Zone-1 Wells (LF-15, EX-2, and LF-17A)

- **LF-15:** TCE was detected in off-site well LF-15 at an estimated trace concentration of 0.3 µg/L, which is less than the MCL for TCE (5 µg/L).

- **EX-2:** Off-site well EX-2 was not sampled in November 2017 because the well has been approved for abandonment by the DTSC (see Section 9.4). TCE was last detected at a trace concentration of 1.0 µg/L (below the MCL of 5 µg/L) in this well during the November 2015 monitoring event. Similarly, PCE was last detected at an estimated trace concentration of 0.3 µg/L (just below the LRL) in this well during the November 2015 monitoring event. In all, VOC concentrations have been less than the MCLs at well EX-2 since 2005.

- **LF-17A:** TCE was detected in off-site well LF-17A at a concentration of 2.1 µg/L, below the MCL. PCE was detected at a concentration of 0.5 µg/L during the November 2017 monitoring event, below the MCL.

Zone-1/Zone-2 Wells (EX-1, EX-3, EX-4, EX-5, EX-6, LF-2, and PZ-4)

- **EX-1:** TCE was detected in well EX-1 at a concentration of 45 µg/L, which is significantly higher than the concentration detected in this well in May 2017 (5.7 µg/L). However, the previous time a sample was collected from this well, in November 2006, TCE was detected at a concentration of 85 µg/L. The only other VOC present in the sample collected from well EX-1 in November 2017 was cis-1,2-DCE, which was detected at a low concentration of 1.1 µg/L consistent with previous results.

- **EX-3:** TCE was detected in well EX-3 at a trace concentration of 0.8 µg/L, below the MCL. Other VOCs were not detected at this well during the November 2017 sampling event.

- **EX-4:** TCE was detected in well EX-4 at a concentration of 79 µg/L, which is generally consistent with concentrations detected in this well during the last two sampling events in May 2017 (45 µg/L) and November 2014 (62 µg/L). The only other VOCs present in the sample collected from this well in November 2017 were cis-1,2-DCE at a trace concentration of 0.9 µg/L and chloroform at 0.5 µg/L.

- **EX-5:** TCE was detected in well EX-5 at a trace concentration of 0.5 µg/L, which is below the MCL and comparable to the TCE concentration detected in this well in November 2005 (0.6 µg/L) when the well was last sampled. PCE was detected in well EX-5 at a trace concentration of 1.0 µg/L, below the MCL.

- **EX-6:** TCE was detected in well EX-6 at a trace concentration of 0.7 µg/L (below the MCL) in November 2017. The last time a sample was collected from this well, in November 2014, TCE was detected at an estimated trace concentration of 0.3 µg/L. PCE was detected in well EX-6 at a concentration of 1.7 µg/L, which is slightly higher than the concentration detected in this well in November 2014 (0.7 µg/L) but below the MCL. Other VOCs were not detected in the groundwater sample collected from this well in November 2017.

- **LF-2:** TCE was detected in well LF-2 at a concentration of 49 µg/L, which is greater than the concentration detected in this well in May 2017 (14 µg/L). However, the previous time a sample was collected from this well prior to 2017, in November 2005, TCE was detected at a much higher concentration of 240 µg/L. The only other VOC present in the sample collected from well LF-2 in November 2017 was cis-1,2-DCE, which was detected at a concentration of 5.1 µg/L below the MCL.

- **PZ-4:** TCE was detected in PZ-4 at a concentration of 1.5 µg/L (below the MCL) in November 2017. Additionally, PCE was detected at a concentration of 5.6 µg/L and chloroform was reported at an estimated concentration of 0.4 µg/L. The piezometer had not been sampled prior to November 2017.

Zone-2 Wells (EX-1B, EX-2B, EX-3B, LF-18B, LF-20C, LF-24B, LF-26B, LF-27B, and LF-31B)

- **EX-1B:** TCE was detected in extraction well EX-1B at a trace concentration of 0.9 µg/L, which is lower than the concentration detected in November 2016 (4.2 µg/L) and below the MCL for TCE. PCE was detected at a low estimated concentration of 0.3 µg/L in November 2016, but was not detected in the EX-1B sample from November 2017. Freon 11 and chloroform were detected at low concentrations of 6.1 µg/L and 2.5 µg/L, respectively.

- **EX-2B:** TCE was detected in extraction well EX-2B at a concentration of 7.2 µg/L, which is lower than the TCE concentration detected in this well in November 2016 (12 µg/L), and just above the MCL. PCE was detected in well EX-2B at a trace concentration of 0.5 µg/L in November 2016, but was not detected above the LRL of 0.5 µg/L in November 2017. Freon 11 was present at a low concentration of 2.6 µg/L, which is consistent with the Freon 11 concentrations detected since 2000. Freon 12 and chloroform were detected at trace concentrations of 0.9 µg/L (estimated) and 0.6 µg/L, respectively.

- **EX-3B:** Extraction well EX-3B was not sampled in November 2017 because the well has been approved for abandonment by the DTSC (see Section 9.4). This well has demonstrated VOC concentrations above MCLs only once since 2006 (i.e., PCE at 5.6 µg/L in November 2011).

- **LF-18B:** VOCs continue to not be detected above LRLs in down gradient Zone-2 well LF-18B. TCE has not been detected in this well since May 2001, when it was detected at a concentration of 1 µg/L.

- **LF-20C:** TCE was detected in extraction well LF-20C at a low concentration of 2.2 µg/L in the primary sample and 1.7 µg/L in the duplicate sample. TCE concentrations in this well have been below the MCL beginning in November 2010. Freon 11 was detected at estimated trace concentrations of 0.9 µg/L in the primary sample and 0.8 µg/L in the duplicate sample.

- **LF-24B:** TCE was detected in well LF-24B at a trace concentration of 1.0 µg/L, which is lower than the concentration detected in this well in November 2016 (1.3 µg/L) and below the MCL for TCE. Other VOCs were not detected in this well during the November 2017 sampling event.

- **LF-26B:** TCE was detected in well LF-26B at a concentration of 93 µg/L in the primary sample and 92 µg/L in the duplicate sample. In general, TCE concentrations have been decreasing in this well since reaching a maximum in 2015. PCE was detected in well LF-26B at a trace estimated concentration of 0.6 µg/L in the primary sample.

- **LF-27B:** TCE was detected in former extraction well LF-27B at a trace concentration of 0.8 µg/L in November 2017, which is lower than the concentration detected in November 2016 (1.2 µg/L) and below the MCL for TCE. TCE has been below its MCL in well LF-27B since November 2008. PCE was detected in this well at a concentration of 2.1 µg/L, which is less than the November 2016 PCE concentration of 3.2 µg/L.

- **LF-31B:** TCE was detected in well LF-31B at a concentration of 6.9 µg/L, which is comparable to the TCE concentrations detected in November 2016 and May 2017 (6.4 and 6.6 µg/L, respectively). PCE was detected in well LF-31B at a very low concentration of 1.9 µg/L, similar to previous results and below the MCL for PCE. Chloroform was detected at a concentration of 2.8 µg/L, which is consistent with previous results. Freon 12 was detected at a concentration of 9.3 µg/L.

Zone-3 Wells (EX-1C, LF-2B, LF-4B, LF-20D, and LF-30C)

- **EX-1C:** Extraction well EX-1C was not sampled in November 2017 because troubleshooting/maintenance activities were being performed at this well during the sampling event (see Section 9.3.2). TCE was last detected in extraction well EX-1C at a concentration of 46 µg/L in May 2017, which was an increase from the concentration detected in this well in November 2016 (28 µg/L).

- **LF-2B:** TCE has not been detected above its LRL in well LF-2B since May 2005 (1.7 µg/L). Freon 11 and Freon 12 were present at low concentrations of 0.7 µg/L (estimated) and 10 µg/L, respectively. Both detections are comparable to those from November 2016.

- **LF-4B:** TCE was detected in well LF-4B at a trace estimated concentration of 0.6 µg/L during the November 2017 sampling event. TCE concentrations in this well have been below the MCL beginning in May 2015. Other VOC detections in well LF-4B included cis-1,2-DCE (22 µg/L), toluene (estimated 0.6 µg/L), ethylbenzene (estimated 0.6 µg/L), m,p-xylenes (1.4 µg/L), and acetone (190 µg/L). It should be noted that the decrease in chemical concentrations in this well, particularly TCE, followed the injection of a carbon substrate (molasses) in April 2015 and again in January 2017.

- **LF-20D:** TCE was detected in extraction well LF-20D at a concentration of 9.3 µg/L, which is a decrease from the detections in November 2016 (16 µg/L) and May 2017 (10 µg/L). This TCE concentration is within the historical range for TCE in this well, but is the lowest TCE concentration since August 1997 (5.9 µg/L). Chloroform and Freon 12 were present in LF-20D at low concentrations of 0.3 µg/L (estimated) and 2.4 µg/L, respectively.

- **LF-30C:** VOCs continue to be not detected above LRLs in down gradient Zone-3 well LF-30C, with the exception of an estimated trace concentration of 1,1-DCE (0.4 µg/L).

3400 Hillview Avenue
January 31, 2018

9.3 ANNUAL PERFORMANCE REVIEW

9.3.1 Description of Remedial Systems

Groundwater extraction has been conducted since August 1991 from up to 12 extraction wells operating at any one time. A total of 14 extraction wells have been installed. Before July 5, 1994, extracted groundwater was discharged to the City of Palo Alto Regional Water Quality Control Plant (PARWQCP) Publicly-Owned Treatment Works via a discharge piping connection to the sanitary sewer system. The extracted groundwater was not treated because concentrations of VOCs were below the PARWQCP's discharge levels.

The GWETS was expanded in July 1994, from the initial seven (5 on site and 2 off site) shallow extraction wells, by installing and connecting four new extraction wells to the groundwater treatment system. The four extraction wells were installed in 1994 to remediate two deeper groundwater-bearing zones (Zones 2 and 3). Groundwater extracted after July 5, 1994, was treated via ultraviolet oxidation (UV/Ox) with a carbon polish and discharged in compliance with the NPDES permit (NPDES No. CAG912003) to the local storm drain that discharges into Matadero Creek. Zone-1/Zone-2 monitoring well LF-2 was converted to an extraction well in August 1999.

In October 2003, wells LF-20C and LF-20D were converted to extraction wells and connected to the groundwater treatment system. Both wells were brought on-line on October 16, 2003.

In January 2008, the UV/Ox system failed, was damaged, and was assessed to be beyond reasonable repair. DTSC staff concurred with this assessment upon observing the condition of the UV/Ox system during a site visit on February 15, 2008. To restart the GWETS in a timely manner, the DTSC approved the use of GAC only for treating extracted groundwater. Since March 2008, extracted groundwater has been successfully treated through two 1,000-pound GAC vessels connected in series prior to discharge to Matadero Creek. Because shallow groundwater is generally not present, and has not been present since late 2006 (until this year, as described above), six on-site, undifferentiated Zone-1/Zone-2 extraction wells (EX-1, EX-3, EX-4, EX-5, EX-6, and LF-2) have been off-line since March 2008, and remained off-line through the 2017 calendar year.

9.3.2 Operational and Compliance Information

During 2017, the GWETS operated continuously, except for routine maintenance and the following periods when the GWETS, or a portion thereof, was known to not have operated for longer than 24 hours. The routine maintenance activities included maintaining the GWETS equipment and performing carbon change-outs.

- The GWETS was found to be shut off on several occasions for a variety of reasons during 2017. The reasons included electrical issues, issues with the low influent alarm, and issues with the high-water alarm in the equalization tank. Upon diagnosing the particular issue, the system was restarted on the same day.

- The GWETS was shut down on October 30, 2017 due to a blockage in the downstream discharge storm drain. Initial troubleshooting was performed on November 2, 2017, and a follow-up camera inspection of the downstream discharge storm drain was conducted on November 29, 2017. The discharge storm drain catch basin inlet was cleaned on November 29, 2017, and the GWETS was returned to normal operation on the same day.

The on-site, undifferentiated Zone-1/Zone-2 extraction wells remain shut down. Historically (i.e., since the latter part of 2006), these wells have contained little to no groundwater, although most recently some groundwater was observed in these wells likely due to the heavy precipitation received in the area during the 2016/2017 winter season. The total volume of groundwater extracted from wells EX-1B, EX-2B, and LF-20C was greater in 2017 (relative to 2016) potentially due to the general rise in groundwater levels across the Site. However, groundwater levels measured on November 8, 2017 (as shown on Figures 4 and 5), do not reflect the typical capture zones created by the Zone-2 and Zone-3 extraction wells since the wells were not pumping at the time of measurement. System flow rates during the reporting period (second semi-annual period of 2017) were also lower, potentially due to the downstream discharge storm drain blockage and issues observed with the GWETS low influent flow and equalization tank high water level alarms.

Based on a flow totalizer at the treatment plant, a total of 2,181,857gallons of groundwater were extracted and approximately 0.33 pounds of VOCs were removed during the 2017 annual reporting period (see Table 9).

9.3.3 Plume Capture Evaluation

Figures 3, 4, and 5 show elevation contours for Zone-1, Zone-2, and Zone-3 groundwater, respectively. The water levels in all site wells were measured on November 6, 2017. The groundwater elevation contour maps indicate that Zone-1, Zone-2, and Zone-3 groundwater generally flows to the northeast. The generally northeast direction of groundwater flow in these zones is consistent with the flow direction measured in the site vicinity, historically.

Figure 3 shows groundwater elevation contours for Zone-1 groundwater. Groundwater was present in several on-site, undifferentiated Zone-1/Zone-2 wells during the 2017 annual monitoring event. However, the height of the water columns in these wells was low, and the undifferentiated Zone-1/Zone-2 extraction wells remain inactive. Thus, a capture area for Zone-1 groundwater was not assessed.

Figure 4 shows groundwater elevation contours for Zone-2 groundwater. The groundwater elevation contour map does not reflect the area of capture typically created by Zone-2 extraction wells extraction wells EX-1B, EX-2B, and LF-20C since the wells were not pumping at the time of measurement.

Figure 5 shows groundwater elevation contours for Zone-3 groundwater. The groundwater elevation contour map does not reflect the area of capture typically created by Zone-3 extraction wells EX-1C and LF-20D because neither well was pumping at the time of measurement. Typically, an area of capture is demonstrated in Zone 3 groundwater when water levels are measured while wells EX-1C and LF-20D are pumping.

9.3.4 Progress Made Towards Achieving Cleanup Goals

The GWETS has effectively remediated groundwater in the 3400 Hillview Avenue study area. By the end of the fourth quarter 2017, a total mass of approximately 279 pounds of VOCs has been removed by the GWETS since operation began in August 1991. In general, wells sampled during the November 2017 monitoring event exhibit either decreasing or stable VOC (primarily TCE) concentration trends. In addition, Zone-3 extraction wells EX-1C and LF-20D appear to be effectively removing VOCs, particularly TCE, from Zone-3 groundwater, although the effectiveness is diminishing due to decreasing concentrations in groundwater.

Zone-1/Zone-2 Groundwater

The GWETS has effectively remediated Zone-1 and Zone-2 groundwater in the study area. The GWETS has limited the down gradient migration and lateral extent of VOC-affected groundwater, and reduced the overall mass of VOCs. VOC concentration trends in most Zone-1 and Zone-2 monitoring and extraction wells show that concentrations have decreased significantly and concentrations in many of the sampled wells are below MCLs.

Total VOC concentrations in most of the perimeter Zone-1 monitoring wells have decreased significantly since installation and/or are below MCLs. The TCE concentrations in Zone-1 wells LF-15 and LF-17A in November 2017 were consistent with those detected in November 2016. TCE in well LF-15 has been below the MCL since November 2007 and TCE in well LF-17A has been below the MCL since November 2009. Although not sampled in November 2017, TCE in well EX-2 has been below the MCL since 2006.

TCE concentrations in three of the seven on-site, undifferentiated Zone-1/Zone-2 wells sampled in November 2017 were below the MCL. TCE concentrations in wells EX-1 (45 µg/L), EX-4 (79 µg/L), and LF-2 (49 µg/L) were greater than the MCL but lower compared to concentrations reported in 2005 and 2006 (i.e., before the wells were observed to be dry). Piezometer PZ-4 was sampled only once, in November 2017, and the TCE concentration at this location (5.6 µg/L) was near the MCL.

TCE concentrations in five of the eight Zone-2 wells sampled in November 2017 were below the MCL. Detected concentrations exhibit decreasing or stable trends in general. None of the samples from Zone-2 wells had a PCE concentration exceeding the MCL in November 2017.

The TCE concentrations in well LF-26B generally showed an increasing trend from November 2006 through May 2015 when TCE reached a maximum concentration of 130 µg/L. Over the last five semi-annual monitoring events (since May 2015), the TCE concentrations have generally decreased to 93 µg/L (92 µg/L in the duplicate sample; see Appendix D) in November 2017. The TCE concentrations in monitoring well LF-31B, located down gradient of well LF-26B, have remained relatively consistent since the well's installation in 2010, ranging from 5 µg/L to 9.3 µg/L.

VOC concentrations in Zone-1 and Zone-2 groundwater can likely be reduced by continued groundwater extraction and treatment or some alternative remedial approach. However, it is unlikely that groundwater extraction will reduce VOC concentrations to below MCLs in all wells. Although some groundwater was recently observed in the on-site, undifferentiated Zone 1/Zone 2 extraction wells, Arcadis proposes to keep these wells off-line. Arcadis will continue to monitor VOC concentrations and groundwater levels in these wells. If warranted by the analytical results and groundwater elevations, some or all of the on-site undifferentiated Zone 1/Zone 2 extraction wells could be returned to operation in the future.

Zone-3 Groundwater

The GWETS has effectively remediated Zone-3 groundwater in the site vicinity. Concentrations of VOCs in on-site Zone-3 monitoring well LF 2B have decreased significantly since extraction from nearby well EX-1C was initiated. TCE has not been detected in well LF-2B above the LRL of 0.5 µg/L since May 2005. Only Freon 11 and Freon 12 have been detected above LRLs, at low concentrations, since that time. Well EX-1C has also displayed a significant reduction in TCE concentrations over time.

VOC concentrations increased in down gradient Zone-3 monitoring well LF-20D from May 1997 until October 2004, when well LF-20D was converted into an extraction well. Since extraction began, VOC concentrations in this well have decreased significantly. The November 2017 TCE concentration (9.3 µg/L from 16 µg/L in November 2016 and 10 µg/L in May 2017) showed a continued decreasing trend in well LF-20D.

Notably, down gradient Zone-3 well LF-30C contained only an estimated trace concentration of 1,1-DCE (0.4 µg/L) in the November 2017 sample.

VOC concentrations observed in the November 2017 sample collected from well LF-4B were significantly less than historical sampling results for this well, likely due to pilot ERD injection activities conducted at this well since April 2015. This well will continue to be monitored for VOCs to evaluate if rebound or stabilization occurs. LF-4B is also analyzed for other ERD performance parameters, and these data will be provided under separate cover, along with an assessment of ERD pilot test performance.

Time Series Plots

To further illustrate the TCE and PCE concentration trends described above, time series plots have been created for the following extraction and monitoring wells sampled through November 2017: EX-1B (TCE), EX-2B (TCE and PCE), LF-26B (TCE), LF-27B (TCE and PCE), LF-31B (TCE), EX-1C (TCE), LF-4B (TCE), and LF-20D (TCE). These wells were selected because they met one or both of the following conditions in the current reporting period:

- Significant/moderate change in TCE and/or PCE concentrations from the last sampling event; and
- TCE and/or PCE concentrations exceed the MCL.

The time series plots are included in Appendix D.

9.4 PROPOSED MODIFICATIONS

Arcadis submitted the *Revised Proposed Modifications to the Operations, Maintenance, and Monitoring Program, 3400 Hillview Avenue, Palo Alto, California* (Revised OM&M Proposal) to the DTSC on August 17, 2017. The original proposal was submitted for DTSC consideration on March 29, 2017. The revised proposal addressed comments received from the DTSC in a letter dated April 14, 2017, and items discussed during a meeting with the DTSC on May 5, 2017. On October 27, 2017, the DTSC provided comments and recommendations following their review of the Revised OM&M Proposal. DTSC correspondence from April 14 and October 27, 2017, approved a reduction of the scope of work for routine OM&M, including:

- Eliminating the semi-annual groundwater sampling event performed in May of each year. Wells that will no longer be sampled semi-annually under the routine groundwater monitoring program include Zone-3 wells LF-2B, LF-4B, LF-30C, EX-1C, and LF-20D, and Zone-2 wells LF-26B and LF-31B. Instead, these well will be sampled annually. Wells LF-4B, LF-26B, and LF-20D may also be sampled more frequently as part of the ERD performance monitoring. Depth-to-water measurements will continue to take place in May, and Arcadis will continue to submit the semi-annual monitoring report documenting the GWETS operations and performance.

- Abandoning Zone-1 wells EX-2, LF-1, and LF-16, and Zone-2 well EX-3B.

- Reducing the groundwater monitoring frequency of Zone-1 well LF-15 and Zone-2 well LF-18B from annual sampling to sampling every five years.
- Discontinuing groundwater extraction from well LF-20C during a trial shutdown.

No additional modifications to the current DTSC-approved monitoring and reporting program or the groundwater remediation system are proposed in this report.

3176 Porter Drive
January 31, 2018

10.0 3176 PORTER DRIVE

10.1 GROUNDWATER FLOW

Groundwater levels in non-pumping wells, pumping wells, and piezometers were measured on November 6, 2017, and are presented on Table 6. A discussion of the pre-extraction, site-specific hydrogeologic conditions including flow zone definition, groundwater flow directions, and temporal variability in groundwater levels was presented in the *Compiled RI Report* (Montgomery Watson 1992). A discussion of groundwater flow directions and capture zones following startup of the extraction wells was presented in the *Post-Construction Verification Report* (Montgomery Watson 1994), in subsequent annual reports, the *Final Revised Five-Year Remedial Action Review Report* (Arcadis 2009) and the *Final Five-Year Remedial Action Review (*Arcadis 2014). Current groundwater flow directions and potentiometric surface elevations are discussed in the following sections.

Shallow Groundwater Zone: The groundwater elevations for the November 2017 groundwater monitoring event are consistent with previous monitoring events. The contours indicate that groundwater in the shallow zone is influenced by the extraction well network and generally flows toward the east. Groundwater levels at the site have recovered from recent years, only four wells were noted as dry in November 2017 (MW-4, MW-5, MW-11A, and MW-19), compared to nine shallow groundwater monitoring wells and one shallow piezometer being dry in November 2016.

Deep Groundwater Zone: The groundwater in the deep zone generally flows towards the southeast, which is consistent with previous monitoring events.

Vertical Gradients: The USEPA online vertical gradient calculator was used to assess vertical gradients (USEPA 2016). This tool is designed to be used on nested vertical well pairs; however, there are no nested vertical wells pairs on-site. Instead, wells that are spatially close were used to evaluate vertical gradients: shallow well MW-7 and deep well MD-6 on the northern portion of the plume, shallow wells MW-31 and MW-32 and deep well DW-7 in the near source area, and shallow well MW-33 and deep well DW-6 in the mid-plume region.

The calculated gradients were as follows:

- Shallow well MW-7 and deep well MD-6: Downward with magnitude of 0.046 ft/ft;
- Shallow well MW-31 and deep well DW-7: Upward with magnitude of 0.008 ft/ft;
- Shallow well MW-32 and deep well DW-7: Upward with magnitude of 0.040 ft/ft; and
- Shallow well MW-33 and deep well DW-6: Upward with magnitude of 0.152 ft/ft.

10.2 GROUNDWATER AND SURFACE WATER QUALITY

Groundwater monitoring was performed on November 6 and 7, 2017. Four wells scheduled to be sampled as part of the annual groundwater monitoring event could not be sampled because they had insufficient water to collect a sample (monitoring wells MW-4, MW-5, and MW-19 and extraction well MW-11A). Groundwater elevations (no sampling required) were recorded from the two piezometers (PZ-1S and PZ-2S) during the monitoring event.

Groundwater samples were collected using the PDB sampling method from site wells, with the exception of the active extraction wells. The deployment depths of the PDBs in each well are presented in Table 5. The PDB sampling was performed in accordance with the *Work Plan for Implementation of PDB Sampling* (Work Plan; Arcadis 2005) and DTSC response letter dated October 28, 2005. The extraction wells were sampled directly from a sample port in the extraction well vault. Samples from each well were analyzed for VOCs using EPA Method 8260B.

As presented in Table 7, elevated reporting limits were reported for samples EW-2B, MW-25, MW-29, MW-30, and MW-33 due to elevated concentrations of TCE, PCE and/or cis-*1,2*-DCE.

Shallow Groundwater Zone

The November 2017 analytical results were generally consistent with previous sampling events (historical results are included in Appendix B) and are presented in Table 7. Results that are considered significantly different or are indicative of a significant trend are discussed below. For the purposes of this discussion, 'low' refers to concentrations of VOCs near the Maximum Contaminant Level to approximately 100 µg/L, 'mid' refers to concentrations from 100 to 500 µg/L, and 'high' refers to concentrations above 500 µg/L.

The shallow groundwater zones within both the up gradient portion of the plume and the plume source with significant November 2017 concentration changes relative to May 2017 or November 2016 concentrations include EW-1B, MW-6RRB, MW-14, MW-22, MW-23B, MW-29, MW-31, and MW-32. The shallow groundwater zone wells in the mid-plume with notable concentration changes during this time period include EW-2B, MW-24, MW-25, and MW-33, and the shallow groundwater wells in the down gradient portion of the plume area with significant concentration changes include EW-3B and MW-11B. These wells are discussed below.

EW-1B – Plume Source

Trend: Extraction well EW-1B, installed in 2013, had mid to high VOC concentrations between 2013 and May 2017; these concentrations have been generally decreasing and are now low VOC concentrations.

Comparison to May 2017: PCE, TCE, cis-1,2-DCE, and VC concentrations all decreased in extraction well EW-1B. PCE decreased from 790 µg/L detected in May 2017 to 21 µg/L detected in November 2017; TCE decreased from 90 µg/L to 7.9 µg/L; cis-1,2-DCE decreased from 550 µg/L to 51 µg/L; and VC decreased from 49 µg/L to 15 µg/L.

MW-6RRB – Plume Source

Trend: MW-6RRB, installed in 2014, had mid to high VOC concentrations between 2014 and May 2015; these concentrations have been generally decreasing and are now low VOC concentrations (except for a May 2017 detection of cis-1,2-DCE of 260 µg/L).

Comparison to May 2017: Concentrations of PCE, TCE, cis-1,2-DCE, and VC decreased in well MW-6RRB since the May 2017 sampling event; PCE decreased from 17 µg/L to 4.3 µg/L; TCE decreased from 7.7 µg/L to 2.4 µg/L; cis-1,2-DCE decreased from 260 µg/L to 24 µg/L; and VC decreased from 38 µg/L to 10 µg/L.

MW-14 – Up gradient Portion of the Plume

Trend: MW-14 historically has had low to mid concentrations of VOCs; PCE, TCE and cis-1,2-DCE; concentrations have increased since 2014, and are similar to concentrations observed in 2008, Since 2009, the VOC concentrations appear to fluctuate seasonally (see Appendix D).

Comparison to May 2017: Concentrations of PCE and cis-1,2-DCE increased in well MW-14 in November 2017 compared to May 2017. Specifically, PCE increased from 8.6 µg/L to 16 µg/L; and cis-1,2-DCE increased from 14 µg/L to 40 µg/L. The concentrations of TCE and VC remained relatively stable during this time period.

MW-22 – Plume Source

Trend: Monitoring well MW-22 historically has had low to high concentrations of VOCs that appear to fluctuate seasonally.

Comparison to May 2017: PCE concentrations have decreased since the May 2017 sampling event from 4.3J µg/L to an estimated concentration of 0.41J µg/L. Cis-1,2-DCE and VC concentrations increased from May 2017 to November 2017, from 340 µg/L to 440 µg/L and from 99 µg/L to 260 µg/L, respectively. TCE concentrations remained relatively stable.

MW-23B – Plume Source

Trend: Monitoring well MW-23B, installed in 2014, has had low to mid concentrations of VOCs. Cis-1,2-DCE and VC concentrations have decreased, while PCE and TCE concentrations have remained relatively stable.

Comparison to May 2017: Cis-1,2-DCE concentrations decreased from 33 µg/L to 2.2 µg/L between May 2017 and November 2017, and VC concentrations decreased from 110 µg/L to 32 µg/L. PCE and TCE concentrations remained relatively stable in November 2017 compared to May 2017.

MW-29 – Plume Source

Trend: Monitoring well MW-29, installed in 2011, had initial low to mid concentrations of VOCs in 2011 and May 2012. Since November 2012, MW-29 has had low to high concentrations of VOCs. VC concentrations have remained relatively stable, while PCE, TCE, and cis-1,2-DCE concentrations have generally increased.

Comparison to May 2017: From May to November 2017, PCE concentrations decreased from 1,700 µg/L to 700 µg/L; TCE concentrations increased from 16 µg/L to 37 µg/L; and cis-1,2-DCE concentrations increased from 120 µg/L to 440 µg/L. VC concentrations remained stable in November 2017 relative to May 2017.

MW-31 – Plume Source

Trend: Monitoring well MW-31, installed in 2013, has had low to high concentrations of VOCs that have generally decreased.

Comparison to May 2017: PCE, TCE, and cis-1,2-DCE concentrations have decreased since the May 2017 sampling event, while the VC concentration remained stable. Specifically, from May 2017 to November 2017, PCE decreased from 93 µg/L to 28 µg/L; TCE decreased from 48 µg/L to 18 µg/L; and cis-1,2-DCE decreased from 790 µg/L to 500 µg/L.

MW-32 – Plume Source

Trend: Monitoring well MW-32, installed in 2013, has had low to high concentrations of VOCs that have been generally increasing.

Comparison to May 2017: PCE, TCE, cis-1,2-DCE, and VC concentrations have decreased since the May 2017 sampling event. Specifically, from May to November 2017, PCE decreased from 3,800 µg/L to an estimated concentration of 110J µg/L; TCE decreased from 31 µg/L to an estimated concentration of 10J µg/L; cis-1,2-DCE decreased from 220 µg/L to an estimated concentration of 72J µg/L; and VC decreased from an estimated concentration of 6.7J to an estimated concentration of 0.25J.

EW-2B – Mid-Plume

Trend: Extraction well EW-2B, installed in 2014, historically has had low to high VOC concentrations; these concentrations have been generally increasing.

Comparison to May 2017: From May to November 2017, PCE and cis-1,2-DCE concentrations decreased in extraction well EW-2B. PCE decreased from 2,000 µg/L detected in May 2017 to 940 µg/L detected in November 2017; and cis-1,2-DCE decreased from 370 µg/L to 210 µg/L. TCE and VC concentrations remained stable.

MW-24 – Mid-Plume

Trend: Monitoring well MW-24 historically has had low to high concentrations of VOCs; PCE, TCE, cis-1,2-DCE, and VC concentrations have generally increased since 2014. The VOC concentrations appear to fluctuate seasonally.

Comparison to May 2017: TCE, cis-1,2-DCE and VC concentrations decreased in November 2017 relative to May 2017 and the TCE concentrations increased slightly. Specifically, PCE decreased from 20 µg/L to 13 µg/L; cis-1,2-DCE decreased from 160 µg/L to 56 µg/L; and VC decreased from 34 µg/L to 16 µg/L. TCE increased from 28 µg/L to 51 µg/L.

MW-25 – Mid-Plume

Trend: Historically MW-25 has had low to high concentration of VOCs; these concentrations have remained relatively stable since 2012.

Comparison to May 2017: PCE, TCE, and cis-1,2-DCE concentrations decreased in well MW-25 between May 2017 and November 2017. Specifically, PCE decreased from 2,700 µg/L to 2,200 µg/L; TCE decreased from 410 µg/L to 270 µg/L; and cis-1,2-DCE decreased from 440 µg/L to 330 µg/L. The VC concentration remained relatively stable.

MW-33 – Mid-Plume

Trend: Monitoring well MW-33, installed in 2014, initially had low VOC concentrations; these concentrations have generally increased since 2015 and now range from low to high concentrations.

Comparison to May 2017: PCE, TCE, and cis-1,2-DCE concentrations decreased between May 2017 and November 2017. The PCE concentrations decreased from 1,700 µg/L to 650 µg/L; TCE concentrations decreased from 33 to 9.5 µg/L; and cis-1,2-DCE concentrations decreased from 230 µg/L to 39 µg/L. VC concentrations remained below the LRL.

EW-3B –Down gradient Portion of the Plume

Trend: EW-3B, installed in 2014, has had low concentrations of VOCs through 2016. A slight increase of low to mid concentrations of VOCs has been observed in 2017.

Comparison to May 2017: PCE, TCE, and cis-1,2-DCE concentrations have decreased slightly since the May 2017 sampling event, but have remained higher than the November 2016 sampling event. PCE decreased from 190 µg/L to 160 µg/L; TCE decreased from 20 µg/L to 17 µg/L; and cis-1,2-DCE decreased from 150 µg/L to 110 µg/L. VC remained below the LRL of 1.0 µg/L.

MW-11B – Down gradient Portion of the Plume

Trend: Extraction well MW-11B has historically had low concentrations of VOCs; recently VOC concentrations have increased in this well.

Comparison to May 2017: The November 2017 concentrations of PCE and TCE increased from May to November 2017. PCE increased from 48 µg/L to 72 µg/L and TCE increased from 4.6 µg/L to 7.8 µg/L. Cis-1,2-DCE and VC have remained relatively stable compared to the May 2017 concentrations.

Deep Groundwater Zone

Concentrations in the deep groundwater zone were generally consistent with the results from previous monitoring events. TCE was detected in six of the deep groundwater zone wells. The detected concentrations ranged from an estimated 0.59J µg/L to 21 µg/L (in DW-1). PCE was detected in two of the deep groundwater zone wells; the detected concentrations were 0.61 µg/L in DW-3 and an estimated concentration of 0.30J µg/L in well MW-11C.

The only deep groundwater zone well with notable changes in November 2017 concentrations relative to May 2017 is DW-7, located in the plume source and discussed below.

DW-7 – Plume Source

Trend: DW-7 has historically had low concentrations of VOCs; concentrations spiked to a moderate level in 2016, but have returned to low concentrations.

Comparison to November 2016 and May 2017: PCE, TCE, and cis-1,2-DCE concentrations have decreased since the November 2016 and May 2017 sampling events. PCE decreased from 92 µg/L in November 2016, to 3.5 µg/L in May 2017 and to below the LRL (<0.50 µg/L) in November 2017. TCE decreased from 8.2 µg/L in November 2016 to

7.0 µg/L in May 2017 to 2.1 µg/L in November 2017. Cis-1,2-DCE decreased from 18 µg/L in November 2016 to an estimated concentration of 0.12J µg/L in May 2016 to below the LRL (<0.50 µg/L) in November 2017. The VC concentrations remained relatively stable.

10.3 ANNUAL PERFORMANCE REVIEW

10.3.1 Description of Remedial Systems

The full-scale GWETS was installed by Montgomery Watson and became operational in 1993. Tetra Tech, Inc. has operated the GWETS and been responsible for discharge of the treated groundwater since December 1, 2015. AECOM filled this role from March 10, 2014, to November 30, 2015, and Arcadis filled this role from July 1, 1999, to early 2014.

Groundwater is currently extracted from the eight shallow zone extraction wells (EW-1B, EW-2B, EW-3B, EW-4, MW-11B, MW-12, MW-16R, and MD-7) and three deep zone extraction wells (MW-11C, MW-11D, and MW-18). The pump in extraction well MW-11A was removed on February 2, 2012, because of insufficient water in the well since November 2009. The extracted water is conveyed to an on-site treatment system, where it is filtered through two GAC treatment vessels configured in series. The treated water is discharged under an NPDES permit to Matadero Creek (NPDES Permit No. CAG912002).

While the GWETS continued operation, additional source area treatment activities were conducted to reduce the remedial timeframe associated with the pump-and-treat remedy. An IRZ technology utilizing ERD to supplement groundwater extraction and treatment was implemented from 2001 through June 2009. The ERD program created a reactive zone that accelerated the enhanced biodegradation of PCE to ethene, indicating complete reductive dechlorination, in portions of the treatment area. The program was suspended in July 2009 as described in the DTSC-approved document entitled *"Request for Permanent Cessation of IRZ Injections and IRZ Performance Groundwater Monitoring,"* dated June 7, 2013. The ERD injections wells were properly abandoned in August and September 2014 in accordance with SCVWD requirements.

Based on additional investigations conducted at the site in 2011, a TCH pilot test was proposed to evaluate the removal of the adsorbed and separate-phase VOC mass in the source area. The DTSC approved the "*Final Revised Thermal Conductive Heating Pilot Test Work Plan,"* dated June 11, 2013, on June 28, 2013. Construction for the TCH pilot test began in September 2013. The pilot test was conducted from March 2014 into July 2014. This pilot test included installation of 24 heater wells to 67 feet bgs, 10 dual-phase extraction wells, 15 temporary soil vapor wells, and additional monitoring points for temperature (12) and pressure (3). It was estimated that a little over 2,100 pounds of VOCs were removed during the TCH pilot test, as detailed in the AECOM document entitled *"Thermal Conductive Heating Pilot Test Completion Report,"* dated December 1, 2014. The pilot test piping and equipment were demobilized in July and August 2014 and the pilot test wells were abandoned in September and October 2014 per SCVWD requirements.

10.3.2 Operational and Compliance Information

The GWETS operated continuously during the semi-annual period from June through November 2017, with the exception of approximately 3.5 hours to replace the GAC and GAC vessel (see Table 4).

3176 Porter Drive
January 31, 2018

Regular O&M activities for the GWETS were performed monthly, including checking pressure gauges, collecting influent, midpoint, and effluent samples from the treatment system, and general maintenance activities. The GAC in the lead GWETS carbon vessel was replaced on July 25, 2017, and this vessel was made the lag vessel. The GWETS resumed operation the same day as the GAC replacement.

The total volume of groundwater treated and discharged to Matadero Creek during the annual period 2017 was approximately 4,122,786 gallons, which is an average flow rate of 8.5 gpm (see Table 8). The volume of groundwater treated and discharged to Matadero Creek during the semi-annual period from June through November 2017 was approximately 2,192,369 gallons, which is an average flow rate of 9.7 gpm (see Table 8). The discharge volumes and average flow rates shown on Table 8 are based on extracted water volume recorded by extraction wellhead totalizers. The estimated mass of total VOCs extracted and treated for the annual period was 11.6 pounds (see Table 9).

10.3.3 Plume Capture Evaluation

Shallow Groundwater Zone

The *Five-Year Remedial Action Review* (Arcadis 2014) discussed the capture zone of the plume in detail. The capture zone modeling indicated that the contaminants are captured by the GWETS. This conclusion was supported by decreasing concentration trends in most down gradient shallow wells (i.e., wells EW-4, MD-7, MW-12, MW-15, MW-16R, and MW-17). It was noted that an exception to decreasing concentration trends was observed at MW-25 where concentrations of PCE increased from 84 µg/L in 2008 to 2,100 µg/L in 2013 (2,200 µg/L in November 2017). This increase was attributed to the decrease in capture by wells EW-2 and EW-3 from 2009 through 2013, caused by decreasing groundwater levels at the Site. In October 2014, deeper extraction wells EW-2B and EW-3B were installed, and the deeper extraction wells were connected to the GETS in November 2014.

While VOC individual concentrations fluctuate within the groundwater plume, the footprints of individual VOC plumes have remained fairly consistent. The concentration trend graphs presented in Appendix D indicate relatively constant or decreasing VOC concentrations at all wells, with the exception of four wells that indicate increasing VOC concentrations:

- MW-14, located approximately 100 feet up gradient of the Site source area;
- EW-2B, located mid-plume and currently extracting impacted groundwater;
- MW-11B, located in the down gradient portion of the plume and currently extracting impacted groundwater; and
- MW-33, located mid-plume.

The higher groundwater concentrations detected within the Site plume have resulted in an increase in the annual mass of extracted VOCs, which in 2017 was 11.6 pounds.

Deep Groundwater Zone

The *Five-Year Remedial Action Review* (Arcadis 2014) discussed the capture zone of the plume in detail. Modeling results showed that the deep zone plume is well captured. The primary contaminants in the deep zone are TCE, with a maximum concentration of 21 µg/L at DW-1, and PCE, with a maximum concentration of 0.61 µg/L at DW-3, during the November 2017 groundwater sampling event.

10.3.4 Progress Made Towards Achieving Cleanup Goals

As indicated in the *1998 Annual Performance Evaluation Report and Five Year Review*, (McLaren/Hart, Inc. 1999), from 1993 to 1998, 169.8 pounds of VOCs were removed from the combined extraction in both the shallow and deep aquifer zone wells, averaging 34 pounds/year. Since then, the total mass removed each year has decreased to an average of 17.6 pounds/year for the period from 1999 to 2008. From 2009 through 2013, the total mass removed per year decreased to an average of 1.87 pounds/year. The total mass removed in 2017 was 11.6 pounds, an increase over recent years. Since 2014, the GWETS annual mass removal has ranged from 1.5 pounds to 16.9 pounds.

10.4 PROPOSED MODIFICATIONS

No modifications to the current DTSC-approved monitoring and reporting program or the groundwater remediation system are proposed.

3333 Hillview Avenue
January 31, 2018

11.0 3333 HILLVIEW AVENUE

11.1 GROUNDWATER FLOW

Groundwater levels in all accessible monitoring wells were measured on November 6, 2017. Depth-to-groundwater and groundwater elevations calculated for the November 6, 2017 event are presented on Table 6. Between November 2016 and November 2017, groundwater elevations decreased an average of 1.2 feet in the Building 5 Upper Flow System and increased an average of 4.25 feet in the Building 6 Flow System.

As depicted on Figures 3 and 4, a groundwater mound is present in the Building 5 Upper Flow System encompassing wells PA-30, PA-43, PA-56, and PA-57. Net groundwater flow within the Building 5 Upper Flow System is interpreted to be towards the east-southeast. Groundwater flow in the Building 5 Lower Flow System (wells PA-18 and PA-29), which is correlated with the Hillview-Porter Regional Site Zone G, is directed towards the northeast and is locally influenced by extraction from Hillview-Porter Regional Site extraction well BP-67B (see Figure 6).

Water-level measurements from two adjacent wells screened in the Building 5 Upper Flow and Building 5 Lower Flow System (PA-30 and PA-29, respectively) were used to calculate the vertical hydraulic gradient between the flow zones. The calculated vertical gradient is presented in the table below and shown on Figure 7.

Well Cluster	Hydraulic Zone	Calculated Vertical Hydraulic Gradient (ft/ft)
		November 2017
PA-30	Upper Flow System	---
PA-29	Lower Flow System (Zone G)	-0.086

Notes:

Positive numbers reflect an upward hydraulic gradient; negative numbers reflect a downward hydraulic gradient.

Depths of screened intervals and groundwater elevations are presented in Table 6.

Gradients calculated using elevation difference between well screen mid-points.

As depicted on Figures 3 and 4, groundwater flow in the Building 6 Flow System is directed towards the east and northeast which is consistent with historical interpretations. Vertical gradients were not calculated for the Building 6 Flow System as all the wells are completed within the same hydraulic zone.

3333 Hillview Avenue
January 31, 2018

11.2 GROUNDWATER AND SURFACE WATER QUALITY

In November 2017, 22 wells were sampled and analyzed for VOCs (EPA Method 8260B). Ten of the 22 wells were also analyzed for hexavalent chromium (EPA Method 7199). As part of the expanded EISB monitoring program, water samples from select EISB injection and monitoring wells were additionally analyzed in the field for the following parameters: oxidation-reduction potential, dissolved oxygen, temperature, pH, conductivity, and ferrous iron during the November 2017 sampling event. Section 11.3.1 provides a description of the expanded EISB injection and monitoring program. Field testing results during the November 2017 sampling event are included on the groundwater sample field data sheets (see Appendix A). The sample for well PA-62R was diluted in the laboratory due to the presence of non-target analytes and results were reported with a higher detection limit (<5.0 to <10.0 µg/L). The higher detection limit in well PA-62R was likely associated with residual EISB injection substrate mixture found in the samples at the laboratory.

Water samples were collected using no-purge PDB sampling devices for VOCs and a no-purge HydraSleeve sampler for non-volatile constituents (e.g., hexavalent chromium). The method used to sample each well is identified on Table 5. Tabulated VOC results are summarized on Table 7 and tabulated historical results are included in Appendix B.

Building 5 Area Upper Flow System – Wells PA-30, PA-40, PA-43, PA-52, PA-56, PA-57, PA-58, PA-59, OBS-1, and OBS-2

VOC Results

1,1-DCE has historically been the predominant VOC detected in Building 5 Upper Flow System wells. In November 2017, 1,1-DCE was detected in four of the ten wells sampled. All 1,1-DCE concentrations reported were below the cleanup goal of 6 µg/L, with concentrations ranging from 0.63 µg/L (OBS-2) to 1.6 µg/L (PA-30).

TCE concentrations in the Building 5 Upper Flow System wells were all below the LRL (0.5 µg/L). VC, a TCE degradation product, was detected above the cleanup goal in wells PA-40 (0.63 µg/L), PA-52 (0.54 µg/L), PA-57 (1.7 µg/L) and OBS-2 (0.74 µg/L). No other VOCs in Building 5 wells were present above their respective cleanup levels. Declining TCE concentrations and Increasing VC concentrations indicate conditions favorable to reductive de-chlorination exist within the expanded EISB treatment zone at Building 5.

Hexavalent Chromium Results

Building 5 wells PA-56, PA-59, OBS-1, and OBS-2 were additionally analyzed for hexavalent chromium in November 2017. Hexavalent chromium results are included on Table 7 and tabulated historical results are included in Appendix B. Hexavalent chromium was not detected above the LRL (10 µg/L) in all four Building 5 Upper Flow System wells sampled.

Building 5 Area Lower Flow System – Wells PA-18 and PA-29

VOC Results

Wells PA-18 and PA-29, which are completed in the Building 5 Lower Flow System, have been correlated with the Hillview-Porter Regional Site Zone G. The Hillview-Porter Regional Site is responsible for monitoring and sampling

these wells. VOC concentration data for these wells are included on the isoconcentration maps for Zone G (see Figures 19 through 21) and a discussion of VOC results is included under the Hillview-Porter Regional Site (refer to Section 12.0).

Alluvium Zone (Matadero Creek Underflow) – Well PA-41

VOC Results

Consistent with recent historical data, 1,1-DCA (20/22 µg/L, duplicate pair), and VC (4.9/5.6 µg/L, duplicate pair) were the predominant VOCs detected in this well in November 2017. Cis-1,2-DCE concentrations in PA-41 declined to below the LRL (0.5 µg/L) in November 2017. The occurrence of VC, a TCE degradation product and the absence of TCE in PA-41 indicate that conditions favorable to reductive de-chlorination exist near PA-41. As depicted in the time-series plot for PA-41 included in Appendix D, VOCs detected in PA-41 continue to exhibit declining concentration trends, except for 1,1-DCA which has been stable at 19 to 22 µg/L since November 2013.

Building 6 Flow System – Wells PA-26R, PA-45R, PA-47R2, PA-53R, PA-55R, PA-60R, PA-61R, PA-62R, PA-63R, OBS-3, and OBS-4

VOC Results

TCE has historically been the predominant VOC detected in Building 6 Flow System wells. In November 2017, TCE was detected in three of eleven wells sampled – PA-45R (0.69 µg/L), PA-55R (1.6 µg/L), and OBS-4 (7.5 µg/L). No other VOCs were detected above cleanup goals, except for VC in PA-53R (2.2 µg/L) and PA-61R (1.0 µg/L). The presence of cis-1,2-DCE and VC, and decreasing TCE concentrations in wells PA-53R and PA-62R suggest that conditions favorable to reductive de-chlorination exist within the expanded EISB treatment zone at Building 6.

Hexavalent Chromium Results

Building 6 wells PA-53R, PA-55R, PA-61R, PA-62R, OBS-3, and OBS-4 were additionally analyzed for hexavalent chromium in November 2017. Hexavalent chromium was detected in one of the six wells sampled (PA-55R at 83 µg/L). Hexavalent chromium concentrations declined in November 2017 in both PA-55R and OBS-4 after implementing the expanded EISB program in September 2016.

11.3 ANNUAL PERFORMANCE REVIEW

11.3.1 Description of Remedial Systems

Building 5 System

The Final Remedial Action (FRA) groundwater remediation system at Building 5 became operational in 1995. The FRA system consisted of three vacuum enhanced groundwater extraction wells (PA-56, PA-57, and PA-58) extracting groundwater from the Upper Flow System. Extracted groundwater was routed to a surge tank, pumped through an aqueous-phase GAC canister for treatment, and discharged to the sanitary sewer under a permit from the PARWQCP. In 1999, the vacuum enhanced component of the groundwater extraction system was discontinued with DTSC approval.

In April 2001, the groundwater conveyance and treatment systems at Building 5 were dismantled to accommodate site redevelopment. A replacement GWETS was installed and became operational in January 2002. The replacement GWETS was similar in configuration to the original system, except that the former pneumatic pumps were replaced with electric submersible pumps.

In August 2006, the Building 5 GWETS was shut down and the extraction pumps removed to facilitate ISCO implementation. The ISCO program was implemented in September 2006 and included the injection of $KMnO_4$ solution into five Upper Flow System wells (PA-30, PA-40, PA-43, PA-56, and PA-57).

Building 6 System

The FRA groundwater remediation system at Building 6 became operational in 1995. The Building 6 FRA system was essentially identical to the remedial system for Building 5, except the system included four vacuum-enhanced groundwater extraction wells (PA-55, PA-60, PA-61, and PA-62). In 1999, the vacuum enhanced component of the groundwater extraction system was discontinued with DTSC approval.

In May 2001, the Building 6 GWETS was dismantled to accommodate site redevelopment. Dismantling included the destruction and replacement of nine monitoring and extraction wells. The top of casing of several wells were raised up to 10 feet in some cases in response to site grading during construction. New well locations and top of casing were resurveyed by a licensed surveyor. Replacement wells were installed in September and October 2001 in the immediate vicinity of the former wells and names designated with an “R” for replacement, except for PA-47R2, which was installed approximately 80 feet south of former well PA-47R. A replacement GWETS was installed and became operational in December 2001. The replacement system is similar in configuration to the original system, except that the former pneumatic pumps were replaced with electric submersible pumps.

In August 2006, the Building 6 GWETS was shut down and the extraction pumps removed from extraction wells to facilitate ISCO implementation. The ISCO program was implemented in September 2006 and included the injection of $KMnO_4$ solution into five Building 6 Flow System wells (PA-26R, PA-55R, PA-60R, PA-61R, and PA-62R).

EISB Program

EISB pilot studies were completed at both Building 5 and 6 in May 2015. Pilot study performance monitoring results showed that conditions favorable for biologically-mediated reductive de-chlorination could be sustained at both the Building 5 and Building 6 plume areas. An expanded EISB program was approved by the DTSC in a letter dated May 26, 2016. Baseline groundwater monitoring was conducted in July 2016 and injection of carbon substrate and de-chlorinating microbes was completed in September 2016. Expanded EISB monitoring was completed in April and November 2017, and results and recommendations were submitted in a separate report to the DTSC, dated February 14, 2018.

Well OBS-2 at Building 5, and wells PA-55R, PA-63R, OBS-3, and OBS-4 at Building 6 are located immediately outside the 2014 and 2016 EISB injection area. These wells continue to exhibit positive ORP levels, higher dissolved oxygen, and low ferrous iron, indicating more oxidizing conditions. However, VOC and hexavalent chromium concentrations in these wells continue to decline or show low levels as a result of EISB injections up gradient and cross-gradient of these wells.

Field testing at Building 6 well PA-60R show ORP levels are increasing; however, DO levels continue to be low and ferrous iron continues to be present. Results indicate that reducing conditions still exist in the treatment zone surrounding this well. In addition, evidence of a substrate layer was noted on groundwater in well PA-60R in November 2017. Low pH in this well found during and immediately following the 2016 injection likely limited biological growth. VOCs continue to be not detected in well PA-60R.

11.3.2 Operational and Compliance Information

Both Building 5 and Building 6 GWETS did not operate during this annual reporting period.

11.3.3 Plume Capture Evaluation

A capture area evaluation was not performed as groundwater extraction did not occur during the annual reporting period.

11.3.4 Progress Made Towards Achieving Cleanup Goals

Between 1995 and 2006, a combined 6,693,351 gallons of groundwater was extracted, and an estimated 2.76 pounds of VOCs were removed by both GWETS. Over ten years of pump-and-treat at Buildings 5 and 6 reduced chemical concentrations in groundwater. However, by 2006, groundwater concentration declines had progressively diminished and it was evident that achieving cleanup goals using pump-and-treat was going to take a very long time. Accordingly, alternative remediation technologies capable of accelerating groundwater cleanup were evaluated. In September 2006, the pump-and-treat system was shut down and ISCO was implemented. The ISCO application resulted in localized destruction of dissolved phase chlorinated ethenes; however, complete destruction of contaminants was not achieved.

EISB pilot studies initiated in 2015 indicated that EISB could be effective in remediating residual VOC impacts to groundwater in the Building 5 and Building 6 plume areas. Based on pilot study results, an expanded EISB program was implemented in September 2016 at both the Building 5 and Building 6. EISB performance monitoring data collected in 2017 show further declines in both VOC and hexavalent chromium concentrations in groundwater.

Contaminants that exceed cleanup goals in one or more monitoring wells is summarized in the table below.

Location	Chemical	Cleanup Goal (µg/L)	Max Conc. In Nov. 2017 (µg/L)	No. of Wells Exceeding Goal
Building 5	1,1-DCA	5	22	1
	VC	0.5	5.6	5
Building 6	TCE	5	7.5	1
	VC	0.5	2.2	2
	Cr^{+6}	10	83	1

As shown in the above table, chemical concentrations in groundwater at Building 5 and Building 6 are approaching cleanup goals. VC, a daughter product of TCE degradation via EISB, is the chemical detected most frequently above its cleanup goal. VC concentrations are expected to continue to decline as EISB progresses.

11.4 PROPOSED MODIFICATIONS

An additional round of EISB performance monitoring is recommended in November 2018. The EISB performance monitoring will be conducted concurrent with the routine annual monitoring program. No other modifications to the current DTSC-approved monitoring and reporting program are proposed.

Hillview-Porter Regional Site
January 31, 2018

12.0 HILLVIEW-PORTER REGIONAL SITE

12.1 GROUNDWATER FLOW

Depth-to-groundwater was measured in 105 monitoring wells, vertical extraction wells, and piezometers on November 6, 2017. Three piezometers and one monitoring well were not accessible. Two Zone A piezometers (PZ-9 and PZ-10) and one Zone A1 well (BP-11) were dry. Depth-to-groundwater and groundwater elevations calculated for the November 2017 event are presented on Table 6. In November 2017, groundwater extraction was occurring in three flow zones (Zones A, G, and H). Groundwater flow patterns interpreted from monitoring data collected during the November 2017 event are discussed below.

Zone A

Water levels increases up to 5.38 feet were observed in most Zone A wells and piezometers when compared to November 2016. In November 2017, groundwater extraction was occurring from transverse horizontal extraction well HW-3 located at the VAHP and 3333 Hillview Avenue. Groundwater flow within Alluvium Zone A at the VAHP is directed along the axis of the alluvial wedge. Flow changes from east-directed on the up gradient side of the VAHP to northeast-directed through the middle and northern portion of the VAHP. Near horizontal extraction well HW-3, groundwater flow is directed towards the middle of the well where the groundwater extraction pump is located (see Figure 3).

In the BPN, east of Matadero Creek, groundwater flow is directed towards the north and northeast at a gradient of 0.004 ft/ft between wells BP-34 and BP-44. West of Matadero Creek, groundwater flow is directed predominantly to the north-northwest between wells PZ-32 and BP-58 at a gradient of 0.008 ft/ft and to the north-northeast between wells BP-50 and BP-59 at a gradient of 0.005 ft/ft. A groundwater ridge is observed in the BPN that is approximately centered on Matadero Creek, indicating groundwater flow near the ridge is directed northwest and northeast, away from the creek. This is consistent with historical hydrologic data indicating that Matadero Creek recharges the shallow groundwater system within the BPN.

Zone B

Water levels increased in all Zone B wells by up to 6.26 feet when compared to November 2016. Groundwater flow in Zone B is directed to the north under a gradient of 0.004 ft/ft between wells BP-43A and BP-48A (see Figure 6).

Zone C

Water levels increased in all Zone C wells by up to 5.46 feet when compared to November 2016. Groundwater flow in Zone C is directed to the east under a gradient of 0.006 ft/ft between wells BP-7B and BP-33 (see Figure 6).

Zone D

Water levels increased in all Zone D wells by up to 5.04 feet when compared to November 2016. Groundwater flow in Zone D is directed to the northeast under a gradient of 0.019 ft/ft between wells BP-46A and BP-49B (see Figure 6).

Zone E

Water levels increased in all Zone E wells by up to 3.93 feet when compared to November 2016. Groundwater flow in Zone E is directed to the north under a gradient of 0.016 ft/ft between wells BP-26A and BP-68 (see Figure 6). The groundwater elevations in wells BP-1 and BP-8 are anomalous and not used to contour the Zone E potentiometric surface. BP-8 is interpreted to be completed within the Zone D/E aquitard and exhibits limited hydraulic connectivity with other Zone E wells.

Zone F

Water level changes in Zone F wells were variable (increases and decreases) when compared to November 2016. Water levels rose in 4 of 6 wells by up to 3.74 feet and decreased in 2 wells by up to 0.33 feet. Groundwater flow in Zone F is directed to the north under a gradient of 0.009 ft/ft between wells BP-2B and BP-47 (see Figure 6).

Zone G

Water levels increased in all Zone G monitoring wells (excluding active extraction well BP-67B) by up to 10.14 feet when compared to November 2016. Groundwater extraction is occurring from Zone G well BP-67B. As depicted on Figure 6, a cone of depression encloses BP-67B and groundwater flow near well is directed towards the well. Groundwater potentials indicate a northwesterly directed flow south of Matadero Creek and an east to southeasterly directed flow north of Matadero Creek (see Figure 6).

Zone H

Water levels increased in all Zone H monitoring wells (excluding active extraction well BP-18C) by up to 5.34 feet when compared to November 2016. Groundwater extraction is occurring from Zone H well BP-18C. As depicted on Figure 6, a cone of depression encloses well BP-18C and groundwater flow near the well is directed towards the well. Groundwater potentials in wells located outside the extraction well influence show groundwater is directed to the north-northeast (see Figure 6). Zone H is believed to be bounded on its southwest side by a fault that appears to act as an up gradient barrier to flow in this zone.

Zone J

The water level in the single Zone J well monitored (BP-25) increased by 1.99 feet when compared to November 2016.

Vertical Potential Gradients

Vertical gradient potentials calculated for selected well pairs that screen distinctly different flow zones are listed in the table below and shown on Figure 7. The direction and magnitude of vertical gradients calculated in November 2017 are consistent with those calculated in November 2016.

Well Cluster	Hydraulic Zone	Calculated Vertical Hydraulic Gradient (ft/ft)
		November 2017
BP-49	Alluvium Zone A	---
BP-49A	Alluvium Zone B	-0.043
BP-49B	Santa Clara Zone D	0.038
BP-49C	Santa Clara Zone E	0.113
BP-12	Alluvium Zone A	---
BP-48A	Alluvium Zone B	-0.107
BP-48B	Santa Clara Zone E	0.048
BP-43A	Alluvium Zone B	---
BP-43A1	Santa Clara Zone C	0.042
BP-43B	Santa Clara Zone D	0.194
BP-18A	Alluvium Zone A	---
BP-18B	Santa Clara Zone H	-0.611
BP-18C (ext)	Santa Clara Zone H	-0.222
BP-36A1	Alluvium Zone A	---
BP-36A	Santa Clara Zone H	-0.169
BP-65A	Santa Clara Zone F	---
BP-65B	Santa Clara Zone G	0.035
BP-73A	Santa Clara Zone G	---
BP-73B	Santa Clara Zone H	-0.135

Notes:

(ext) – active extraction well; note that gradients calculated in well clusters containing an active extraction well may not represent area-wide conditions.

Positive numbers reflect an upward gradient; negative numbers reflect a downward gradient.

Depths of screened intervals and groundwater elevations are presented in Table 6.

Gradients calculated using elevation difference between well screen mid-points.

Matadero Creek Flow Measurements

In accordance with the current DTSC-approved creek monitoring program, creek flows were measured at creek gauging locations X-2 and X-3 in November 2017. Creek flow measurement stations are shown on Figure 2. Creek flow was measured using an 18-inch-long cutthroat flume fitted with an 8-inch flume. Creek flow at cross-section locations X-2 and X-3 was estimated to be approximately 40 gpm and 33 gpm, respectively.

12.2 GROUNDWATER AND SURFACE WATER QUALITY

In November 2017, 66 wells were sampled for VOC analysis (EPA Method 8260B). Groundwater samples were collected using one of two methods: (1) directly from a dedicated sample port at the wellhead (active extraction wells only); or (2) sampled using a PDB sampler. The sampling method employed for each well is identified on Table 5.

TCE is the chemical detected in groundwater at the highest frequency and greatest concentration. Chemical isoconcentration maps for PCE, TCE, and 1,1-DCE for Zone A are presented in Figures 8 through 10 and Zones B through H isoconcentration maps are presented in Figures 19 through 21. The November 2017 results are described below.

Zone A

Twenty-Four Zone A wells were sampled in November 2017. TCE concentrations reported in Zone A wells ranged from below the LRL to 210/210 µg/L in a duplicate pair from PA-8 located on the former 3333 Hillview Avenue property (now 3373 and 3375 Hillview Avenue). TCE concentrations in Zone A are shown on Figure 9. Current VOC results are consistent with recent historical data and trends.

TCE concentrations in Zone A wells located in the BPN were all below the cleanup goal of 5 µg/L. No other VOCs were detected in Zone A wells located in the BPN.

TCE concentrations in Zone A wells located at the VAHP and the former 3333 Hillview Avenue property ranged from the below the LRL to 210/210 µg/L in PA-8. The TCE concentration in PA-8 declined from 410 µg/L in November 2016 to 210/210 µg/L (duplicate pair) in November 2017. As depicted in the time-series concentration plots included in Appendix D, TCE concentrations in most Zone A wells at the VAHP and the former 3333 Hillview Avenue property are stable or declining. The only other VOC detected in Zone A wells at the VAHP and 3333 Hillview Avenue property at concentrations exceeding the cleanup goals is 1,1-DCE (7.0 µg/L in DH-03 and 7.7/8.4 µg/L in a duplicate pair from PA-8).

Zone B

Five Zone B wells were sampled in November 2017. TCE concentrations reported in Zone B wells ranged from 1.2 µg/L to 7.8 µg/L in BP-49A. TCE concentrations greater than cleanup goals were reported in 2 of the 5 Zone B wells monitored in November 2017: BP-48A (6.6 µg/L) and BP-49A (7.8 µg/L). No other VOCs were detected above cleanup goals. Current VOC results are consistent with recent data and trends.

Zone C

Four Zone C wells were sampled in November 2017. TCE concentrations reported in Zone C wells ranged from below the LRL to 5.6/8.9 µg/L in a duplicate pair from BP-43A1. A TCE concentration greater than the cleanup goal was reported in one Zone C well: BP-43A1 (5.6/8.9 µg/L). No other VOCs were detected above cleanup goals. Current VOC results are consistent with recent data and trends.

Zone D

Four Zone D wells were sampled in November 2017. TCE concentrations reported in Zone D wells ranged from below the LRL to 14 µg/L in MW-D. A TCE concentration greater than the cleanup goal was reported in one Zone D well: MW-D (14 µg/L). No other VOCs were detected above cleanup goals. The only other VOC detected above cleanup goals was PCE (8.8 µg/L in MW-D). Current VOC results are consistent with recent data and trends.

Zone E

Ten Zone E wells were sampled in November 2017. TCE concentrations reported in Zone E wells ranged from below the LRL to 9.6 µg/L in BP-8. A TCE concentration greater than the cleanup goal was reported in 3 of the 10 Zone E wells monitored: BP-8 (9.6 µg/L), BP-57 (7 µg/L), and BP-62B (7.5 µg/L). The only other VOC detected above cleanup goals was PCE (5.8 µg/L in BP-8). Current VOC results are consistent with recent data and trends.

Zone F

Five Zone F wells were sampled in November 2017. TCE concentrations reported in Zone F wells ranged from below the LRL to 44 µg/L in BP-2B. TCE concentrations greater than the cleanup goal were reported in 2 of the 5 Zone F wells monitored: BP-2B (44 µg/L) and PA-13 (13 µg/L). No other VOCs were detected above cleanup goals. Current VOC results are consistent with recent data and trends.

Extraction from Zone F (wells BP-2B and BP-65A) was discontinued with DTSC approval in 1999. Since that time, VOC concentrations in Zone F wells have exhibited stable or declining concentration trends, except well BP-2B, which increased from 37 µg/L to 71 µg/L between 2006 and 2008. Since 2008, the TCE concentration in well BP-2B has declined and remains stable around 50 µg/L. The absence of VOCs in down gradient plume boundary wells BP-47 and BPX-F1 indicate the plume in Zone F is stable and not expanding.

Zone G

Seven Zone G wells were sampled in November 2017. TCE concentrations reported in Zone G wells ranged from below the LRL to 21 µg/L in active extraction well BP-67B. TCE concentrations greater than the cleanup goal were reported in 3 of the 7 Zone G wells monitored: BP-67B (21 µg/L), PA-18 (10 µg/L), and PA-29 (18/18 µg/L in duplicate pair). No other VOCs were detected above cleanup goals. VOC concentrations in Zone G wells exhibit stable to declining trends. The absence of VOCs in down gradient plume boundary well BP-73A and the trace VOC levels in down gradient plume boundary well BP-47B indicate extraction from well BP-67B continues to provide plume containment.

Zone H

Six Zone G wells were sampled in November 2017. TCE concentrations reported in Zone H wells ranged from 4 µg/L to 150/170 µg/L in duplicate pair from active extraction well BP-18C. TCE concentrations greater than the cleanup goal were reported in 4 of the 6 Zone H wells monitored: BP-18B (22 µg/L), BP-18C (150/170 µg/L in duplicate pair), BP-36A (12 µg/L), and BPX-H1 (53 µg/L). Other VOCs detected above cleanup goals were cis-1,2-DCE (15/17 µg/L duplicate pair from BP-18C), and VC (2.1 µg/L in BP-18B and 1 µg/L in a field duplicate sample from active extraction well BP-18C).

The TCE concentration in Zone H extraction well BP-18C has increased from 77 µg/L to 170 µg/L between 2008 and 2017. TCE concentration increases were also observed in wells PA-17 and BPX-H1 between 2008 and 2016, but declined in November 2017. TCE in eastern plume boundary well BP-36A increased to 11 µg/L in November 2015, declined to below the cleanup level in November 2016 (1.8 µg/L), and increased to 12 µg/L in November 2017. The TCE concentration in northern plume boundary well BP-73B reached a maximum concentration of 16 µg/L in November 2016, but declined to below the cleanup goal in November 2017.

Zone J

A single Zone J well was sampled in November 2017 (BP-25A). Zone J lies on the southwest side of the fault at the VAHP and is hydraulically separated by this fault from flow zones H and I, on the northeast side of the fault. Flow within Zone J is to the west-northwest. As described in the 1994 Remedial Investigation (RI) report for the Hillview-Porter Regional Program, chemicals detected in Zone J are sourced from an area south or southeast of well BP-25A and unrelated to SRP sites named in the RAO. In November 2017, TCE was detected in well BP-25A at 16 µg/L. The only other VOC detected in BP-25A above cleanup goals is PCE (7.2 µg/L). Current VOC results are consistent with recent data and trends.

Matadero Creek

In accordance with the current DTSC-approved creek monitoring program, surface water samples were collected and analyzed for VOCs from creek stations MC-4, MC-5, MC-7, MC-8, MC-9, MC-10, MC-11, and MC-12 and creek seep locations MC-9A and MC-11A. Surface water samples were collected at each location using a disposable bailer.

The November 2017 results confirm VOC concentrations in the surface waters of Matadero Creek remain below cleanup goals. The only VOC detected in Matadero creek samples was a single TCE detection of 0.71/0.52 µg/L in duplicate pair from location MC-8.

12.3 ANNUAL PERFORMANCE REVIEW

12.3.1 Description of Remedial Systems

Interim Remedial Measures (IRMs) were initiated prior to approval of the FRA and consisted of several remedial actions. The aeration of Matadero Creek, which was the first IRM initiated, was discontinued in March 1997 with DTSC approval. The remainder of the IRMs in conjunction with additional extraction wells in selected areas comprises the FRA as described below.

1. Horizontal well field: Two horizontal extraction wells, which extract groundwater from the first-encountered Alluvium flow zone (Zone A) located at 3333 Hillview Avenue and the VAHP. These wells are referred to as the axial (HW-2) and transverse (HW-3) horizontal wells, respectively. A DTSC-approved shutdown of horizontal extraction well HW-2 in March 2010. Horizontal well HW-3 remains active.

2. Main vertical well field: As constructed, the main vertical well field consisted of 15 vertical extraction wells extracting groundwater from eight flow zones. Eleven of the fifteen vertical extraction wells (BP-7B, BP-7C, BP-7D, BP-8, BP-12, BP-26A, BP-46A, BP-46B, BP-48A, BP-58, and BP-62A) are completed in five flow zones (Zones A through E) and are located along approximately 2,500 feet of the Bike Path (Bike Path extraction wells). The four remaining wells comprising the main vertical well field (BP-2B, BP-18C, BP-65A, and BP-67B) are located west of the Bike Path at 3333 Hillview Avenue and the VAHP. Thirteen of the vertical extraction wells (BP-2B, BP-7B, BP-7C, BP-7D, BP-8, BP-12, BP-26A, BP-46A, BP-46B, BP-48A, BP-58, BP-62A, and BP-65A) are currently shut down. Two vertical wells located at 3333 Hillview Avenue (BP-18C and BP-67B) remain active.

3. McGregor Way groundwater extraction and discharge system (GWEDS): Three vertical extraction wells (BP-43A, BP-43A1, and BP-43B) located in the BPN east of the Bike Path, formerly extracted groundwater from three flow zones (Zones B, C, and D, respectively). The extracted groundwater was formerly discharged to the sanitary sewer under a permit from the PARWQCP. All three GWEDS extraction wells are currently inactive.

4. Groundwater treatment plant: All groundwater extracted from the horizontal and main vertical well field is conveyed to a central groundwater treatment plant, where VOCs are removed through a GAC adsorption process. Treated groundwater is discharged through an existing storm drain to Matadero Creek in accordance with an NPDES general permit (Order No. R2-2009-0059, NPDES No. CAG912003).

As described in the DTSC-approved *"Groundwater Remediation Facility Reconfiguration Work Plan, 3181/3221/3215 Porter Drive, Palo Alto, California" (Work Plan),* dated June 2, 2016, and the *"Addendum to the Groundwater Remediation Facility Reconfiguration Work Plan, 3181/3221/3215 Porter Drive, Palo Alto, California" (Work Plan Addendum),* dated August 2, 2016, the Hillview-Porter Regional Site treatment plant was retrofitted to accept and treat VOC-impacted groundwater from the 3215 Porter Drive (HP Building 15), 3165 Porter Drive (Teledyne MEC), and 3300 Hillview Avenue sites. The treatment plant and all extraction wells were temporarily shut down on January 6, 2017, to complete the modifications. The treatment plant and extraction wells were brought back on-line in April 2017.

12.3.2 Operational and Compliance Information

As described in Section 12.3.1, the Hillview-Porter Regional Site GWETS was shut down on January 6, 2017, to accommodate the DTSC-approved facility reconfiguration associated with property redevelopment. The groundwater extraction wells and retrofitted treatment plant came back on-line in late April 2017. Following restart in April 2017, the three active Hillview-Porter Regional Site extraction wells and treatment plant operated continuously, except for downtime incidents noted in Table 4, those presented in the report entitled *"Combined Semi-Annual Status and Monitoring Report,"* dated July 15, 2017, and minor shut downs (less than 24 hours) for system maintenance or repairs.

Hillview-Porter Regional Site
January 31, 2018

Between November 30, 2016 and November 21, 2017, an estimated 2,663,586 gallons of groundwater, as metered at the individual wells, were extracted by the three active extraction wells (see Table 8). The combined average flow rate for extraction system during this timeframe was estimated at 7.63 gpm. No significant problems with the extraction system were encountered during the annual reporting period.

Between November 30, 2016 and November 21, 2017, an estimated 6,587,824 gallons of groundwater, as metered by a single flow totalizer at the treatment plant, were treated and discharged (see Table 9). This total includes groundwater produced from the Hillview-Porter Regional Site, the 3215 Porter Drive Site (HP Building 15 Site), the 3165 Porter Drive Site (Teledyne MEC Site), and the 3300 Hillview Avenue Site. An estimated 4.67 pounds of VOCs were treated during the 2017 annual reporting period. There were no violations of the NPDES discharge requirements during annual reporting period.

12.3.3 Plume Capture Evaluation

The Hillview-Porter Regional Site groundwater extraction system currently includes three active extraction wells pumping groundwater from the following three VOC-impacted flow zones: Alluvium Zone A – 1 horizontal extraction well; Santa Clara Formation Older Sequence Zone G – 1 vertical extraction well; and Santa Clara Formation Older Sequence Zone H – 1 vertical extraction well. Estimated hydraulic capture areas created by extraction from these wells are depicted graphically on Figure 3 (Zone A) and Figure 6 (Zones G and H). Plume capture evaluation for each flow zone is discussed below.

- As depicted on Figure 3, a cone of depression exists near the center of HW-3 and the capture area created by HW-3 nearly encompasses the width of the saturated alluvial wedge. Monitoring data confirm that HW-3 is effective in reducing groundwater influx into Matadero Creek and capturing VOC-affected groundwater migrating from up gradient SRP sites.

- As depicted on Figure 6, a cone of depression exists around Zone G extraction well BP-67B. The interpreted capture area encompasses the TCE plume within Zone G. Stable trends in plume boundary wells BP-73A and BP-47B confirm that operation of the groundwater extraction system is providing plume containment.

- As depicted on Figure 6, a cone of depression exists around Zone H extraction well BP-18C. The capture area for extraction well BP-18C extends approximately 350 feet north-northeast (down gradient). Extraction from BP-18C captures groundwater with the highest TCE concentrations. TCE concentrations in down gradient wells BPX-H1 and BP-73B slowly increased over the past few years; however, the November 2017 results show TCE concentration in both wells declined when compared to the November 2016 results.

12.3.4 Progress Made Towards Achieving Cleanup Goals

Groundwater extraction has been effective at containing and reducing VOC concentrations in each of the affected flow zones. Approximately 265 million gallons of groundwater has been removed since operation began in 1994. A recent detailed evaluation of progress made towards achieving cleanup goals is presented in the *Fourth Five-Year Remedial Action Status and Effectiveness Evaluation Report for the Hillview-Porter Regional Site*, dated March 15, 2016.

The most notable concentration reductions have been achieved in the Alluvium Zone A. As expected, cleanup of the Alluvium Zone A is progressing from east to west. Cleanup of the Alluvium Zone A underlying the BPN is considered complete and is now progressing towards the west, where groundwater extraction is ongoing. TCE concentrations in the Alluvium Zone A beneath the VAHP and the former 3333 Hillview Avenue property have declined by more than 80 percent and the lateral extent of the TCE plume continues to slowly contract. Axial horizontal extraction well HW-2 was shut down in March 2010 as TCE concentrations in monitoring wells surrounding well HW-2 (BP-2A, BP-3, BP-21, and BP-36A1) were all approaching or below the cleanup goal (5 µg/L). Monitoring data collected following shutdown of horizontal extraction well HW-2 reveal no material changes in water quality. Ongoing extraction from transverse horizontal extraction well HW-3 is expected to continue control the influx of VOC-impacted groundwater into Matadero Creek and capture VOC-impacted groundwater from up gradient SRP sites.

Concentration reductions in the deeper groundwater zones have also been achieved; although the rate of decline is slower than observed in the shallow alluvium. Cessation of groundwater extraction from Zones B through F occurred several years ago. Since cessation of groundwater extraction in these zones, plume dimensions and contaminant concentrations have generally been stable to declining, with few exceptions. The observed plume stability is inferred to result from source reduction achieved via historical extraction combined with physical natural attenuation processes, including sorption, dilution, diffusion, and volatilization. The absence to low levels of TCE daughter products suggest that biologically-mediated anaerobic degradation is not a dominant attenuation process in these deeper flow zones. Geochemical data typically used to qualitatively assess the viability and efficacy of anaerobic degradation have not been collected. The maximum TCE concentration remaining in Zones B, C, D, and E in November 2017 is 7.8 µg/L, 5.6/8.9 µg/L (duplicate pair), 14 µg/L, and 9.6 µg/L, respectively. In Zone F, TCE concentrations in all wells, except BP-2B are nearing the cleanup goal. The TCE concentration in BP-2B gradually increased between 2006 and 2008. Since 2008, the TCE concentration has declined and now appears stable near 50 µg/L. TCE in other Zone F wells remain stable and no evidence of plume expansion has been observed. With time, natural attenuation processes are expected to further reduce TCE concentrations.

Groundwater extraction from Zones G and H at the former 3333 Hillview Avenue property and VAHP is ongoing. The maximum TCE concentrations in Zone G and H wells in November 2017 was 21 µg/L (extraction well BP-67B) and 150/170 µg/L (duplicate pair from extraction well BP-18C), respectively. TCE concentrations in most Zone G and H wells are stable or declining (see plots in Appendix D).

12.4 PROPOSED MODIFICATIONS

No modifications to the current DTSC-approved monitoring and reporting program are proposed.

TABLES

TABLE 1
SITE STATUS SUMMARY
SRP Sites and Regional Site
Palo Alto, California

Site Address	Parties Named by DTSC	Type of Contamination s=soil g=groundwater	Cleanup Activities	Remediation and Monitoring Status
3165 Porter Drive	Teledyne MEC and Stanford. DTSC order issued August 1990 (amended August 1995). Five-Year Review submitted in 1999, 2004, 2009, and 2014.	s,g: 1,1,1-TCA, TCE, 1,1-DCE, 1,2-DCE	600 cubic yards of soil excavated, aerated, and disposed off-site October 1993 to January 1994. Groundwater extraction system installed 1994. *In situ* Chemical Oxidation Injections performed adjacent to wells EW-2, EW-3, EW-S7, and MW-S9 in June 2005. Approximately 2,500 gallons of $KMnO_4$ impacted groundwater pumped from wells EW-S7 and EW-3 in October/November 2007. 4 extraction wells taken out of service in January 2017 to accommodate property redevelopment. 2 new extraction wells installed in September 2016.	4 groundwater extraction wells (all wells currently active). Between approximately 1,953 and 2,877 gallons per day of groundwater extracted and treated at the Hillview-Porter Regional Site groundwater treatment facility. Groundwater monitoring program.
3215 Porter Drive	HP Inc. and Stanford. DTSC order issued March 1989 (amended July 1995). Five-Year Review submitted in 1999, 2004, 2009, and 2014.	s: TCE, PCE, 1,1,1-TCA, 1,1-DCE, MC, 1,2-DCE, 1,1-DCA g: Chloroform, Cr(VI), 1,1-DCA, 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, Freon 12, Freon 113, PCE, 1,2,4-TCB, TCE	Chemical and waste treatment facilities removed, and soil excavated in October 1988 and April 1990. Groundwater extraction IRM installed in June 1990. Soil vapor extracted from three wells operated April 1992 to June 1993. Expanded soil vapor extraction and air injection system operated August 1993 to August 1996. Expanded groundwater extraction system installed September 1993. $KMnO_4$ injection pilot study began in shallow zone in 2001. $KMnO_4$ injection pilot study began in deeper zone in 2003. Supplemental $KMnO_4$ injections performed in October 2004. Chromium pre-treatment system for groundwater began operation in July 2009. EISB Injection pilot study began in February 2015. EISB and ZVI pilot study began in August 2016. Groundwater conveyance piping and associated control system were re-routed to the Hillview-Porter Regional Site groundwater treatment facility to accommodate Stanford property redevelopment (November 2016 to April 2017). Groundwater treatment facility decommissioned in January 2017.	21 groundwater extraction wells (15 wells currently active). Approximately 17,300 gallons per day of groundwater extracted and treated at the Hillview-Porter Regional Site groundwater treatment facility. Groundwater monitoring program. EISB/ZVI performance monitoring program.

TABLE 1 – Continued
SITE STATUS SUMMARY
SRP Sites and Regional Site
Palo Alto, California

Site Address	Parties Named by DTSC	Type of Contamination s=soil g=groundwater	Cleanup Activities	Remediation and Monitoring Status
Corner of Page Mill Road and Porter Drive	HP Inc., Kaiser Electronics, and Stanford. DTSC order issued November 1990 (amended June 1995). Five-Year Review submitted in 1999, 2004, 2009, and 2014.	s: acetone, toluene, Freon g: Chloroform, 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, Freon 113, TCE, toluene,	Groundwater extraction system installed September 1993. Trial shutdown of groundwater extraction system implemented in April 1997. $KMnO_4$ injection pilot study performed in 1999. 8 of 10 extraction wells converted to monitoring wells in August 2017.	10 groundwater extraction wells (all wells currently inactive). Groundwater monitoring program.
3300 Hillview Avenue	Xerox, HM Holdings, Syntex, Syva, and Stanford. DTSC order issued October 1990 (amended September 1995). Five-Year Review submitted in 2000, 2006, 2011, and 2016.	s: TCE g: TCE, PCE, 1,1-DCE, 1,2-DCE, Freon 113, Freon 12, chloroform, 1,1,1-TCA	Groundwater extraction system installed December 1994.	2 Groundwater extraction wells (1 extraction well is inactive on trial basis). Approximately 275 gallons per day of groundwater extracted and treated at the Hillview-Porter Regional Site groundwater treatment facility. Groundwater monitoring program.
3210 Porter Drive	Coherent, HM Holdings, and Stanford. DTSC order issued November 1990 (amended March 1996). Five-Year Review submitted in 2001, 2006, 2011, and 2017.	s,g: TCE, PCE, 1,2-DCE g: TCE, PCE, 1,1-DCE, Freon 113, CHCL3, Freon 12, BDCMe	Acid Neutralization Sump Removal February 1989. Acid Dilution Sump Removal October 1992. Outdoor soil vapor extraction system operated from April 1992 to April 1995. Soil vapor extraction system beneath building operated from August 1995 to February 1997. Groundwater extraction system IRM began operation February 1991. Expanded groundwater extraction system began operation August 1995. Soil vapor extraction system beneath building restarted September 2002. Onsite groundwater treatment system installed July 2010.	3 Groundwater extraction wells. 5,300 gallons per day of groundwater extracted and treated onsite. Groundwater monitoring program. 7 Soil Vapor Extraction (SVE) wells. SVE on temporary shutdown and monitored on an annual basis.

TABLE 1 – Continued
SITE STATUS SUMMARY
SRP Sites and Regional Site
Palo Alto, California

Site Address	Parties Named by DTSC	Type of Contamination s=soil g=groundwater	Cleanup Activities	Remediation and Monitoring Status
3400 Hillview Avenue	GlaxoSmithKline (SmithKline Beecham), Gould Electronics, Solutia Inc. (on behalf of Pharmacia Corp, f/k/a Monsanto), Vishay GSI, Inc. (formerly General Instrument Corp.), Quality Technologies, and Stanford. DTSC order issued August 1988 (amended March 1996). Five-Year Review submitted in 1999, 2004, 2009, and 2014.	s: TCE, PCE, 1,2-DCE, acetone, toluene, xylene, ethylbenzene g: TCE, PCE, 1,2-DCE, Freon	6,000 cubic yards of soil excavated, remediated, and used for grading at site December 1990 to April 1991. Shallow groundwater extraction system installed August 1991. Shallow system expanded, and deeper groundwater extraction system installed May 1994. One additional extraction well added in 1999. Two additional deeper extraction wells added in 2003. Numerous wells and piezometers have been abandoned and sealed. Four Zone 3 wells (IP wells) installed and ERD pilot test activities conducted since 2014.	11 groundwater extraction wells. Due to lack of water, 6 shallow extraction wells have been inactive since March 2008. Pumps pulled from wells in July 2008. On average, approximately 19,000 gallons per day of groundwater extracted and treated via system. Groundwater treatment system initially utilized UV oxidation and granular activated carbon (GAC) polish; starting March 2008, changed to GAC only after UV oxidation system failed. Groundwater monitoring program. ERD pilot test performance monitoring.
3176 Porter Drive	Lockheed Martin Corporation, Teledyne Singer, Librascope Corporation, and Stanford. DTSC order issued November 1986 (amended November 1991) and July 1995. Five-Year Review submitted in 1999, 2004, 2009, and 2014.	s,g: TCE, PCE s: 1,1,1-TCA, xylenes g: 1,2-DCE, VC	Underground sump removed 1986. Groundwater extraction IRM installed September 1989. Soil vapor extraction system operated May 1989 to June 1990. 550 cubic yards of soil excavated and remediated 1990. Groundwater extraction and treatment system installed September 1993. Bioremediation IRZ pilot test in shallow groundwater August 2001 to November 2002. Expanded IRZ system approved by DTSC for implementation in 2003. IRZ system expansion, in 2004, and implementation, February 2004 through June 2009. Thermal conductive heating pilot test operated March 2014 to July 2014.	11 groundwater extraction wells. Approximately 8,552 gallons per day of groundwater extracted and treated via carbon. Groundwater monitoring program. Soil vapor monitoring program.

TABLE 1 – Continued
SITE STATUS SUMMARY
SRP Sites and Regional Site
Palo Alto, California

Site Address	Parties Named by DTSC	Type of Contamination s=soil g=groundwater	Cleanup Activities	Remediation and Monitoring Status
3333 Hillview Avenue	Watkins Johnson and Stanford. DTSC order issued May 1990 (amended February 1996). Five-Year Review submitted in 2000, 2005, 2010, and 2015.	s: TCE, PCE, toluene, 1,2-DCE, MC, xylene g: benzene, TCE, TCA, DCE, toluene	Groundwater extraction systems were installed in 1995 and dismantled in 2001 to accommodate redevelopment. Groundwater extraction and treatment systems were rebuilt in late 2001 and operated from January 2002 through August 2006. Both groundwater extraction systems were shut down in August 2006 and *in situ* chemical oxidation was implemented in September 2006. EISB pilot study was implemented at Building 5 and Building 6 in 2014 and 2015. Expanded EISB Program was implemented at Building 5 and Building 6 in 2016.	7 extraction wells (all wells are currently inactive). Groundwater monitoring program. Expanded EISB performance monitoring program.
Hillview-Porter Regional Site	14 RPs complying with DTSC order issued December 1988 (amended June 1990, April 1992, and June 1997). Five-Year Review submitted in 2001, 2006, and 2011, and 2016.	g: Chloroform,1,1-DCA, 1,2-DCA, 1,1-DCE, *cis*-1,2-DCE, Freon 12, Freon 113, PCE, TCE, VC Matadero Creek: TCE	Matadero Creek Aeration operated March 1993 – March 1997. Zone A groundwater extraction began March 1995. Zones A through E groundwater extraction at Bike Path began May 1994. Zones F, G, and H groundwater extraction began November 1995. Zones B, C, and D groundwater extraction at McGregor Way in BPN began May 1996.	2 horizontal groundwater extraction wells (1 horizontal groundwater extraction well is currently active). 15 vertical groundwater extraction wells (2 vertical groundwater extraction wells are currently active) Approximately 11,800 gallons per day of groundwater extracted and treated using carbon at the groundwater treatment plant. 3 vertical groundwater extraction wells on McGregor and Ilima Way (all wells currently inactive). Groundwater monitoring program.

Abbreviations

BTXE:	Benzene, Toluene, Xylene, Ethylbenzene
1,1-DCA:	1,1-Dichloroethane
DCB:	Dichlorobenzene
1,1-DCE:	1,1-Dichloroethene
1,2-DCE:	1,2-Dichloroethene
EISB:	Enhanced *In Situ* Bioremediation
ERD:	Enhanced Reductive De-chlorination
$KMnO_4$:	Potassium Permanganate
MC:	Methylene Chloride
PCE:	Tetrachloroethene
RP:	Responding Parties
1,1,1-TCA:	1,1,1-Trichloroethane
TCE:	Trichloroethene

TABLE 2
FLOW ZONE CORRELATION CHART
SRP Sites and Regional Site
Palo Alto, California

Site	Site-Specific Flow Zone	Correlated Flow Zone Mapped in Consolidated Report
3165 Porter Drive	Alluvium Zone	First-Encountered GW
	Santa Clara Zone 1	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*
	Santa Clara Shallow Zone	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone* (MW-5, MW-6, and MW-S12)
	Santa Clara Zone 2	Deeper GW Zones
	Santa Clara Deep Zone	Deeper GW Zones (MW-S11)
	Deeper Santa Clara Zone	Deeper GW Zones (MW-9)
3215 Porter Drive	Alluvium Zone	First-Encountered GW
	Santa Clara Zone 1	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*
	Santa Clara Zone 2	Deeper GW Zones
	Santa Clara Zone 3	Deeper GW Zones
Corner of Page Mill Road and Porter Drive	Alluvium Zone	First-Encountered GW
	Santa Clara Zone 1	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*
	Deeper Santa Clara	Deeper GW Zones
3300 Hillview Avenue	First Zone	First-Encountered GW
	Second Zone	First GW in Santa Clara and Unnamed Sandstone
	Third Zone	Deeper GW Zones
3210 Porter Drive	Alluvium Zone	First-Encountered GW
	Santa Clara Zone	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*
3400 Hillview Avenue	Zone 1	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*(south of Miranda Ave.)
	Zone 2	First GW in Santa Clara Fm
	Zone 3	Deeper GW Zones
3176 Porter Drive	Shallow Zone	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*
	Deep Zone	Deeper GW Zones
3333 Hillview Avenue	Building 5 Upper Flow System	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*
	Building 5 Lower Flow System	Regional Site Zone G
	Building 6 Flow System	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*
Hillview-Porter Regional Site	Zone A	First-Encountered GW
	Zone B	Zone B
	Zone C	Zone C
	Zone D	Zone D
	Zone E	Zone E
	Zone F	Zone F
	Zone G	Zone G
	Zone H	Zone H
3170 Porter Drive**	First GW SW and Upper Qsc	First-Encountered GW/First GW in Santa Clara Fm and Unnamed Sandstone*
	Qsc/Ts Contact	First GW in Santa Clara and Unnamed Sandstone
	Ts Above Clay	Deeper GW Zones

Notes

* First-encountered groundwater zone wells completed in the Santa Clara Formation and Unnamed Sandstone are included on both the First-Encountered GW and the First GW in Santa Clara Fm and Unnamed Sandstone Zone Maps.

** 3170 Porter Drive is included in the correlation chart for regional interpretation purposes but is not a participating party to the Consolidated Report.

TABLE 3
SEMI-ANNUAL STATUS REPORT
SRP Sites and Regional Site
Palo Alto, California

Site Location	Actions Completed During Reporting Period (June 1 – November 30, 2017)				Actions Completed or Anticipated During Next Reporting Period (December 1, 2017 – May 31, 2018)				Reports Submitted to Other Agencies
	O&M	Monitoring	Other	Description of Other Activities	O&M	Monitoring	Other	Description of Other Activities	
3165 Porter Drive	X	X	X	• Groundwater extraction system reconfiguration completed in April 2017. • Replacement monitoring well P-3R installed September 28, 2017.	X	X			
3215 Porter Drive	X	X	X	• Groundwater extraction system reconfiguration completed in April 2017.	X	X	X	• Conduct semi-annual EISB constituent monitoring of extraction wells AL-5 and SCI-20 in May 2018.	
Corner of Page Mill Road and Porter Drive		X	X	• Extraction wells AL-11, AL-12, AL-13, AL-14, AL-15, SC1-12, SC1-13, and SC1-14 were converted to monitoring wells in August 2017.		X			
3300 Hillview Avenue	X	X			X	X			
3210 Porter Drive	X	X			X	X			• Quarterly NPDES Self-Monitoring Reports submitted to the RWQCB.
3400 Hillview Avenue	X	X	X	• Conducted ERD pilot test performance monitoring. • Submitted the technical memorandum *Proposed Modifications to the Operations, Maintenance, and Monitoring Program* (dated March 29, 2017) and a revision (dated August 17, 2017) to the DTSC.	X	X	X	• Continue ERD pilot test performance monitoring. Evaluate results and provide recommendations to the DTSC. • Abandon four wells: EX-2, EX-3B, LF-1, and LF-16.	• Quarterly NPDES Self-Monitoring Reports submitted to the RWQCB.

TABLE 3
SEMI-ANNUAL STATUS REPORT
SRP Sites and Regional Site
Palo Alto, California

Site Location	Actions Completed During Reporting Period (June 1 – November 30, 2017)				Actions Completed or Anticipated During Next Reporting Period (December 1, 2017 – May 31, 2018)				Reports Submitted to Other Agencies
	O&M	Monitoring	Other	Description of Other Activities	O&M	Monitoring	Other	Description of Other Activities	
3176 Porter Drive	X	X	X	• Resurveyed the groundwater monitoring and extraction wells on June 12, 2017. • Submitted *First 2017 Semiannual Performance Evaluation Report* to DTSC on June 30, 2017. • Changed GAC in lead vessel of GWETS on July 25, 2017, reversed flow direction so new GAC became lag vessel. • Submitted responses to DTSC on August 7, 2017, regarding their June 26, 2017, comments on the 2016 Draft Consolidated Annual Monitoring Report for Hillview-Porter Region. • Bypassed the bag filter housings on September 6, 2017, in accordance with DTSC approval (July 26, 2017 email). • Submitted *Second 2017 Semiannual Soil Vapor Survey Summary Report* to DTSC on November 30, 2017.	X	X	X	• Sample indoor air within the 3176 Porter Drive building in December 2017/January 2018 and submit Winter 2017/2018 Potential Vapor Intrusion Evaluation Report. • Sample soil vapor monitoring points in March 2017 and submit First 2017 Semiannual Soil Vapor Survey Summary Report. • Sample groundwater monitoring wells in May 2017 and submit 2017 Semiannual Performance Evaluation Report.	• *Second Quarter 2017 NPDES Self-Monitoring Report*, August 8, 2017, to RWQCB. • *Third Quarter 2017 NPDES Self-Monitoring Report*, November 10, 2017, to RWQCB.

TABLE 3
SEMI-ANNUAL STATUS REPORT
SRP Sites and Regional Site
Palo Alto, California

Site Location	Actions Completed During Reporting Period (June 1 – November 30, 2016)				Actions Completed or Anticipated During Next Reporting Period (December 1, 2016 – May 31, 2017)				Reports Submitted to Other Agencies
	O&M	Monitoring	Other	Description of Other Activities	O&M	Monitoring	Other	Description of Other Activities	
3333 Hillview Drive	X	X	X	• Conducted Expanded EISB Program monitoring concurrent with Annual monitoring in November 2017.	X		X	• Submit Expanded EISB Program Performance Report in February 2018.	
Hillview-Porter Regional Site	X	X			X	X			• Quarterly NPDES Self-Monitoring Reports submitted to the RWQCB.

TABLE 4
O&M ISSUE AND CORRECTIVE ACTION LOG
SRP Sites and Regional Site
Palo Alto, California
June through November 2017

Date of Discovery	Description of Event	Corrective Action	Date of Restart	DTSC Notification Date
3165 Porter Drive				
	No events to report			

TABLE 4
O&M ISSUE AND CORRECTIVE ACTION LOG
SRP Sites and Regional Site
Palo Alto, California
June through November 2017

Date of Discovery	Description of Event	Corrective Action	Date of Restart	DTSC Notification Date
3215 Porter Drive				
06/02/17	Extraction well AL-9 was down due to communication issues.	The PLC module was replaced, and the extraction well was restarted.	06/20/17	06/02/17
10/05/2017	Extraction well AL-8 was down due to a pump motor issue.	The motor was replaced, and the extraction well was restarted.	10/11/17	10/05/17
10/18/17	Extraction well SC1-2 was down due to electrical issues.	A communication control component was replaced, and the extraction well was restarted.	11/03/17	10/19/17
10/27/17	Extraction wells AL-3, AL-8, AL-9, and SC1-8 were down due to a planned power outage at 3201/3251 Hillview Avenue for ongoing construction work.	Extraction wells resumed operation once power was restored.	10/29/17	10/27/17

TABLE 4
O&M ISSUE AND CORRECTIVE ACTION LOG
SRP Sites and Regional Site
Palo Alto, California
June through November 2017

Date of Discovery	Description of Event	Corrective Action	Date of Restart	DTSC Notification Date
3300 Hillview Avenue				
	No events to report.			

TABLE 4
O&M ISSUE AND CORRECTIVE ACTION LOG
SRP Sites and Regional Site
Palo Alto, California
June through November 2017

Date of Discovery	Description of Event	Corrective Action	Date of Restart	DTSC Notification Date
3210 Porter Drive				
	No events to report.			

TABLE 4
O&M ISSUE AND CORRECTIVE ACTION LOG
SRP Sites and Regional Site
Palo Alto, California
June through November 2017

Date of Discovery	Description of Event	Corrective Action	Date of Restart	DTSC Notification Date
3400 Hillview Avenue				
06/01/17	The treatment system was found to be shut off due to an outlet fuse failure.	Troubleshooting was conducted on June 6, 2017, and the system was brought back online on the same day. A new sump pump was installed during this event.	06/06/17	06/05/17
06/09/17	Treatment system was shut down to replace GAC in one vessel.	Corrective action not required. Treatment system down for approximately 4 hours during this event.	--	--
Multiple	The GWETS was found to be shut off on a number of occasions for a variety of reasons during 2017. The reasons included electrical issues, issues with the low influent alarm, and issues with the high-water alarm in the equalization tank.	The system was reset and restarted on the same date.	Multiple	--
10/30/17	Extraction system was shut down due to a blockage in the downstream discharge storm drain.	Troubleshooting was performed on November 2, 2017; and follow-up camera inspection of the discharge storm drain was completed on November 29, 2017. Discharge storm drain catch basin inlet was cleaned on November 29, 2017, and the system was restarted on the same day.	11/29/17	11/2/17

TABLE 4
O&M ISSUE AND CORRECTIVE ACTION LOG
SRP Sites and Regional Site
Palo Alto, California
June through November 2017

Date of Discovery	Description of Event	Corrective Action	Date of Restart	DTSC Notification Date
3176 Porter Drive				
7/25/17	Planned treatment system shut down to install new GAC vessel with new GAC.	Corrective action not required. Treatment system down for approximately 3.5 hours during planned event.	7/25/17	--

TABLE 4
O&M ISSUE AND CORRECTIVE ACTION LOG
SRP Sites and Regional Site
Palo Alto, California
June through November 2017

Date of Discovery	Description of Event	Corrective Action	Date of Restart	DTSC Notification Date
Hillview-Porter Regional Site				
06/19/17	Extraction well HW-3 was down due to pump motor issues.	Motor VFD controls were inspected and adjustments made to restart operation of pump.	06/20/17	06/19/17
09/01/17	Extraction well BP-67B was down due flow meter issues.	The flow meter was replaced in the extraction well vault and the extraction well restarted.	09/06/17	09/01/17
11/15/17	Extraction well HW-3 was down (planned) for repairs to the in-vault piping.	The ball check valve was replaced, and the piping was reduced to 1-inch to improve flow meter accuracy.	11/17/17	11/16/17

TABLE 5
MONITORING ACTIVITIES CONDUCTED IN NOVEMBER 2017
SRP Sites and Regional Site
Palo Alto, California

Number of Wells to be Sounded	Number of Wells Actually Sounded	Date of Soundings	Number of Sample Locations	Location I.D.	Date Sampled	Type of Sample [1]	Sampling Method [2]	Analysis Method [3]	Comments
3165 Porter Drive									
19	19	6-Nov-17	6 of 6	EW-2	6-Nov-17	GW	EXT	8260B/7199A	
				EW-3	6-Nov-17	GW	EXT	8260B/7199A	
				EW-S5R	6-Nov-17	GW	EXT	8260B	
				EW-S13R	6-Nov-17	GW	EXT	8260B	
				MW-16	6-Nov-17	GW	PDB(37.71)	8260B	
				P-3R	6-Nov-17	GW	PDB (40)	8260B	
3215 Porter Drive									
44	44	6-Nov-17	29 of 44	AL-1	6-Nov-17	GW	EXT	8260B/7199A	
				AL-2	9-Nov-17	GW	EXT	8260B/7199A	
				AL-3	9-Nov-17	GW	EXT	8260B/7199A	
				AL-5	9-Nov-17	GW	EXT	8260B/7199A/6010B	
				AL-6	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				AL-7	9-Nov-17	GW	EXT	8260B	
				AL-8	9-Nov-17	GW	EXT	8260B/7199A	
				AL-9	9-Nov-17	GW	EXT	8260B	
				MSC1-1	9-Nov-17	GW	PDB/HS (36.75)	8260B/7199A	
				MSC1-2	9-Nov-17	GW	PDB (37.5)	8260B	
				MSC2-1	9-Nov-17	GW	PDB (77.25)	8260B	
				MW-2	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-6	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-8	9-Nov-17	GW	PDB (43)	8260B	
				MW-16	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-17	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-18	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-22	9-Nov-17	GW	PDB/HS (22)	8260B/7199A	
				MW-23	9-Nov-17	GW	B	8260B/7199A	
				MW-24	9-Nov-17	GW	PDB/HS (28)	8260B/7199A	
				MW-28	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-33	9-Nov-17	GW	PDB (50)	8260B	
				MW-34	9-Nov-17	GW	PDB/HS (24)	8260B/7199A	
				MW-39	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-40	9-Nov-17	GW	PDB/HS (27.5)	8260B/7199A	
				MW-41	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-43	9-Nov-17	GW	PDB/HS (57)	8260B/7199A	
				MW-77	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
3215 Porter Drive - continued									

TABLE 5
MONITORING ACTIVITIES CONDUCTED IN NOVEMBER 2017
SRP Sites and Regional Site
Palo Alto, California

Number of Wells to be Sounded	Number of Wells Actually Sounded	Date of Soundings	Number of Sample Locations	Location I.D.	Date Sampled	Type of Sample [1]	Sampling Method [2]	Analysis Method [3]	Comments
				MW-78	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-79	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				MW-80	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				SC1-2	9-Nov-17	GW	EXT	8260B/7199A	
				SC1-3	6-Nov-17	GW	EXT	8260B/7199A	
				SC1-7	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				SC1-9	9-Nov-17	GW	PDB (59)	8260B	
				SC1-10	6-Nov-17	GW	PDB/HS (37)	8260B/7199A	
				SC1-16	NS	NS	NS	NS	Well inaccessible. Well buried for protection during Stanford property redevelopment.
				SC1-17	6-Nov-17	GW	EXT	8260B/7199A	
				SC1-18	9-Nov-17	GW	EXT	8260B	
				SC1-19	9-Nov-17	GW	EXT	8260B/7199A	
				SC1-20	9-Nov-17	GW	EXT	8260B/7199A/6010B	
				SC2-2	9-Nov-17	GW	PDB (78.5)	8260B	
				SC2-3	9-Nov-17	GW	EXT	8260B/7199A	
				SC2-5	9-Nov-17	GW	EXT	8260B/7199A	
Corner of Page Mill Road and Porter Drive									
36	36	6-Nov-17	16 of 17	AL-10	9-Nov-17	GW	PDB (48)	8260B	
				AL-11	6-Nov-17	GW	PDB (33.5)	8260B	
				AL-12	6-Nov-17	GW	PDB (31.5)	8260B	
				AL-14	6-Nov-17	GW	PDB (32.25)	8260B	
				AL-15	6-Nov-17	GW	PDB (38.5)	8260B	
				MW-5	6-Nov-17	GW	PDB (29.5)	8260B	
				MW-6	6-Nov-17	GW	PDB (38.75)	8260B	
				MW-13	NS	NS	NS	NS	Well was dry
				MW-74	9-Nov-17	GW	PDB (36)	8260B	
				MW-75	9-Nov-17	GW	PDB (58)	8260B	
				MW-82	9-Nov-17	GW	PDB (41)	8260B	
				MW-106	9-Nov-17	GW	PDB (64)	8260B	
				MW-107	9-Nov-17	GW	PDB (102.5)	8260B	
				SC1-12	6-Nov-17	GW	PDB (61.5)	8260B	
				SC1-13	6-Nov-17	GW	PDB (72)	8260B	
				SC1-14	6-Nov-17	GW	PDB (69)	8260B	
				SC1-15	9-Nov-17	GW	PDB (73.5)	8260B	

TABLE 5
MONITORING ACTIVITIES CONDUCTED IN NOVEMBER 2017
SRP Sites and Regional Site
Palo Alto, California

Number of Wells to be Sounded	Number of Wells Actually Sounded	Date of Soundings	Number of Sample Locations	Location I.D.	Date Sampled	Type of Sample [1]	Sampling Method [2]	Analysis Method [3]	Comments
3300 Hillview Avenue									
11	11	6-Nov-17	14 of 14	MW-A	6-Nov-17	GW	SUBm	8260B	
				MW-B	6-Nov-17	GW	SUBm	8260B	
				MW-C	7-Nov-17	GW	SUBm	8260B	
				MW-D	7-Nov-17	GW	SUBm	8260B	
				MW-E	6-Nov-17	GW	SUBm	8260B	
				MW-EB	27-Nov-17	GW	SUBm	8260B	
				MW-F	6-Nov-17	GW	SUBm	8260B	
				MW-FB	7-Nov-17	GW	EXT	8260B	
				MW-FC	6-Nov-17	GW	SUBm	8260B	
				MW-G	7-Nov-17	GW	SUBm	8260B	
				MW-GB	7-Nov-17	GW	SUBm	8260B	
				MW-9B	7-Nov-17	GW	SUBm	8260B	Sampled by 3210 PD
				MW-10	7-Nov-17	GW	SUBm	8260B	Sampled by 3210 PD
				TBM-SYNTEX	7-Nov-17	CR	GRAB	8260B	Surface water sample
3210 Porter Drive									
15	15	6-Nov-17	15 of 15	CEW-1	6-Nov-17	GW	EXT	8260B	
				CEW-2	6-Nov-17	GW	EXT	8260B	
				CEW-3	7-Nov-16	GW	EXT	8260B	
				MW-2A	7-Nov-17	GW	SUBm	8260B	
				MW-2B	7-Nov-17	GW	SUBm	8260B	
				MW-3	7-Nov-17	GW	SUBm	8260B	
				MW-4	6-Nov-17	GW	SUBm	8260B	
				MW-5	6-Nov-17	GW	SUBm	8260B	
				MW-6	7-Nov-17	GW	SUBm	8260B	
				MW-7	7-Nov-17	GW	SUBm	8260B	
				MW-9B	7-Nov-17	GW	SUBm	8260B	
				MW-10	7-Nov-17	GW	SUBm	8260B	
				MW-11	7-Nov-17	GW	SUBm	8260B	
				MW-13A	6-Nov-17	GW	SUBm	8260B	
				MW-14	7-Nov-17	GW	SUBm	8260B	
3400 Hillview Avenue									
31	30	6-Nov-17	21 of 24	LF-1	NS	NS	NS	NS	Well approved for abandonment
				LF-2B	7-Nov-17	GW	PDB	8260B	
				LF-3	NS	NS	NS	NS	
				LF-4A	NS	NS	NS	NS	Insufficient water to sample
				LF-4B	8-Nov-17	GW	PDB	8260B	
				LF-15	6-Nov-17	GW	PDB	8260B	
				LF-16	NS	NS	NS	NS	Well approved for abandonment
				LF-17A	6-Nov-17	GW	PDB	8260B	
				LF-18B	6-Nov-17	GW	PDB	8260B	
				LF-20B	NS	NS	NS	NS	
				LF-20C	8-Nov-17	GW	EXT	8260B	

TABLE 5
MONITORING ACTIVITIES CONDUCTED IN NOVEMBER 2017
SRP Sites and Regional Site
Palo Alto, California

Number of Wells to be Sounded	Number of Wells Actually Sounded	Date of Soundings	Number of Sample Locations	Location I.D.	Date Sampled	Type of Sample [1]	Sampling Method [2]	Analysis Method [3]	Comments
3400 Hillview Avenue - continued									
				LF-20D	8-Nov-17	GW	EXT	8260B	
				LF-24B	6-Nov-17	GW	PDB	8260B	
				LF-25B	NS	NS	NS	NS	
				LF-26B	6-Nov-17	GW	PDB	8260B	
				EX-3B	NS	NS	NS	NS	Well approved for abandonment
				LF-30C	6-Nov-17	GW	PDB	8260B	
				LF-31B	6-Nov-17	GW	PDB	8260B	
				EX-1	7-Nov-17	GW	B	8260B	
				EX-2	NS	NS	NS	NS	Well approved for abandonment
				EX-3	7-Nov-17	GW	B	8260B	
				EX-4	7-Nov-17	GW	B	8260B	
				EX-5	7-Nov-17	GW	B	8260B	
				EX-6	7-Nov-17	GW	B	8260B	
				LF-2	7-Nov-17	GW	B	8260B	
				EX-1B	8-Nov-17	GW	EXT	8260B	
				EX-2B	8-Nov-17	GW	EXT	8260B	
				LF-27B	6-Nov-17	GW	PDB	8260B	
				EX-1C	NS	NS	NS	NS	Extraction well shut off for maintenance
				PZ-2	NS	NS	NS	NS	Well could not be located
				PZ-4	7-Nov-17	GW	B	8260B	
3176 Porter Drive									
52	52	6-Nov-17	41 of 47	DW-1	7-Nov-17	GW	PDB (63.6)	8260B	
	45 non-dry wells			DW-2	7-Nov-17	GW	PDB (74.4)	8260B	
	5 dry wells			DW-3	7-Nov-17	GW	PDB (55.8)	8260B	
	2 non-dry pzs			DW-5	7-Nov-17	GW	PDB (72.5)	8260B	
				DW-6	NS	NS	NS	NS	
				DW-7	7-Nov-17	GW	PDB(74.5)	8260B	
				DW-8	NS	NS	NS	NS	
				DW-10	7-Nov-17	GW	PDB (78.0)	8260B	
				DW-11	7-Nov-17	GW	PDB (69.5)	8260B	
				EW-1	NS	NS	NS	NS	EW-1B sampled instead. Well was dry
				EW-1B	7-Nov-17	GW	EXT	8260B	
				EW-2	NS	NS	NS	NS	EW-2B sampled instead. Well was dry
				EW-2B	6-Nov-17	GW	EXT	8260B	Duplicate collected
				EW-3	NS	NS	NS	NS	EW-3B sampled instead.
				EW-3B	7-Nov-17	GW	EXT	8260B	
				EW-4	7-Nov-17	GW	EXT	8260B	
				MD-4	7-Nov-17	GW	PDB (65.5)	8260B	
				MD-6	7-Nov-17	GW	PDB (74.0)	8260B	
				MD-7	7-Nov-17	GW	EXT	8260B	
				MW-2	7-Nov-17	GW	PDB (22.5)	8260B	
				MW-4	NS	NS	NS	NS	Well was dry

TABLE 5
MONITORING ACTIVITIES CONDUCTED IN NOVEMBER 2017
SRP Sites and Regional Site
Palo Alto, California

Number of Wells to be Sounded	Number of Wells Actually Sounded	Date of Soundings	Number of Sample Locations	Location I.D.	Date Sampled	Type of Sample [1]	Sampling Method [2]	Analysis Method [3]	Comments
3176 Porter Drive - continued									
				MW-5	NS	NS	NS	NS	Well was dry
				MW-6RRB	7-Nov-17	GW	PDB (37.0)	8260B	
				MW-7	7-Nov-17	GW	PDB (31.1)	8260B	
				MW-8	7-Nov-17	GW	PDB (38.0)	8260B	
				MW-10	7-Nov-17	GW	PDB (29.8)	8260B	
				MW-11A	NS	NS	NS	NS	Well was dry
				MW-11B	7-Nov-17	GW	EXT	8260B	Duplicate collected
				MW-11C	7-Nov-17	GW	EXT	8260B	Duplicate collected
				MW-11D	7-Nov-17	GW	EXT	8260B	
				MW-12	7-Nov-17	GW	EXT	8260B	
				MW-13	7-Nov-17	GW	PDB (29.5)	8260B	
				MW-14	7-Nov-17	GW	PDB (36.5)	8260B	
				MW-15	7-Nov-17	GW	PDB (27.9)	8260B	
				MW-16R	7-Nov-17	GW	EXT	8260B	
				MW-17	7-Nov-17	GW	PDB (25.5)	8260B	
				MW-18	6-Nov-17	GW	EXT	8260B	
				MW-19	7-Nov-17	NS	NS	NS	Well was dry
				MW-20	7-Nov-17	GW	PDB (25.0)	8260B	
				MW-21	7-Nov-17	GW	PDB (27.0)	8260B	
				MW-22	7-Nov-17	GW	PDB (35.0)	8260B	
				MW-23B	7-Nov-17	GW	PDB (42.0)	8260B	
				MW-24	7-Nov-17	GW	PDB (37.8)	8260B	
				MW-25	7-Nov-17	GW	PDB (30.0)	8260B	
				MW-26	7-Nov-17	GW	PDB (38.0)	8260B	Duplicate collected
				MW-29	7-Nov-17	GW	PDB (51.5)	8260B	
				MW-30	7-Nov-17	GW	PDB (46.5)	8260B	
				MW-31	7-Nov-17	GW	PDB (44.5)	8260B	
				MW-32	7-Nov-17	GW	PDB (59.5)	8260B	
				MW-33	7-Nov-17	GW	PDB (54.5)	8260B	Duplicate collected
				PZ-1S	7-Nov-17	-	-	-	Piezometer for groundwater elevation monitoring only
				PZ-2S	7-Nov-17	-	-	-	Piezometer for groundwater elevation monitoring only.
3333 Hillview Avenue									
23	23	6-Nov-17	22 of 22	PA-26R	10-Nov-17	GW	PDB (50)	8260B	
				PA-30	7-Nov-17	GW	PDB (32.25)	8260B	
				PA-40	7-Nov-17	GW	PDB (37.8)	8260B	
				PA-41	6-Nov-17	GW	PDB (29)	8260B	Duplicate collected
				PA-43	7-Nov-17	GW	PDB (25.2)	8260B	
				PA-45R	6-Nov-17	GW	PDB (47.6)	8260B	
				PA-47R2	6-Nov-17	GW	PDB (45)	8260B	
				PA-52	6-Nov-17	GW	PDB (54.61)	8260B	
				PA-53R	10-Nov-17	GW	PDB/HS (50.2)	8260B/7199A	
				PA-55R	10-Nov-17	GW	PDB/HS (55)	8260B/7199A	

TABLE 5
MONITORING ACTIVITIES CONDUCTED IN NOVEMBER 2017
SRP Sites and Regional Site
Palo Alto, California

Number of Wells to be Sounded	Number of Wells Actually Sounded	Date of Soundings	Number of Sample Locations	Location I.D.	Date Sampled	Type of Sample [1]	Sampling Method [2]	Analysis Method [3]	Comments
3333 Hillview Avenue - continued									
				PA-56	7-Nov-17	GW	PDB/HS (28.7)	8260B/7199A	
				PA-57	7-Nov-17	GW	PDB (39)	8260B	
				PA-58	7-Nov-17	GW	PDB (58.4)	8260B	
				PA-59	7-Nov-17	GW	PDB/HS (50.1)	8260B/7199A	
				PA-60R	10-Nov-17	GW	PDB (47)	8260B	
				PA-61R	10-Nov-17	GW	PDB/HS (54.3)	8260B/7199A	
				PA-62R	10-Nov-17	GW	PDB/HS (52.2)	8260B/7199A	
				PA-63R	6-Nov-17	GW	PDB (55)	8260B	Duplicate collected
				OBS-1	7-Nov-17	GW	PDB/HS (35)	8260B/7199A	
				OBS-2	7-Nov-17	GW	PDB/HS (35)	8260B/7199A	
				OBS-3	10-Nov-17	GW	PDB/HS (55)	8260B/7199A	
				OBS-4	10-Nov-17	GW	PDB/HS (59)	8260B/7199A	
Hillview-Porter Regional Site									
109	105	6-Nov-17	78 of 78	BP-1	8-Nov-17	GW	PDB (53.5)	8260B	
				BP-2A	8-Nov-17	GW	PDB (18.5)	8260B	
				BP-2B	8-Nov-17	GW	PDB (35)	8260B	
				BP-3	8-Nov-17	GW	PDB (17.5)	8260B	
				BP-5	8-Nov-17	GW	PDB (33)	8260B	
				BP-7B	8-Nov-17	GW	PDB (33.5)	8260B	
				BP-7C	8-Nov-17	GW	PDB (46.5)	8260B	
				BP-7D	8-Nov-17	GW	PDB (187)	8260B	
				BP-8	8-Nov-17	GW	PDB (50)	8260B	
				BP-12	6-Nov-17	GW	PDB (31)	8260B	
				BP-13	7-Nov-17	GW	PDB (35.5)	8260B	
				BP-18A	8-Nov-17	GW	PDB (18.5)	8260B	
				BP-18B	8-Nov-17	GW	PDB (38.5)	8260B	
				BP-18C	8-Nov-17	GW	EXT	8260B	
				BP-21	8-Nov-17	GW	PDB (31.5)	8260B	
				BP-25A	6-Nov-17	GW	PDB (154)	8260B	
				BP-26A	8-Nov-17	GW	PDB (93.5)	8260B	
				BP-28A	6-Nov-17	GW	PDB (77)	8260B	
				BP-36A	6-Nov-17	GW	PDB (74.5)	8260B	
				BP-36A1	6-Nov-17	GW	PDB (13)	8260B	
				BP-37	6-Nov-17	GW	PDB (48.5)	8260B	
				BP-43A	7-Nov-17	GW	PDB (53)	8260B	
				BP-43A1	7-Nov-17	GW	PDB (118.5)	8260B	
				BP-43B	7-Nov-17	GW	PDB (158.41)	8260B	
				BP-44	6-Nov-17	GW	PDB (53)	8260B	
				BP-46A	8-Nov-17	GW	PDB (147)	8260B	
				BP-46B	8-Nov-17	GW	PDB (260)	8260B	
				BP-47	8-Nov-17	GW	PDB (83.92)	8260B	
				BP-47B	8-Nov-17	GW	PDB (197.5)	8260B	

TABLE 5
MONITORING ACTIVITIES CONDUCTED IN NOVEMBER 2017
SRP Sites and Regional Site
Palo Alto, California

Number of Wells to be Sounded	Number of Wells Actually Sounded	Date of Soundings	Number of Sample Locations	Location I.D.	Date Sampled	Type of Sample [1]	Sampling Method [2]	Analysis Method [3]	Comments
Hillview-Porter Regional Site - continued									
				BP-48A	8-Nov-17	GW	PDB (68)	8260B	
				BP-48B	8-Nov-17	GW	PDB (334)	8260B	
				BP-49A	7-Nov-17	GW	PDB (67)	8260B	
				BP-49B	7-Nov-17	GW	PDB (216)	8260B	
				BP-49C	7-Nov-17	GW	PDB (323)	8260B	
				BP-50	6-Nov-17	GW	PDB (44)	8260B	
				BP-51	7-Nov-17	GW	PDB (33.5)	8260B	
				BP-53	7-Nov-17	GW	PDB (38)	8260B	
				BP-54	6-Nov-17	GW	PDB (30.5)	8260B	
				BP-55	6-Nov-17	GW	PDB (51)	8260B	
				BP-56	7-Nov-17	GW	PDB (41)	8260B	
				BP-57	8-Nov-17	GW	PDB (30.5)	8260B	
				BP-58	6-Nov-17	GW	PDB (40)	8260B	
				BP-61B	8-Nov-17	GW	PDB (177.5)	8260B	
				BP-62A	8-Nov-17	GW	PDB (61)	8260B	
				BP-62B	8-Nov-17	GW	PDB (306)	8260B	
				BP-65A	8-Nov-17	GW	PDB (28)	8260B	
				BP-65B	8-Nov-17	GW	PDB (116)	8260B	
				BP-67B	8-Nov-17	GW	EXT	8260B	
				BP-68	7-Nov-17	GW	PDB (343)	8260B	
				BP-73A	8-Nov-17	GW	PDB (87)	8260B	
				BP-73B	8-Nov-17	GW	PDB (166)	8260B	
				BP-74R	7-Nov-17	GW	PDB (16)	8260B	Replacement well installed in November 2015
				BP-75R	7-Nov-17	GW	PDB (19)	8260B	Replacement well installed in November 2015
				BPX-F1	8-Nov-17	GW	PDB (85)	8260B	
				BPX-H1	8-Nov-17	GW	PDB (85)	8260B	
				DH-03	6-Nov-17	GW	PDB (14.3)	8260B	
				MW-C	6-Nov-17	GW	PDB (147.5)	8260B	
				MW-D	6-Nov-17	GW	PDB (183)	8260B	
				PA-08	6-Nov-17	GW	PDB (18.5)	8260B	
				PA-13	6-Nov-17	GW	PDB (33)	8260B	
				PA-17	6-Nov-17	GW	PDB (42.5)	8260B	
				PA-18	6-Nov-17	GW	PDB (57.5)	8260B	
				PA-19	6-Nov-17	GW	PDB (18.5)	8260B	
				PA-20	6-Nov-17	GW	PDB (25)	8260B	
				PA-29	8-Nov-17	GW	PDB (48)	8260B	
				PW-1	6-Nov-17	PW	EXT	8260B	Private well in BPN
				PW-2	6-Nov-17	PW	EXT	8260B	Private well in BPN
				TW-1B	8-Nov-17	GW	PDB (16.5)	8260B	
				MC-04	7-Nov-17	CR	GRAB/B	8260B	
				MC-05	7-Nov-17	CR	GRAB/B	8260B	
				MC-07	7-Nov-17	CR	GRAB/B	8260B	

TABLE 5

MONITORING ACTIVITIES CONDUCTED IN NOVEMBER 2017

SRP Sites and Regional Site

Palo Alto, California

Number of Wells to be Sounded	Number of Wells Actually Sounded	Date of Soundings	Number of Sample Locations	Location I.D.	Date Sampled	Type of Sample [1]	Sampling Method [2]	Analysis Method [3]	Comments
Hillview-Porter Regional Site - continued									
				MC-08	7-Nov-17	CR	GRAB/B	8260B	
				MC-09	7-Nov-17	CR	GRAB/B	8260B	
				MC-9A	7-Nov-17	CR	GRAB/B	8260B	
				MC-10	7-Nov-17	CR	GRAB/B	8260B	
				MC-11	7-Nov-17	CR	GRAB/B	8260B	
				MC-11A	7-Nov-17	CR	GRAB/B	8260B	
				MC-12	7-Nov-17	CR	GRAB/B	8260B	

Notes and abbreviations:

[1] GW - groundwater sample collected from monitoring or extraction well.
CR - surface water sample collected from Matadero Creek.

[2] B - bailer
EXT - extraction well sample port.
SUBm - portable dedicated submersible pump - micropurge technique.
PDB (33) - passive diffusion bag sampler and deployment depth in feet below top of casing.
HS - HydraSleeve® and sample depth in feet below top of casing.
GRAB - grab sample from Matadero Creek.

[3] 8260B - USEPA Method 8260B (8010 list only).
7199A - Hexavalent chromium by USEPA Method 7199A.
6010B - Dissolved arsenic and manganese
NS = Not Sampled.
- = Sampling not required (groundwater elevation monitoring only)

TABLE 6
Well Construction Details and Groundwater Elevation Data for November 2017
SRP Sites and Regional Site
Palo Alto, California

Well Number	Site Zone Designation	Formation of Completion	Screened Interval feet, msl	Top of casing feet, msl	Depth to Water feet, btoc	Groundwater Elevation feet, msl	As-Built Depth feet, bgs
Corner of Page Mill Road and Porter Drive							
AL-10	A	Qal	65.30 - 75.30	123.30	40.98	82.32	63
AL-11	A	Qal	73.10 - 83.10	106.75	24.13	82.62	35
AL-12	A	Qal	68.70 - 83.70	107.13	24.47	82.66	39
AL-13	A	Qal	64.00 - 84.00	107.83	25.00	82.83	45.5
AL-14	A	Qal	60.00 - 85.00	108.64	25.11	83.53	53
AL-15	A	Qal	68.00 - 93.00	112.63	25.14	87.49	48
MW-1	SC1	Qsc	88.02 - 94.02	123.73	30.61	93.12	36
MW-2	A	Qal	88.04 - 93.04	114.77	26.54	88.23	27.5
MW-3	A	Qal	74.19 - 84.19	107.30	21.89	85.41	33
MW-4	A	Qal	76.41 - 91.41	112.71	25.18	87.53	36.5
MW-5	SC1	Qsc	83.66 - 88.66	113.92	24.32	89.60	30.5
MW-6	SC1	Qsc	76.40 - 81.40	115.24	27.11	88.13	39.5
MW-7	SC1	Qsc	42.40 - 52.40	112.54	24.88	87.66	71
MW-8	SC1	Qsc	39.00 - 49.00	108.50	25.71	82.79	70.5
MW-9	A	Qal	66.60 - 76.60	108.54	23.63	84.91	43
MW-10	A	Qal	84.60 - 94.60	117.98	29.29	88.69	34.5
MW-11	SC1	Qsc	84.30 - 94.30	119.48	29.03	90.45	36.5
MW-12	A	Qal	80.60 - 90.60	122.88	32.74	90.14	43.5
MW-13	A	Qal	84.90 - 89.90	109.06	Dry	Dry	25
MW-14	SC1	Qsc	78.30 - 88.30	129.82	46.63	83.19	52.5
MW-15	DSC	Qsc	7.00 - 17.00	112.62	21.91	90.71	105.5
MW-17	DSC	Qsc	10.00 - 18.00	108.76	23.98	84.78	99
MW-74	A	Qal	85.62 - 90.62	124.31	34.88	89.43	39
MW-75	SC1	Qsc	70.74 - 78.74	131.14	43.33	87.81	60.5
MW-82	A	Qal	82.00 - 92.00	128.11	39.72	88.39	47
MW-83	SC1	Qsc	87.10 - 97.10	129.83	34.69	95.14	43.5
MW-106	SC1	Qsc	64.00 - 74.00	128.52	39.43	89.09	65.5
MW-107	DSC	Qsc	25.10 - 35.60	128.30	37.41	90.89	103.5
MW-108	DSC	Qsc	47.70 - 58.20	131.38	59.54	71.84	84
PAL-1	A	Qal	69.80 - 79.80	126.75	44.39	82.36	57
PSC1-1	SC1	Qsc	56.70 - 61.70	106.66	22.92	83.74	50
PSC1-2	SC1	Qsc	41.80 - 56.80	127.02	45.88	81.14	85
SC1-12	SC1	Qsc	33.70 - 58.70	112.27	24.37	87.90	80.5
SC1-13	SC1	Qsc	23.90 - 38.90	107.36	24.21	83.15	85.5
SC1-14	SC1	Qsc	25.40 - 45.40	108.34	25.26	83.08	83.5
SC1-15	SC1	Qsc	38.80 - 53.80	123.80	40.96	82.84	90.5
3165 Porter Drive							
EW-02	SC1	Qsc	63.50 - 73.50	105.37	39.80	65.57	45
EW-03	SC1	Qsc	71.90 - 76.90	102.94	31.29	71.65	34.5
EW-S1	Destroyed on January 24, 2017						
EW-S5	Destroyed on January 24, 2017						
EW-S5R	SC1	Qsc	60.40 - 67.40	102.27	31.97	70.30	48
EW-S7	Destroyed on January 23, 2017						
EW-S13R	SC1	Qsc	57.30 - 62.30	98.33	37.40	60.93	47
MW-1	A	Qal	76.60 - 81.60	100.94	26.60	74.34	27
MW-4	SC1	Qsc	87.10 - 92.10	111.88	25.32	86.56	27
MW-5	SCS	Qsc	55.20 - 65.20	112.80	27.31	85.49	60
MW-6	SCS	Qsc	67.50 - 87.50	114.01	28.31	85.70	49
MW-7	SC2	Qsc	53.60 - 63.60	106.01	22.93	83.08	55
MW-8	SC1	Qsc	61.80 - 66.80	104.25	23.39	80.86	45
MW-9	DSC	Qsc	6.60 - 11.60	106.31	24.33	81.98	102
MW-10	SC1	Qsc	76.70 - 86.70	108.51	27.65	80.86	34
MW-13	A	Qal	77.70 - 83.70	104.18	23.97	80.21	29
MW-15	SC1	Qsc	58.80 - 65.80	101.47	23.97	77.50	45
MW-16	SC1	Qsc	66.40 - 76.40	103.19	23.79	79.40	39
MW-18	SC2	Qsc	62.90 - 67.90	104.66	24.29	80.37	44
MW-S2	Destroyed on November 14, 2016						
MW-S4	Destroyed on November 14, 2016						
MW-S9	Destroyed on November 14, 2016						
MW-S10	Destroyed on November 14, 2016						
MW-S11	SCD	Qsc	45.20 - 55.20	108.66	NM [1]	NM	66
MW-S12	SCS	Qsc	62.10 - 72.10	108.42	NM [1]	NM	47.5
MW-S13	SC1	Qsc	58.00 - 62.30	100.43	NM [1]	NM	46
MW-S14	Destroyed on November 14, 2016						
MW-S15	SC1	Qsc	55.92 - 62.92	102.92	NM [1]	NM	47
P-1	SC2	Qsc	50.50 - 70.50	112.25	30.27	81.98	64
P-2	A	Qal	63.50 - 76.50	103.98	24.07	79.91	43
P-3	Destroyed on November 14, 2016						
P-3R	SC2	Qsc	62.31 - 67.31	105.31	24.95	80.36	43.3

TABLE 6
Well Construction Details and Groundwater Elevation Data for November 2017
SRP Sites and Regional Site
Palo Alto, California

Well Number	Site Zone Designation	Formation of Completion	Screened Interval feet, msl	Top of casing feet, msl	Depth to Water feet, btoc	Groundwater Elevation feet, msl	As-Built Depth feet, bgs
3170 Porter Drive							
EW-1	UQsc	Qsc	75.17 - 95.17	110.17	27.27	82.90	38
EW-2	UQsc	Qsc	54.32 - 74.32	110.32	26.98	83.34	61
EW-3	UQsc	Qsc	68.43 - 83.43	109.43	24.17	85.26	44
EW-4	UQsc	Qsc	53.40 - 63.40	109.40	22.97	86.43	59
EW-5	UQsc	Qsc	69.38 - 94.38	110.38	24.00	86.38	44
EW-6	1GWSW	Qal/Ts	98.50 - 108.50	120.50	9.35	111.15	23
EW-7	Qsc/Ts	Qsc	-0.86 - 9.14	109.14	21.47	87.67	113
EW-8	Qsc/Ts	Qsc	25.21 - 35.21	108.21	58.54	49.67	86
EW-9	Ts/clay	Ts	-19.61 - -4.61	102.39	12.05	90.34	125
EW-10	Ts/clay	Ts	-2.22 - 12.78	108.78	43.25	65.53	114
EW-11	UQsc	Qsc	67.56 - 82.56	102.56	19.08	83.48	38
EW-12	1GWSW	Qal/Ts	95.75 - 105.75	115.75	8.92	106.83	20
EW-13	UQsc	Qsc	38.07 - 53.07	107.57	44.94	62.63	72.5
MW-1	1GWSW	Qal/Ts	103.42 - 113.42	123.42	4.09	119.33	20.5
MW-2	1GWSW	Qal/Ts	103.51 - 113.51	123.51	8.54	114.97	20.5
MW-3	UQsc	Qsc	77.59 - 87.59	122.59	34.76	87.83	45
MW-5	1GWSW	Qal	98.68 - 108.68	118.61	7.82	110.79	25.5
MW-8	UQsc	Qsc	77.48 - 87.48	117.44	33.41	84.03	41
MW-9	UQsc	Qsc	74.35 - 79.35	119.35	32.17	87.18	45
MW-10	1GWSW	Ts	90.96 - 100.96	110.96	8.08	102.88	20
MW-12	1GWSW	Ts	111.48 - 116.48	123.98	5.25	118.73	12.5
MW-13	1GWSW	Qal/Ts	97.57 - 101.57	114.57	12.63	101.94	17
MW-15	Ts/clay	Ts	-16.45 - -22.45	102.55	11.25	91.30	125
MW-17	Qsc/Ts	Qsc/Ts	22.19 - 32.19	110.19	15.53	94.66	88
MW-19	Ts/clay	Ts	19.69 - 29.69	111.69	16.85	94.84	92
MW-20	Qsc/Ts	Qsc/Ts	45.80 - 49.80	111.80	14.63	97.17	66
MW-21	UQsc	Qsc	77.58 - 92.58	111.58	27.49	84.09	34
MW-26	Ts/clay	Ts	-87.50 - -94.62	110.04	23.49	86.55	203.5
MW-28	Qsc/Ts	Ts	-34.03 - -27.03	109.97	13.77	96.20	144
MW-30	Ts/clay	Ts	2.65 - 12.65	103.65	7.71	95.94	101
MW-31	UQsc	Qsc	84.56 - 94.56	103.56	17.93	85.63	19.5
MW-33	Qsc/Ts	Ts	26.45 - 36.45	110.45	20.28	90.17	84.5
MW-34	Qsc/Ts	Ts	-6.77 - 0.23	109.23	11.29	97.94	116.5
MW-35	UQsc	Qsc	43.95 - 53.95	108.95	25.88	83.07	66
PZ-1	Ts/clay	Ts	52.75 - 60.75	112.75	24.35	88.40	66
PZ-2	1GWSW	Qal/Ts	98.42 - 108.42	116.16	NM	NM	46
PZ-3	1GWSW	Qal/Ts	96.12 - 110.12	116.77	10.18	106.59	46
PZ-4	UQsc	Qsc	64.81 - 79.81	103.81	21.91	81.90	39
PZ-5	UQsc	Qsc	78.39 - 88.39	110.89	28.98	81.91	32
PZ-6	UQsc	Qsc	51.23 - 66.23	110.23	33.24	76.99	59
PZ-7	UQsc	Qsc	47.72 - 62.72	112.22	28.86	83.36	64.5
PZ-8	UQsc	Qsc	68.87 - 78.87	111.87	24.56	87.31	43
PZ-9	UQsc	Qsc	58.78 - 68.78	110.28	25.32	84.96	51.5
PZ-10	Qsc/Ts	Qsc/Ts	-10.98 - -0.98	112.52	17.07	95.45	123.5
PZ-11	Ts/clay	Ts	59.42 - 67.42	104.42	11.52	92.90	50
PZ-12	Ts/clay	Ts	-23.91 - -13.91	103.89	10.38	93.51	130
PZ-13	Ts/clay	Ts	-21.25 - -11.25	110.25	28.29	81.96	131.5
PZ-14	Ts/clay	Ts	5.07 - 15.07	109.57	27.49	82.08	104.5
PZ-15	Ts/clay	Ts	-42.36 - -32.36	109.14	27.17	81.97	151.5
PZ-16	UQsc	Qsc	74.83 - 81.83	102.83	19.73	83.10	30
PZ-18	UQsc	Qsc	50.50 - 60.50	108.50	30.82	77.68	59.00
3176 Porter Drive							
DW-1	D	Qsc	42.80 - 47.80	108.97	26.17	82.80	66.8
DW-2	D	Qsc	31.50 - 41.50	111.16	29.12	82.04	81.7
DW-3	D	Qsc	50.50 - 60.50	111.61	30.60	81.01	54
DW-5	D	Qsc	28.20 - 38.20	103.84	25.73	78.11	80
DW-6	D	Qsc	3.20 - 13.20	108.14	24.04	84.10	106.6
DW-7	D	Qsc	28.40 - 38.40	107.92	28.58	79.34	81.5
DW-8	D	Qsc	38.70 - 48.70	107.78	23.94	83.84	71.7
DW-10	D	Qsc	21.80 - 31.80	107.90	30.49	77.41	86
DW-11	D	Qsc	31.30 - 40.80	105.43	28.10	77.33	74.7
EW-1	S	Qsc	75.00 - 95.00	107.65	Dry	Dry	25
EW-1B	S	Qsc	61.91 - 81.91	107.38	NM	NM	50
EW-2	S	Qsc	75.00 - 95.00	107.54	Dry	Dry	34.5
EW-2B	S	Qsc	60.39 - 90.39	107.04	NM	NM	55
EW-3	S	Qsc	70.00 - 85.00	104.62	27.40	NM	35
EW-3B	S	Qsc	57.44 - 82.44	104.19	NM	NM	55
EW-4	S	Qsc	68.00 - 83.00	101.63	NM	NM	36
MD-4	D	Qsc	37.00 - 47.00	105.83	27.66	78.17	69.5
MD-6	D	Qsc	33.00 - 38.00	109.69	29.89	79.80	80.4

TABLE 6
Well Construction Details and Groundwater Elevation Data for November 2017
SRP Sites and Regional Site
Palo Alto, California

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MD-7	S	Qsc	43.20 - 53.20	102.42	21.56	80.86	60.5
MW-2	S	Qsc	83.00 - 93.00	110.25	25.04	85.21	27.4
MW-4	S	Qsc	84.40 - 94.40	110.22	Dry	Dry	26
MW-5	S	Qsc	86.10 - 91.10	107.89	Dry	Dry	22
MW-6RR	Destroyed on September 19, 2013						
MW-6RRB	S	Qsc	68.34 - 83.34	110.28	29.57	80.71	45
MW-7	S	Qsc	73.70 - 83.70	109.88	28.54	81.34	39.1
MW-8	S	Qsc	74.20 - 84.20	109.85	31.78	78.07	38.5
MW-10	S	Qsc	74.50 - 84.50	104.62	26.90	77.72	32.4
MW-11A	S	Qsc	79.90 - 89.90	105.65	Dry	Dry	28
MW-11B	S	Qsc	62.20 - 72.20	105.69	NM	NM	43
MW-11C	D	Qsc	49.90 - 54.90	105.74	31.45	74.29	58
MW-11D	D	Qsc	34.80 - 39.80	105.68	28.38	77.30	73
MW-12	S	Qsc	65.70 - 75.70	102.59	25.01	77.58	38
MW-13	S	Qsc	66.10 - 76.10	100.55	23.80	76.75	37
MW-14	S	Qsc	69.10 - 79.10	110.40	29.07	81.33	42.8
MW-15	S	Qsc	71.70 - 76.70	101.48	24.98	76.50	31.1
MW-16R	S	Qsc	60.40 - 70.40	102.73	NM	NM	45
MW-17	S	Qsc	75.10 - 80.10	102.22	23.05	79.17	27.5
MW-18	D	Qsc	29.60 - 39.60	107.91	NM	NM	80
MW-19	S	Qsc	77.60 - 87.60	104.50	25.88	78.62	26.4
MW-20	S	Qsc	75.70 - 85.70	107.77	26.17	81.60	31.2
MW-21	S	Qsc	69.00 - 89.00	109.11	31.43	77.68	40
MW-22	S	Qsc	69.00 - 89.00	109.20	30.28	78.92	39.4
MW-23	Destroyed on September 17, 2013						
MW-23B	S	Qsc	57.44 - 72.44	109.75	29.12	80.63	50
MW-24	S	Qsc	69.50 - 89.50	105.67	27.50	78.17	39.5
MW-25	S	Qsc	69.50 - 89.50	107.55	30.24	77.31	39.3
MW-26	S	Qsc	69.50 - 89.50	107.10	28.63	78.47	39.5
MW-29	S	Qsc	54.63 - 64.63	108.97	30.20	78.77	57
MW-30	S	Qsc	54.18 - 64.18	106.18	29.17	77.01	52
MW-31	S	Qsc	62.39 - 72.39	109.69	30.68	79.01	50
MW-32	S	Qsc	47.59 - 57.59	109.88	31.20	78.68	65
MW-33	S	Qsc	51.47 - 61.47	108.82	31.67	77.15	60
PZ-1S	S	Qsc	68.00 - 83.00	102.97	22.90	80.07	36.6
PZ-2S	S	Qsc	71.00 - 86.00	106.99	30.34	76.65	36.3
3210 Porter Drive							
CEW-1	S	Qal	67.13 - 77.13	95.93	23.15	72.78	35
CEW-2	S	Qal	66.46 - 76.46	96.36	21.12	75.24	31
CEW-3	S	Qal	67.35 - 77.35	96.91	23.07	73.84	31
MW-2A	S	Qal	70.90 - 78.90	97.91	23.06	74.85	27
MW-2B	D	Qsc	53.82 - 63.82	97.50	22.23	75.27	44
MW-3	S	Qal	66.93 - 71.93	98.97	23.07	75.90	32
MW-4	D	Qsc	50.63 - 60.63	100.65	25.71	74.94	50
MW-5	S	Qal	67.40 - 74.40	99.40	24.98	74.42	32
MW-6	S	Qal	69.77 - 79.77	98.29	23.45	74.84	28.5
MW-7	S	Qal	70.24 - 80.24	97.24	22.41	74.83	27
MW-9B	D	Qsc	44.88 - 54.88	92.88	17.35	75.53	48
MW-10	S	Qal	66.33 - 76.33	94.33	19.40	74.93	28
MW-11	S	Qal	72.01 - 79.01	99.01	23.08	75.93	28
MW-13A	S	Qal	67.20 - 77.20	100.22	25.71	74.51	35
MW-14	S	Qsc	69.15 - 79.15	104.80	25.86	78.94	34
3215 Porter Drive							
AL-1	A	Qal	66.30 - 76.30	94.33	24.27	70.06	31
AL-2	A	Qal	57.10 - 72.10	88.10	22.86	65.24	37
AL-3	A	Qal	64.80 - 74.80	93.78	21.95	71.83	34
AL-5	A	Qal	70.50 - 80.50	94.36	20.02	74.34	30
AL-6	A	Qal	68.90 - 73.90	95.87	NM [1]	NM	32.5
AL-7	A	Qal	68.80 - 78.80	117.77	43.12	74.65	50.5
AL-8	A	Qal	61.50 - 76.50	91.46	17.59	73.87	35
AL-9	A	Qal	67.80 - 77.80	99.80	28.29	71.51	37
MSC1-1	SC1	Qsc	52.30 - 62.30	94.25	19.50	74.75	42.5
MSC1-2	SC1	Qsc	52.30 - 62.30	94.37	20.14	74.23	42.5
MSC1-3	SC1	Qsc	42.30 - 52.30	104.25	28.19	76.06	62.5
MSC2-1	SC2	Qsc	17.80 - 22.80	96.75	21.94	74.81	84.5
MW-1	SC1	Qsc	45.70 - 55.70	100.42	NM [1]	NM	55
MW-2	SC1	Qsc	48.30 - 58.30	97.45	NM [1]	NM	52
MW-4	Destroyed on November 15, 2016						
MW-5	Destroyed on November 15, 2016						
MW-6	SC1	Qsc	49.60 - 59.60	99.07	NM [1]	NM	50.5

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SRP Sites and Regional Site
Palo Alto, California

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MW-8	A	Qal	72.20 - 82.20	115.82	37.74	78.08	44.5
MW-9	A	Qal	74.80 - 84.80	100.06	NM [1]	NM	26
MW-10	Destroyed on November 15, 2016						
MW-11	Destroyed on November 15, 2016						
MW-12	Destroyed on November 15, 2016						
MW-14	A	Qal	67.90 - 82.90	97.56	NM [1]	NM	30.5
MW-15	SC1	Qsc	52.70 - 62.70	97.47	NM [1]	NM	45
MW-16	A	Qal	67.00 - 77.00	98.06	NM [1]	NM	32
MW-17	A	Qal	75.20 - 80.20	99.10	NM [1]	NM	24.5
MW-18	SC1	Qsc	60.10 - 67.10	100.72	NM [1]	NM	42
MW-19	SC2	Qsc	0.40 - 9.60	100.15	NM [1]	NM	101.5
MW-20	Destroyed on November 15, 2016						
MW-21	SC2	Qsc	21.20 - 28.20	98.81	NM [1]	NM	79
MW-22	A	Qal	74.00 - 79.00	96.26	20.12	76.14	23
MW-23	A	Qal	73.50 - 78.50	99.86	25.40	74.46	27
MW-24	SC1	Qsc	62.30 - 69.30	95.86	19.81	76.05	34.5
MW-26	Destroyed on November 15, 2016						
MW-28	A	Qal	72.60 - 82.60	97.65	NM [1]	NM	26
MW-29	Destroyed on November 14, 2016						
MW-30	Destroyed on November 14, 2016						
MW-31	A	Qal	78.90 - 84.90	99.24	NM [1]	NM	22
MW-32	A	Qal	75.00 - 85.00	129.02	50.86	78.16	55
MW-33	SC1	Qsc	64.50 - 71.50	116.14	38.31	77.83	53
MW-34	A	Qal	70.80 - 77.80	94.50	19.57	74.93	24.5
MW-35	SC1	Qsc	39.20 - 49.20	94.95	20.24	74.71	56.5
MW-36	A	Qal	70.20 - 74.90	97.92	23.65	74.27	31
MW-39	SC1	Qsc	61.60 - 66.60	99.15	NM [1]	NA	38
MW-40	A	Qal	64.00 - 74.00	96.53	22.10	74.43	33
MW-41	SC1	Qsc	42.10 - 52.10	101.12	NM [1]	NA	59
MW-42	SC2	Qsc	46.30 - 56.30	109.95	34.87	75.08	66.5
MW-43	SC1	Qsc	33.10 - 43.10	96.58	21.80	74.78	64
MW-46	SC1	Qsc	65.40 - 60.40	97.89	23.61	74.28	38.5
MW-47	A	Qal	78.00 - 82.00	98.98	NM [1]	NM	21
MW-48	SC1	Qsc	67.40 - 77.40	109.83	33.88	75.95	45
MW-49	SC3	Qsc	-48.60 - -38.60	96.15	16.28	79.87	145.5
MW-50	SC2	Qsc	-4.20 - 0.80	100.56	NM [1]	NM	105.5
MW-76	SC1	Qsc	46.50 - 53.00	128.51	71.69	56.82	82.5
MW-77	A	Qal	70.31 - 80.31	99.86	NM [1]	NM	30
MW-78	A	Qal	70.23 - 80.23	99.56	NM [1]	NM	30
MW-79	SC1	Qsc	48.73 58.73	98.03	NM [1]	NM	50
MW-80	SC1	Qsc	46.48 56.48	100.83	NM [1]	NM	55
PSC1-3	SC1	Qsc	35.95 - 50.95	99.66	NM [1]	NM	64.5
PAL-2R	A	Qal	67.06 - 77.06	99.89	24.24	75.65	42
PAL-3	A	Qal	69.50 - 74.50	94.92	20.74	74.18	25
SC1-1	SC1	Qsc	36.70 - 56.70	98.29	23.01	75.28	67.5
SC1-2	SC1	Qsc	37.70 - 62.70	95.34	26.81	68.53	66.1
SC1-3	SC1	Qsc	52.60 - 57.60	93.59	31.14	62.45	46.5
SC1-4	SC1	Qsc	37.80 - 47.80	91.76	17.24	74.52	59.5
SC1-5	SC1	Qsc	57.40 - 67.40	100.56	27.92	72.64	49
SC1-6	Destroyed on January 23, 2017						
SC1-7	SC1	Qsc	23.60 - 33.60	96.60	NM [1]	NM	78
SC1-8	Destroyed on January 23, 2017						
SC1-9	SC1	Qsc	33.90 - 58.90	94.96	18.81	76.15	66.5
SC1-10	SC1	Qsc	57.00 - 67.00	94.98	20.30	74.68	42
SC1-11	Destroyed on January 23, 2017						
SC1-16	SC1	Qsc	35.50 - 50.50	97.40	NM [1]	NM	66.5
SC1-17	SC1	Qsc	52.40 - 57.40	91.37	33.68	57.69	44.5
SC1-18	SC1	Qsc	59.20 - 64.20	97.67	26.66	71.01	47.5
SC1-19	SC1	Qsc	54.30 - 64.30	99.64	35.69	63.95	45.5
SC1-20	SC1	Qsc	52.47 - 60.78	93.02	37.42	55.60	45
SC2-1	Destroyed on November 15, 2016						
SC2-2	SC2	Qsc	6.20 - 11.20	91.24	16.37	74.87	90
SC2-3	SC2	Qsc	18.80 - 33.80	95.79	22.32	73.47	82.5
SC2-4	SC2	Qsc	28.50 - 38.50	97.54	22.66	74.88	70
SC2-5	SC2	Qsc	11.40 - 18.40	92.47	18.79	73.68	86
3300 Hillview Avenue							
MW-A	Z1	Qal	70.95 - 77.45	95.45	20.31	75.14	26.5
MW-B	Z1	Qal	70.16 - 77.66	95.66	21.33	74.33	27
MW-C	Z1	Qal	71.25 - 76.75	94.25	20.19	74.06	24.5

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SRP Sites and Regional Site
Palo Alto, California

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MW-D	Z1	Qal	69.56 - 77.56	88.29	13.74	74.55	20
MW-E	Z1	Qal	68.84 - 80.84	96.84	22.51	74.33	28
MW-EB	Z2	Qsc	34.31 - 44.31	96.31	24.43	71.88	67
MW-F	Z1	Qal	61.05 - 71.05	95.05	21.18	73.87	35
MW-FB	Z2	Qsc	38.37 - 48.37	94.46	22.03	72.43	58
MW-FC	Z3	Qsc	-40.09 - -30.09	94.91	17.58	77.33	140
MW-G	Z1	Qal	60.29 - 70.29	96.29	21.91	74.38	37
MW-GB	Z2	Qsc	26.23 - 36.23	96.23	21.24	74.99	70
3333 Hillview Avenue							
PA-14	A	Qal	65.12 - 75.12	106.12	30.16	75.96	41
PA-26R	B6FS	Qsc	40.70 - 50.70	95.82	32.44	63.38	56.5
PA-30	B5UFS	Qsc	54.41 - 59.41	89.24	21.46	67.78	35
PA-40	B5UFS/B5LFS	Qsc	49.56 - 53.26	88.87	22.42	66.45	40.4
PA-41	MCUF	Qal	55.06 - 63.06	86.51	27.13	59.38	33.45
PA-43	B5UFS	Qsc	61.76 - 66.76	89.61	21.95	67.66	28.5
PA-45R	B6FS	Qsc	47.25 - 57.25	99.25	39.05	60.20	52
PA-47R2	B6FS	Qsc	50.70 - 60.70	100.70	34.63	66.07	51
PA-52	B5UFS	Qsc	33.73 - 38.73	90.84	25.50	65.34	66.5
PA-53R	B6FS	Qsc	41.45 - 51.45	96.63	39.01	57.62	56.5
PA-55R	B6FS	Qsc	38.08 - 48.08	98.61	40.52	58.09	61.5
PA-56	B5UFS	Qsc	58.56 - 63.16	89.33	21.39	67.94	35.3
PA-57	B5UFS	Qsc	48.89 - 54.39	90.74	22.51	68.23	47
PA-58	B5UFS	Qsc	28.64 - 33.14	89.32	24.25	65.07	65
PA-59	B5UFS	Qsc	38.54 - 43.54	91.17	24.74	66.43	53.5
PA-60R	B6FS	Qsc	45.39 - 55.39	99.16	36.37	62.79	57
PA-61R	B6FS	Qsc	36.68 - 46.68	96.18	37.21	58.97	63
PA-62R	B6FS	Qsc	40.07 - 50.07	97.70	40.07	57.63	62
PA-63R	B6FS	Qsc	37.87 - 47.87	97.87	33.58	64.29	61.5
OBS-1	B5UFS	Qsc	50.02 - 60.02	89.99	26.45	63.54	40
OBS-2	B5UFS	Qsc	49.79 - 59.79	89.79	23.47	66.32	40
OBS-3	B6FS	Qsc	34.66 - 44.66	94.66	33.95	60.71	60
OBS-4	B6FS	Qsc	32.65 - 42.65	96.65	41.01	55.64	64
3400 Hillview Avenue							
EX-1	Z1/Z2	Qal	69.98 - 89.96	103.00	22.68	80.32	34
EX-1B	Z2	Qsc	34.18 - 49.18	99.26	19.48	79.78	69
EX-1C	Z3	Qsc	35.44 - 53.44	104.05	21.60	82.45	NA
EX-2	Z1	Qal	62.79 - 77.79	94.66	18.73	75.93	32
EX-2B	Z2	Qsc	32.58 - 47.58	98.21	18.60	79.61	69
EX-3	Z1/Z2	Qal/Qsc	73.32 - 88.32	101.25	21.22	80.03	28.5
EX-3B	Z2	Qsc	38.50 - 48.50	96.49	20.21	76.28	62
EX-4	Z1/Z2	Qal/Qsc	75.08 - 90.38	104.02	24.00	80.02	29
EX-5	Z1/Z2	Qal/Qsc	76.20 - 91.20	104.42	24.36	80.06	28.5
EX-6	Z1/Z2	Qsc	77.06 - 92.06	105.02	25.01	80.01	28
LF-1	Z1/Z2	Qal	71.45 - 86.45	102.98	20.45	82.53	30
LF-2	Z1/Z2	Qsc	74.39 - 84.39	105.16	23.80	81.36	30
LF-2B	Z3	Qsc	37.22 - 52.22	105.29	22.57	82.72	62
LF-3	Z1/Z2	Qsc	76.17 - 86.17	105.86	26.11	79.75	30
LF-4A	Z1/Z2	Qsc	83.86 - 93.86	113.61	Dry	Dry	30
LF-4B	Z3	Qsc	46.47 - 56.47	113.47	30.00	83.47	57
LF-15	Z1	Qal/Qsc	63.74 - 84.74	94.74	16.37	78.37	31
LF-16	Z1	Qal/Qsc	66.20 - 85.25	96.75	17.15	79.60	30.5
LF-17A	Z1	Qal	68.35 - 78.35	97.35	21.43	75.92	29
LF-18B	Z2	Qsc	36.35 - 41.85	90.85	15.76	75.09	55
LF-20B	Z2	Qsc	34.64 - 44.64	99.64	19.67	79.97	65
LF-20C	Z2	Qsc	9.73 - 19.73	97.94	17.90	80.04	90
LF-20D	Z3	Qsc	-12.59 - -2.59	97.98	14.35	83.63	112
LF-24B	Z2	Qsc	34.59 - 44.59	100.59	20.46	80.13	66
LF-25B	Z2	Qsc	28.08 - 38.08	95.58	16.11	79.47	67.5
LF-26B	Z2	Qsc	30.95 - 40.95	96.95	17.77	79.18	66
LF-27B	Z2	Qsc	37.99 - 47.99	95.80	19.51	76.29	58.5
LF-30C	Z3	Qsc	-19.20 - -9.20	95.80	18.52	77.28	115
LF-31B	Z2	Qsc	30.45 - 20.45	96.45	16.00	80.45	80
PZ-2	Z1/Z2	Qal/Qsc	74.41 - 84.41	107.41	NM	NM	33
PZ-4	Z1/Z2	Qal/Qsc	76.93 - 86.93	107.93	28.12	79.81	31
PZ-5	Z1	Qal	58.57 - 68.57	93.07	NM [2]	NM	34.5
S-1	Z1	Qal	54.52 - 64.52	94.52	17.75	76.77	NA
S-4	Z2	Qsc	45.69 - 55.69	95.69	18.84	76.85	NA
Hillview-Porter Regional							
BP-1	E	Qsc	34.16 - 39.16	89.16	30.80	58.36	55
BP-2A	A	Qal	56.26 - 66.26	79.94	14.68	65.26	20

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Palo Alto, California

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BP-2B	F	Qsc	39.11	-	44.11	75.22	12.43	62.79	37.5
BP-3	A	Qal	57.95	-	67.95	81.80	12.62	69.18	18.5
BP-5	A	Qal	26.80	-	36.80	63.80	31.99	31.81	37
BP-7B	C	Qsc	34.78	-	37.78	67.80	24.50	43.30	35
BP-7C	C	Qsc	21.83	-	24.83	67.67	25.56	42.11	48
BP-7D	E	Qsc	-122.01	-	-112.01	67.79	10.83	56.96	192
BP-8	D/E	Qsc	16.03	-	21.03	68.78	14.20	54.58	53
BP-11	A1	Qal	32.58	-	42.58	59.58	Dry	Dry	27
BP-12	A	Qal	18.39	-	28.39	54.41	23.67	30.74	37.5
BP-13	A	Qal	20.71	-	30.71	58.21	26.37	31.84	37.5
BP-18A	A	Qal	61.91	-	71.91	81.90	11.85	70.05	20
BP-18B	H	Qsc	42.09	-	47.59	81.59	24.98	56.61	39.5
BP-18C	H	Qsc	20.71	-	25.71	80.44	28.61	51.83	61
BP-21	A	Qal	64.05	-	69.05	96.13	25.59	70.54	18
BP-25A	J	Qsc	-70.95	-	-60.95	93.05	19.27	73.78	164
BP-26A	E	Qsc	-26.92	-	-21.92	68.57	8.77	59.80	98
BP-27	F	Qsc	19.00	-	9.00	97.94	40.08	57.86	89
BP-28A	B	Qal	-23.97	-	-13.97	56.03	26.20	29.83	80
BP-33	B/C	Qsc	-67.83	-	-57.83	57.17	22.88	34.29	125
BP-34	A	Qal	11.21	-	16.21	63.21	31.52	31.69	52
BP-36A	H	Qsc	4.33	-	9.33	84.17	22.77	61.40	76
BP-36A1	A1	Qal	66.04	-	71.04	83.98	12.16	71.82	14
BP-37	A	Qal	-9.73	-	-4.73	39.27	17.19	22.08	49
BP-39	A1	Qal	9.81	-	12.81	47.81	NM	NM	38
BP-41	A	Qal	-2.27	-	2.73	47.73	21.02	26.71	50
BP-43A	B	Qal	5.86	-	10.86	61.30	29.01	32.29	56.5
BP-43A1	C	Qsc	-58.47	-	-53.47	61.37	26.35	35.02	121.5
BP-43B	D	Qsc	-100.00	-	-95.00	61.39	17.75	43.64	163
BP-44	A	Qal	-18.97	-	-13.97	36.03	16.11	19.92	55
BP-46A	D	Qsc	-81.79	-	-71.79	69.96	24.15	45.81	154
BP-46B	E	Qsc	-196.03	-	-186.03	69.67	17.42	52.25	268
BP-47	F	Qsc	-6.87	-	2.13	88.63	29.69	58.94	96
BP-47B	G	Qsc	-104.21	-	-113.21	88.79	25.12	63.67	203
BP-48A	B	Qal	-18.17	-	-8.17	54.32	27.55	26.77	74
BP-48B	E	Qsc	-282.27	-	-272.27	55.73	16.37	39.36	338
BP-49	A	Qal	16.31	-	26.31	59.31	27.67	31.64	43
BP-49A	B	Qal	-10.69	-	-6.69	59.31	28.86	30.45	70.5
BP-49B	D	Qsc	-162.59	-	-152.59	59.41	23.26	36.15	222.5
BP-49C	E	Qsc	-266.13	-	-261.13	59.37	11.23	48.14	326
BP-50	A	Qal	3.23	-	8.23	48.23	21.81	26.42	45.5
BP-51	A	Qal	18.12	-	20.62	53.12	23.30	29.82	35.5
BP-53	A	Qal	10.97	-	19.97	51.47	22.88	28.59	41.5
BP-54	A	Qal	13.82	-	18.82	45.95	20.49	25.46	32.75
BP-55	A	Qal	-8.37	-	7.13	43.13	17.80	25.33	52
BP-56	A	Qal	8.66	-	12.66	50.76	22.91	27.85	43
BP-57	D/E	Qsc	37.79	-	42.79	70.29	13.12	57.17	33
BP-58	A	Qal	5.80	-	10.80	48.39	21.95	26.44	45
BP-59	A	Qal	-22.75	-	-13.75	35.75	17.22	18.53	60
BP-61B	G	Qsc	-109.06	-	-99.06	71.94	1.50	70.44	181
BP-62A	B	Qal	-6.58	-	3.42	58.02	29.05	28.97	66
BP-62B	E	Qsc	-250.35	-	-245.35	59.65	13.93	45.72	310
BP-64	G	QSc	-44.03	-	-39.03	73.97	3.54	70.43	118
BP-65A	F	QSc	43.41	-	48.41	73.56	9.98	63.58	31
BP-65B	G	QSc	-45.83	-	-35.83	74.17	7.54	66.63	120
BP-67A	G	QSc	-23.69	-	-13.69	84.81	21.10	63.71	108.5
BP-67B	G	QSc	-35.68	-	-30.68	84.29	21.08	63.21	121
BP-68	E	Qsc	-293.11	-	-283.11	56.89	16.88	40.01	350
BP-73A	G	QSc	0.80	-	10.80	93.92	28.94	64.98	93
BP-73B	H	QSc	-78.00	-	-68.00	94.16	38.60	55.56	172
BP-74R	A	Qal	59.23	-	69.23	85.23	14.00	71.23	26
BP-75R	A	Qal	59.74	-	69.74	86.74	14.66	72.08	27
MW-C	C	Qsc	-89.80	-	-84.80	59.35	23.80	35.55	150
MW-D	D	Qsc	-125.25	-	-120.25	59.28	16.00	43.28	185.5
BPX-F1	F	Qsc	0.50	-	15.50	89.15	28.54	60.61	93
BPX-H1	H	Qsc	3.22	-	18.22	91.26	31.28	59.98	91
TW-1B	A	Qal	55.50	-	65.50	76.97	10.29	66.68	20
DH-03	A	Qal	56.09	-	76.09	86.09	12.91	73.18	30
PA-07	A	Qal/Qsc	59.32	-	74.32	91.32	16.91	74.41	32
PA-08	A	Qal	62.32	-	72.32	82.32	11.20	71.12	21
PA-09	A	Qal/Qsc	62.68	-	72.68	93.68	19.79	73.89	31

TABLE 6
Well Construction Details and Groundwater Elevation Data for November 2017
SRP Sites and Regional Site
Palo Alto, California

Well Number	Site Zone Designation	Formation of Completion	Screened Interval feet, msl	Top of casing feet, msl	Depth to Water feet, btoc	Groundwater Elevation feet, msl	As-Built Depth feet, bgs
PA-13	F?	Qsc	50.84 - 60.84	83.84	24.94	58.90	33.5
PA-17	H	Qsc	46.64 - 56.64	89.64	32.60	57.04	43
PA-18	G	Qsc	30.17 - 35.17	88.38	24.53	63.85	58
PA-19	A	Qal	67.76 - 74.76	86.76	15.01	71.75	19
PA-20	A	Qal	62.02 - 77.02	90.02	13.84	76.18	28
PA-29	G	Qsc	38.59 - 46.59	90.09	23.54	66.55	51.5
PZ-1	A	Qal	57.50 - 62.50	75.38	16.72	58.66	18
PZ-2	Qsc-Osu	Qsc	47.50 - 51.50	81.54	22.69	58.85	34
PZ-3	Qsc-Osu	Qsc	58.19 - 63.19	75.95	16.25	59.70	18
PZ-4	Qsc-Osu	Qsc	59.53 - 64.53	86.36	26.28	60.08	27
PZ-5	G	Qsc	60.24 - 65.24	86.35	10.10	76.25	26.5
PZ-6	Qsc-Osu	Qsc	55.50 - 60.60	86.54	25.73	60.81	31
PZ-7	Qsc-Osu	Qsc	59.20 - 64.20	80.02	NM	NM	21
PZ-8	Qsc-Osu	Qsc	49.10 - 54.00	89.42	32.14	57.28	40
PZ-9	A	Qal	64.50 - 69.50	81.93	Dry	Dry	17.5
PZ-10	A	Qal	67.50 - 72.70	82.65	Dry	Dry	15.5
PZ-11	A	Qal	68.31 - 73.31	84.52	13.10	71.42	16
PZ-12	A	Qal	67.90 - 73.10	83.35	10.77	72.58	15
PZ-13	A	Qal	68.50 - 73.50	85.42	11.98	73.44	14
PZ-14	A	Qal	70.00 - 75.00	88.31	14.82	73.49	14
PZ-15	A	Qal	72.60 - 77.60	88.84	14.47	74.37	18
PZ-16	A	Qal	72.74 - 77.74	90.41	15.75	74.66	18
PZ-19	A	Qal	67.00 - 72.50	79.61	NM	NM	13
PZ-20	Qsc-Osu	Qsc	55.21 - 60.21	83.27	24.54	58.73	26
PZ-21	Qsc-Osu	Qsc	49.60 - 53.60	79.26	13.51	65.75	30
PZ-22	A	Qal	61.80 - 66.40	77.53	10.95	66.58	15.5
PZ-24	Qsc-Osu	Qsc	59.50 - 64.50	77.04	11.77	65.27	21
PZ-28	Qsc-Osu	Qsc	45.10 - 50.10	77.56	10.93	66.63	32.5
PZ-30	A	Qal	17.00 - 27.00	57.01	25.81	31.20	40.5
PZ-31	A	Qal	16.10 - 26.10	54.10	23.60	30.50	38
PZ-32	A	Qal	20.06 - 30.06	55.06	22.74	32.32	35
PZ-33	A	Qal	62.46 - 72.46	84.46	11.33	73.13	22
PZ-36	A	Qal	48.00 - 58.00	73.54	12.90	60.64	25.5
PZ-37	A	Qal	67.90 - 77.90	88.30	14.53	73.77	20.5
PZ-46	A	Qal	69.10 - 74.10	84.06	12.24	71.82	15
PZ-47	A	Qal	59.00 - 69.00	88.56	NM	NM	27
PZ-48	A	Qal	66.10 - 71.10	90.08	16.63	73.45	22.5

Notes and Abbreviations

NM = not measured
NS = well not surveyed for top of casing elevation
btoc = below top of casing
bgs = below ground surface
(1) Well inaccessible. Well buried for protection during Stanford property redevelopment.
(2) Well could not be located; it was likely paved over with a sidewalk on the 3330 Hillview Avenue property (referring to PZ-5 of the 3400 Hillview Avenue site)

Explanation of Site Zone Designation

1GWSW =First groundwater southwest
A = Alluvium zone
D = Deep zone
DSC = Deeper Santa Clara Formation zone
Qsc-Osu = Santa Clara Formation Older Sequence, undifferentiated
Qsc-Ysu = Santa Clara Formation Younger Sequence, undifferentiated
Qsc/Ts = Qsc/Ts contact flow zone
S = Shallow zone
SC1 = Santa Clara Formation - Zone 1
SC2 = Santa Clara Formation - Zone 2
SC3 = Santa Clara Formation - Zone 3
SCS = Santa Clara Formation Shallow Zone
SCD = Santa Clara Formation Deep Zone
Ts/clay = Ts above clay flow zone
UGW = Underlying groundwater flow zone
UQsc = Upper Qsc flow zone
Z1 = Zone 1
Z2 = Zone 2
Z3 = Zone 3
B5UFS = Building 5 Upper Flow System
B5LFS = Building 5 Lower Flow System
B6FS = Building 6 Flow System
MCUF= Matadero Creek Underflow

Explanation of Hillview-Porter Regional Site Zone Designation

A = Alluvium, Zone A
B = Alluvium, Zone B
B/C = Santa Clara Formation Younger Sequence, B/C Aquitard
C = Santa Clara Formation Younger Sequence, Zone C
D = Santa Clara Formation Younger Sequence, Zone D
D/E = Santa Clara Formation Younger Sequence, D/E Aquitard
E = Santa Clara Formation Younger Sequence, Zone E
E/F = Santa Clara Formation Younger Sequence, E/F Aquitard
F = Santa Clara Formation Younger Sequence, Zone F
G = Santa Clara Formation Older Sequence, Zone G
H = Santa Clara Formation Older Sequence, Zone H
I = Santa Clara Formation Older Sequence, Zone I
J = Santa Clara Formation Older Sequence, Zone J - designation is questionable

Explanation of formation of completion

Qal = Well completed in alluvium
Qal/Qsc = Well completed across the alluvium/Santa Clara Formation contact
Qsc/Ts = Well completed across the Santa Clara Formation/Unnamed Sandstone contact
Qsc = Well completed in Santa Clara Formation
Ts = Well completed in Unnamed Sandstone

TABLE 7
Summary of Chemical Testing Results for November 2017
SRP Sites and Regional Site
Palo Alto, California
All results reported in micrograms per liter (µg/L)

Well Name	Date Sampled	TCE	PCE	1,1-DCA	1,1-DCE	Freon-113	1,1,1-TCA	CHCL3	*cis* -1,2-DCE	VC	Other/Comments
Corner of Page Mill Road and Porter Drive (HP Building 28)											
AL-10	9-Nov-17	**88**	<0.5	<0.5	**1.0**	**3.1**	<0.5	**1.0**	**12**	<0.5	trans-1,2-DCE = 0.61
AL-11	6-Nov-17	**19**	<0.5	<0.5	**0.56**	**2.5**	<0.5	**1.9**	**2.9**	<0.5	
AL-12	6-Nov-17	**31**	<0.5	<0.5	**0.80**	**2.7**	<0.5	<1.0	**5.3**	<0.5	
AL-14	6-Nov-17	**66**	<0.5	<0.5	**0.80**	**2.4**	<0.5	<1.0	**13**	<0.5	trans-1,2-DCE = 0.59
AL-15/DUP 1	6-Nov-17	**100/99**	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<1.0/<1.0	**11/11**	<1.0/<1.0	
MW-5	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-6	6-Nov-17	**1.9**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well was dry
MW-74	9-Nov-17	**62**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	**29**	<0.5	trans-1,2-DCE = 0.94
MW-75	9-Nov-17	**11**	<0.5	<0.5	<0.5	**10**	<0.5	<1.0	<0.5	<0.5	
MW-82	9-Nov-17	**160**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	**8.4**	<0.5	
MW-83	7-Aug-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-106	9-Nov-17	**92**	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	**20**	<1.0	
MW-107	9-Nov-17	**18**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
SC1-12	6-Nov-17	**100**	<0.5	<0.5	<0.5	<0.5	<0.5	**1.0**	**13**	<0.5	trans-1,2-DCE = 0.54
SC1-13	6-Nov-17	**1.3**	<0.5	<0.5	<0.5	**4.6**	<0.5	**5.6**	**0.87**	<0.5	
SC1-14	6-Nov-17	**94**	<0.5	<0.5	**0.61**	**2.5**	<0.5	**1.0**	**10**	<0.5	
SC1-15/DUP 2	9-Nov-17	**160/160**	<0.5/<0.5	<0.5/<0.5	**0.51/0.52**	**3.2/3.2**	<0.5/<0.5	**1.2/1.1**	**17/16**	<0.5/<0.5	trans-1,2-DCE = 0.72/0.67
TB1	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
TB2	9-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
3165 Porter Drive											
EW-2	6-Nov-17	**15**	<0.5	<0.5	<0.5	**2.3**	<0.5	**6.7**	<0.5	<0.5	Cr(VI) = 41
EW-3	6-Nov-17	**39**	<0.5	<0.5	**0.69**	<0.5	<0.5	<1	<0.5	<0.5	Cr(VI) = 2,300
EW-S5R	6-Nov-17	**2.3**	<0.5	<0.5	**<0.5**	**0.60**	<0.5	<1	<0.5	<0.5	DCDFMe = 7.5
EW-S13R	6-Nov-17	**58**	<0.5	<0.5	**3.1**	**7.8**	<0.5	**4.7**	**0.96**	<0.5	
MW-16	6-Nov-17	**6.9**	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
P-3R	6-Nov-17	**1.0**	<0.5	<0.5	**0.84**	**3.9**	<0.5	**25**	<0.5	<0.5	Acetone = 120
Trip Blank	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	Cme = 2.7
3170 Porter Drive											
EW-2	4-Dec-17	<0.5	<0.5	**1.1**	**14**	<0.5	<0.5	<1	<0.5	<0.5	DCDFMe = 1.3
EW-3	4-Dec-17	**7.4**	<0.5	**2.8**	**230**	**13**	<0.5	**1.3**	<0.5	<0.5	1,2-DCA = 1.2; DCDFMe = 1.2
EW-4	15-Nov-17	**1.2**	<0.5	<0.5	**21**	**0.74**	<0.5	<1	<0.5	<0.5	
EW-5	4-Dec-17	**0.6**	<0.5	<0.5	**10**	<0.5	<0.5	<1	<0.5	<0.5	
EW-6	15-Nov-17	**6.5**	**0.59**	**190**	**260**	**4.5**	**270**	<1	<0.5	0.69	1,2-DCA = 5.6
EW-7	15-Nov-17	**0.7**	<0.5	**0.51**	**78**	**2.3**	<0.5	<1	<0.5	<0.5	
EW-8	10-Dec-17	**0.6**	<0.5	<0.5	**10**	<0.5	<0.5	<1	<0.5	<0.5	
EW-10	4-Dec-17	**4.5**	<0.5	<0.5	**34**	**2.2**	<0.5	<1	<0.5	<0.5	DCDFMe = 2.8
EW-11	4-Dec-17	<0.5	<0.5	<0.5	**2.1**	<0.5	<0.5	<1	<0.5	<0.5	
EW-12	15-Nov-17	**61**	<0.5	<0.5	**1.1**	<0.5	<0.5	<1	**18**	<0.5	*trans*- 1,2-DCE = 2.2
EW-13	15-Nov-17	**5.4**	<0.5	<0.5	**25**	**2**	<0.5	<1	<0.5	<0.5	DCDFMe = 3.7; TCFMe = 1.4
MW-5	7-Nov-17	<50	<0.5	**140**	**2100**	**6.1**	**2000**	**3.6**	<0.5	0.83	1,2-DCA = 16
MW-8	8-Nov-17	**28**	<0.5	<0.5	**0.52**	<0.5	<0.5	<1	<0.5	<0.5	1,2-DCA = 1.3; DCDFMe = 8.1; TCFMe = 1.2
MW-9	15-Nov-17	<0.5	<0.5	<0.5	**33**	**0.95**	<0.5	<1	<0.5	<0.5	
MW-10 (15')	7-Nov-17	**14**	<0.5	**1.2**	**2.0**	<0.5	<0.5	<1	**2.1**	<0.5	
MW-12	7-Nov-17	**540**	**0.84**	<0.5	**0.64**	<0.5	<0.5	<1	**96**	<0.5	*trans*- 1,2-DCE = 4.3
MW-13	7-Nov-17	**6.5**	<0.5	**5.8**	**64**	**0.82**	<0.5	<1	**0.97**	<0.5	*trans*- 1,2-DCE = 0.53
MW-15 (122')	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
MW-17 (82')	7-Nov-17	**0.96**	<0.5	**1.3**	**96**	**5.5**	<0.5	<1	<0.5	<0.5	
MW-19 (90')	7-Nov-17	**46**	<0.5	**16**	**2200**	**91**	<0.5	**13**	**0.71**	<0.5	
MW-20 (63')	7-Nov-17	<0.5	<0.5	<0.5	**34**	<0.5	<0.5	<1	<0.5	<0.5	
MW-21	7-Nov-17	**0.57**	<0.5	<0.5	**4.0**	**2.5**	<0.5	<1	<0.5	<0.5	
MW-33 (82')	7-Nov-17	<0.5	<0.5	<0.5	**21**	**1.9**	<0.5	<1	<0.5	<0.5	
MW-35 (63')	7-Nov-17	**15**	<0.5	**0.52**	**4.3**	**1.7**	<0.5	<1	<0.5	<0.5	DCDFMe = 1.0; TCFMe = 9.0
PZ-1	7-Nov-17	**22**	<1	**22**	**130**	**9.8**	**14**	<2	**1.6**	<1	1,2-DCA = 1.3
PZ-6 (57')	7-Nov-17	**6.2**	<1	**4.2**	**530**	**21**	<1	**2.5**	<1	<1	1,2-DCA = 1.9; DCDFMe = 3.7

TABLE 7
Summary of Chemical Testing Results for November 2017
SRP Sites and Regional Site
Palo Alto, California
All results reported in micrograms per liter (µg/L)

Well Name	Date Sampled	TCE	PCE	1,1-DCA	1,1-DCE	Freon-113	1,1,1-TCA	CHCL3	*cis* -1,2-DCE	VC	Other/Comments
PZ-7 (62')	7-Nov-17	**10**	<0.5	**1.6**	**72**	**6.1**	<0.5	<1	<0.5	<0.5	DCDFMe = 0.68; TCFMe = 2.2
PZ-9 (45')	7-Nov-17	**14**	<0.5	**6.7**	**820**	**45**	<0.5	**3.8**	<0.5	<0.5	1,2-DCA = 2.8; DCDFMe = 5.9
PZ-10 (120')	7-Nov-17	<0.5	<0.5	<0.5	**67**	<0.5	<0.5	<1	<0.5	<0.5	
PZ-13 (126')	7-Nov-17	<0.5	<0.5	<0.5	**49**	<0.5	<0.5	<1	<0.5	<0.5	
PZ-14 (93')	7-Nov-17	**0.55**	<0.5	<0.5	**43**	**1.4**	<0.5	<1	<0.5	<0.5	
PZ-18 (53')	7-Nov-17	**1.9**	<0.5	<0.5	**9.9**	<0.5	<0.5	<1	<0.5	<0.5	DCDFMe = 1.4
3176 Porter Drive											
DW-1	7-Nov-17	**21**	<0.5	**0.49J**	**4.4**	<2.0	<0.5	<0.5	<0.5	<0.5	TCFMe = 0.59
DW-2	7-Nov-17	**0.53**	<0.5	<0.5	<0.5	<2.0	<0.5	**0.86**	<0.5	<0.5	
DW-3	7-Nov-17	**2.9**	**0.61**	<0.5	<0.5	<2.0	<0.5	**0.64**	<0.5	<0.5	
DW-5	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
DW-6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
DW-7	7-Nov-17	**2.1**	<0.5	<0.5	<0.5	<2.0	<0.5	**0.54**	<0.5	<0.5	
DW-8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
DW-10	7-Nov-17	<0.5UJ	<0.5UJ	<0.5UJ	<0.5UJ	<2.0UJ	<0.5UJ	<0.5UJ	<0.5UJ	<0.5UJ	
DW-11	7-Nov-17	**0.59J**	<0.5UJ	<0.5UJ	<0.5UJ	<2.0UJ	<0.5UJ	**0.31J**	<0.5UJ	<0.5UJ	
EW-1B	7-Nov-17	**7.9**	**21**	<0.5	<0.5	<2.0	<0.5	<0.5	**51**	**15**	trans-1,2-DCE = 0.35J
EW-2B/DUP	6-Nov-17	**51/50**	**940/910**	<5.0/<10	<5.0/<10	<20/<40	<5.0/<10	<5.0/<10	**210/200**	<5.0/<10	
EW-3B	7-Nov-17	**17**	**160**	<1.0	**0.83J**	<4.0	<1.0	<1.0	**110**	<1.0	
EW-4	7-Nov-17	<0.5	**5.4**	<0.5	<0.5	<2.0	<0.5	<0.5	**0.37J**	<0.5	
MD-4	7-Nov-17	**0.28J**	<0.5UJ	<0.5UJ	<0.5UJ	<2.0UJ	<0.5UJ	**0.77J**	<0.5UJ	<0.5UJ	
MD-6	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	**0.93**	<0.5	<0.5	
MD-7	7-Nov-17	<0.5	**0.40J**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-2	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well was dry
MW-5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well was dry
MW-6RRB	7-Nov-17	**2.4**	**4.3**	<0.5	<0.5	<2.0	<0.5	**0.55**	**24**	**10**	trans-1,2-DCE = 0.74
MW-7	7-Nov-17	**2.9**	**13**	<0.5	<0.5	<2.0	<0.5	<0.5	**21**	**0.39 J**	
MW-8	7-Nov-17	**0.67**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	**3.0**	**10**	Chloroethane = 0.96; trans-1,2-DCE =0.25J
MW-10	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-11A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well was dry
MW-11B/DUP	7-Nov-17	**7.8/7.1**	**79F1/72**	<0.5UJ/<0.5	<0.5UJ/<0.5	<2.0UJ/<2.0	<0.5UJ/<0.5	**1.8/1.6**	**32/31**	<0.5/<0.5	
MW-11C/DUP	7-Nov-17	**2.3J/2.3**	**0.3J/0.31J**	<0.5UJ/<0.5	<0.5UJ/<0.5	<2.0UJ/<2.0	<0.5UJ/<0.5	**1.3J/1.2**	<0.5UJ/<0.5	<0.5UJ/<0.5	
MW-11D	7-Nov-17	**0.84**	<0.5	<0.5	<0.5	<2.0	<0.5	**0.38J**	<0.5	<0.5	
MW-12	7-Nov-17	<0.5	**1.5**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-13	7-Nov-17	**0.36J**	<0.5	<0.5	<0.5	<2.0	<0.5	**1.1**	<0.5	<0.5	
MW-14	7-Nov-17	**3.5**	**16**	<0.5	<0.5	<2.0	<0.5	<0.5	**40**	<0.5	
MW-15	7-Nov-17	<0.5	**1.6**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-16R	7-Nov-17	<0.5	**0.43J**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-17	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-18	6-Nov-17	**2.3**	**1.4**	<0.5	<0.5	<2.0	<0.5	**0.71**	<0.5	<0.5	
MW-19	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well was dry
MW-20	7-Nov-17	<0.5	**14**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-21	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	**2.1**	<0.5	Chloroethane = 8.9; trans-1,2-DCE = 0.55
MW-22	7-Nov-17	**3.9**	**0.41J**	<0.5	**2.3**	<2.0	<0.5	<0.5	**440**	**260**	trans-1,2-DCE = 15;
MW-23B	7-Nov-17	**1.1**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	**2.2**	**32**	Chloroethane =2.1; trans-1,2-DCE = 0.78
MW-24	7-Nov-17	**13**	**51**	<0.5	**0.57**	<2.0	<0.5	<0.5	**56**	**16**	trans-1,2-DCE = 0.27J
MW-25	7-Nov-17	**270**	**2200**	<20	<20	<80	<20	<20	**330**	<20	
MW-26/DUP	7-Nov-17	<0.5UJ/0.5UJ	<0.5UJ/<0.5UJ	<0.5UJ/<0.5UJ	<0.5UJ/<0.5UJ	<2.0UJ/<2.0UJ	<0.5UJ/<0.5UJ	<0.5UJ/<0.5UJ	<0.5UJ/<0.5UJ	<0.5UJ/<0.5UJ	
MW-29	7-Nov-17	**37**	**700**	<2.0	**1.8J**	<8.0	<2.0	<2.0	**440**	**1.4J**	trans-1,2-DCE = 1.5J
MW-30	7-Nov-17	**120**	**800**	<13	<13	<50	<13	<13	**650**	<13	
MW-31	7-Nov-17	**18**	**28**	<0.5	**0.83**	<2.0	<0.5	<0.5	**500**	**160**	Chloroethane = 0.71J; trans-1,2-DCE = 5.5
MW-32	7-Nov-17	**10J**	**110J**	<0.5 UJ	<0.5 UJ	<2.0 UJ	<0.5 UJ	**2.2J**	**72J**	**0.25J**	trans-1,2-DCE = 0.73J
MW-33/DUP	7-Nov-17	**9.5/9.6**	**650/630**	<5.0/<5.0	<5.0/<5.0	<20/<20	<5.0/<5.0	**3.5J/3.5J**	**39/39**	<5.0/<5.0	
Trip Blank	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	Trip Blank

TABLE 7
Summary of Chemical Testing Results for November 2017
SRP Sites and Regional Site
Palo Alto, California
All results reported in micrograms per liter (µg/L)

Well Name	Date Sampled	TCE	PCE	1,1-DCA	1,1-DCE	Freon-113	1,1,1-TCA	CHCL3	*cis* -1,2-DCE	VC	Other/Comments
3210 Porter Drive											
CEW-1	6-Nov-17	<0.5	**9.8**	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
CEW-2	6-Nov-17	**2.9**	**6.7**	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
CEW-3	7-Nov-17	**24**	**5.5**	<0.5	**0.33J**	**2.2**	<0.5	**0.70J**	<0.5	<0.5	DCDFMe = 0.48J
MW-2A	7-Nov-17	**0.36J**	**7.8**	<0.5	<0.5	<0.5	<0.5	<1.0	**0.093J**	<0.5	
MW-2B	7-Nov-17	<0.5	**0.75**	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-3	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-4	6-Nov-17	**1.6**	**7.6**	<0.5	<0.5	**0.57**	<0.5	<1.0	<0.5	<0.5	DCDFMe = 2.8
MW-5	6-Nov-17	**110**	**18**	<0.5	**0.57**	**5.9**	<0.5	**5.3**	<0.5	<0.5	
MW-6	7-Nov-17	<0.5	**3.1**	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-7	7-Nov-17	**3.1**	**6.4**	<0.5	<0.5	<0.5	<0.5	<1.0	**0.087J**	<0.5	
MW-9B	7-Nov-17	**6.2**	**4.3**	<0.5	**0.26J**	<0.5	<0.5	<1.0	**0.11J**	<0.5	
MW-10/DUP-2	7-Nov-17	**21/21**	**0.31J/0.26J**	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<1/<1	**4.0/3.9**	**0.65/0.98**	
MW-11	7-Nov-17	**0.83**	**0.81**	<0.5	<0.5	<0.5	<0.5	<1.0	**0.42J**	<0.5	
MW-13A/DUP-1	6-Nov-17	**11/10**	**9.6/7.9**	<0.5/<0.5	<0.5/<0.5	**0.63/0.51**	<0.5/<0.5	<1.0/<1.0	**2.6/2.9**	<0.5/<0.5	
MW-14	7-Nov-17	**0.29J**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	DCDFMe = 0.69
Trip Blank TB-1	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
Trip Blank TB-2	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
Equipment Blank EB-1	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Toluene = 1.5
Equipment Blank2 EB-2	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Ethylbenzene = 0.15J, Naphthalene = 0.94J, Toluene = 1.4, Total Xylenes = 0.93J
3215 Porter Drive (HP Building 15)											
AL-1/DUP1	6-Nov-17	**130/140**	**0.76/0.77**	<0.5/<0.5	**2.0/2.1**	<0.5/<0.5	<0.5/<0.5	**1.8 / 1.8**	<0.5/<0.5	<0.5/<0.5	DCDFMe = 1.9/2.2; Cr(VI) = <10/<10
AL-2	9-Nov-17	**47**	**1.3**	<0.5	**3.5**	**4.8**	<0.5	2.2	<0.5	<0.5	DCDFMe = 1.9; Cr(VI) = <10
AL-3/DUP2	9-Nov-17	**16 / 16**	<0.5/<0.5	<0.5/<0.5	**15/15**	**1.4/1.5**	<0.5/<0.5	<1.0/<1.0	**0.60/0.62**	<0.5/<0.5	Cr(VI) = <10/<10
AL-5	9-Nov-17	**62**	<0.5	<0.5	**1.2**	**1.0**	<0.5	**1.1**	<0.5	<0.5	Cr(VI) = 11; As = <0.010 mg/L; Mn = 0.020 mg/L
AL-6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
AL-7	9-Nov-17	**67**	<0.5	**1.1**	**3.2**	**3.6**	<0.5	**1.1**	**5.9**	<0.5	
AL-8	9-Nov-17	**21**	<0.5	**0.65**	**21**	**1.1**	<0.5	**1.9**	**0.69**	<0.5	Cr(VI) = <10
AL-9	9-Nov-17	**23**	<0.5	**2.9**	**47**	**1.2**	<0.5	<1.0	**1.3**	<0.5	trans-1,2-DCE = 0.84
MSC1-1	9-Nov-17	**450**	<5.0	<5.0	**390**	**43**	<5.0	<10	**6.8**	<5.0	DCDFMe = 21; Cr(VI) = <10
MSC1-2	9-Nov-17	**18**	<0.5	<0.5	**4.7**	**0.60**	<0.5	<1.0	<0.5	<0.5	
MSC2-1	9-Nov-17	**5.3**	<0.5	<0.5	**4.5**	**26**	<0.5	<1.0	<0.5	<0.5	
MW-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-6	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-8	9-Nov-17	**51**	<0.5	**0.64**	**3.6**	**6.4**	<0.5	**1.5**	**5.2**	<0.5	
MW-16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-17	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-18	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-22	9-Nov-17	**23**	<0.5	<0.5	**2.2**	**1.1**	<0.5	<1.0	<0.5	<0.5	1,2,4-TCB = 1.3; Cr(VI) = <10
MW-23	9-Nov-17	**5.0**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Cr(VI) = <10
MW-24	9-Nov-17	**19**	<0.5	<0.5	**1.7**	**0.77**	<0.5	<1.0	<0.5	<0.5	Cr(VI) = <10
MW-28	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-33	9-Nov-17	**50**	<0.5	0.62	**4.6**	**5.0**	<0.5	**1.4**	**3.4**	<0.5	
MW-34	9-Nov-17	**30**	<0.5	<0.5	**6.8**	**1.3**	<0.5	**3.7**	<0.5	<0.5	Cr(VI) = <10
MW-39	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-40	9-Nov-17	**130**	**1.1**	<0.5	**3.6**	**1.1**	<0.5	<1.0	<0.5	<0.5	DCDFMe = 6.9; Cr(VI) = <10
MW-41	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-43	9-Nov-17	<0.5	<0.5	<0.5	<0.5	**18**	<0.5	<1.0	<0.5	<0.5	Cr(VI) = <10
MW-77	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-78	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-79	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
MW-80	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
SC1-2/DUP3	9-Nov-17	**110/110**	<2.5/<2.5	<2.5/<2.5	**5.3/4.6**	**7.9/6.6**	<2.5/<2.5	<5.0/ <5.0	<2.5/<2.5	<2.5/<2.5	Cr(VI) = <10 / <10
SC1-3	6-Nov-17	**50**	**0.92**	<0.5	**3.7**	**3.4**	<0.5	**1.8**	<0.5	<0.5	DCDFMe = 2.1; Cr(VI) = <10
SC1-7	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
SC1-9	9-Nov-17	**5.7**	<0.5	**0.71**	**37**	**1.4**	<0.5	<1.0	**1.0**	<0.5	
SC1-10	6-Nov-17	**52**	<0.5	<0.5	**9.6**	**2.4**	<0.5	**1.2**	**0.54**	<0.5	DCDFMe = 1.5; Cr(VI) = <10

TABLE 7
Summary of Chemical Testing Results for November 2017
SRP Sites and Regional Site
Palo Alto, California
All results reported in micrograms per liter (µg/L)

Well Name	Date Sampled	TCE	PCE	1,1-DCA	1,1-DCE	Freon-113	1,1,1-TCA	CHCL3	*cis* -1,2-DCE	VC	Other/Comments
SC1-16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Well buried for protection during Site redevelopment
SC1-17	6-Nov-17	**190**	<0.5	**1.1**	**93**	**14**	<0.5	**2.7**	**1.9**	<0.5	DCDFMe = 7.3; trans-1,2-DCE = 0.87; Cr(VI) = <10
SC1-18	9-Nov-17	**11**	<0.5	**1.1**	**46**	**0.80**	<0.5	**1.5**	**0.85**	<0.5	
SC1-19	9-Nov-17	**150**	<2.5	<2.5	<2.5	<2.5	<5.0	<2.5	<2.5	<2.5	DCDFMe = 3.7; Cr(VI) = <10
SC1-20	9-Nov-17	**280**	<0.5	<0.5	**17**	**3.4**	<0.5	**2.2**	**1.0**	<0.5	DCDFMe = 0.82; Cr(VI) = <10; As = <0.010 mg/L; Mn = 0.020 mg/L
SC2-2	9-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
SC2-3	9-Nov-17	**97**	<0.5	<0.5	**3.8**	**15**	<0.5	**3.0**	**0.62**	<0.5	DCDFMe = 0.60; Cr(VI) = <10
SC2-5	9-Nov-17	**41**	<0.5	<0.5	**5.6**	**18**	<0.5	<1.0	**1.1**	<0.5	Cr(VI) = <10
TB1	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
TB2	9-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
3300 Hillview Avenue											
MW-A	6-Nov-17	**6.3**	**3.6**	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-B	6-Nov-17	**4.8**	**1.0**	<0.5	<0.5	<0.5	<0.5	**1.8**	<0.5	<0.5	
MW-C/DUP-2	7-Nov-17	**21/22**	**0.89/0.96**	<0.5/<0.5	**0.52**/<0.5	**5.8/6.4**	<0.5/<0.5	<1.0/<1.0	<0.5/<0.5	<0.5/<0.5	DCDFMe = 1.0/1.2
MW-D	7-Nov-17	**3.2**	**0.56**	<0.5	<0.5	**3.0**	<0.5	<1.0	<0.5	<0.5	
MW-E	6-Nov-17	**4.2**	**1.9**	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-EB/DUP-1	27-Nov-17	**220/210**	<5.0/<5.0	<5.0/<5.0	<5.0/<5.0	**8.0/7.1**	<5.0/<5.0	<10/<10	<5.0/<5.0	<5.0/<5.0	
MW-F	6-Nov-17	**8.4**	**0.55**	<0.5	<0.5	**5.7**	<0.5	<1.0	<0.5	<0.5	DCDFMe = 0.67
MW-FB	7-Nov-17	**55**	**1.7**	<0.5	**1.6**	**4.0**	<0.5	<1.0	<0.5	<0.5	DCDFMe = 3.9
MW-FC	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
MW-G	7-Nov-17	**54**	**1.7**	<0.5	**0.81**	**25**	<0.5	<1.0	<0.5	<0.5	DCDFMe = 3.4
MW-GB	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Total Xylenes = 2.1
TBM-Syntex	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
Equipment Blank1	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Equipment Blank
Trip Blank1	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
Trip Blank2	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
3333 Hillview Avenue											
PA-26R	10-Nov-17	<0.5	<0.5	<0.5	**0.6**	<0.5	<0.5	<1	<0.5	<0.5	
PA-30	7-Nov-17	<0.5	<0.5	<0.5	**1.6**	<0.5	<0.5	<1	<0.5	<0.5	
PA-40	7-Nov-17	<0.5	<0.5	<0.5	**1.1**	<0.5	<0.5	<1	<0.5	**0.63**	
PA-41/DUP-2	6-Nov-17	<0.5/<0.5	<0.5/<0.5	**20/22**	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<1/<1	<0.5/<0.5	**4.9/5.6**	trans-1,2-DCE=0.53
PA-43	7-Nov-17	<0.5	<0.5	**1.3**	0.95	<0.5	<0.5	<1	<0.5	<0.5	
PA-45R	6-Nov-17	**0.69**	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
PA-47R2	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
PA-52	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	**0.54**	
PA-53R	10-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	**1.3**	**2.2**	Cr(VI)=<10
PA-55R	10-Nov-17	**1.6**	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	Cr(VI)=83
PA-56	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	Cr(VI)=<10
PA-57	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	**1**	**1.7**	
PA-58	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	**1.6**	<0.5	
PA-59	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	Cr(VI)=<10
PA-60R	10-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	
PA-61R	10-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	**1**	Cr(VI)=<10
PA-62R	10-Nov-17	<5	<5	<5	<5	<5	<5	<10	**5.8**	<5	Cr(VI)=<10
PA-63R/DUP-1	6-Nov-17	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	**0.76/0.65**	<0.5/<0.5	<0.5/<0.5	<1/<1	<0.5/<0.5	<0.5/<0.5	
OBS-1	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	Cr(VI)=<10
OBS-2	7-Nov-17	<0.5	<0.5	**3.9**	**0.63**	<0.5	<0.5	<1	**0.51**	**0.74**	Cr(VI)=<10
OBS-3	10-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	Cr(VI)=<10
OBS-4	10-Nov-17	**7.5**	**0.86**	<0.5	<0.5	<0.5	<0.5	<1	**1.1**	<0.5	Cr(VI)=<10
SB-1 (PDB source blank)	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	PDB source blank
TB-1 (Trip Blank)	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	Trip Blank
TB-2 (Trip Blank)	10-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	Trip Blank

TABLE 7
Summary of Chemical Testing Results for November 2017
SRP Sites and Regional Site
Palo Alto, California
All results reported in micrograms per liter (µg/L)

Well Name	Date Sampled	TCE	PCE	1,1-DCA	1,1-DCE	Freon-113	1,1,1-TCA	CHCL3	*cis* -1,2-DCE	VC	Other/Comments
3400 Hillview Avenue											
EX-1	07-Nov-17	**45**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	**1.1**	<0.5	
EX-1B	08-Nov-17	**0.9**	<0.5	<0.5	<0.5	<2.0	<0.5	**2.5**	<0.5	<0.5	TCFMe=6.1
EX-1C	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Extraction well shut-off for maintenance
EX-2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
EX-2B	08-Nov-17	**7.2**	<0.5	<0.5	<0.5	<2.0	<0.5	**0.6**	<0.5	<0.5	TCFMe=2.6; DCDFMe=0.9J
EX-3	07-Nov-17	**0.8**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
EX-3B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
EX-4	07-Nov-17	**79**	<0.5	<0.5	<0.5	<2.0	<0.5	**0.5**	**0.9**	<0.5	
EX-5	07-Nov-17	**0.5**	**1.0**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
EX-6	07-Nov-17	**0.7**	**1.7**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
LF-1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
LF-2	07-Nov-17	**49**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	**5.1**	<0.5	
LF-2B	07-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	TCFMe=0.7J; DCDFMe=10
LF-3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
LF-4A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Insufficient water to sample
LF-4B	08-Nov-17	**0.6J**	<1.0	<1.0	<1.0	<10.0	<1.0	<1.0	**22**	<1.0	Acetone=190; Toluene=0.6J; Ethylbenzene=0.6J; m,p-Xylenes=1.4
LF-15	06-Nov-17	**0.3J**	<0.5	<0.5	<0.5	<2.0	<0.5	**0.9**	<0.5	<0.5	
LF-16	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
LF-17A	06-Nov-17	**2.1**	**0.5**	<0.5	<0.5	<2.0	<0.5	**0.5J**	<0.5	<0.5	
LF-18B	06-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
LF-20B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
LF-20C/Dup (LF-120C)	08-Nov-17	**2.2/1.7**	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<2.0/<2.0	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	TCFMe=0.9J/0.8J
LF-20D	08-Nov-17	**9.3**	<0.5	<0.5	<0.5	<2.0	<0.5	**0.3J**	<0.5	<0.5	DCDFMe=2.4
LF-24B	06-Nov-17	**1**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
LF-25B	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
LF-26B/Dup (LF-126B)	06-Nov-17	**93/92**	**0.6J**/<1.0	<1.0/<1.0	<1.0/<1.0	<4.0/<4.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	
LF-27B	06-Nov-17	**0.8**	**2.1**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
LF-30C	06-Nov-17	<0.5	<0.5	<0.5	**0.4J**	<2.0	<0.5	<0.5	<0.5	<0.5	
LF-31B	06-Nov-17	**6.9**	**1.9**	<0.5	<0.5	<2.0	<0.5	**2.8**	<0.5	<0.5	DCDFMe=9.3
PZ-4	07-Nov-17	**1.5**	**5.6**	<0.5	<0.5	<2	<0.5	**0.4J**	<0.5	<0.5	
FB-110617	06-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	Field Equipment Blank
TB-110617	06-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	Trip Blank
Hillview-Porter Regional											
BP-1	8-Nov-17	**2.4**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-2A	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-2B	8-Nov-17	**44**	**2.4**	<0.5	**2.9**	**1.5**	<0.5	<1.0	<0.5	<0.5	
BP-3	8-Nov-17	**5.1**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-5	8-Nov-17	**0.79**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-7B	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-7C	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-7D	8-Nov-17	**4.8**	**1.8**	<0.5	**2.3**	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-8	8-Nov-17	**9.6**	**5.8**	<0.5	**4.0**	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-12	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-13	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-18A	8-Nov-17	**14**	**0.82**	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	DCDFMe = 0.52
BP-18B	8-Nov-17	**22**	**0.68**	<0.5	**3.1**	**0.76**	<0.5	<1.0	**2.3**	**2.1**	DCDFMe = 1.0
BP-18C/DUP1	8-Nov-17	**150/170**	<2.5/<0.5	<2.5/<0.5	**2.9/3.0**	<2.5/**1.1**	<2.5/<0.5	<5.0/<1.0	**15/17**	<2.5/**1.0**	DCDFMe = <2.5/1.0
BP-21	8-Nov-17	**0.53**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-25A	6-Nov-17	**16**	**7.2**	<0.5	**4.3**	<2.0	<0.5	**1.3**	**3.4**	<0.5	DCDFMe = 3.3
BP-26A	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-28A	6-Nov-17	**1.2**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-36A	6-Nov-17	**12**	<0.5	<0.5	**0.85**	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-36A1	6-Nov-17	**2.1**	**0.62**	<0.5	<0.5	<2.0	<0.5	**0.72**	<0.5	<0.5	
BP-37	6-Nov-17	**4.2**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-43A	7-Nov-17	**1.4**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-43A1/DUP2	7-Nov-17	**5.6/8.9**	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<2.0/<2.0	<0.5/<0.5	<0.5/<0.5	**1.3 / 2.1**	<0.5/<0.5	

TABLE 7
Summary of Chemical Testing Results for November 2017
SRP Sites and Regional Site
Palo Alto, California
All results reported in micrograms per liter (µg/L)

Well Name	Date Sampled	TCE	PCE	1,1-DCA	1,1-DCE	Freon-113	1,1,1-TCA	CHCL3	*cis* -1,2-DCE	VC	Other/Comments
BP-43B	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-44	6-Nov-17	**1.2**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-46A	8-Nov-17	<0.5	<0.5	<0.5	**0.62**	<0.5	<0.5	<1.0	2.0	<0.5	
BP-46B	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-47	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-47B	8-Nov-17	<0.5	<0.5	**0.94**	<0.5	<0.5	<0.5	<1.0	**1.3**	<0.5	
BP-48A	8-Nov-17	**6.6**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-48B	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-49A	7-Nov-17	**7.8**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	**0.86**	<0.5	
BP-49B	7-Nov-17	**0.57**	<0.5	**0.70**	<0.5	<2.0	<0.5	<0.5	**0.67**	<0.5	
BP-49C	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-50	6-Nov-17	**1.2**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-51	7-Nov-17	**1.4**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-53	7-Nov-17	**0.63**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-54	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-55	6-Nov-17	**4.4**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-56	7-Nov-17	**1.7**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-57	8-Nov-17	**7.0**	**4.5**	<0.5	**3.2**	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-58	6-Nov-17	**3.4**	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-61B/DUP3	8-Nov-17	**0.70/0.64**	<0.5/<0.5	<0.5/<0.5	**1.9/1.8**	**5.6/6.1**	<0.5/<0.5	**1.2/1.0**	<0.5/<0.5	<0.5/<0.5	
BP-62A	8-Nov-17	**4.1**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-62B	8-Nov-17	**7.5**	<0.5	**0.82**	**1.5**	<0.5	<0.5	<1.0	**0.70**	<0.5	1,2-DCA = 0.60
BP-65A	8-Nov-17	**4.6**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-65B	8-Nov-17	**0.66**	<0.5	<0.5	**2.4**	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-67B	8-Nov-17	**21**	**1.2**	**0.83**	**1.5**	**0.51**	<0.5	<1.0	**1.3**	<0.5	DCDFMe = 0.79
BP-68	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
BP-73A	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BP-73B	8-Nov-17	**4.0**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	**0.51**	<0.5	
BP-74R	7-Nov-17	**39**	**1.7**	<0.5	**0.65**	<2.0	<0.5	<0.5	**1.8**	<0.5	DCDFMe = 1.2
BP-75R/DUP4	7-Nov-17	**200/190**	**5.0/4.8**	**0.74/0.77**	**5.7/5.5**	**2.6/2.6**	<0.5 / <0.5	**0.51/0.51**	**5.9/5.7**	<0.5/<0.5	DCDFMe = 18/17
BPX-F1	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
BPX-H1	8-Nov-17	**53**	<0.5	<0.5	**0.57**	**0.60**	<0.5	<1.0	**4.3**	<0.5	
DH-03	6-Nov-17	**19**	<0.5	<0.5	**7.0**	<2.0	<0.5	**1.6**	<0.5	<0.5	
MW-C	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MW-D	6-Nov-17	**14**	**8.8**	<0.5	**3.9**	<2.0	<0.5	<0.5	**0.74**	<0.5	
PA-08/DUP6	6-Nov-17	**210/210**	**4.6/4.5**	<1.0/<1.0	**7.7/8.4**	<4.0/<4.0	<1.0/<1.0	<1.0/<1.0	**2.9/2.9**	<1.0/<1.0	DCDFMe = 32/33
PA-13	6-Nov-17	**13**	<0.5	<0.5	**2.3**	<2.0	<0.5	<0.5	<0.5	<0.5	
PA-17	6-Nov-17	**4.0**	<0.5	<0.5	<0.5	**3.2**	<0.5	<0.5	**0.56**	<0.5	
PA-18	6-Nov-17	**10**	**1.1**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
PA-19	6-Nov-17	**1.3**	**0.73**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
PA-20	6-Nov-17	**8.2**	**0.77**	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
PA-29/DUP7	8-Nov-17	**18/18**	**1.1/1.2**	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<1.0/<1.0	**0.88/0.87**	<0.5/<0.5	
PW-1 (private well in BPN)	6-Nov-17	**2.5**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
PW-2 (private well in BPN)	6-Nov-17	**2.4**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	TCFMe = 2.0
TW-1B	8-Nov-17	**4.8**	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	
TB1	6-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	Trip Blank
TB2	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	Trip Blank
TB3	8-Nov-17	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	<0.5	<0.5	Trip Blank
Matadero Creek (Hillview-Porter Regional)											
MC-04	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MC-05	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MC-07	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MC-08/DUP5	7-Nov-17	**0.71/0.52**	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<2.0/<2.0	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	<0.5/<0.5	
MC-09	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MC-9A	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MC-10	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MC-11	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	

TABLE 7
Summary of Chemical Testing Results for November 2017
SRP Sites and Regional Site
Palo Alto, California
All results reported in micrograms per liter (µg/L)

Well Name	Date Sampled	TCE	PCE	1,1-DCA	1,1-DCE	Freon-113	1,1,1-TCA	CHCL3	*cis* -1,2-DCE	VC	Other/Comments
MC-11A	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	
MC-12	7-Nov-17	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	

Notes and Abbreviations:

Analytes detected are shown in bold

UJ = The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

J = Estimated value

NS = Not sampled

NA = Analyte not included in analysis

DCBMe	Dichlorobromomethane	trans-1,2-DCE	*trans* -1,2-Dichloroethene	PCE	Tetrachloroethene	CMe	Chloromethane
CHCL3	Chloroform	CB	Chlorobenzene	1,1,1-TCA	1,1,1-Trichloroethane	BRFM	Bromoform
1,1-DCA	1,1-Dichloroethane	TCFMe	Trichlorofluoromethane (Freon 11)	1,1,2-TCA	1,1,2-Trichloroethane	1,2-DCP	1,2-Dichloropropane
1,2-DCA	1,2-Dichloroethane	DCDFMe	Dichlorodifluoromethane (Freon 12)	TCE	Trichloroethene	1,2-DCB	1,2-Dichlorobenzene
1,1-DCE	1,1-Dichloroethene	DCM	Methylene Chloride	VC	Vinyl Chloride	1,4-DCB	1,4-Dichlorobenzene
cis-1,2-DCE	*cis* -1,2-Dichloroethene			Bme	Bromomethane	CTC	Carbon Tetrachloride
Cr (VI)	Hexavalent Chromium						

TABLE 8
SUMMARY OF EXTRACTION SYSTEM FLOW DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3165 PORTER DRIVE

WELL		Date of Meter Reading (1) 1-Dec-16	4-Jan-17	25-May-17	15-Jun-17	20-Jul-17	17-Aug-17	7-Sep-17	3-Oct-17	6-Nov-17	13-Dec-17	Annual Totals
EW-S1	Period Flow (gallons)	30,279	43,844	--	--	--	--	--	--	--	--	74,123
	Average Flow Rate (gpm)	0.88	0.90	--	--	--	--	--	--	--	--	0.89
EW-2	Period Flow (gallons)	349	477	22,465	13,390	18,019	16,220	11,468	13,605	16,555	17,109	129,657
	Average Flow Rate (gpm)	0.01	0.01	0.54	0.32	0.43	0.39	0.27	0.33	0.40	0.41	0.31
EW-3	Period Flow (gallons)	7,922	11,640	790	449	604	522	354	418	517	865	24,081
	Average Flow Rate (gpm)	0.23	0.24	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.06
EW-S5	Period Flow (gallons)	2,073	3,190	--	--	--	--	--	--	--	--	5,263
	Average Flow Rate (gpm)	0.06	0.07	--	--	--	--	--	--	--	--	0.06
EW-S5R	Period Flow (gallons)	--	--	97,046	45,816	75,226	53,355	35,352	41,737	50,844	49,000	448,376
	Average Flow Rate (gpm)	--	--	2.32	1.10	1.80	1.28	0.85	1.00	1.22	1.17	1.34
EW-S7	Period Flow (gallons)	2,185	3,387	--	--	--	--	--	--	--	--	5,572
	Average Flow Rate (gpm)	0.06	0.07	--	--	--	--	--	--	--	--	0.07
EW-S13	Period Flow (gallons)	2,562	4,460	--	--	--	--	--	--	--	--	7,022
	Average Flow Rate (gpm)	0.07	0.09	--	--	--	--	--	--	--	--	0.08
EW-S13R	Period Flow (gallons)	--	--	16,817	11,538	18,110	13,340	9,464	11,479	14,801	16,640	112,189
	Average Flow Rate (gpm)	--	--	0.40	0.28	0.43	0.32	0.23	0.27	0.35	0.40	0.34
Cumulative extraction well flow												
	Period Flow (gallons)	**45,370**	**66,998**	**137,119**	**71,193**	**111,959**	**83,437**	**56,638**	**67,239**	**82,717**	**83,614**	
	Average Flow Rate (gpm)	**1.31**	**1.37**	**3.28**	**1.70**	**2.68**	**2.00**	**1.36**	**1.61**	**1.98**	**2.00**	

Reporting Per Reporting Period Totals			**Annual Totals**		
Total Extracted	Total Extracted Flow	485,604 gallons	Total Extracted Flow	806,284	gallons
Average Flow F	Average Flow Rate	1.94 gpm	Average Flow Rate	1.93	gpm

Notes:

(1) First period begins on November 7, 2016. System shut down between January 4, 2017 and April 26, 2017.

TABLE 8
SUMMARY OF EXTRACTION SYSTEM FLOW DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3215 PORTER DRIVE														
		Date of Meter Reading [1]												Annual
WELL		19-Dec-16	30-Jan-17 [2]	Feb-17	Mar-17	24-Apr-17 [3]	22-May-17	28-Jun-17	19-Jul-17	29-Aug-17	25-Sep-17	24-Oct-17	28-Nov-17	Totals
AL-1	Period Flow (gallons)	12,160	10,780	0	0	0	23,700	35,942	25,438	27,190	19,010	12,340	13,030	179,590
	Average Flow Rate (gpm)	0.30	0.30	0.00	0.00	0.00	0.59	0.67	0.84	0.46	0.49	0.30	0.26	0.35
AL-2	Period Flow (gallons)	180,010	126,010	0	0	0	74,800	230,049	256,701	153,060	236,270	178,040	199,680	1,634,620
	Average Flow Rate (gpm)	4.46	3.50	0.00	0.00	0.00	1.86	4.32	8.49	2.59	6.08	4.26	3.96	3.29
AL-3	Period Flow (gallons)	15,500	15,430	0	0	0	43,840	79,432	25,228	25,130	20,610	13,700	10,420	249,290
	Average Flow Rate (gpm)	0.38	0.43	0.00	0.00	0.00	1.09	1.49	0.83	0.43	0.53	0.33	0.21	0.48
AL-5 [4]	Period Flow (gallons)	0	0	0	0	0	39,280	22,101	12,282	24,105	23,824	8,721	11,141	141,453
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.97	0.41	0.41	0.41	0.61	0.21	0.22	0.27
AL-6 [5]	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AL-7	Period Flow (gallons)	18,400	15,930	0	0	0	50,090	50,966	21,294	23,780	15,890	12,900	16,420	225,670
	Average Flow Rate (gpm)	0.46	0.44	0.00	0.00	0.00	1.24	0.96	0.70	0.40	0.41	0.31	0.33	0.44
AL-8	Period Flow (gallons)	93,390	7,360	0	0	0	124,200	232,218	50,882	72,510	109,070	56,660	97,340	843,630
	Average Flow Rate (gpm)	2.32	0.20	0.00	0.00	0.00	3.08	4.36	1.68	1.23	2.81	1.36	1.93	1.58
AL-9	Period Flow (gallons)	8,560	6,440	0	0	0	10,040	7,003	9,027	11,750	11,340	7,410	6,870	78,440
	Average Flow Rate (gpm)	0.21	0.18	0.00	0.00	0.00	0.25	0.13	0.30	0.20	0.29	0.18	0.14	0.16
SC1-2	Period Flow (gallons)	10,110	7,240	0	0	0	9,310	8,196	7,974	11,360	12,340	5,100	8,000	79,630
	Average Flow Rate (gpm)	0.25	0.20	0.00	0.00	0.00	0.23	0.15	0.26	0.19	0.32	0.12	0.16	0.16
SC1-3	Period Flow (gallons)	19,430	13,660	0	0	0	13,040	9,715	5,725	26,520	27,410	21,880	25,500	162,880
	Average Flow Rate (gpm)	0.48	0.38	0.00	0.00	0.00	0.32	0.18	0.19	0.45	0.70	0.52	0.51	0.31
SC1-6 [6]	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SC1-7 [5]	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SC1-8 [6]	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SC1-9 [7]	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SC1-11 [6]	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SC1-16 [5]	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SC1-17	Period Flow (gallons)	3,570	2,510	0	0	0	210	7,222	4,078	5,970	5,730	4,320	5,740	39,350
	Average Flow Rate (gpm)	0.09	0.07	0.00	0.00	0.00	0.01	0.14	0.13	0.10	0.15	0.10	0.11	0.07

TABLE 8
SUMMARY OF EXTRACTION SYSTEM FLOW DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3215 PORTER DRIVE

WELL		Date of Meter Reading [1] 19-Dec-16	30-Jan-17 [2]	Feb-17	Mar-17	24-Apr-17 [3]	22-May-17	28-Jun-17	19-Jul-17	29-Aug-17	25-Sep-17	24-Oct-17	28-Nov-17	Annual Totals
SC1-18	Period Flow (gallons)	14,660	10,000	0	0	0	11,760	23,888	13,352	19,730	19,630	15,050	15,950	144,020
	Average Flow Rate (gpm)	0.36	0.28	0.00	0.00	0.00	0.29	0.45	0.44	0.33	0.50	0.36	0.32	0.28
SC1-19	Period Flow (gallons)	14,440	10,450	0	0	0	10,430	25,840	13,770	20,630	21,440	16,870	19,320	153,190
	Average Flow Rate (gpm)	0.36	0.29	0.00	0.00	0.00	0.26	0.48	0.46	0.35	0.55	0.40	0.38	0.29
SC1-20	Period Flow (gallons)	0	0	0	0	0	14,522	7,903	9,918	14,893	15,387	12,068	15,399	90,089
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.36	0.34	0.33	0.25	0.40	0.29	0.31	0.19
SC2-3	Period Flow (gallons)	7,320	5,080	0	0	0	29,780	9,683	8,397	12,400	12,560	5,080	10,640	100,940
	Average Flow Rate (gpm)	0.18	0.14	0.00	0.00	0.00	0.74	0.18	0.28	0.21	0.32	0.12	0.21	0.20
SC2-5	Period Flow (gallons)	15,390	11,710	0	0	0	15,000	13,695	12,775	19,100	19,300	8,040	16,680	131,690
	Average Flow Rate (gpm)	0.38	0.33	0.00	0.00	0.00	0.37	0.26	0.42	0.32	0.50	0.19	0.33	0.26
Cumulative extraction well flow														
	Period Flow (gallons)	**412,940**	**242,600**	**0**	**0**	**0**	**470,002**	**763,852**	**476,841**	**468,128**	**569,811**	**378,179**	**472,130**	
	Average Flow Rate (gpm)	**10.24**	**6.74**	**0.00**	**0.00**	**0.00**	**11.65**	**14.53**	**15.77**	**7.93**	**14.66**	**9.06**	**9.37**	

Reporting Period Totals

Total Extracted Flow	3,128,941	gallons	
Average Flow Rate	11.88	gpm	

Annual Totals

Total Extracted Flow	4,254,482	gallons
Average Flow Rate	11.10	gpm

Notes:

(1) First period begins on November 21, 2016.

(2) The extraction system and treatment plant operations ceased on January 6, 2017. The extraction system was rerouted to the Hillview-Porter Regional treatment plant and the 3215 Porter Drive treatment plant was destroyed to facilitate the Stanford property redevelopment project.

(3) The rerouted extraction system was restarted on April 25, 2017.

(4) Well AL-5 was shut down and the pump was pulled in November 2016. A new pump was installed and the well was restarted on April 25, 2017.

(5) Wells AL-6, SC1-7, and SC1-16 were converted to monitoring wells in November 2016.

(6) Wells SC1-6, SC1-8, and SC1-11 were destroyed in January 2017 as part of the Stanford property redevelopment project.

(7) Well SC1-9 remained shut down throughout the annual reporting period.

TABLE 8
SUMMARY OF EXTRACTION SYSTEM FLOW DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3300 HILLVIEW AVENUE

WELL		Date of Meter Reading[1] 29-Nov-16	04-Jan-17	24-Jan-17	01-Mar-17	04-Apr-17	26-Apr-17	07-Jun-17	03-Jul-17	04-Aug-17	05-Sep-17	05-Oct-17	07-Nov-17	Annual Totals
MW-D [2]	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MW-FB	Period Flow (gallons)	14,540	21,535	1,375	0	0	0	130	13,310	10,285	19,563	10,382	7,504	98,624
	Average Flow Rate (gpm)	0.46	0.42	0.05	-	-	-	0.002	0.36	0.22	0.42	0.24	0.16	0.19
Cumulative extraction well flow														
	Period Flow (gallons)	**14,540**	**21,535**	**1,375**	**0**	**0**	**0**	**130**	**13,310**	**10,285**	**19,563**	**10,382**	**7,504**	
	Average Flow Rate (gpm)	**0.46**	**0.42**	**0.05**	**-**	**-**	**-**	**0.00**	**0.36**	**0.22**	**0.42**	**0.24**	**0.16**	

Reporting Period Totals

Total Extracted Flow 61,174 gallons

Average Flow Rate 0.23 gpm

Annual Totals

Total Extracted Flow 98,624 gallons

Average Flow Rate 0.19 gpm

Notes:

(1) First period begins on November 7, 2016.

(2) Well MW-D remained shut down throughout this reporting period.

TABLE 8
SUMMARY OF EXTRACTION SYSTEM FLOW DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3210 PORTER DRIVE

			Date of Meter Reading[1]											Annual
WELL		**29-Nov-16**	**4-Jan-17**	**24-Jan-17**	**1-Mar-17**	**4-Apr-17**	**26-Apr-17**	**7-Jun-17**	**3-Jul-17**	**4-Aug-17**	**5-Sep-17**	**6-Oct-17**	**7-Nov-17**	Totals
CEW-1	Period Flow (gallons)	52,062	118,351	56,457	8,971	99,269	59,874	126,856	87,962	111,942	76,236	81,280	64,926	944,186
	Average Flow Rate (gpm)	1.64	2.28	1.96	0.17	2.03	1.89	2.10	2.35	2.43	1.65	1.82	1.41	1.81
CEW-2	Period Flow (gallons)	1	0	79	335	-15	120	70,786	44,890	0	4	19	38,375	154,594
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.01	0.00	0.00	1.17	1.20	0.00	0.00	0.00	0.83	0.27
CEW-3	Period Flow (gallons)	1,653	60,708	85,683	11,669	92,640	59,877	114,414	71,314	84,330	78,570	81,210	87,740	829,809
	Average Flow Rate (gpm)	0.05	1.17	2.98	0.23	1.89	1.89	1.89	1.90	1.83	1.71	1.82	1.90	1.61
Cumulative extraction well flow														
	Period Flow (gallons)	**53,716**	**179,059**	**142,219**	**20,975**	**191,894**	**119,871**	**312,056**	**204,166**	**196,272**	**154,810**	**162,509**	**191,041**	
	Average Flow Rate (gpm)	**1.70**	**3.45**	**4.94**	**0.40**	**3.92**	**3.78**	**5.16**	**5.45**	**4.26**	**3.36**	**3.64**	**4.15**	

Reporting Period Totals		**Annual Totals**	
Total Extracted Flow	1,220,855 gallons	Total Extracted Flow	1,928,589 gallons
Average Flow Rate	4.34 gpm	Average Flow Rate	3.68 gpm

Notes:
(1) First period begins on November 7, 2016.

TABLE 8
SUMMARY OF EXTRACTION SYSTEM FLOW DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3400 HILLVIEW AVENUE

WELL		Date of Meter Reading [1] 28-Dec-16	27-Jan-17	21-Feb-17	31-Mar-17	26-Apr-17	26-May-17	29-Jun-17	28-Jul-17	21-Aug-17	29-Sep-17	27-Oct-17	9-Nov-17	Annual Totals
EX-1	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EX-3	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EX-4	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EX-5	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EX-6	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LF-2	Period Flow (gallons)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EX-1B	Period Flow (gallons)	25,890	19,730	25,210	160,460	46,180	181,290	59,360	35,670	13,700	4,000	41,170	30	612,690
	Average Flow Rate (gpm)	0.62	0.46	0.70	2.93	1.23	4.20	1.21	0.85	0.40	0.10	1.02	0.00	1.35
EX-1C [2]	Period Flow (gallons)	--	--	--	--	--	--	--	--	--	--	--	--	904710[2]
	Average Flow Rate (gpm)	--	--	--	--	--	--	--	--	--	--	--	--	2.66
EX-2B	Period Flow (gallons)	18,540	12,540	16,040	123,400	25,780	117,080	38,080	20,610	3,330	1,110	12,740	20	389,270
	Average Flow Rate (gpm)	0.80	0.29	0.45	2.26	0.69	2.71	0.78	0.49	0.10	0.03	0.32	0.00	0.86
LF-20C	Period Flow (gallons)	28,430	20,990	26,540	231,760	48,230	183,120	60,180	36,920	13,370	3,840	36,910	40	690,330
	Average Flow Rate (gpm)	0.68	0.49	0.74	4.24	1.29	4.24	1.23	0.88	0.39	0.10	0.92	0.00	1.52
LF-20D	Period Flow (gallons)	24,080	18,220	20,560	148,200	33,070	133,420	50,380	31,420	12,370	3,750	39,190	50	514,710
	Average Flow Rate (gpm)	0.58	0.42	0.57	2.71	0.88	3.09	1.03	0.75	0.36	0.09	0.97	0.00	1.13
Cumulative Extraction Well Flow														
	Period Flow (gallons)	**96,940**	**71,480**	**88,350**	**663,820**	**153,260**	**614,910**	**208,000**	**124,620**	**42,770**	**12,700**	**130,010**	**140**	
	Average Flow Rate (gpm)	**2.68**	**1.66**	**2.46**	**12.14**	**4.09**	**14.24**	**4.25**	**2.97**	**1.25**	**0.32**	**2.91**	**0.00**	

Reporting Period Totals [3]

Total Extracted Flow 572,289 gallons

Average Flow Rate 2.38 gpm

Annual Totals [3]

Total Extracted Flow 2,181,857 gallons

Average Flow Rate 4.39 gpm

Notes:

(1) First period begins on 11/29/2016. Due to lack of water, shallow extraction wells (EX-1, LF-2, EX-3, EX-4, EX-5, and EX-6) have been shut down since the GWET system was restarted on March 10, 2008.

(2) EX-1C period totalizer readings not recorded, periodically, due to a car parked over the well during site visits. The annual total represents a minimum volume (Period flow between Dec. 28, 2016 and Aug. 21, 2017).

(3) Represents the average flow rates and period flow for the GWET system effluent totalizer, not individual extraction wells.

TABLE 8
SUMMARY OF EXTRACTION SYSTEM FLOW DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3176 PORTER DRIVE

WELL		Date of Meter Reading [1] 06-Dec-16	04-Jan-17	01-Feb-17	02-Mar-17	04-Apr-17	02-May-17	02-Jun-17	07-Jul-17	03-Aug-17	06-Sep-17	03-Oct-17	06-Nov-17	Annual Totals
EW-1B	Period Flow (gallons)	240	937	54	5,842	14,167	13,881	14,517	6,574	638	782	64	254	57,710
	Average Flow Rate (gpm)	0.01	0.02	0.00	0.14	0.30	0.34	0.33	0.13	0.02	0.02	0.00	0.01	0.11
EW-2B	Period Flow (gallons)	216	203	169	8,162	0	0	54,596	159,651	114,066	155,329	114,602	133,658	740,436
	Average Flow Rate (gpm)	0.01	0.00	0.00	0.20	0.00	0.00	1.22	3.17	2.93	3.17	2.95	2.73	1.42
EW-3B	Period Flow (gallons)	147,631	149,679	22,849	75,569	34,680	5,193	10,256	7,521	4,373	6,264	5,191	5,548	327,123
	Average Flow Rate (gpm)	3.66	3.58	0.57	1.81	0.73	0.13	0.23	0.15	0.11	0.13	0.13	0.11	0.63
EW-4	Period Flow (gallons)	4,020	1,330	248	2,596	9,083	4,606	806	3,792	456	485	286	279	23,967
	Average Flow Rate (gpm)	0.10	0.03	0.01	0.06	0.19	0.11	0.02	0.08	0.01	0.01	0.01	0.01	0.05
MW-11B	Period Flow (gallons)	0	0	8,150	53,389	100,284	108,540	112,149	112,958	87,784	112,806	89,190	114,063	899,313
	Average Flow Rate (gpm)	0.00	0.00	0.20	1.28	2.11	2.69	2.51	2.24	2.26	2.30	2.29	2.33	1.72
MW-11C	Period Flow (gallons)	60,453	66,913	10,560	82,045	130,058	106,896	109,529	111,047	84,693	109,020	85,286	107,258	1,003,305
	Average Flow Rate (gpm)	1.50	1.60	0.26	1.96	2.74	2.65	2.45	2.20	2.18	2.23	2.19	2.19	1.92
MW-11D	Period Flow (gallons)	1,445	996	392	29,140	42,064	20,469	23,333	17,424	12,759	12,441	13,262	10,531	182,811
	Average Flow Rate (gpm)	0.04	0.02	0.01	0.70	0.89	0.51	0.52	0.35	0.33	0.25	0.34	0.22	0.35
MW-12	Period Flow (gallons)	4	1	1	443	17,615	11,877	12,693	13,757	9,841	12,421	9,512	11,955	100,116
	Average Flow Rate (gpm)	0.00	0.00	0.00	0.01	0.37	0.29	0.28	0.27	0.25	0.25	0.24	0.24	0.19
MW-16R	Period Flow (gallons)	2,717	2,437	357	1,129	2,798	2,503	2,911	3,529	2,705	3,497	2,770	3,543	28,179
	Average Flow Rate (gpm)	0.07	0.06	0.01	0.03	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.05
MW-18	Period Flow (gallons)	162,795	156,956	23,861	1,210	95,046	75,644	79,456	73,871	54,875	67,775	52,564	64,963	746,221
	Average Flow Rate (gpm)	4.04	3.76	0.59	0.03	2.00	1.88	1.78	1.47	1.41	1.38	1.35	1.33	1.43
MD-7	Period Flow (gallons)	1,441	954	221	2,550	2,557	1,245	1,622	954	759	1,108	592	1,043	13,605
	Average Flow Rate (gpm)	0.04	0.02	0.01	0.06	0.05	0.03	0.04	0.02	0.02	0.02	0.02	0.02	0.03
Cumulative extraction well flow														
	Period Flow (gallons)	**380,962**	**380,406**	**66,862**	**262,075**	**448,352**	**350,854**	**421,868**	**511,078**	**372,949**	**481,928**	**373,319**	**453,095**	
	Average Flow Rate (gpm)	**9.45**	**9.11**	**1.66**	**6.28**	**9.44**	**8.70**	**9.45**	**10.14**	**9.59**	**9.84**	**9.60**	**9.25**	

Reporting Period Totals

Total Extracted Flow	2,192,369 gallons
Average Flow Rate	9.7 gpm

Annual Totals

Total Extracted Flow	4,122,786 gallons
Average Flow Rate	8.5 gpm

Notes:

(1) First period begins on November 8, 2016.

TABLE 8
SUMMARY OF EXTRACTION SYSTEM FLOW DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

HILLVIEW-PORTER REGIONAL PROGRAM

WELL		Date of Meter Reading [1] 19-Dec-16	30-Jan-17 [2]	27-Feb-17	29-Mar-17	26-Apr-17 [3]	22-May-17	29-Jun-17	28-Jul-17	29-Aug-17	25-Sep-17	24-Oct-17	21-Nov-17	Annual Totals
HW-3	Period Flow (gallons)	61,396	48,514	0	0	0	64,770	102,178	101,232	111,184	89,204	85,318	57,316	721,112
	Average Flow Rate (gpm)	2.24	1.87	0.00	0.00	0.00	1.73	1.87	2.42	2.41	2.29	2.04	1.42	1.53
BP-18C	Period Flow (gallons)	165,604	134,180	0	0	0	220,248	231,444	142,952	137,324	200,048	235,620	212,756	1,680,176
	Average Flow Rate (gpm)	6.05	5.18	0.00	0.00	0.00	5.88	4.23	3.42	2.98	5.15	5.64	5.28	3.65
BP-67B	Period Flow (gallons)	18,171	13,235	0	0	0	35,857	44,667	33,673	34,704	30,046	32,894	19,051	262,298
	Average Flow Rate (gpm)	0.66	0.51	0.00	0.00	0.00	0.96	0.82	0.81	0.75	0.77	0.79	0.47	0.55
Cumulative extraction well flow														
	Period Flow (gallons)	**245,171**	**195,929**	**0**	**0**	**0**	**320,875**	**378,289**	**277,857**	**283,212**	**319,298**	**353,832**	**289,123**	
	Average Flow Rate (gpm)	**8.96**	**7.56**	**0.00**	**0.00**	**0.00**	**8.57**	**6.91**	**6.65**	**6.15**	**8.21**	**8.47**	**7.17**	

Reporting Period Totals

Total Extracted Flow 1,901,611 gallons

Average Flow Rate 7.26 gpm

Annual Totals

Total Extracted Flow 2,663,586 gallons

Average Flow Rate 7.63 gpm

Notes:

(1) First period begins on November 30, 2016.

(2) The extraction system and treatment plant operations ceased on January 6, 2017 to facilitate treatment plant modifications associated with the planned Stanford redevelopment project.

(3) The Hillview Porter Regional extraction system and treatment plant operations were restarted on April 25, 2017.

TABLE 9
SUMMARY OF GROUNDWATER TREATMENT SYSTEM OPERATIONAL DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3165 PORTER DRIVE - Groundwater Extracted is Conveyed and Treated at 3215 Porter Drive Treatment System					
Date of [1] Meter Reading	**Days in Period**	**Period Flow Volume[2] (gallons)**	**Influent Total VOC Concentration (µg/L)**	**Effluent Total VOC Concentration (µg/L)**	**Estimated VOC Mass Treated for Period (pounds)**
1-Dec-16	24	45,370	34.9	See note 3	0.013
4-Jan-17	34	66,998	34.9	"	0.019
6-Jan-17	System turned off to allow for reconfiguration associated with property redevelopment.				
26-Apr-17	System restarted with new extraction well configuration (EW-2, EW-3, EW-S5R, and EW-S13R).				
25-May-17	29	137,119	21/9.1/49[4]	"	0.019
15-Jun-17	21	71,193	21/9.1/49[4]	"	0.011
20-Jul-17	35	111,959	21/9.1/49[4]	"	0.017
17-Aug-17	28	83,437	21/9.1/49[4]	"	0.013
7-Sep-17	21	56,638	21/9.1/49[4]	"	0.009
3-Oct-17	26	67,239	21/9.1/49[4]	"	0.011
6-Nov-17	34	82,717	24/39.7/2.9/74.6[5]	"	0.017
13-Dec-17	37	83,614	24/39.7/2.9/74.6[5]	"	0.018

Reporting Period Totals

Total volume of groundwater treated:	485,604 gallons
Average flow rate:	1.94 gpm
Estimated VOC mass treated:	0.085 pounds

Annual Totals

Total volume of groundwater treated:	806,284 gallons
Average flow rate:	1.93 gpm
Estimated VOC mass treated:	0.148 pounds

Notes

1. First period begins on November 7, 2016.
2. Total flow based on sum of individual wellhead totalizers.
3. Refer to 3215 Porter Drive treatment system for effluent data.
4. Total VOC concentration for EW-2 and EW-3 combined (ESCE)/EW-S5R/EW-S13R on May 17, 2017
5. Total VOC concentration for individual extraction wells EW-2/EW-3/EW-S5R/EW-S13R on November 6, 2017.

Abbreviations

µg/L = micrograms per liter
VOC = Volatile Organic Compounds
gpm = gallons per minute

TABLE 9
SUMMARY OF GROUNDWATER TREATMENT SYSTEM OPERATIONAL DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3215 PORTER DRIVE					
Date of [1] Meter Reading	**Days in Period**	**Period Flow Volume (gallons) [2]**	**Influent Total VOC Concentration (µg/L)**	**Effluent Total VOC Concentration [3] (µg/L)**	**Estimated VOC Mass Treated for Period (pounds)**
28-Dec-16	36	718,127	80.93	ND	0.484
6-Jan-17 [3, 4]	9	176,584	33.28	ND	0.049
27-Jan-17	21	9,465 [4]	NA	NA	0.000

Reporting Period Totals

Total volume of groundwater treated:	0	gallons
Average flow rate:	0.00	gpm
Estimated VOC mass treated:	0.00	pounds

Annual Totals

Total volume of groundwater treated:	894,711	gallons
Average flow rate:	13.81	gpm
Estimated VOC mass treated:	0.53	pounds

Notes

1. First period begins on November 22, 2016.

2. Total groundwater volume reported includes groundwater conveyed from 3165 Porter Drive and 3300 Hillview Avenue.

3. Building 15 Site treatment plant was decommissioned in January 2017 for Stanford property redevelopment. Refer to Hillview-Porter Regional Site treatment system for effluent data after January 27, 2017.

4. Flow volume attributed to rain water and residual water drained from the GAC vessels that was processed through the Building 15 Site treatment plant between January 6 and 27, 2017.

Abbreviations

ND = not detected above laboratory reporting limits
NA = not applicable as water was not extracted groundwater
µg/L = micrograms per liter
VOC = Volatile Organic Compounds
gpm = gallons per minute

TABLE 9
SUMMARY OF GROUNDWATER TREATMENT SYSTEM OPERATIONAL DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3300 HILLVIEW AVENUE - Groundwater Extracted is Conveyed and Treated at Hillview-Porter Regional Site					
Date of [1] Meter Reading	**Days in Period**	**Period Flow Volume (gallons)**	**Influent Total VOC Concentration (µg/L)**	**Effluent Total VOC Concentration (µg/L)**	**Estimated VOC Mass Treated for Period (pounds)**
29-Nov-16	22	14,540	NM[2]	See note 3	0.011
4-Jan-17	36	21,535	NM[2]	"	0.017
24-Jan-17	20	1,375	NM[2]	"	0.001
1-Mar-17	36	0	NM[2]	"	0.000
4-Apr-17	34	0	NM[2]	"	0.000
26-Apr-17	22	0	NM[2]	"	0.000
7-Jun-17	42	130	NM[2]	"	0.000
3-Jul-17	26	13,310	NM[2]	"	0.010
4-Aug-17	32	10,285	NM[2]	"	0.008
5-Sep-17	32	19,563	NM[2]	"	0.015
5-Oct-17	30	10,382	NM[2]	"	0.008
7-Nov-17	33	7,504	66.2	"	0.004

Reporting Period Totals

Total volume of groundwater treated:	61,174 gallons
Average flow rate:	0.23 gpm
Estimated VOC mass treated:	0.05 pounds

Annual Totals

Total volume of groundwater treated:	98,624 gallons
Average flow rate:	0.19 gpm
Estimated VOC mass treated:	0.08 pounds

Notes

1. First period begins on November 7, 2016.
2. Influent data from sample collected on 11/7/16 with a total VOC concentration of 93.5 µg/L.
3. Refer to Hillview-Porter Regional Site treatment system for effluent data.

Abbreviations

VOC = volatile organic compounds
NM = not measured
gpm = gallons per minute
µg/L = micrograms per liter

TABLE 9
SUMMARY OF GROUNDWATER TREATMENT SYSTEM OPERATIONAL DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3210 PORTER DRIVE					
Date of [1] Meter Reading	**Days in Period**	**Period Flow Volume (gallons)**	**Influent Total VOC Concentration (µg/L)**	**Effluent Total VOC Concentration (µg/L)**	**Estimated VOC Mass Treated for Period (pounds)**
29-Nov-16	22	53,716	NM[2]	ND	0.007
4-Jan-17	36	179,059	NM[2]	ND	0.023
24-Jan-17	20	142,219	NM[2]	ND	0.018
1-Mar-17	36	20,975	NM[2]	ND	0.003
4-Apr-17	34	191,894	NM[2]	ND	0.024
26-Apr-17	22	119,871	40.15	ND	0.040
7-Jun-17	42	312,056	NM[3]	ND	0.104
3-Jul-17	26	204,166	NM[3]	ND	0.068
4-Aug-17	32	196,272	NM[3]	ND	0.066
5-Sep-17	32	154,810	NM[3]	ND	0.052
6-Oct-17	31	162,509	NM[3]	ND	0.054
7-Nov-17	32	191,041	27.59	ND	0.044

Reporting Period Totals

Total volume of groundwater treated:	1,220,855 gallons
Average flow rate:	4.34 gpm
Estimated VOC mass treated:	0.39 pounds

Annual Totals

Total volume of groundwater treated:	1,928,589 gallons
Average flow rate:	3.68 gpm
Estimated VOC mass treated:	0.50 pounds

Notes
1. First period begins on November 7, 2016.
2. Influent data used in VOC mass calculation obtained from sample collected on 11/7/16 (total VOCs = 15.14 µg/L).
3. Influent data used in VOC mass calculation obtained from sample collected on 4/26/17 (total VOCs = 40.15 µg/L).

Abbreviations
VOC = volatile organic compounds
NM = not measured
gpm = gallons per minute
µg/L = micrograms per liter
ND = Concentration not detected at or above laboratory reporting limit.

TABLE 9
SUMMARY OF GROUNDWATER TREATMENT SYSTEM OPERATIONAL DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3400 HILLVIEW AVENUE					
Date of Meter Reading	**Days in Period**	**Period Flow Volume[1] (gallons)**	**Influent Total VOC Concentration (µg/L)**	**Effluent Total VOC Concentration[2] (µg/L)**	**Estimated VOC Mass Treated for Period (pounds)**
28-Dec-16	29	142,500	10.95	0.33	0.013
27-Jan-17	30	106,080	43.40	0.76	0.038
21-Feb-17	25	111,480	43.40	ND	0.040
31-Mar-17	38	304,280	43.40	0.44	0.109
26-Apr-17	26	78,331	11.54	0.49	0.007
26-May-17	30	866,897	11.54	1.10	0.075
29-Jun-17	34	236,634	11.54	ND	0.023
28-Jul-17	29	126,168	11.54	1.87	0.010
21-Aug-17	24	42,975	10.60	ND	0.004
29-Sep-17	39	32,309	10.60	1.93	0.002
27-Oct-17	28	134,190	11.96	ND	0.013
9-Nov-17	13	13	11.96	0.99	0.000

Reporting Period Totals

Total volume of groundwater treated:	572,289 gallons
Average flow rate:	2.4 gpm
Estimated VOC mass treated:	0.05 pounds

Annual Totals

Total volume of groundwater treated:	2,181,857 gallons
Average flow rate:	4.4 gpm
Estimated VOC mass treated:	0.33 pounds

Notes:
1. First period begins on November 29, 2016.
2. For the purpose of calculating mass of VOCs removed from extracted groundwater, effluent samples reported as ND for all VOCs are assumed to have a VOC concentration of 0 mg/L.

Abbreviations
ND = not detected at or above laboratory reporting limit
µg/L = micrograms per liter
VOC = volatile organic compounds
gpm = gallons per minute

TABLE 9
SUMMARY OF GROUNDWATER TREATMENT SYSTEM OPERATIONAL DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

3176 PORTER DRIVE					
Date of [1] Meter Reading	Days in Period	Period Flow Volume [2] (gallons)	Influent Total VOC Concentration [3] (µg/L)	Effluent Total VOC Concentration [4] (µg/L)	Estimated VOC Mass Treated for Period (pounds)
6-Dec-16	28	380,962	51.5	ND	0.16
4-Jan-17	29	380,406	51.5	ND	0.16
1-Feb-17	28	66,862	51.5	ND	0.03
2-Mar-17	29	262,075	183.6	0.4 [5]	0.40
4-Apr-17	33	448,352	183.6	ND	0.69
2-May-17	28	350,854	183.6	ND	0.54
2-Jun-17	31	421,868	569.0	ND	2.00
7-Jul-17	35	511,078	569.0	ND	2.42
3-Aug-17	27	372,949	569.0	ND	1.77
6-Sep-17	34	481,928	313.0	ND	1.26
3-Oct-17	27	373,319	313.0	ND	0.97
6-Nov-17	34	453,095	313.0	ND	1.18

Reporting Period Totals

Total volume of groundwater treated:	2,192,369 gallons
Average flow rate:	9.7 gpm
Estimated VOC mass treated:	9.6 pounds

Annual Totals

Total volume of groundwater treated:	4,122,786 gallons
Average system flow rate:	8.2 gpm
Estimated VOC mass treated:	11.6 pounds

Notes

1. First period begins on November 8, 2016.
2. Period flow volume data is calculated from the sum of each individual extraction well totalizer that records the groundwater pumped to the treatment system.
3. Starting in June 2016 influent sample collection frequency changed from monthly to quarterly.
4. For the purpose of calculating mass of VOCs removed from extracted groundwater, effluent samples reported as ND for all VOCs are assumed to have a VOC concentration of 0 µg/L.
5. None of the VOC concentrations exceeded the NPDES Permit discharge limits.

Abbreviations:

µg/L = micrograms per liter
ND = not detected at or above laboratory reporting limit
VOC = volatile organic compounds
gpm = gallons per minute

TABLE 9
SUMMARY OF GROUNDWATER TREATMENT SYSTEM OPERATIONAL DATA
DECEMBER 2016 THROUGH NOVEMBER 2017
SRP Sites and Regional Program, Palo Alto, California

HILLVIEW-PORTER REGIONAL PROGRAM - GROUNDWATER TREATMENT SYSTEM					
Date of [1] Meter Reading	Days in Period	Period Flow Volume (gallons)	Influent Total VOC Concentration (µg/L)	Effluent Total VOC Concentration (µg/L)	Estimated VOC Mass Treated for Period (pounds)
28-Dec-16	28	321,609	151.2	ND	0.405
30-Jan-17 [2]	33	78,386	0.61	ND	0.000
27-Feb-17	28	6,882	0.61	ND	0.000
29-Mar-17	30	5,055	0.61	ND	0.000
28-Apr-17 [3]	30	79,805	68.0	ND	0.045
30-May-17	32	1,095,717	68.0	ND	0.621
29-Jun-17	30	954,040	68.0	ND	0.541
28-Jul-17	29	862,205	80.5	ND	0.578
22-Aug-17	25	741,550	80.5	ND	0.497
29-Sep-17	38	1,086,980	80.5	ND	0.729
25-Oct-17	26	665,230	111.1	ND	0.616
21-Nov-17	27	690,365	111.1	ND	0.639

Reporting Period Totals

Total volume of groundwater treated:	5,000,370 gallons
Average flow rate:	19.84 gpm
Estimated VOC mass treated:	3.60 pounds

Annual Totals

Total volume of groundwater treated:	6,587,824 gallons
Average system flow rate:	12.85 gpm
Estimated VOC mass treated:	4.67 pounds

Notes

1. First period begins on November 30, 2016.

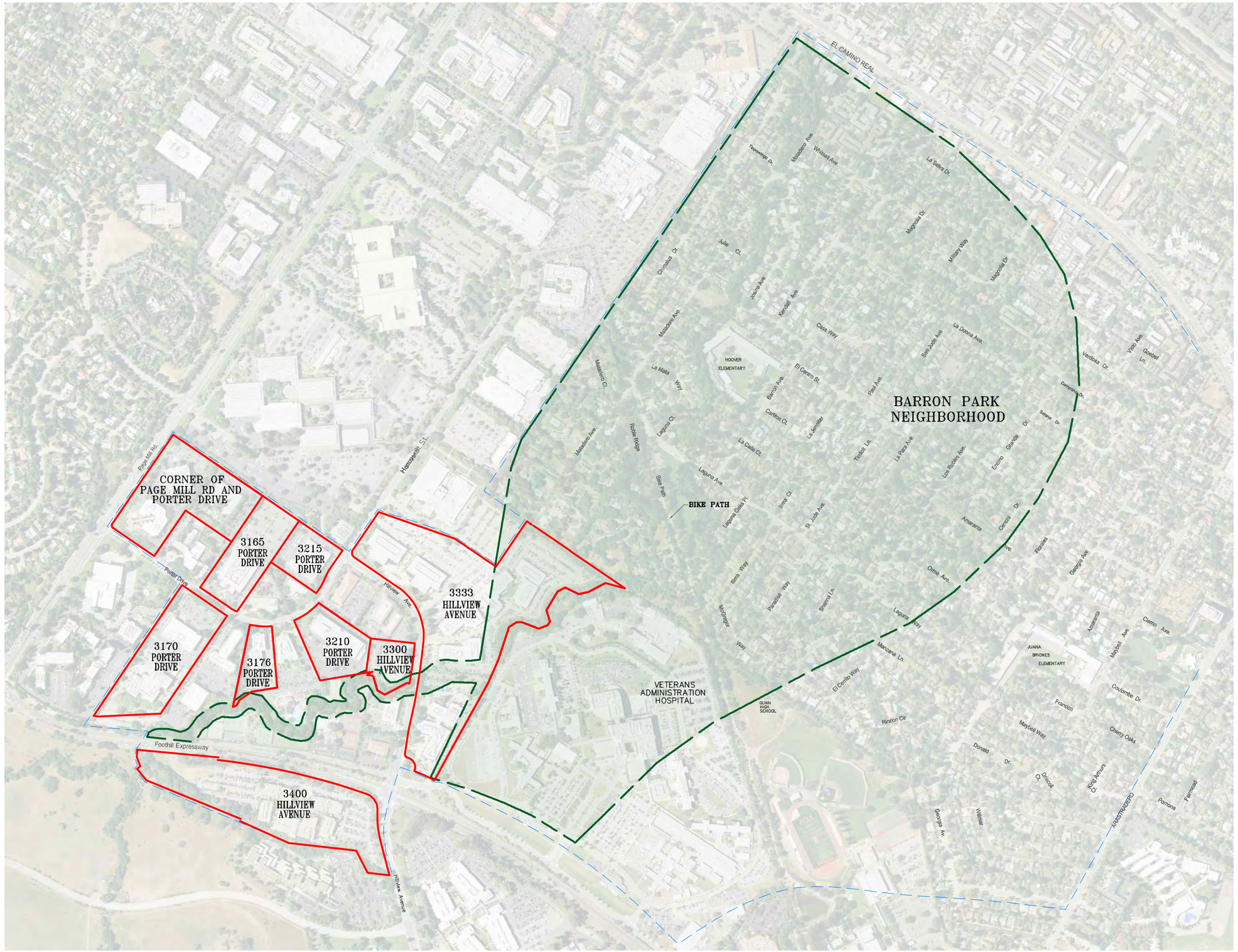
2. The extraction system and treatment plant operations ceased on January 6, 2017, to facilitate treatment plant modifications associated with the planned Stanford redevelopment project. Periodic discharge of rain water that accumulated in the treatment plant containment area occurred during the system shutdown.

3. On April 25, 2017, Hillview-Porter Regional treatment system was restarted. Flow volumes after this date consist of water conveyed from Hillview-Porter Regional Site, HP Building 15 Site, Teledyne MEC, and 3300 Hillview Ave. extraction wells.

Abbreviations

ND = not detected above laboratory reporting limit
µg/L = micrograms per liter
VOC = Volatile Organic Compounds
gpm = gallons per minute

FIGURES



EXPLANATION:

Hillview–Porter Regional Site Study Area

Boundary of Hillview–Porter Region

SRP Site Boundary

0 350 700

SCALE FEET

FIGURE 1
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

HILLVIEW-PORTER REGION MAP

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BARRON PARK NEIGHBORHOOD

HOOVER ELEMENTARY

BUILDING 6 WELLS

BUILDING 5 WELLS

BIKE PATH

AXIAL HORIZONTAL EXTRACTION WELL (HW-2)

TRANSVERSE HORIZONTAL EXTRACTION WELL (HW-3)

VETERANS ADMINISTRATION HOSPITAL

JUANA BRIONES ELEMENTARY

GUNN HIGH SCHOOL

Foothills Expressway

EXPLANATION:

Monitoring wells screened in alluvium
- ○ BP-6 First-encountered groundwater zone
- ● BP-13 Second groundwater zone

Monitoring wells screened in Santa Clara Formation
- ◇ MW-8 First-encountered groundwater zone
- ◆ MW-43 Second groundwater zone
- ◆ DW-8 Third or deeper groundwater zone

Monitoring wells screened in Unnamed Sandstone
- △ MW-1 First-encountered groundwater zone
- ▲ DW-2 Deeper intervals
- ⊹ MW-34 Monitoring wells screened in Santa Clara formation/Unnamed Sandstone contact zone in Region
- ▲ MW-1 Unnamed Sandstone wells screened in first sandstone zone beneath Santa Clara formation

- ○ PW-1 Private wells in Barron Park Neighborhood
- ⧗ MC-4 Regional surface water sampling stations
- ⊠ X-1 Regional surface water measurement stations
- ■ S-1 Site-specific surface water sampling and measurement stations
- Approximate areal extent of saturated alluvium in Region
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation

0 300 600
SCALE FEET

FIGURE 2
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

WELL AND CREEK MONITORING LOCATIONS

Stantec

2019/09/24 1:47:09 P:\1857\active\185709521\05_report-data\drawing\figure\200-0584\WP_Consolidated_Rpt-2017\Fig 2 - 2017.dwg

EXPLANATION:

- Alluvium wells screened in first–encountered groundwater zone
- Santa Clara Formation wells screened in first–encountered groundwater zone
- Unnamed Sandstone wells screened in first–encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 19.92 — Groundwater elevation (feet msl)
- 118 — Groundwater elevation contour (feet msl) (Dashed where inferred)
- Depression in groundwater surface
- Estimated limit of groundwater capture zone

Notes: (73.13) – Data not used in contouring

Dry – Indicates well is dry

NM – Not Measured

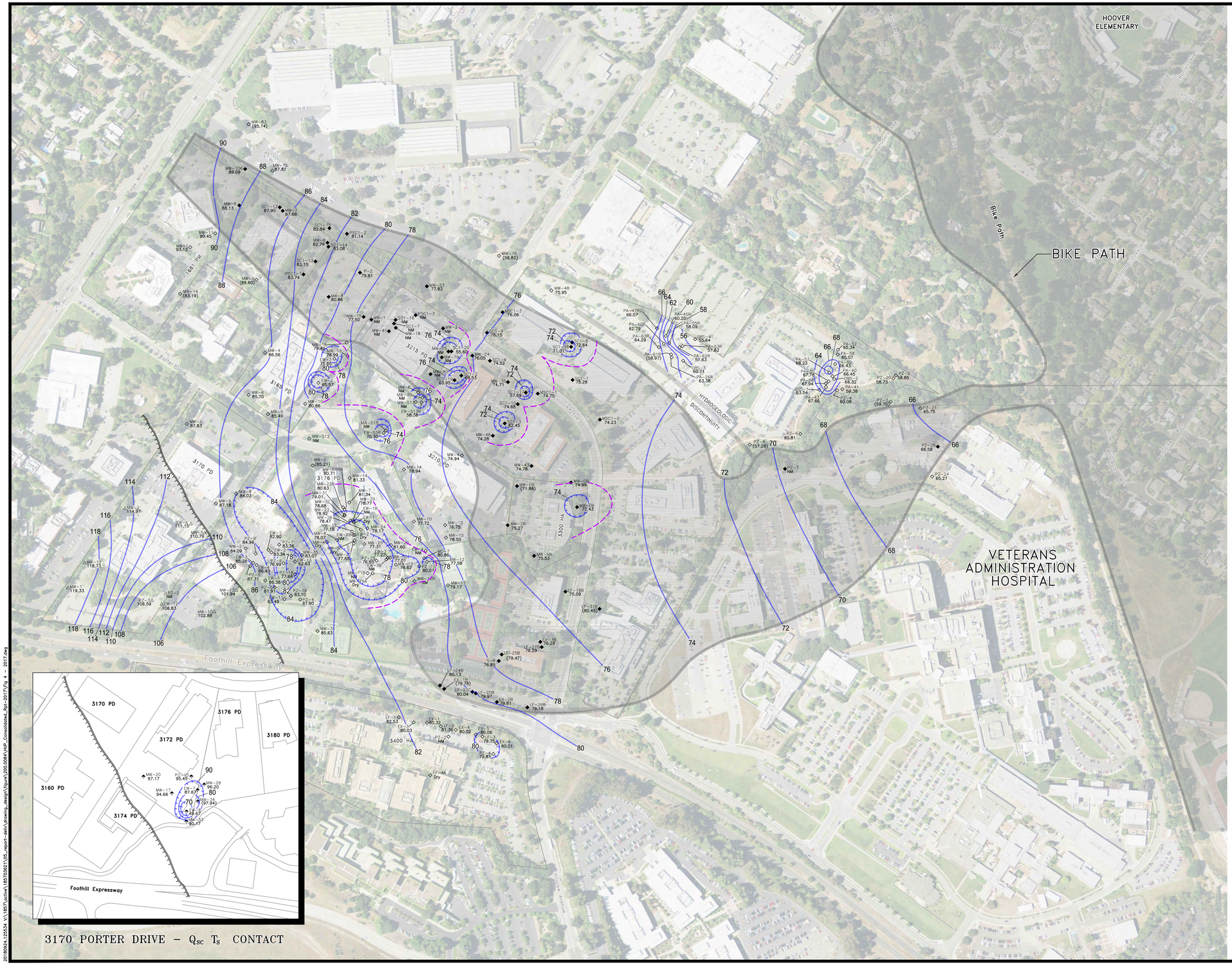
Alluvium Zone A axial horizontal extraction well HW–2 is inactive

0 300 600
SCALE FEET

FIGURE 3
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

GROUNDWATER POTENTIOMETRIC MAP FIRST-ENCOUNTERED GROUNDWATER NOVEMBER 2017

Stantec



EXPLANATION:

- ◇ Santa Clara Formation wells screened in first-encountered groundwater zone
- ◆ Santa Clara Formation wells screened in first groundwater beneath saturated alluvium
- ◓ Wells screened in Santa Clara Formation/Unnamed Sandstone contact zone
- △ Unnamed Sandstone wells screened in first-encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 65.75 Groundwater elevation (feet msl)
- 66 Groundwater elevation contour (feet msl) (Dashed where inferred)
- Depression in groundwater surface
- Estimated limit of groundwater capture zone

Notes: (31.20) – Data not used in contouring

Dry – Indicates well is dry

NM – Not Measured

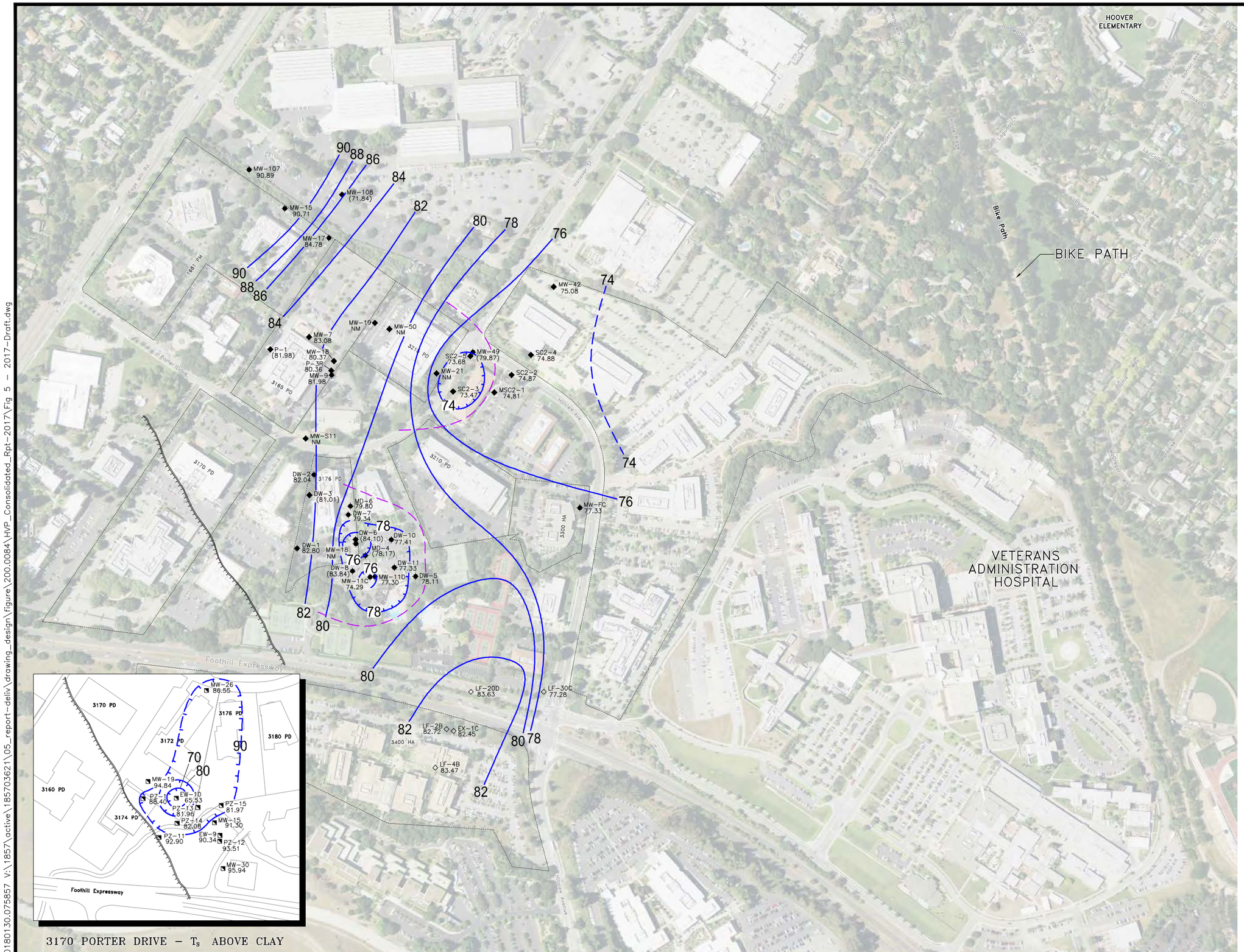
0 200 400
SCALE FEET

FIGURE 4
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

GROUNDWATER POTENTIOMETRIC MAP FIRST GROUNDWATER ZONES IN SANTA CLARA FORMATION AND UNNAMED SANDSTONE NOVEMBER 2017

Stantec

20180924-125534 V:\1857\active\185703621\05_report-dell\drawing_design\figure\200.0084\WP_Consolidated_Rpt-2017\Fig 4 - 2017.dwg



EXPLANATION:

- Wells screened in second Santa Clara Formation groundwater zone
- Wells screened in third or deeper groundwater zone within Santa Clara Formation
- Unnamed Sandstone well screened in first sandstone zone beneath Santa Clara Formation
- ◇ Wells screened in second or third groundwater zones in Santa Clara Formation. Based on lithologic and hydrogeologic data, these zones are in good hydraulic communication.

Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation

75.08 Groundwater elevation (feet msl)

90 Groundwater elevation contour (feet msl) (Dashed where inferred)

Depression in groundwater surface

Estimated limit of groundwater capture zone

Note: (79.87) – Data not used in contouring

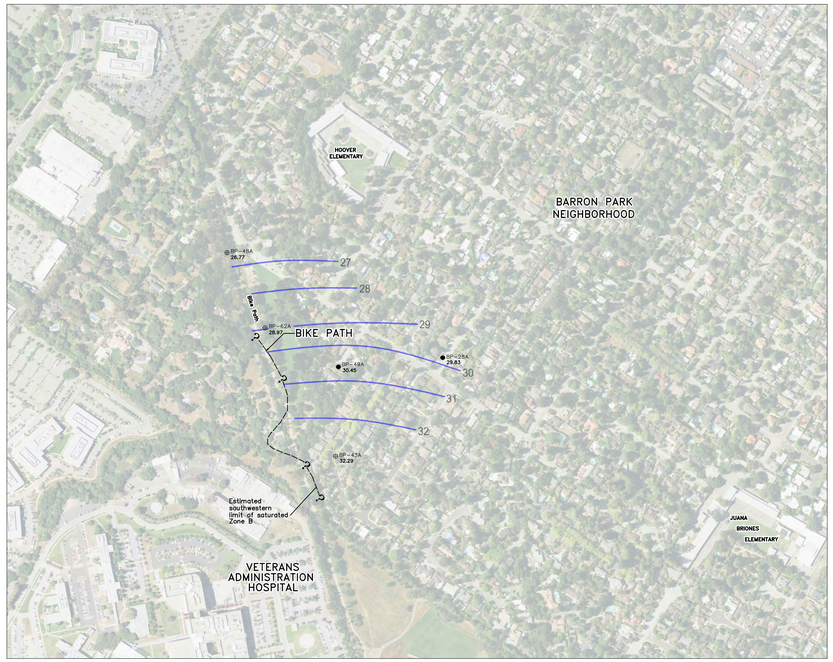
0 400 800
SCALE FEET

FIGURE 5
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

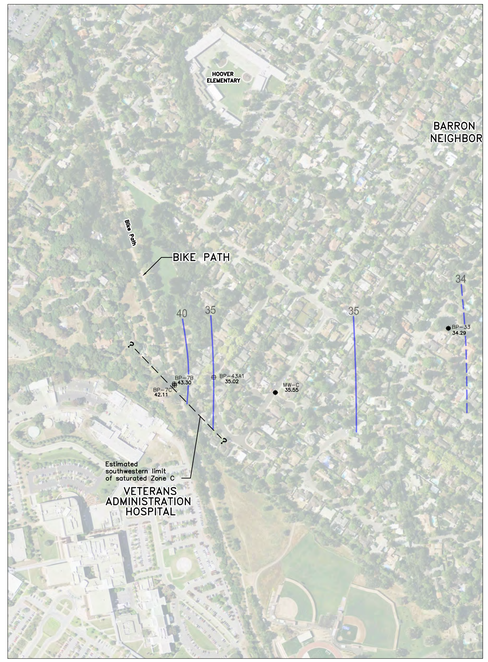
GROUNDWATER POTENTIOMETRIC MAP DEEPER GROUNDWATER ZONES NOVEMBER 2017

Stantec

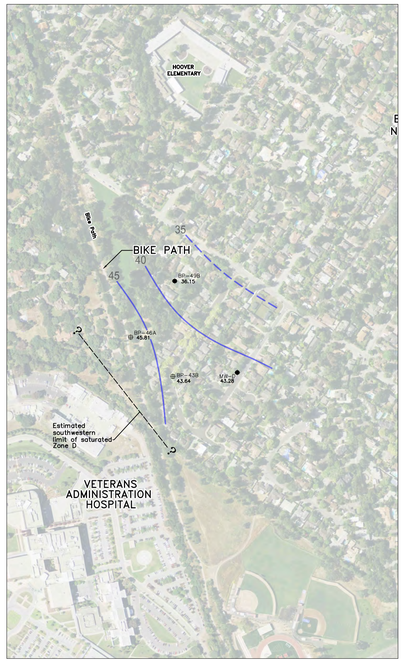
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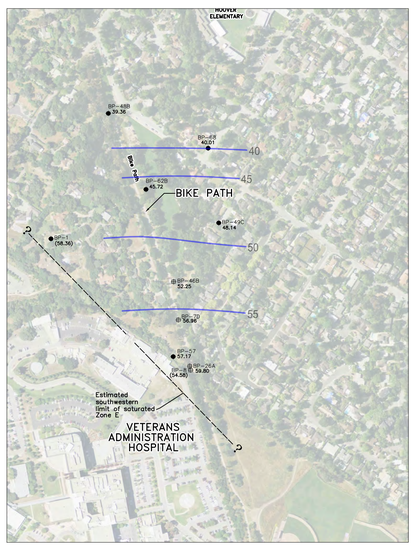
ZONE B



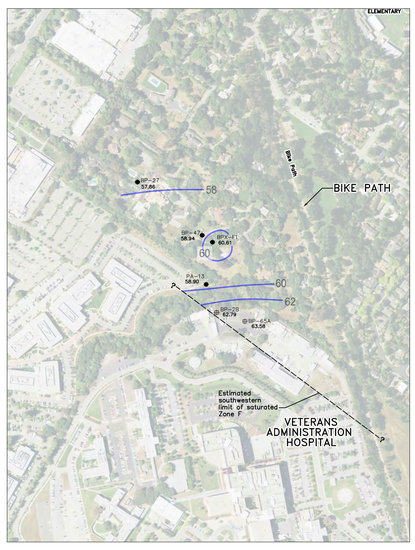
ZONE C



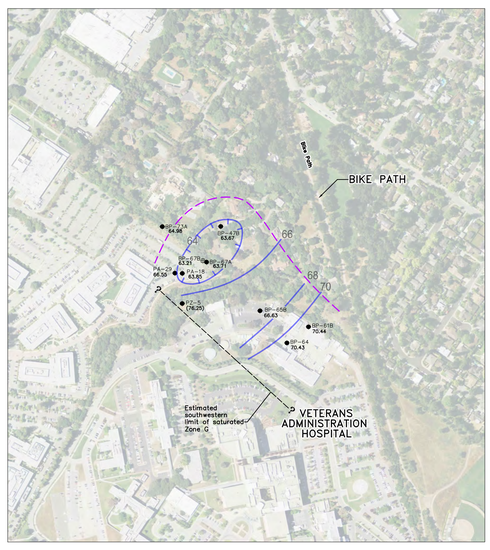
ZONE D



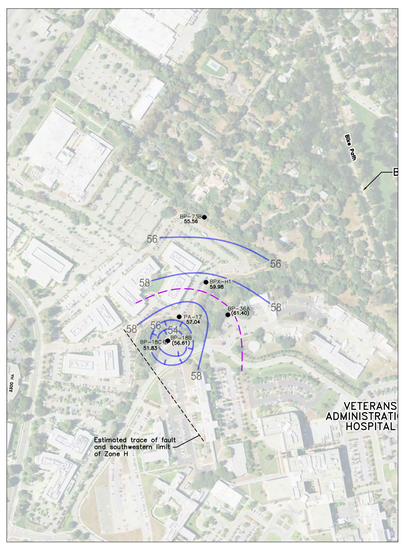
ZONE E



ZONE F



ZONE G



ZONE H

EXPLANATION

- BP-49B — Regional Program monitoring well
- PZ-8 — Regional Program piezometer
- PA-29 — Adjacent site monitoring well
- BP-67B — Vertical extraction well
- 36.15 — Measured groundwater elevation (in feet above mean sea level)
- 40 — Groundwater elevation contour (feet msl) (Dashed where inferred)
- Depression in groundwater surface
- Estimated limit of groundwater capture zone

Notes: (56.61) – Data not used in contouring

Zone B extraction wells BP-43A, BP-48A and BP-62A are inactive.

Zone C extraction wells BP-7B, BP-7C and BP-43A1 are inactive.

Zone D extraction well BP-43B and BP-46A are inactive.

Zone E extraction wells BP-7D, BP-8, BP-26A and BP-46B are inactive.

Zone F extraction wells BP-2B and BP-65A are inactive.

NM – Not Measured

0 400 800
SCALE FEET

FIGURE 6
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

GROUNDWATER POTENTIOMETRIC MAP HILLVIEW - PORTER REGIONAL SITE ZONES B THROUGH H NOVEMBER 2017

Stantec

20180924_130728 V:\1875\active\185730601\05_report_delv\drawing_design\Cgnet\2000.0004\WP_Groundstated_Apr-2017\Fig 6 - 2017.dwg

EXPLANATION:

Monitoring wells screened in alluvium
- ○ BP-6 First-encountered groundwater zone
- ◆ BP-13 Second groundwater zone

Monitoring wells screened in Santa Clara Formation
- ◇ MW-8 First-encountered groundwater zone
- ◆ MW-43 Second groundwater zone
- ◆ DW-8 Third or deeper groundwater zone

Monitoring wells screened in Unnamed Sandstone
- △ MW-1 First-encountered groundwater zone
- ▲ DW-2 Deeper intervals
- MW-34 Monitoring wells screened in Santa Clara formation/Unnamed Sandstone contact zone in Region
- ▲ MW-1 Unnamed Sandstone wells screened in first sandstone zone beneath Santa Clara formation

- ◇ PW-1 Private wells in Barron Park Neighborhood
- MC-4 Regional surface water sampling stations
- ⊠ X-1 Regional surface water measurement stations
- ■ S-1 Site-specific surface water sampling and measurement stations
- Approximate areal extent of saturated alluvium in Region
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation

VERTICAL GRADIENT EXPLANATION:

−0.074 – Direction and magnitude of vertical gradient (negative value is downward; positive value is upward)

FLOW ZONE ABBREVIATIONS:

AL – Alluvium Zone
UAL – Upper Alluvium Zone
LAL – Lower Alluvium Zone
SC1 – Santa Clara Zone 1
SC2 – Santa Clara Zone 2
SC3 – Santa Clara Zone 3
1st – First-Encountered Groundwater Zone
2nd – Second-Encountered Groundwater Zone
DSC – Deeper Santa Clara Zone
A-H – Regional Flow Zone Designation
UFS – Upper Flow System
LFS – Lower Flow System
SGZ – Shallow Groundwater Zone
DGZ – Deep Groundwater Zone

0 300 600
SCALE FEET

FIGURE 7
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

VERTICAL GRADIENTS
NOVEMBER 2017

Stantec

20180924 145461 V:\1857\active\185736601\05_report-delv\drawing_design\Figure7_20180924.mxd *Coordinated_Apr_2017* Fig 7 - 2017.dwg



EXPLANATION:

- ○ Alluvium wells screened in first-encountered groundwater zone
- ◇ Santa Clara Formation wells screened in first-encountered groundwater zone
- △ Unnamed Sandstone wells screened in first-encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 2,200 Concentration in parts per billion (ppb)
- <0.5UJ/<0.5UJ Duplicate pair (ppb)
- J Estimated value
- UJ The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 5–49 ppb

Note: NS – Indicates well not sampled
(110J) – Data not used in contouring

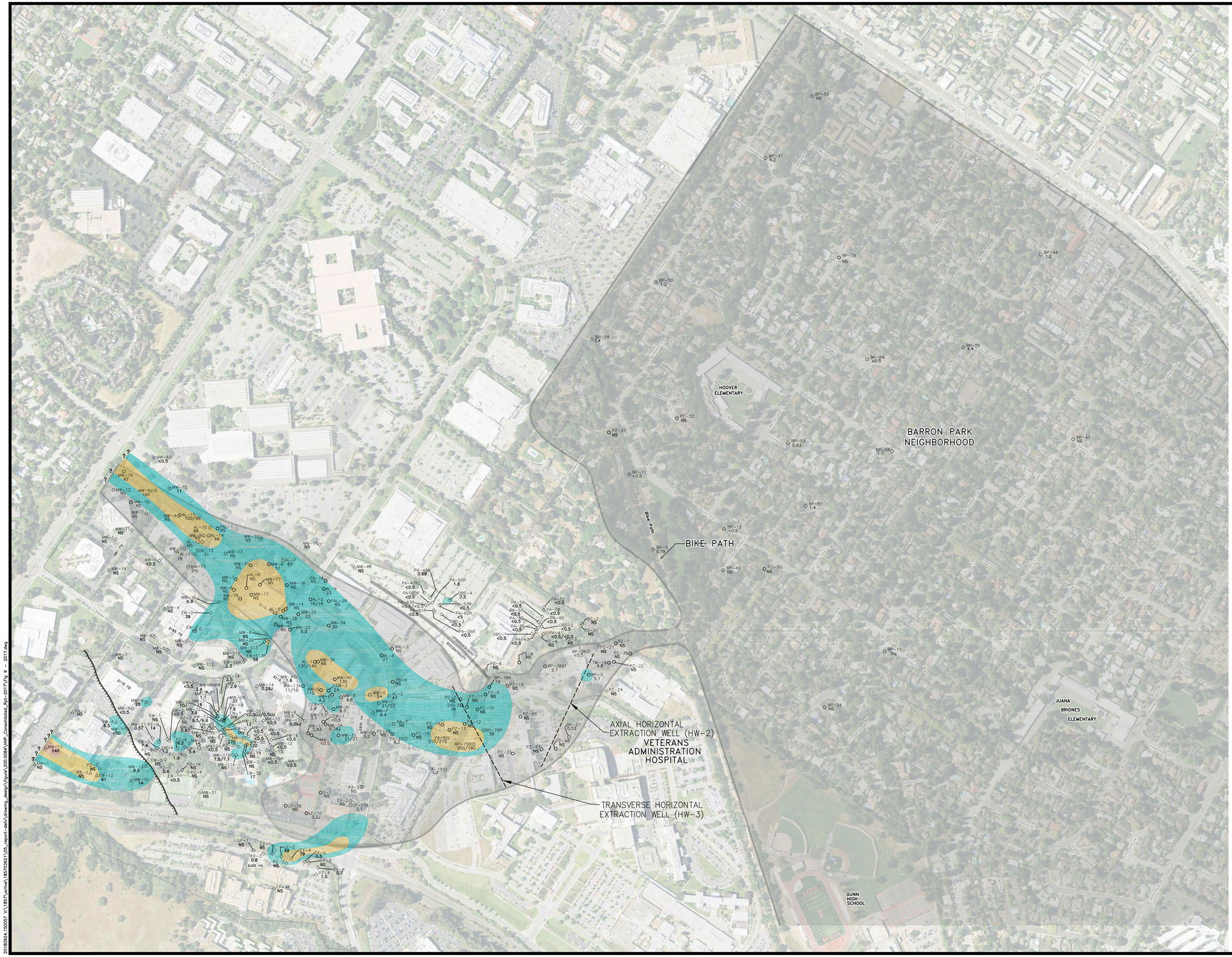
0 300 600
SCALE FEET

FIGURE 8
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

PCE ISOCONCENTRATION MAP FIRST-ENCOUNTERED GROUNDWATER NOVEMBER 2017

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EXPLANATION:

- ○ Alluvium wells screened in first-encountered groundwater zone
- ◇ Santa Clara Formation wells screened in first-encountered groundwater zone
- △ Unnamed Sandstone wells screened in first-encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 2,100 Concentration in parts per billion (ppb)
- <0.5UJ/0.5UJ Duplicate pair (ppb)
- J Estimated value
- UJ The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

- >5000 ppb
- 500-4999 ppb
- 50-499 ppb
- 5-49 ppb

Notes: NS - Indicates well not sampled
(25) - Data not used in contouring

FIGURE 9
HILLVIEW - PORTER REGION
PALO ALTO, CALIFORNIA

TCE ISOCONCENTRATION MAP FIRST-ENCOUNTERED GROUNDWATER NOVEMBER 2017

Stantec

20180924 150057 K:\185X\active\185703521\05_report-data\drawing_design\figure\200.0084.hwp_Consolidated_Rpt-2017.Fig 9 - 2017.dwg

EXPLANATION:

- ○ Alluvium wells screened in first-encountered groundwater zone
- ◇ Santa Clara Formation wells screened in first-encountered groundwater zone
- △ Unnamed Sandstone wells screened in first-encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 2,100 Concentration in parts per billion (ppb)
- <0.5UJ/<0.5 Duplicate pair (ppb)
- J Estimated value
- UJ The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 6–49 ppb

Notes: NS – Indicates well not sampled
(4.0) – Data not used in contouring

0 300 600
SCALE FEET

FIGURE 10
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

1,1-DCE ISOCONCENTRATION MAP FIRST-ENCOUNTERED GROUNDWATER NOVEMBER 2017

Stantec

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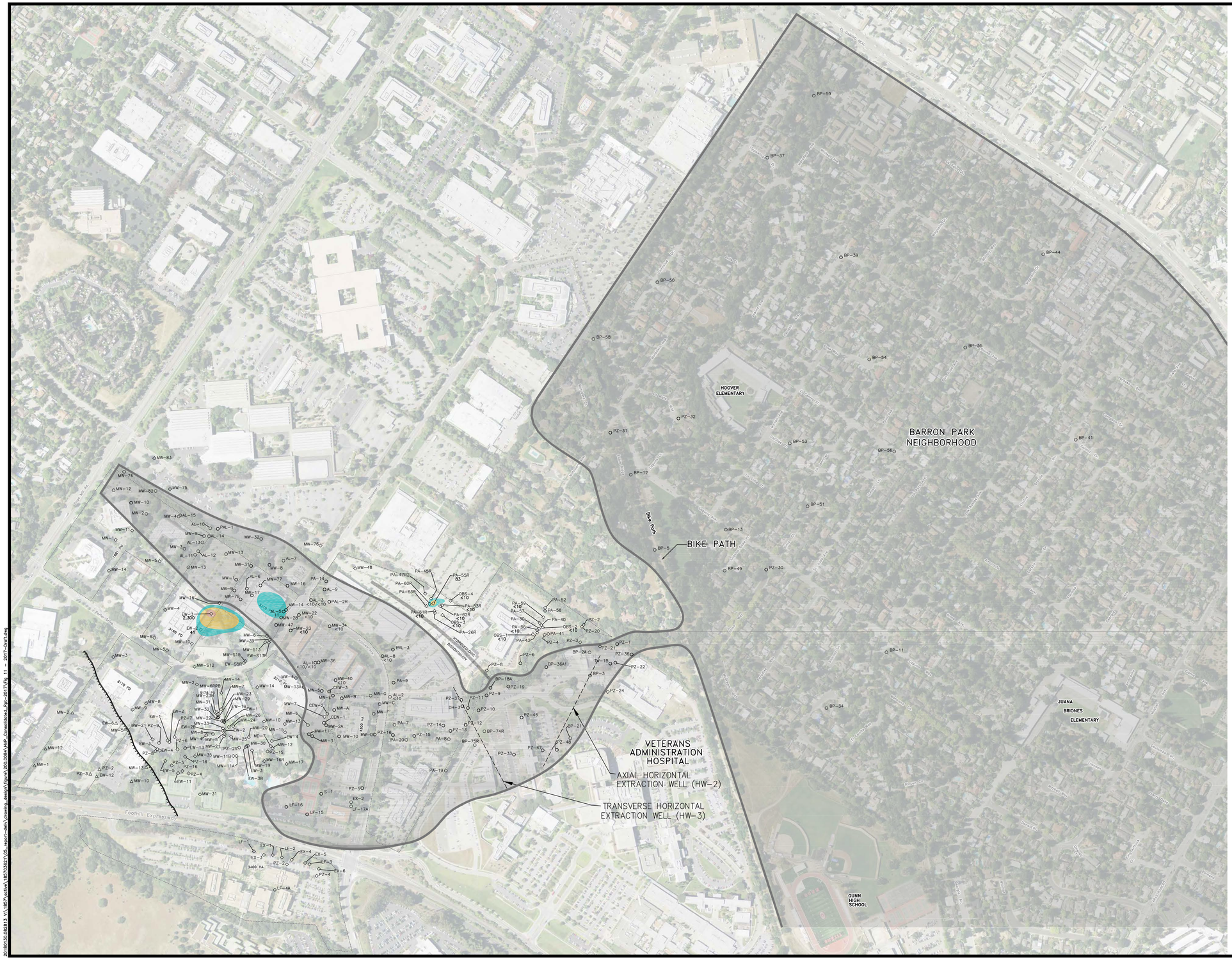
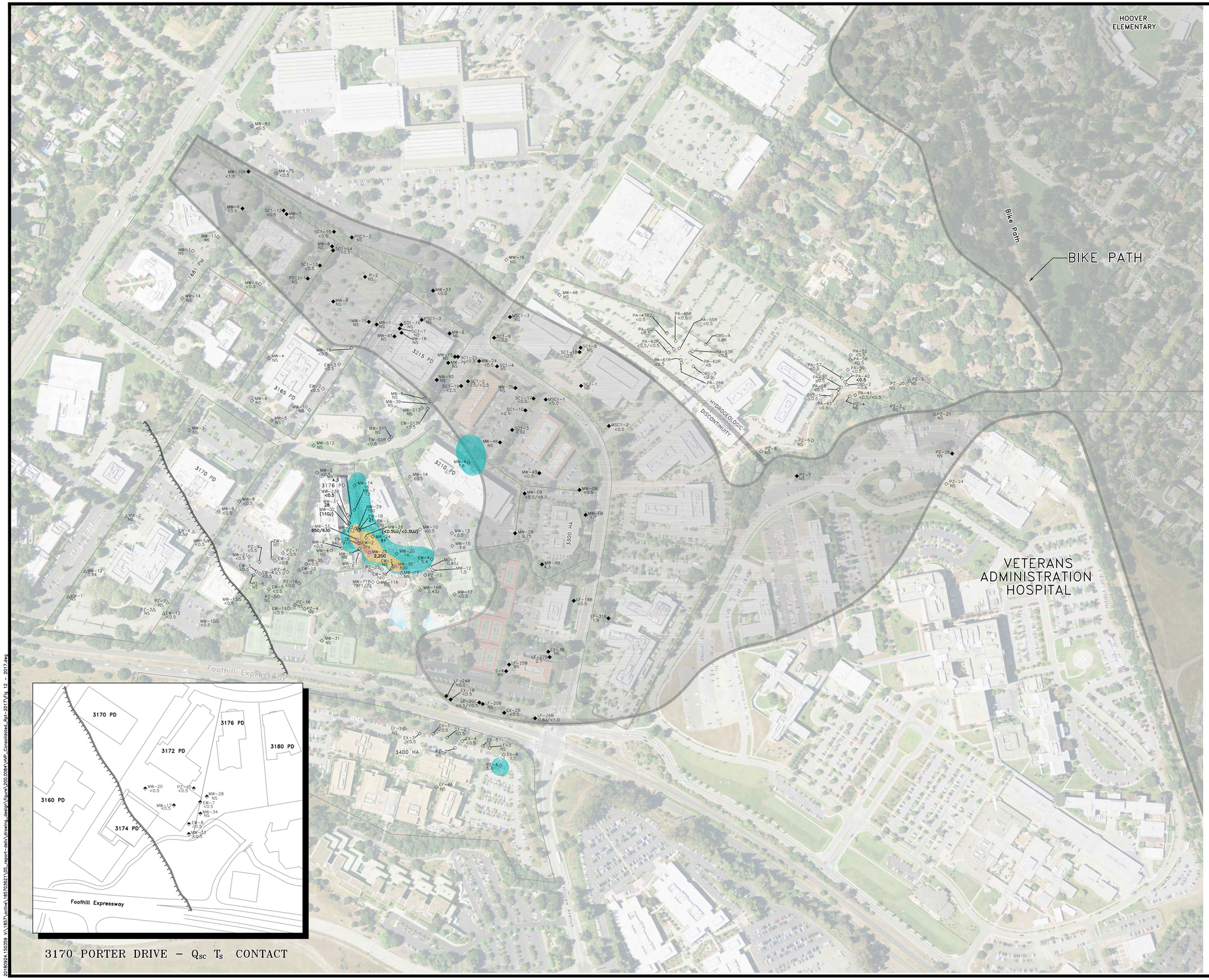


FIGURE 11
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

HEXAVALENT CHROMIUM ISOCONCENTRATION MAP FIRST-ENCOUNTERED GROUNDWATER NOVEMBER 2017

Stantec

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3170 PORTER DRIVE – Q_{SC} T_S CONTACT

EXPLANATION:

- ◇ Santa Clara Formation wells screened in first–encountered groundwater zone
- ◆ Santa Clara Formation wells screened in first groundwater beneath saturated alluvium
- ◓ Wells screened in Santa Clara Formation/Unnamed Sandstone contact zone
- △ Unnamed Sandstone wells screened in first–encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 2,200 Concentration in parts per billion (ppb)
- <0.5UJ/<0.5UJ Duplicate pair (ppb)
- J Estimated value
- UJ The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 5–49 ppb

Note: NS – Indicates well not sampled
(110J) – Data not used in contouring

0 200 400
SCALE FEET

FIGURE 12
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

PCE ISOCONCENTRATION MAP FIRST GROUNDWATER ZONES IN SANTA CLARA FORMATION AND UNNAMED SANDSTONE NOVEMBER 2017

Stantec

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HOOVER ELEMENTARY

BIKE PATH

VETERANS ADMINISTRATION HOSPITAL

HYDROGEOLOGIC DISCONTINUITY

Foothill Expressway

Hillview Avenue

Bike Path

Page Mill Rd

Porter Drive

Hoover St

Laguna Ave

Matadero Creek

3215 PD

3165 PD

3170 PD

3176 PD

3210 PD

3400 HA

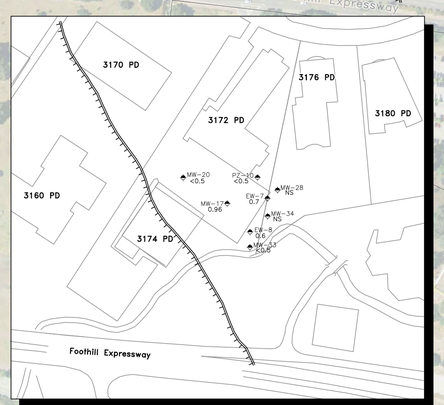
3300 HA

EXPLANATION:

- ◇ Santa Clara Formation wells screened in first–encountered groundwater zone
- ◆ Santa Clara Formation wells screened in first groundwater beneath saturated alluvium
- ◓ Wells screened in Santa Clara Formation/Unnamed Sandstone contact zone
- △ Unnamed Sandstone wells screened in first–encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 280 Concentration in parts per billion (ppb)
- 220/210 Duplicate pair (ppb)
- J Estimated value
- UJ The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 5–49 ppb

Notes: NS – Indicates well not sampled
(25) – Data not used in contouring



3170 PORTER DRIVE – Q_{sc} T_s CONTACT

0 200 400
SCALE FEET

FIGURE 13
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

TCE ISOCONCENTRATION MAP FIRST GROUNDWATER ZONES IN SANTA CLARA FORMATION AND UNNAMED SANDSTONE NOVEMBER 2017

Stantec

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EXPLANATION:

- ◇ Santa Clara Formation wells screened in first-encountered groundwater zone
- ◆ Santa Clara Formation wells screened in first groundwater beneath saturated alluvium
- ♠ Wells screened in Santa Clara Formation/Unnamed Sandstone contact zone
- △ Unnamed Sandstone wells screened in first-encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 2,100 Concentration in parts per billion (ppb)
- <0.5UJ/<0.5 Duplicate pair (ppb)
- J Estimated value
- UJ The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 6–49 ppb

Notes: NS – Indicates well not sampled
(4.0) – Data not used in contouring

0 200 400
SCALE FEET

FIGURE 14
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

1,1-DCE ISOCONCENTRATION MAP FIRST GROUNDWATER ZONES IN SANTA CLARA FORMATION AND UNNAMED SANDSTONE NOVEMBER 2017

Stantec

3170 PORTER DRIVE – Q_{sc} T_s CONTACT

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EXPLANATION:

- ◇ Santa Clara Formation wells screened in first-encountered groundwater zone
- ◆ Santa Clara Formation wells screened in first groundwater beneath saturated alluvium
- ◆ Wells screened in Santa Clara Formation/Unnamed Sandstone contact zone
- △ Unnamed Sandstone wells screened in first-encountered groundwater zone
- Approximate areal extent of saturated alluvium
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 2,300 Concentration in parts per billion (ppb)
- <xx/<xx Duplicate pair (ppb)
- >1000 ppb
- 50–999 ppb
- 10–49 ppb

HOOVER ELEMENTARY

BIKE PATH

VETERAN'S ADMINISTRATION HOSPITAL

HYDROGEOLOGIC DISCONTINUITY

3170 PD
3176 PD
3172 PD
3180 PD
3160 PD
3174 PD
3215 PD
3165 PD
3210 PD
3400 HA

Foothill Expressway

3170 PORTER DRIVE – Q_{SC} T_S CONTACT

0 200 400
SCALE FEET

FIGURE 15
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

HEXAVALENT CHROMIUM ISOCONCENTRATION MAP FIRST GROUNDWATER ZONES IN SANTA CLARA FORMATION AND UNNAMED SANDSTONE NOVEMBER 2017

Stantec

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HOOVER ELEMENTARY

BIKE PATH

VETERANS ADMINISTRATION HOSPITAL

MW-107 <0.5
MW-108 NS
MW-15 NS
MW-17 NS
MW-42 NS
MW-19 NS
MW-50 NS
MW-7 NS
P-1 NS
MW-18 NS
P-3R <0.5
MW-9 NS
MW-49 NS
SC2-5 <0.5
MW-21 NS
SC2-3 <0.5
SC2-4 NS
SC2-2 <0.5
MSC2-1 <0.5
MW-S11 NS
DW-2 <0.5
DW-3 0.61
MD-6 <0.5
DW-7 <0.5
MW-18 1.4
DW-10 <0.5UJ
DW-1 <0.5
DW-6 NS
MD-4 <0.5UJ
DW-11 <0.5UJ
DW-8 NS
MW-11C 0.3J/0.31J
MW-11D <0.5
DW-5 <0.5
MW-FC <0.5
LF-20D <0.5
LF-30C <0.5
LF-2B <0.5
EX-1C NS
LF-4B <1.0

3170 PD
3176 PD
3172 PD
3180 PD
3160 PD
3174 PD
3165 PD
3215 PD
3210 PD
3400 HA
3500 HA
Foothill Expressway
Hillview Avenue
Porter Drive
Page Mill Rd.
Hoover St.
Bike Path

3170 PORTER DRIVE – T_s ABOVE CLAY

MW-26 NS
MW-19 <0.5
PZ-1 <1.0
EW-10 <0.5
PZ-13 <0.5
PZ-15 NS
PZ-14 <0.5
MW-15 <0.5
PZ-11 NS
EW-9 NS
PZ-12 NS
MW-30 NS

EXPLANATION:

- ◆ Wells screened in second Santa Clara Formation groundwater zone
- ◆ Wells screened in third or deeper groundwater zone within Santa Clara Formation
- ◪ Unnamed Sandstone well screened in first sandstone zone beneath Santa Clara Formation
- ◇ Wells screened in second or third groundwater zones in Santa Clara Formation. Based on lithologic and hydrogeologic data, these zones are in good hydraulic communication.
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- **0.61** Concentration in parts per billion (ppb)
- **0.3J/0.31J** Duplicate pair (ppb)
- **J** Estimated value
- **UJ** The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 5–49 ppb

Note: NS – Indicates well not sampled

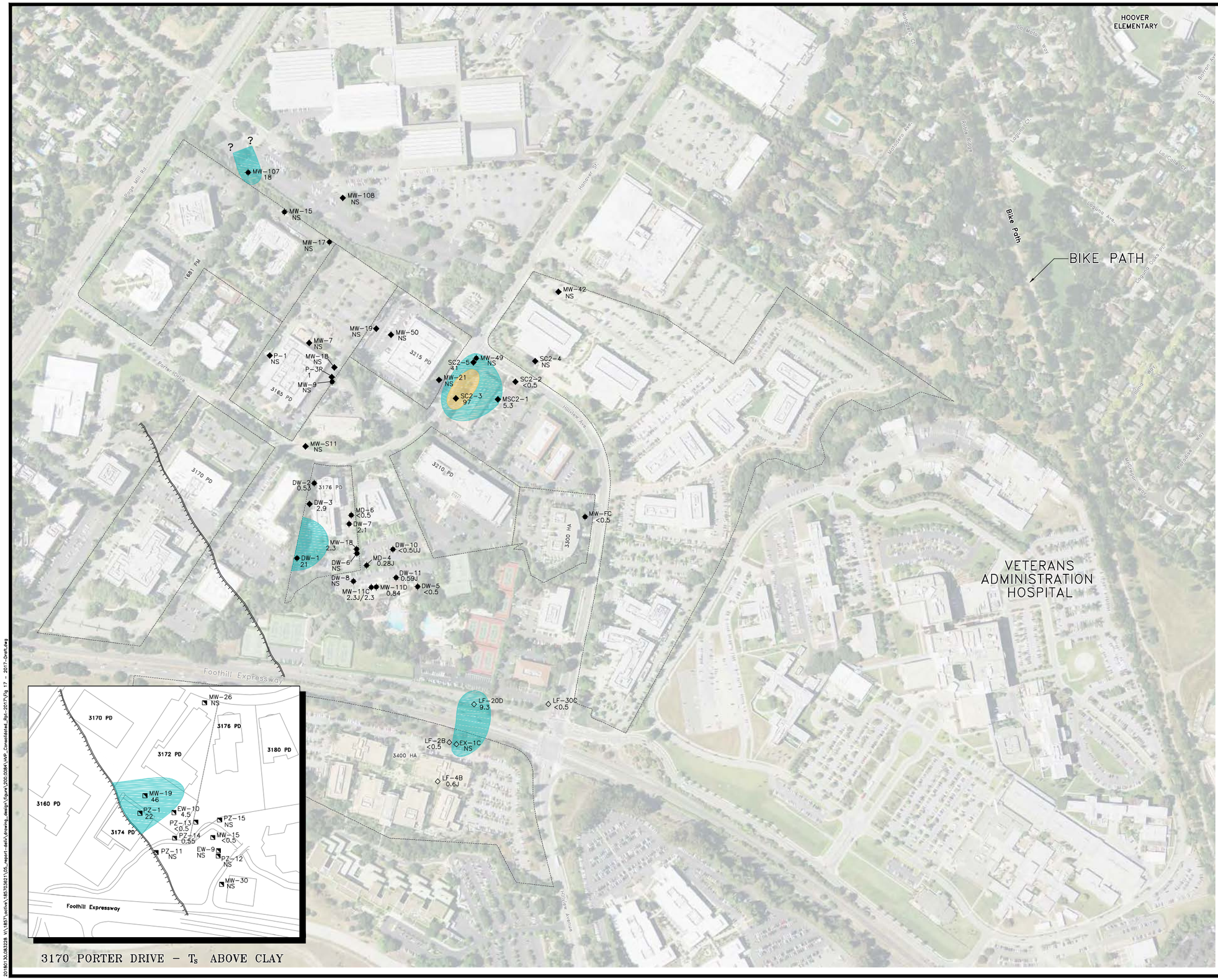
0 400 800
SCALE FEET

FIGURE 16
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

PCE ISOCONCENTRATION MAP DEEPER GROUNDWATER ZONES NOVEMBER 2017

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3170 PORTER DRIVE – T_s ABOVE CLAY

EXPLANATION:

- ◆ Wells screened in second Santa Clara Formation groundwater zone
- ◆ Wells screened in third or deeper groundwater zone within Santa Clara Formation
- ◪ Unnamed Sandstone well screened in first sandstone zone beneath Santa Clara Formation
- ◇ Wells screened in second or third groundwater zones in Santa Clara Formation. Based on lithologic and hydrogeologic data, these zones are in good hydraulic communication.
- Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation
- 97 Concentration in parts per billion (ppb)
- 2.3J/2.3 Duplicate pair (ppb)
- J Estimated value
- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 5–49 ppb

Note: NS – Indicates well not sampled

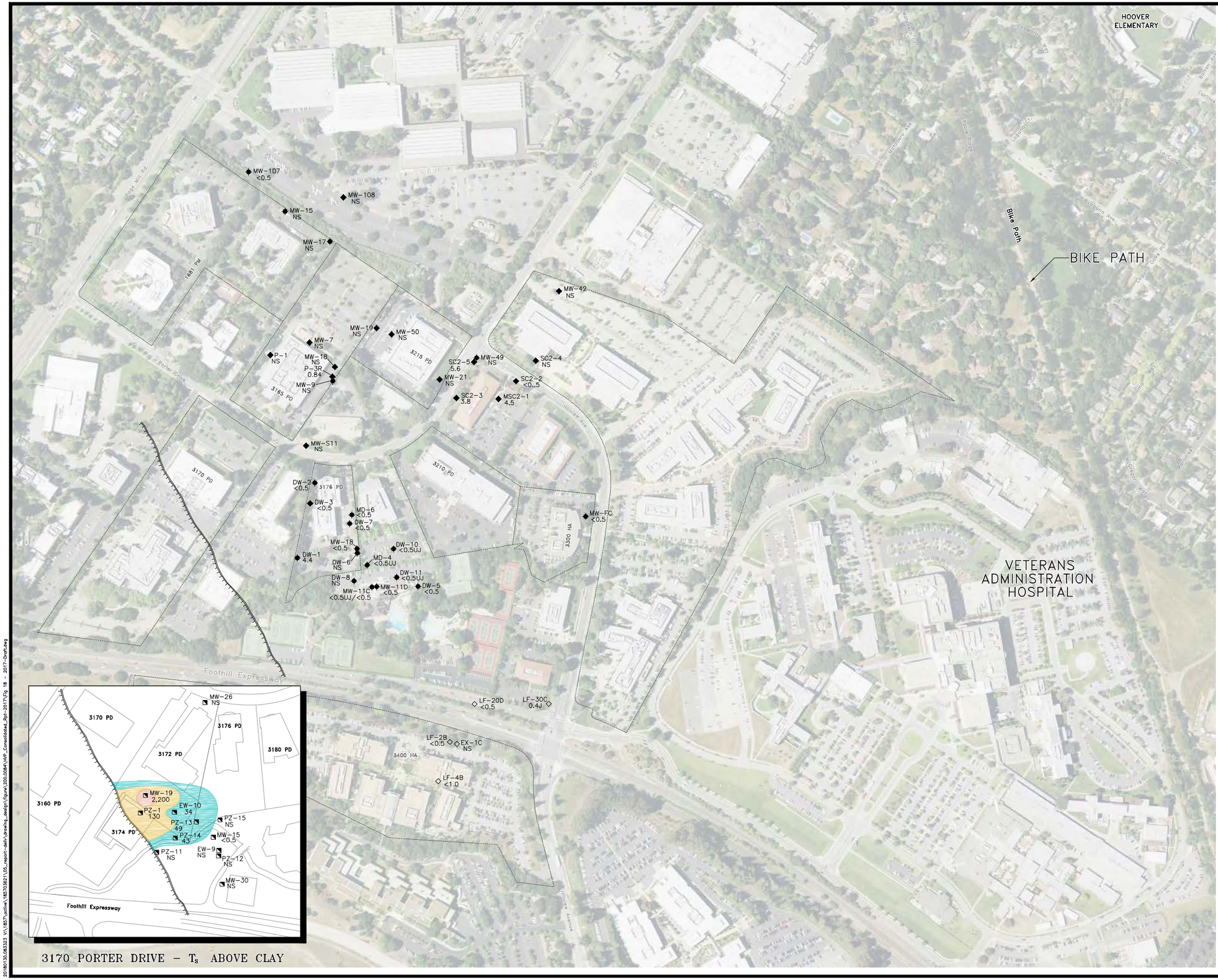
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SCALE FEET

FIGURE 17
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

TCE ISOCONCENTRATION MAP DEEPER GROUNDWATER ZONES NOVEMBER 2017

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EXPLANATION:

- ◆ Wells screened in second Santa Clara Formation groundwater zone
- ◆ Wells screened in third or deeper groundwater zone within Santa Clara Formation
- ◪ Unnamed Sandstone well screened in first sandstone zone beneath Santa Clara Formation
- ◇ Wells screened in second or third groundwater zones in Santa Clara Formation. Based on lithologic and hydrogeologic data, these zones are in good hydraulic communication.

Approximate location of buried contact between Unnamed Sandstone and Santa Clara Formation

5.6	Concentration in parts per billion (ppb)
<0.5UJ/<0.5	Duplicate pair (ppb)
J	Estimated value
UJ	The analyte was not detected; however, the quantitation limit is approximate and may be imprecise due to significant headspace (bubbles >6mm diameter) in the sample container.

- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 6–49 ppb

Note: NS – Indicates well not sampled

0 400 800
SCALE FEET

FIGURE 18
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

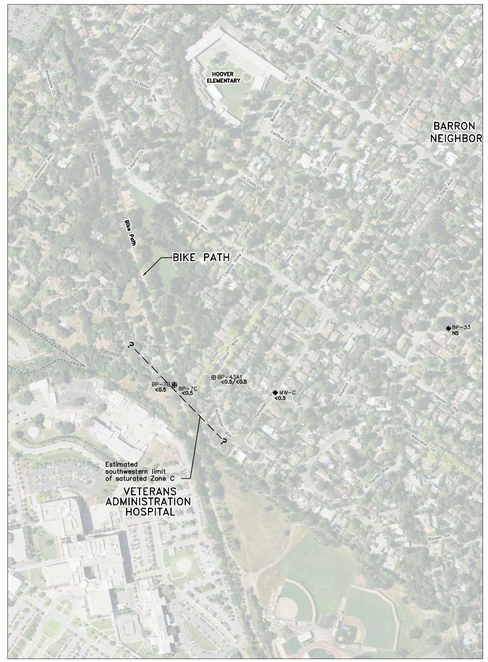
1,1-DCE ISOCONCENTRATION MAP DEEPER GROUNDWATER ZONES NOVEMBER 2017

Stantec

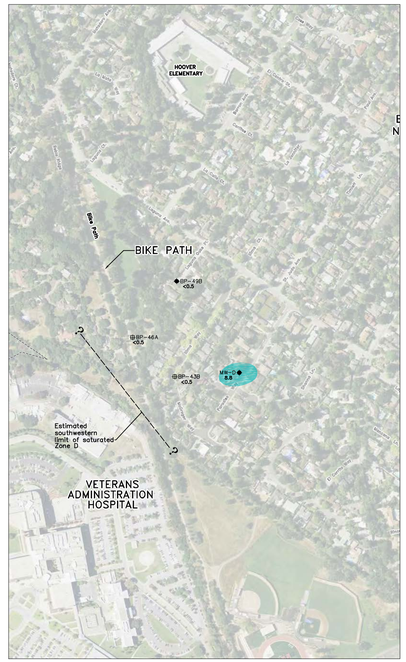
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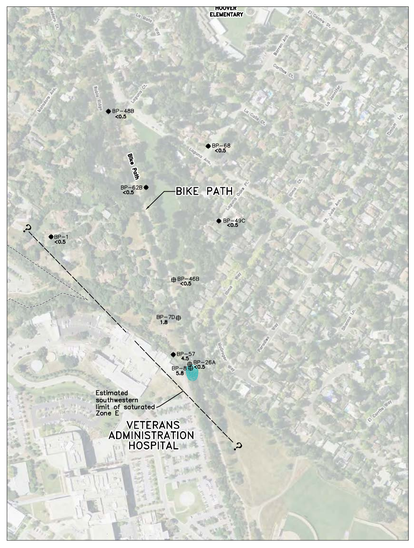
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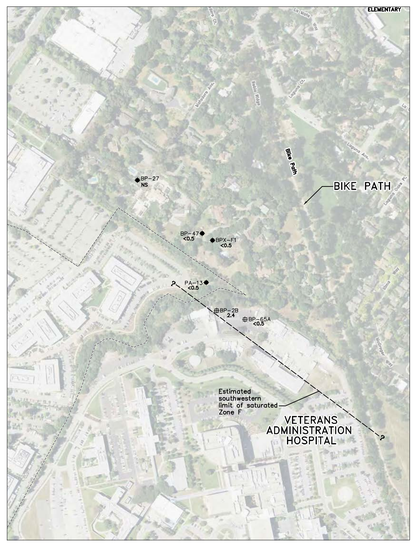
ZONE C



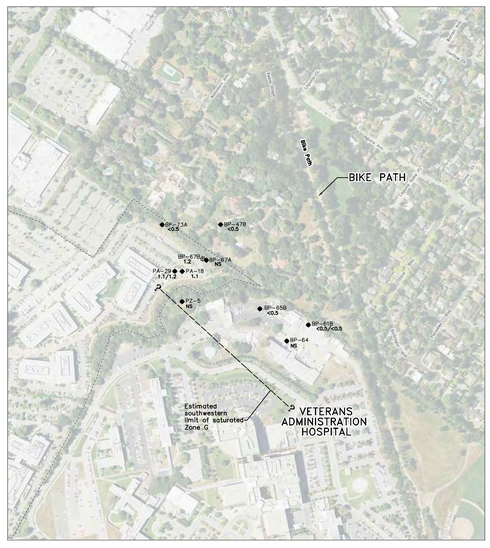
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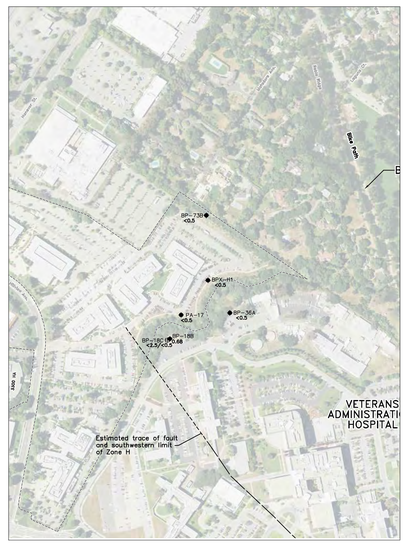
ZONE E



ZONE F



ZONE G



ZONE H

EXPLANATION

- BP-15 Regional Program monitoring well
- PZ-8 Regional Program piezometer
- PA-6 Adjacent site monitoring well
- BP-12 Regional Program vertical extraction well
- 3.9 Concentration in parts per billion (ppb)
- 2.3/2.2 Duplicate pair (ppb)
- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 5–49 ppb

Notes: NS – Indicates well not sampled

0 400 800
SCALE FEET

FIGURE 19
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

PCE ISOCONCENTRATION MAPS HILLVIEW - PORTER REGIONAL SITE ZONES B THROUGH H NOVEMBER 2017

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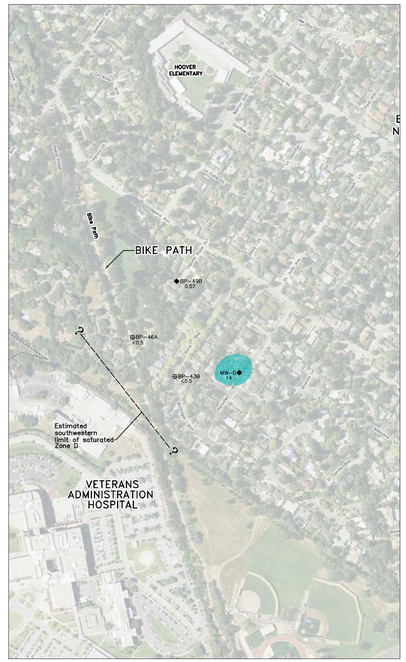
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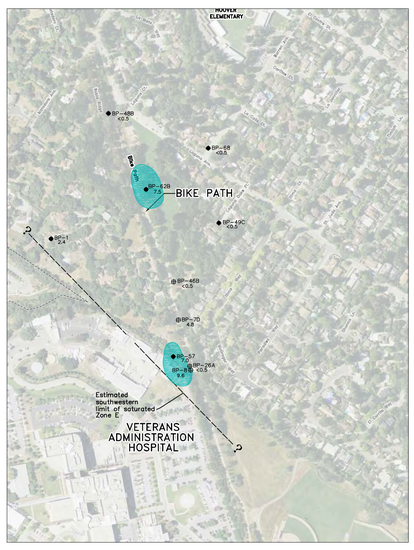
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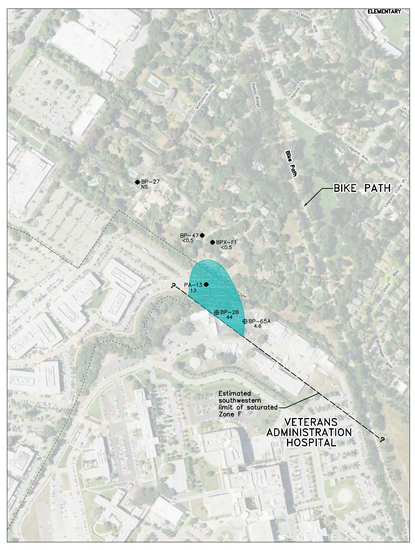
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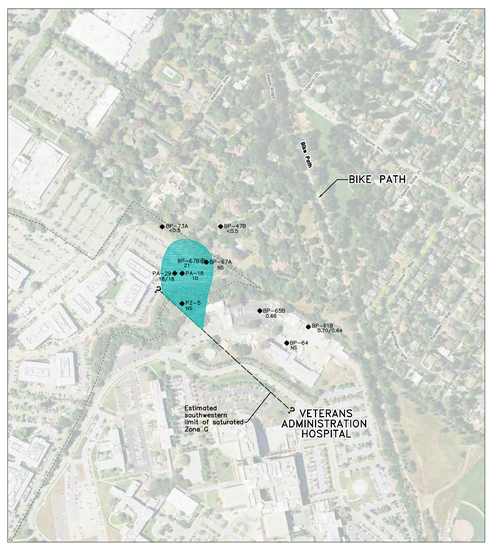
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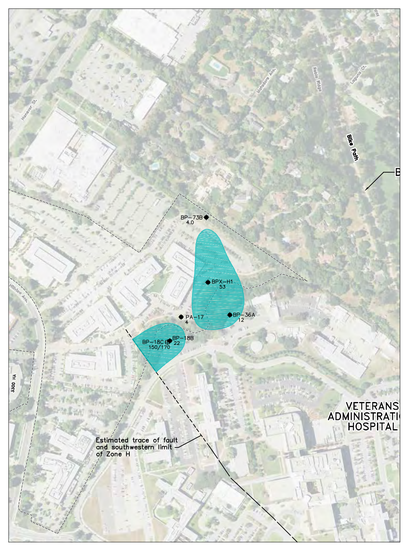
ZONE E



ZONE F



ZONE G



ZONE H

EXPLANATION

- BP-15 Regional Program monitoring well
- PZ-8 Regional Program piezometer
- PA-6 Adjacent site monitoring well
- BP-12 Regional Program vertical extraction well
- 14 Concentration in parts per billion (ppb)
- 5.6/8.9 Duplicate pair (ppb)
- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 5–49 ppb

Notes: NS – Indicates well not sampled

0 400 800
SCALE FEET

FIGURE 20
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

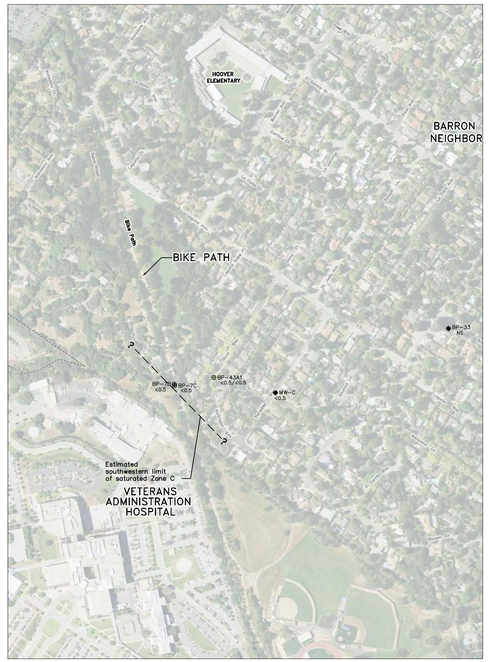
TCE ISOCONCENTRATION MAPS HILLVIEW - PORTER REGIONAL SITE ZONES B THROUGH H NOVEMBER 2017

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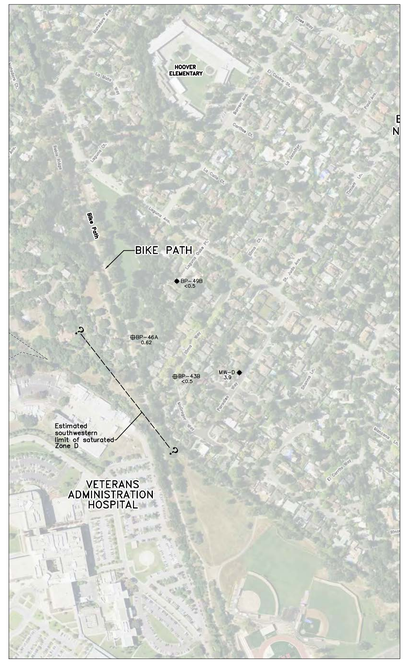
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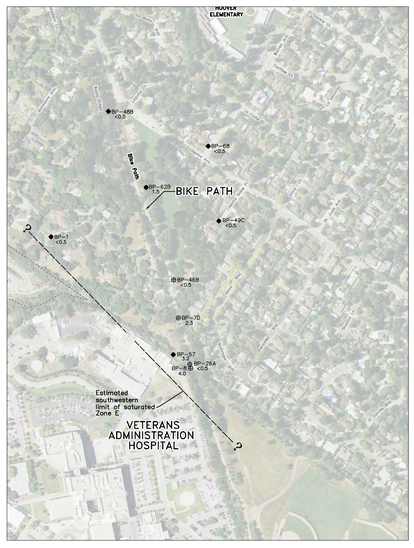
ZONE B



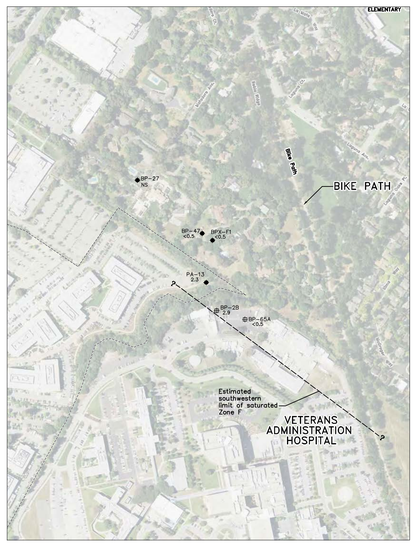
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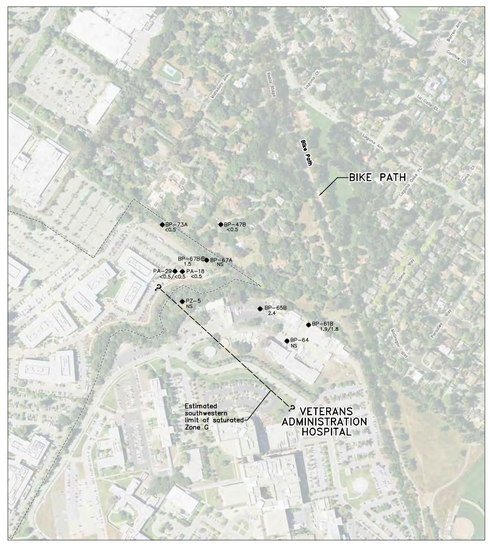
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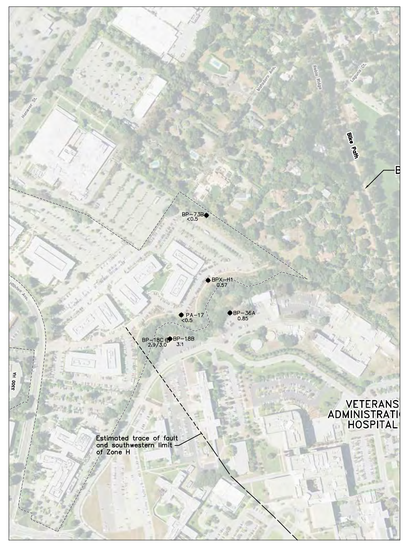
ZONE E



ZONE F



ZONE G



ZONE H

EXPLANATION

- BP-15 Regional Program monitoring well
- PZ-8 Regional Program piezometer
- PA-6 Adjacent site monitoring well
- BP-12 Regional Program vertical extraction well
- 0.62 Concentration in parts per billion (ppb)
- <0.5/<0.5 Duplicate pair (ppb)
- >5000 ppb
- 500–4999 ppb
- 50–499 ppb
- 6–49 ppb

Notes: NS – Indicates well not sampled

0 400 800
SCALE FEET

FIGURE 21
HILLVIEW – PORTER REGION
PALO ALTO, CALIFORNIA

1,1-DCE ISOCONCENTRATION MAPS HILLVIEW - PORTER REGIONAL SITE ZONES B THROUGH H NOVEMBER 2017

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