4.G Hazards and Hazardous Materials

4.G.1 Introduction

This section evaluates the hazardous materials and physical hazards impacts that would result from Project Site development, including construction and remediation activities, as well as operation of proposed onsite land uses. It identifies the ways that hazardous materials and other types of hazards would expose people and the environment to various health and safety risks. This section also describes existing contamination of soils and groundwater due to historic uses of the Project Site.

Historic and current land uses on the Project Site are summarized in this section based on environmental assessments and a review of regulatory databases. In addition, the section describes regulatory requirements providing for the management of soil or groundwater contamination within the Project Site. Assessments provided to the City as part of the Specific Plan application package for the DSP and DSP-V scenarios were independently reviewed by CDM Smith on behalf of the City and determined to be adequate for the purposes of CEQA analysis.

This section also describes routine hazardous materials that are likely to be used within the Project Site and the potential for upset and accident conditions in which hazardous materials could be released. The impact analysis identifies ways in which proposed Project Site development would routinely use, store, or transport hazardous materials, and evaluates the extent to which existing and future populations would be exposed to hazardous materials. Feasible mitigation measures are identified to reduce significant impacts.

Air emissions can also carry hazardous materials and create potential risks to human health and the environment. Sources of hazardous or toxic air emissions include, but are not limited to: industrial processes; vehicle use (diesel particulate emissions from exhaust); and proximity to existing or relocated sources of diesel or other toxic air emissions such as the US 101 freeway and the Caltrain rail line, as well as off-site industries and businesses. Impacts related to toxic air contaminants, including the release of diesel particulate matter from construction truck trips and/or delivery truck trips (when the haul routes are located within one-quarter mile of an existing or proposed school) are identified in Section 4.B, *Air Quality*. The Project Site's proximity to air traffic and the potential for air safety hazards is evaluated in this section, along with an analysis of potential fire hazards and emergency response/access issues associated with proposed Project Site development. Other safety hazards, such as earthquakes, are addressed in Section 4.E, *Geology, Soils, and Seismicity*. Flooding and sea level rise are addressed in Section 4.H, *Surface Water Hydrology and Water Quality*.

Some of the key terms used in the management of hazardous materials and the context within which they apply to sites where contaminants have been identified in soil or groundwater are presented below.

- A "hazardous material" is any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or an administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment (*California Health and Safety Code*, Section 25501).

- A "hazardous waste" is a waste substance that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (*California Health and Safety Code*, Section 25117).
- A "hazardous materials release site" refers to any area, location, or facility where a hazardous material has been released or threatens to be released to the environment.
- "Remedial action" or "remediation" refers to actions required by federal; state; or local laws, ordinances, or regulations necessary to prevent, minimize, or mitigate damage that may result from the release or threatened release of a hazardous material. These actions include site cleanup, monitoring, testing, and analysis of site conditions, site operation and maintenance, and placing conditions or restrictions on the land use of a site upon completion of remedial actions.
- "Constituent of concern" or "contaminant of concern" is a hazardous material that has the potential to cause damage to human health or the environment, and create a "risk" to human health and the environment.
- "Exposure pathway" is the course a chemical or pollutant takes from the source to the organism exposed. A "complete" exposure pathway consists of four elements: chemical sources, migration routes (i.e., transport in the environment), an exposure point for contact (i.e., soil, air, or, water); and exposure routes.
- "Exposure route" is the way a chemical or pollutant enters the organism after contact. Four exposure routes are recognized in risk evaluation methods: ingestion, inhalation, dermal (skin and eye), and injection.
- An "extremely hazardous substance," in the context of *Public Resources Code* Section 21151.4 pertaining to hazardous materials emissions near schools, refers to a material included on lists compiled pursuant to Section 25532 of the *California Health and Safety Code*, which incorporates regulated toxic and flammable substances under Section 112(r) of the federal *Clean Air Act* Table 3 of Section 112(r) lists those regulated substances pursuant to Section 25532(g)(2) of *California Health and Safety Code*.

There are three basic ways in which a person may come into contact with a hazardous substance: inhalation, ingestion, or direct contact. Some common exposure pathways by which people may be exposed to hazardous substances include the following:

- **Groundwater and Surface Water:** Exposure will occur if people drink contaminated groundwater or surface water, accidentally ingest it while swimming, or if it comes into contact with their skin (e.g., in the shower, while swimming or wading in contaminated water, etc.).
- **Soil, Sediment, Dust:** People will be exposed to hazardous substances in soil, sediment, or dust if they accidentally ingest it (e.g., the contaminants such as lead dust or other heavy

metals land on their food), if they breathe it in (especially dust), or if their skin comes into direct contact with the contaminated materials. Because of their play habits, children can be highly susceptible to exposure through these pathways.

- **Air:** When a hazardous substance takes the form of vapors or is absorbed by particulate matter (e.g., benzene, volatile organic compounds, dust, etc.), the simple act of breathing can expose people to contamination. In some cases, a person's skin can absorb a hazardous substance in vapor form, although inhalation is considered the greater threat.
- **Food:** Eating food that has been contaminated is another common exposure route. In some cases, food found on people's plates may be contaminated as a result of direct exposure to the hazardous substance. In other cases, food contamination may occur further down the food chain. For example, hazardous substances can collect in the fatty tissues of animals that ingest contaminated plants. The contamination can then be transferred to the animals' natural predators, and eventually, to people.

Activities within a site can result in spills or leaks of hazardous materials to the ground, causing soil and/or groundwater contamination. This occurs for various reasons, due to (1) activities occurring in violation of regulatory standards, (2) past activities that occurred prior to the establishment of regulatory standards or (3) past activities that occurred legally under previous, less stringent regulatory controls than currently exist.

Exposure to some chemical substances may harm internal organs or systems in the human body, ranging from temporary effects to permanent disability or death. Aquatic, terrestrial, or avian species may also be similarly adversely affected. While a "hazard" includes any situation that has the potential to cause damage to human health or the environment, the "risk" to human health and the environment is determined by the probability of exposure to hazardous materials (which are also referred to as "constituents of concern" or "contaminants of concern" in many investigations of past releases of hazardous materials) and the severity of harm that such exposure would pose.

The "risk" to human health and the environment is determined by (1) the probability of exposure to hazardous materials and (2) the severity of harm such exposure would pose. Thus, the likelihood and means of exposure, in addition to the inherent toxicity of a material, are used to determine the degree of risk to human health or the environment. For example, a high probability of exposure to a low toxicity chemical would not necessarily pose an unacceptable human health or environmental risk, whereas a low probability of exposure to a very high toxicity chemical might. Methodologies have been established by the United States Environmental Protection Agency (US EPA) that are also used at the state level to quantify risk and assist in determining how risks should be managed.

Federal and state laws require that hazardous materials be specially managed and that excavated soils having concentrations of contaminants that are higher than certain acceptable levels be specially managed, treated, transported, and/or disposed of as a hazardous waste. Title 22 of the California Code of Regulations §66261.20–24 contains technical descriptions of characteristics that would cause a soil, once excavated and discarded, to be designated a hazardous waste. California regulations are compliant with federal regulations and, in most cases, are more stringent. State and federal regulations also set standards for allowable concentrations of contaminants in order to protect the public health from harmful concentrations of hazardous materials. Applicable regulations are set forth and discussed in greater detail in Section 4.G.3 below.

4.G.2 Environmental Setting

Existing Contamination and Assessments within the Project Site

The Project Site contains two primary areas where past hazardous materials releases have occurred: the former Brisbane Landfill and the former railyard. For regulatory purposes, the former railyard was divided into a north area (Operable Unit 1 or OU-1 which is north of Geneva Avenue), and a south area (Operable Unit 2 or OU-2 south of Geneva Avenue), recognizing differences in the type of contamination present and the different regulatory agencies responsible for overseeing site remediation (Regional Water Quality Control Board and Department of Toxic Substances Control). The three sites (the landfill, OU-1 and OU-2) are described in separate subsections set forth below. **Figure 4.G-1** shows the location of these areas within the Project Site along with other sites discussed in the section.

The information provided for the landfill, OU-1 and OU-2 was obtained from the subsurface soil and groundwater investigation reports resulting from ongoing monitoring within the Project Site described above. While data from quarterly groundwater monitoring reports has been provided, it should be noted that groundwater concentrations commonly fluctuate over time.

The reports described below were independently reviewed by CDM Smith and ESA on behalf of the City and reviewed to assess their suitability for use in this EIR, and to describe existing conditions at the landfill, OU-1 and OU-2 (Geosyntec, 2010; Burns & McDonnell, 2002a; Burns & McDonnell, 2008; MACTEC, 2010a; LFR, 2008; BKF, 2011; and Fugro, 2011 and CDM, 2005). In addition, a database search was generated for the Project Site (EDR, 2011). The results of the database search are included in Appendix H-1.

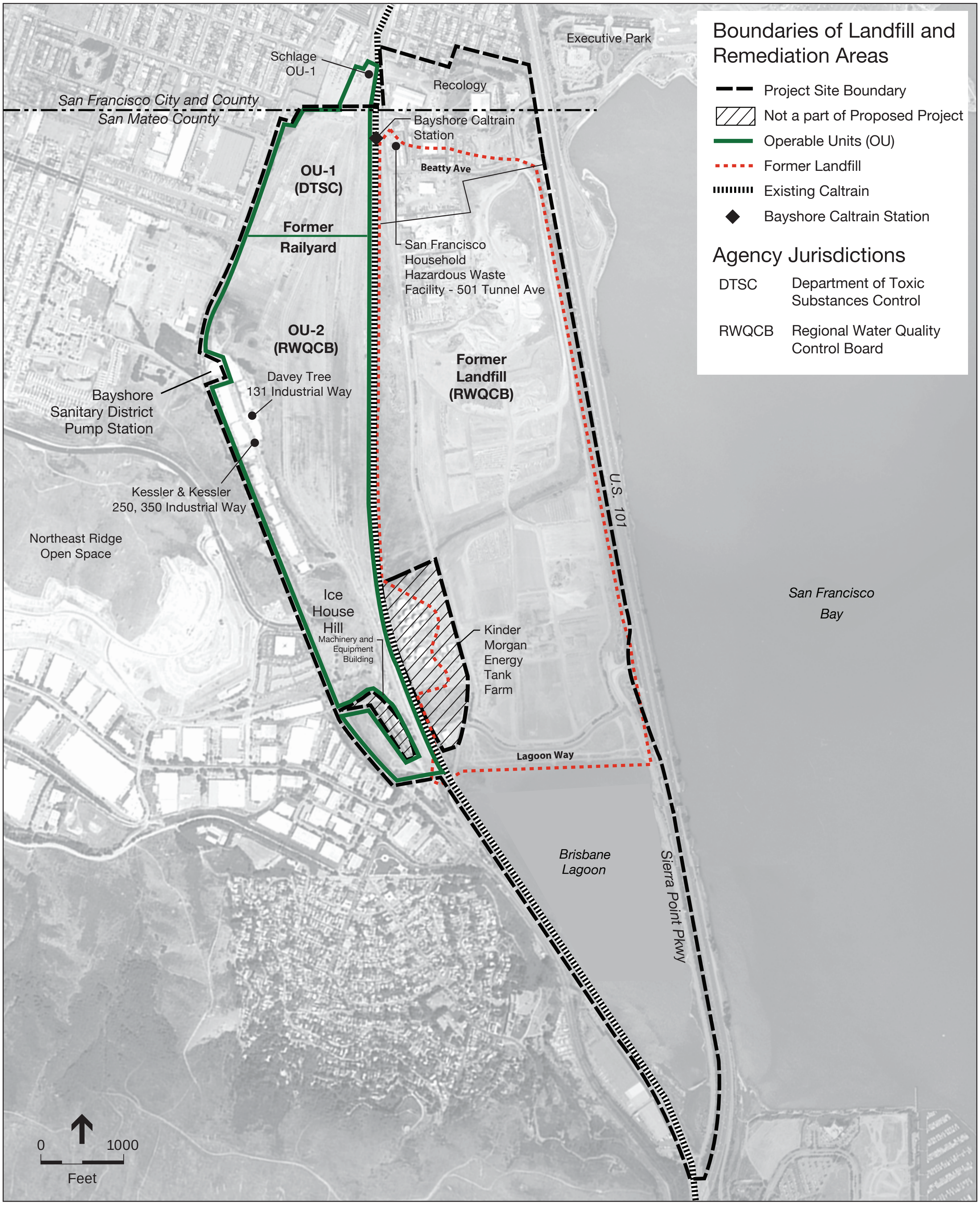
Over the years, a number of hazardous materials investigations have been undertaken on behalf of the landowner. These investigations have been summarized as follows (Geosyntec, 2012a).

Preliminary Geotechnical Investigation – 1977

In 1977, John V. Lowney & Associates completed a preliminary geotechnical investigation for the landfill to assess geotechnical issues associated with the development of the site for commercial and industrial use. The report concluded that development of the landfill site for commercial and industrial use was feasible. The primary concerns identified in the report for construction were the control of methane gas, which had been previously measured at explosive levels within the landfill, and the potential for differential settlement.

Environmental Assessment of Fill - 1982

In 1982, Harding Lawson Associates (HLA) conducted an environmental assessment of the former railyard, which consisted of drilling and collecting soil samples from 25 shallow boreholes and installing monitoring wells in 24 of the boreholes to assess the presence of contaminants. Groundwater samples were collected from these wells and one deep production well. Ten soil samples, 24 groundwater samples, and one oil sample from the vicinity of the oil tank were collected and submitted for chemical analysis. The results of soil sample analyses were not



SOURCE: BKF 2011

Brisbane Baylands . 206069

Figure 4.G-1
Former Landfill Site and Former Railyard Site (Remediation Areas)

described in recent reports. Groundwater from well HLA-1, located in the northern part of the railyard, was analyzed for heavy metals, VOCs, and SVOCs, and groundwater from HLA-4 was analyzed for SVOCs only. The remaining wells were tested for pH and total organic carbon (TOC). Results indicated that the groundwater collected from HLA-1 was impacted by VOCs, including TCE (10,000 μg/L), trans-1,2-DCE (2,770 μg/L), PCE (600 μg/L), vinyl chloride (460 μg/L) and 1,1-DCE (75 μg/L). Well HLA-1 also contained TOC (91 mg/L), total chromium (0.026 mg/L), bis(2-ethylhexyl)phthalate (30 μg/L) and mercury (0.0003 mg/L).

Soil and Groundwater Investigation – 1985

In 1984, Ecology and Environment, Inc. (E&E) conducted a two-phase environmental investigation at the former railyard. The first phase of the investigation included measuring water levels in 24 of the HLA wells and collecting groundwater samples from 18 of the wells. The second phase of the investigation, undertaken in 1985, included abandoning and sealing all the HLA wells (due to problems with their construction), drilling and collecting soil samples from 41 soil borings, and installing and collecting soil and groundwater samples from 14 new shallow groundwater basin wells and 13 new deep groundwater basin wells. A total of 136 soil samples and 46 groundwater samples were collected and analyzed. The results of soil samples were not discussed in the recent reports.

Groundwater levels were measured and the flow direction evaluated. Groundwater samples were analyzed for VOCs and metals. The highest VOC concentration was PCE (10,100 μg/L) at well MW-5A, screened in the A-Fill. Trans-1,2-DCE was reported at a concentration of 2,360 μg/L at well HLA-1. TCE was detected in wells MW-5A, MW-5B, and MW-6A at concentrations ranging from 2,080 μg/L to 9,550 μg/L. No SVOCs were detected in the wells sampled. Arsenic was detected at concentrations ranging from 0.043 mg/L to 1.9 mg/L (MW- 3A). Other metals detected in groundwater include total barium (up to 2.93 mg/L), total copper (up to 1.56 mg/L), total chromium (up to 1.81 mg/L) and total zinc (up to 4.88 mg/L).

Remedial Action Alternative Feasibility Study – 1986

In 1985 and 1986, the Mark Group performed a Remedial Action Alternative Feasibility Study for the former railyard, which included drilling and collecting soil samples from 21 soil borings, nine shallow groundwater basin wells, and five deep groundwater basin wells. Four of the shallow groundwater basin wells were installed next to existing deeper wells. Five shallow groundwater basin well pairs were installed in new locations. A total of 69 soil samples were collected from soil borings and well borings, and 41 groundwater samples were collected and analyzed. The Mark Group also surveyed measuring points and measured water levels in all of the wells, performed some small-scale aquifer tests to estimate hydraulic conductivities and aquifer interconnections, and made limited measurements of tidal fluxes. Groundwater samples were analyzed for metals and VOCs. Arsenic, barium, and chromium were detected in groundwater samples. Methylene chloride was detected at 500 μg/L in well MK-5A, TCE at 1.3 μg/L in MK-4B and xylenes at 2.3 μg/L (MK-2A) and 0.6 μg/L (MK-3B). The Mark Group also sampled existing wells for VOCs and metals. The highest concentration of VOCs was TCE detected at 1,000,000 μg/L in well MW-5A, located near the Schlage Lock site boundary. A second sample obtained from this well two months later indicated a TCE concentration of 140,000 μg/L. Other VOCs detected at much lower levels included benzene, 1,1,1-trichloroethane (1,1,1-TCA), 1,1,2-TCA, toluene, PCE, methylene chloride, cis-1,2-DCE, chloroform, ethylbenzene, xylene and 1,1,2,2-tetrachloroethane.

Detection Monitoring Program Investigation – 1987

The first comprehensive soil, groundwater, and surface-water quality evaluation at the Brisbane Landfill was performed by SPTC in 1987. Twenty-eight (28) samples[1] of materials underlying the refuse fill area and the railyard (just upgradient of the landfill) were collected and analyzed for VOCs, SVOCs, phenols and 14 priority pollutant metals (PPMS)[2]. The report stated that "... it appears that disposal operations have impacted soil chemical quality below the landfill area." (Geosyntec, 2012). However, "With the exception of three semi-volatile organic compounds: phenanthrene, pyrene, and chrysene, the levels of chemical constituents detected were found at low levels which should not be of environmental concern. These compounds were detected only at shallow depths in the Bay mud and are generally considered to have low mobility."

Additionally, 15 groundwater samples were collected from shallow groundwater zone and deep groundwater zone groundwater monitoring wells and analyzed for VOCs, SVOCs, phenols, oil and grease, 13 PPMs, nitrate, Total Kjeldahl Nitrogen (TKN), general mineral and physical parameters[3], oxidation and reduction potential, and total and fecal coliforms. Shallow groundwater samples, obtained from monitoring wells within the landfill area, indicated elevated levels of a variety of inorganic constituents and parameters... "Probable sources of these higher levels could be the waste materials disposed of at the site and bay waters, in which the wastes were placed" (Kleinfelder, 1987). A variety of VOCs and SVOCs were also detected at low levels in samples from on-site shallow groundwater zone wells. In general, a greater number of constituents were detected in the last areas to be filled than in earlier fill areas.

Additionally, seven surface-water samples, obtained during low and high tides on 18 December 1986, were analyzed for the same constituents as the groundwater samples. No PPMs or VOCs were detected in any of the samples analyzed. Detected concentrations of other chemicals in the surface-water samples were "... well below designated level to protect marine waters and should not be a concern."

Groundwater Monitoring Program –1989

In 1989, S.S. Papadopoulos & Associates Inc. developed and implemented a semiannual groundwater monitoring program for the former railyard. Under the monitoring plan, Papadopoulos sampled groundwater and measured water levels in the 40 wells at the site and collected and analyzed two samples of water from the onsite ditch. The groundwater samples

---

1 Including 27 samples of Young Bay Mud and one sample of silty sand underlying the Young Bay Mud.
2 PPMs included antimony, arsenic, beryllium, cadmium, chromium, copper, iron (soil samples only), lead, mercury, nickel, selenium, silver, thallium and zinc.
3 General mineral and physical parameters included color, odor, turbidity, bicarbonate/carbonate and hydroxide alkalinity, calcium, chloride, foaming agents (MBAS), iron, magnesium, manganese, pH, potassium, sodium, sulfate, specific/electrical conductance, total dissolved solids (TDS), total hardness and fluoride.

were analyzed for VOCs, BTEX, and metals. The analytical results confirmed the presence of VOCs and metals identified previously. Metals detected included arsenic, barium, chromium, copper, lead and zinc.

Groundwater Monitoring - 1989

HCI conducted groundwater sampling at the former railyard in June 1989. Water levels were measured and samples collected from 31 wells. HCI also removed 11,500 gallons of oil-contaminated water and sediments from the on-site drainage ditch for off-site treatment and recycling.

Remedial Investigation Data Study – 1989

In May 1989, HCI completed a Remedial Investigation Data Study (RIDS) report for the former railyard (referred to in their report as "SPTCO Bayshore Facility"). The purpose of the study was to review and interpret data generated in the previous investigations and to identify data gaps and additional work needed to allow better definitions of the nature and extent of contamination and potential risks associated with the site, and to design effective remedial actions. To meet these objectives, HCI developed a Supplemental Remedial Investigation (SRI) Work Plan concluding that:

- Low to moderate concentrations of metals were found in soils at many locations across the site. HCI suggested that these sporadic distribution patterns were probably related to the generally poor quality of fill material used to raise the land level in the region.
- Oil and/or fuel type organic materials were observed in the soils underlying the turntable and former oil tank location by all of the previous investigators.
- The presence of VOCs in soils appeared to be limited to low levels of chlorinated hydrocarbons in the northwest corner of the site, where they are closely related to the extent of VOC's in groundwater.

Phase 1 Geotechnical Investigation – 1990

In 1990, Kleinfelder conducted a geotechnical investigation to evaluate foundation requirements for future development of the landfill area. They also conducted an evaluation of the extent of refuse at the site and installed soil gas and gas pressure probes to provide additional information for design of a landfill gas extraction system.

Air Quality Solid Waste Assessment – 1990

The Air Quality Solid Waste Assessment Test (SWAT) field program at the Brisbane Landfill consisted of landfill gas (LFG) sampling, ambient air sampling, gas migration testing, and instantaneous surface monitoring performed in October-November 1989 and in May 1990.

Gas stream characterization revealed the presence of methane gas in all samples at concentrations ranging from 67.7 to 81.8 percent by volume. Additionally, benzene was detected in two samples at concentrations of 1,080 ppb and 881 ppb.

Instantaneous surface monitoring was conducted over a three-day period in October-November of 1989. Percent-level total organic compound concentrations (measured as methane) were detected south of Lagoon Road, along the northern Tunnel Road perimeter and in one area near the eastern perimeter of the landfill. In addition to these elevated perimeter readings, percent-level measurements were detected in part of the interior northwestern, central, and southeastern sectors of the landfill site. Supplemental testing conducted in May 1990 confirmed the existence of these interior gas “seep” areas. In all cases, the locations of high landfill gas emissions corresponded to areas where extreme landfill settlement had occurred or irregular landfill contours existed, thus likely indicating the need for soil addition and compaction. Once compacted soil was placed over the identified “seep” areas, additional instantaneous surface emissions surveying was conducted. The maximum single point instantaneous measurement obtained was 30 ppm, while the majority of readings were less than 5 ppm.

Ambient air sampling was conducted over three separate days. The analytical results indicated that air contaminants apparently were not emitted from the landfill into the ambient atmosphere at levels that would be likely to pose a potential threat to public health or safety or a threat to the environment.

Gas migration testing was performed at eight perimeter probe locations. Probe samples were monitored for total organic compounds (TOCs), measured as methane, using field instrumentation. Gas concentrations, detected in six probes, ranged from 1 to 24 ppm.

Supplemental Remedial Investigation – 1990

In 1990, L-F implemented the Work Plan for the former railyard prepared by HCI in 1989. The field work and laboratory analyses included a soil gas/ groundwater survey, soil characterization from shallow trenches and deeper borings, surface soil sampling, air sampling, piezometer and monitoring well installation, groundwater and surface-water sampling, hydraulic testing and tidal fluctuation monitoring. The majority of work was performed in the OU2 area south of the Brisbane portion of OU-1. Forty shallow borings were drilled to collect samples and make visual observations to identify the lateral and vertical extent of chemical-affected soils at the site. The analytical results and visual observations of the soil samples collected from the borings were also used to refine the locations for the eight new wells and 10 piezometers.

Additionally, eight groundwater monitoring wells were installed in the deep groundwater basin to better characterize quality and flow of the deeper water bearing unit. Data collected through these activities, along with soil and groundwater data previously collected, were summarized and evaluated to characterize the extent of chemicals at and in the vicinity of the former railyard.

Three general areas of concern at the site were identified:

- The North Area – High concentrations of chlorinated VOCs were detected primarily in shallow and deep groundwater basins in this area. A localized area of oil was also identified in the extreme northwest corner of the site. The principal VOCs detected include: TCE, PCE, vinyl chloride, 1,1-DCE, 1,2-DCE, 1,1,1-TCA, and 1,1,2-TCA.

- Turntable and Oil Tank Areas – Petroleum hydrocarbons, primarily heavy, viscous Bunker C oil, were observed throughout this area. Other lighter fraction oils were also identified in the Turntable Area. Bunker C oil extends off-site to properties along Industrial Way.
- South Disposal Area – Metals were detected at concentrations above regulatory standards in soils in this former solid waste disposal area. The principle metals of concern in this area are arsenic, copper, mercury and lead, although other metals have also been detected.

Water Quality Solid Waste Assessment – 1992

In 1992, Kleinfelder conducted a Water Quality Solid Waste Assessment Test (SWAT) investigation to evaluate whether the landfill had an adverse effect on water quality. The report concluded that organic compounds had been detected and had impacted the shallow water bearing groundwater zone above the Young Bay Mud[4]. The report also concluded that the Young Bay Mud was an effective barrier and coupled with the observed upward vertical groundwater gradient, should prevent the downward migration of contaminants. The report also concluded that the refuse layer of the landfill did not appear to be tidally influenced and that contamination at the site would not be classified as a hazardous waste under California regulations.

The SWAT report also stated that groundwater (within and immediately adjacent to the landfill) and surface water (crossing and adjacent to the landfill) contained naturally occurring minerals (e.g., chloride, total dissolved solids (TDS), iron and manganese) at concentrations in excess of non-health related drinking water standards, i.e., secondary maximum contaminant levels (MCLs). As such, these waters would not be considered a potential drinking water source as defined by the State Water Resources Control Board.

Interim Remedial Investigation – 1995

This investigation included historical research and assessment of the Project Site and the Schlage property, along historical research and assessment of the Bodinson, Norton Trust, and SPTC properties as well as an assessment of the Schlage and Project Site. Results confirmed the presence of CVOCs, total petroleum hydrocarbons (TPH), and metals in groundwater and soil.

Field Investigation, Project Site and Schlage Site – 1998

The primary purpose of this September 1998 investigation was additional characterization of VOC distribution in groundwater near the boundary between the Project Site and the Schlage property. The investigation included groundwater sampling at various depths, soil sampling, and a passive soil gas survey.

---

[4] The highest VOC concentrations and greatest number of VOCs exceeding primary MCLs [CRWQCB, 2011] were detected in samples collected from four monitoring wells adjacent to the Santa Fe Pacific Pipelines (SFPP) (currently Kinder Morgan Energy Partners, LLP) “Tank Farm” facility near the southwest comer of the landfill, suggesting the tank farm as a possible source area.

Landfill Footprint Delineation – 2000

Geosyntec performed two investigations to identify property owners and to delineate the footprint of the Brisbane Landfill in 2000. Additionally, Subsurface Consultants, Inc. completed a technical review of geologic information to delineate the northern extent of the landfill.

Landfill Cover Thickness Investigation – 2001

An existing soil cover thickness investigation performed in August 2000 consisted of drilling 40 borings to the top of waste within the landfill. Locations of these borings were to supplement borings drilled by Geosyntec in March 2000 as part of the waste extent delineation program. Based on the results of the 2000 B&M and Geosyntec investigations, a contour map of the soil cover thickness, reflecting the mid-2000 conditions, was prepared. According to the map, the thickness of the cover material generally ranged from 1 to 37 feet.[5] However, as stated in the report, "With the continued inert filling operations at the landfill, and on-going settlement of refuse and underlying Bay Mud, development of homogenous contour maps for the top of refuse and top of Bay Mud that are inclusive of both pre-2000 elevation data and the data collected in 2000 was not possible."

Interior Drainage Channel Investigation – 2002

The primary objective of this investigation was to evaluate the depth to landfill waste beneath the interior drainage channel for use in planning and channel liner system design. According to the report, waste is generally present under the IDC throughout the landfill at depths of 3 to 6 feet below the existing channel surface. Also, most of the soils above waste materials "... in the upper ranges of the channel are low plasticity clays or silts and may provide an acceptable foundation for a channel lining system." However, soils in the lower range of the interior drainage channel "are high plasticity clays and probably do not provide an acceptable foundation for a channel lining system." Young Bay Mud was found to be present under the interior drainage channel at depths ranging from 8 to 16 ft below the channel surface.

Final Closure and Post-closure Maintenance Plan – 2002

The final closure and post-closure maintenance plans (FCPMPs) for the Brisbane Landfill were prepared to address requirements of Sections 20950 through 21200 of Title 27 of the Code of California Regulations[6].

The final closure and post-closure maintenance plans propose to install a final cover system over the entire Brisbane Landfill consisting of the following layers (from bottom to top):

- a minimum 2-ft thick soil foundation layer (in-place soil);

5 Adjacent to Guadalupe Lagoon, the cover material ranged from 1 ft to 5 ft.
6 The Title 27 regulations provide minimum standards related to closure and postclosure maintenance of solid waste landfills.

- a low-hydraulic conductivity layer (flexible membrane liner (FML) or a minimum 1-ft thick compacted clay liner (CeL), with a maximum hydraulic conductivity of 1 x 10-6 cm/s); and
- an erosion-resistant layer "of sufficient thickness to allow for the installation of utilities at the proper depths without harming the low-hydraulic conductivity layer."

The final closure and post-closure maintenance plans state that prior to each increment of development on landfill, a detailed Development Plan will be prepared and submitted to the regulatory agencies for review and approval[7].

The Brisbane Landfill final closure and post-closure maintenance plans were conditionally approved by the Regional Water Quality Control Board. Additionally, the Local Enforcement Agency, San Mateo County Environmental Health Division, reviewed the final closure and post-closure maintenance plans, and provided their preliminary comments.

Remedial Investigation Report Joint Groundwater Operable Unit – 2002

The objective of the investigation was to evaluate the nature and extent of groundwater contamination beneath both the former Schlage Lock and the Brisbane portion of OU-1. The investigation (1) evaluated the hydrogeology and geology of the site as it relates to groundwater and contamination migration; (2) compiled available groundwater chemical data into a single document along with a representative summary of hydrogeological data and information; (3) characterized the nature and extent of contamination in the groundwater at the site; (4) evaluated transport routes of the chemical substances present in groundwater at the site; and (5) developed a foundation of data necessary for the preparation of a Risk Assessment (RA) and subsequent Remedial Action Plan for the groundwater at the site. The chemicals of concern at the site were identified as CVOCs. The report also presented an outline of the objectives of the groundwater remedy (i.e., pump and treat) that was operating at the time.

Wetland Mitigation Plan – 2004

B&M conducted pedestrian surveys at the Brisbane Baylands on May 27 – 30, 2003 to identify federal jurisdictional wetlands and other waters of the United States (U.S.) in anticipation of federal permit requirements for site remediation. B&M identified 27 wetland areas[8], one tidally influenced drainage area (the interior drainage channel), and one tidal water body (Brisbane Lagoon) within the Brisbane Baylands boundaries during wetland surveys. Remediation activities were identified as impacting approximately 1.7 acres (2,200 linear feet) of saltwater marsh wetlands and tidal waters along the interior drainage channel and 1.4 acres of freshwater marsh wetlands.

The 2004 wetland mitigation plan provided for creating two types of wetland habitats to offset impacts to jurisdictional wetlands. Both types were planned to utilize native vegetation to increase function and habitat value. One acre of saltwater marsh wetlands and three acres of

---

7 The CRWQCB [2001, 2003] requires submittal of detailed Construction (Development) Plans at least 60 days prior to construction commencement.

8 Includes four wetland areas that were originally determined to be non-jurisdictional.

freshwater marsh wetlands, including a shallow water shoreline zone, a deep water zone and an open water zone, were planned along the existing interior drainage channel.

Proposed maintenance activities focused on promoting wetland habitat establishment. Additionally, a success criterion monitoring program was developed to assure that the mitigation areas will restore or exceed the functions and values of existing waters of the U.S. The wetland mitigation plan was not implemented and federal permits have since lapsed.

Soil Conditions Summary – 2005

The main objective of this report prepared by Burns & McDonnell was to summarize existing OU-1 soil analytical data and to identify data gaps, if any, for scoping future investigations. It was reported that the highest concentrations of VOCs (PCE and TCE) were detected topographically down slope of the Schlage buildings and parking lot immediately adjacent to the Schlage/Project Site property line (samples TR-21 and TR-59). TCE concentrations at the site ranged from 0 to 16,000 mg/kg. PCE concentrations ranged from 0 to 8,000 mg/kg. TPH was detected in shallow soils in two of the 17 locations sampled, with the highest concentration of TPH detected in the area of the former sludge pits. Confirmatory samples taken from the walls of the sludge pit excavation did not show a detection of TPH above the method detection limit. Metals were detected in shallow soils in all of the 51 locations sampled across the entirety of OU-1. Arsenic, chromium and lead were detected at the highest concentrations, in some cases exceeding screening criteria, but not in any one specific area of OU-1. According to the report, the metals are widespread because the area was filled with rubble and debris in the early 1900s.

Soil and Groundwater Sampling – 2005/2006

Fifty-eight (58) borings were advanced within OU-1 during collection of soil and groundwater samples between December 2005 and September 2006. Soil samples were analyzed for metals and VOCs, while groundwater samples were analyzed for VOCs only. Results indicated that impacts of VOCs to groundwater were limited to the area near the northern boundary of the Brisbane portion of OU-1, related to the Schlage Lock site. Soil impacts due to arsenic, lead, cadmium, mercury and chromium were further delineated.

Landfill Gas Surface Emission Evaluation – 2006

Geosyntec performed an evaluation of landfill gas surface emissions at the Brisbane Landfill in June 2006. The work followed the requirements of federal (Subpart WWW[9]) and state (Rule 34 of Regulation 8 by the BAAQMD) regulations for surface emissions. The LFG surface emission survey indicated no detection of LFG along the perimeter or within the boundary of the landfill.

Soil Sampling Summary Report – 2006

Soil and shallow groundwater sampling was performed at OU-1 (including both San Francisco County and Brisbane portions) in December 2005 and January 2006 to supplement the existing

9 Section 60.755(c) and/or (d) (Subpart WWW) of Title 60 of the Code of Federal Regulations (CFR).

data from previous subsurface investigations of the OU-1 area, to reduce the spacing between soil and groundwater sampling locations, and to further characterize the soil and groundwater. Soil samples from 25 borings were analyzed for metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) and from 20 borings for VOCs. Groundwater samples obtained from six borings were analyzed for VOCs. The analytical results of 48 soil samples indicated the presence of metals, at concentrations exceeding screening levels or background across the site, in 15 out of 25 borings. VOC detections in soil samples were limited to four locations in a small area east and south of the Project Site/Schlage Lock property line. Eight VOCs (including acetone, 1,1- dichloroethane, cis-1,2-DCE, ethylbenzene, total xylenes, toluene, TCE and PCE) were detected in the six groundwater samples. At two locations, concentrations of TCE and PCE were above their respective maximum contaminant levels (MCLs).

OU1 Additional Investigation – 2006

An additional soil and groundwater investigation was performed at OU-1 both (San Francisco and Brisbane portions) in August 2006 to further assess the quality of soil and groundwater. Thirty-three borings were drilled to approximately 12 to 15 feet below the ground surface and soil and groundwater samples were obtained from each boring. Selected soil samples were analyzed for metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium and silver) and CVOCs, while groundwater samples were analyzed for CVOCs only. The laboratory results of 19 soil samples indicated that concentrations of a number of metals exceeded their respective background concentrations. Maximum concentrations of metals that exceeded their background concentrations were: 350 mg/kg (arsenic), 4,400 mg/kg (chromium), 8,000 mg/kg (lead) and 100 mg/kg (mercury). Eight out of 33 soil samples analyzed for VOCs indicated the presence of TCE (at the maximum concentration of 160 μg/kg), PCE (110 μg/kg) and toluene (11 μg/kg). Groundwater samples collected from the 33 borings indicated the presence of nine VOCs in the A-Fill groundwater, including acetone, cis-1,2-DCE (6.9 to 1,300 μg/L), ethylbenzene, PCE (19 to 750 μg/L), TCE (6.9 to 1,100 μg/L), toluene, trans-1,2-dichloroethene (ND to 18 μg/L), vinyl chloride (0.61 to 160 μg/L) and xylenes. Additionally, five VOCs (cis-1,2-DCE, PCE, TCE, trans-1,2-DCE and vinyl chloride) exceeded their respective MCLs. Generally, the investigation results indicated that impacts of CVOCs to groundwater were limited to the area near the northern boundary of OU-1, related to the Schlage Lock site.

Preliminary Geotechnical Investigation and Recommendations Report – 2008

Geosyntec developed preliminary geotechnical conclusions and recommendations for future development of the Brisbane Landfill based on the field investigations, laboratory testing and evaluations of available subsurface data. Findings and recommendations included:

- The subsurface stratigraphy at the site consists of (from the ground surface, down) 10 to 40 ft of non-engineered fill over approximately 20 to 35 ft of waste underlain by soft to stiff Young Bay Mud and Old Bay Mud, which consist of clays and silts with sand layers.
- The water levels are between elevations +5 ft and + 10 ft mean sea level (msl).
- In general, bedrock is within the elevations shown on the 1969 California division of Mines and Geology regional map or higher (i.e., closer to the surface) with localized variations.

- A relatively thick sand layer was encountered in the northern portion of the site.
- Settlement of the waste fill, the Young Bay Mud and a portion of the Old Bay Mud are expected. Differential settlements will affect structures and will induce downdrag loads in deep foundations. Placing fill over non-engineered fill and refuse will cause uneven settlement. Design and construction of structures and placement of fills over refuse should, therefore, consider the impacts of short- and long-term settlement.
- Engineered Fill materials shall be non-expansive, free of organics and debris, and compacted at 90 percent relative compaction in accordance with ASTM D1557, unless modified by the final design. Structural Fill and Retaining Wall Fill needs to be compacted at 95 percent relative compaction. The top 5 feet of fill should be compacted to 95 percent relative compaction (ASTM D 1557) and within 3 percent of the optimum moisture content.
- Shallow Foundation (i.e., slab-on-grade and shallow footings) may be an option provided that buildings are monitored for differential settlements and the foundations are repaired (e.g., slab jacking, grouting, etc.). Settlements may cause grade reversal and therefore affect the long-term performance of the utilities (e.g., sewers and water supply lines) at the site. Flexible joints shall be necessary.
- Deep Foundation – for structures that cannot tolerate differential settlements, deep foundations are recommended. To reduce down drag (i.e., negative skin friction) due to settling deposits, a bituminous coating over 70% of the length of the settling layer can be used. A 14-in. by 14-in. (360-mm by 360-mm) precast pre-stressed concrete pile was evaluated for preliminary pile capacities. Piles shall be designed in accordance with the applicable local/state ordinances and requirements. Compatibility of pile materials shall be evaluated with leachate and sea water.
- The slope stability analyses performed for the 2006-proposed grading plan slopes facing Guadalupe Lagoon show that addition of fill lowers the existing static factor of safety; therefore, consideration should be given to minimizing the addition of fill in the area, and slope stability analyses performed for the final development grading plan.

Leachate Management Plans - 2002-2008

As required by Regional Water Quality Control Board Waste Discharge Requirements, the landowner (UPC) submitted a Leachate Management Plan for the landfill in 2002. The Leachate Management Plan considered two methods of leachate collection and extraction: (1) a french drain along the landfill perimeter and/or slurry wall; and (2) a series of leachate extraction wells strategically located for suitable operation. In 2006, in response to a request by the Regional Water Quality Control Board, UPC submitted a revised Leachate Management Plan that proposed a seep mitigation program designed to improve water quality parameters for Brisbane Lagoon seeps and overall lagoon water beyond those required by the Regional Water Quality Control Board to protect ecological receptors. The Regional Water Quality Control Board approved the revised Leachate Management Plan in 2007. The revised Leachate Management provides interim management of landfill leachate under the current (i.e., pre-development) site use.

In 2008, a Draft Leachate Management Plan was prepared to establish a long-term approach for managing leachate at the Brisbane Landfill and to provide a basis for landfill development planning, including the preparation of the Environmental Impact Report (EIR). Pursuant to the

2008 Draft Leachate Management Plan, it is intended for the Draft Leachate Management Plan to remain in "draft" status until completion and certification of the EIR for Project Site development. At that time, applicable mitigation measures from the EIR for Project Site development will be incorporated into the Final Leachate Management Plan. The Final Leachate Management Plan will be submitted to the Regional Water Quality Control Board for approval and subsequently implemented by the landowner, UPC. Prior to certification of the EIR for Project Site development and approval of a land use plan for the Project Site, from which the Regional Water Quality Control Board can set risk-based clean-up goals and use to tier its environmental review and approval of the Final Leachate Management Plan by the Regional Water Quality Control Board, leachate at the landfill will be managed in accordance with existing Waste Discharge Requirements and the approved revised Leachate Management Plan, unless otherwise required by the Regional Water Quality Control Board.

The Draft Leachate Management Plan addresses the following interim and long-term leachate management objectives:

- minimize the amount of leachate generated;
- collect leachate from existing and future-identified leachate seeps;
- convey and dispose of collected leachate off-site in an environmentally-safe and cost-effective manner; and
- monitor to confirm that interim and long-term mitigation measures meet the requirements of the Regional Water Quality Control Board and Title 27.

The interim objectives are currently being achieved through: (1) grading of the existing intermediate cover to enhance surface drainage toward a storm-water runoff system (thus reducing surface infiltration); (2) installation of a temporary Leachate Seep Collection and Transmission System to collect leachate at the Lagoon seeps and convey it through a sanitary system for off-site treatment and disposal; (3) based on experience/performance of the above and internal drainage channel seep Screening Level Ecological Risk Assessment results, a decision will be made by the Regional Water Quality Control Board as to the most appropriate measure(s) to be implemented for the internal drainage channel seeps; and (4) monitoring performance of interim measures by measuring leachate fluid levels in leachate monitoring wells and inspecting landfill perimeter for seeps.

The primary method for long-term leachate management at the Brisbane Landfill is to reduce leachate generation through the construction of a low-permeability final cover. Construction of the final cover will reduce leachate generation by approximately 90 percent. The Draft Leachate Management Plan anticipates that following construction of the final cover, no additional leachate management actions will be required. The Draft Leachate Management Plan also identifies potential contingency leachate mitigation measures in case leachate management objectives are not met by construction of the final cover system.

Sampling and Analysis for Lead and Arsenic in Soil – 2009

In October 2009, Mactec further characterized the extent of arsenic and lead-impacted soil in the San Francisco County portion of OU-1 to fill a data gap identified in the 2009 Feasibility Study / Remedial Action Plan. In addition, a limited number of soil samples were analyzed for PCBs and pesticides. Based on analysis of samples from 46 soil borings, the extent of soil above risk-based cleanup levels for arsenic and lead was identified. Arsenic above risk-based cleanup levels was found to be more widespread than lead, but limited to near-surface soils and considered to be the result of spraying of lead arsenate herbicides. PCBs or pesticides were either not detected or detected below screening values in the soil samples analyzed. The remedial activities of the San Francisco portion of OU-1 are currently being implemented.

Landfill Groundwater, Surface-Water and Leachate Monitoring – 2002-Present

Semiannual groundwater, surface-water, and leachate monitoring has been performed at the Brisbane Landfill pursuant to Regional Water Quality Control Board Waste Discharge Requirements since 2002. The monitoring results confirm the SWAT investigation findings that the shallow groundwater zone at the landfill has been impacted by the waste. However, the Young Bay Mud that separates the shallow and deep groundwater zones, along with the upward hydraulic gradient, prevents contamination of the deep groundwater zones.

Results of the surface-water monitoring in the Brisbane Lagoon and internal drainage channel indicate low concentrations of the target chemicals. Additionally, Screening-Level Ecological Risk Assessments performed for seeps discharging to the Brisbane Lagoon and internal drainage indicate that they do not pose a significant threat to the environment.

Groundwater Monitoring – Ongoing

Groundwater monitoring has been carried out at the San Francisco and Brisbane portions of OU-1 since 1995, in accordance with the Operation and Maintenance (O&M) agreement between the DTSC and the landowner. From 1995 through the present, groundwater monitoring has been conducted at various times by Recon Environmental Corp., SCS Engineers, B&M, and Mactec. Groundwater samples from all of the wells have been analyzed for CVOCs. Also, groundwater from designated wells has been analyzed for TPH, total chromium, hexavalent chromium, benzene/toluene/ethylbenzene/xylenes (collectively, BTEX), and MTBE. Since the third quarter of 2008, Mactec has conducted quarterly groundwater monitoring events for the San Francisco portion of OU-1.

Settlement Evaluation Program – 2008-Present

As recommended by Geosyntec a settlement monitoring program was implemented at the landfill to evaluate short- and long-term settlement, and to calibrate the settlement model developed for the landfill. The model considers primary and secondary settlements of the cover soil, waste, Young Bay Mud and Old Bay Mud. The program, initiated in 2008, includes quarterly and semiannual monitoring of four deep settlement monitoring systems (i.e., two Sondexes at two landfill locations) and 30 shallow settlement monuments.

Risk-Based Cleanup Levels

In January 2009, Mactec [2009c] calculated risk-based clean-up levels for constituents of concern in soil within the Brisbane and San Francisco portions of OU-1. The constituents of concern included PAHs, quantified as benzo-a-pyrene (BaP), arsenic, cadmium, lead and mercury. The maximum concentrations for the constituents of concern in soil were compared by MACTEC to regulatory screening levels, which included the California Environmental Protection Agency (CalEPA) California Human Health Screening Levels. Although the maximum concentration of chromium in the San Mateo County OU-1 is below the regional screening level for total chromium, testing for hexavalent chromium had not been conducted at this location.

The January 2009 clean-up levels recommended by MACTEC for the constituents of concern in soil at OU1 are presented below.

- **PAH as BaP**
  - Residential: 0.4 mg/kg
  - Recreational: 0.4 mg/kg
  - Commercial: 0.4 mg/kg
- **Lead**
  - Residential: 254 mg/kg
  - Recreational: 599 mg/kg
  - Commercial: 800 mg/kg
- **Arsenic**
  - Residential: 19.1 mg/kg
  - Recreational: 19.1 mg/kg
  - Commercial: 19.1 mg/kg
- **Cadmium**
  - Residential: 2.7 mg/kg
  - Recreational: 2.7 mg/kg
  - Commercial: 2.7 mg/kg
- **Mercury**
  - Residential: 18 mg/kg
  - Recreational: 18 mg/kg
  - Commercial: 18 mg/kg

Preliminary Fill Soil Import Criteria – 2011

The placement of fill materials by the landowner is occurring at the landfill to accelerate consolidation of the waste and to provide bearing capacity for future development. Guidance was developed by Geosyntec to screen fill materials accepted as Brisbane Landfill cover soil.

Overview of Project Site Geology

As discussed in more detail in Section 4.E, *Geology, Soils, and Seismicity*, the stratigraphy[10] from top (youngest) to bottom (oldest) for the Project Site consists of Artificial Fill comprised of construction debris and landfill waste, alluvial sediments and bedrock. A summary of geologic materials found on the Project Site includes.

- **Artificial Fill**
  - ***Landfill.*** Non-engineered fill material includes soils, concrete, bricks, tires, steel, and wood. The soil types range from sandy clay to gravel with sand and range in thickness from 6 to 40 feet. The majority of fill was composed of silty clayey sand and concrete matrix. A clean soil layer approximately ten feet thick overlies the waste.
  - ***Underlying the landfill and former railyard.*** Non-engineered fill ranges in thickness from 0 to 15 feet, and consists of a heterogeneous mixture of clay, silt, coarse sand, and gravel with fragments of brick, stone, and wood from the 1906 San Francisco earthquake rubble. The A-Fill was placed directly on the marine sediments that comprise the Bay Margin deposits.
- **Waste**. Wood, paper, plastic, glass, wires, metals, and gravelly soils. Thickness ranges from 20 to 35 feet.
- **Young Bay Mud**. Elastic silt or fat clay. Thickness ranges from 10 to 50 feet.
- **Old Bay Mud**. Classified as low-to-high plasticity clays and clayey sands. In the northwest portion of the site a sand layer ranging from 88 to 93 feet (27 to 28 meters) in thickness underlies the base of the Young Bay Mud.
- **A-Sand**. A-Sand is a yellow-to-brown, fine-to-medium-grained quartz sand with some minor lenses of silt and clay. The sand is medium dense to very dense at depth. The thickness of the A-Sand beneath the site within the former railyard ranges from approximately 14 to 33 ft thick.
- **A-Aquitard**[11]. The A-Sand overlies and is separated from B-Sand by a southward dipping clay unit referred to as the A-Aquitard. The A-Aquitard is a yellow to brown, stiff, low-plasticity clay to sandy clay with occasional lenses of cleaner sand. This unit dips southward and the depth to the top of this unit is approximately 20 ft below the ground surface within the former railyard.
- **B-Sand**. The B-Sand unit occurs below the A-Aquitard and is similar to the A-Sand in lithology. The top of the B-Sand has been encountered at depths ranging from 55 to 60 feet below the ground surface within the former railyard.
- **Franciscan Assemblage**. Sandstones, shale, siltstones, chert, greenstone, and schist. Partially recrystallized and intruded by serpentine. Slope stability characteristics highly variable. Subject to sliding where highly sheared.

---

[10] Stratigraphy is the vertical arrangement or sequencing of underlying materials that can be interpreted to describe the geologic history or for geotechnical purposes to design building foundations.

[11] An aquitard is a geologic formation retarding the flow of water, a geologic formation that may contain groundwater, but is incapable of transferring that water to the surface

Overview of Project Site Hydrogeology

The Project Site is located within the 880-acre Visitacion Valley Groundwater Basin, which is part of the San Francisco Bay Hydrologic Region (DWR 118, 2003). The regional groundwater in the area of the Project Site is characterized by shallow and deep water bearing units (often referred to as Zones A and B), which are separated by a tight grained layer of Younger Bay Mud (see also generalized cross sectional view in Figure 4.E-3) (Geosyntec, 2010). Zone A is comprised of shallow water-bearing sediments encountered from the ground surface to depths of approximately 20 feet below ground surface (bgs). The Zone A water-bearing sediments are typically encountered above the Younger Bay Mud soil layer. The relatively coarse-grained water-bearing Zone B sediments are encountered beneath the Younger Bay Mud.

The influence of tidal cycles on water levels in shallow and deep groundwater monitoring wells was studied by Kleinfelder in 1987 and 1991. The purpose of these tidal studies was to evaluate the hydraulic communication between groundwater and San Francisco Bay and the potential contribution of leachate recharge from the Bay. The study concluded that the shallow groundwater basin was not in hydraulic communication with San Francisco Bay and that the deep groundwater basin, at least in the vicinity of the tested well, appeared to have some discharge to San Francisco Bay (B&M, 2002b). Therefore, it appears that tidal influence is not likely a significant contributor to recharge of leachate in the landfill (Geosyntec, 2012).

Overview of Historic Hazardous Materials and Contamination within the Project Site

The Project Site contains contaminants in the soil and groundwater that would require remediation prior to future development. Both the State of California and San Mateo County provide regulatory oversight for these measures. These agencies are currently monitoring the site and will oversee remediation techniques and results in accordance with the Remedial Action Plans (RAPs) that would need be prepared, approved and implemented prior to any development on the Project Site.

The historical land uses at the Brisbane Landfill, former Southern Pacific railyard, Kinder Morgan Energy Tank Farm, and the Recology site have resulted in releases of various chemicals to soil and groundwater within and adjacent to the Project Site. As such, soil and groundwater contamination on the site has been the subject of numerous investigation and cleanup efforts. Assessments to evaluate soil and groundwater have been performed within the Project Site, since 1987, as discussed above, including assessments as required by the Site Cleanup Requirement (SCR) Order No. 92-141 issued by the California Regional Water Quality Control Board (RWQCB) on November 18, 1992. Most of the groundwater cleanup and remedial activities have focused on various volatile organic carbons (VOCs), metals (primarily arsenic [As] and lead [Pb]), and bunker C oil.

The western portion of the Project Site was contaminated during its use by the Southern Pacific Railroad as a railyard between 1914 and 1960. For purposes of remediation and regulatory oversight, this area has been divided into two “operable units” based on the type and nature of contamination. The California Department of Toxic Substances Control (DTSC) oversees Operable Unit 1 (OU-1) in the northwestern portion of the Project Site. OU-1 contains volatile organic compounds (VOCs). A groundwater treatment system has been in place in this area since 1995 to improve groundwater conditions. Groundwater continues to be monitored through quarterly reports to DTSC.

Operable Unit 2 (OU-2) is located to the south of OU-1, and contains Bunker C fuel oil and heavy metals (primarily lead). The remediation strategies for this portion of the Project Site are supported by monitoring of groundwater and surface water quality, which is reported to the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). Both Bunker C oil and lead have low solubility and mobility.

The eastern half of the Project Site north of the lagoon was contaminated from 1932 to 1967, when this area was operated as the Brisbane Landfill. Following cessation of landfill operations, the landfill was buried with a soil cover approximately 20–30 feet deep to prevent future human contact with contamination. Some methane gas is still being generated by decomposing solid waste within the landfill. Currently, methane gas emissions are collected through wells and piping, and burned periodically in a flare. The San Mateo County Health Services Agency oversees the landfill site, along with the San Francisco Bay Regional Water Quality Control Board (RWQCB). Groundwater/leachate and stormwater quality is being regularly monitored by consultants for the landowner as described above at well and outfall locations and reported to the Regional Water Quality Control Board.

Types of Hazardous Materials Found within the Project Site

The potential for exposure to hazardous materials within the Project Site includes:

- Underlying contamination of the soil, air and groundwater from historic railyard and landfill uses;
- Existing offsite hazardous sites; and
- The acquisition, use, storage, disposal, and potential accidental release of hazardous materials associated with development that may occur as the result of new Project Site development.

A brief description of the primary types of contaminants found within the Project Site is provided below.

Leachate

Leachate is defined as liquid that has come into contact with solid waste, carrying dissolved or suspended materials. Leachate can be either liquid that is generated as part of the decomposition of the waste or liquid that has percolated into the waste from external sources (e.g., surface drainage, rainfall, or groundwater). The quantity of leachate generated at a landfill is a direct function of the amount of water entering the landfill from external sources.

Landfill Gas (LFG)

Decomposition of organic waste under anaerobic conditions (without the presence of oxygen) results in landfill gas (LFG) generation.

Volatile Organic Compounds (VOCs)

Volatile organic compounds (VOCs) are organic chemicals that have a high vapor pressure under ordinary, room temperature conditions. VOCs are numerous, varied, and ubiquitous. They include both human-made and naturally occurring chemical compounds. Some VOCs are dangerous to human health or cause harm to the environment. Harmful VOCs are typically not acutely toxic, but instead have compounding long-term health effects. Concentrations of VOCs are usually low and symptoms are slow to develop.

Metals

As the result of past industrial operations, various metals can be found in onsite soils, including primarily arsenic (As), lead (Pb), and chromium (Cr). The main use of metallic arsenic is for strengthening alloys of copper and especially lead (as in car batteries). Arsenic is common in semiconductor electronic devices. Arsenic and its compounds are also used in the production of pesticides, treated wood products, herbicides, and insecticides, although these applications are declining. Arsenic is highly poisonous.

Lead is a soft and malleable metal, used in building construction, lead-acid batteries, bullets and shot, weights, as part of solders, pewters, fusible alloys, and as a radiation shield. Lead is a poisonous substance that damages the nervous system and causes brain and nervous system disorders. Excessive lead also causes blood disorders in mammals. Lead is a neurotoxin that accumulates both in soft tissues and the bones.

Chromium is a steely-gray, lustrous, hard and brittle metal, which is odorless and tasteless. Metallic chromium is used in the steelmaking process to form stainless steel, adding high resistance to corrosion and discoloration, along with chrome plating. Because chromium compounds were also used in dyes and paints and the tanning of leather, these compounds are often found in soil and groundwater at abandoned industrial sites. Primer paint containing hexavalent chromium is still widely used for aerospace and automobile refinishing applications.

Bunker C Fuel

Bunker fuel is technically any type of fuel oil used aboard ships or trains, getting its name from the containers on ships and in ports that it is stored in. Bunker C fuel oil is a high-viscosity residual oil that requires pre-heating before the oil can be pumped from a bunker tank. “Residual” refers to the material remaining after the more valuable cuts of crude oil have boiled off. The residue used for Bunker C fuel may contain various undesirable impurities including 2 percent water and one-half percent mineral soil.

Polychlorinated Biphenyls (PCBs)

PCBs are petroleum-based oils that were formerly used primarily as insulators in many types of electrical equipment, including transformers and capacitors. After PCBs were determined to be carcinogenic in the mid to late 1970s, the U.S. EPA banned PCB use in most new equipment and began a program to phase out certain existing PCB-containing equipment. Fluorescent lighting ballasts manufactured after January 1, 1978, for example, do not contain PCBs and are required to have a label clearly stating that PCBs are not present in the unit.

Brisbane Landfill

The Project Site contains the former Brisbane Landfill, which encompasses an area of approximately 364 acres bounded by the railroad corridor to the west, US Highway 101 to the east, and Brisbane Lagoon to the south. An earthen dike separates the landfill from Brisbane Lagoon. Disposal operations were initiated at the Brisbane Landfill in 1932 and continued until 1967. Waste was placed directly on tidal flats and waters at the margin of San Francisco Bay. The edge of the refuse pile was open to direct wave action from San Francisco Bay until construction of US Highway 101 in about 1959 (BKF, 2011).

The Brisbane Landfill operated and closed before either modern waste disposal practices were developed or formal regulatory designs for closure were required. As a result, waste disposal design features such as liners, segregation of waste into disposal cells, and leachate collection systems were not components at the site. Waste containment was consistent with practices in the industry at that time where waste fill was placed directly on native soils (Geosyntec, 2012).

The total volume of waste disposed at the landfill has been estimated to be 12.5 million cubic yards (Burns and McDonnell, 2002b). Of this volume, an estimated 73 percent was produced by residential and commercial activities, with inert fill accounting for approximately 25 percent, and the remaining 2 percent assumed to be liquid waste (Geosyntec, 2012). Waste tires were also placed in the landfill as reported by KRON-TV in 1965; an aerial photograph of the Brisbane Landfill taken in 1963 shows four localized black areas, likely representing tire stockpiles (Geosyntec). The depth of the waste layer is estimated to range from 20 to 35 feet.

Following closure of the landfill, the area was subsequently buried with a 20- to 30-foot cover of soil to prevent future direct human contact with refuse. As part of Title 27 landfill closure requirements and RWQCB Waste Discharge Order 01-041, the landfill is routinely monitored for offsite migration of contaminants in groundwater, leachate seeps, and soil gas. The landfill closure process is overseen Environmental Health Division of the by San Mateo County Health System and the RWQCB.

It is reported that the site was used for the disposal of primarily non-hazardous solid wastes including domestic, industrial, and shipyard waste; construction rubble, and sewage (RWQCB, 2001). An independent review by Golder Associates of publicly available site assessment reports, as well as groundwater and landfill gas monitoring data concluded that there was no evidence of hazardous material disposal at the landfill other than typical household hazardous waste (Golder, 2008). The monitoring, analysis and testing performed to date indicate that the hazardous waste constituents in the groundwater, leachate and leachate seeps, are consistent with other landfills in the Bay Area. The landfill gas constituents are actually much lower than typical landfills, further indicating that hazardous materials were not disposed at the former landfill (Golder, 2008).

Waste tires were also placed in the landfill as reported by KRON-TV in 1965; an aerial photograph of the Brisbane Landfill taken in 1963 shows four localized black areas, likely representing tire stockpiles (Geosyntec, 2012). Borings logs conducted in the area identified confirm rubber debris in the area. The landfill closed before more stringent landfill regulations were in place that would have provided more detailed information on the waste stream profile.

Current uses on the former Brisbane Landfill include soil and aggregate material recycling operations and non-irrigated open space. Two recycling companies currently operate on the former landfill: Brisbane Recycling Company and Brisbane Soil Processing, LLC. Brisbane Recycling Company maintains a concrete recycling operation in the northern portion of the former landfill area. In the southern portion of the area, Brisbane Soil Processing maintains a soil recycling operation. Materials from the recycling operations are kept in stockpiles that have contributed to consolidation of underlying refuse and Bay mud (see Section 4.E, *Geology, Soils, and Seismicity*). Because each of the project Site development scenarios proposed future development of the landfill, these uses would be replaced regardless of which scenario were to be selected.

Soil/Groundwater Contamination from Brisbane Landfill

Site monitoring wells at the periphery of the former Brisbane Landfill outside of the waste layer have been classified as shallow or deep based on their depth in relationship to the shallow and deep groundwater zones present in the area (Geosyntec, 2010).[12] Water quality of shallow wells is generally screened at depths of less than 25 feet and deep wells are screened between depths of 40 to 100 feet (see **Figures 4.G-2a, 2b, 3, 4,** and **5**). Fine-grained marine deposits with scattered coarser sand lenses underlie the site; there are no well-defined aquifers[13] underlying the site. As such, water levels measured in the shallow monitoring wells are generally similar to what is observed in the fill materials and Younger Bay Mud. Water levels measured in the deep monitoring wells respond to different conditions found in deeper portions of the Younger Bay Mud, the older Bay Mud, and deeper sand lenses.

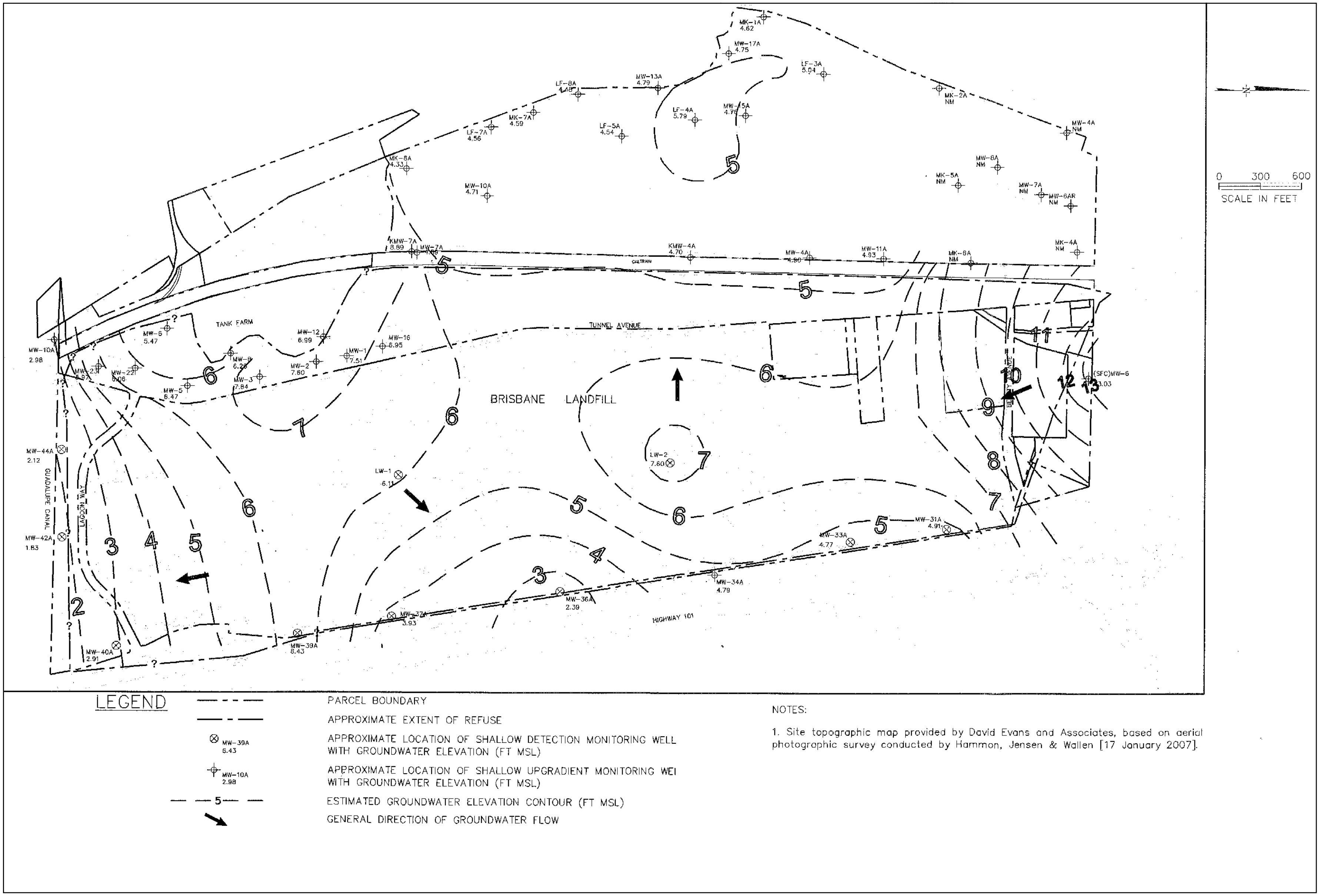
Monitoring of groundwater levels by Geosyntec for the landowner has been ongoing for several years. **Table 4.G-1** summarizes depths to groundwater and groundwater elevations for the May and August 2010 monitoring events, indicating year 2010 baseline groundwater elevations.[14] The depths to groundwater are measured from ground surface whereas the elevations are measured relative to mean sea level.

TABLE 4.G-1
SUMMARY OF BRISBANE LANDFILL GROUNDWATER DEPTHS AND ELEVATIONS

	Depths to Groundwater (feet below ground surface)		Groundwater Elevations (feet, mean sea level, USGS datum)	
	May 2010	August 2010	May 2010	August 2010
Shallow	4.70 to 11.35	4.70 to 11.40	1.84 to 21.30	1.51 to 15.91
Deep	0.44 to >15.98	0.00 to 7.30	5.53 to >15.98	5.55 to 15.98

SOURCE: Geosyntec, 2010

12 The wells are not located in the waste material but are placed around the periphery to monitor conditions around the former landfill.
13 An aquifer is a wet underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt, or clay) from which groundwater can be usefully extracted using a water well.
14 Note that groundwater levels in the deep wells appear to be relatively shallow based on the measured depths within the monitoring wells due to upward pressure of the deeper screened wells which are representative of an upward vertical hydraulic gradient.

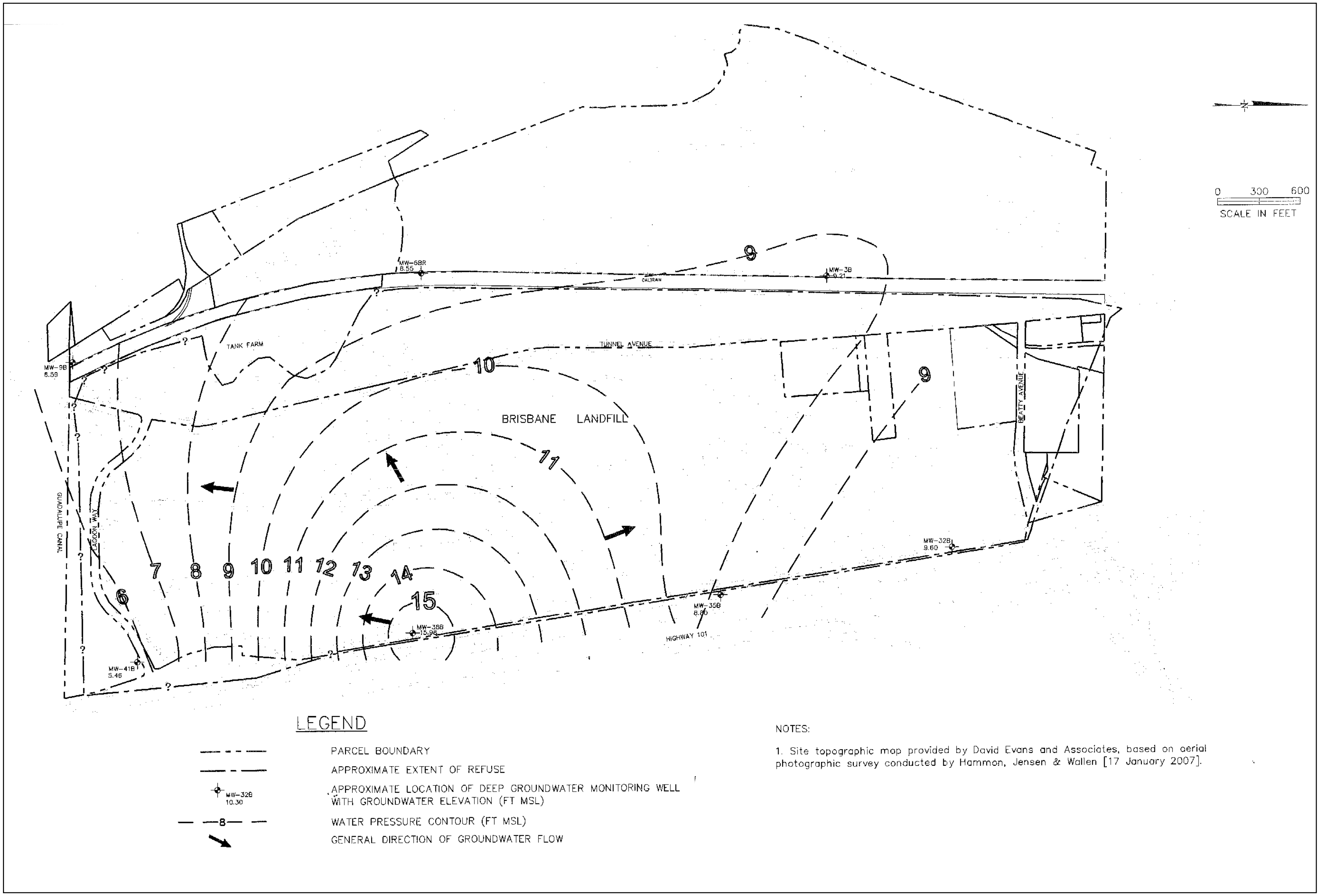


SOURCE: Geosyntec, 2012c

Brisbane Baylands . 206069

Figure 4.G-2a

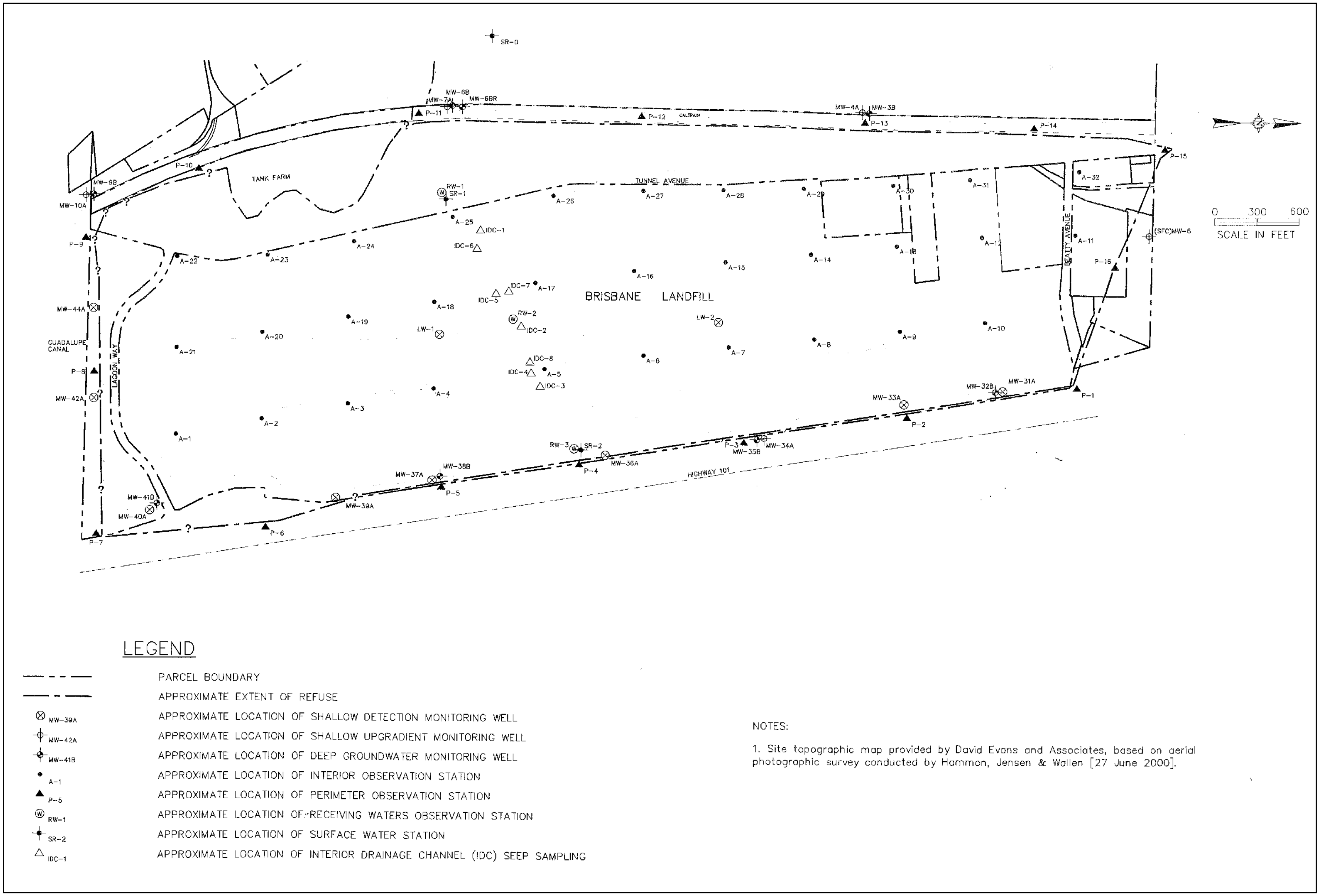
Shallow Groundwater Contours Under Brisbane Landfill



SOURCE: Geosyntec, 2012c

Brisbane Baylands . 206069

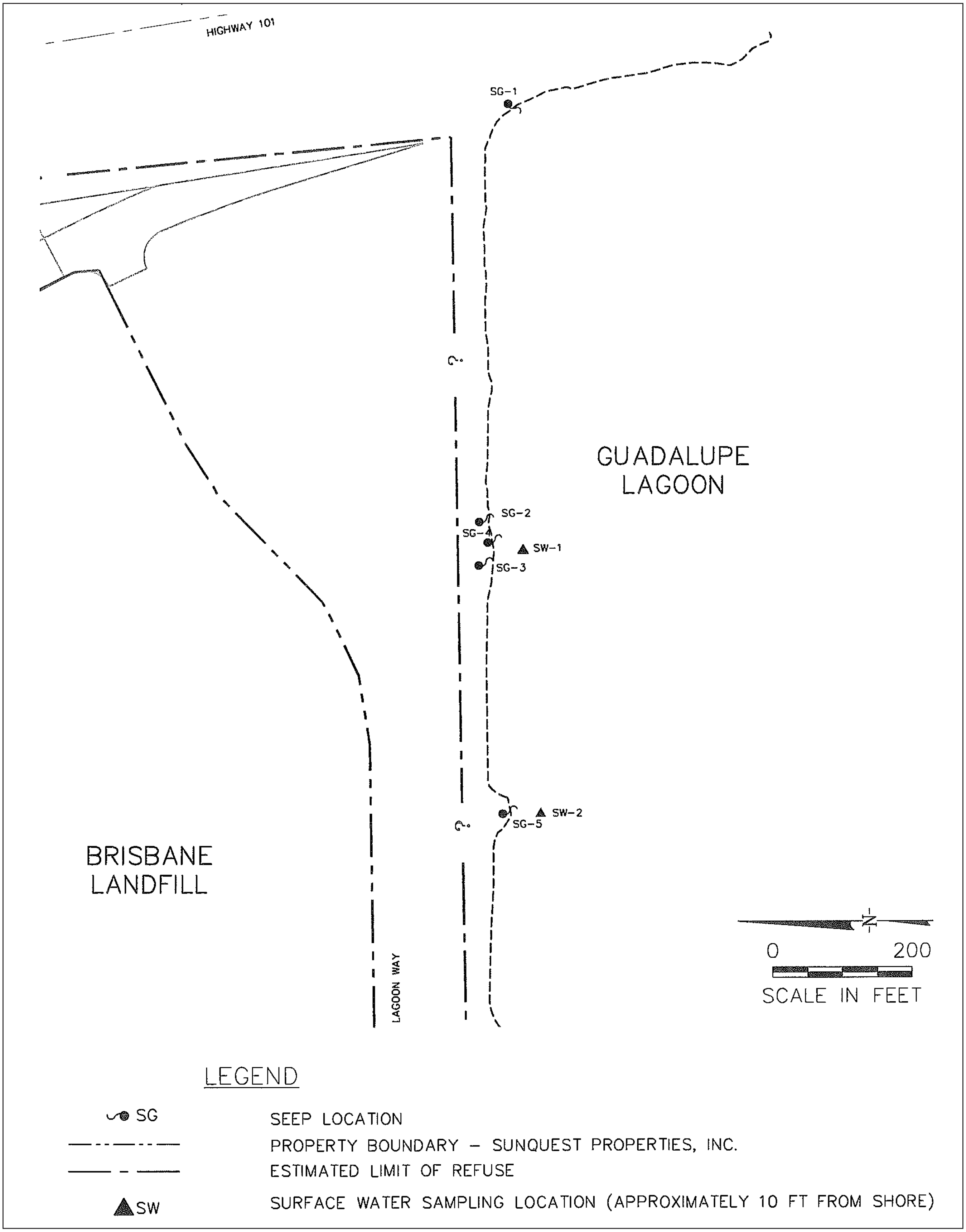
Figure 4.G-2b
Deep Groundwater Contours Under Brisbane Landfill



SOURCE: Geosyntec, 2012c

Brisbane Baylands . 206069

Figure 4.G-3
Groundwater Monitoring Stations
at Brisbane Landfill



SOURCE: Geosyntec, 2012c

Brisbane Baylands . 206069

Figure 4.G-4
Seep and Surface Water Sampling Sites at Brisbane Landfill

SOURCE: Geosyntec, 2012c

Brisbane Baylands . 206069

Figure 4.G-5
Groundwater Countour Map of OU-1 and OU-2

Groundwater flow in the shallow zone is generally a combination of east toward San Francisco Bay and south toward Brisbane Lagoon. Groundwater flow in the deep zone radiates away in several directions from a well located adjacent to U.S. 101 and south of the Central Drainage Channel. Tidal influences or leakage between water-bearing zones may be the cause for this condition (BKF, 2011). As indicated by the groundwater levels in the deep wells compared to the shallow wells shown in Table 4.G-1, groundwater beneath the landfill is characterized by strong upward vertical hydraulic gradients indicating that groundwater flows in an upward vertical direction which helps to explain why the depths to groundwater in the deep wells appear to be shallow. An upward gradient occurs naturally in association with groundwater discharge at the Bay margin. In addition, the upward gradient is significantly increased due to the weight of the landfill materials consolidating the underlying Bay Mud. This upward gradient at the site is observed by the presence of artesian conditions in the deep monitoring wells, meaning that the elevation of the groundwater surface is higher than that of the overlying shallow groundwater surface. (BKF, 2011).

Investigation and sampling activities were commenced as early as December 1986. As of 2010, the monitoring program included 20 groundwater monitoring wells (located primarily around the perimeter of the former landfill), two leachate wells[15], and various seep check locations along the Lagoon and interior drainage channel to monitor how groundwater seeps may be affecting the lagoon and channel water quality (Geosyntec, 2012). Leachate and groundwater samples were analyzed in September 2010 for the following compounds:

- Volatile organic compounds (VOCs)
- Semi-volatile organic compounds (SVOCs)
- Organochlorine pesticides and polychlorinated biphenyls (PCBs)
- Sulfate
- Ammonia
- Total dissolved solids (TDS)
- Total organic carbon (TOC)
- Nitrate
- Metals (arsenic, barium, lead, nickel, and selenium)

Groundwater in both the shallow and deep groundwater zones has been impacted by a number of constituents, including volatile organic compounds (VOCs), total dissolved solids, ammonia, and dissolved metals. For purposes of analysis, the level of these constituents is compared to the primary maximum contaminant level (MCL), which constitutes the enforceable standard for the maximum concentration of a contaminant that is allowed in drinking water.

15 Leachate wells are intended to monitor and characterize contamination in the water that filters through landfill waste. The leachate wells at the former landfill are centrally located at the landfill on either side of the interior drainage channel.

According to the most recent groundwater monitoring report prepared for the landowner and reported to the Regional Water Quality Control Board (Geosyntec, 2010), VOCs, including benzene, 1.4-dichlorobenzene, and MTBE, continue to be detected in groundwater collected from the shallow aquifer wells at levels above-MCL concentrations, but do not show any statistically significant increase, meaning that concentrations are either decreasing or remaining stable. Chlorobenzene also was detected, but at levels below MCL concentrations. In the deep aquifer, trace concentrations of methylene chloride, chlorobenzene, and naphthalene were also detected. No semi-volatile organic compounds (SVOCs) were detected in the deep aquifer. Recent groundwater monitoring data for shallow monitoring wells also indicates that concentrations of total dissolved solids are not increasing. However, concentrations of ammonia, which is toxic to aquatic life, continue to exceed RWQCB water quality objectives (regulatory standards) for ammonia (Geosyntec, 2010) in shallow wells. Dissolved metals detected in both the shallow and deep wells include arsenic, barium, and selenium (for the deep wells). Arsenic and barium remain above MCLs in both the shallow and deep wells. Analyses performed on contaminant detections in the shallow monitoring wells located within the landfill footprint and down-gradient of the landfill indicates that none of the tested constituents of concern show statistically significant increases, meaning that concentrations are either decreasing or remaining stable. This suggests that no new releases are occurring.

Leachate Generation from Brisbane Landfill

The most recent leachate monitoring results (Geosyntec, 2010) indicate the presence of VOCs in samples collected from the two leachate monitoring wells. Trace concentrations of six SVOCs and metals (barium and nickel) also were detected. Ammonia exceeded the RWQCB water quality objectives in both leachate wells. In general, the 2010 sampling indicated a slight leachate buildup (Geosyntec, 2010).

A leachate seep collection and transmission system (LSCTS) was installed by the landowner as part of a leachate management system to meet the interim objective required by the Regional Water Quality Control Board. The system is located at the southern end of the Brisbane Landfill, intercepting leachate and conveying it to the Bayshore Sanitary District sewer line. Results from the summer 2010 monitoring event indicated that no leachate seeps were observed; therefore, the leachate seep collection and transmission system is operating as designed, and no exposure to human or environmental receptors is occurring (Geosyntec, 2010). **Table 4.G-2** presents the maximum reported concentrations of chemical compounds in the leachate wells. Those chemical compounds not included in this table were not detected above the laboratory reporting limits. The Maximum Contaminant Level for California drinking water is provided for context, but it should be noted that groundwater is not used for domestic water supply in Brisbane, and thus cleanup levels ultimately approved by the Regional Water Quality Control Board may not reflect drinking water standards.

Table 4.G-3 lists the maximum or highest reported concentration of chemical compounds in the groundwater wells, along with Maximum Contaminant Level for California drinking water for comparison purposes.

TABLE 4.G-2
BRISBANE LANDFILL
MAXIMUM CONCENTRATIONS OF CHEMICAL COMPOUNDS IN LEACHATE WELLS

Chemical Compound	Maximum Concentration	Units	California Maximum Contaminant Level (MCL)
Benzene	8.9	µg/L	1
n-butyl benzene	1.6	µg/L	--
Sec-butyl benzene	2.8	µg/L	--
Chlorobenzene	33	µg/L	--
1,4-dichlorobenzene	7.0	µg/L	5
Ethylbenzene	1.3	µg/L	680
Isopropylbenzene	2.7	µg/L	--
Methyl tertiary butyl ether (MTBE)	8.6	µg/L	5
Naphthalene	21	µg/L	--
n-propylbenzene	4.9	µg/L	--
Toluene	0.91	µg/L	150
1,2,4-trimethylbenzene	1.2	µg/L	--
Xylenes	2.2	µg/L	1750
Acenaphthalene	3.8	µg/L	--
1,4-dichlorobenzene	2.4	µg/L	5
Fluorene	2.7	µg/L	--
2-methylnaphthalene	8.1	µg/L	--
Phenanthrene	2.7	µg/L	--
Barium	500	µg/L	1,000
Nickel	11	µg/L	100
TDS	8100	mg/L	--
Ammonia (unionized)	1.704	mg/L	--
Ammonia as nitrogen	390	mg/L	--
TOC	69	mg/L	--

NOTE: MCLs have not been established for all compounds but are provided where available.

µg/L = micrograms per liter
mg/L = milligrams per liter

SOURCE: Geosyntec, 2010

Results of these sampling events are used to monitor the flow of groundwater contaminants and characterize the migration of contaminants[16]. Typically, landfill closure requirements are designed to isolate groundwater contamination and prevent offsite migration which is measured through perimeter wells.

Soil Gas from Brisbane Landfill

Given that landfill operations were initiated with placement of waste on tidal flats and that subsequent borings into the waste revealed continued saturated conditions within the waste mass, sufficient moisture has existed to promote a high rate of decomposition since disposal operations began in 1932 (Golder, 2008). The greatest organic decomposition typically occurs under such conditions during the initial 20- to 30-year period after solid waste is deposited. Decomposition of the organic fraction of the waste will continue to occur over time, with an ongoing decline in

[16] Pursuant to the requirements of the Regional Water Quality Control Board, the landowner is responsible for undertaking groundwater monitoring and reporting results to the Regional Water Quality Control Board.

**TABLE 4.G-3
BRISBANE LANDFILL
MAXIMUM CONCENTRATIONS OF CHEMICAL COMPOUNDS IN GROUNDWATER WELLS**

Chemical Compound	Maximum Concentration	Units	California Maximum Contaminant Level (MCL)
Benzene	1.6	µg/L	1
Sec-butyl benzene	1.7	µg/L	--
Chlorobenzene	26	µg/L	--
1,2-dichlorobenzene	0.55	µg/L	600
1,4-dichlorobenzene	4.6	µg/L	5
Isopropylbenzene	0.56	µg/L	--
Methyl tertiary butyl ether (MTBE)	8.8	µg/L	5
Naphthalene	1.3	µg/L	--
Xylenes	1.1	µg/L	1750
Arsenic	160	µg/L	50
Barium	1,000	µg/L	1,000
Nickel	14	µg/L	100
TDS	23,000	mg/L	--
Ammonia (unionized)	1.314	mg/L	--
Ammonia as nitrogen	180	mg/L	--
TOC	18	mg/L	--
Nitrate as nitrogen	19	mg/L	0.01
Sulfate	18,000	mg/L	--

µg/L = micrograms per liter
mg/L = milligrams per liter

SOURCE: Geosyntec, 2010

the rate of production of LFG. Since the Brisbane Landfill has been closed over 40 years, the rate of methane gas production from the site has diminished over time, as evidenced in the landfill gas monitoring (Golder, 2008). Nevertheless, continued generation of LFG indicates that decomposition of waste within the landfill is ongoing and must be controlled to ensure protection of human health and the environment. Landfill gas can build up underground and release into the environment, presenting either an exposure hazard or even an explosion hazard if not appropriately addressed (Golder, 2008).

As previously noted, a landfill gas control system was installed by the landowner pursuant to requirements of the Regional Water Quality Control Board, and is currently in place to collect and combust methane and other landfill gases, which is a common way of addressing build-up of gases. The landfill gas control system has been in place since at least 2002, and will be required to continue operating in accordance with Title 27 requirements. A report titled *Operation, Monitoring, and Maintenance of the Landfill Gas (LFG) Migration Control Facilities at the Closed Brisbane Landfill, Brisbane, California* (SCS, 2008) found that while some minor repairs were necessary, the LFG control facilities at the former Brisbane Landfill were operating satisfactorily. To ensure that LFG control facilities continue to meet operational criteria, SCS Engineers performs periodic monitoring of the landfill gas system on behalf of the landowner, including weekly monitoring of the monitors operating the flare station, monthly monitoring and adjustment of landfill gas extraction wells, and quarterly monitoring of component emissions.

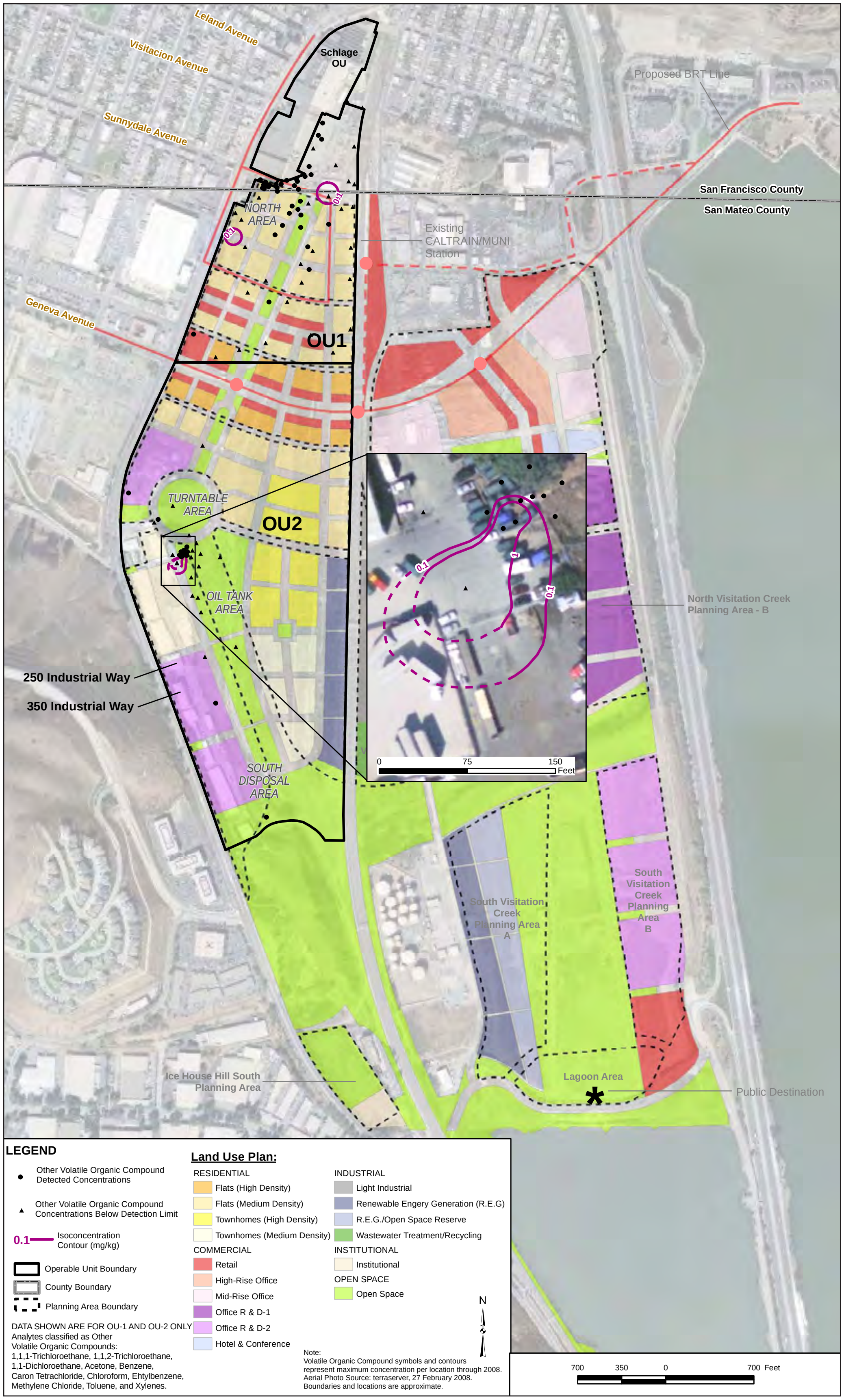
Minor repairs, such as those noted as being needed in the 2008 report described above, are conducted during monitoring visits and major repairs and equipment replacements are performed as needed and documented in monthly reports.

Former Southern Pacific Railyard (Operable Unit 1 and Operable Unit 2)

The western half of the Project Site has a long history of industrial usage and much of the existing contamination in this area occurred between 1914 and 1960, during the occupancy of the Southern Pacific railyards and the Schlage Lock Facility, although other subsequent uses may have also contributed. For regulatory purposes, this area is divided into a northern portion, Operable Unit 1 (OU-1), and a southern portion, Operable Unit 2 (OU-2) based on types of contaminants that are presented and the agency having regulatory authority over remediation (see Figure 4.G-1). OU-1 extends beyond the Project Site boundary and into the City and County of San Francisco. The San Francisco portion of OU-1 has been addressed by the landowner of that property and the California Department of Toxic Substances Control (DTSC) separately from the Brisbane portion of OU-1 due to their different sources of contamination, and the two different municipal agencies (Brisbane and San Francisco) having authority of land use approvals that will ultimately define clean up levels, although there are migration issues that tie them together. DTSC has regulatory authority over the remediation of and oversees OU-1, which is primarily contaminated by VOCs in soil and groundwater. The RWQCB oversees OU-2, which is primarily contaminated with Bunker C fuel oil and heavy metals (primarily lead). Interim remedial measures for OU-2 were approved by the RWQCB in the 2004 Interim Remedial Measures Work Plan (Burns & McDonnell, 2005). As described below, remediation of OU-1 and OU-2 would occur as part of Project Site development. Proposed remedial actions for OU-1 and OU-2 are described in greater detail below as part of the discussion of Project site development impacts and mitigation measures. **Figures 4.G-6a** through **4.G-6m** illustrate existing contamination within OU-1 and OU-2, following the text discussion of OU-1 and OU-2.

Operable Unit 1

The area designated as OU-1 within Brisbane comprises approximately 44 acres west of the Caltrain/Union Pacific railroad tracks in the northwest portion of the Project Site. As discussed in Section 4.D, *Cultural Resources*, from 1914 through 1960, OU-1 was used by the Southern Pacific Railroad for major railcar rehabilitation, locomotive maintenance operations, and material transfer operations. By 1950, approximately 75 railroad maintenance shops and smaller structures were located along the western edge of the railroad yard along Bayshore Boulevard. These buildings included a machine shop, a powerhouse, a coach repair shop, a freight car repair shop, a lumber shed, a storage shed, loading platforms, a tower at the north end of the yard, and thousands of linear feet of rail spurs. By 1954, Southern Pacific had nearly completed the changeover from steam-powered locomotives to diesel power, and began closing shops later that year. Southern Pacific ceased operations in 1960 and the site became relatively idle for many years before being sold in the late 1980s. Most of the maintenance shops were removed at this time.

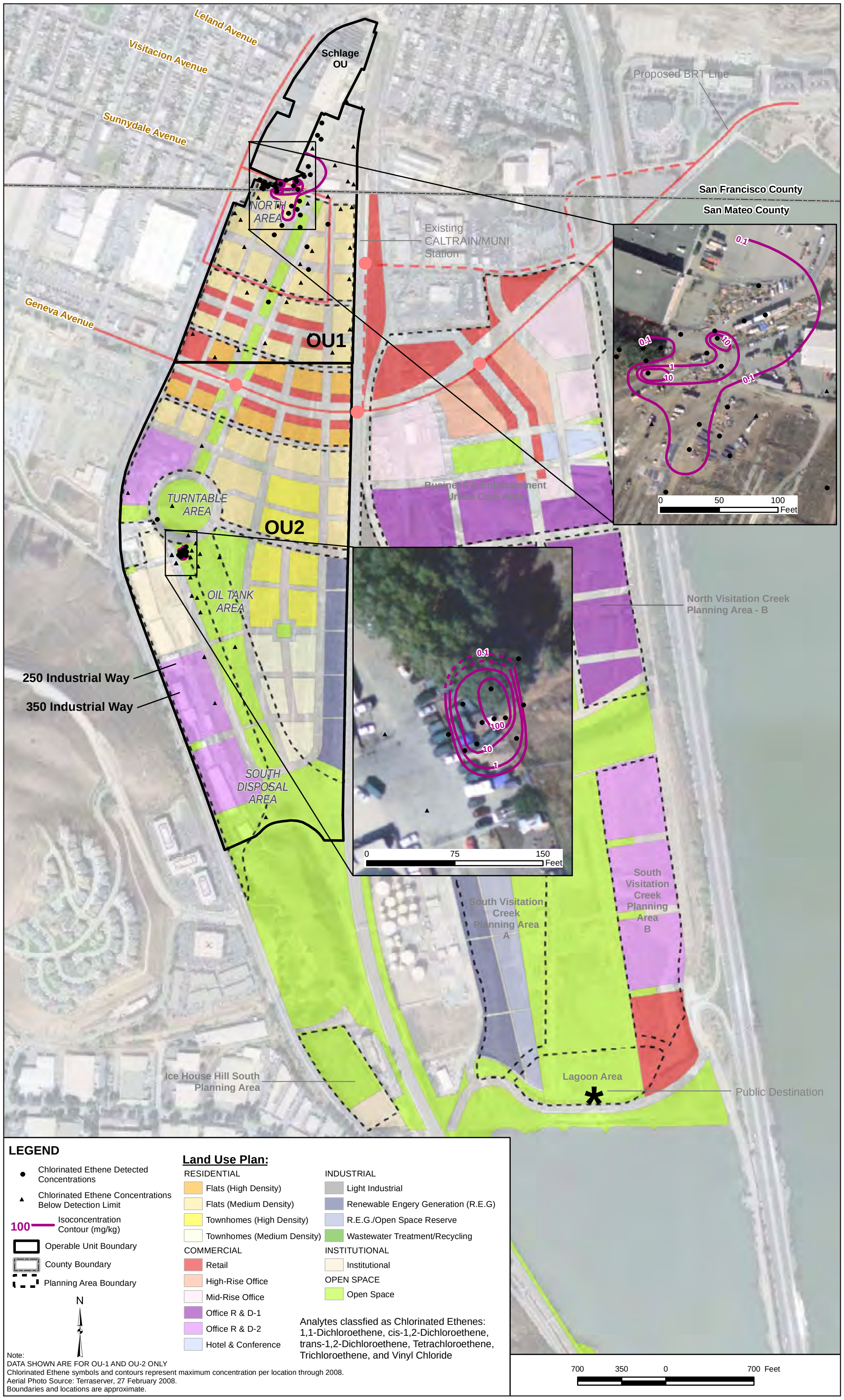


SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6a

Historical Maximum Concentrations of Other Volatile Organic Compounds in Soil at OU-1 and OU-2

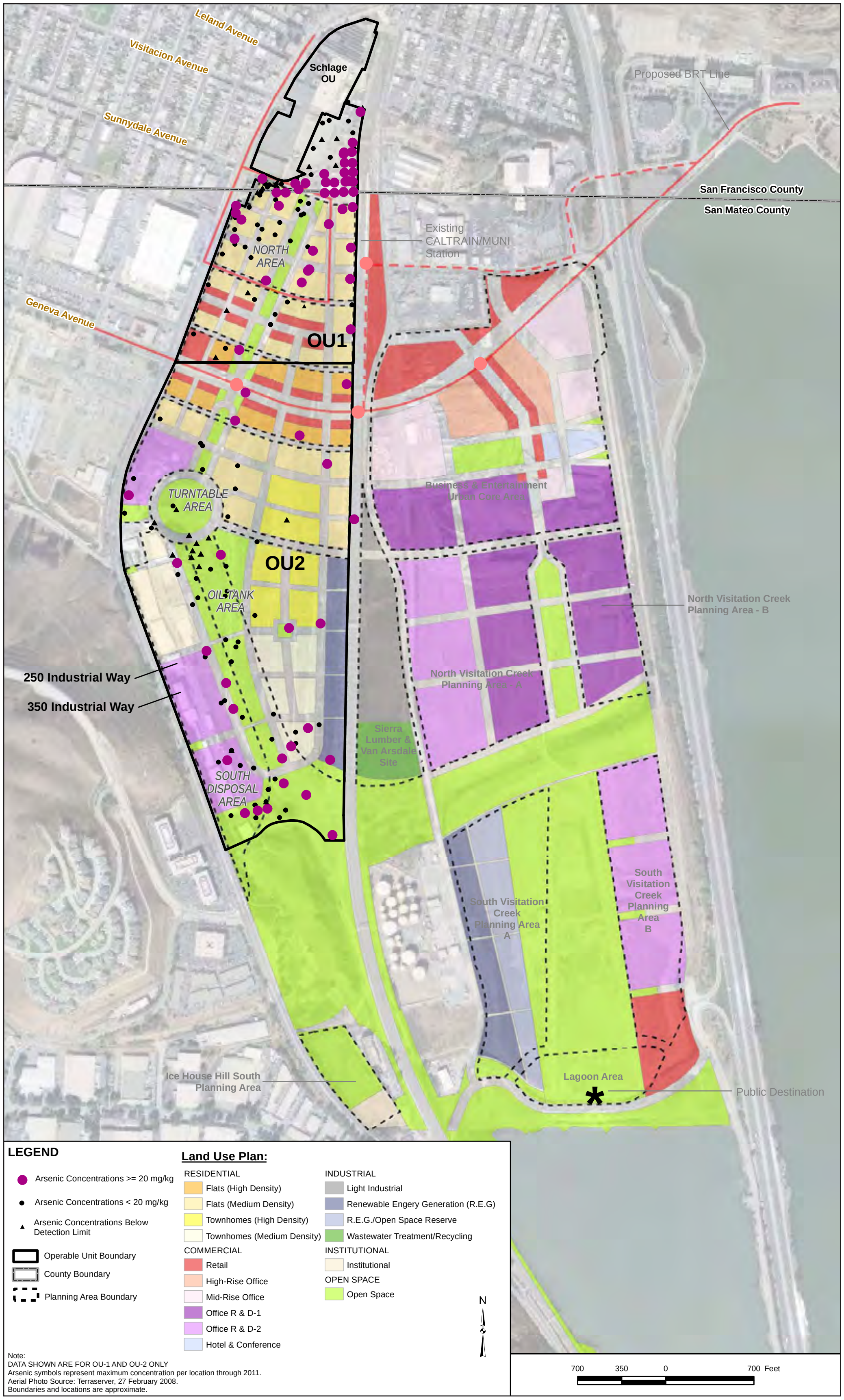


SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6b

Historical Maximum Concentrations of Chlorinated Ethenes in Soil at OU-1 and OU-2

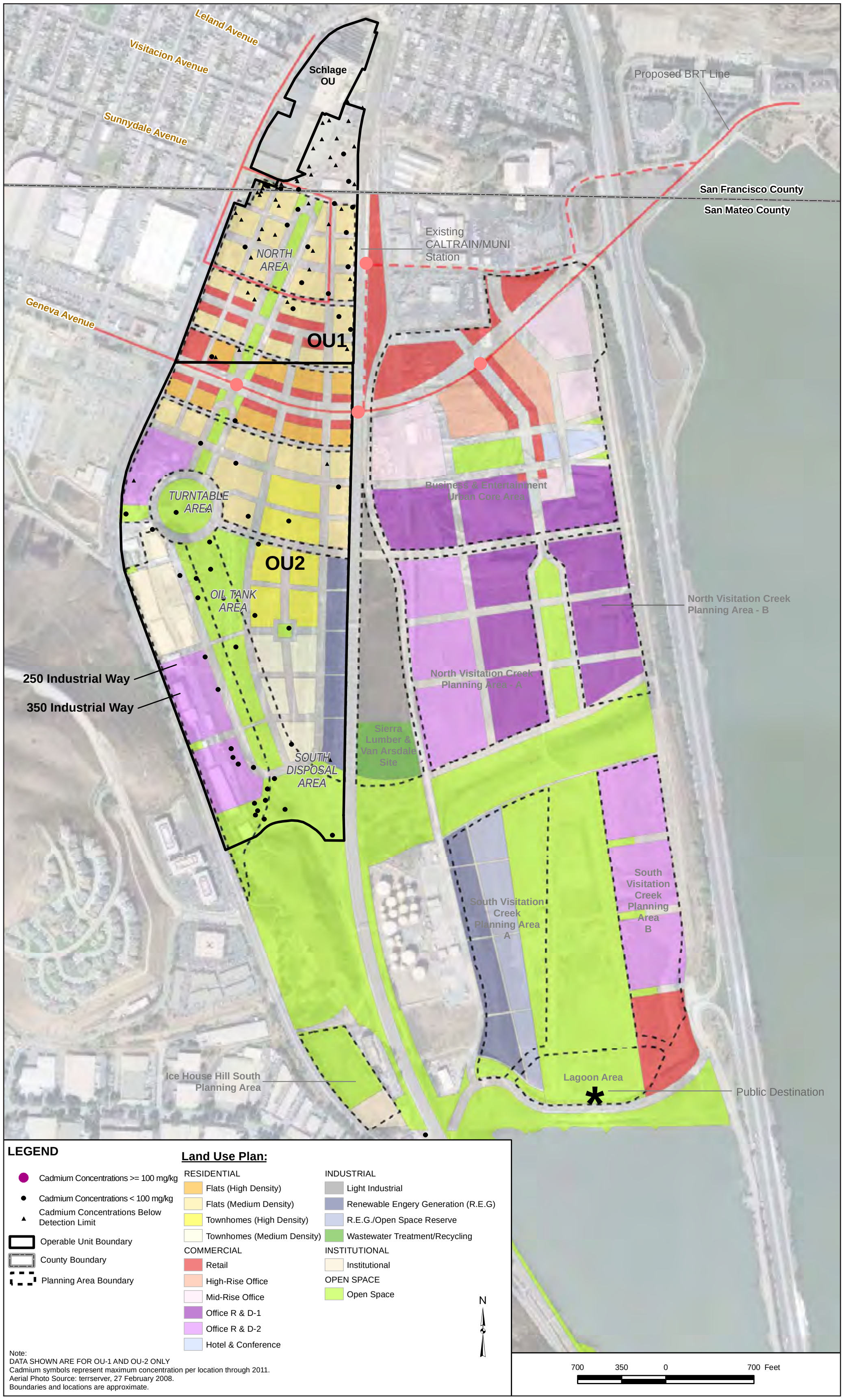


SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6c

Arsenic in Soil at OU-1 and OU-2

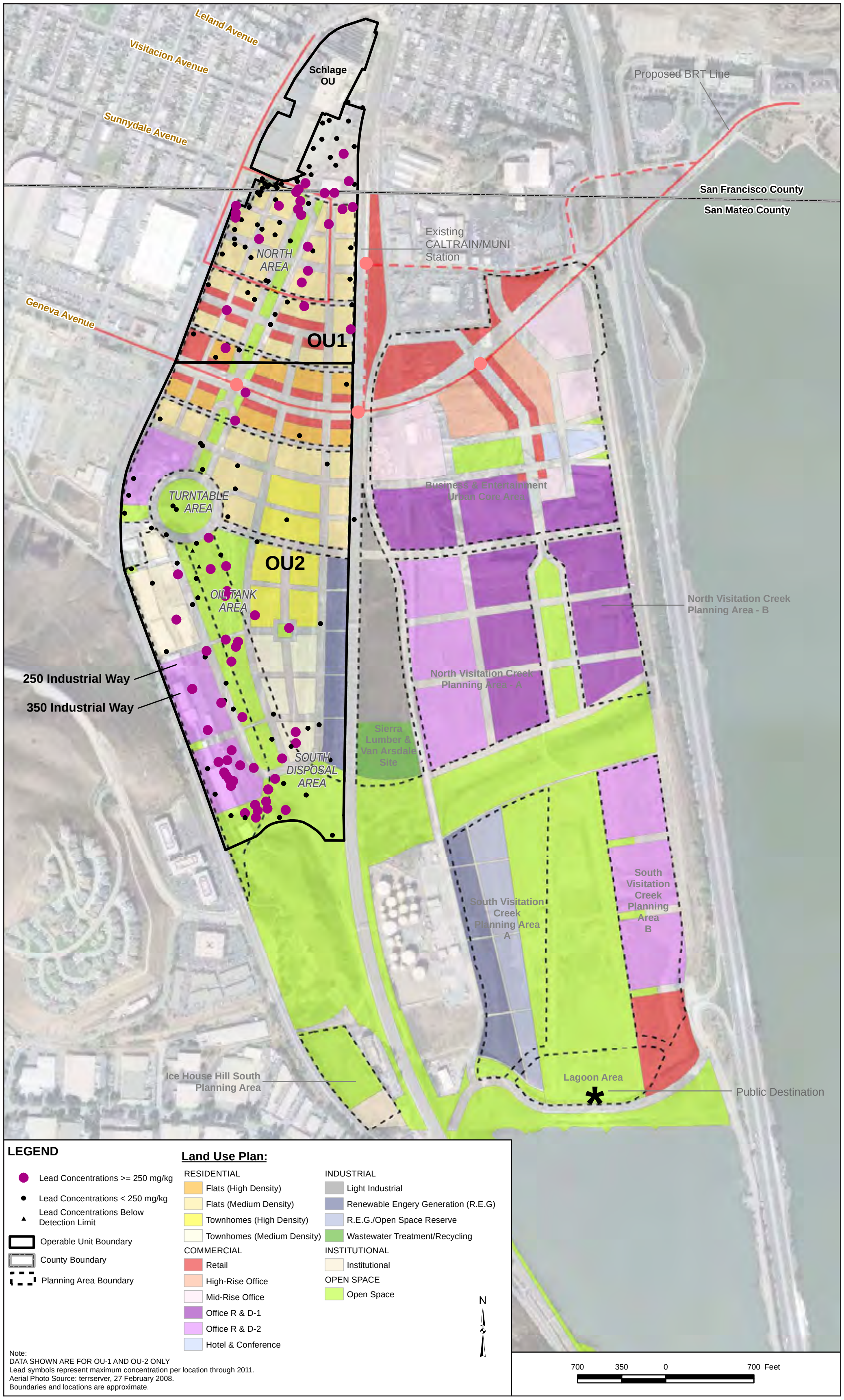


SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6d

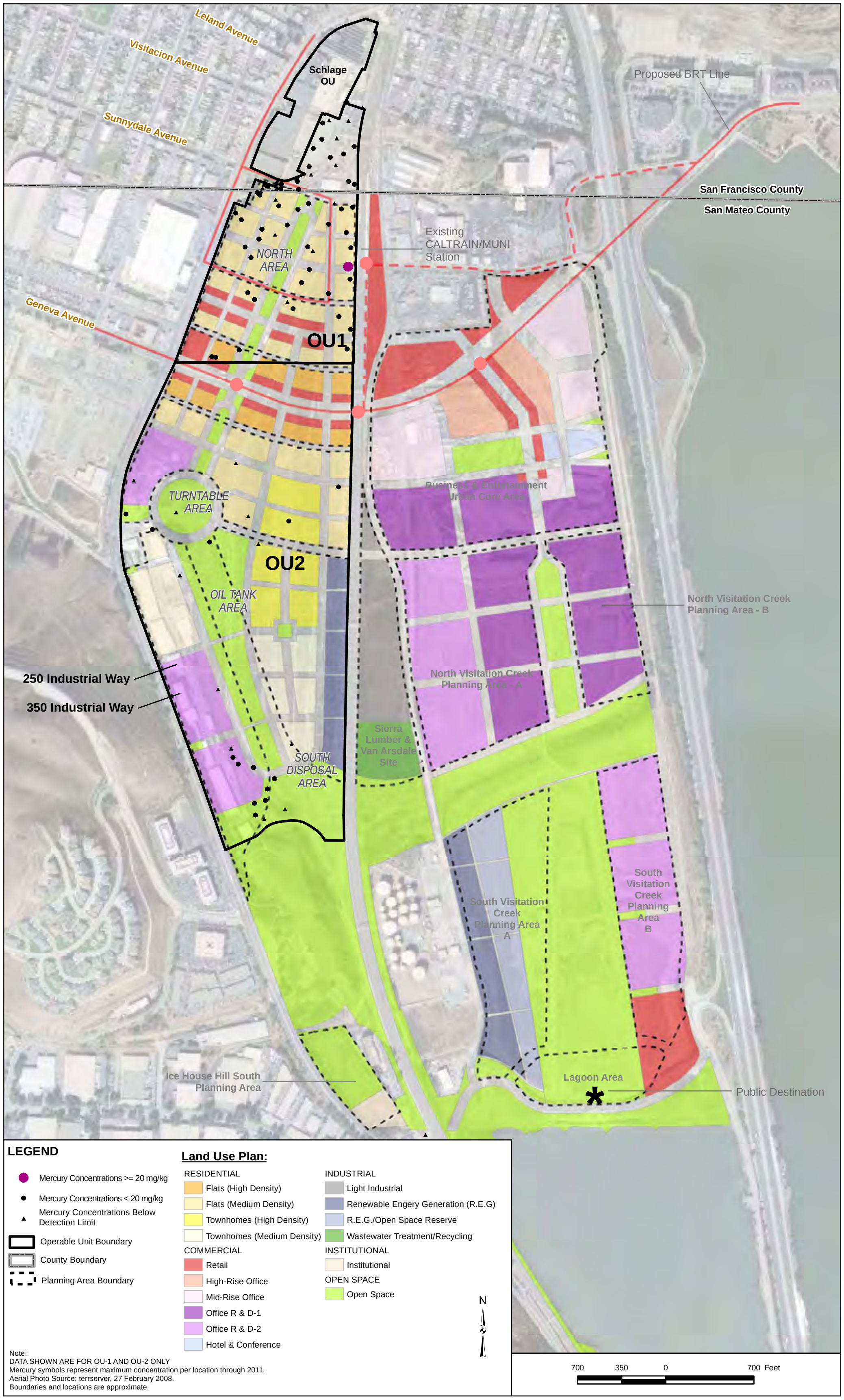
Cadmium in Soil at OU-1 and OU-2



SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6e
Lead in Soil at OU-1 and OU-2

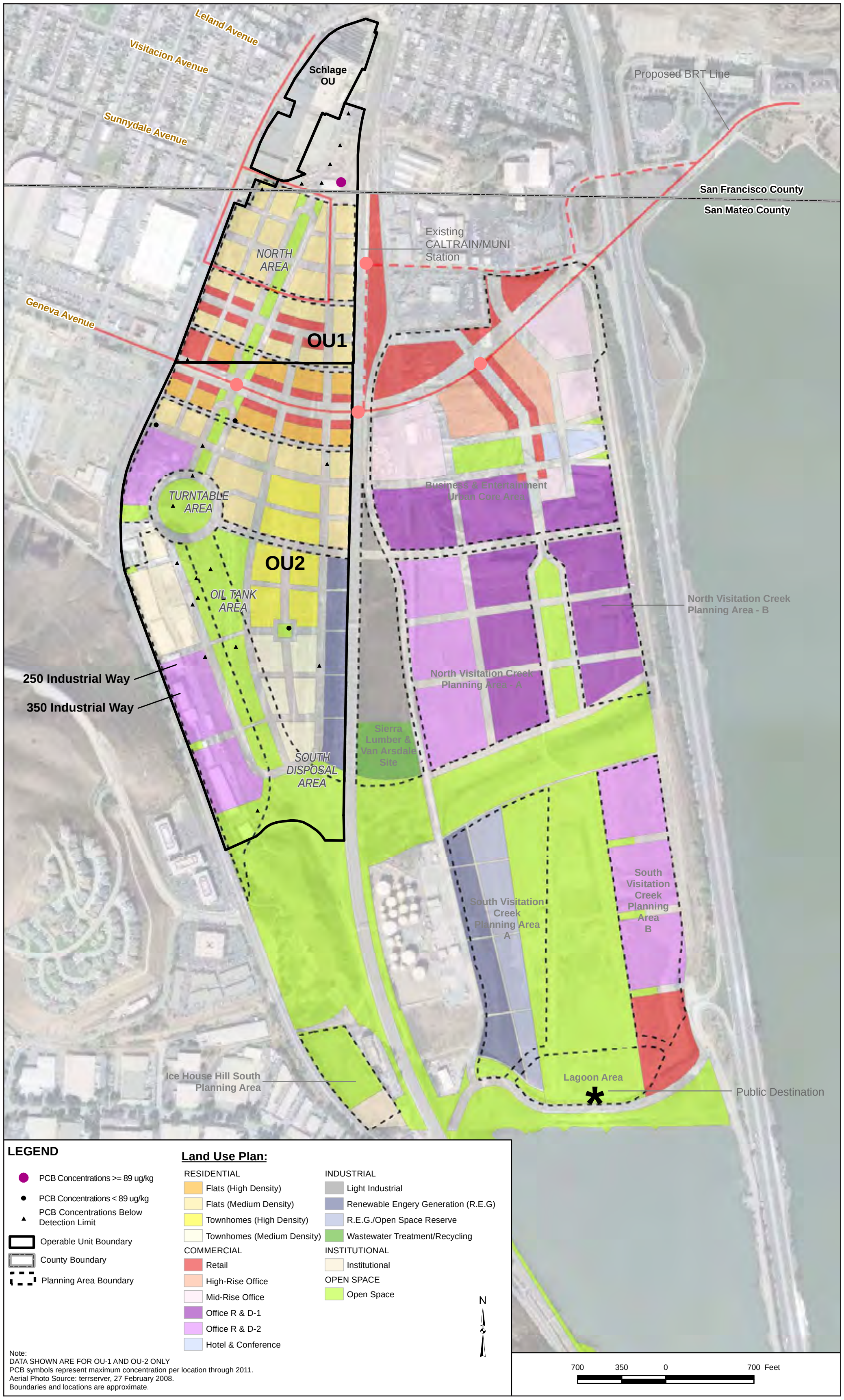


SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6f

Mercury in Soil at OU-1 and OU-2

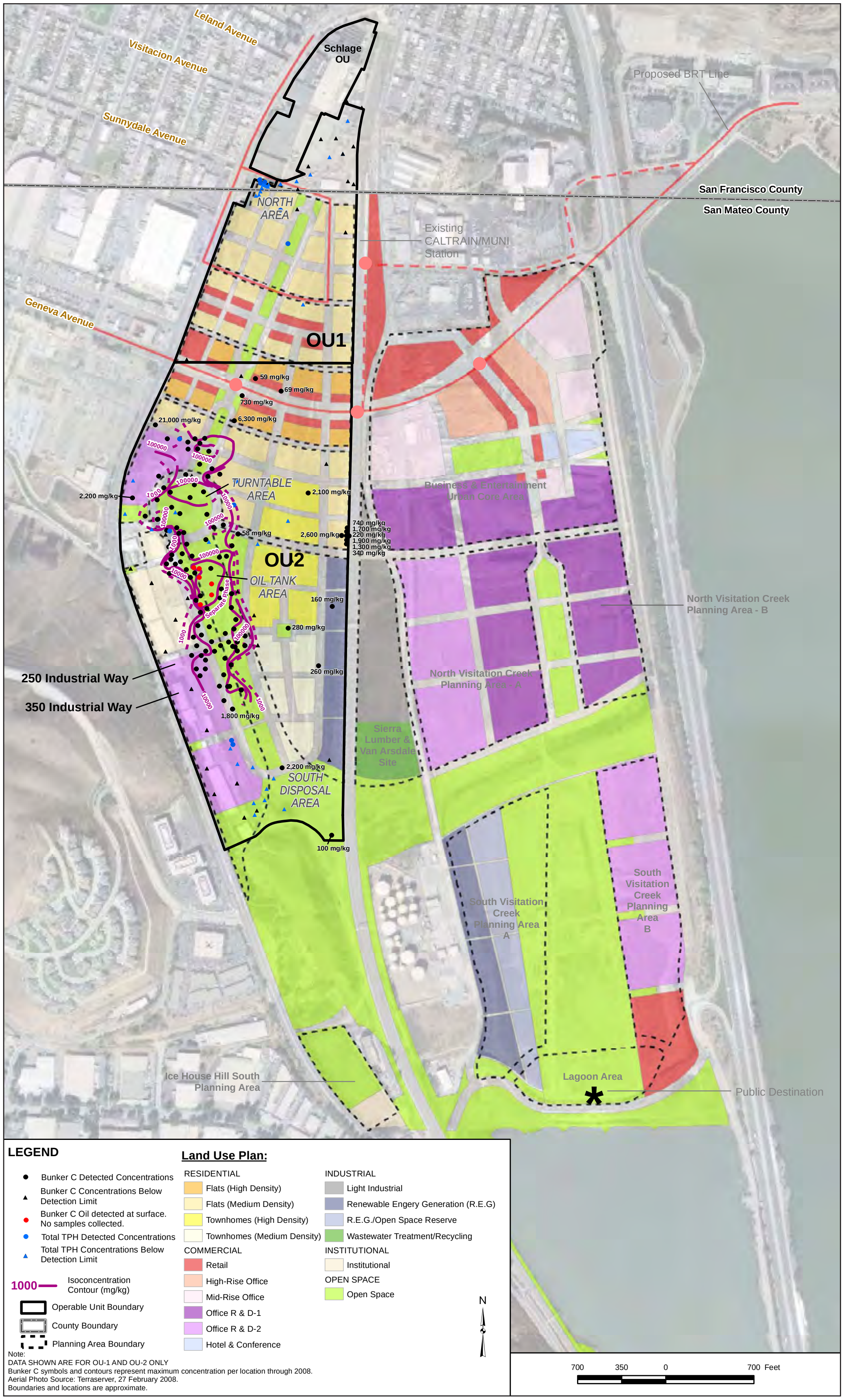


SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6g

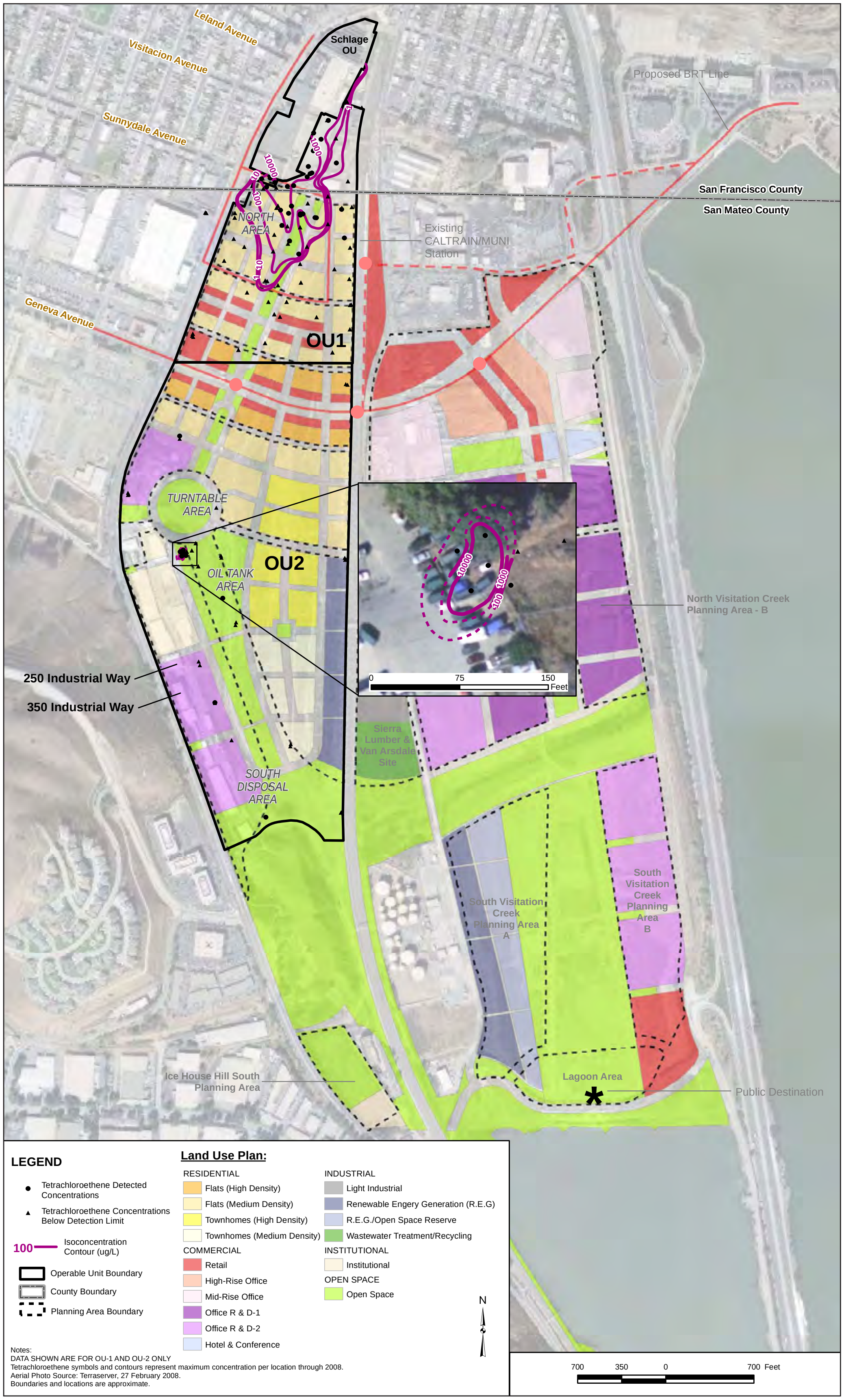
PCBs in Soil at OU-1 and OU-2



SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6h
Historical Maximum Concentrations of Bunker C Oil in Soil at OU-1 and OU-2

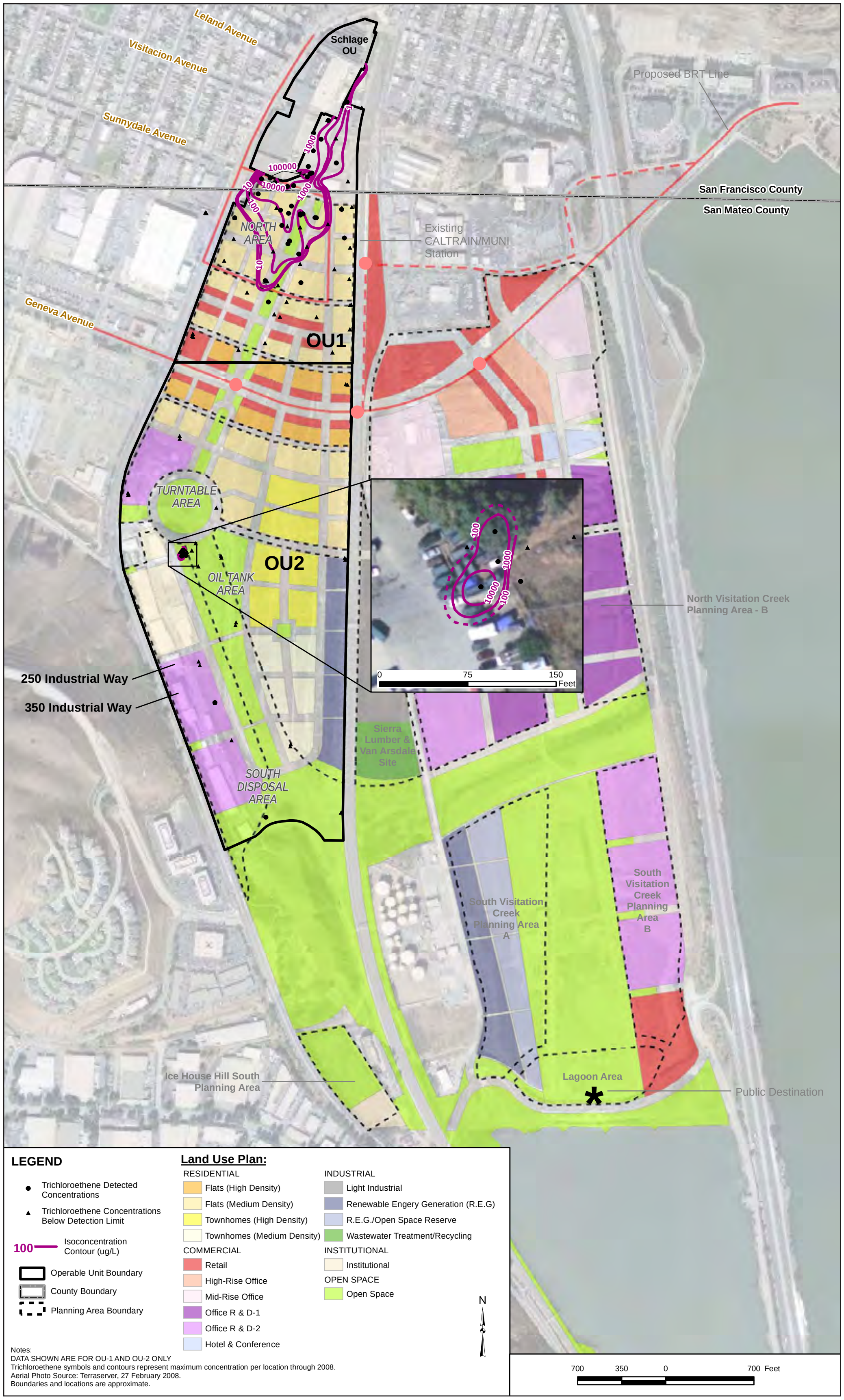


SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6i

Historical Maximum Concentrations of Tetrachloroethene in Groundwater at OU-1 and OU-2



SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6j

Historical Maximum Concentrations of Trichloroethene in Groundwater at OU-1 and OU-2

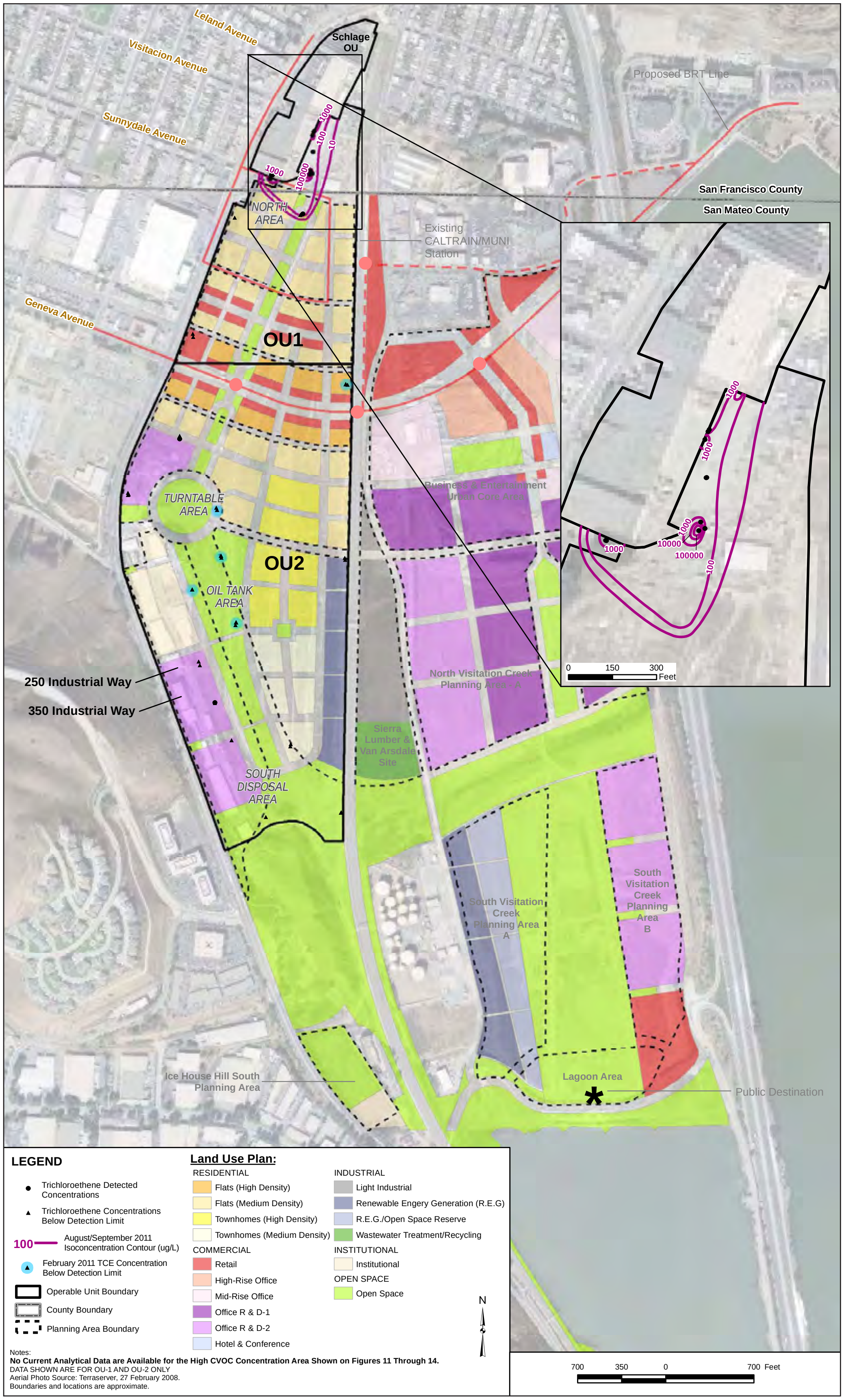
SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6k
Historical Maximum Concentrations of Dichloroethene in Groundwater at OU-1 and OU-2

SOURCE: Geosyntec, 2012a

Figure 4.G-6I
Historical Maximum Concentrations of Vinyl Chloride in Groundwater at OU-1 and OU-2



SOURCE: Geosyntec, 2012a

Brisbane Baylands . 206069

Figure 4.G-6m
Current TCE Concentrations in Groundwater at OU-1 and OU-2

The San Francisco portion of OU-1 (Schlage Lock property) north of the Project Site consists of soil and groundwater impacted by VOCs that underlie a portion of OU-1. The Brisbane (Project Site) portion of OU-1 contains soil and groundwater impacted by contaminants of concern other than VOCs, including arsenic, lead, cadmium, and mercury in the soil, and nickel, total chromium, and hexavalent chromium in groundwater. Groundwater contamination within the Brisbane portion of OU-1 largely originated from the San Francisco portion of OU-1 (Schlage Lock property).

As noted above, DTSC has regulatory authority and oversees the groundwater and soil investigations and remediation plans for OU-1, which have been ongoing since 1982.

Soil/Groundwater Contamination in OU-1

Groundwater flow in the shallow aquifer below the Project Site converges from the north and west, and flows eastward toward San Francisco Bay. Groundwater in the northern portion of the deep aquifer generally flows to the south, and groundwater flow through the deep aquifer in the radiates away in several directions. The groundwater flow direction in the deep aquifer is to the south (Geosyntec, 2012).

Investigation and sampling activities OU-1 were commenced as early as March 1984. A total of 36 wells were in the monitoring program, and have been analyzed for the following compounds:

- Diesel-range total petroleum hydrocarbons (TPHd)
- Gasoline-range TPH (TPHg)
- Motor oil range TPH (TPHmo)
- Bunker Oil C (TPHc)
- VOCs
- Benzene, toluene, ethylbenzene and xylenes (BTEX)
- MTBE
- Total Chromium
- Hexavalent Chromium

Since 2008, groundwater monitoring at OU-1 has been conducted by MACTEC on behalf of the landowner and reported to DTSC. Groundwater samples collected from all wells have been analyzed for VOCs, total chromium, hexavalent chromium, dissolved nickel, total petroleum hydrocarbons, benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl tert-butyl ether (MTBE).

Soil and groundwater constituents of concern associated with OU-1 contamination include volatile organic compounds (VOCs) (primarily trichloroethylene (TCE), tetrachloroethylene (PCE), cis-1.2-dichloroethylene [cis-DCE], and vinyl chloride [VC]); total petroleum hydrocarbons (TPH) as Bunker C (fuel oil); and metals, primarily chromium.

A brief summary of constituents of concern detections found during 2010 monitoring by MACTEC (MACTEC, 2010a) generally shows that contamination levels are remaining stable as follows:

- Constituents of concern detections in the shallow aquifer are limited to two wells, within the Brisbane portion of OU-1, which is consistent with previous observations. PCE and TCE concentrations in both wells are low or not detected (MACTEC, 2010a).

- Concentrations of constituents of concern in a portion of the shallow aquifer known as the Colma Formation are generally consistent with previous observations, with the exception of the first detection of vinyl chloride in one well. Concentrations of PCE and TCE in the Colma Formation have decreased consistently since the well was installed, but remain above their respective maximum contamination levels.[17]

- Concentrations of constituents of concern in the deep aquifer are generally consistent with previous observations. Concentrations of total dissolved chromium slightly exceed maximum contamination levels. Though concentrations of dissolved hexavalent chromium do not exceed maximum contamination levels for total dissolved chromium (current action level), hexavalent chromium does constitute approximately 80 to 90 percent of the total chromium detected at OU-1. The California Department of Public Health (CDPH) has recently defined (CDPH, 2011) a draft public health goal for hexavalent chromium, and will determine an appropriate maximum contamination levels for this contaminant upon finalization of the public health goal. No total petroleum hydrocarbons were detected in deep aquifer groundwater during the Fourth Quarter 2010 monitoring event.

- Existing groundwater conditions indicate that conditions in the groundwater plume are favorable for application of a remediation technology known as enhanced reductive dechlorination.

Groundwater monitoring conducted in February and May 2008, as reported by Geosyntec in 2010, at which time Geosyntec reported that groundwater contamination levels were remaining stable. Thus, the 2008 groundwater monitoring data provides a reasonable baseline for 2010 conditions. **Table 4.G-4** shows the highest reported concentrations of chemical compounds in groundwater, along with Maximum Contaminant Level for California drinking water for comparison purposes. Some samples were collected at earlier dates as noted.

Completed Environmental Remediation Investigations and Actions for OU-1 (San Francisco and Brisbane Portions[18])

Soil Excavation. *In 1993, contaminated soils adjacent to and beneath sludge traps of the former Schlage Lock facility in San Francisco were excavated by the landowner to remove VOC-impacted soils from beneath sumps within the Degreasing Room and Strip Room of Plant 3 of the former Schlage Lock facility (Treadwell & Rollo, 1996). The excavated soils were hauled offsite to a disposal facility and replaced with clean fill. Details on the nature and extent of the remaining contamination at this location are summarized in the Joint Groundwater Remedial Action Plan (RAP), and generally showed remaining concentrations of metals and limited detections of VOCs in the soil (BKF, 2011).*

Groundwater Extraction and Treatment. In 1995, the landowner, UPC, constructed a groundwater extraction and treatment system to control migration and expansion of the groundwater plume beneath OU-1, which emanates from the former Schlage Lock facility in San Francisco

[17] Maximum contaminant levels (MCLs) are drinking water health standards which are commonly used for comparison purposes in groundwater investigations but do not necessarily represent cleanup levels.
[18] As previously noted, OU-1 is divided into San Francisco and Brisbane portions due to the different activities that originally created contamination of the properties, and also recognizing the fact that two different municipal agencies have authority over the land use approvals that will be the basis for required clean-up levels.

TABLE 4.G-4
MAXIMUM CONCENTRATIONS OF CHEMICAL COMPOUNDS IN OPERABLE UNIT NO. 1 WELLS

Chemical Compound	Maximum Concentration	Units	California Maximum Contaminant Level (MCL)
Tetrachloroethene (PCE)	9,700	µg/L	5
Trichloroethene (TCE)	230,000	µg/L	5
Chloroform	6.3	µg/L	--
Cis-1,2-dichlroethene (cis-1,2-DCE)	250	µg/L	6
Trans-1,2-DCE	150	µg/L	10
1,1-DCE	0.8	µg/L	6
Vinyl chloride	140	µg/L	0.5
TPH mostly as Bunker C Oil (Aug. 2006)	150,000	µg/L	--
Benzene	73	µg/L	1
Toluene	90	µg/L	150
Ethylbenzene	67	µg/L	680
Total xylenes	157	µg/L	1,750
Total chromium (February 2008)	52	µg/L	50
Hexavalent chromium (February 2008)	0.05	µg/L	0.02[a]

µg/L = micrograms per liter
MCL = Maximum Contaminant Level for drinking water for California

a There is no separate MCL for Hexavalent chromium but a Public Health Goal has been established specifically for Hexavalent chromium to distinguish it from Total Chromium.

SOURCE: Geosyntec, 2010

(Geosyntec, 2010). Extracted groundwater was treated using granular activated carbon filters, and the treated water was discharged to a sanitary sewer under an industrial wastewater discharge permit. The primary goals of the treatment system were to contain the VOC-impacted groundwater within the upper fill zone and to remove the VOCs. As of June 2008, approximately 5,135 pounds of PCE and 668 pounds of TCE had been removed by the groundwater extraction and treatment system, which was taken offline in July 2008 with DTSC approval, prior to initiating in-situ groundwater treatment pilot studies at OU-1 (Geosyntec, 2010). The groundwater extraction and treatment system has been kept in operational condition and on a stand-by status to process well development purge water and decontamination rinse water from drilling operations.

Soil Vapor Extraction. *A soil vapor extraction and treatment system was installed by the landowner, UPC, in 1999 near the former Schlage Lock facility, at the source of the VOC contamination that underlies OU-1 (Geosyntec, 2010). The treatment system consisted of eight extraction wells, one piezometer*[19]*, and 44 soil vapor monitoring points. Extracted soil vapor was treated using vapor-phase granular activated carbon and discharged to the atmosphere under a*

19 A piezometer is an instrument use to monitor water pressure and groundwater levels. Typical applications include monitoring pore-water pressure to determine the stability of slopes, embankments, and landfill dikes; ground improvement techniques such as vertical drains, sand drains, and dynamic compaction; dewatering schemes for excavations and underground openings; seepage and ground water movement in embankments, landfill dikes, and dams; and water drawdown during pumping tests.

permit from the Bay Area Air Quality Management District (BAAQMD). The system was decommissioned in September 2008 and the equipment removed from the OU-1 site. The extraction wells, piezometer, and soil vapor monitoring points were properly destroyed in January 2009 in accordance with local requirements (Geosyntec, 2010). As of September 2008, approximately 3,830 pounds of VOCs had been removed by the treatment system.

In-Situ Groundwater Treatment. Groundwater treatment pilot studies were initiated in August 2008 by the landowner as described at the outset of Section 4.G.2, and consisted of a remediation technology known as "in-situ chemical oxidation," which treats groundwater in place as opposed to extracting it for treatment (Geosyntec, 2010). In-situ chemical oxidation proved to be an effective technology for the destruction of VOCs at high concentrations, but less so for those at lower concentrations. The enhanced reductive dechlorination study, mentioned above, identified enhanced reductive dechlorination as the preferred technology for groundwater remediation.

Soils Gas from OU-1. From July 2008 through March 2009, MACTEC conducted additional investigation activities on behalf of the landowner in order to further evaluate OU-1 site soil gas conditions after operation of the soil vapor extraction and treatment system to confirm the effectiveness of the system. The results from the investigation indicate soil samples collected in the soil vapor extraction and treatment system area after operation of the system had maximum reported PCE and TCE concentrations of 1 milligram per kilogram (mg/kg) and 0.23 mg/kg, respectively. These values are significantly lower than maximum concentrations reported prior to soil vapor extraction and treatment system's operation (95 mg/kg and 100 mg/kg, respectively). Soil gas data available for OU-1 were collected prior to operation and decommissioning of the soil vapor extraction and treatment system. Cleanup levels for soil gas at the site were developed on behalf of the landowner to mitigate potential health risks from inhalation of VOC vapors and were included in the 2009 Feasibility Study/Remedial Action Plan (FS/RAP) as part of ongoing efforts by the landowner to remediate the site (BKF et al., 2011).

Schlage Lock Site (San Francisco Portion of OU-1). The Schlage Lock Company manufactured door hardware and lock parts from 1926 to 1999 at a facility located at Bayshore and Sunnydale Boulevards immediately north of the Project Site in San Francisco. Operations started in a building known as Plant 1. The size of the facility was expanded in 1942, 1950. The manufacturing process included stamping and machining metal alloys; deburring brass, bronze, nickel, silver and steel parts; and cleaning brass and bronze parts with a product known as Safety Kleen 150, a petroleum naphtha solvent. Other solvents that contained trichloroethane were also commonly used at the facility, which closed operation in December 1999 (Geosyntec, 2008).

Soil removal and cleanup actions have been conducted by the landowner at this site since 1994 when a groundwater extraction and treatment system was installed. Groundwater was sampled quarterly to monitor the movement and levels of chemicals. The groundwater extraction and treatment system ceased operation in 2009. In 1996, an interim removal action was conducted by the landowner at the strip and degreasing rooms in Building 3 to remove soil contaminated with volatile organic compounds (VOCs). Also, in 1999, a soil vapor and extraction treatment system (SVETS) was installed by the landowner to remove soil vapor underneath the strip and degreasing area. The soil vapor and extraction treatment system was decommissioned in September 2008.

The groundwater is contaminated with VOCs underneath OU-1 site that originate from the Schlage Lock site. As a result, in addition to groundwater and soil contamination in the Schlage Lock site, cleanup will include groundwater contaminated with VOCs at the OU-1 site (discussed above). Remediation at the site is being conducted in accordance with an approved Remedial Action Plan (Geosyntec, 2012).

Completed Environmental Investigations and Remediation Actions for OU-2

Operable Unit 2 (OU-2) is located south of Geneva Avenue and comprises an area of approximately 142 acres west of the Caltrain/Union Pacific railroad tracks in the center and southwest portion of the Project Site. This area comprises approximately 75 percent of the former SPRR railyard, and also encompasses the Bayshore Industrial Park. As part of the railyard operations, OU-2 included an oil tank farm as well as what is known as the South Disposal Area (Burns & McDonnell, 2008). In 1960, the SPRR ceased operations and the former railyard area has been inactive and unoccupied since that time. The primary contamination issues at OU-2 include total petroleum hydrocarbons and heavy metals resulting from the historical railyard use (Burns & McDonnell, 2008).

Soil/Groundwater Contamination in OU-2. Various petroleum hydrocarbons, volatile organic compounds (VOCs), and metals have been released to soil and groundwater at the Operable Unit No. 2 portion of the former Southern Pacific’s Bayshore railyard (Burns & McDonnell, 2009). In response to known contamination, investigation and sampling activities were commenced as early as March 1984 as a precursor to site remediation. In addition to railyard operations, contamination of soil with petroleum hydrocarbons and heavy metals within OU-2 is thought to have originated from the oil tank farm operations (Geosyntec, 2010).

Thirty-nine monitoring wells and piezometers (used for measuring water levels only) are located at the OU-2 site. Wells have been completed in both shallow and deeper water-bearing zones to provide vertical delineation of lithology[20] and information regarding groundwater quality and groundwater flow conditions. As part of the monitoring and cleanup work at the site, activities within OU-2 are described based on past activities at the sites of contamination as: the Oil Tank Area and the South Disposal Area. Semi-annual groundwater and surface water sampling is conducted by the landowner and reported to the Regional Water Quality Control Board at the OU-2 site to monitor groundwater flow conditions and water quality as part of ongoing remediation efforts.

The primary contaminants of concern are petroleum hydrocarbons (including Bunker C fuel oil) and heavy metals. The wells are also monitored for VOCs (primarily PCE). Groundwater and surface water are monitored on a semi-annual basis. Groundwater concentrations of Bunker C fuel oil and metals exceed the Remedial Action Objectives in soil set forth in a Conceptual Remedial Action Plan proposed to the Regional Water Quality Control Board by the landowner,

---

[20] The lithology of a rock unit is a description of its physical characteristics visible at outcrop, in hand or core samples or with low magnification microscopy, such as color, texture, grain size, or composition. It may be either a detailed description of these characteristics or a summary of the physical character of a rock.

and would therefore require remediation (Burns & McDonnell, 2002a). The RWQCB provided a conditional Approval Letter dated May 9, 2002 with the following requirements:

- Recalculate RAOs with Dilution Attenuation Factor of 22 instead of 39
- Design 7 to 10 feet of soil cap, including an additional protective layer of clay or geosynthetic liner over Bunker C oil concentrations in excess of 46,000 mg/kg
- Close the existing drainage ditch
- Use silica gel cleanup procedure on all Total Petroleum Hydrocarbon as gasoline samples
- Prepare a Soil Management Plan for future Site development
- Provide additional future calculation of RAOs for VOCs if buildings are constructed over area with residual VOCs
- Revise Residual Risk Management Plan to reflect addition of 7 to 10 feet of imported clean fill across the site
- Propose and implement deed restrictions that properly address the residual contamination (Geosyntec, 2008)

Groundwater monitoring conducted in February and May 2008, as reported by Geosyntec in 2010, at which time Geosyntec reported that groundwater contamination levels were remaining stable. Thus, the 2008 groundwater monitoring data provides a reasonable baseline for 2010 conditions. **Table 4.G-5** shows the highest reported concentrations of chemical compounds in groundwater.

TABLE 4.G-5
MAXIMUM CONCENTRATIONS OF CHEMICAL COMPOUNDS IN OPERABLE UNIT NO. 2 WELLS

Chemical Compound	Maximum Concentration	Units	California Maximum Contaminant Level (MCL)
TPHg (in only one well)	26.8	μg/L	--
TPHd	991	μg/L	--
TPHmo (in only one well)	611	μg/L	--
MTBE	2.3	μg/L	5
Arsenic	75.6	μg/L	50
Barium	392	μg/L	1,000
Copper (in only one well)	22.1	μg/L	1,300
Lead (in only one well)	5.3	μg/L	15
Molybdenum	5.8	μg/L	--
Nickel (in only one well)	9.7	μg/L	100
Zinc	21.9	μg/L	--

μg/L = micrograms per liter

SOURCE: Geosyntec, 2010

No other chemicals were detected above their respective reporting limits.

Sediment within the vicinity and underlying a north-south drainage ditch has been impacted by Bunker C fuel oil and metals. Currently, surface water is conveyed in a number of stormwater system components, including the "brick arch" sewer, with ultimate discharge into San Francisco Bay. The surface water drainage ditch has been identified as a preferential pathway allowing impacted surface water and suspended sediments to be transported into San Francisco Bay (Geosyntec, 2010).

Remedial Action Plans (RAPs) for OU-2 were initially proposed by the landowner in a 2002 Final Revised RAP (Burns & McDonnell, 2002a***)*** and then revised in the 2004 Interim Remedial Measures (IRMs) work plan (Burns & McDonnell, 2004). Interim remedial measures for OU-2 were approved by the RWQCB in the 2004 Interim Remedial Measures Work Plan (Burns & McDonnell, 2005). However, because specific land uses are now being proposed within the Project Site as part of the Project Site development described in Chapter 3, *Project Description*, of this EIR, alternative remedial activities are being considered and will be finalized in a revised RAP for OU-2. Regardless of the specific land uses ultimately approved for the OU-2 area, remediation must occur.

Soil Gas in OU-2. No known soil vapor studies have been conducted for OU-2. The remedial strategy is to excavate and dispose of VOC-impacted soil, thereby removing the potential source for soil vapors and making it unnecessary to implement other measures to block the exposure pathway (Geosyntec, 2012a).

Recology Solid Waste Transfer Facility

The existing 44-acre Recology Solid Waste Transfer Facility (Recology) site is located within the Project Site, and is situated partially within the City of Brisbane and partially within the City and County of San Francisco. Operational activities include waste transfer, materials recovery, public disposal and recycling, vehicle weighing and maintenance, organics transfer, fueling, temporary hazardous materials storage, fleet parking, cart and container maintenance and storage. The facility included seven underground storage tanks (USTs) within a small area in the center of the facility that were removed in the mid to late 1990's. The Recology site is partly located over former landfill, as would be the proposed expansion area.

Data indicates that multiple investigations and removal actions occurred between 1986 and 1999. Since February 1988, the site has been in the verification monitoring stage of the regulatory process.[21] Groundwater at the site is impacted by total petroleum hydrocarbons in the form of diesel fuel. Data from the most recent remedial investigation report indicate groundwater flow direction at the site is to the south toward the balance of the Project Site and that concentrations of total petroleum hydrocarbons in the form of gasoline, diesel, and motor oil at the site exceed the groundwater environmental screening levels (Fugro, 2011).

[21] Generally, sites that have undergone some removal actions will be monitored for a period of time to ensure source removal and to monitor for potential changes as groundwater levels fluctuate with the seasons.

Petroleum hydrocarbons were released to soil and groundwater at the Recology site from underground storage tanks (USTs) and dispensers (Fugro, 2011a). Site investigation and remediation activities commenced at the Recology site in August 2000. Two extraction wells were installed to remove free-floating petroleum product. On March 22, 2011, one extraction well had a sheen, and the other extraction well had no observable floating petroleum product. Groundwater in selected wells was sampled and analyzed in September 2010 for the following compounds (Fugro, 2011a) (but not all of the listed compounds were analyzed in all wells):

- TPHd
- TPHmo
- TPHg
- BTEX
- MTBE
- Inorganic parameters (pH, electrical conductivity, dissolved oxygen)

Results of analyses (see **Table 4.G-6**) indicate that groundwater in the former underground storage tank (UST) area is affected primarily by petroleum hydrocarbons.

TABLE 4.G-6
MAXIMUM CONCENTRATIONS OF CHEMICAL COMPOUNDS IN RECOLOGY WELLS

Chemical Compound	Maximum Concentration	Units	California Maximum Contaminant Level (MCL)
TPHg	180	µg/L	--
TPHd	1,000	µg/L	--
MTBE	2.2	µg/L	5

µg/L = micrograms per liter

SOURCE: Fugro, 2010

Other Hazardous Facilities on Project Site

Other hazardous material facilities on the Project Site include hazardous material generators, sites with leaking tanks or other soil and groundwater contamination issues, and landfills[22].

Hazardous Waste Generators

Four small quantity generators of hazardous waste (SQGs) are located within the Project Site. While the database search identifies generators of hazardous waste or owners of storage tanks that hold potentially hazardous materials, the existence of these generators and storage facilities does not necessarily indicate that the contents have been released to the environment in such a way that would affect the Project Site or other uses in the area. However, since these facilities may need to

[22] Under regulatory guidelines the term “landfill” can refer to any solid waste disposal facilities that could include not only municipal waste but also other facilities that accept waste such as biosolids (byproducts from sanitary waste facilities), compost land farms, and others.

be removed during development of the Project Site, the hazardous materials at these four small quantity generator sites are as follows:

- **Hernandez Automotive SVC/Tiger's Automotive (MAP ID#H68/H69/H70, 23 Industrial Way).**[23] This facility, which is located within OU-2, is a truck and equipment repair and maintenance shop. The facility generates spent solvents, paint sludge, and waste oil. No notices of violation were found to have been issued during the database search. Thus, there is no indication that contamination is present at this site, other than the contamination already identified within OU-2.
- **Advance Carbon Products, Inc. (MAP ID#E43, 171 Industrial Way).** This facility, which is located within OU-2, generates organic solids and laboratory waste chemicals. No notices of violation were found to have been issued during the database search. Thus, there is no indication that contamination is present at this site, other than the contamination already identified within OU-2.
- **SCARAB (MAP ID#E42, 180 Industrial Way).** This facility is located within OU-2. The facility generates hydrocarbon solvents. No notices of violation were found to have been issued during the database search. Thus, there is no indication that contamination is present at this site, other than the contamination already identified within OU-2.
- **LD Truck and Equipment Repair (MAP ID#B8, 374 Industrial Way).** This small quantity generator, which is located within OU-2, is a truck and equipment repair and maintenance shop. Waste generated includes tetrachloroethylene (TCE). No notices of violation were found to have been issued during the database search. Based on the database search, there is no indication that contamination is present at this site, other than the contamination already identified within OU-2.

Existing Waste Facilities

There are two active operations within the Project Site that accept waste materials. These include:

- **Davey Tree Company (Map ID #E49, 131 Industrial Way).** This Class III[24] facility is a small active processing facility that accepts landscape materials for chipping and composting. Other than contamination from the already identified operable units, there is no indication of contamination being present at this site. Further, based on the nature of the operations at this site, which does not accept hazardous materials, it is unlikely that the Project Site will be impacted by former operations at this facility. This site facility will be removed as part of the Project Site development.
- **San Francisco Household Hazardous Waste Facility (MAP ID# Y283-286, 501 Tunnel Avenue).** This is an active collection facility that accepts household hazardous waste from residents in limited quantities, tires, landscape materials, construction/demolition debris, and inert materials. This facility accepts household hazardous wastes for transfer and disposal at an offsite location. This site is co-located with the Recology facility which was discussed in more detail above.

---

[23] MAP ID# refers to map identification numbers that were included in the EDR database report which can be cross-referenced in Appendix-H.

[24] Landfills are generally categorized according to three classifications (Class I, II, and III) which reflect the type of materials that can be accepted. Class I landfills can accept hazardous waste, Class II can accept "designated" hazardous waste and nonhazardous materials and Class III landfills can only accept nonhazardous wastes.

Other Areas of Contamination

In addition to soil and groundwater contamination associated with the former landfill, there are two Spills, Leaks Investigation and Cleanup (SLIC) and Leaking Underground Storage Tank (LUST) sites[25] that are within the Project Site and are still open cases. These investigations are overseen by the RWQCB. Additional Spills, Leaks Investigation and Cleanup and Leaking Underground Storage Tank sites within the Project Site that are closed are listed in the Environmental Data Resources, Incorporated report provided in Appendix H of this Draft EIR. The sites are as follows:

- **Kessler & Kessler (Map ID # B20, 350 Industrial Way).** This site, which is located within OU-2, is both a Spills, Leaks Investigation and Cleanup and Leaking Underground Storage Tank site. Records available on the SWRCB Geotracker website indicate that a leak was discovered in 1991. The preliminary assessment commenced in 1992, and concluded that soil and groundwater onsite was impacted with TPH and BTEX. The current clean-up status of the Site is "Open-Inactive" (GeoTracker, 2013).
- **Kessler & Kessler (Map ID # B36, 250 Industrial Way).** Also located within OU-2, this site is both a Spills, Leaks Investigation and Cleanup and Leaking Underground Storage Tank site. Records available on the SWRCB GeoTracker website indicate that a leak was discovered in 1988. The preliminary assessment commenced that same year and concluded that onsite soil and groundwater were impacted with TPH and BTEX. The current clean-up status of the Site is "Open-Inactive" (GeoTracker, 2013).

Overview of Existing Conditions in the Vicinity of the Project Site

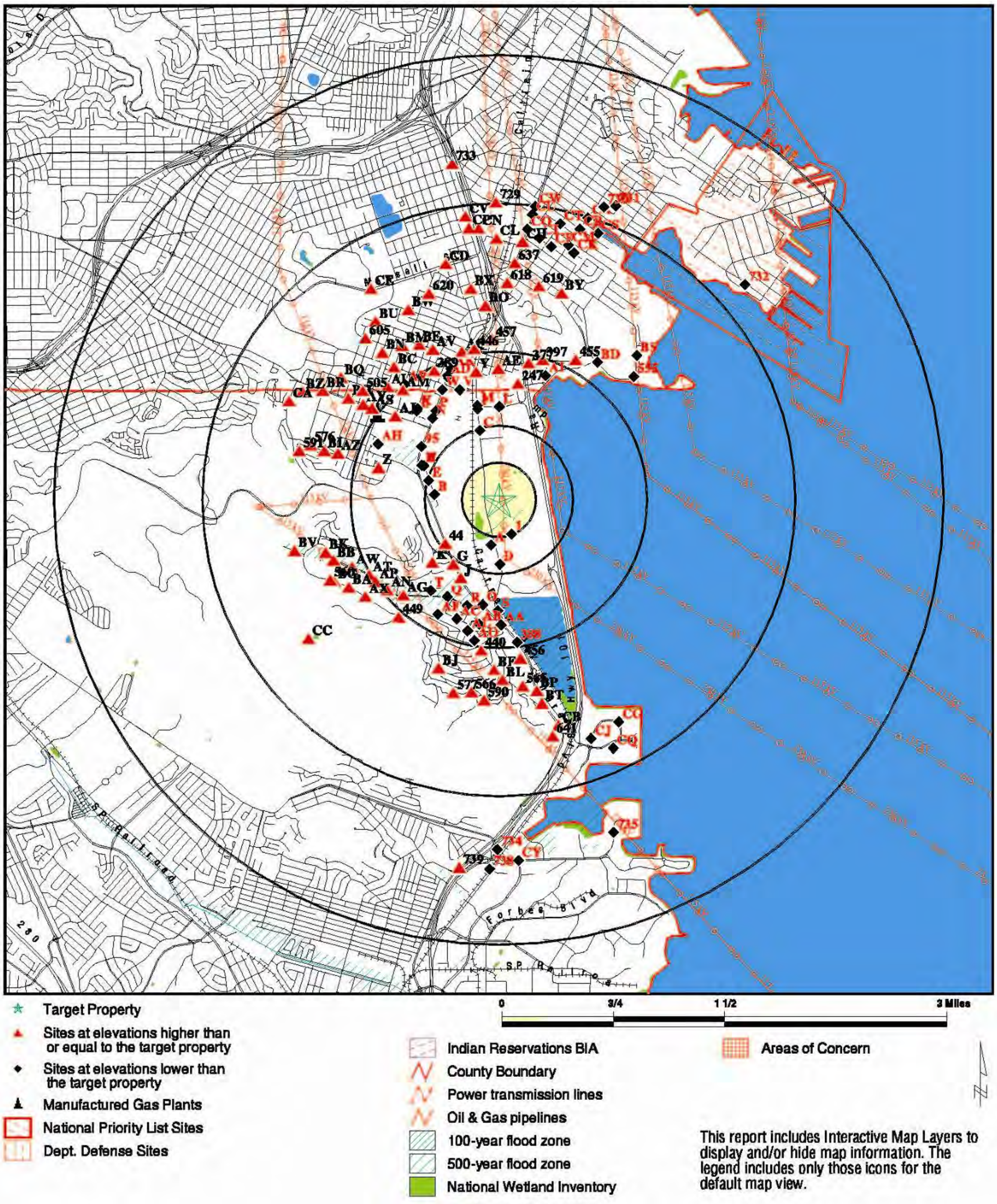
Environmental Data Resources, Inc. (EDR) performed a computerized public records search of government hazardous materials databases in April 2011.[26] The database search was conducted for all sites located within 2.5 miles from the center of the Project Site in order to ensure that all pertinent hazardous materials sites within 1 mile of the Project Site boundary were identified. **Figure 4.G-7** provides a map of the area searched and an overview of the identified hazardous sites. **Table 4.G-7** lists identified the number of hazardous sites for each database located within the Project Site vicinity (i.e., outside of the Project Site but within the 2.5-mile search radius).

Hazardous sites within the Project Site were discussed in under "Overview of Existing Conditions at Project Site" above.

Appendix H of this EIR presents a complete list of the databases searched and information concerning the governing agencies, the sites identified in the Project Site vicinity, and a map locating all sites. Although the agency lists are updated regularly, there may be contaminated sites that have not yet been identified and, therefore, are absent from the databases.

---

25 SLIC – Spills, Leaks, Investigations, and Cleanup; LUST – Leaking Underground Storage Tank
26 The 2010 baseline for analysis of this Project originates from the 2010 issuance of Notice of Preparation, however the more recent EDR database search was used to capture any more recent additions to the databases that might more accurately reflect conditions closer to potential development.



SOURCE: EDR, Inc. (2011) TeleAtlas Rel. (7/2009); CDM

Brisbane Baylands . 206069

Figure 4.G-7
Identified Hazardous Materials Sites

TABLE 4.G-7
GOVERNMENT DATABASES LISTING HAZARDOUS SITES IN PROJECT SITE VICINITY

	Date EDR Contacted Agency	Number of Sites
Federal Records Databases		
National Priority List (NPL)	12/31/2010	1
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	11/30/2010	2
CERCLIS No Further Remedial Action Planned (NFRAP)	10/28/2010	2
Resource Conservation and Recovery Act (RCRA) CORRACTS	5/25/2010	1
RCRA Transport, Store, Treat or Dispose (TSD) Facilities	2/17/2010	1
RCRA Large Quantity Generators (LQG)	2/17/2010	7
RCRA Small Quantity Generators (SQG)	2/17/2010	35
Emergency Response Notification System (ERNS)	12/31/2010	61
Hazardous Materials Information Reporting System (HMIRS)	12/31/2010	7
FIFRA/TSCA Tracking System (FTTS)	4/9/2009	6
Section Seven Tracking System (SSTS)	12/31/2009	2
Facility Index System (FINDS)	4/14/2010	76
Department of Transportation, Office of Pipeline Safety (DOT-OPS)	10/13/2010	1
Formerly Used Defense Sites (FUDS)	12/31/2009	1
Mines Master Index File (MINES)	8/4/2010	1
State and Local Records Databases		
DTSC Involved Cleanup (RESPONSE)	2/7/2011	9
State Landfill	2/2/2011	5
Waste Management Units (WMUDS)	4/1/2000	10
California Water Resources Control Board – Waste Discharge System (CA WDS)	6/19/2007	3
Cortese Hazardous Waste and Substances Sites List	1/4/2011	74
Recycling Facilities (SWRCY)	11/8/2010	1
Leaking Underground Storage Tanks (LUST)	2/3/2011	105
California Facility Inventory Database (CA FID UST)	10/31/1994	23
Spills, Leaks, Investigation & Cleanup Cost Recovery Listing (SLIC)	2/3/2011	7
San Mateo County Hazardous Materials Business Plan (BI)	2/14/2011	173
Underground Storage Tank Facilities (UST)	2/3/2011	29
Hazardous Substance Storage Container Database (HIST UST)	10/15/1990	41
Aboveground Storage Tank Facilities (AST)	8/1/2009	9
Statewide Environmental Evaluation and Planning System (SWEEPS UST)	6/01/1994	49
California Hazardous Material Incident Reporting System (CHMIRS)	12/31/2009	31
Deed Restriction Listing (DEED)	12/14/2010	4
Voluntary Cleanup Program Properties (VCP)	2/7/2011	3
Toxic and criteria pollutant emission sites (EMI)	12/31/2008	32
Clandestine Drug Labs (CDL)	12/32010	0
Facility and Manifest Data (HAZNET)	12/31/2009	206
Drycleaners	9/15/2010	5

SOURCE: EDR, 2011.

Hazardous Materials Management Facilities in Project Site Vicinity

The EDR report contains databases that include both sites where unauthorized releases of hazardous materials have occurred, as well as permitted facilities that handle or store hazardous materials, also referred to as hazardous materials management facilities, which have not necessarily released hazardous materials into the environment. The following hazardous materials management facilities were identified within the Project Site vicinity (defined as the search radius described above):

- 35 small quantity generators (SQG), including four that are located between a quarter-mile and half-mile from the Project Site;
- 1 hazardous materials transportation, storage and/or disposal (TSD) site;
- 7 large quantity generators (LQG); and
- 9 registered above-ground storage tank (AST) facilities.

Based on the database information, the following locations, due to their characteristics and proximity to the Project Site, are listed as a potential concern for future Project Site development. Hazardous waste generators located farther than one mile from the Project Site boundaries are unlikely to affect the Project Site because they are considered to be too far away to have any substantive effects. Such sites are therefore not discussed in detail. Of the 19 locations identified within one mile of the Project Site boundaries during the database review, 16 of the locations were reported to be in good regulatory standing, with no record of Notice of Violations (NOVs) issued from regulatory agencies and are therefore found to be unlikely to pose an environmental risk to the Project Site.

Three locations have been issued Notices of Violations as follows:

- **Quicksilver Products (Map ID# Q156/157/158, 200 Valley Drive)** – This is a transport facility that accepts waste including elemental mercury waste from offsite sources and, thus, is a transportation, storage and/or disposal facility. Additionally, this facility was a large quantity generator as recently as 1997 for the generation of non-ferrous metals. A corrective action was initiated by California Department of Toxic Substances Control (DTSC) at the site in 1990 and terminated in 1999. The site received 38 NOVs between 1989 and 1996. The facility achieved compliance on all issues by December 31, 1998 (EDR, 2011).
- **VWR International LLC (MAP ID#BP575, 3745 Bayshore Boulevard)** – This facility manufactures scientific products and is a large quantity generator. The facility received a Notice of Violation in 1986 and has been in compliance since 1987 (EDR, 2011). Wastes generated include halogenated and oxygenated solvents. This facility is in the process of terminating operations on a permanent basis.
- **SFPP, L.P/ Chevron/ Tosco Corp Brisbane Terminal (Map ID # A2/A3/S170, 950 Tunnel Avenue)** – This is a bulk terminal storing fuel, waste oil, organic solvents, and other liquid hazardous materials that is classified as a large quantity generator, small quantity generator, and a storage location. Wastes generated include ignitable aqueous wastes and benzene. The site received a Notice of Violation on December 20, 2005, and achieved compliance the same day (DTSC).

All sites listed above are currently in good standing with all federal, state, and local hazardous materials management regulations (EDR, 2011). The complete list of small quantity generators (SQGs) and large quantity generators (LQGs) is provided in the EDR report in Appendix H-1 of this EIR.

Landfills in Project Site Vicinity

One active landfill and one inactive landfill were identified in the vicinity of the Project Site as follows:

- **Associated Trucking Inc. (Map ID # CL680, 350 Paul Avenue)** – This is a small active landfill associated with a trucking and transportation facility, accepting small volumes of construction/demolition debris and inert materials.
- **Sierra Point Landfill (Map ID # CJ657/ CQ699-701, 1000 Marina Boulevard) –** This is an inactive landfill located more than 1 mile away from the Project Site boundary that is partially redeveloped as a commercial/office park and marina. Under a post-closure agreement with the Department of Environmental Health Division of the San Mateo County Health System, Sierra Point Landfill currently monitors for landfill gas generation at perimeter and surface emissions monitoring locations. As part of the regulatory requirements, any soil gas exceedances must be addressed to suit the existing land uses. Leachate and landfill gas continue to be monitored at the landfill.

Based on location and elevation, none of the landfills/collection facilities listed above has onsite contamination that could pose a risk to human health or the environment during construction activities or following future development on the Project Site (EDR, 2011).[27]

Soil/Groundwater Contamination in Project Site Vicinity

The following sites were identified as having soil and/or groundwater contamination in the vicinity of the Project Site:

- 105 Leaking Underground Storage Tanks (LUST) Program sites; and
- 7 Spills, Leaks, Investigation and Cleanup Program (SLIC) sites.

Based on information provided by the database search, 94 of the Leaking Underground Storage Tank sites and 5 of the Spills, Leaks Investigation and Cleanup sites have received closure from the governing agency, indicating that the contamination was found to be sufficiently contained (EDR, 2011). The remaining 11 Leaking Underground Storage Tank sites and 2 Spills, Leaks Investigation and Cleanup sites (identified in **Table 4.G-8**) are open cases overseen by the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region.

[27] Page 10 of the Executive Summary shows that only the Associated Trucking site is located on an equal or higher elevation and it is not included on any other databases with documented unauthorized releases.

TABLE 4.G-8
SOIL/GROUNDWATER CONTAMINATION SITES PENDING IN PROJECT SITE VICINITY
(*OPEN* LEAKING UNDERGROUND STORAGE TANK *AND* SPILLS,
LEAKS INVESTIGATION AND CLEANUP *SITES)*

	Map ID	Address
Leaking Underground Storage Tanks (LUST)		
Pacific American Services	AM380	450 Allen
Bayshore Gas & Service LLP	AQ441	2260 Bayshore Boulevard
McDonald’s Restaurant	AY486/AY487	2750 Geneva
Former Auto Repair Facility	CH651	6201 3rd Street
Commercial Building	CH654	6199 3rd Street
Exxon RAS #7-8959	CP697	2985 San Bruno Avenue
ARCO #02056	CP698	2990 San Bruno Avenue
V & A Auto Repair	N126	2800 Bayshore Boulevard
Stephens Family Trust	CI688	1428 Egbert Avenue
Sunset Scavenger (within Project Site)	M96	515 Tunnel Avenue
Former Gasoline Station	CT713	2495 Jennings Street
Spills, Leaks, Investigations and Cleanup (SLIC)		
Kinder Morgan Tank Farm	S177-S194	950 Tunnel Avenue
Heidelberg West Inc.5700 3rd Street	AG321	355 Valley Drive

NOTE: Table does not include sites within the Project Site, which are discussed separately below.

SOURCE: EDR, 2011.

The following seven sites (four Leaking Underground Storage Tank sites and two Spills, Leaks Investigation and Cleanup sites) were determined to have groundwater impacts with the potential to affect the Project Site[28]:

- **Schlage Lock Facility (MAP ID# AK365, 2401 Bayshore Boulevard).** This site is a former manufacturing facility that is no longer in operation and is currently undergoing environmental cleanup. According to the database review, wastes generated include contaminated soil. This site is a small quantity generator and was formerly a large quantity generator. The facility received four notices of violations in 2002 and achieved compliance in 2002. This site is now part of the Visitacion Valley redevelopment project area.

- **Pacific American Services (Map ID # AM380, 450 Allen Way).** This site is located approximately 1,300 feet west-northwest of the Project Site. Data reviewed indicates that source removal occurred in 1993 and 1994 and the site assessment was opened in October 2008. Groundwater at the site is impacted with the primary contaminant of concern being total petroleum hydrocarbons (TPH) as diesel. Although the full extent of the hydrocarbon contamination has not been identified to the east, based on the age of the release and the distance from the Project Site, this Leaking Underground Storage Tank site is unlikely to

28 Determination is made on the basis of the assumption that groundwater flow direction generally mimics surface topography.

result in adverse environmental conditions, such as contamination or additional environmental risk, at the Project Site (West, 2011).[29]

- **Bayshore Gas & Service LLP (Map ID # AQ441, 2260 Bayshore Boulevard).** This site is located approximately 1,460 feet north of the Project Site. The site assessment was opened in November 1994. Data reviewed indicate that tanks were removed from the site in 1994 and 2002. Groundwater at the site is impacted with TPH gasoline. Based on recent groundwater monitoring reports, regional groundwater flow is estimated to be towards the San Francisco Bay (Golden Gate Environmental, Inc., 2009). Based on the cross-gradient location of the Project Site to the Bayshore Gas & Service site, this Leaking Underground Storage Tank site is unlikely to result in adverse environmental conditions, such as contamination or additional environmental risk, at the Project Site.[30]

- **McDonald's Restaurant (Map ID # AY487, 2750 Geneva Avenue).** This site is located approximately 2,580 feet west-northwest of the Project Site. Data reviewed indicate that a removal action occurred in 1986 and verification monitoring started in September 2001 (EDR, 2011). Groundwater at the site is impacted with TPH as gasoline. Data from a January 2010 site investigation report indicate that samples from monitoring well MW-4, which is farthest down-gradient of the site, have no detectable concentrations of TPH as gasoline. Based upon this limited extent of contamination and distance from the Project Site, this Leaking Underground Storage Tank site is unlikely to result in adverse environmental conditions, such as contamination or additional environmental risk, at the Project Site.

- **V & A Auto Repair (Map ID # N126, 2800 Bayshore Boulevard).** This site is located adjacent to the Project Site, across Bayshore Boulevard. Data reviewed indicate that a removal action occurred in 2008 and that, as of March 2010, the site is in the site assessment stage of the regulatory process.[31] Groundwater at the site is impacted by TPH as gasoline, benzene, toluene, ethylbenzenes, and xylenes (BTEX). Data from the most recent groundwater monitoring report indicate that groundwater flow direction at the site is to the south, in the direction of the Project Site, and that contaminants of concern are present at the site above Regional Water Quality Control Board, San Francisco Bay Region, environmental screening levels (ESLs). However, the most recent groundwater monitoring report also indicates that during the 2009 groundwater monitoring round, contaminants of concern were not detected (i.e., below laboratory detection levels) in monitoring wells located between the source area and the Project Site (Environmental Resource Group, Inc., 2009).

- **Heidelberg West, Inc. (Map ID # AG321, 355 Valley Drive).** This site is located approximately 1,980 feet west-southwest of the Project Site. Data reviewed indicate that tank removal actions occurred in 1987 and 1991; and as of August 1987, the site is in the Site Remediation stage of the regulatory process. Groundwater at the site is impacted by trichloroethylene (TCE) and is currently being treated by a groundwater extraction and treatment system. Data from the most recent remedial investigation report indicate

[29] Hydrocarbons will naturally degrade over time into harmless components and generally do not migrate very far) from the original source.
[30] Similar to the concept of an object rolling downhill, groundwater movement also goes from higher elevations to lower elevations. Sites that are at relatively similar groundwater elevations are then considered to be cross-gradient and would not affect one another.
[31] Generally, once COCs have been identified in either soils or groundwater, a site will remain in the Site Assessment stage until both the vertical and horizontal extent of contamination have been clearly defined.

groundwater flow direction at the site is to the east and northeast and that no contaminants of concern were detected in groundwater downgradient of the site (Aquifer Sciences, Inc., 2009). Based upon the limited extent of contamination, which does not extend beyond the site and is being actively remediated, this Spills, Leaks Investigation and Cleanup site is unlikely to result in adverse environmental conditions at the Project Site, such as contamination or additional environmental risk.

- **Kinder Morgan/SFPP LP/Brisbane Terminal (also known as Kinder Morgan Tank Farm) (Map ID # S177-194, 950 Tunnel Avenue).** Petroleum hydrocarbons were released to soil and groundwater at the Kinder Morgan Energy Tank Farm, and have been under investigation since the early 1990s (LFR, 2008). This Spills, Leaks Investigation and Cleanup site is surrounded by, but not within the Project Site boundaries. The Kinder Morgan/SFPP LP/Brisbane Terminal site is a bulk petroleum storage facility and distribution terminal. The facility has 21 above ground storage tanks, which are constructed on a bedrock outcrop to the west of the former Brisbane Landfill. Five loading rack facilities, where transport trucks are filled with petroleum products, are also located at the site. The Kinder Morgan Terminal is an important nexus in the fuel distribution system for Northern California and the Bay Area. In addition to supplying fuel to retail service stations in the Bay Area, the terminal provides aviation fuel to San Francisco International Airport. Since the early 1990s, Kinder Morgan has conducted subsurface assessments, including the installation of 33 groundwater monitoring wells, to evaluate impacted soil and groundwater quality conditions in the vicinity of the site.

  Previous remedial actions have occurred between 1998 and 2006 and consisted of dual-phase extraction, non-aqueous phase hydrocarbons (NAPH) recovery and soil excavations. The current approved remedial activities being implemented are monitored natural attenuation (MNA) for the dissolved phase petroleum hydrocarbon plume in shallow groundwater and NAPH recovery using absorbent socks and hand bailing in wells exhibiting NAPH near the manifold and loading rack areas of the site (Arcadis, 2011).

  Conclusions in the Semiannual Groundwater Monitoring Report, July 1 to December 31, 2010, prepared for Kinder Morgan, have been reviewed and are summarized below (Arcadis, 2011):

  - Soil impacts are limited to the Kinder Morgan property.

    - Based on the total dissolved solids (TDS) concentrations, which are greater than 1,000 milligrams per liter (mg/L) (upper limit for drinking water supplies established in CCR Title 22, Section 64449), groundwater beneath the [Kinder Morgan] Project Site is not considered to be a drinking water supply. Though water samples were found to be above estuary habitat environmental screening levels in surface waters adjacent to the Kinder Morgan facility, it was determined that the Kinder Morgan facility was not the source (Arcadis, 2011).

    - Groundwater contaminants of concern include non-aqueous phase hydrocarbons, total petroleum hydrocarbons, benzene, and methyl tert-butyl ether (MTBE). The total petroleum hydrocarbons groundwater plume extends off the Kinder Morgan site underneath the footprint of the Brisbane Landfill. However, concentrations of contaminants of concern extending underneath the Brisbane Landfill are below environmental screening levels.

- Groundwater was first encountered at a depth of 2 to 13 feet below the top of casing in the monitoring wells. Impacted groundwater beneath the Kinder Morgan site generally flows in a radial pattern outward from the center of the northern tank farm to the northeast and east towards the Brisbane Landfill. Recent groundwater measurements indicate that there is also a localized area of groundwater flow, westward from the Brisbane Landfill into the Kinder Morgan site.

- During the fourth quarter of 2010, the concentration trends for total petroleum hydrocarbons, BTEX compounds, and MTBE were generally stable or decreasing in the majority of monitored site wells, but a few of the wells showed increasing concentrations. Plume extent for the majority of the contaminants has been shown to be stable or decreasing.

- The presence of contaminants attributable to the Brisbane Landfill (e.g., chlorobenzene) supports the theory that groundwater flow beneath the landfill is a contributing source of groundwater contamination in the northeastern portion of the Kinder Morgan facility (Arcadis, 2011). This theory has also been documented and confirmed by the RWQCB. Therefore, the combined groundwater flow directions and distribution of contaminants of concern in groundwater suggests that groundwater from the Brisbane Landfill is affecting groundwater beneath the Kinder Morgan site (Arcadis, 2011).

  A report prepared for the site that evaluated various remediation alternatives, known as a Remedial Action Effectiveness Evaluation, concluded that the recent trends showing decreasing total petroleum hydrocarbons and volatile organic compounds (VOC) concentrations and the overall decreasing contamination plume size are largely the result of natural processes where the contaminants degrade into harmless elements (Arcadis, 2011). A screening level risk evaluation conducted as part of the Remedial Action Effectiveness Evaluation found that concentrations of contaminants of concern in the Kinder Morgan groundwater plume, on the site, and below the landfill remain below the environmental screening levels (ESLs) for Indoor Air for Commercial/Industrial Land Use as established by the RWQCB. Concentrations of contaminants of concern in soil are above environmental screening levels for protection of a construction worker; however, protective measures are in place for construction workers at the Kinder Morgan facility.

In addition, as part of the 2011 Remedial Action Effectiveness Evaluation (Arcadis, 2011) for the Kinder Morgan site, the possibility of volatilization of contaminants of concern from groundwater to indoor air was evaluated assuming potential commercial use. Maximum detected concentrations of volatile constituents were found to be below environmental screening level for the protection of indoor air in a commercial or industrial setting (Arcadis, 2011). This evaluation was performed for the well with the highest detected levels of contaminants of concern, located in the center of the Kinder Morgan property. Volatile constituents in wells bordering the Project Site have most recently been below laboratory detection levels with the exception of one well in the northeastern corner of the site that is impacted by contaminants of concern from the Brisbane Landfill, as discussed above.

4.G.3 Regulatory Setting

Development within the Project Site must comply with federal, state, regional, and local regulations. This section discusses requirements to the extent that they will affect Project Site development.

Federal Regulations

Hazardous Materials Management

The primary federal agencies responsible for hazardous materials management include the U.S. Environmental Protection Agency (U.S. EPA) and the U.S. Department of Labor Occupational Safety and Health Administration (OSHA).

Resource Conservation and Recovery Act of 1976

The U.S. EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste in a “cradle to grave” manner through the Resource Conservation and Recovery Act (RCRA). RCRA sets standards for hazardous waste treatment storage and disposal units intended to manage hazardous wastes in a manner that minimizes present and future threats to the environment and human health. RCRA was amended in 1984 to reaffirm the regulation from generation to disposal and to prohibit the use of certain techniques for hazardous waste disposal. The U.S. EPA has largely delegated responsibility for implementing the RCRA program to the State of California, which implements this program through the California Hazardous Waste Control Law.

Remediation of existing contamination on the Project Site may be subject to certain RCRA requirements that apply to contaminated soil or groundwater. In addition, proposed commercial uses on the Project Site area may generate or handle hazardous waste that could subject the Project Site development to RCRA requirements.

Emergency Planning and Community Right-to-Know Act of 1986

Through the Emergency Planning and Community Right-to-Know Act of 1986 (also known as Title III of Superfund), the U.S. EPA also imposes requirements that hazardous materials are properly handled in order to prevent or mitigate risk to human or environmental health in the event of an accidental release.

Occupational Safety and Health Act of 1970

Federal and occupational health and safety regulations also contain provisions regarding hazardous waste management through the Occupational Safety and Health Act of 1970 (amended), which is implemented by OSHA. Code 29 of Federal Regulations (29 CFR) requires special training of handlers of hazardous materials; notification to employees who work in the vicinity of hazardous materials; acquisition from the manufacturer of material safety data sheets (MSDS),which describe the proper use of hazardous materials; and training of employees to remediate any hazardous material accidental releases. OSHA regulates administration of 29 CFR.

Safety and Health Regulations for Construction

OSHA also establishes standards regarding safe exposure limits for chemicals to which construction workers may be exposed. Safety and Health Regulations for Construction (29 CFR 1926.65 Appendix C) contains requirements for construction activities, which include occupational health and environmental controls to protect worker health and safety. The guidelines describe the health and safety plan(s) that must be developed and implemented during construction, including associated training, protective equipment, evacuation plans, chains of command, and emergency response procedures.

Due to the known and potential existence of hazardous materials in the vicinity of the Project Site, adherence to applicable hazard-specific OSHA standards would be required to maintain worker safety. For example, methane is regulated by OSHA under 29 CFR Part 1910.146 relative to worker exposure to a "hazardous atmosphere" within confined spaces where the presence of flammable gas vapor or mist is in excess of 10 percent of the lower explosive limit.

Hazardous Materials Transportation Act

The transportation of hazardous materials is regulated by the Hazardous Materials Transportation Act (HMTA), which is administered by the Research and Special Programs Administration (RSPA) of the U.S. Department of Transportation (USDOT). The Hazardous Materials Transportation Act provides USDOT with a broad mandate to regulate the transport of hazardous materials, with the purpose of adequately protecting the nation against risk to life and property, which is inherent in the commercial transportation of hazardous materials. The Hazardous Materials Transportation Act governs the safe transportation of hazardous materials by all modes, excluding bulk transportation by water. The Research and Special Programs Administration carries out these responsibilities by prescribing regulations and managing a user-funded grant program for planning and training grants for states and Indian tribes. USDOT regulations that govern the transportation of hazardous materials are applicable to any person who transports, ships, causes to be transported or shipped, or are involved in any way with the manufacture or testing of hazardous materials packaging or containers. USDOT regulations pertaining to the actual movement govern every aspect of the movement, including packaging, handling, labeling, marking, placarding, operational standards, and highway routing. Additionally, USDOT is responsible for developing curriculum to train for emergency response, and administers grants to states and Indian tribes for ensuring the proper training of emergency responders. Hazardous Materials Transportation Act was enacted in 1975 and was amended and reauthorized in 1990, 1994, and 2005.

Landfills

RCRA regulates landfill siting, design, operation, and closure (including identifying liner and capping requirements) for licensed landfills. In California, RCRA landfill requirements are delegated to the California Department of Resources Recycling and Recovery (CalRecycle), which is discussed in detail below.

Soil/Groundwater Contamination

As noted above, RCRA allows the U.S. EPA to oversee the closure and post-closure of landfills. Additionally the federal Safe Drinking Water Act, 40 CFR Part 141 gives the U.S. EPA the power to establish water quality standards and beneficial uses for waters from below- or above-ground sources of contamination. For the Project Site, water quality standards are administered by the RWQCB.

Soil Gas

RCRA also allows the U.S. EPA to control risk to human health at contaminated sites. Vapor intrusion presents a significant risk to human populations overlying contaminated soil and groundwater and is considered when conducting human health risk assessments and developing Remedial Action Objectives.

State Regulations

Hazardous Materials Management

In the regulation of hazardous waste management, California law often mirrors or is more stringent than federal law. Enforcement of state laws has been delegated to a state or local agency. The California Environmental Protection Agency (CalEPA) and California Occupational Safety and Health Administration (CalOSHA) are the primary state agencies responsible for hazardous materials management. Additionally, the California Emergency Management Agency (CalEMA) administers the California Accidental Release Prevention (CalARP). DTSC (a branch of CalEPA) regulates the generation, transportation, treatment, storage, and disposal hazardous waste, as well as the investigation and remediation of hazardous waste sites. The California DTSC program incorporates the provisions of both federal (RCRA) and state hazardous waste laws.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

In 1996, CalEPA adopted the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The Unified Program consolidates and coordinates the six state programs that regulate business and industry use, storage, handling, and disposal of hazardous materials and wastes. For the Project Site, the San Mateo County Environmental Health Division is the Certified Unified Program Agency (CUPA). Under the Unified Program, any future user storing hazardous materials and/or waste at their business site will be required to submit business information and hazardous materials inventory forms to the CUPA.

California Accidental Release Prevention

In 1997 CalEMA implemented CalARP, which is intended to prevent accidental releases of those substances determined to potentially pose the greatest risk of immediate hazard to the public and the environment. Regulated materials are toxic and flammable substances listed in Tables 1 through 3 of CCR Title 19 Section 2770.5. Under the program, CUPAs interact directly with businesses that handle, manufacture, use, or store any of the regulated substances over a threshold level. Also, such businesses are required to file a Risk Management Plan with the local CUPA.

The regulations that define the Risk Management Plan process are found in the California Health and Safety Code Sections 25531-25543.3. A Risk Management Plan provides additional planning information that covers equipment and systems safety, operating procedures, preventive maintenance, upset risk assessments, and safety auditing. The State Office of Emergency Services has primary responsibility for regulating acutely hazardous materials. Local governments have the lead role for working directly with businesses in implementing this program. The Certified Unified Program Agency for the Project Site is the Environmental Health Division of the San Mateo County Health System.

Hazardous Waste Control Act

The Hazardous Waste Control Act was passed in 1972 and established the California Hazardous Waste Control Program within the Department of Health Services. California's hazardous waste regulatory effort became the model for the federal Resource Conservation and Recovery Act (RCRA). California's program, however, was broader and more comprehensive than the federal system, regulating wastes and activities not covered by the federal program. California's Hazardous Waste Control Law was followed by emergency regulations in 1973 that clarified and defined the hazardous waste program, as follows:

- Included were definitions of what was a waste and what was hazardous as well as what was necessary for appropriate handling, processing, and disposal of hazardous and extremely hazardous waste in a manner that would protect the public, livestock, and wildlife from hazards to health and safety.
- The early regulations also established a tracking system for the handling and transportation of hazardous waste from the point of waste generation to the point of ultimate disposition, as well as a system of fees to cover the costs of operating the hazardous waste management program.
- Advancing the newly developing awareness of hazardous waste management issues, the program established a technical reference center, for public and private use, dealing with all aspects of hazardous waste management.

Hazardous Waste Source Reduction and Management Review Act

Senate Bill (SB) 14 is the Hazardous Waste Source Reduction and Management Review Act of 1989. SB 14 requires hazardous waste generators to seriously consider source reduction as the preferred method of managing hazardous waste. Source reduction is preferable over recycling and treatment options because source reduction avoids waste generation costs and management liability. Source reduction also provides the best protection for public health and the environment.

Hazardous Material Response Plans and Inventory Law (AB 2185)

Any business handling hazardous materials (as defined in Section 25500 of California Health and Safety Code [CH & SC], Division 20, Chapter 6.95) is required to register as a hazardous materials handler and comply with California's Hazardous Material Response Plans and Inventory Law (AB 2185), which is also known as the Waters Bill. The Waters Bill requires that any release or threatened release of a hazardous material to a workplace or the environment be reported immediately to the local administering agency and the State Office of Emergency

Services, if the release or threatened release poses a significant present or potential hazard to human health and safety, property, or the environment, regardless of the amount of hazardous materials handled by the business. In addition, businesses handling more than 500 pounds of solid, 55 gallons of liquid, or 200 cubic feet of gaseous hazardous material at any one time are required to file a Business Plan, which outlines the facility's emergency response procedures and provides a chemical inventory, with the local administering agency. The reporting requirements do not apply if releases or threatened releases are associated with activities that have been authorized by a government agency.

California Code of Regulations

Title 8 – CalOSHA. CalOSHA administers federal occupational safety requirements and additional state requirements in accordance with California Code of Regulations Title 8. CalOSHA requires preparation of an Injury and Illness Prevention Program (IIPP), which is an employee safety program of inspections, procedures to correct unsafe conditions, employee training, and occupational safety communication. This program is administered via inspections by the local CalOSHA enforcement unit.

CalOSHA regulates lead exposure during construction activities under CCR Title 8, Section 1532.1, Lead, which establishes the rules and procedures for conducting demolition and construction activities such that worker exposure to lead contamination is minimized or avoided.

Compliance with CalOSHA regulations and associated programs would be required for the proposed Project due to the potential hazards posed by onsite construction activities and contamination from former uses.

Title 24, Part 9 – California Fire Code. The California Fire Code (http://publicecodes.cyberregs.com/st/ca/st/b300v10/index.htm) regulates the type, configuration, and quantity of hazardous materials that may be stored within structures or in outdoor areas. The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises; and to provide safety and assistance to firefighters and emergency responders during emergency operations.

Landfills

Title 27, Environmental Protection – Division 2, Solid Waste

In California, waste disposal on land is regulated by California Department of Resources Recycling and Recovery (CalRecycle) (formerly the California Integrated Waste Management Board). CalRecycle, through Title 27 of the California Code of Regulations, regulates the closure and post-closure activities at landfill sites. CalRecycle designates a local enforcement agency (LEA) to perform oversight of post-closure land uses at disposal sites. For the Project Site, the San Mateo County Environmental Health Division regulates landfills on behalf of CalRecycle. The California Air Resources Board (CARB), which regulates stationary and mobile air emission sources, also has enforcement authority. Landfill gas is regulated by the CARB through its local affiliate, the BAAQMD.

The requirements for post-closure land use of solid waste disposal sites are described in CCR Title 27, Section 21190 titled "CIWMB – Post-Closure Land Use." Title 27 requires that the proposed post-closure land use be designed and maintained to:

- Protect public health and safety and prevent damage to structures, roads, utilities, and gas monitoring and control systems;
- Prevent public contact with waste, LFG, and leachate; and
- Prevent LFG explosions.

The CalRecycle regulatory requirements described in CCR Title 27 Section 21190 apply to landfills that were operating on or after January 1, 1988. However, based on the LEA Advisory #51 dated July 22, 1998:

> If a significant change in post-closure land use is proposed for these sites (sites that ceased operating prior to January 1, 1988), a post-closure land use proposal should be submitted to the LEA to address compliance with 27 CCR 21190. The LEA is required to approve the proposed post-closure land use if the Project Site development involves structures within 1,000 feet of the disposal area, structures on top of waste, modification of the low permeability layer, or irrigation over waste (27 CCR 21190(c)).

Calderon Act of 1984

Additionally, the Calderon Act of 1984 required preparation of a Solid Waste Assessment Test (SWAT) and Solid Waste Air Quality Assessment Test (SWAQAT) for all landfill sites in California to determine whether a site, as a result of leakage of contaminants, contributed to degradation of groundwater quality or air quality. This was administered by the regional agency, which for the Project Site is the RWQCB.

California Department of Transportation – Hazardous Materials Transportation

Within California, the state agencies with primary responsibility for enforcing federal and state regulations and for responding to transportation emergencies are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). Together, federal and state agencies determine driver-training requirements, load labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Soil/Groundwater Contamination

Safe Drinking Water and Toxic Enforcement Act

The Safe Drinking Water and Toxic Enforcement Act, better known as Proposition 65, was passed into law by California in 1986. Proposition 65 authorizes the California Department of Health Services (DHS) to protect the public from contaminants in drinking water by establishing

MCLs that are as stringent as those required by the federal Safe Drinking Water Act. This initiative was developed in order to improve public health by reducing the incidence of cancer and adverse reproductive outcomes that might result from exposure to potentially hazardous chemicals. To carry out this mission, Proposition 65 requires the creation of a list of chemicals and substances and the levels at which they are believed to have the potential to cause cancer or deleterious reproductive effects in humans. The law also restricts discharges of these listed chemicals into known drinking water sources at levels above the regulatory levels of concern. Finally, Proposition 65 requires that a clear and understandable warning be given prior to a known and intentional exposure to a listed substance. The Project Site is subject to the provisions of Proposition 65 due to the potential for exposure of persons to Proposition 65-listed chemicals.

Porter Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1970 established the State Water Resources Control Board and nine RWQCBs within California. These entities are the primary state agencies responsible for protecting California water quality to meet present and future beneficial uses and regulating appropriative surface rights allocations. The RWQCB, San Francisco Bay Region, is the regional board responsible for the Project Site vicinity and specifically oversees both the former Brisbane Landfill and OU-2.

Soil Gas

CCR Title 8, Section 5155 Airborne Contaminants

CalOSHA regulates exposure to airborne contaminants during construction under CCR Title 8, Section 5155, Airborne Contaminants, which establishes the compounds that are considered a health risk, the exposure limits associated with such compounds, protective equipment, workplace monitoring, and medical surveillance required for compliance. Compliance with these CalOSHA regulations and associated programs would be required at the Project Site due to the potential hazards posed to construction workers from soil gas compounds that may exist onsite.

Murrell-Carlford Act

In 1967, California passed the Murrell-Carlford Act to establish the California Air Resources Board (CARB). The CARB regulates stationary sources of emissions to air as well as sources contributing to indoor air quality.

CalRecycle also allows the LEA, which for the Project Site is the SMCDEH, to regulate LFG emissions as part of the post-closure monitoring for inactive landfills.

Regional/Local Regulations

San Mateo County Hazardous Materials Business Plan Program

Businesses must complete a Hazardous Materials Business Plan (Business Plan) for the safe storage and use of chemicals. Firefighters, health officials, planners, public safety officers, health care providers, and others rely on the Business Plan in an emergency. The intent of the Business

Plan is to prevent or lessen damage to the health and safety of people and the environment when a hazardous material is released.

The Business Plan must include:

- Owner/operator information, including emergency contacts;
- The type and quantity of reportable hazardous materials;
- A site map;
- Spill prevention procedures;
- Emergency response procedures;
- An employee training program; and
- Record-keeping procedures.

In general, a business must submit a Business Plan to the County if it handles and/or stores a hazardous material equal to or greater than the minimum reportable quantities. These quantities are 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet (at standard temperature and pressure) for compressed gases. Radioactive materials and extremely hazardous substances are reportable in any amount.

City of Brisbane Policies and Programs

The City of Brisbane Fire Department is part of the North County Fire Authority, a Joint Powers Authority (JPA) established in 2003 that also serves the communities of Daly City and Pacifica. JPA operations are governed by the California Fire Code, as described above. The JPA administers the California Fire Code (CFC) through regular site inspections and issuance of notices of violation (NOVs) in cases of non-compliance.

The City of Brisbane's general policy on hazardous materials management is included in the City of Brisbane 1994 General Plan. Policies and programs within the Community Health and Safety Element that address hazardous materials management include the following:

> ***Policy 166:*** Protect the community's health, safety, welfare, natural resources and property through regulation of the handling and storage of hazardous materials, with specific focus on prevention of accidents.
>
>> *Program 166a:* Work closely with County, State and Federal agencies in the regulation of hazardous materials.
>>
>> *Program 166b:* Continue administration of Hazardous Materials Management Plans through the Brisbane Fire Department.
>>
>> *Policy 166.1:* Require disclosure, in a risk analysis, of all hazardous materials to be utilized in research and development and biotechnical research, the assumptions that were used, and methods of safe handling and disposal. The City has a concern with and may exclude research and development and biotechnical research uses which involve high use or generation of hazardous materials and/or do not address public safety in handling and disposal to the City's satisfaction.

Program 1661a: In connection with any application for a proposed specific plan or land use development project involving biotechnical research activities, determine the nature and extent of any regulations that should be adopted to protect the public health and safety before any such specific plan or land use development application is approved.

The General Plan also includes the following Health and Safety Element policies applicable specifically to the Baylands subarea:

Policy 369: Disclose, in a risk analysis, all hazardous materials to be utilized in research and development and biotechnical research, the assumptions that were used, and methods of safe handling and disposal. The City has a concern with and may exclude research and development and biotechnical research uses which involve high use or generation of hazardous materials and/or do not address public safety in handling and disposal to the City's satisfaction.

Policy 379: There shall be no fabrication, manufacturing, processing or treatment of materials in this subarea other than that which is directly incidental to a permitted or conditional use. There shall be no processing of hazardous waste materials.

Policy 389: Special attention should be paid to uses of the adjacent property that has potential for the storage and/or processing of hazardous materials.

The Safety Element of the City of Brisbane General Plan includes the following policies that are applicable to development on inactive landfills:

Policy 172: Establish that it is of the highest priority that contaminated lands in Brisbane be remediated.

Program 172a: Communicate this priority to responsible State and Federal agencies and encourage these agencies to establish remediation plans and programs.

Program 172b: Seek to direct State and Federal funds to remediate contaminated lands in Brisbane.

Program 172c: Require private property owners to remediate contaminated lands consistent with State and Federal requirements.

Program 172d: Continue to maintain good communications and working relationships with the CalEPA DTSC, the RWQCB and other agencies regulating remedial actions.

Policy 173: The City shall not grant approval of a development project on a contaminated site unless a plan for remediation of the site has first been approved and adopted by all Federal, State and local agencies having jurisdiction over the remediation plan.

Policy 174: Include the remediation requirements of Federal, State and local agencies in the process of making determinations on land use designations and development applications.

Program 174a: Take into account risk assessments and other technical studies prepared by governmental agencies when making land use determinations for contaminated lands.

Program 174b: Condition all final approval of development projects on full compliance with all orders, remediation programs and mitigation measures imposed by regulatory agencies.

Program 174c: Require applicants to provide for analysis by environmental engineers, toxicologists or other technical specialists deemed necessary by the City to process development applications and complete environmental review for projects on contaminated lands.

Policy 175: Assure that any development otherwise permitted on lands filled with municipal waste is safe by implementing the following programs.

Program 175a: Exchange information with the CIWMB, SMDEH, and other responsible agencies regarding the requirements for safe and successful landfill development, utilizing the experience of Sierra Point.

Program 175b: Require evidence that scientific testing and verification has taken place to the satisfaction of regulatory agencies.

Program 175c: Encourage property owners of filled lands to complete all testing and related requirements of the Federal, State and local agencies well in advance of requesting land use permits from the City.

The Safety Element of the 1994 City of Brisbane General Plan also includes the following policies that apply specifically to the Baylands area:

Policy 330.1: Prohibit housing on the Baylands.

Policy 362: Support County and regional efforts to maintain and improve water quality in San Francisco Bay. Work closely with responsible agencies to assure monitoring of the landfill so as to avoid toxic leaking into the Bay and to have property owners repair any leaks.

Policy 365: Comply with applicable Federal, State and regional standards for development on landfill.

Policy 367: Develop grading and drainage controls for landfill.

Policy 368: Comply with the requirements of remediation plans approved by the DTSC, the RWQCB and other responsible agencies in conjunction with development on lands that have been contaminated by toxic substances.

Policy 370: Provide a risk assessment analysis identifying toxic contamination, landfill limitations and other related factors and resultant environmental impacts in order to address, mitigate and disclose the characteristics of the land and its suitability for safe development[32].

---

32 The findings of studies completed to date characterizing contamination within the Project Site, delineating existing hazards and risks, identifying remediation actions taken to date, and evaluating impacts of remediation activities are presented in this Section of the EIR. Following certification of this EIR and selection of a Concept Plan establishing permitted uses for the Project Site by the City, the landowner will be required to undertake further studies to define the specific clean-up levels based on approved land uses and detail the specific remedial technologies that it proposes to employ to achieve those clean-up levels as part of the review and approval of Remedial Action Plans and landfill closure plans by the Regional Water Quality Control Board and DTSC.

> ***Policy 371:*** Disclose the underlying assumptions of all risk analyses for toxic lands and lands that are considered at risk for liquefaction.
>
> ***Policy 373.1:*** Work closely with the CIWMB and the BAAQMD to assure monitoring of regulatory air quality issues, especially those pertaining to grading, surcharging and methane emissions, by regulatory agencies.
>
> ***Policy 387:*** Development on landfill shall comply with applicable Federal, State and regional standards.
>
> ***Policy 391:*** Work closely with regulatory agencies to encourage ongoing toxic remediation programs and monitoring by those agencies.

In 2009, the City of Brisbane updated the Housing Element of its General Plan. The 2007-2014 Housing Element, includes the following policies that may apply to development at the Project Site:

> ***Policy H.H.2:*** Regulate the development of environmentally sensitive and hazardous lands to assure the mitigation of significant impacts.
>
>> *Program H.H.2.a:* Work with responsible agencies to protect identified environmentally sensitive areas, including, but not limited to, wetlands, riparian habitat, critical wildlife habitat, geologically hazardous areas, areas subject to flooding, visually prominent or sensitive areas, and electric transmission line corridors.

4.G.4 Impacts and Mitigation Measures

Significance Criteria

Based on Appendix G of the CEQA Guidelines, a proposed project would have significant impacts relating to hazards if the construction or operation of the project would:

- Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within 0.25 mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;
- Result in a safety hazard for people residing or working in the project area for a project located within an airport land use plan or, where such plan has not been adopted, be within 2 miles of a public airport use airport or public use airport;
- Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area;

- Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Impact Assessment Methodology

General Approach

The impact assessment evaluates the construction and operational impacts of the Project Site development, including the impacts of remediation of the former Brisbane Landfill, OU-1, and OU-2.

The assessment of hazardous waste effects that would occur under each Project Site development scenario focuses on hazards that would be encountered during construction and operation of proposed development. To identify hazards from proposed Project Site development, known hazardous materials at the Project Site were reviewed to assess the risks associated with their remediation. The EDR database was used to identify additional known hazardous material sites within the vicinity that could be disturbed during construction activities. Database information obtained on these sites was augmented by searching online databases of regulatory agencies to verify the closure status of sites or obtain information on the type and extent of contamination at the sites. Information on hazardous materials associated with the former Brisbane Landfill, OU-1, and OU-2 was obtained from publicly available documents located on the GeoTracker and EnviroStor websites and hazardous materials summary reports prepared for the Project Site.

Appendix H of this EIR contains a complete list of the databases searched, information describing the governmental agencies and their databases, and a map showing all of the sites. Figure 4.G-2 shows the location of these sites.

Impacts associated with air emissions are addressed in Section 4.B, *Air Quality*, of this EIR. Impacts associated with surface water quality are discussed in Section 4.H, *Hydrology and Water Quality*.

Implementation of remedial actions would occur under each of the four proposed development scenarios, and related impacts associated with earthmoving and transport and potential release of hazards would be similar for all scenarios, regardless of potential differences in cleanup levels based on the land uses that may ultimately be approved. Other types of potential hazards and hazardous materials effects, such as those related to the routine transport of materials, proximity to airports, and potential for hazards related to wildland fires, also would be similar for all four development scenarios. Therefore, the analysis of impacts associated with each of the four proposed development scenarios generally is grouped together in this section.

Approach to Analysis

The following impact analyses focus on whether the physical development of the Project Site would expose construction and maintenance workers, visitors, existing and future residents, employees, or ecological systems to hazards associated with identified contaminants throughout the life of proposed Project site uses. The analysis also addresses impacts associated with future construction and operation of proposed land uses on the Project Site. Construction and operation of proposed development would require the use and transport of hazardous materials, including fuels, oils and other chemicals during construction, as well as the storage and transport of potentially hazardous materials associated with building demolition and implementation and maintenance of remedial actions. Following certification of this EIR and selection of a Concept Plan setting forth permitted uses for the Project Site by the City, the landowner will be required to undertake further studies to define the specific clean-up levels based on approved land uses and risk-based clean up goals, and then detail the specific remedial technologies that it proposes to employ to achieve those clean-up levels as part of the review and approval of Remedial Action Plans and landfill closure plans by the Regional Water Quality Control Board and DTSC.

Project Site development includes implementation of required remedial actions associated with the former Brisbane Landfill, OU-1, and OU-2 which have been undergoing investigation, identification, and remediation as required by the California Department of Toxic Substances Control (DTSC) and Regional Water Quality Control Board (RWQCB). In general, proposed development on contaminated sites requires an approved remedial action plan to be completed and certified by the overseeing agency prior to development or change in land use. Ultimately, cleanup levels are determined on a site-specific basis, including potential exposure pathways, existing and future land uses, and the characteristics of the contaminants involved.

Remedial Actions on the Project Site

Remedial actions required for the former Brisbane Landfill, OU-1, and OU-2 would be completed prior to development and are described below.

Remedial Actions at the Former Brisbane Landfill

Based on the review of existing conditions, on-going monitoring and data collected as discussed in section 4G.2, current issues to be addressed in future landfill remediation include; the following:

- lack of a low permeability engineered landfill cap that is compliant with Title 27;
- the presence of leachate and the continued requirement to prevent any increases in leachate that exceed regulatory standards,
- hydrologic connectivity to groundwater and surface water (primarily the Central Drainage Canal),
- ongoing consolidation of refuse and underlying geologic materials (Bay Muds), and
- control of landfill gas.

Final remedial actions implemented at the former Brisbane Landfill ultimately will be defined by the RWQCB, CalRecycle/San Mateo County Department of Health Services, and the City of Brisbane within the Final Closure and Post-closure Plans and would be influenced by the nature of the proposed development. These Final Closure and Post-closure Plans would include:

- Operation and maintenance of the existing Leachate Seep Collection and Transmission System (LSCTS);
- Operation and maintenance of the landfill Gas Collection and Control System (GCCS);
- Continued groundwater, surface water, and leachate quality monitoring and evaluation;
- Installation of a final cover system over the entire landfill; and
- Operation and maintenance of a landfill gas collection and monitoring system.

In addition, proposed Project Site development would also be subject to land use controls such as deed restrictions that limit site uses and require notifications for any ground disturbances. All of these measures would be required by Title 27 CCR 21190, as defined by CalRecycle, in order to achieve landfill closure and to minimize or eliminate risk to human health and the environment under any of the proposed project scenarios. These actions, as they pertain to the former Brisbane Landfill, have been generally described in the Final Closure and Post-Closure Maintenance Plan (Burns & McDonnell, 2002b), and include the following components.

Landfill Final Cover System. In accordance with Title 27 of the California Code of Regulations, a 2-foot thick foundation layer using onsite cover material would be graded over the entire site. In addition, the finished grade elevations over the majority of the Project Site would accommodate the depth of the low-hydraulic-conductivity layer (LHCL), without the need to excavate into the refuse material. Any areas of the site that require excavation and relocation of refuse material (e.g., building foundations and utility infrastructure) would be completed in accordance with the Title 27 of the California Code of Regulations to ensure that the low-hydraulic-conductivity layer requirements are met. Additionally, as required by Title 27, long-term maintenance, as described below, would be required to ensure the continued integrity of the final cover system.

Activities associated with construction of the final landfill cover would include the following:

- Excavation and removal of approximately 3.7 million cubic yards of soil;
- Excavation and stockpiling of approximately 5 million cubic yards of soil;
- Relocation of approximately 41,500 cubic yards of refuse material, in order to achieve grade elevations for placement of the foundation layer and low-hydraulic-conductivity layer. The material will most likely be excavated using either excavators or bulldozers and hauled to lower-lying areas of the site within the landfill footprint. This relocated material will then be covered and capped. All relocation of refuse will be performed in accordance with a site-specific health and safety plan developed during the design process and reviewed/approved by CalRecycle and the San Mateo County Environmental Health Division.
- Construction of the 2-foot foundation layer;

- Placement of the low-hydraulic-conductivity layer at depths as described in the Infrastructure Plan, with different depths for building pads, utility corridors, and designated open space areas; and
- Replacement of the stockpiled material on the surface to bring the landfill to final development grades.

Landfill Gas Control System. Decomposition of the organic component of solid waste leads to generation of LFG. Uncontrolled migration of landfill gas can lead to the creation of explosive conditions, primarily in or near enclosed areas (structures, utility vaults, etc.). A landfill control system typically consists of a system of interconnected horizontal and vertical pipes connected to vacuum blower. Landfill gas is extracted by a vacuum applied to the waste and combusted using a LFG flare that is typically permitted by the local air quality management district. Long-term system maintenance and a landfill perimeter and surface emissions monitoring program would occur to ensure the effectiveness of the landfill gas control system.

Surface Water Management System. Percolation of water into the waste would result in the generation of leachate. Actions would be taken to prevent ponding of water and percolation through the cover system and into the waste to minimize the generation of leachate. A surface water management system would facilitate surface transport of stormwater across the final cover and off of the landfill surface. This includes maintaining a minimum grade of 3 percent for all landfill surfaces. Leachate seeps in the Central Drainage Channel and Brisbane Lagoon have been identified as a recurring condition and would be addressed by reconstructing the channel and installing a layered lining system that includes a barrier membrane to ensure that the Central Drainage Channel and Brisbane Lagoon are fully isolated from any leachate migration as part of the ongoing remedial activities at the landfill, unrelated to the Project Site development.

Post-Closure Monitoring. Throughout the post-closure monitoring period (defined in the regulations as a minimum of 30 years), remedial action components at the former landfill will be maintained through the preparation of location-specific plans that define the particular remedial action components or landfill closure elements that will need to be implemented to accommodate proposed development. In accordance with RWQCB Waste Discharge Requirements, location-specific plans will include measures, such as maintaining the required 3-percent minimum grade, intended to prevent ponding of water and erosion, maintain operation of the landfill gas control system, and continue groundwater monitoring and landfill gas perimeter and surface emissions monitoring.

Worker Safety. To ensure worker safety during cleanup and maintenance of the former landfill site, a site-specific safety plan would be developed per OSHA Safety and Health Standards 29 CFR 1910.120. The plan would regulate all activities that could bring workers in contact with potentially contaminated soil or groundwater, landfill gas, or leachate, and would require review and approval by the local enforcement agency (LEA). The final closure and post-closure maintenance plans state that prior to each increment of development on landfill, a detailed Development Plan will be prepared and submitted to the regulatory agencies for review and approval. Per the Final Closure and Post-Closure Maintenance Plan, which received conditional approval from the RWQCB and the San Mateo County Environmental Health Division, the site-specific safety plan would include, but not be limited to, the following measures:

- A listing of the hazards present;
- A listing of the tasks and objectives of the operations to take place;
- A hazard analysis for each task;
- Employee training requirements in order to complete the defined tasks;
- Personal protective equipment for each employee and engineering controls for each task;
- Frequency of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used;
- Decontamination measures; and
- An emergency response plan.

The site-specific health and safety plan, in accordance with CFR 29 Section 1910.120 will be kept onsite at all times while landfill closure operations are being conducted. Workers will be briefed on the site-specific health and safety plan prior to performing any closure-related work.

Proposed Remedial Actions for OU-1

Remediation efforts for OU-1 have been separated into the San Francisco portion (also referred to as the Schlage San Francisco OU) and the Brisbane portion in recognition of the different operations on each site originally causing contamination and the two different jurisdictions with authority over the approval of land uses that will ultimately determine clean-up levels; only the Brisbane portion of OU-1 is within the Project Site. Based on Health Risk Estimates prepared for the Schlage San Francisco OU, Remedial Action Objectives (RAOs) have been developed for that area in San Francisco by the landowner, subject to Department of Toxic Substances Control review and approval. Remedial Action Objectives are a set of remediation goals designed to limit human health risk and exposure to contaminants. A list of the Remedial Action Objectives and descriptions of the specific remedial action plans for the Schlage San Francisco OU, for both soil and groundwater contamination, are included in 2009 Feasibility Study/Remedial Action Plan (FS/RAP) by MACTEC on behalf of the property owner (BKF et al., 2011).[33] While remediation of the Schlage San Francisco OU is not part of proposed Project Site development, the Remedial Action Objectives that were developed for the San Francisco portion of OU-1 are applicable to the volatile organic compound (VOC) groundwater plume extending below the Project Site (Brisbane portion of OU-1) and subject to approval by the Department of Toxic Substances Control. (Geosyntec, 2012a) The Remedial Action Objectives for groundwater for the Schlage San Francisco OU are California maximum contamination levels (MCLs).

In the Schlage San Francisco OU Feasibility Study/Remedial Action Plan prepared by MACTEC on behalf of the property owner (BKF et al., 2011), excavation and onsite treatment, relocation and capping for soils, and in-situ groundwater treatment and monitoring were the preferred

[33] As noted above, however, the soil remediation that would be required on the Schlage San Francisco OU would not be part of the Project.

remedial action strategies identified for implementation at OU-1. The 2009 Feasibility Study/Remedial Action Plan was prepared to address the VOC groundwater plume portion of OU-1, and states proposes that groundwater will be treated in-situ using Enhanced Reductive Dechlorination (ERD). Long-term groundwater monitoring will also be performed. Target cleanup goals for groundwater will be the maximum contaminant levels (MCLs) allowed by the California Department of Public Health for drinking water, or other concentrations protective of human health and the environment as may be established by DTSC or the RWQCB to ensure that beneficial uses of groundwater will not be adversely affected.

Remedial Action Objectives for heavy metals within the soil and groundwater within the Brisbane (Project Site) portion of OU-1 are currently being discussed with DTSC by the landowner for determination of final site cleanup requirements. Based on the 2012 Hazardous Materials Summary Report (Geosyntec, 2012a) and email communications from Geosyntec, UPC's primary remedial consultant (Geosyntec 2012b), the process to determine Remedial Action Objectives and appropriate risk-based cleanup levels for metals-impacted soil and groundwater within OU-1 will be similar to the process used for the Schlage San Francisco OU. This will require approval by DTSC or the RWQCB for each Operable Unit. Per email communication from Geosyntec (Geosyntec, 2012b), risk-based cleanup goals[34] will be calculated assuming an acceptable excess cancer risk (ECR) of 1×10^{-6} for residential and recreational uses and 1×10^{-5} for commercial uses, risk levels generally considered to be negligible and acceptable by the U.S. EPA and sufficiently small so further remediation is not required. Applicable remedial activities that may be implemented at OU-1 are summarized in Appendix H.

Based on the known contaminant distribution, Remedial Action Objectives for specific proposed land uses, and the characteristics of the various contaminants, remedial activities within the Project Site at OU-1 will include a combination of the following technologies[35]:

- ***Soil Excavation.*** Targeted excavation of metals-impacted soil with onsite reuse or offsite disposal will be provided. Up to 28,000 cubic yards (cy) of metals-impacted soil will be excavated and reused onsite at OU-1 (Geosyntec, 2012b). Excavation strategies that may be employed at OU-1 include:
    - *Targeted Excavation with Offsite Disposal*. With this technology, heavily contaminated soil is excavated and transported by truck or rail to a permitted offsite treatment and disposal facility. Pretreatment may be required at the disposal facility prior to disposal.

34 Historically, regulatory agencies have used conservative standard-based criteria (i.e., drinking water standards) or required cleanups to background levels, often assumed to be pristine environments. In some cases, these types of criteria can lead to costly cleanup requirements. Recently, there has been a trend to use site-specific risk-based cleanup goals instead of "standard-based" or "background levels." Rather than pre-determining specific contaminant levels to be applied to every site regardless of the risks involved in exposure of the public to contaminants, risk-based cleanup goals involve application of performance standards (e.g., acceptable cancer risk) to site-specific conditions based on actual health and environmental risk posed by contaminants in the ground or water.. As a result, land uses where risks to the public health are higher (e.g., residential) will have more stringent clean-up requirements than would less sensitive uses (e.g. industrial), given the same level of cancer risk.

35 Final remediation technologies will be determined in a final Remediation Action Plan/Feasibility Study and could be adaptively managed such that the Remedial Action Objectives for the specific land uses being approved within the Project Site are achieved.

- *Targeted Excavation with Onsite Treatment*. With this technology, heavily contaminated soil is excavated and stockpiled onsite for treatment and subsequent reuse onsite. Potential treatment technologies include:
  - Plasma arc centrifugal treatment technology (PACT), which uses heat generated by a plasma arc to melt the inorganic portion of waste material while destroying the organic portion, creating an inert slag that can be reused onsite;
  - Smoldering treatment technology (STAR), a new technology to remediate oil in the subsurface, either in situ or above-ground in treatment chambers following excavation which uses smoldering combustion (the type of combustion that turns charcoal into ash in a barbeque grill) to quickly and efficiently destroy contaminants; and bioremediation which uses naturally occurring microorganisms to degrade organic contaminants in soil.
- *Targeted Excavation with Onsite Extraction.* With this technology, moderately contaminated soil is excavated and placed in areas that will be covered by soil, concrete slabs, or other structures that prevent contact with the soil.

- ***In-situ Bioremediation*.** Bioremediation uses naturally occurring microorganisms to degrade organic contaminants in groundwater in situ. The microorganisms break down contaminants by using them as a food source or co-metabolizing them with a food source. Aerobic processes require an oxygen source, and the end products typically are carbon dioxide and water. Anaerobic processes are conducted in the absence of oxygen, and the end products can include methane, hydrogen gas, sulfide, elemental sulfur, and dinitrogen gas. Sometimes, nutrients and microorganisms that have been adapted for degradation of specific contaminants are applied to enhance the process. These nutrients and microorganisms are added to the groundwater through direct injection or through constructed monitoring wells and groundwater concentrations are monitored over time to evaluate the effectiveness of the treatment. In-situ bioremediation could involve the use of Enhanced Reductive Dechlorination (ERD), a treatment consistent with the proposed groundwater remediation as defined in the Schlage Lock San Francisco OU Feasibility Study/Remedial Action Plan, to address A-zone VOC-impacted groundwater.

- ***Monitored Natural Attenuation (MNA).*** Monitored natural attenuation is the likely remedial option for the deep aquifer VOC plume. The term “natural attenuation” refers to the reliance on natural processes to achieve site-specific remedial objectives. Where found to be a viable remedy, monitored natural attenuation may be used within the context of a carefully controlled and monitored site cleanup approach. To be considered an acceptable alternative, monitored natural attenuation would be expected to achieve site remedial objectives within a timeframe that is reasonable compared to that offered by other more active methods. Natural attenuation processes include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants. Under this process data from long-term continued quarterly monitoring of the deep wells would be evaluated to assess the effectiveness of the following factors in remediating the deep VOC plume: (1) source removal of VOC-impacted soils in the Schlage San Francisco OU, (2) ERD remediation in the shallow aquifer, and (3) monitored natural attenuation. A formal assessment would occur at the first five-year review.

- ***Targeted Soil-Vapor Extraction.*** Soil-vapor extraction (SVE) is an in-situ soil remediation technology in which a vacuum is applied to soil in the unsaturated (vadose) zone to induce the controlled movement of air and remove volatile and some semi-volatile contaminants from the soil. The vapor leaving the soil may be treated to recover or destroy the volatilized contaminants, depending on local and state air discharge regulations. Vertical extraction wells typically are used at depths of 5 feet or greater below ground surface (bgs) and have been applied successfully at depths as great as 300 feet bgs. Horizontal extraction vents (installed in trenches or horizontal borings) also can be used as warranted by contaminant zone geometry, drill rig access, or other site-specific factors.

- ***Vapor Intrusion Minimization.*** The potential for vapor intrusion into buildings from subsurface contamination can be minimized using active and/or passive technologies. Active strategies, which typically require some ongoing consumption of energy, include sub-slab depressurization systems that use a blower to create a strong vacuum under the building slab and redirect sub-slab vapor to outdoor air. Passive approaches include passive sub-slab venting, a technology that relies on convective air flow beneath the building slab generated by wind turbines at the roofline, sub-slab vapor barriers, and podium construction techniques, which allow vapors to dissipate in open air parking structures.

- ***Capping.*** Contaminated soil can be consolidated and covered onsite under buildings, roads, clean soil, or other areas approved by the regulatory agencies. In addition to regulatory agency approval, this option would require the filing of a deed notice for each capped area. The purpose of capping a contaminated site is to prevent human contact with the contaminated soil. Capping methods vary dependent upon site conditions, including contaminant chemistry, soil type, climate, and land use.

- ***Institutional Controls.*** Similar to the Schlage San Francisco OU, a land use control consisting of a State Land Use Covenant and deed restriction would be recorded on the title to the property to limit human exposures for contaminants left in place in soil above levels considered protective of unrestricted use of the site. Depending on the land uses approved by the City and associated clean-up levels, the restrictive covenant could include the following restrictions:

  - No first floor residences or daycare facilities (DSP, DSP-V scenarios)[36];
  - No hospital or schools;
  - No growing of food;
  - Where concentrations of groundwater contaminants of concern are above their MCL, no use of underlying groundwater; and
  - No excavation in contaminated soil without a Soil Management Plan and DTSC approval.

Soil gas samples will be collected as part of remediation confirmation sampling activities as required by DTSC after remedial actions have been completed to document soil gas concentrations and confirm that cleanup levels have been met.

Additionally, soil and groundwater target redevelopment cleanup goals (TRCGs) will be used for planning purposes to assess when soil gas sampling should be conducted to demonstrate that

[36] This requirement assumes City approval of prohibitions on first floor residences for the DAP and DSP-V scenarios. Should the City approve residential use within the Project Site, but not approve a prohibition against first floor residential uses, remediation of proposed sites for residential development under the DSP and DSP-V scenarios would be required to meet regulatory standards for residential use.

redevelopment activities can be initiated at the site with the oversight of DTSC. TRCGs are an interim guidance value for the contractors and will not be used to evaluate completion of the remediation. During the implementation of the remediation activities, soil and groundwater samples will be taken to track the progress of the cleanup and will be compared to TRCGs as required by DTSC in accordance with the requirements of the final Remediation Action Plan.

Proposed Remediation Actions for OU-2

Burns and McDonnell prepared a Revised Remedial Action Plan on behalf of the landowner (Revised RAP) in 2002 (Burns & McDonnell, 2002a). The 2002 Revised Remedial Action Plan for OU-2 revised updated risk-based cleanup levels (CULs) previously developed by Burns and McDonnell in 1998. The 2002 Revised RAP was again revised in the 2004 Interim Remedial Measures (IRMs) work plan (Burns & McDonnell, 2004). Interim remedial measures for OU-2 were approved by the RWQCB in the 2004 Interim Remedial Measures Work Plan (Burns & McDonnell, 2005). However, because specific land uses are now being proposed within the Project Site as part of the Project Site development described in Chapter 3, *Project Description*, of this EIR, alternative remedial activities are being considered and will be finalized in a revised RAP for OU-2.

Contaminants of concern included total petroleum hydrocarbons in the form of Bunker C, polynuclear aromatic hydrocarbons (PAHs), metals, and halogenated VOCs. Exposure scenarios included site workers and residents. Ecological receptors (tissues, organisms, populations, communities, and ecosystems) were evaluated for exposure to contaminated soil, sediment, and surface water. Target cleanup goals for groundwater will be the MCLs allowed by the California Department of Public Health for drinking water, or other concentrations protective of human health and the environment as may be established the RWQCB to ensure that beneficial uses of groundwater will not be adversely affected. As the 2012 Hazardous Materials Summary Report (HMSR) (Geosyntec, 2012a) indicates, once development plans are in place, updated risk-based, development-specific cleanup levels will be established to guide remedial efforts at OU-2.

Remedial Action Objectives established in the 2002 Revised RAP include:

- Prevention of human contact with Bunker C oil, metals, and halogenated VOCs;
- Prevention of migration of Bunker C oil, metals, and halogenated VOCs to the Bay;
- Removal of free product to the extent practicable; and
- Prevention of ecological impacts to surface water at the drainage ditch.

The following soil excavation activities are proposed as an element of the overall remediation at OU-2 (Geosyntec, 2012a):

- Excavation of approximately 16,000 cubic yards (cy) of total petroleum hydrocarbon-contaminated soil and 1,000 cy of VOC-contaminated soil for offsite disposal;
- Excavation of approximately 37,000 cy of total petroleum hydrocarbons-contaminated soil for onsite treatment and reuse; and

- Excavation of approximately 12,000 cy of total petroleum hydrocarbons-contaminated soil for onsite reuse.

The RWQCB conditionally approved the Revised RAP in 2002 with final approval dependent on applicability to future site development (Geosyntec, 2012a). Once development plans have been finalized, an updated Human Health Risk Assessment (HHRA) will be prepared to evaluate development-specific exposure pathways. The HHRA will be used to guide the development of establish remedial actions necessary to protect human health and the environment. The Human Health Risk Assessment will be developed under the oversight the RWQCB and will require the RWQCB's approval before development can proceed. A previous baseline risk assessment (BRA) conducted by Levine-Fricke in 1990 found that health risks to potential future residents presented an excess cancer risk (ECR) of 1x 10^{-2}, which is greater than the U.S. Environmental Protection Agency's (U.S. EPA's) acceptable ECR of $1x10^{-6}$.

Project Impacts and Mitigation Measures

Impact 4.G-1: Would the project create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?

Impact Significance by Scenario (before Mitigation)			
DSP	**DSP-V**	**CPP**	**CPP-V**
SM	SM	SM	SM

SU = Significant Unavoidable
SM = Significant but Mitigable
LTS = Less than Significant
- = no impact

DSP, DSP-V, CPP, and CPP-V

Project Construction

Pursuant to **Mitigation Measures 4.G-2a through 4.G-2d**, Project Site construction activities for each of the four development scenarios would not commence until site remediation plans are approved and completed. Because Project site grading and remediation will be intertwined, only grading required for approved remediation activities will be permitted prior to completion of remediation. A discussion of hazards and impacts associated with site remediation is provided as part of Impact 4.G-2.

Following remediation activities, construction activities would require the use and transportation of hazardous materials (e.g., fuels, cement products, lubricants, paints, adhesives, and solvents). In addition, construction vehicles used in Project Site construction activities could accidentally release hazardous materials such as oils, grease or fuels. These hazardous materials and vehicles would remain within the Project Site during the period of construction activities. Accidental releases of hazardous materials during demolition and construction activities could impact soil and/or groundwater quality, which could result in adverse health effects to construction workers, the public, and the environment. However, the contractor's compliance with federal, state and local requirements related to use, storage, and disposal of hazardous materials during construction would reduce impacts related to inadvertent release of hazardous materials to less-than-significant levels. In addition, site-specific development within the Project Site would be required to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) pursuant to **Mitigation**

Measure 4.H-1a, which would further reduce impacts related to the routine transport, use or disposal of hazardous materials.

Compliance with the SWPPP and applicable requirements would ensure that hazards to the public or the environment through the routine transport and use or disposal of hazardous materials during project construction activities would be reduced to a less-than-significant level.

Conclusion with Mitigation: In addition to implementation of **Mitigation Measures 4.G-2a through 4.G-2d,** compliance with applicable federal (Resource Conservation and Recovery Act of 1976, Occupational Safety and Health Act of 1970, 29 CFR 1926.65 Appendix C requirements for construction activities), state, and local requirements related to the use, storage, and disposal of hazardous materials, including preparation of a Stormwater Pollution Prevention Plan pursuant to **Mitigation Measure 4.H-1a**, would reduce impacts to below a level of significance.

Project Operations

Impact Significance by Scenario (before Mitigation)			
DSP	**DSP-V**	**CPP**	**CPP-V**
LTS	LTS	LTS	LTS

SU = Significant Unavoidable
SM = Significant but Mitigable
LTS = Less than Significant
- = no impact

Nearly all proposed uses associated with Project Site development under each development scenario would involve the presence of hazardous materials (or products containing hazardous materials) at varying levels, and this would represent an increase in hazardous materials use compared to existing conditions. It would also increase the number of people who would be exposed to potential health and safety risks associated with routine use. The following summarizes the general types of hazardous materials that would be expected to be associated with Project Site operations based on proposed land uses.

Project Site development involves a variety of different land uses under each of the four proposed development scenarios. Commercial/retail and building support activities would use hazardous chemicals common in other commercial/retail and support settings. These chemicals could include familiar materials such as toners; paints; lubricants; kitchen and restroom cleaners; and refrigerants associated with building mechanical and heating, ventilation and air conditioning (HVAC) systems, and other maintenance materials. Grounds and landscape maintenance within the Project Site would also use a wide variety of commercial products formulated with hazardous materials, including fuels, cleaners and degreasers, solvents, paints, lubricants, adhesives, sealers, and pesticides/herbicides. These common consumer products would be used for the same purposes as in any commercial/retail or support setting. Small quantities of hazardous materials are also associated with residential land uses, including cleaning products, fuels, oils, pesticides, and lubricants. Because general commercial/retail and household hazardous materials are typically handled and transported in small quantities, and because the health effects associated with them are generally not as serious as industrial uses, operation of the new uses within the Project Site would not cause an adverse effect on the environment with respect to the routine transport, use, or disposal of general office and household hazardous materials. For commercial/retail uses, existing regulatory requirements include appropriate training of employees in the use, storage, and disposal of the hazardous materials and wastes they are expected to encounter in the workplace.

Industrial uses would include the storage, handling, transport, and disposal of relatively larger quantities of hazardous materials that would similarly be subject to regulatory requirements that are designed to minimize the potential for adverse effects due to exposure (See also discussion below in Impact 4.G-2).

Under the CPP-V scenario, operations at the expanded Recology facility would include increased onsite use of gasoline and diesel fuels, as well as liquefied natural gas, which would be stored on-site is above-ground tanks. Safety requirements for the storage of these materials are prescribed in the Hazardous Materials Business Plan for the Recology Site, which was approved by the San Mateo County Environmental Health Division. Compliance with the Hazardous Materials Business Plan, which is on file with the San Mateo County Environmental Health Division, would ensure impacts elated to the routine transport, use or disposal of hazardous materials at the Recology site will be less than significant.

Proposed industrial land uses would include businesses and facilities in which some laboratory-based activities would be reasonably anticipated. Industrial operations could involve "dry" laboratories (or operations), where relatively small or negligible quantities of hazardous materials would be used because the space would typically be used for office-based research, software development, and similar uses. In those cases, the types of hazardous materials would be limited to such items as cleaning and maintenance materials, and office products such as adhesives and glues. "Wet" lab functions, on the other hand, could involve a broad spectrum of activities involving hazardous materials, which would be used in controlled indoor environments. The types and volumes of hazardous materials that would be used in wet laboratories are difficult to predict because the specific businesses that would move to the Project Site are not known, and because hazardous materials use is subject to continuous change as technologies evolve and as businesses change. It is, however, reasonably foreseeable that hazardous materials would be used routinely. Industrial businesses, including research and development operations would be subject to more intense regulation and oversight than typical commercial/office businesses (and households in the DSP and DSP-V scenarios) that handle smaller quantities of more common materials. Employees performing wet laboratory work would be required (by law) to receive specific training in the use and handling of hazardous materials, which is intended to protect the workplace and also to minimize the potential for spills or inadvertent releases that could adversely affect the environment through air emissions or releases to sewers, storm drains, or land.

Any medical-related establishment operating within the Project Site such as doctor/dentist offices, medical laboratories, or pharmacies, would involve use, transport, and storage of small amounts of laboratory-type chemicals, compressed gases, pharmaceuticals, and radiological materials would be used and stored. Medical, biohazardous, and low-level radioactive wastes would also be produced from these activities.

Project site development is not anticipated to include the type of large-scale manufacturing or processing facilities that would use, store, or transport use large quantities of hazardous materials that would present a substantial risk to people. There, would, however, be numerous locations where smaller quantities of hazardous materials would be present. The risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. For this reason, the individuals most at risk would be employees or others in the immediate vicinity of the hazardous materials, rather than visitors or residents (in the DSP and DSP-V scenarios). Generally, the health and safety procedures required for the routine transport, use, and disposal of hazardous materials protect workers and other individuals in the immediate vicinity of those materials and also protect the adjacent community and environment. Because the use, transport, and disposal of hazardous materials is highly regulated, activities in compliance with those regulations will result in less than significant impacts, except in the case of accidents, which is discussed in Impact 4.G-2.

Hazardous materials would routinely be transported to, from, and within the Project Site, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. The specific types and amounts of hazardous materials transported to or from the Project Site as a result of Project Site development cannot be quantified. While the types of land uses proposed for the Project Site are known, the specific businesses and their particular operations cannot be known at this time. It is, however, reasonable to anticipate that Project Site development will bring uses to the site that involve hazardous materials use, and that there would be an increase in transportation relative to current conditions. Such transportation would be provided by vendors licensed for such transport, and appropriate documentation for all hazardous materials and wastes would be required for compliance with the existing hazardous materials regulations.

Conclusion: Buildings where commercial and industrial businesses would use hazardous materials would be constructed in accordance with current laws and regulations, which require storage that minimizes exposure to people or the environment, and the potential for inadvertent releases. In addition, these materials would be labeled to inform users of potential risks and to instruct them in appropriate storage, handling, and disposal procedures. Employers are required by law (Cal/OSHA) to ensure employee safety by properly identifying hazardous materials and adequately training workers. The use of hazardous materials and generation of wastes would continue to be regulated under the authority of the County Department of Environmental Health, with additional oversight by other agencies (e.g., DTSC, RWQCB). Transporters of hazardous materials and wastes are required to comply with federal laws and regulations that are monitored and enforced by the California Highway Patrol.

The County Department of Environmental Health would continue to conduct periodic inspections to ensure that hazardous materials and wastes are being used and stored properly. For these reasons, hazardous materials uses and waste generation for project operations would not pose a substantial public health or safety hazard to the surrounding area. With adherence to existing regulatory requirements, impacts related to the routine transport, use or disposal of hazardous materials (including radiological, hazardous and medical wastes) during operation would be less than significant. No mitigation is necessary.

Impact 4.G-2: Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment?

Impact Significance by Scenario (before Mitigation)			
DSP	**DSP-V**	**CPP**	**CPP-V**
SM	SM	SM	SM
SU = Significant Unavoidable SM = Significant but Mitigable LTS = Less than Significant - = no impact			

DSP, DSP-V, CPP, and CPP-V

Construction

As described for Impact 4.G-1, construction activities associated with future Project Site development would require the use, storage, transport, and disposal of hazardous materials during construction (e.g., fuels, oils and other chemicals for vehicle or equipment refueling and maintenance activities). While the routine use, storage, transport, and disposal of hazardous materials in accordance with applicable regulations would not pose health risks or result in significant impacts, improper use, storage, transportation and disposal of hazardous materials and wastes could result in accidental spills or releases, posing health risks to workers, the public, and the environment. Project Site development and construction activities, including demolition and remediation activities, for all four scenarios will require disturbance of subsurface soils and groundwater. As discussed above, past land uses, including former Brisbane Landfill and Southern Pacific railyard operations, resulted in soil and groundwater contamination at the former Brisbane Landfill, OU-1, and OU-2.

Former landfill operations resulted in the disposal of 12.5 million cubic yards of non-hazardous domestic, industrial, and shipyard waste at the Brisbane Landfill from 1930 to 1967. The thickness of the current soil cover ranges from a few feet to over 30 feet in some locations and soil movement or grading could take place in areas where the soil cover remains shallow. OU-1 still overlies a plume of VOC-impacted groundwater. Contaminants at OU-2 are widespread over the former railyard, with metals impacts in soil occurring in fill materials sitewide. Bunker C fuel impacts in soil and groundwater are limited to areas where fueling operations and disposal took place.

Remediation of the known contamination areas including the former Brisbane Landfill, OU-1, and OU-2 need to be completed prior to commencement of construction for future development under any of the four scenarios. While the remediation technologies that will ultimately be approved by DTSC and the RWQCB will be designed to both (1) effectively remediate contaminated soils and groundwater and (2) protect the environment and health of workers during remediation, given the age of existing onsite buildings, hazardous materials such as asbestos-containing materials and lead-based paint are likely to be encountered during demolition of structures. In addition, hazardous materials may still be encountered during Project Site construction activities following remediation. Encountering contaminated soils or groundwater either during or following remediation could expose construction workers, the environment, or the public to adverse effects of either known or previously unidentified contamination. Exposure to hazardous materials could cause various short-term and/or long-term health effects. Possible health effects could be acute (immediate, or of short-term severity), chronic (long-term, recurring, or resulting from repeated exposure), or both. Acute effects, often resulting from a single exposure, could result in a range of effects from minor to major, such as nausea, vomiting, headache, dizziness, or burns. Chronic exposure could result in systemic damage or damage to organs, such as the lungs, liver, or kidneys. Health effects would be specific to each hazardous material.

Temporary dewatering in areas of shallow groundwater is often necessary for excavation to construct shallow foundation systems, utility corridors, or installation of deep pilings, depending on approved development plans. If dewatering is required and groundwater contamination is still present at OU-1, OU-2, and the Brisbane Landfill when construction and dewatering commences, exposure of workers, the public, or the environment to contaminated groundwater could occur if dewatering is not handled appropriately.

Remediation of the former landfill, OU-1, and OU-2 would be required prior to any future development of these portions of the Project Site. As described below, final closure and remediation of the former landfill would require containment of existing waste in order to prevent exposure of the public or the ecosystem to the in-place waste, prevention of liquid percolation through to the underlying waste, and prevention of LFG emissions. Remedial activities at OU-1 and OU-2 are estimated to involve excavation, handling, and offsite disposal of up to 94,000 cy of contaminated soil. These activities could result in the exposure of construction workers to hazardous materials through ingestion or dermal contact with total petroleum hydrocarbons, metals, or VOC-impacted soils; ingestion or dermal contact with VOC-impacted groundwater; and/or inhalation of VOCs within excavations.

As discussed above in the Setting section, the Kinder Morgan Bulk Terminal facility is located adjacent to and surrounded by the Project Site, and there are liquid gas pipelines that cross the Project Site leading to the terminal. Project construction would involve significant earthwork activities that if not managed appropriately could inadvertently damage a pipeline and potentially expose workers, the public and the environment to adverse effects. However, pipeline operators are required by law to post brightly-colored markers along their right-of-way to indicate the presence of their underground pipelines. Markers contain information about the nearby pipeline as well as emergency contact information. To ensure safety and avoid damage, anyone planning to dig or excavate is also required by law to contact the Underground Service Alert center at least 48 hours in advance so that utility operators, including Kinder Morgan, can coordinate with the contractor to avoid any close contact with the pipeline. Thus, grading and construction operations conducted in accordance with applicable regulations would not result in significant impacts.

While current regulations and procedures would minimize the potential for accidental damage to Kinder Morgan’s pipelines, the possibility remains that underground excavations for grading, demolition, or construction of underground utilities would still damage a pipeline, with a resulting release of hazardous materials. To minimize damage and facilitate closing down a line in the event of an accident, pipelines are continuously monitored 24 hours per day, 7 days per week both at Brisbane Terminal and at Kinder Morgan’s regional headquarters in Orange, California, as well as by a Supervisory Control and Data Acquisition (SCADA) computer system, impacts are considered to be less than significant. The computer system gathers data in real time about all current operating conditions: pipeline pressures, volume, flow rates, status of pumping equipment and valves, temperatures, and can react to any sudden changes should they occur.

Conclusion: With compliance with federal, state, and local regulations pertaining to the handling and disposal of hazardous waste, including preparation and implementation of a Soil and Groundwater Management Plan and a Master Deconstruction and Demolition Plan, hazards to the public through foreseeable upset or accident conditions involving the release of hazardous materials into the environment would be reduced to a less-than-significant level. **Mitigation Measures 4.G-2a, 4.G-2b, 4.G-2c, 4.G-2d** would be required for all Project Site development scenarios to avoid significant impacts.

Mitigation

Mitigation Measure 4.G-2a (Confirm Achievement of Remediation Goals): Prior to approval of a specific plan for any parcel within the Project Site, the project applicant shall provide confirmation to the City that the Department of Toxic Substances Control (DTSC), Regional Water Quality Control Board (RWQCB), and/or the San Mateo County Environmental Health Division as the Local Enforcement Agency, as applicable, have reviewed and are prepared to approve a Remedial Action Plan or final closure and post-closure maintenance plans upon certification of appropriate environmental documentation for that action.

Mitigation Measure Applicability by Scenario			
DSP	**DSP-V**	**CPP**	**CPP-V**
✓	✓	✓	✓
✓ = measure applies - = measure does not apply			

Prior to issuance of a building or grading permit (other than for grading needed for remediation activities) for any parcel within the Project Site, the applicant shall provide the City with evidence that the Department of Toxic Substances Control (DTSC), Regional Water Quality Control Board (RWQCB), and/or the San Mateo County Environmental Health Division as the Local Enforcement Agency in relation to the landfill have approved applicable Remedial Action Plan(s) or final closure and post-closure maintenance plans.

Prior to commencement of building construction or site grading for any parcel within the Project Site, the project applicant shall obtain regulatory approval from the Department of Toxic Substances Control (DTSC), Regional Water Quality Control Board (RWQCB), and/or the San Mateo County Environmental Health Division as the Local Enforcement Agency in relation to the landfill for the proposed land use, in the form of a Remediation Action Completion Report or equivalent closure letter stating that remediation goals have been achieved for proposed land uses.

Mitigation Measure 4.G-2b (Soil and Groundwater Management Plan): Prior to issuance of a building or grading permit for any parcel within the Project Site a Soil and Groundwater Management Plan (SGMP) shall be prepared by a qualified environmental consulting firm, reviewed and approved by DTSC and the RWQCB and implemented by the project applicant.

Mitigation Measure Applicability by Scenario			
DSP	**DSP-V**	**CPP**	**CPP-V**
✓	✓	✓	✓
✓ = measure applies - = measure does not apply			

The Soil and Groundwater Management Plan shall also include a requirement for development and implementation of site-specific safety plans to be prepared prior to commencement of construction consistent with Occupational Safety and Health Administration (OSHA) Safety and Health Standards 29 CFR 1910.120 as well as management of groundwater produced through temporary dewatering activities.

Such site-specific safety plans shall include necessary training, operating and emergency response procedures, and reporting requirements to regulate all activities that bring workers in contact with potentially contaminated soil or groundwater, landfill gas, or leachate to ensure worker safety and avoid impacts to the environment. Further, the Soil and Groundwater Management Plan shall include protocols for any areas of the site that require excavation and relocation of refuse material (e.g., building foundations and utility infrastructure) in accordance with the Title 27 of the California Code of Regulations to ensure that the integrity of the low-hydraulic-conductivity layer (LHCL) requirements are maintained.

Mitigation Measure Applicability by Scenario			
DSP	DSP-V	CPP	CPP-V
✓	✓	✓	✓
✓ = measure applies - = measure does not apply			

Mitigation Measure 4.G-2c (Master Deconstruction and Demolition Plan): Prior to issuance of a demolition permit for any parcel within the Project Site, a Master Deconstruction and Demolition Plan shall be submitted by the project applicant to the City Building Official. The plan shall be reviewed and approved by the Building Official prior to issuance of the requested demolition permit. This plan shall include documentation of hazardous materials determinations (surveys) and demolition or deconstruction recommendations in accordance with local and state requirements. If the surveys conducted by licensed professionals prior to issuance of a demolition permit per the requirements above hazardous building materials[37], demolition or deconstruction shall proceed in accordance with applicable BAAQMD, OSHA, and CalOSHA requirements, which may include air permits or agency notifications, worker awareness training, exposure monitoring, medical examinations and a written respiratory protection program.

Mitigation Measure Applicability by Scenario			
DSP	DSP-V	CPP	CPP-V
✓	✓	✓	✓
✓ = measure applies - = measure does not apply			

Mitigation Measure 4.G-2d (NPDES Permit): Prior to issuance of a building or grading permit for any parcel within the Project Site, preparation and implementation of an industry standard spill prevention and protection procedure plan shall be conducted by a licensed professional selected or approved by the City in accordance with NPDES General Construction Permit requirements, and reviewed and approved by the City Building Official. The plan shall include implementation of Best Management Practices for the storage and use of hazardous materials in accordance with California Stormwater Quality Association Construction guidelines, including emergency procedures for

37 Typical hazardous building materials include lead-based paint; asbestos-containing materials, such as insulation, paint, or fiberboards; PCBs in lighting ballasts or wiring; and mercury in thermostat switches. BAAQMD oversees the public health and environmental aspects of removal and disposal of asbestos-containing materials and other hazardous building materials. CalOSHA oversees worker protection and contractor licensing with respect to hazardous building materials.

hazardous materials releases for materials that shall be brought onto the site as part of site development and construction activities. The plan shall include standard emergency procedures for hazardous materials releases that would be implemented during Project construction activities, identification of required personal protective equipment, proper housekeeping, spill containment procedures, training of workers to respond to accidental spills/releases, most direct route to a hospital, and requirements for a site safety officer. These measures shall be included within a construction management plan required to be reviewed by all workers.

Conclusion with Mitigation: With implementation of **Mitigation Measures 4.G-2a**, (confirm achievement of remediation goals), **4.G-2b** (implement a Soil and Groundwater Management Plan), **4.G-2c** (Master Deconstruction and Demolition Plan), and **4.G-2d** (prepare a spill pollution prevention plan), impacts related to releases resulting from improper use, storage, or disposal of hazardous materials or wastes during site development and construction activities would be reduced to a less-than-significant level.

Operation

Impact Significance by Scenario (before Mitigation)			
DSP	**DSP-V**	**CPP**	**CPP-V**
SM	SM	SM	SM

SU = Significant Unavoidable
SM = Significant but Mitigable
LTS = Less than Significant
- = no impact

Proposed Project Site development for each of the four development scenarios includes a variety of different land uses. Businesses associated with industrial/commercial/retail and building support activities would use hazardous chemicals common in other commercial/retail and support settings. These chemicals could include familiar materials such as toners, paints, lubricants, and kitchen and restroom cleaners as well as relatively small quantities of fuels, oils, and other petroleum-based products. Industrial uses could include storage, transport, handling, and disposal of larger quantities of hazardous materials. As required by the San Mateo County Department of Environmental Health (SMCDEH), and the Certified Unified Program Agency (CUPA), any businesses that would store hazardous materials and/or waste at its business site would be required to submit business information and hazardous materials inventory forms. The City of Brisbane requires all new commercial and other users to follow applicable regulations and guidelines regarding storage and handling of hazardous waste. All hazardous materials are required to be stored and handled according to manufacturer's directions and local, state and federal regulations, noted above. The City of Brisbane Fire Department administers the California Fire Code for the Project Site through regular site inspections to ensure hazardous materials are stored and handled properly.

In addition, the Kinder Morgan Bulk Terminal facility stores large quantities of hazardous materials that are delivered by pressurized liquid pipelines that traverse the Project Site to the facility. Upset and accident conditions could result in the release of large quantities of gasoline, diesel or jet fuel that might potentially adversely affect residents, workers, visitors or the environment. However, the storage tanks are constructed, monitored, inspected, and upgraded as necessary in accordance with the American Petroleum Institute recommendations. The tanks are kept at atmospheric pressure and any damage would result in leakage rather than an explosion. Secondary containment improvements are incorporated into the facility design which would ensure that in the unlikely event of leakage including substantial damage from an earthquake, any released fuels would remain at the terminal within the containment areas. The tanks are on a regular inspection schedule, including major inspections where the tanks are emptied and all components inspected and upgraded as necessary to limit the potential for any releases.

As noted above, the pipelines are pressurized and continuously monitored by trained operators and a computerized system that can react to any sudden changes. The Pipeline and Hazardous Materials Safety Administration (PHMSA) is the primary federal regulatory agency responsible for ensuring that pipelines are safe, reliable, and environmentally sound. The federal pipeline integrity management regulations for hazardous liquid pipelines (§195.452) and natural gas pipelines (§192.901- §192.951) require operators to perform risk assessments (PHMSA, 2013) of their pipelines to:

- Ensure that integrity assessment methods (internal inspection, pressure testing, direct assessment, etc.) are employed to address significant threats on pipeline segments.
- Ensure that integrity assessments of the highest risk segments are scheduled with priority over lower risk segments.
- Ensure that assessments of threats and potential consequences are conducted to define, evaluate, and implement additional measures that address significant threats to the pipeline (e.g., conducting depth-of-cover surveys and correcting any deficiencies), or reduce potential consequences of failures (e.g., installing additional valves on the pipeline to reduce the amount of liquid or gas that might be released should a failure occur).

Conclusion: Implementation of **Mitigation Measure 4.G-2e** (preparation of a Hazardous Materials Business Plan) would be required for all proposed development scenarios to avoid the creation of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials in the environment during operational phases of the development scenarios. In addition, the existing regulatory requirements and hazardous materials management of the Kinder Morgan Bulk Terminal facility reduce the potential for adverse effects from upset and accident conditions to less than significant levels. California Government Code Section 4216 also requires that:

- Delineation of the Proposed excavation sites be delineated with water soluble or chalk based white paint on paved surfaces or with other suitable markings such as flags or stakes on unpaved areas.
- Dig Alert be called at least 2 full working days prior to digging.
- No excavation may proceed without a Dig Alert ticket number.

As a result, impacts will be mitigated to a less than significant level.

Mitigation

Mitigation Measure Applicability by Scenario			
DSP	DSP-V	CPP	CPP-V
✓	✓	✓	✓
✓ = measure applies - = measure does not apply			

Mitigation Measure 4.G-2e (Hazardous Materials Business Plan). Prior to receipt of a Certificate of Occupancy, any business that would handle, store, transport, or dispose of hazardous materials or wastes shall prepare and implement a Hazardous Materials Business Plan (HMBP) that shall include at a minimum, the following components:

- Details, including floor plans, of the facility and business conducted at the site;
- An inventory of the type and quantity of hazardous materials that are handled or stored onsite;
- Spill prevention procedures;
- An emergency response plan that provides emergency notification procedures; and
- A safety and emergency response training program for new employees with annual refresher courses.

The HMBP shall be submitted to and approved by the San Mateo Department of Environmental Health prior to site occupancy.

Conclusion with Mitigation: With implementation of **Mitigation Measure 4.G-2b** (Hazardous Materials Business Plan), the potential for accidental releases and upset conditions to occur as the result of storage or disposal of hazardous materials or wastes during operational phases of the development scenarios would be minimized. Thus, significant impacts related to hazards to the public or the environment through reasonably foreseeable upset or accident conditions involving the release of hazardous materials into the environment will be reduced to a less-than-significant level.

Soil Gas and Vapor Intrusion

Impact Significance by Scenario (before Mitigation)			
DSP	DSP-V	CPP	CPP-V
SM	SM	SM	SM
SU = Significant Unavoidable SM = Significant but Mitigable LTS = Less than Significant - = no impact			

As described in Subsection 4.G.2, *Environmental Setting*, the waste materials associated with the former Brisbane Landfill are still undergoing decomposition under anaerobic conditions, which creates landfill gases (LFG) such as methane. Accumulation of landfill gases within confined spaces such as underground structures, basements, or utility vaults can lead to explosive conditions due to high levels of methane within landfill gases, which are typically composed primarily of methane and carbon dioxide. Depending on the composition of landfill waste, landfill gases may also contain non-methane organic compounds, such as TCE, benzene, and vinyl chloride.[38]

[38] Due to the age of the waste materials at the Brisbane Landfill, most of the decomposition has already occurred and the gas samples from the Solid Waste Assessment Test show primarily methane gas. Although benzene was also detected, no other constituents of concern (Kleinfelder, 1990b)

The methane in landfill gases presents an explosion risk at certain concentrations. The methane and the carbon dioxide in landfill gases can also accumulate in confined spaces or low points such as utility vaults or utilities trenches during construction. Because landfill gas is denser than air, it is able to displace oxygen, posing an asphyxiation hazard. Non-methane organic compounds such as TCE, benzene, and vinyl chloride are typically found in very low concentrations in landfill gases and only benzene has been identified at the Brisbane landfill which can present a toxic or carcinogenic hazard, or both, above certain concentrations.

The greatest decomposition of organic materials in waste typically occurs during the first 20 to 30 years. Since waste disposal on the former landfill site ceased in 1967, it is believed that a majority of decomposition has already taken place. However, even with the passage of more than 40 years, landfill gases continue to be generated, indicating that decomposition is still ongoing. To minimize risks related to landfill gas generation, a landfill gas collection system is currently operating on the Project Site and is overseen by the BAAQMD. Landfill gas is collected by vertical and horizontal extraction wells aligned along the perimeter of the landfill site. As described above, the Project Site also includes former industrial areas, OU-1 and OU-2, which remain impacted by the industrial activities formerly conducted onsite. This contamination could pose a risk to future occupants of buildings onsite through inhalation of volatile organics and incidental ingestion or dermal contact with contaminated soil or groundwater. While proposed remediation activities would minimize exposure risks related to landfill gas, further action is necessary to minimize impacts related to exposure from vapor intrusion into buildings to be constructed within OU-1 and OU-2.

In accordance with Title 27 requirements, the low-hydraulic-conductivity layer within the former landfill area would be placed approximately 4 to 8 feet below the final building pad grades. This additional depth would allow for the construction of the building foundation systems (grade beams, pile caps) and utility systems with minimal impact to the low-hydraulic-conductivity layer. If the future final designs for the foundation systems require additional depths, the low-hydraulic-conductivity layer would be removed and replaced to accommodate the deeper structures in accordance with Title 27 California Code of Regulations (CCR). For the larger building structures, any deep pile foundations penetrating the low-hydraulic-conductivity layer would be designed pursuant to Title 27 CCR 21190(e) requirements with final approval from the RWQCB. Special detailing for these penetrations may be required by RWQCB and incorporated into the final design plans to repair the integrity of the low-hydraulic-conductivity layer (BKF, 2011).

Conclusion: Soil gas and vapor intrusion from legacy contamination represent a significant impact. **Mitigation Measures 4.G-2f through 4.G-2h** would be required for all development scenarios to avoid a significant impact.

Mitigation

Mitigation Measure 4.G-2f: Prior to issuance of a building permit for any development within the Project Site, proposed underground utilities and utility vaults located on or within 500 feet of the landfill footprint shall be constructed with soil vapor barriers and constructed of intrinsically safe and/or explosion-proof equipment in accordance with City Building Division requirements and overseeing agency (DTSC or RWQCB) as well as the San Mateo County Environmental Health Division as necessary.

Mitigation Measure Applicability by Scenario			
DSP	DSP-V	CPP	CPP-V
✓	✓	✓	✓

✓ = measure applies
- = measure does not apply

Mitigation Measure 4.G-2g Prior to issuance of a grading permit, all grading specifications for OU-1 and OU-2 shall be developed in accordance with RWQCB and DTSC requirements regarding soil vapor barriers, and incorporated into the final grading plan. Any installation of utilities in areas that have adopted soil capping remediation strategies shall be located above the contaminated soil and groundwater areas in accordance with RWQCB and DTSC requirements. Where gravity and utility force mains require encroachment into contaminated areas, special construction details and mitigation measures shall be developed during the preparation of the final RAPs for OU-1 and OU-2 as approved by the RWQCB and DTSC and in accordance with Soil and Groundwater Management Plans. Final RAPs shall include overseeing agency (DTSC or RWQCB) approved Human Health Risk Assessments which include inhalation risks and are based on proposed land uses.

Mitigation Measure Applicability by Scenario			
DSP	DSP-V	CPP	CPP-V
✓	✓	✓	✓

✓ = measure applies
- = measure does not apply

Mitigation Measure 4.G-2h Construction of all new structures within the former landfill footprint and within OU-1 and OU-2, as well as on site areas within 1,000 feet of the waste material footprint shall incorporate sub-slab vapor barriers to minimize potential vapor intrusion into buildings. Further, all structures built on within 1,000 feet of the landfill footprint shall be equipped with automatic combustible gas sensors in sub-floor areas and in the first floor of occupied interior spaces of buildings. A centralized sensor monitoring and recording system shall also be provided. Gas monitoring for trace gases shall be conducted in accordance with the requirements of Title 27, for 30 years or until the operator receives authorization from the local enforcement agency (LEA) and CalRecycle to discontinue monitoring upon demonstration by the operator that there is no potential for trace gas migration into onsite structures.

Mitigation Measure Applicability by Scenario			
DSP	DSP-V	CPP	CPP-V
✓	✓	✓	✓

✓ = measure applies
- = measure does not apply

Conclusion with Mitigation: With implementation of **Mitigation Measures 4.G-2f through 4.G-2h,** new construction would be designed to prevent exposure of occupants and visitors to the site to exposure of soil vapor hazards from being on a hazardous materials site pursuant to Government Code Section 65962.5, and the impact would be less than significant for all scenarios.

Overall Conclusion

With implementation of **Mitigation Measures 4.G-2a and 4.G-2b**, impacts related to hazard to the public or the environment resulting from the release of hazardous materials from accident and upset conditions would be less than significant.

Impact 4.G-3: Would development emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within 0.25 mile of an existing or proposed school?

Impact Significance by Scenario (before Mitigation)			
DSP	**DSP-V**	**CPP**	**CPP-V**
SM	SM	SM	SM
SU = Significant Unavoidable SM = Significant but Mitigable LTS = Less than Significant - = no impact			

DSP, DSP-V, CPP, and CPP-V

All proposed Project Site development scenarios include a charter high school to be constructed in the general area of Icehouse Hill. The DSP and DSP-V scenarios also include an elementary school, and both schools would be constructed within areas in the Icehouse District that are designated for institutional use. These areas are situated south of the Roundhouse and north of Icehouse Hill. Under the CPP and CPP-V scenarios, a charter high school would be developed at the base of Icehouse Hill within 0.25 mile of the Kinder Morgan site. The CPP and CPP-V scenarios do not include an elementary school.

Although there would likely be some variation among the four scenarios, all development scenarios would entail the storage, handling, transport, and disposal of hazardous materials in association with the research and development (R&D), institutional, and commercial uses proposed by each of the development scenarios. Examples of common hazardous materials could include fuels, oils, lubricants, paints, cleaning chemicals, and other petroleum products. If not managed appropriately, schoolchildren may be exposed to accidental spillage or leakage of hazardous materials stored onsite.

As discussed under **Impact 4.G-2** and required by **Mitigation Measure 4.G-2e,** all new development would be required to follow applicable regulations and guidelines regarding storage and handling of hazardous waste. All hazardous materials would be required to be stored and handled according to manufacturer's directions and local, state, and federal regulations. These requirements would include posting of signs, notification of the local fire department, filing of the Hazardous Materials Business Plan, and use of specialized containment facilities. In addition to mandatory adherence to City and County requirements, compliance with the requirements of CCR Title 5, Section 14010, Standards for School Site Construction and California Department of Education School Facilities Planning Division as overseen by DTSC further ensures that hazardous materials impacts on proposed schools would be less than significant.

Conclusion: Implementation of a Hazardous Materials Business Plan, as required by **Mitigation Measure 4.G-2e,** and siting requirements for proposed schools, as specified by **Mitigation Measure 4.G-3,** would be necessary to reduce impacts related to hazardous emissions within 0.25 mile of a school to a less-than-significant level for all scenarios.

Mitigation

Mitigation Measure Applicability by Scenario			
DSP	DSP-V	CPP	CPP-V
✓	✓	✓	✓
✓ = measure applies - = measure does not apply			

Mitigation Measure 4.G-3: Grade K-12 school facilities constructed on the Project Site shall not be located within 0.25 miles of a facility with hazardous emissions or that handles hazardous or acutely hazardous materials, substances or waste, unless approved by School Facilities Planning Division of the California Department of Education in conformance with California Code of Regulations (CCR) Title 5, Section 14010 which sets forth California Department of Education criteria for school site locations:

- "If the proposed [school] site is within 1,500 feet of a railroad track easement, a safety study shall be done by a competent professional trained in assessing cargo manifests, frequency, speed, and schedule of railroad traffic, grade, curves, type and condition of track need for sound or safety barriers, need for pedestrian and vehicle safeguards at railroad crossings, presence of high pressure gas lines near the tracks that could rupture in the event of a derailment, preparation of an evacuation plan. In addition to the analysis, possible and reasonable mitigation measures must be identified in accordance the referenced code." California Code of Regulations (CCR) Title 5, Section 14010 (d)
- "The [school] site shall not be located near an above-ground water or fuel storage tank or within 1,500 feet of the easement of an above ground or underground pipeline that can pose a safety hazard as determined by a risk analysis study, conducted by a competent professional, which may include certification from a local public utility commission." CCR Title 5, Section 14010 (h):

Grade K-12 school facilities shall also comply with California Education Code Sections 17210 through 17224 and related statutory provisions related to risk to human health or the environment at proposed school properties as overseen by the Department of Toxic Substances Control (DTSC). In accordance with California Education Code Sections 17210 through 17224 and related statutory provisions, the school district must prepare a Phase I Environmental Site Assessment and/or a Preliminary Endangerment Assessment (PEA) to identify potential contamination and evaluate whether it presents a risk to human health or the environment at proposed school properties as overseen by the Department of Toxic Substances Control (DTSC). The environmental investigation and any required remediation of properties to be developed for use as schools shall be overseen by DTSC in coordination with the California Department of Education and the School Facilities Planning Division.

Final design plans shall be approved by the School Facilities Planning Division of the California Department of Education prior to commencement of construction.

All required remediation within 0.25 miles of a proposed K-12 school site within the Project Site shall be completed prior to occupancy of the school.

Conclusion with Mitigation: With implementation of **Mitigation Measures 4.G-2e and 4.G-3**, the impact related to emissions of hazardous materials within 0.25 mile of schools would be reduced to a less-than-significant level.

Impact 4.G-4: Would development be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and result in a safety hazard to the public or environment?

Impact Significance by Scenario (before Mitigation)			
DSP	DSP-V	CPP	CPP-V
SM	SM	SM	SM

SU = Significant Unavoidable
SM = Significant but Mitigable
LTS = Less than Significant
- = no impact

DSP, DSP-V, CPP, and CPP-V

As described above in Subsection 4.G.2, *Environmental Setting*, the Project Site includes a number of different sites that are included on databases listing hazardous materials pursuant to Government Code Section 65962.5 including the former Brisbane Landfill, OU-1 and OU-2, and the Schlage Lock facility. As mentioned above, these sites have a long history of environmental investigation and cleanup efforts with additional remediation activities occurring in the future. These sites are actively overseen by regulatory agencies (DTSC and RWQCB) to ensure that all remediation is completed to levels that protect human health and the environment. The impacts related to safety hazards to the public or environment from these sites are further discussed and analyzed above under **Impact 4.G-1 (**however impacts from soil vapor intrusion are discussed below).

Conclusion: This impact would be significant, and implementation of **Mitigation Measures 4.G-1a and 4.G-1b** is recommended under all four proposed development scenarios.

Conclusion with Mitigation: With the inclusion of **Mitigation Measures 4.G-1a and 4.G-1b**, impacts related to being located on a hazardous materials site pursuant to Government Code Section 65962.5 under any of the scenarios would be reduced to a less-than-significant level.

Impact 4.G-5: Would development result in a safety hazard for people residing or working in the project area for a project located within an airport land use plan or, where such plan has not been adopted, be within 2 miles of a public airport or public use airport; or be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?

Impact Significance by Scenario (before Mitigation)			
DSP	DSP-V	CPP	CPP-V
-	-	-	-

SU = Significant Unavoidable
SM = Significant but Mitigable
LTS = Less than Significant
- = no impact

DSP, DSP-V, CPP, and CPP-V

The Project Site is located more than 2 miles from the nearest public airport, the San Francisco International Airport, or airstrip, and is not located within an airport land use plan. Development under any of the proposed scenarios would not conflict with an airport land use plan nor present any other impact related to a public airport use or private airstrip.

Conclusion: Implementation of Project Site development would have no impact related to airports and airstrips.

Impact 4.G-6: Would development impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?

Impact Significance by Scenario (before Mitigation)			
DSP	**DSP-V**	**CPP**	**CPP-V**
LTS	LTS	LTS	LTS

SU = Significant Unavoidable
SM = Significant but Mitigable
LTS = Less than Significant
- = no impact

DSP, DSP-V, CPP, and CPP-V

As discussed in Section 4.L, *Public Services*, of this EIR, fire protection services are provided to Brisbane by the North County Fire Authority (NCFA), a Joint Powers Authority established in 2003 to serve the communities of Brisbane, Daly City, and Pacifica. The North County Fire Authority delivers emergency and non-emergency services, including rapid assistance for medical, fire, or other hazardous situations, to the member and contract communities from nine strategically located fire companies. Brisbane is served from Fire Station No. 81 located at 3445 Bayshore Boulevard, just southwest of the Project Site. Project Site development would increase the demand for fire protection and expand the geographic area within which services must be provided. Additionally, construction of the street system must be designed to accommodate emergency response and evacuation.

The circulation plan for Project site development is designed to ensure appropriate emergency access to and egress from the Project Site under all four scenarios. The DSP and DSP-V scenarios reserve a specific site within the Icehouse District for the development of institutional uses that would include a fire facility centrally located adjacent to the Roundhouse Green. Based on the analysis of police and fire protection services undertaken in Section 4.L, *Public Services*, Project site development under any of the proposed development scenarios will require an upgrade to fire facilities to serve to the Project Site. It is therefore assumed that the CPP and CPP-V scenarios would include a similar fire facility in a central location similar to that provided in the DSP and DSP-V scenarios. Adequate access to and from this facility would be provided by the roadway and circulation improvements proposed for each scenario. Section 4.N, *Traffic and Circulation*, provides a more detailed description and analysis of these proposed infrastructure improvements for all four scenarios. Additionally, all site-specific development site designs, including private internal circulation and building site plans, will be subject to review and approval by the City, as well as emergency service providers under each of the four development scenarios.

The Kinder Morgan Bulk Terminal facility has a comprehensive Integrated Contingency Plan that meets all regulatory requirements from regulatory agencies and is reviewed by emergency response agencies for completeness. The Integrated Contingency Plan is routinely updated to reflect any changes in conditions and provides for response actions and drills as well as annual training requirements for employees. Because access to and from the Kinder Morgan site will be maintained, needed transportation improvements will be provided under each development scenario, and emergency response facilities will be improved under each development scenario, Project site development would not interfere with emergency response capabilities related to the Kinder Morgan facility.

Proposed Project site development and emergency response requirements are sufficient to ensure that the potential significant health and safety effects associated with possible impairment or implementation of any emergency response or evacuation plans would remain a less-than-significant impact.

Conclusion: This impact would be less than significant for each of the development scenarios. No mitigation is required.

Impact 4.G-7: Would development expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Impact Significance by Scenario (before Mitigation)			
DSP	**DSP-V**	**CPP**	**CPP-V**
-	-	-	-

SU = Significant Unavoidable
SM = Significant but Mitigable
LTS = Less than Significant
- = no impact

DSP, DSP-V, CPP, and CPP-V

The Project Site is located in an urban setting, has been developed with urban uses in the past, and does not adjoin any wildlands that are at risk for wildfires. As mentioned above, fire protection services are provided to the Brisbane by the North County Fire Authority, which delivers emergency and non-emergency fire response services. The City is served from Fire Station No. 81 located at 3445 Bayshore Boulevard, just southwest of the Project Site. Project Site development under any of the development scenarios would be required to adhere to applicable fire and building codes, which provide minimum safety measures that would be incorporated into all building designs.

Project Site characteristics and existing fire protection services are sufficient to ensure that the potential significant health and safety effects associated with wildfires would remain a less-than-significant impact.

Conclusion: No impact related to wildland fire hazards would result for any of the proposed development scenarios. No mitigation is required.

References – Hazards and Hazardous Materials

Aquifer Sciences, Inc. 2009. Investigation of Off-site Groundwater Quality. May 28.

Arcadis. 2011. Remedial Action Effectiveness Evaluation, SFPP, L.P. Brisbane Terminal, 950 Tunnel Avenue, Brisbane, California. February 7, 2011.

BKF Engineers, Brown and Caldwell, Geosyntec, Graf Con, Millennium Design, and Treadwell& Rollo, and (BKF et al), *Draft Brisbane Baylands Infrastructure Plan*, February 2011. Burns & McDonnell, 2008a, *Groundwater Monitoring Report, May 2008, Northern Portion of the Former Bayshore Railyard – OU-1, Brisbane, CA.* June 2008a.

Burns & McDonnell, *Groundwater Monitoring Report, June 2008, Southern Portion of the Former Bayshore Railyard, Brisbane, California*, August, 2008b.

Burns & McDonnell, *Draft Soil Workplan, Operable Unit 1, Sunquest Properties, Inc., San Mateo and San Francisco Counties*, July 22, 2005.

Burns & McDonnell, 2004, *Interim Remedial Measure Workplan Southern Area of the Former Bayshore Railyard Suite (OU-2) Brisbane, California*, prepared for Sunquest Properties, Inc., July 2004c.

Burns & McDonnell, 2002a, *Final Revised Remedial Action Plan (Revised RAP) Southern Portion of the Former Bayshore Railyard (OU-2)*, February 2002a.

Burns & McDonnell, 2002b, *Final Closure and Post-Closure Maintenance Plan*, October 2002b.

California Department of Public Health (CDPH), Fact Sheet – Final Public Health Goal for Hexavalent Chromium, July 27, 2011.

Camp Dresser & McKee (CDM), Final Report of Findings, Environmental Engineering Peer Review, Baylands Remediation Efforts. November 2, 2005.

City of Brisbane. *The 1994 General Plan*, adopted June 21, 1994.

Environmental Data Report (EDR), Radius Map with GeoCheck, Brisbane Baylands, Brisbane, CA, April 7, 2011.

Environmental Resource Group, Inc. 2009. 2nd Semi-Annual Groundwater Monitoring Report for 2008, V&A Auto Repair. March 31.

Fugro. 2011. Groundwater Monitoring Report – July 2011, Wells SMW-1 through SMW-4, MW-6, EW-1 & EW-2 (SMCO SITE #550048). November 21.

Fugro West, Inc., Groundwater Monitoring Report (SMCO Site #550048) – January 2011 Wells SMW-1 through SMW-4 Tunnel Avenue and Beatty Road, Brisbane, California, January 2011a.

Geosyntec Consultants, 2012a, *Hazardous Materials Summary Report (HMSR), Operable Units 1 and 2, Brisbane, CA*, March 1, 2012a.

Geosyntec Consultants, 2012b, email communications regarding ESA questions, April 13, 2012b.

Geosyntec Consultants, 2012c, *Hazardous Materials Summary Report, Brisbane Landfill, Brisbane, San Mateo County, California*, February 29, 2012.

Geosyntec Consultants, *Summer-Fall 2010 Semiannual Discharge Monitoring Report, Brisbane Landfill, Brisbane, CA*, October 30, 2010.

GeoTracker, 2013. California State Water Resources GeoTracker database, accessed January 7, 2013.

Golden Gate Environmental, Inc. 2009. *Groundwater Monitoring Report – 1st Quarter 2009, Bayshore Auto, 2260 Bayshore Boulevard, San Francisco, California, SFDPH-LOP Site #10445*. February 25.

Golder Associates, Incorporated, *Characterization Study, Brisbane Landfill,* December 1, 2008.

Kleinfelder, Inc., 1990b, *Air Quality Solid Waste Assessment Test Report for the Brisbane Landfill*, December 1990b.

Levine-Fricke, 1990, *Draft Supplemental Remedial Investigation Data Study Report, The Bayshore Railyard, Brisbane, CA*, July 18, 1990.

LFR, Incorporated, *Groundwater Monitoring Well Network Evaluation, SFPP, L.P. Brisbane Terminal, 950 Tunnel Avenue, Brisbane California*, September 30, 2008.

Mactec. 2010. Groundwater Monitoring Report, First Quarter 2010, Schlage OU, San Francisco, and Brisbane, California. May.

Pipeline & Hazardous Materials Safety Administration (PHMSA), Fact Sheet on Risk Assessment, http://primis.phmsa.dot.gov/comm/FactSheets/FSRiskAssessment.htm, accessed February 8, 2013.

Regional Water Quality Control Board (RWQCB), Order 01-041 Waste Discharge Requirements, April 2001.

SCS Engineers, *Operation, Monitoring, and Maintenance of the Landfill Gas (LFG) Migration Control Facilities at the Closed Brisbane Landfill, Brisbane, California*, September 2008.

Treadwell & Rollo, *Removal Action Completion Report, Schlage Lock/Pacific Lithograph Site, San Francisco, CA*, October 1, 1996.

West Environmental Services & Technology. 2011. *Report of Findings and Groundwater Monitoring Plan*. January 2011.

This page intentionally left blank