5.4 HAZARDOUS MATERIALS

1. INTRODUCTION

This section analyzes the project's potential impacts from hazards and hazardous materials. Relevant regulations and existing conditions are described, as well as the potential for the project to impact sensitive receptors. Information and the analysis in this section is largely based on the findings and documentation from the Human Health Risk Assessment (HHRA)[1], October 2014, that was prepared to identify and evaluate the potential risks to on-site human receptors. Data from this study, as well as other relevant information supporting the evaluation in this section are included in Appendix E of this EIR.

2. ENVIRONMENTAL SETTING

Regulatory Framework

Federal Regulations

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (USEPA), through the Code of Federal Regulations (CFR), defines a hazardous waste as a substance that (1) may cause or significantly contribute to an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness and (2) that poses a substantial present or potential future hazard to human health or the environment when it is improperly treated, stored, transported, disposed of or otherwise managed. Hazardous waste can also be ignitable, corrosive, or reactive (explosive).[2] Hazardous and toxic substances are defined as chemicals (chemicals, dusts, mixtures, paints, fuels, solvents, etc.) present in the workplace which are capable of causing harm. A material that contains defined amounts of toxic chemicals may also be classified as a hazardous material. The USEPA has developed a list of specific hazardous wastes that are in the form of solids, semi-solids, liquids, and gases.

The USEPA is the lead federal agency responsible for enforcing federal regulations regarding hazardous materials and hazardous waste. The primary legislation governing hazardous materials and hazardous waste are the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Superfund Amendments and Reauthorization Act (SARA). A summary of potentially relevant major federal, state, and local laws regarding hazards and hazardous materials is provided below.

Resource Conservation and Recovery Act

The Federal Resource Conservation and Recovery Act[3] of 1976, as amended by the Hazardous Waste Amendments of 1984, provides for the management of hazardous waste for its entire existence (generation

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[1] *Geosyntec Consultants, 2014. Human Health Risk Assessment Report, Former Kast Property.*

[2] *U.S. Environmental Protection Agency; 40 CFR 261.3. http://www.gpo.gov/fdsys/pkg/CFR-2011-title40-vol26/pdf/CFR-2011-title40-vol26-sec261-3.pdf. Accessed August 2014.*

[3] *Resource Conservation and Recovery Act; 42 USC§6901-6992(k). http://elr.info/sites/default/files/docs/statutes/full/rcra.pdf. Accessed August 2014.*

to disposal) to ensure the waste is handled in a manner protective of human health and the environment. RCRA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA's corrective action program is designed to investigate and guide the cleanup of any contaminated air, groundwater, surface water, or soil from hazardous waste management of spills or releases into the environment as a result of the past and present activities at RCRA-regulated facilities.

RCRA allows individual states to develop their own program for the regulation of hazardous waste as long as it is at least as stringent as RCRA. The State of California has developed the California Hazardous Waste Control Law (HWCL) (Health and Safety Code [HSC] §25100 et seq. and 22 California Code of Regulations [CCR] §66260.1 et seq.), and the USEPA has authorized RCRA enforcement by the State of California. Primary authority for the statewide administration and enforcement of the HWCL rests with the California Environmental Protection Agency (Cal EPA) Department of Toxic Substances Control (DTSC).

Under RCRA, a waste is hazardous if it belongs to any one of four waste categories as outlined below:

- Listed Wastes: specific wastes that EPA has determined are hazardous. The lists include the F-list (certain wastes from common manufacturing and industrial processes), K-list (certain wastes from specific industries), and P- and U-lists (certain wastes from specific commercial chemical products);
- Characteristic Wastes: wastes that do not meet any of the listings above but that exhibit ignitability, corrosivity, reactivity, or toxicity;
- Universal Wastes: batteries, pesticides, mercury-containing equipment (e.g., thermostats) and lamps (e.g., fluorescent bulbs); and,
- Mixed Wastes: waste that contains both radioactive and hazardous waste components.

RCRA Hazardous Waste Characterization/Classification

Under RCRA, waste characterization can be based on generator knowledge and/or testing to determine toxicity, ignitability, corrosivity and/or reactivity. To characterize a waste as RCRA hazardous for toxicity, sample results must be compared to the Toxicity Characteristic Leaching Procedure (TCLP) value for a particular constituent. The total concentration of a particular constituent must be compared to 20 times (20X) the threshold of the TCLP for that constituent. If the concentration does not exceed the 20X value, then the material is not considered RCRA hazardous; however, if the concentration exceeds this 20X value, then the sample must be analyzed for solubility using a TCLP method. If the result from TCLP test exceeds the TCLP value for the particular constituent, then the material is considered a RCRA-hazardous waste. If the TCLP result does not exceed the TCLP value for a particular constituent, then the material is non-hazardous under RCRA, though it can still be classified as hazardous under California law based on the results of a Waste Extraction Test (WET, see description below for non-RCRA hazardous waste characterization).

All RCRA-hazardous waste must either be disposed in a Class I landfill (i.e., sites that may accept hazardous and non-hazardous wastes), which may require some form of pre-treatment, or be destroyed via incineration or other appropriate methodology approved by the USEPA.

Non-RCRA Hazardous Waste Characterization/Classification

To characterize a waste as non-RCRA hazardous, the total concentration of a constituent must be compared to the Total Threshold Limit Concentration (TTLC) threshold value, and to 10 times (10X) the value of the Soluble Threshold Limit Concentrations (STLC) for that constituent. If the total concentration does not exceed the TTLC threshold or the 10X value, then the material is not non-RCRA hazardous; however, if the concentration exceeds this TTLC threshold, then it is considered non-RCRA hazardous, or if the concentration does not exceed the TTLC threshold, but exceeds the 10X value, then the sample must be analyzed for solubility using a WET. If the WET result exceeds the STLC threshold value for a particular constituent, then the material is considered a non-RCRA or California hazardous waste, and a TCLP test could be required to determine if this waste is RCRA hazardous. If the TTLC result does not exceed the TTLC threshold and the WET result does not exceed the STLC threshold value for a particular constituent, then the material is non-hazardous, pending the results of the TCLP test if the total concentration exceeds 20X the TCLP threshold.

When multiple samples are taken of a large quantity of impacted soil, appropriate averaging techniques are used to develop an average concentration of constituents of concern (COCs). This is done so that a small pocket of impacted soil with a high concentration of a COC (i.e., "nugget" effect) does not inappropriately define the entire soil quantity.

Non-Hazardous Waste

Materials that are not hazardous under California or federal law are considered non-hazardous and can be disposed in a Class III landfill (i.e., sites that may accept non-hazardous wastes). Materials disposed of in Class III landfills can include construction debris (i.e., asphalt, concrete, wood, etc.) and soil that is determined to be non-hazardous based on the results of analytical tests performed on the material.

National Contingency Plan/Comprehensive Environmental Response, Compensation, & Liability Act

The National Contingency Plan (NCP) is a blueprint for responding to both oil spills and hazardous substance releases originally prepared under the Clean Water Act. Following the passage of the Comprehensive Environmental Response, Compensation, and Liability Act in 1980, the NCP was broadened to cover releases at waste sites. CERCLA established the Federal Superfund program to respond to releases and threatened releases of hazardous substances at sites on the National Priority List (NPL), which are considered sufficiently impacted to justify the use of public funds for remediation, if no responsible parties are willing or able to perform the remediation. The NPL includes nine criteria with which to evaluate remedial alternatives.[4] An acceptable alternative must meet Criteria 1 and 2, known as "threshold criteria," in order to be carried further in the analysis. Criteria 3 through 7, known as "balancing criteria," are evaluated to determine the best overall solution. Criteria 8 and 9, known as "modifying criteria," are evaluated based on State and public comment. Under CERCLA, USEPA or other federal lead agency would provide the opportunity for the State and the public to provide comments. Although CERCLA does not apply to the project, the comments of state agencies and the public are considered by the Regional Board through the Porter-Cologne Act, the California Environmental Quality Act (CEQA), and other applicable state laws. The relative consistency of the RP's Proposed Remedy and other considered alternatives with these criteria is evaluated in the Feasibility Study (FS).

[4] *40 CFR §300.430.*

Superfund Amendments and Reauthorization Act

The Superfund Amendments and Reauthorization Act (SARA)amended CERCLA and those amendments pertain primarily to emergency management, reporting of releases, and compilation of data for public information (community right to know) purposes. SARA does not apply to the project because the site is not on the NPL and deals primarily with releases of petroleum hydrocarbons.

The Superfund Amendments and Reauthorization Act (SARA(pertains primarily to emergency management, reporting of releases, and compilation of data for public information (community right to know) purposes. SARA does not apply to the project because the site is not on the NPL.

Federal Occupational Safety and Health Administration

The Federal Occupational Safety and Health Act of 1970, which is implemented by the Federal Occupational Safety and Health Administration (OSHA), contains provisions with respect to hazardous materials handling. Federal OSHA requirements, including those set forth in 29 CFR §1910, et seq. and 29 CFR §1926 are designed to promote worker safety, worker training, and a worker's right–to-know. To the extent these laws and rules apply to the project, they are accounted for and applied in the Health and Safety Plan (HASP) that apply to all remediation activities.

State Regulations

California Code of Regulations

California law establishes a program of state "Superfund" sites, which are sites not on the NPL, but which the state believes are sufficiently problematic to warrant state intervention in the event that no responsible parties address the conditions. Like CERCLA, the state "Superfund" program contains mechanisms by which the state requires cooperation. The state "Superfund" program is substantially the same as CERCLA. The State of California Code of Regulations (CCR) establishes standards related to toxins and waste disposal. A summary of key standards related to remedial activities of hazardous materials are provided below. The California definition of "hazardous substance" utilizes, in large part, the same definitional language as CERCLA, but is more broad, and includes more substances as "hazardous substances" than the CERCLA definition. Those substances are the non-RCRA or California hazardous wastes.

California Hazardous Waste (aka "Non-RCRA Hazardous Waste") and California Code of Regulations Title 22

Among other things, Title 22 relates to the cleanup and prevention of toxins in soils and water. Sections 66261.1 through 66261.126 provide for the identification and listing of hazardous waste and criteria for identifying the characteristics of hazardous waste, sampling methods, hazardous constituents, and basis for listing hazardous waste. Title 22 identifies and lists hazardous wastes and standards applicable to generators and transporters of hazardous waste. It provides standards for owners and operators of hazardous waste transfer, treatment, storage and disposal facilities. Title 22 establishes the minimum standards for acceptable management of hazardous waste. It also governs enforcement and inspections. Selection and ranking criteria for hazardous waste sites requiring remedial action are identified. It governs site and facility cleanup services, corrective action, and site remediation.

California Code of Regulations Title 23

Title 23 addresses public health and safety issues related to hazardous materials and wastes, and it specifies disposal requirements. Title 23 includes requirements intended to protect waters of the state from discharges of hazardous substances. General closure requirements and criteria are provided in Title 23, Chapter 16.

California Health and Safety Code

The California Health and Safety Code, section 25356 establishes criteria for the protection of public health, safety, and the environment associated with toxic substances. The DTSC enforces cleanup of contaminated sites through the implementation of Remedial Action Plans (RAPs), which are regulated by CERCLA and Section 25356.1 of the California Health and Safety Code.

California Hazardous Waste Control Law

The Hazardous Waste Control Law (HWCL) is the primary hazardous waste statute in the State of California. The HWCL implements RCRA as a "cradle-to-grave" waste management system which specifies that generators have the primary duty to determine whether their wastes are hazardous and to ensure their proper management. The HWCL also establishes criteria for the reuse and recycling of hazardous wastes used or reused as raw materials. The HWCL exceeds federal requirements by mandating source reduction planning and a much broader requirement for permitting facilities that treat hazardous waste. It also regulates a number of types of wastes and waste management activities that are not covered by federal law with RCRA.

Disposal Facilities for Wastes

California has Class I, II and III receiver facilities. Class I facilities may accept both RCRA and non-RCRA or California hazardous wastes; Class II facilities may accept "designated"[5] non-hazardous wastes; and Class III facilities may only accept non-hazardous wastes."[6] Non-hazardous wastes can include construction debris (i.e., asphalt, concrete, wood, etc.) and soil that is determined to be non-hazardous.

All non-RCRA/California hazardous wastes must either be disposed of in a Class II landfill (i.e., sites that may accept "designated" and non-hazardous wastes), a Class I landfill or be destroyed via incineration or other appropriate methodology approved by the USEPA. Note that since material disposed of in Class II landfills are not considered hazardous waste by RCRA, it would not require pre-treatment prior to disposal.

In California, options for disposal of hazardous waste are limited by the capacity of the available receiver facilities under each facility's permit. However, the RP's Proposed Remedy does not anticipate use of Class I landfills. The RP intends to transfer impacted soil to a permitted waste treatment facility. More specifically, the soil would be transported to the Soil Safe facility in Adelanto, California.

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[5] *Designated waste (non-municipal, non-hazardous) is waste that under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state. Designated waste is permitted to be received by Class II landfills, which are specially designed to reduce the risks of groundwater contamination from industrial wastes.*

[6] *Land Disposal Section – Wastes Allowed for Discharge at Disposal Facilities, http://www.waterboards.ca.gov/water_issues/programs/land_disposal/walist.shtml. Accessed July2014.*

Department of Toxic Substances Control

The DTSC oversees and enforces the cleanup of soils and groundwater, and evaluates soil, water, and air samples taken at waste or contaminated sites. Primary authority for the statewide administration and enforcement of the HWCL rests with the DTSC. Pursuant to HSC §25355.5, DTSC may enter into agreements to provide remediation oversight services with responsible parties for cleanup of contaminated sites.

California Water Resources Control Board

Responsibility for the protection of water quality in California resides with the State Water Resources Control Board (State Water Board) and nine Regional Water Quality Control Boards (Regional Boards). The State Water Board and Regional Boards have legal authority to regulate site cleanup per Division 7 of the California Water Code (CWC), State Water Board plans and policies, and the Regional Water Quality Control Plans (Basin Plans). The Regional Boards oversee the dischargers' (responsible parties) activities pertaining to the cleanup of pollution at sites to ensure that the dischargers clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored. The site is within the jurisdiction of the Los Angeles Regional Board, as discussed below. Pursuant to WC sections 13304 and 13267, the Regional Boards may require responsible parties for cleanup of contaminated sites, such as the project[7], to pay the Regional Board's oversight costs.

In 2008, environmental investigations, overseen by DTSC, were conducted at the adjacent former Turco Products Facility. During those investigations, contamination by petroleum hydrocarbons was discovered at sample locations within the former Kast Tank Farm Property site. DTSC communicated these findings to the Regional Board in March 2008, and in April 2008 the Regional Board sent an inquiry to Shell regarding the status of any environmental investigations at the site. This inquiry was followed by the Regional Board's CWC Section 13267 Order to Conduct an Environmental Investigation at the former Kast Property issued to Shell on May 8, 2008. A series of extensive multimedia sampling and investigations, pilot studies, and other environmental evaluations of the site have been conducted in response to that Order and subsequent 13267 Orders issued on October 1, 2008 and November 18, 2009, Section 13304 Order dated October 15, 2009, and Cleanup and Abatement Order (CAO) R4-2011-0046 dated March 11, 2011, as amended.

Shell has conducted extensive multimedia sampling at the site during multiple investigations from 2008 to present. All of the investigations have occurred under Regional Board oversight, following work plans reviewed by the Regional Board in consultation with other governmental agencies including the Office of Environmental Health Hazard Assessment (OEHHA), the Los Angeles County Fire Department, and Los Angeles County Department of Public Health and approved by the Regional Board. All of these work plans and reports documenting findings of the work conducted are available to the public on the State Water Board GeoTracker website at http://geotracker.waterboards.ca.gov/profile_report.asp?globalo_id=T10000000228.

[7] *For the purposes of this section of the EIR, the term "contaminated" when used in reference to soil or materials at the Site means soil or materials at the Site that are or have been in contact with COPCs. This does not mean that the Site necessarily meets the definition of "contaminated" when the term is used in any federal, state, or local regulatory context, nor does it imply that the "contaminated" material presents a risk to human health or the environment.*

Investigations at the site since 2008 have included:

- Assessment in public rights-of-way, the adjacent railroad right-of-way, and other nonresidential areas consisting of:
  - Shallow and deep soil sampling;
  - Shallow and deep soil vapor sampling;
  - Advancing Cone Penetration Testing and Rapid Optical Screening Tool (CPT/ROST) and Cone Penetration Testing and Ultraviolet Optical Screening Tool (CPT/UVOST) soundings for Light Non-Aqueous Phase Liquid (LNAPL) assessment;
  - Groundwater monitoring well installation and sampling;
  - Background outdoor air sampling; and
  - Background soil sampling.
- Assessment at individual residential properties consisting of:
  - Methane screening;
  - Sub-slab soil vapor probe installation and sampling;
  - Shallow soil sampling, and
  - Indoor and outdoor air sampling.
- Assessment of environmental impact and feasibility of removal of residual concrete reservoir slabs.
- Pilot testing to evaluate different potential remedies for site impacts.

Shell, with oversight from the Regional Board has prepared three documents that address the remediation of the site: (1) the Feasibility Study (FS) which outlines available remediation technologies, (2) the Human Health Risk Assessment (HHRA) to estimate potential human health risks, and (3) the Remedial Action Plan (RAP) to identify the proposed remedial action.

Feasibility Study

A FS[8] was prepared o identify and screen remedial technologies for the COCs which include petroleum hydrocarbons (TPHs), TPH-diesel (TPHd), TPH-motor oil (TPHmo), and volatile organic compounds (VOCs) such as benzene, ethylbenzene, and naphthalene. The FS also evaluates remedial alternatives capable of achieving the remedial action objectives (RAOs) presented in the HHRA, leading to a recommendation of the preferred alternative. The preferred alternative is further developed in the RAP. The following RAOs are proposed for the project based on site-specific considerations:

- Prevent human exposures to concentrations of COCs in soil, soil vapor, and indoor air such that total (i.e., cumulative) lifetime incremental carcinogenic risks are within the NCP risk range of 1×10-6 to 1×10-4 and non-cancer Hazard Indices are less than 1 or concentrations are below background, whichever is higher. Potential human exposures include onsite residents and construction and utility

[8] *Geosyntec Consultants, 2014. Feasibility Study Report, Former Kast Property.*

maintenance workers. For onsite residents, the lower end of the NCP risk range (i.e., 1×10-6) and a non-cancer hazard index less than 1 have been used.

- Prevent fire/explosion risks in indoor air and/or enclosed spaces (e.g., utility vaults) due to the accumulation of methane generated from the anaerobic biodegradation of petroleum hydrocarbons in soils. Eliminate methane in the subsurface to the extent technologically and economically feasible.
- Remove or treat mobile LNAPL to the extent technologically and economically feasible, and where a significant reduction in risk to groundwater will result.
- Reduce COCs in groundwater to the extent technologically and economically feasible to achieve, at a minimum, the water quality objectives in the Basin Plan to protect the designated beneficial uses, including municipal supply.

Human Health Risk Assessment

The HHRA[9] was prepared to estimate potential human health risks associated with COCs detected in soil, sub-slab soil vapor, and soil vapor at the site. The objective of the HHRA is to evaluate potential human health impacts to onsite residents and onsite construction and utility maintenance workers. In addition, potential leaching of COCs from soil to underlying groundwater was evaluated. The findings of the HHRA were used as a basis for remedy evaluation in the FS, and remedial action planning as presented in the RAP. The HHRA contains these major components:

- Data evaluation and selection of COCs;
- Identification of potentially exposed populations and exposure pathways;
- Fate and transport modeling;
- Toxicity assessment;
- Site-specific cleanup goals (SSCGs);
- Risk characterization;
- Uncertainty analysis.

California Environmental Protection Agency

In January 1996, the California CalEPA adopted regulations implementing a "Unified Hazardous Waste and Hazardous Materials Management Regulatory Program" (Unified Program). The program addresses hazardous waste generators and hazardous waste on-site treatment, underground storage tanks (USTs) and above ground storage tanks (ASTs), hazardous material release response plans and inventories, risk management and prevention programs, and Uniform Fire Code (UFC) hazardous materials management plans and inventories. The Unified Program is implemented at the local level by a local agency: the Certified Unified Program Agency (CUPA). The CUPA is responsible for consolidating the administration of the six program elements within its jurisdiction. In the City of Carson the Los Angeles County Fire Department conducts inspections of businesses, manages and reviews various hazardous waste permits for business plans, and oversees cleanups. The County of Los Angeles Department of Public Works handles all other elements.

California Office of Environmental Health Hazard Assessment

The OEHHA is the state agency for the assessment of health risks posed by environmental contaminants. The mission of OEHHA is to protect human health and the environment through scientific evaluation of risks posed by hazardous substances. The Office is one of five state departments within the Cal EPA. OEHHA implements the Safe Drinking Water and Toxic Enforcement Act of 1986, commonly known as Proposition 65, and compiles the state's list of substances known or suspected to cause cancer or reproductive harm. The Office also develops health-protective exposure levels for contaminants in air, water, and soil as guidance for regulatory agencies and the public. These include public health goals for contaminants in drinking water and both cancer potency factors and non-cancer reference exposure levels for the Air Toxics Hot Spots Program (Assembly Bill [AB] 2588).

California Occupational Safety and Health Administration

Locally, the U.S. Department of Labor has delegated the authority to administer OSHA regulations to the State of California. The California OSHA program (CalOSHA) (codified in the CCR, Title 8, or 8 CCR generally and in the Labor Code §6300-6719) is administered and enforced by the Division of Occupational Safety and Health (DOSH). CalOSHA is very similar to the Federal OSHA program. For example, both programs contain rules and procedures related to exposure to hazardous materials during demolition and construction activities. CalOSHA standards establish exposure limits for certain air contaminants, which define the maximum amount of hazardous airborne chemicals to which an employee may be exposed over specific periods. Employers are required to provide a written health and safety program, worker training, emergency response training, and medical surveillance. CalOSHA requires employers to implement a comprehensive, written Injury and Illness Prevention Program (IIPP). An IIPP is an employee safety program for potential workplace hazards, including those associated with hazardous materials.

California Department of Transportation

The California Department of Transportation (Caltrans) sets standards for trucks in California which are enforced by the California Highway Patrol. Trucks transporting hazardous waste are required to maintain a hazardous waste manifest. This manifest is required to describe the contents of the material in the truck so that wastes can be readily identified in the event of a spill.

State regulations require the use of certified hazardous waste haulers for the transport of hazardous waste in California. Certified waste haulers are required to adhere to certain inspection and maintenance schedules and maintain sufficient insurance coverage. These regulations would apply to trucks that transport hazardous materials from the site under the project.

Regional

Los Angeles Regional Water Quality Control Board

The Regional Board develops and implements its Basin Plan that designates the beneficial uses of waters of the state, establishes water quality objectives to protect those uses, and describes implementation programs to meet the water quality objectives. The Basin Plan implements a number of federal and state laws, the most important of which are the State Porter-Cologne Water Quality Control Act and the Federal Clean Water

[9] *Geosyntec Consultants, 2014. Human Health Risk Assessment Report, Former Kast Property.*

Act. Refer to Section 5.5, *Hydrology and Water Quality*, of this EIR for a detailed discussion of the applicable water quality regulations.

The Regional Board has jurisdiction in matters concerning the management of potential sources of surface and groundwater contamination, including cleanup of discharges of waste from tanks and other point and non-point sources of discharges. The Regional Board will serve as the lead agency for the proposed project.

South Coast Air Quality Management District

As discussed in Section 5.1, Air Quality, of this EIR the South Coast Air Quality Management District (SCAQMD) regulates emissions associated with the excavation and remediation of certain contaminated materials through SCAQMD Rule 1166, Volatile Organic Compound Emissions from Decontamination of Soil. This rule requires development and approval of a mitigation plan, monitoring of VOC concentrations, and implementation of the mitigation plan if "VOC-contaminated material"[10] is detected. The SCAQMD also regulates fugitive dust emissions through SCAQMD Rule 403, Fugitive Dust. This rule requires the implementation of best available fugitive dust control measures during active construction periods capable of generating fugitive dust emissions from on-site earth-moving activities, construction/demolition activities, and construction equipment travel on paved and unpaved roads.

Local

City of Carson General Plan, Safety Element

The City of Carson General Plan Safety Element (adopted October 11, 2004) evaluates natural and man-made hazards that have the potential to endanger the welfare and safety of the general public and aims to reduce the potential risk of death, injuries, property damage and the economic and social dislocation resulting from them.[11] Man-made hazards involve hazardous materials, transportation, oil production facilities, civil unrest, national security emergencies and terrorism. The concerns identified in the Safety Element are subsequently incorporated into goals, policies and implementation actions to reduce the impacts of hazards. Policies and implementation measures of the General Plan Safety Element that pertain to the proposed project include the following:

> **Goal SAF-4**: Minimize the threat to the public health and safety and to the environment posed by a release of hazardous materials.
>
> - **Policy SAF-4.1:** Strictly enforce federal, state and local laws and regulations relating to the use, storage, and transportation of toxic, explosive, and other hazardous and extremely hazardous materials to prevent unauthorized discharges.
> - **Policy SAF-4.3:** Through the planning and business permit processes, continue to monitor the operations of businesses and individuals which handle hazardous materials.

[10] *VOC-contaminated material is defined by SCAQMD as excavated soil that measures greater than r ppm total VOCs as measured with an OVA (e.g., PID), within three inches of the excavated material within three minutes of excavation.*

[11] *City of Carson, 2004. General Plan Safety Element. http://ci.carson.ca.us/content/files/pdfs/GenPlan/Chapter06.Safety.pdf. Accessed August 2014.*

Existing Conditions

Regional Health Risks

The SCAQMD has conducted a series of region-wide air toxics studies called the Multiple Air Toxics Exposure Study (MATES), which are aimed at estimating the cancer risk from toxic air emissions throughout the South Coast Air Basin (SoCAB) by conducting a comprehensive monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to fully characterize health risks for those living in the air basin. The final draft of the third update of the study, MATES III, was released in September 2008. The study concluded that the average carcinogenic risk from air pollution in the South Coast Air Basin is approximately 1,200 in one million. Mobile sources (e.g., cars, trucks, trains, ships, aircraft, etc.) represent the greatest contributors. Approximately 85 percent of the risk is attributed to diesel particulate emissions, approximately 10 percent to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde), and approximately 5 percent of all carcinogenic risk is attributed to stationary sources (which include industries and other certain businesses, such as dry cleaners and chrome plating operations).

As part of the MATES III study, the SCAQMD has prepared a series of maps that show regional trends in estimated outdoor inhalation cancer risk from toxic emissions, as part of an ongoing effort to provide insight into relative risks. The maps' estimates represent the number of potential cancers per million people associated with a lifetime of breathing air toxics (24 hours per day outdoors for 70 years) in parts of the area. The MATES III Los Angeles County map, which is the most recently available map to represent existing conditions near the project area estimated cancer risk for that location is estimated at 1,090 cancers per million, while the area around the project site ranges between 1,087 to 1,434 cancers per million.[12] Generally, the risk from air toxics is lower near the coastline; it increases inland, with higher risks concentrated near large diesel sources (e.g., freeways, airports, and ports).

Existing Emissions

The site is currently occupied with residential uses with hardscape and streets. Various investigations at the site have identified contamination in soil, soil gas and groundwater. The site generates emissions through fugitive dust and volatilization of existing contaminants. Current fugitive dust emissions are mainly due to wind erosion and vehicles travelling on surface streets. Wind erosion and road dust is minimized due to existing development and paved roads. As the site is developed with residential uses, existing emissions are minimal and do not significantly impact the current ambient air quality.

Sensitive Receptors and Locations

Offsite

Some population groups, including children, elderly, and acutely and chronically ill persons (especially those with cardio-respiratory diseases), are considered more sensitive to air pollution than others. Off-site sensitive land uses close to the site are shown in **Figure 5.4-1**, *On and Off-Site Receptor Locations*, and include the following:

[12] *South Coast Air Quality Management District, Multiple Air Toxics Exposure Study, MATES III Carcinogenic Risk Interactive Map, http://www3.aqmd.gov/webappl/matesiii/. Accessed August 2014.*

- Single-Family Residential Dwellings: Residential uses located to the south, west and east, adjacent to the site, including the Monterey Pines Community located to the southwest of the site. Residential uses are also located further away to the north of the site.
- School: Wilmington Middle School is located southwest of the site across Lomita Boulevard.

On-site

In addition to the closest off-site sensitive receptors described above, this EIR also considers on-site residences as sensitive receptors. On-site residential uses include Single-Family Residential Dwellings which include the residential areas located along Marbella Avenue, East 24th Street, Ravenna Avenue, Panama Avenue, Realty Street, and Lomita Boulevard. On-site properties that are not being remediated or restored and that are not vacated but that are near to the cluster of properties in some stage of remediation and/or restoration would be treated as a sensitive receptor. This would provide for a conservative and health protective analysis.

Results of Sampling Activities

Soil Contaminants

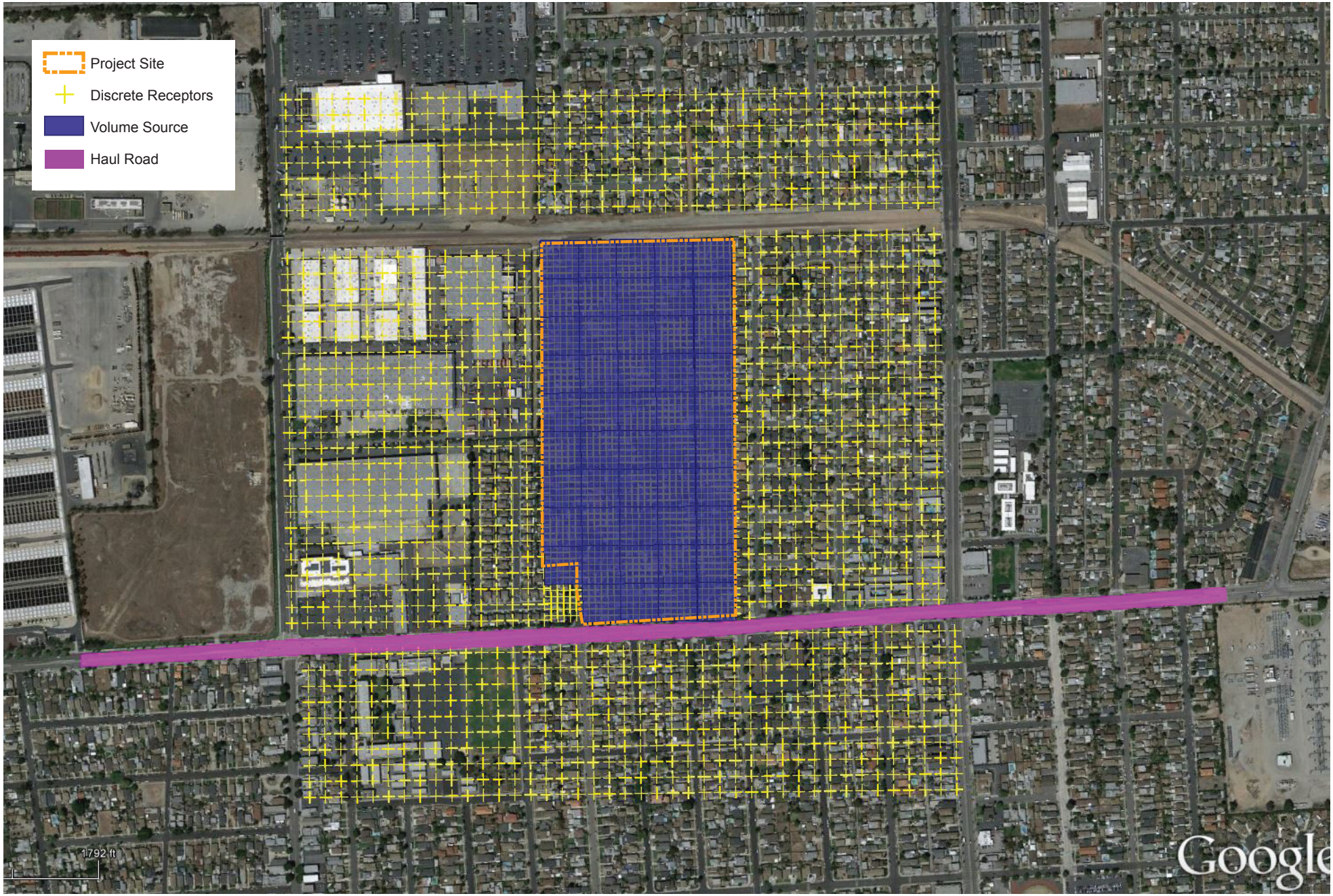
Soil samples showing elevated TPH and other VOCs and semi-volatile organic compounds (SVOCs) related to petroleum releases were found: (1) beneath the footprint of the former reservoirs; (2) within the fill material above the base level of the former reservoirs and (3) in areas outside the footprints of the former reservoirs. Higher concentrations of petroleum hydrocarbons tend to be located inside and closer to the edges of the former reservoir footprints. Concrete slabs, interpreted to be reservoir bottoms, were encountered in some of the borings at depths ranging from approximately 8 to 10 feet below ground surface (bgs).

Soil Vapor Contaminants

Methane, benzene, naphthalene, perchloroethylene (PCE) and trichloroethylene (TCE), and trihalomethanes (THMs) were all detected in soil vapor samples. Methane was detected in subsurface soil vapor samples, particularly deeper soil vapor samples. Methane screening conducted inside residences and in utility vaults, storm drains, and sewer manholes at and surrounding the site have not identified methane concentrations in enclosed spaces that indicate a potential safety risk. Very few instances of methane detection have been found in sub-slab soil vapor, and in all but one location, the results of methane speciation indicate the source was either a natural gas pipeline leak or a sewer leak.[13]

Benzene detections in sub-slab soil vapor are scattered and generally much lower than soil vapor detections at 5 feet bgs and deeper, up to 15 feet bgs. As with methane, transport is primarily through diffusion, and benzene moving upward from depth is typically biologically degraded and/or significantly attenuated in the aerobic shallow soils before it reaches the surface. Elevated benzene concentrations at 5 and 15 feet bgs are present inside the footprint of the former reservoirs as well as outside. Please refer to Figure 5.5-4 for additional details regarding benzene concentrations on-site.

[13] *URS Corporation and Geosyntec Consultants, 2014. Remedial Action Plan, Former Kast Property.*



PCR

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On and Off-Site Receptor Locations

Former Kast Property Tank Farm Site Remediation Project
Health Risk Assessment
Source: PCR Services Corporation, 2014.

FIGURE
5.4-1

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Elevated naphthalene concentrations in sub-slab soil vapor samples are few and scattered. Elevated naphthalene concentrations at 5 feet bgs appear to be concentrated along 244th Street and scattered along Marbella Avenue. Naphthalene was not detected in soil vapor samples from 15 feet bgs.

Groundwater Contaminants

Groundwater monitoring wells have been sampled quarterly since installation. Groundwater results from the most recent sampling event in the Second Quarter 2014 are discussed below. Most of the groundwater monitoring wells are screened in the water table aquifer, the top of which ranges from approximately 51 to 65 feet bgs. The remaining wells are screened in the Upper and Lower Gage aquifer. The Gage aquifer extends from approximately 90 to 170 feet bgs. The latest groundwater results are generally consistent with previously reported results. Groundwater is impacted with TPH and other VOCs and SVOCs related to petroleum releases on-site. These non-site related contaminants include tert-butyl alcohol (TBA) and chlorinated compounds (including TCE and PCE).

Site-related contaminants in groundwater exceeding California drinking water standards (Maximum Contaminant Levels [MCLs] or Department of Human Health Notification Levels [NLs]) are benzene, naphthalene, and arsenic. TPH also exceeds the Regional Water Quality Control Board, San Francisco Bay Region (San Francisco Bay Regional Board) December 2013 Environmental Screening Levels (ESLs). It should be noted that the drinking water supplied to the Carousel community by the water provider is screened in a lower aquifer than the impacted groundwater at the site and is tested according to state standards and is safe to drink (California Water Service Company, 2013). No current or future use of the shallow zone and Gage aquifer at or near the site is anticipated due to: 1) high total dissolved solids and other water quality issues unrelated to site conditions, 2) is present in a low yield, thin aquifer, 3) there are restrictions on groundwater pumping in the basin due to the adjudication of the groundwater resource; and, 4) the overlying land use is completely residential without the open space necessary for water production infrastructure.

If petroleum hydrocarbons from crude oilare present at sufficiently high concentration they may occur as a non-aqueous phase liquid (NAPL), which typically has lower density than water and is often referred to as "light NAPL" or LNAPL. LNAPL has been detected at a measurable thickness in groundwater at the site in two wells located approximately 43 feet from each other in Marbella Avenue. An LNAPL sample collected from one of the wells was analyzed and was characterized as a relatively unweathered crude oil. Currently, LNAPL is removed from these wells monthly using dedicated pumps installed in the wells. To date, approximately 120 gallons of LNAPL have been recovered from the two wells. LNAPL has not been detected in any of the other groundwater monitoring wells at the site.

Benzene is present beneath much of the site in the shallow groundwater zone. Benzene in groundwater is attributed to one or more of the following: leaching of benzene from hydrocarbon-impacted soils; and/or leaching of benzene from LNAPL locally present at or near the water table beneath the site.The highest concentrations of benzene detected in the shallow zone were from two wells located in the northeastern portion of the site. Offsite to the northeast (downgradient), benzene was detected in one downgradient well. Benzene was not detected in samples collected in the deeper portion of the Gage aquifer during recent monitoring events.

Naphthalene has been detected in groundwater from the majority of site monitoring wells. However, during the most recent sampling only one well located in the northern portion of the site had a detected concentration that exceeded the NL of 17 µg/L. Naphthalene historically has been detected at two monitoring wells. Concentrations of naphthalene historically exceeding the NL are limited to these two areas. The monitoring well located in 244th Street near Ravenna Avenue, consistently has had the highest naphthalene concentrations.

MCLs and NLs have not been established for TPH in groundwater. The San Francisco Bay Regional Board has established ESLs for TPHg, TPHd, and TPHmo in groundwater of 100 µg/L. Based on the most recent data, the TPHg ESL was exceeded in eight wells, the TPHd ESL was exceeded in eight wells, and TPHmo ESL was exceeded in six wells. The monitoring well located in 244th Street near Ravenna Avenue, consistently has had the highest TPH and VOC concentrations.

Arsenic has been detected in most of the monitoring wells. The latest sampling event had arsenic concentrations exceeding the MCL of 10 µg/L in four wells. Overall, arsenic concentrations have been declining in most wells with historic arsenic concentrations above MCLs. Arsenic was not detected above the MCL in the three offsite shallow zone downgradient wells. Dissolved arsenic concentrations in the deeper Gage wells are significantly lower and the concentration in only one well was above the MCL. Arsenic is a natural trace element that occurs in soils. Because arsenic is naturally soluble, dissolved arsenic is a common contaminant in Southern California groundwater. It is likely that at least a portion, if not all, of the dissolved arsenic beneath the site is derived from natural sediments beneath the site. Petroleum hydrocarbon contamination at the site may enhance the solubility of arsenic by lowering oxygen levels in the subsurface, thus increasing the mobility of arsenic in soils beneath the site. Once petroleum hydrocarbons are depleted, elevated arsenic would be expected to return to background concentrations. Based on groundwater monitoring well data, relatively elevated arsenic concentrations are localized in the central western portion of the site and are attenuated significantly in the downgradient direction.

Constituents of Concern

USEPA risk assessment guidance presents a methodology for identifying which detected chemicals should be included in a quantitative risk assessment. These COCs are defined by USEPA[14] as chemicals potentially related to the site whose data are of sufficient quality for use in a quantitative risk assessment. USEPA guidance states that the list of chemicals should include all chemicals that were:

- Positively detected in at least one sample;
- Detected above levels of the same chemicals found in associated blank samples;
- Tentatively identified but may be associated with the site based on historical information;
- Transformation products of detected chemicals; and
- Detected above naturally occurring levels (background).

[14] *U.S. Environmental Protection Agency, Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A), (1989), http://www.epa.gov/oswer/riskassessment/ragsa/pdf/rags_a.pdf. Accessed August 2014.*

Some of contaminants at the site are considered to be hazardous and may volatilize when exposed to the atmosphere resulting in air emissions of toxic air contaminants (TACs). In addition, non-volatile TACs contained in soil may be released into the air in the form of fugitive dust through wind erosion, or soil handling activities. TACs are defined by California Health and Safety Code Section 39655 as follows:

> *"Toxic air contaminant" means an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal act (42 U.S.C. Sec. 7412(b)) is a toxic air contaminant.*

Exposure to TACs may create adverse health effects, such as cancer and/or non-cancerous chronic and/or acute health impacts. Numerous samples have been collected as a part of the site investigation to determine the COCs.

Detected compounds include inorganics, polycyclic aromatic hydrocarbons (PAHs), TPHs, VOCs, SVOCs and metals. Those chemicals that have a potential to cause adverse human health impacts are defined as COCs. The first step for COC selection involved excluding a chemical as a COC if it was detected in five or less samples collected from across the site. Due to the large number of soil samples collected (over 10,000) this equates to less than or equal to 0.05 percent of soil samples.

USEPA guidance referenced above also allows for handling of outlier values which are not representative of the data set as a whole. However, distribution of concentration data at a site may be strongly skewed so that there are a few hot spots of contamination. Certain chemicals which may have outlier concentrations are further analyzed in order to determine if the concentration is representative of the entire site. If a hot spot is suspected, areas of high concentration may be evaluated as a separate hot spot or statistical analysis may be performed to determine a more representative concentration.

To identify COCs for each media, the maximum concentration for that media was compared to one-tenth of its respective risk based screening level (RBSL). One-tenth of the RBSL was used as a conservative approach to screen chemicals for further analysis and to address potential cumulative effects. If the maximum concentration was greater than one-tenth of the RBSL it was selected as a COC for the site. In addition to the RBSL screen, the COC screening process for metals and carcinogenic PAHs (cPAHs as benzo(a)pyrene equivalents) included a comparison to site background, with only those compounds exceeding background being selected as COCs.

For the selection of soil COCs to address the leaching to groundwater pathway, chemicals that were detected in groundwater above their respective MCL or NL were included. Based on the site conceptual model (SCM) presented in Section 2 of the Site-Specific Cleanup Goals (SSCG) report, by Geosyntec, and the age of potential petroleum releases at the site, groundwater impacts from leaching of soils are not expected to change. As a result, the inclusion of chemicals that have been detected above MCLs and NLs is considered appropriate for COC selection. For TPH constituents, no MCL or NL is available but, given their prevalence in soils, they were included as COCs in the evaluation of leaching to groundwater. **Table 5.4-1**, *List of Contaminants of Concern*, lists the COCs detected in soil and soil vapor samples that are associated with the site.

Table 5.4-1

List of Contaminants of Concern

Chemical Abstract Service (CAS) Number	Contaminant of Concern
7440-36-0	Antimony
7440-38-2	Arsenic
7440-43-9	Cadmium
18540-29-9	Chromium, Hexavalent
7440-48-4	Cobalt
7440-50-8	Copper
7439-92-1	Lead
7440-28-0	Thallium
7440-62-2	Vanadium
7440-66-6	Zinc
58-55-3	Benzo (a) Anthracene
50-32-8	Benzo (a) Pyrene
205-99-2	Benzo (b) Fluoranthene
207-08-9	Benzo (k) Fluoranthene
218-01-9	Chrysene
53-70-3	Dibenz (a,h) Anthracene
193-39-5	Indeno (1,2,3-c,d) Pyrene
90-12-0	1-Methylnapthalene
91-57-6	2-Methylnapthalene
129-00-0	Pyrene
121-14-2	2, 4-Dinitotoluene
117-81-7	Bis (2-Ethylhexyl) Phthalate
68334-30-5	TPH as Diesel
PHCG	TPH as Gasoline
TPHMOIL	TPH as Motor Oil
79-34-5	1,1,2,2-Tetrachloroethane
96-18-4	1,2,3-Trichloropropane
95-63-6	1,2,4-Trimethylbenzene
107-06-2	1,2-Dichloroethane
78-87-5	1,2-Dichloropropane
108-67-8	1,3,5-Trimethylbenzene
106-46-7	1,4-Dichlorobenzene
71-43-2	Benzene
75-27-4	Bromodichloromethane
74-83-9	Bromomethane
100-41-4	Ethylbenzene
75-09-2	Methylene Chloride

Table 5.4-1 (Continued)

List of Contaminants of Concern

Chemical Abstract Service (CAS) Number	Contaminant of Concern
91-20-3	Naphthalene
75-65-0	Tert-Butyl Alcohol (TBA)
127-18-4	Tetrachloroethene
108-88-3	Toluene
79-01-6	Trichloroethene
75-01-4	Vinyl Chloride
1330-20-7	Xylenes, Total

Source: Human Health Risk Assessment Report. Former Kast Property. Geosyntec. 2014.

Local Health Risks

As discussed in the RAP,[15] sampling completed during site investigations confirms that there were petroleum releases at the site. Petroleum hydrocarbon and related VOC and SVOCs impacts occur in shallow and deep soils; VOCs and methane resulting from degradation of petroleum hydrocarbons are present in subsurface soil vapor; dissolved-phase VOC and TPH impacts are present in groundwater, and LNAPL is locally present above groundwater.

In addition to hydrocarbon-related contaminants, contaminants are also locally present from chlorinated solvents, such PCE and TCE, and from THMs. Although the chlorinated solvents TCE and PCE are found sporadically around the site in shallow soils, their presence in groundwater is related to offsite sources.[16] THMs are commonly found in drinking water that has been treated with chlorine or chloramines and form when chlorine reacts with organic matter in the water.[17] THMs have all been detected in site soils, soil vapor, and groundwater. Because their source is related to drinking water delivered to the site by Cal-Water, THMs are not considered site-related COCs.

Although petroleum hydrocarbons in the subsurface have likely fermented to produce methane at depth, such methane is generally not present in the shallow subsurface and has not been detected in residences or enclosed areas of the site at levels that pose a hazard. Methane generated at depth typically migrates very

[15] *URS Corporation and Geosyntec Consultants, 2014. Remedial Action Plan, Former Kast Property.*

[16] *URS Corporation and Geosyntec Consultants, 2014. Human Health Risk Assessment, Former Kast Property.*

[17] *California Water Service Company. https://www.calwater.com/help/water-quality/. Accessed August 2014.*

slowly through soils because it is not under significant pressure. Transport is primarily through diffusion, and methane moving upward from depth is typically biologically degraded and/or significantly attenuated in the aerobic shallow soils before it reaches the surface.

This bio-attenuation in the vadose zone is evident in the soil vapor data collected at the site and reported in the Interim Residential Reports and the Street Soil Vapor Monitoring Reports.[18] These natural mechanisms explain the lack of elevated methane levels in the sub-slab soil vapor samples and in indoor air within the residences that have been tested.

As discussed previously, an HHRA was prepared for the project site to evaluate potential impacts associated with COCs detected in soil, sub-slab soil vapor, and soil vapor currently at the site. These health impacts presented in the HHRA represent the existing health risk to residents and workers on-site due to exposure to COCs.

Existing emissions were evaluated from soil and sub-slab soil vapor at different soil depth intervals. The soil pathway evaluated exposure via ingestion, dermal contact and inhalation of COCs. Sub-slab soil vapor evaluated exposure via indoor air inhalation. Cumulative risks were then summed up for soil and soil vapor risks to evaluate health impacts to on-site residents. It should be noted that analysis of soil and sub-slab soil vapor impacts included all COCs including background concentrations. Background concentrations are those that are either native or anthropogenic, that are presented but not associated with any site activities. Although soil and soil vapor health impacts evaluate all COCs, cumulative impacts exclude background concentrations. Therefore, cumulative health impacts may be lower than those calculated for soil and sub-slab soil vapor.

HI and Incremental Lifetime Cancer Risk (ICLR) over a 30 year period exceeded thresholds for on-site residences. The maximum ICLR due to the soil exposure pathway exceeded 10 in a million cancer risk. The maximum ICLR due to soil vapor was found to be 20 in a million at 378 E. 249th Street, where elevated benzene concentrations were observed underneath the residence and a sub-slab mitigation system was installed as an interim measure. Two indoor air sampling events have been conducted at this property and the multiple-lines-of evidence vapor intrusion evaluation indicated that the indoor air concentrations are indistinguishable from background levels. However, as discussed previously, cumulative risks were summed across all media, but excluded background levels. The HHRA indicates that only one property had cumulative risk greater than 1×10^{-6} (a value of 2×10^{-6}) when the media risks separately were less than 1×10-6. However, this property is already identified for consideration in the FS and RAP due to an exceedance of the SSCG for leaching to groundwater and therefore potential cumulative risks for this property will be addressed as a part of the remedial action for soils. The cumulative non-cancer HI was less than 1 for the maximum impacted on-site residential receptor.

Construction and utility maintenance worker exposures were evaluated for two areas within the site: (1) within the individual property boundaries and (2) within the streets. The maximum ILCR for maintenance workers due to soil was approximately 30 in one million. Soil vapor risk ILCR was 3 in one million. Non-cancer HI was below 1. Cumulative cancer risk for maintenance workers was below one in one million and non-cancer HI of less than 1.

3. METHODOLOGY AND THRESHOLDS

Methodology

This section explains the methodology used to assess health impacts due to TACs released during remediation activities and also identifies sources of TAC emissions. The evaluation of potential hazards from hazardous material handling that may result from the short- and long-term implementation of the RAP is conducted as follows:

Short-Term Hazards

Emissions Calculations

As discussed in Section 5.1, Air Quality, of this EIR implementation of the RAP has the potential to emit pollutant emissions through the use of heavy-duty construction equipment, soil movement (excavation), VOC off-gassing and SVE/bioventing. However, not all remediation activities are expected to release TACs. Emissions sources such as reentrained road dust and concrete breaking analyzed in Section 5.1 are not expected to contain large quantities of contaminated soil.

Fugitive dust emissions would result from various soil handling activities and unpaved road dust from on-site vehicle travel. TACs contained in the soil would be released along with the fugitive dust. Fugitive VOC emissions would occur from exposing VOC contaminated material to the ambient air due to excavation and soil handling. Diesel particulate emissions resulting from use of construction equipment can vary substantially from day-to-day, depending on the level of activity and the specific type of operation. The assessment of TACs emitted during remediation activities considers each of these potential sources. A summary of the remedial activities and equipment that would be used during implementation of the RAP is provided below:

- **Equipment and Truck Exhaust:** Equipment and trucks operating on-site would emit diesel particulate matter (DPM) during operation and idling.
- **Demolition Activities:** Implementation of the RAP and Alternatives 2 and 3would require removal of varying amounts of hardscape and softscape. Such activities would generate fugitive dust.
- **Excavation and Grading Activities:** Soil would be excavated from different portions of the site and transported off-site for treatment. Wells would also be drilled to install the SVE/bioventing system. Trenching would be performed throughout the site including off-site for installation of SVE piping. Fugitive dust and volatile compounds may be emitted when soil is handled (picked up/dropped).
- **Exposed Surfaces and Stockpiles:** As soil is excavated, VOCs contained in soil may be released to the atmosphere from the exposed active working excavation area.

Emissions from these sources were calculated for each phase of the RAP based on a six year construction schedule. Following the active construction phase, operations of the SVE/Bioventing would continue for 30 to 40 years. In addition to emissions being calculated on a temporal (time) basis, where a source of potential emissions could be identified emissions were also calculated specifically for such sources to allow for more

[18] *URS Corporation and Geosyntec Consultants , 2014. Remedial Action Plan, Former Kast Property.*

representative dispersion modeling. Additional details regarding how pollutant emissions were calculated are provided below and in Appendix E of this EIR.

Vehicle and Equipment Exhaust

Short-term activities associated with implementation of the RAP would require use of heavy-duty diesel-powered on-road vehicles and heavy-duty diesel-powered off-road equipment that generate emissions of DPM. Emission factors for both off-road (heavy construction equipment) and on-road (haul trucks) were generated through two different emissions models. Emissions from heavy-duty diesel-powered on-road vehicles were calculated using the EMFAC2011 emissions model developed by CARB.[19] On-road diesel vehicles include, but are not limited to, water trucks, dump trucks, fuel delivery trucks, and hauler trucks. As discussed in Section 5.1, Air Quality, Project Design Feature (PDF) AQ-2 requires that the, on-road diesel trucks would be limited to those that meet or exceed the emission standards for model year 2007 or newer, which would minimize emissions compared to the statewide fleet average. In addition, on-road diesel vehicle would comply with idling limit of five minutes at a time per location in accordance with the Air Toxics Control Measure (ATCM) adopted by CARB to limit toxic emissions from idling diesel trucks.[20] Idling emissions from on-road diesel vehicles were calculated based on compliance with the ATCM. Travel emissions were calculated based on the number of truck trips, speed, and distance travelled. The SCAQMD recommends that health risk assessments include other sources of toxics within a one-quarter mile of a facility. Thus, on-road diesel vehicle emissions resulting from travel on off-site local roadways (i.e., East Lomita Boulevard and Wilmington Avenue were considered). Off-site speeds were conservatively set at 25 mph, which is below the posted speed limits on East Lomita Boulevard and Wilmington Avenue. This lower speed was used for modeling as emissions are typically higher at lower speeds.

Emissions from heavy-duty diesel-powered off-road equipment are based on USEPA non-road emissions standards. USEPA emissions standards are classified as Tiers 1-4, with a higher tier engine resulting in lower emissions (i.e., cleaner). In accordance with PDF AQ-1 in Section 5.1, Air Quality, off-road diesel equipment would be limited to those that meet or exceed the emission standards for Tier 3 equipment. Therefore, emissions for off-road equipment were based on Tier 3 emissions standards. Other parameters used in the calculation include load factors, hours of operation, and horsepower ratings. The load factor is the percent of engine output during average operations. Equipment engines do not run at maximum load (100 percent) throughout the day. Average load factors were based on data from the California Emissions Estimator Model (CalEEMod) developed by the SCAQMD, which contains off-road engine load factors.[21] Off-road equipment emissions were then calculated based on the Tier 3 emissions standards, load factor, hours of operation and horsepower ratings supplied for the proposed equipment.

Fugitive Dust (Demolition, Excavation and Grading)

Emissions of fugitive dust from remediation related activities were calculated using USEPA methodologies for construction and hazardous waste/superfund site evaluations and include emissions from construction activities, wind erosion, and concrete breaking. The USEPA methodologies are outlined in the USEPA's *AP-*

[19] *California Air Sources Board Mobile Source Emission Inventory – Current Methods and Data: http://www.arb.ca.gov/msei/modeling.htm. Accessed June 2012.*

[20] *Cal. Code Regs. Tit. 13, §2485. (http://www.arb.ca.gov/msprog/truck-idling/2485.pdf)*

[21] *California Emissions Estimator Model, http://caleemod.com/. Accessed August 2014.*

42, Compilation of Air Pollutant Emission Factors.[22] Fugitive dust emissions are comprised of particulate matter of varying sizes. Respirable particulate matter consists of particles less than 10 microns in aerodynamic diameter (PM_{10}). Fine particulate matter are particles less than 2.5 microns ($PM_{2.5}$) and are known to penetrate deeper into the lungs and thus have increased adverse health effects compared to PM_{10}. It should be noted that $PM_{2.5}$ is a subset of PM_{10}, and that emissions of $PM_{2.5}$ are calculated using emission factors first developed for PM_{10} and conservative assumptions regarding percentages of PM_{10} that is $PM_{2.5}$ applied broadly by source type, such as dust and exhaust.

As required by the SCAQMD the project would implement fugitive dust control measures consistent with SCAQMD rules and regulations. At least 60 to 80 percent of potential fugitive dust emissions from exposed surfaces and active excavation or demolition sites would be controlled with water or other dust suppressants. Fugitive dust control percentages vary depending on the type of control measure (watering, soil stabilizers) and the type of surface (active, inactive). An 84 percent dust control efficiency was assumed in the emissions calculations which is consistent with application of dust suppressants and watering.

Volatile Emissions (Exposed Surfaces)

Volatile emissions from remedial activities would occur via the release of the VOCs in the soil during the handling/excavation of material. Volatile emissions also occur via diffusion of VOCs from undisturbed subsurface material through the soil media and emission at the surface. Emissions of VOCs depend on the amount of VOCs in the soil, soil physical properties, moisture content of the soil, vapor pressure and volatility of the compound, the partitioning between the contaminant and the soil moisture, and the diffusivity of the VOC through the air-filled pore space.

Since calculating VOC emissions requires a significant amount of chemical-specific information, computer models developed by USEPA are used in determining the volatilization factors and the emission rates. The Exposure Model for Soil Organic Fate and Transport (EMSOFT) (2002 Update) developed by the USEPA was used to calculate the volatile emissions for this EIR. The EMSOFT model is based on the theory and studies of Jury, et.al., and addresses situations in which contaminated materials are located at the surface and buried beneath a clean soil cover.[23,24] The model takes into account the specific properties of each chemical including Henry's law constant, diffusivity in air and water, and soil properties such as moisture and porosity. Chemical- and site-specific data were entered into the EMSOFT model. The 95 percent UCL concentrations for each chemical were used in the EMSOFT model for chemicals that were detected in five samples or more. The maximum concentrations for each chemical were used in the EMSOFT model for chemicals with less than eight samples or that were detected in less than five samples. USEPA default values were used where chemical- and site-specific data were not available based on recommendations in the *EMSOFT User's Guide*.[25] For modeling purposes, it was assumed that the incremental increase in volatile emissions from existing conditions would begin at the onset of the project and would continue for an

[22] *U.S. Environmental Protection Agency, AP-42, Compilation of Air Pollutant Emission Factors, http://www.epa.gov/ttnchie1/ap42/. Accessed 2012-2013. This risk assessment largely utilized data from Volume I, Chapters 4, 11, and 13.*

[23] *Jury, W. A., W. F. Spencer, and W. J. Farmer. 1983. Behavior Assessment Model for Trace Organics in Soil: I. Model Description. J. Environ. Qual., Vol. 12, no. 4, pp. 558-564.*

[24] *Jury, W. A., D. Russo, G. Streile, and H. El Abd. 1990. Evaluation of Volatilization by Organic Chemicals Residing Below the Soil Surface. Water Resources Res. Vol 26, No. 1, pp. 13-20.*

[25] *U.S. Environmental Protection Agency, EMSOFT User's Guide: Update to EMSOFT User's Guide, (2002).*

averaging period (i.e., the length of time off-gassing would occur) consistent with the duration of the specific volatile emissions-generating phase or sub-phase of the project.

To convert the EMSOFT modeled volatilization factors (in units of mass per area-time) into estimated VOC emissions (in units of mass per time) into the atmosphere, the volatilization factors were multiplied by the area exposed to the atmosphere, which is the area actively volatilizing due to short-term activities associated with implementation of the RAP. The values were then converted to the appropriate time period to obtain emissions in units of mass per time period (e.g., pounds per hour, pounds per year, etc.). As with fugitive dust emission, VOC emissions would be controlled using a number of measures. VOC emissions would be actively monitored during excavation/handling of contaminated materials. VOCs emissions would also be controlled using suppressants. Soils with over 50 ppm VOC would be reconsolidated to a treatment cell as required by SCAQMD regulations. For modeling purposes, the emission estimates take into account the application of suppressants, which USEPA has indicated has a control efficiency range between 91 and 100 percent for long-term control (the lower value of 91 percent was used as a conservative approach).[26]

Toxic Air Contaminants Pathways

The SCAQMD has developed guidance for Rule 1401 – New Source Review of Air Toxic Contaminants, which provides methodology for preparing health risk assessments within the basin. Under this guidance, the SCAQMD recommends that the inhalation, soil ingestion, dermal absorption, home-grown vegetables and mother's milk pathways be enabled in the Hotspots Analysis and Reporting Program (HARP)(discussed in more detail later in this Section). Therefore, these pathways were evaluated in the health risk assessment for residential receptors. The home-grown vegetables and mother's milk pathways are not included for non-residential receptors since no exposure would occur through these pathways for workers. It should be noted that the inclusion of these exposure pathways in the health risk assessment does not indicate that substantial risks are anticipated or expected for the pathways. It is expected that the primary risk driver would be associated with the inhalation pathway and that the other pathways (i.e., soil ingestion, dermal absorption, home-grown vegetables and mother's milk) would not result in substantial risks. Although home-grown vegetables are not a likely pathway, this was considered in the analysis as a conservative measure for on-site and off-site impacts.

Health Risk Assessment - TACs

Potential health impacts are evaluated through a health risk assessment which includes dispersion modeling and health risk calculations. Concentrations of COCs at receptors were determined based on dispersion modeling. A dispersion model is a "computerized set of mathematical equations that uses emissions and meteorological information to simulate the behavior and movement of air pollutants in the atmosphere. The results of a dispersion model are estimated outdoor concentrations of individual air pollutants at specified location."[27] Dispersion modeling was performed using the AMS/EPA Regulatory Model (AERMOD) (version 14134) which is a steady-state Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. AERMOD is listed as a preferred model in USEPA's *Guideline*

[26] *U.S. Environmental Protection Agency, Control of Air Emissions from Superfund Sites, (1992).*

[27] *U.S. Environmental Protection Agency, Glossary of Key Terms, http://www.epa.gov/ttn/atw/natamain/gloss1.html. Accessed June 2013.*

on Air Quality Models.[28] AERMOD is utilized by the USEPA and Cal EPA for estimating ground-level impacts from point and fugitive sources in simple and complex terrain. AERMOD is capable of modeling a variety of source types.

Sources of on-site equipment movement and excavation activities were characterized as volume sources each sized to represent an 8-house cluster under the base remedy, and a 16-house cluster under the Expedited Implementation Option.[29] Haul truck routes on and off-site were represented using area sources. Area sources simulate uniform emission density across a defined area, which is more representative of haul roads than other modeling source types. DPM, fugitive dust, and volatile emissions resulting from remediation activities were modeled as volume sources. Emissions from heavy duty diesel trucks coming to and from the site were modeled as an area source along Lomita Boulevard, at a distance of one mile from the site. Trucks travelling over one mile away from the site are not expected to impact on-site or nearby off-site receptors. Vehicle height was assumed to be 10 feet (~3 meters) which results in a plume height of approximately 5 meters based on equations in the USEPA guidance for haul roads.

As mentioned previously, remediation would occur in sets of 8-home clusters under the base remedy and a maximum of 16 homes at one time under the Expedited Option. While each home cluster is being remediated, residential uses which are not undergoing active remediation may be occupied, which may include homes adjacent to remediation activities. In order to account for these homes in the health risk analysis, receptors were placed on-site throughout the remediation area. Receptors were also placed off-site to account for residential and school uses as well as workers near the project site. Off-site receptors were placed at a 25-meter spacing covering nearby receptors including residential uses, school, and workers. On-site receptors were placed using 10-meter spacing between receptors.

As remediation activities would move throughout the site when a cluster is completed, the location of sources and receptors would change over time (temporally). In order to account for the temporal nature of emissions sources and receptors, sources were overlaid on top of receptors as shown in Figure 5.4-1. The AERMOD dispersion model ignores receptors placed inside volume sources and concentrations at each sensitive receptor would be representative of all sources which do not overlap the receptor location. This source-receptor configuration would account for all sources throughout the site. This source-receptor configuration would be appropriate for modeling long-term emissions and short-term emissions.

The SCAQMD provides model-ready, preprocessed meteorological data for use in dispersion modeling using AERMOD. The use of SCAQMD meteorological data ensures consistency among dispersion modeling analyses in the South Coast Air Basin and eliminates the need for a project applicant to process its own meteorological data. Meteorological data from the SCAQMD Long Beach North monitoring station, located at 3648 N Long Beach Blvd, Long Beach, CA 90807, approximately four and a half miles to the north-east of the site, was used. To account for annual variations in wind patterns, six years of meteorological data were used (years 2006-2011). Terrain heights were obtained from digital terrain elevation data developed by the U.S. Geological Survey (USGS) by using its Shuttle Radar Topography Mission (SRTM) data.

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[28] *40 CFR Part 51, Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule.*

[29] *Base remedy is proposed in the RAP as remediating 8-home clusters. However, an expedited option is proposed which will remediate a maximum of 16 homes at one time.*

Cancer risk calculations require other parameter inputs, such as breathing rate, body weight and exposure duration. Residential and school receptor breathing rates were assumed to be OEHHA "high end" of 393 liters per kilogram of body weight per day (L/kg body weight/day) which represents the 95th percentile breathing rate as a conservative assumption. Although use of a high end breathing rate may overestimate cancer risk, this breathing rate takes into account children's breathing rates, which tend to be higher than those of adults.[30] Worker breathing rates were assumed to be 149 L/kg body weight/day. Body weight was assumed to be an average 63 kg (139 pounds) for residential or school receptors and 70 kg (154 pounds) for worker receptors, consistent with OEHHA recommendations.[31] Exposure durations were also assumed to be 350 days per year for residential uses. Worker receptors are assumed to be 245 days per year. These OEHHA values for these parameters are generally more conservative than typically used for risk assessments and, thus, likely result in overestimated impacts.

Pollutants emitted from the site may impact a sensitive receptor through multiple environmental pathways such as inhalation, ingestion, and dermal absorption. Although inhalation is the dominant pathway (contributes most to health risk impacts), particulate based COCs emitted from the site have the potential to deposit in the soil near the site. These particulates may be deposited on skin (dermal) or ingested during inhalation. As indicated above, SCAQMD guidance for Rule 1401 – New Source Review of Air Toxic Contaminants provides methodology for preparing health risk assessments within the basin. Under this guidance, the SCAQMD recommends that the inhalation, soil ingestion, and dermal absorption pathways be enabled in HARP. As a result, even though some of these are not expected to contribute substantially to the overall risk, these pathways were nevertheless enabled in the HARP software for analysis of project impacts.

Carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, would have some associated risk. Incremental health risk associated with exposure to carcinogenic compounds is defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. Under a deterministic approach (i.e., point estimate methodology), the cancer risk probability is determined by multiplying the chemical's annual concentration by its unit risk factor (URF). The URF is a measure of the carcinogenic potential of a chemical when a dose is received through the inhalation pathway. It represents an upper bound estimate of the probability of contracting cancer as a result of continuous exposure to an ambient concentration of one microgram per cubic meter ($\mu g/m^3$) over a 70-year lifetime. The URFs utilized in the assessment and the corresponding cancer potency factors (CPF) were obtained principally from OEHHA Guidance.

OEHHA and CalEPA are responsible for identifying compounds the State believes are TACs and for developing and updating toxicity factors. Several COCs identified on-site do not have OEHHA toxicity factors and, therefore, are not included in the HARP software. However, these COCs have toxicity factors developed by other agencies and are listed in sources such as the USEPA Integrated Risk Information System (IRIS) database, Provisional Peer Reviewed Toxicity Values (PPRTV), Agency for Toxic Substances and Disease Registry (ASTDR), or the Health Effects Assessment Summary Tables (HEAST). The Regional Board determined on a case-by-case basis the toxicity data for each of these COCs. As the toxicity factor database contained within HARP cannot be edited by the user, health risk calculations for these chemicals must be

[30] *Base remedy is proposed in the RAP as remediating 8-home clusters. However, an expedited option is proposed which will remediate a maximum of 16 homes at one time.*

[31] *Ibid.*

performed outside of HARP. These calculations include dispersion modeling output values, dose calculation (breathing rate, body weight), health risk calculations (cancer, chronic, acute). These calculations were performed using methodology identical to that used in HARP, and are included in Appendix E of this EIR.

Total Petroleum Hydrocarbons were analyzed based on the Interim Guidance on Evaluating Human Health Risk from Total Petroleum Hydrocarbons (Cal-EPA, 2009). Toxicity factors for TPH have been suggested by CalEPA DTSC (CalEPA, 2009a, 2013a). Even though these toxicity factors for TPH have not gone through the same level of peer review as the other toxicity factor references used for the other COCs, the toxicity factors presented in CalEPA DTSC TPH guidance were used for TPH SSCGs. These values were presented in a letter from Geosyntec dated August 15, 2011 describing the derivation of RBSLs for TPH (TPH RBSL Letter; Geosyntec, 2011), which was approved by the Regional Board on November 14, 2011.

Health risk impacts are assessed using the HARP (version 1.4) developed by CARB.[32] The health risk calculation methodology contained in HARP is consistent with the OEHHA *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*.[33] For this risk assessment, the HARP model was used to analyze the results of the AERMOD dispersion model and determine the chemical-specific incremental increases in cancer risks and non-cancer chronic and acute health impacts. The results of the health risk assessment are calculated based on identifying the maximum exposed individual (MEI) for each receptor type (i.e., residential, worker, school). The location of the MEI for acute, chronic and cancer risk may vary depending on the type of chemical and the source. Certain chemicals may have a cancer risk factor, while others may only have a chronic and/or acute risk factor which would result in the MEI for cancer, chronic, and acute cases being located at different receptor locations.

It should be noted that not all chemicals have a cancer, chronic and acute toxicity factor. A chemical may have an adverse effect on human health with respect to cancer risk (70-year lifetime risk), long-term chronic impacts, or short-term acute impacts, or a combination thereof. Thus, each COC was evaluated in the health risk assessment based on chemical-specific toxicity values with respect to cancer risk, chronic impacts, and/or acute impacts, as appropriate. Detailed information regarding modeling input values, modeling results, and health risk impact calculations, including those performed outside of the HARP model, are provided in Appendix E of this EIR.

Accidental Upset or Release

Evaluation of accidental upset or release was based on the Chemical Process Safety (CCPS) Guidelines for Hazard Evaluation Procedures[34] risk assessment matrix reproduced as **Table 5.4-2**, *Release Risk Assessment Matrix*. This risk assessment matrix takes into account both the likelihood of accidental release and severity of consequence and rates the accidental release risk ranging from "acceptable" to "unacceptable." A significant impact with regard to accidental upset or release would occur if the accidental release risk exceeds the "acceptable with controls" level.

[32] *California Air Resources Board, "Hotspots Analysis Reporting Program," http://www.arb.ca.gov/toxics/harp/harpdownload.htm. Accessed April 2013.*

[33] *Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, August 2003.*

[34] *California Accidental Release Prevention Program Regulation (CCR Title 19, Division 2, Chapter 4.5), http://www.lafd.org/prevention/pdfforms/calarp_appen_a1.pdf. Accessed July 2013.*

Table 5.4-2

Release Risk Assessment Matrix

Frequency Category (Increasing Likelihood)					
	4				
	3				
	2				
	1				
		1	2	3	4
		Consequence Category (Increasing Severity)			

Risk Guide

	Unacceptable
	Undesirable
	Acceptable (with controls)
	Acceptable (as is)

Source: Guidelines for Hazard Evaluation Procedure. Center for Chemical Process Safety (CCPS), (1992).

Implementation of the RAP would involve several processes which may be subject to accidental release or upset conditions. In the short-term, trucks involved in the transport of contaminated materials off-site (long distance hauling) may experience an accident resulting in a spill. Equipment involved in the excavation and consolidation of on-site materials may result in an acute, accidental release to the environment. A failure of equipment during long term implementation of the RAP may occur and result in an acute release to the environment and the potential consequences are analyzed below.

The frequency of occurrence for an upset condition or accidental release is defined as follows, based on CCPS Guidelines, for increasing likelihood:

1. Very unlikely to unlikely, but possible.
2. Likely to occur during lifetime.
3. Will occur several times over life of process.
4. Likely to occur frequently.

CCPS defines the consequence of an accident as follows, for increasing severity.

1. Negligible – Less than minor injury, occupational illness, or system damage.
2. Marginal - Minor injury, minor occupational illness, or minor system damage.
3. Critical – severe injury, severe occupational illness, or major system damage.
4. Catastrophic – death or system loss.

The acceptability of the risk posed by a specific future hypothetical scenario is assessed by qualitatively identifying the appropriate consequence category along the horizontal axis of the matrix and the appropriate frequency category along the vertical axis. The intersection of those two categories defines the acceptability of the risk, shown in Table 5.4-2.

Long Term Hazards

The HHRA[35] identified populations that may potentially be exposed to chemicals in environmental media, their exposure pathways during post-remediation (long-term), and the route of potential intake. The conceptual site model (CSM), which identifies long-term impacts, developed for the project incorporates the current and the anticipated future use of the site, the current understanding of the sources of COCs, the means by which they may be released and transported within and among media, and the exposure pathways and routes by which they may contact human receptors.

Potential exposure to COCs detected in soil, sub-slab soil vapor, and soil vapor is partly dependent on the type of chemicals that are present and their respective exposure media. For VOCs in soil, exposure may occur via direct contact to soil (dermal contact or incidental ingestion) as well as indirect exposure (inhalation) from vapors migrating from the subsurface into indoor or outdoor air. Potential exposure to soil vapor may occur from inhalation of vapors migrating up from the subsurface into outdoor air. For non-volatile chemicals such as metals and most SVOCs and PAHs, exposure could be from direct human contact as well as inhalation of particulates. While the groundwater beneath the site is not currently used for drinking water (nor will be in the foreseeable future due to the level of Total Dissolved Solids, existing controls on pumping from the groundwater basin, and built out nature of overlying land use), COCs in soils may migrate to groundwater through leaching. **Table 5.4-3**, *Summary of Receptor Groups and Exposure Pathways*, summarizes the information presented below.

Long term hazards analysis will also consider background concentrations in evaluating health impacts to on-site receptors. Metals and other compounds may be associated with petroleum hydrocarbons, but are also naturally occurring in the environment. According to the DTSC for naturally occurring materials such as metals, evaluation of background concentrations can be used to determine if concentrations are consistent with naturally occurring levels. [36] If concentrations of a compound are within background, the compound is

[35] *Geosyntec Consultants, 2014. Human Health Risk Assessment Report, Former Kast Property.*

[36] *Department of Toxic Substances Control, Interim Guidance: Evaluating Human Health Risks from Total Petroleum Hydrocarbons. 2009.*

Table 5.4-3

Summary of Receptor Groups and Exposure Pathways

Receptor	Exposure Medium	Potentially Complete Exposure Pathway
Onsite Resident (Child and Adult)	Surface Soil (< 2 ft bgs)	Incidental Ingestion Dermal Contact Outdoor Air Inhalation
	Shallow Surface Soil (< 5 ft bgs)	Incidental Ingestion Dermal Contact Outdoor Air Inhalation
	Shallow Subsurface Soil (> 5 to < 10 ft bgs)	Infrequent Incidental Ingestion Infrequent Dermal Contact Infrequent Outdoor Air Inhalation
	Sub-Slab and Soil Vapor	Vapor Inhalation in Indoor Air via Vapor Intrusion
Construction and Utility Maintenance Worker	Shallow Soil (< 10 ft bgs)	Incidental Ingestion Dermal Contact Outdoor Air Inhalation
	Soil Vapor	Vapor Inhalation in Outdoor Air
Groundwater	Shallow Soil (< 10 ft bgs)	Leaching to Groundwater

Source: PCR Services Corporation, 2014

not considered a COC and is not evaluated further. Cumulative long-term health risk impacts will be analyzed while taking into account background concentrations determined in the HHRA.

Uncertainties in Health Risk Assessments

The process of assessing health risks and impacts includes a degree of uncertainty. The level of uncertainty is dependent on the availability of data and the extent to which assumptions are relied upon in cases where the data are incomplete or unknown. All health risk assessments rely upon scientific studies in order to reduce the level of uncertainty; however, it not possible to completely eliminate uncertainty from the analysis. Where assumptions are used to substitute for incomplete or unknown data, it is standard practice to err on the side of health protection in order to avoid underestimating or underreporting the risk to the public. Therefore, as discussed earlier, this health risk assessment used for purposes of this EIR followed the standard practice of erring on the side of health protection in cases where assumptions were relied upon. In general, sources of uncertainty that may lead to an overestimation or an underestimation of the risk include: (1) extrapolation of toxicity data in animals to humans; (2) uncertainty in the estimation of the emissions; (3) uncertainty in the air dispersion models; and (4) uncertainty in the exposure estimates. These sources of uncertainty, as they relate to the project, are described in greater detail below. In addition to uncertainty, there exists "a natural range or variability in the human population in such properties as height, weight, and susceptibility to chemical toxicants."[37] As mentioned previously, it is typical to err on the side of health

[37] *Office of Environmental Health Hazard Assessment, Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, August 2003.*

protection by assessing risk on the most sensitive populations, such as children and the elderly. Some examples of uncertainty or overestimation may include:

- Receptor exposure duration: The health risk assessment assumes residents would be exposed to project-related average annual concentrations 24-hours per day, 350 days per year. The exposure duration does not take into account residents who leave the house for work or school or work stoppages or breaks (such as meal and rest periods and idle non-work hours). In addition, the exposure duration does not take into account time spent indoors vs. outdoors.
- Emissions estimation: Emissions from diesel powered equipment are assumed to be running continuously during a 8-hour workday. While most equipment may run continuously during each work day throughout the remediation process, some equipment may sit idle or be used for only a few hours per day. The health risk assessment assumes a worst-case scenario where all equipment would be running during the workday, generating diesel particulate emissions.
- Dispersion modeling parameters: The AERMOD dispersion model is able to account for dust deposition while in transport through the air which would deplete the plume (lower concentration). As a dust plume travels from the source to the receptor, heavier dust particles may drop out of the plume resulting in lower concentrations for receptors located farther away from the source. As a worst-case scenario, the dispersion modeling did not account for plume depletion due to deposition as sensitive receptors are located relatively close to the dust generating activities.

Thresholds of Significance

For purposes of this EIR, the Regional Board has utilized the checklist questions in Appendix G of the *CEQA Guidelines*[38] as significance criteria to determine whether a project would have a significant environmental impact due to hazards and hazardous materials. The questions are as follows:

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

b) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?

c) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

d) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

[38] *Association of Environmental Professionals, 2014. 2014 CEQA Statute and Guidelines. http://resources.ca.gov/ceqa/docs/2014_CEQA_Statutes_and_Guidelines.pdf. Accessed August 2014.*

e) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

f) 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?

As determined in the Initial Study, which is contained in Appendix A of this EIR, the RP's Proposed Remedy would not result in a safety hazard for people residing or working at a public or private airport or airstrip within two miles of the project area (criterion d). The nearest airport is the Torrance Municipal Airport located over 3.3 miles to the west of the site. In addition, the project would not expose people or structures to a significant risk of loss, injury or death involving wildland fires (criterion f) as the project is located in an industrial/residential area with no wildlands. No further analysis of these topics is necessary.

The project site is not included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 (criterion b) and therefore, would not create a significant safety hazard to the public or environment under Government Code Section 65962.5.[39] Site investigations and remediation are being conducted under the oversight of the Regional Board and all applicable rules and regulations are being followed. Therefore, impacts relating to the project site creating a significant safety hazard to the public or environment as a result of being on the list of hazardous sites compiled pursuant to Government Code Section 65962.5 is less than significant. Therefore, no further analysis of this topic is necessary.

The project could potentially impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan (criterion e). However, lane closures if required during the soil excavation phase of the project would be done in accordance with the Construction Traffic Management Plan and Encroachment Permits from the City of Carson. These temporary lane closures are not expected to interfere with emergency evacuation or emergency response plans. There may be temporary street blockages for several minutes at a time as trucks maneuver to dump loads, but no long term closures are expected. Drilling and trenching in the streets for well and piping installation would be required for installation of the soil vapor extraction system. Similar to the installation of water or sewer lines, there may be short-term blockages of driveways to individual residential properties for less than a day. Trenching that interferes with access would be covered by steel plates to allow access at night and if construction activities are delayed. Therefore, impacts relating to interference with an adopted emergency response or evacuation plan would be less than significant. Therefore, no further analysis of this topic is necessary.

Under CEQA, "a significant hazard to the public" is typically defined based on consideration of the increased risk in carcinogenic and non-carcinogenic human health impacts due to exposure to short- and long-term project-related TACs. The Regional Board has established Remedial Action Objectives (RAOs) and Site-Specific Cleanup Goals (SSCGs) applicable to the site for COCs during implementation of the RAP and the monitoring period after implementation. Thus, based on the RAOs and SSCGs established for the RAP in

[39] *Department of Toxics Substance Control. Envirostor Hazardous Waste and Substances Site List. http://www.envirostor.dtsc.ca.gov/public/mapfull.asp?global_id=&x=-119&y=37&zl=18&ms=640,480&mt=m&findaddress=True&city=carson,%20ca&zip=&county=&federal_superfund=true&state_response=true&voluntary_cleanup=true&school_cleanup=true&ca_site=true&tiered_permit=true&evaluation=true&military_evaluation=true&school_investigation=true&operating=true&post_closure=true&non_operating=true. Accessed August 2014.*

addition to SCAQMD guidance, a significant impact on human health or safety would occur if the direct or indirect changes in the environment brought about by the project would potentially result in one or more of the following future conditions:

HAZ-1 Result in an incremental increase in cumulative lifetime potential cancer risk from exposure to project-related TACs and COCs emitted as a direct result of implementation of the RAP in excess of one in one million (1×10^{-6}), or in excess of 10 in one million (1×10^{-5}) if Best Available Control Technologies (BACT) are implemented.[40]

HAZ-2 Result in an incremental increase in cumulative lifetime potential cancer risk from exposure to COCs in soil, soil vapor, and indoor air for residences in excess of 1×10^{-6} and for on-site construction and utility maintenance workers an incremental increase in cumulative lifetime potential cancer risk outside of the NCP risk range of 1×10^{-6} to 1×10^{-4};

HAZ-3 Result in a chronic or acute non-cancer hazard index (HI) of greater than 1.0;

HAZ-4 In accordance with the SSCGs, create conditions leading to, or otherwise allowing, building interiors to accumulate and or be exposed to methane concentrations exceeding 5 percent of the Lower Explosive Limit (LEL) for methane.

HAZ-5 Create a risk of accidental release which exceeds the "acceptable with controls" category (see Table 5.4-2 of this EIR) through the routine transport, use, or disposal of hazardous materials;

HAZ-6 Create a risk of accidental release which exceeds the "acceptable with controls" category (see Table 5.4-2 of this EIR) through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;

HAZ-7 Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

4. PROJECT ANALYSIS

Project Design Features

The following Project Design Features (PDFs) would result in a reduction in hazards and are proposed as part of the Project. The PDFs contained in Section 5.1, *Air Quality* (PDF AQ-1 through AQ-12) would also apply to a reduction in hazards as well as Section 5.5*, Hydrology and Water Quality* (PDF H/WQ 5-1 through H/WQ 5-3).

PDF HAZ-1 Remediation activities conducted at the property located at 24832 Panama Avenue shall implement additional measures to control volatile TAC emissions, due to high concentrations of vinyl chloride found on-site. These measures include applying water at least twice daily or Rusmar AC-565 foam (or similar), in accordance with manufacturer recommended specifications to active excavation areas. Workers performing remediation activities at this address shall use appropriate Personal Protective Equipment (PPE).

[40] *T-BACT is defined under SCAMQD Rule 1401(c)(2) as being the most stringent emissions limitation or control technique which has been achieved in practice or is technologically feasible.*

Analysis of Project Impacts

Threshold HAZ-1: Would the project result in an incremental increase in cumulative lifetime potential cancer risk from exposure to project-related TACs and COCs emitted as a direct result of implementation of the RAP in excess of one in one million (1×10^{-6}), or in excess of 10 in one million (1×10^{-5}) if Best Available Control Technologies (BACT) are implemented?

Impact Statement HAZ-1: *Unmitigated impacts due to on-site remediation activities would result in a less than significant impact. The incremental lifetime increase in cancer risk due to implementation of the RAP would not exceed the one in one million threshold at nearby sensitive receptors. The Expedited Implementation Option would also result in a less than significant impact.*

Threshold HAZ-2: Would the project result in an incremental increase in cumulative lifetime potential cancer risk from exposure to COCs in soil, soil vapor, and indoor air for residences in excess of 1×10^{-6} and for on-site construction and utility maintenance workers an incremental increase in cumulative lifetime potential cancer risk outside of the NCP risk range of 1×10^{-6} to 1×10^{-4}?

Impact Statement HAZ-2: *The RAP is intended to reduce long-term risk from potential exposure to COCs in soil, soil vapor, and indoor air. As documented in the HHRA, risks to residences and onsite construction and utility workers post-implementation of the RAP, would be below thresholds. Therefore, implementation of the RAP would result in less than significant impacts.*

Threshold HAZ-3: Would the project result in a chronic or acute non-cancer hazard index (HI) of greater than 1.0?

Impact Statement HAZ-3: *On-site remediation activities would result in less than significant impacts with regard to chronic and acute non-cancer risk with incorporation of PDFs. Therefore, mitigation measures would not be required. The Expedited Implementation Option would also result in a less than significant impact.*

Short-Term

During excavation activities, COCs contained in the soil would be released to the atmosphere in the form of fugitive dust and volatile gases. In addition, heavy equipment and trucks operating on-site would release DPM. The COCs and DPM released as a result of the RAP may pose a hazard to the public occupying the site or the environment. Such emissions would vary somewhat from day to day, depending on the level of disposal and other activities, but the analysis here assumes disposal of the maximum daily amount of excavated materials determined from the maximum total volume.

As specified in the PDFs mentioned above, emissions of toxins would be controlled through various methods including spraying water onto the soil and work area or using chemical suppressants as appropriate (PDF AQ-7 and AQ-8). VOC monitoring would be conducted to ensure no applicable state or SCAQMD standards would be exceeded (PDF AQ-4). In particular, the project would comply with SCAQMD Rule 1166 regarding VOC-contaminated material (PDF AQ-6). The possibility of hazards from ignitable waste or soil gas accumulation would be maintained at a negligible level through proper grading and transport loading procedures. Transport trucks would undergo procedures to avoid the inadvertent transport of materials off-

site (decontamination) and would be inspected for compliance prior to exiting the site, and wastes transported off-site would be properly manifested and handled by a fully licensed and permitted waste transporter (PDF AQ-10).

As discussed previously, the receptors analyzed in the health risk assessment include on-site residential receptors and off-site receptors including residential uses, students, staff and visitors to Wilmington Middle School to the southwest of the site as well as workers located to the west of the site. As cancer and chronic health risk impacts are based on long-duration exposure times, receptors at which individuals may reside at for long periods of time (>8-hours per day) were analyzed for cancer and chronic health risk impacts. These receptors include residential, the middle school, and workers. Because acute risk impacts are based on short-duration exposure times (<1-hour), all receptors (residential, school, worker) were analyzed for acute health risk impacts. **Table 5.4-4**, *Maximum Incremental Cancer Risk Impacts - Unmitigated*, presents a summary of the health risk assessment results (Appendix E of this EIR). Sensitive receptors are numbered sequentially and include residents, school, and workers. Please refer to the figures in the following sections for the location of maximum impacted receptors and corresponding receptor number. As discussed earlier, due to the conservative nature of the risk evaluations conducted for the project, actual health risks are expected to be much lower than predicted.

Table 5.4-4

Maximum Incremental Cancer Risk Impacts – Unmitigated [a,b]

Sensitive Receptor Type [c]	Cancer Risk (per million)	Chronic Risk Hazard Index	Acute Risk Hazard Index
Residential, On-Site	0.81	0.01	0.01
Residential, Off-Site	0.59	0.01	0.01
School	0.11	0.001	0.001
Workers	0.09	0.01	0.01

[a] *The "unmitigated" scenario includes emissions reductions from implementation of the voluntary project design features (PDFs) described throughout this EIR. PDFs will be enforceable by the Regional Board. Mitigation measures are discussed separately. Cancer risk values based on a 5-year exposure duration of maximum levels of all chemicals, which is a hypothetical and very conservative set of assumptions. Analysis includes inhalation, soil ingestion, and dermal for residential receptors and non-residential receptors.*

[b] *Shaded values indicate an exceedance of the significance threshold.*

[c] *Sensitive receptors include residential within the site. School receptors include Wilmington Middle School.*

Additional details and modeling files may be found in Appendix E of this EIR.

Source: PCR Services Corporation 2014.

Off-Site Sensitive Receptors

Residential Receptors

Based on upper bound toxicity values and exposure assumptions, an incremental cancer risk of 0.59 in one million is estimated for the maximally exposed individual residential receptor (MEIR) off-site. The maximum chronic HI estimate at the MEIR is 0.01, and the maximum estimated acute HI is 0.01.

It should be noted that health risk impact values presented in Table 5.4-4 represent the combined impact from the various chemicals that would be emitted from implementation of the RAP. In order to identify the health risk impact contribution by each source and chemical, receptors with the maximum impact have been

further analyzed to identify source and chemical contribution. The details of these maxima are listed on **Table 5.4-5**, *Maximum Impacted Off-Site Residential Receptor - Unmitigated*. The maximum impact for each exposure evaluation point (cancer, chronic and acute risk) may not occur at the same receptor due to varying toxicity factors, source location and wind direction. As discussed above, certain chemicals may not have a toxicity factor for long-duration exposure or short-duration exposure. In addition, chemicals would be emitted from different areas of the site depending upon the phase with varying emission rates. Locations of the corresponding maximally impacted receptors are shown on **Figure 5.4-2**, *Maximally Exposed Individual Resident (MEIR): Off-Site*. The predicted maximum impacted residential receptor for cancer risk is located in the residential area adjacent to the halfway point of the site's western boundary (see Figure 5.4-2).

Table 5.4-5

Maximally Impacted Off-site Residential Receptor – Unmitigated [a,b]

Cancer Risk – Maximally Exposed Individual Receptor

Chemical	Cancer Risk Contribution [c] (per million)	Percent of Total
Total	**0.59**	**100%**
Diesel engine exhaust, particulate matter	0.46	77%
Benzene	0.08	13%
Naphthalene	0.05	8%

Chronic Risk – Maximally Exposed Individual Receptor

Chemical	Chronic Risk Contribution [c]	Percent of Total
Total	**0.01**	**100%**
Benzene	0.01	~ 100%
Chromium, hexavalent (& compounds)	<0.01	~ 0%

Acute Risk – Maximally Exposed Individual Receptor

Chemical	Acute Risk Contribution [c]	Percent of Total
Total	**0.01**	**100%**
Benzene	0.01	96.4%
Arsenic	<0.01	3.6%
Xylenes (mixed)	<0.01	0.3%

[a] *Cancer risk values based on a five year exposure duration. Analysis includes inhalation, soil ingestion, and dermal for residential receptors.*

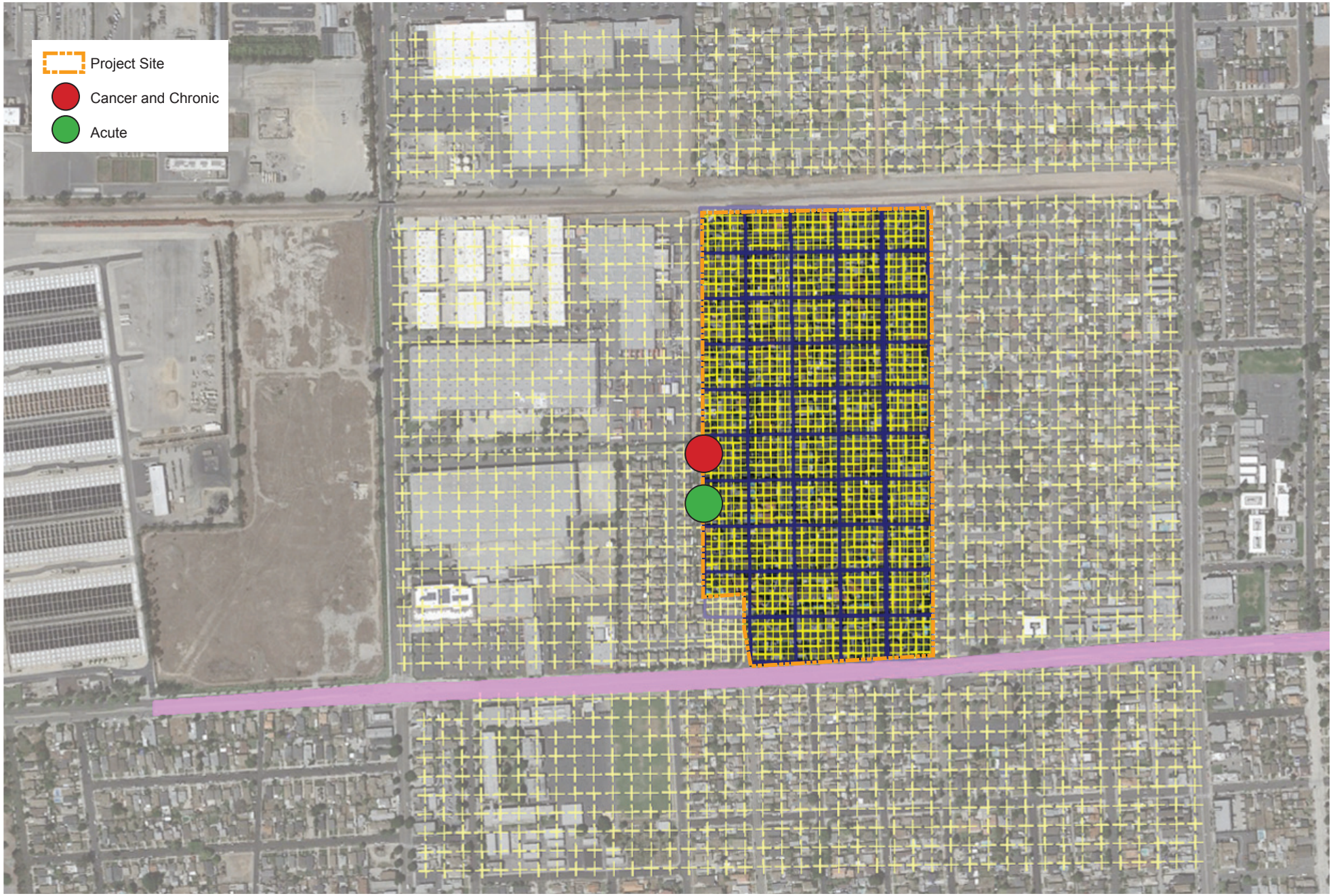
[b] *Sensitive receptors include residential uses within the site. School receptors include Wilmington Middle School southwest of the site.*

[c] *Shaded values indicate an exceedance of the significance threshold.*

Additional details and modeling files may be found in Appendix E of this EIR.

Source: PCR Services Corporation 2014.

As shown in Table 5.4-8, DPM and benzene contribute approximately 77 and 13 percent of the total cancer risk, respectively. Benzene contributes almost 100 percent of the total chronic risk. The maximum residential acute health risk impact occurs off-site, located directly adjacent to the eastern boundary of the



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Maximally Exposed Individual Resident (MEIR): Off-Site

Former Kast Property Tank Farm Site Remediation Project
Health Risk Assessment
Source: PCR Services Corporation, 2014.

FIGURE
5.4-2

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site(see **Figure 5.4-2**). The main contributor to the maximum acute risk are volatile emissions resulting from excavation activities.

Health risk impact values calculated for this EIR take into account the PDFs listed above. As a result, maximum cancer risk at the off-site residential receptor would not exceed the threshold of one in one million. Chronic and acute HIs are less than 1. Therefore, implementation of the RAP would result in a less than significant impact with regard to cancer, chronic, and acute risk.

Student Receptor. Based on upper bound toxicity values and exposure assumptions, the maximally exposed individual student receptor (MEIS) unmitigated incremental cancer risk estimate is 0.11 in a million. The maximum estimated unmitigated chronic and acute HIs are 0.01 and 0.001, respectively.

The maximally impacted student receptor is located at the northeast corner of Wilmington Middle School (see **Figure 5.4-3**, *Maximally Exposed Individual School Receptor*). As shown in **Table 5.4-6,** *Maximally Impacted School Receptor - Unmitigated*, DPM and benzene contribute to 85 and 9 percent of the total cancer risk, respectively. The maximum chronic non-cancer risk impact also occurs at the northeast corner of the school in which benzene contributes to almost 100 percent of the total chronic risk. The cancer risk and chronic non-cancer risk assessments represent a highly conservative assumption of continuous exposure for five years at that same location, in accordance with OEHHA guidance, even though that is not expected to occur. The maximally impacted acute receptor occurs at along the northern portion of the school. Benzene emissions contribute to 96 percent of the acute health risk. Cancer, chronic and acute health impacts at the school receptor would remain below significance thresholds.

Worker Receptors. Several off-site worker receptors have been analyzed surrounding the site. These receptors include off-site. Detailed results for individual worker receptors are provided in Appendix E. Based on upper bound toxicity values and exposure assumptions, the maximally exposed individual worker receptor (MEIW) incremental cancer risk estimate is 0.09 in a million. The maximum estimated chronic and acute HIs are 0.01 and 0.01, respectively.

The maximum estimated incremental cancer risk for the MEIW is located at the eastern boundary of the office building area directly adjacent to the site (see **Figure 5.4-4**, *Maximally Exposed Individual Worker*). As shown in **Table 5.4-7,** *Maximally Impacted Worker Receptors - Unmitigated*, DPM and benzene contribute to 77 and 13 percent of the total cancer risk of 0.09 per million, respectively with inhalation being the primary pathway. This receptor is located along Lomita Boulevard, the project's designated haul route for heavy-duty diesel trucks during construction. The maximum chronic risk impact also occurs at this same receptor, in which DPM contributes to almost 100 percent of the total chronic risk with a chronic HI of 0.01. The maximum worker acute health risk impact is located at an off-site receptor along the eastern boundary of the site. Benzene contributes to 96 percent of the acute health risk with an HI of 0.01.

The maximum incremental cancer risk estimate at the worker receptor would remain below the threshold of one in one million. Chronic and acute HIs are also less than 1. Therefore, implementation of the RAP would result in a less than significant impact with regard to cancer, chronic and acute health risk for off-site workers.

Table 5.4-6

Maximally Impacted School Receptor – Unmitigated [a,b]

Cancer Risk – Maximally Exposed Individual Receptor

Chemical	Cancer Risk Contribution (per million)	Percent of Total
Total	**0.11**	**100%**
Diesel engine exhaust, particulate matter	0.09	85%
Benzene	0.01	9%
Naphthalene	0.01	5%

Chronic Risk – Maximally Exposed Individual Receptor

Chemical	Chronic Risk Contribution	Percent of Total
Total	**0.001**	**100%**
Benzene	0.001	~ 100%
Chromium, hexavalent (& compounds)	<0.01	~ 0%

Acute Risk – Maximally Exposed Individual Receptor

Chemical	Acute Risk Contribution	Percent of Total
Total	**0.001**	**100%**
Benzene	0.001	96.2%
Arsenic	<0.001	3.6%
Xylenes (mixed)	<0.001	0.3%

[a] *The "unmitigated" scenario includes emissions reductions from implementation of the voluntary project design features (PDFs) described throughout this EIR. PDFs will be enforceable by the Regional Board. Mitigation measures are discussed separately. Cancer risk values based on a five-year exposure duration. Analysis includes inhalation, soil ingestion, and derma for non-residential receptors.*

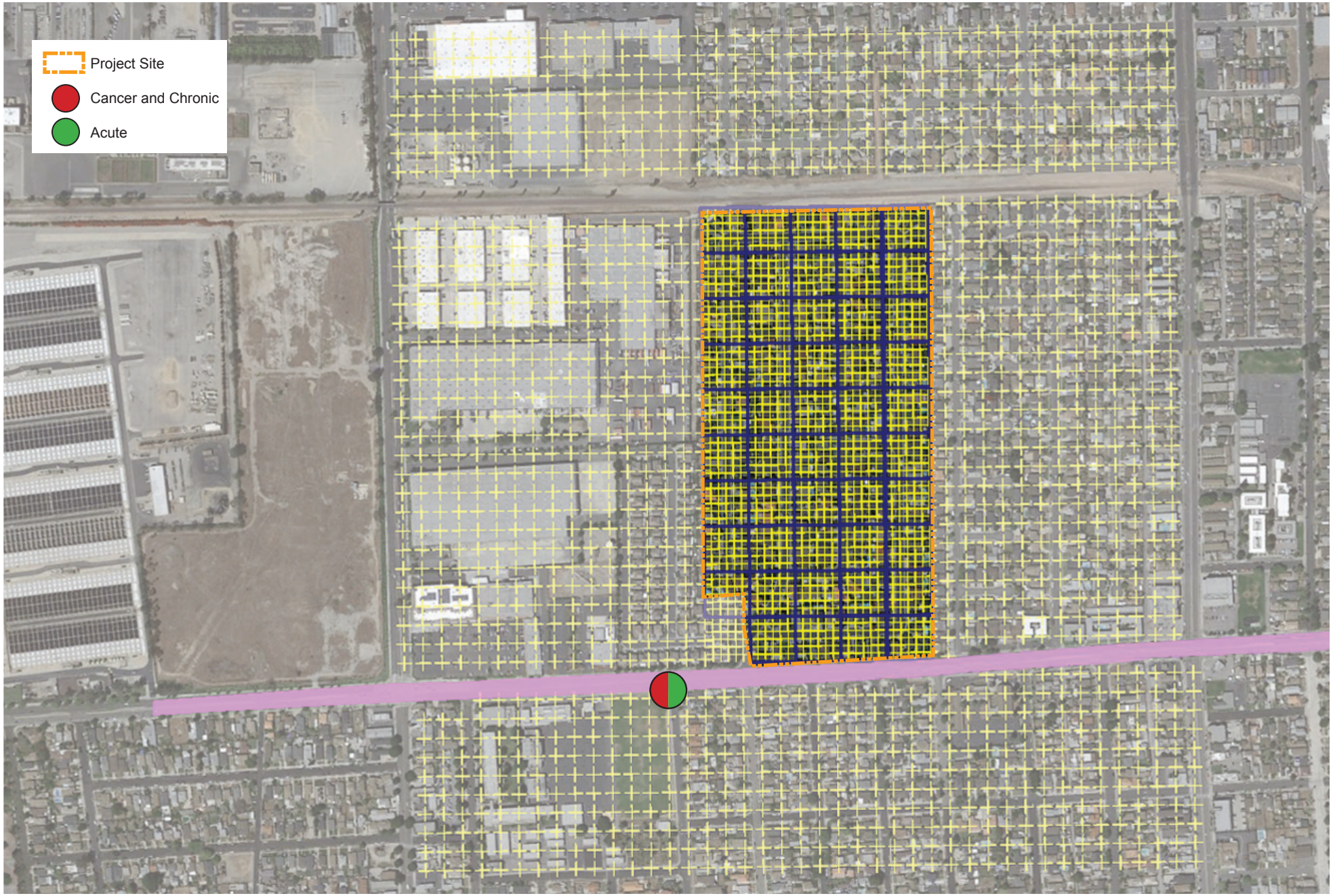
[b] *Sensitive receptors include residential uses on site. School receptors include Wilmington Middle School southwest of the site.*

Additional details and modeling files may be found in Appendix E of this EIR.
Source: PCR Services Corporation 2014.

On-Site Residential Receptors

Based on upper bound toxicity values and exposure assumptions, an incremental increase in cancer risk of 0.81 in one million is estimated for the maximally exposed individual residential receptor (MEIR) on-site. The lifetime incremental increase in cancer risk for on-site receptors resulting from remediation activities range from 0.25 to 0.81 in one million, depending on location and proximity to activities. The majority of on-site residents would be exposed to cancer risk values between 0.60 and 0.81 to in one million, mainly occurring within the center portions of the site. The maximum chronic HI estimate at the on-site MEIR is 0.01, and the maximum estimated acute HI is 0.01.

It should be noted that health risk impact values presented in Table 5.4-4 represent the combined impact from the various chemicals that would be emitted from implementation of the RAP. In order to identify the health risk impact contribution by each source and chemical, receptors with the maximum impact have been further analyzed to identify source and chemical contribution. The details of these maxima are listed on **Table 5.4-8**, *Maximally Impacted On-Site Residential Receptor - Unmitigated*. The maximum impact for each



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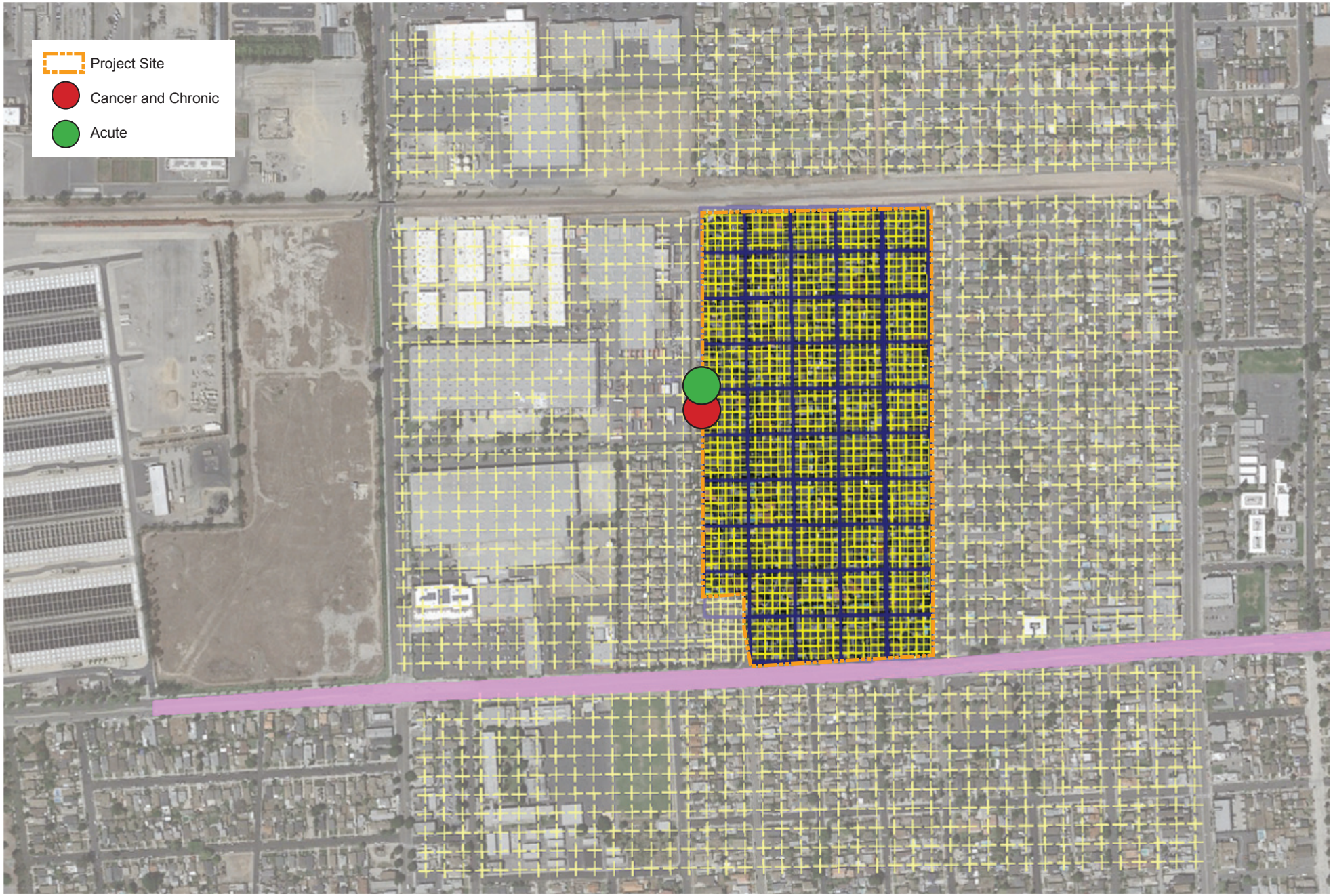
Maximally Exposed Individual School Receptor (MEIS)

Former Kast Property Tank Farm Site Remediation Project
Health Risk Assessment
Source: PCR Services Corporation, 2014.

FIGURE
5.4-3



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Maximally Exposed Individual Worker (MEIW)

Former Kast Property Tank Farm Site Remediation Project
Health Risk Assessment
Source: PCR Services Corporation, 2014.

FIGURE
5.4-4

Table 5.4-7

Maximally Impacted Worker Receptors – Unmitigated [a,b]

Cancer Risk – Maximally Exposed Individual Receptor

Chemical	Cancer Risk Contribution (per million)	Percent of Total
Total	**0.09**	**100%**
Diesel engine exhaust, particulate matter	0.07	77%
Benzene	0.01	13%
Naphthalene	0.01	8%

Chronic Risk – Maximally Exposed Individual Receptor

Chemical	Chronic Risk Contribution	Percent of Total
Total	**0.01**	**100%**
Benzene	0.01	~ 100%
Chromium, hexavalent (& compounds)	<0.01	~ 0%

Acute Risk – Maximally Exposed Individual Receptor

Chemical	Acute Risk Contribution	Percent of Total
Total	**0.01**	**100%**
Benzene	0.01	96.3%
Arsenic	<0.01	3.6%
Xylenes (mixed)	<0.01	0.3%

[a] *Cancer risk values based on a five year exposure duration. Analysis includes inhalation, soil ingestion, and dermal for non-residential receptors.*

[b] *Sensitive receptors include light industrial/commercial uses to the west of the site.*

Additional details and modeling files may be found in Appendix E of this EIR.

Source: PCR Services Corporation 2014.

exposure evaluation point (cancer, chronic and acute risk) may not occur at the same receptor due to varying toxicity factors, source location and wind direction. As discussed above, certain chemicals may not have a toxicity factor for long-duration exposure or short-duration exposure. In addition, chemicals would be emitted from different areas of the site depending upon the phase with varying emission rates. Locations of the corresponding maximally impacted receptors are shown on **Figure 5.4-5**, *Maximally Exposed Individual Resident (MEIR): On-Site*. The predicted maximum impacted residential receptor for cancer and chronic risk is located towards a receptor towards the center of the site (see Figure 5.4-5).

As shown in Table 5.4-8, DPM and benzene contribute to 77 and 13 percent of the total cancer risk, respectively. Benzene contributes to almost 100 percent of the total chronic risk. The maximum residential acute health risk impact occurs at a receptor located towards the center of the site (see Figure 5.4-5 Benzene emissions contribute 96 percent of the acute health risk.

Health risk impact values calculated for this EIR take into account the PDFs listed above. As a result, the maximum cancer risk at the on-site residential receptor would not exceed the threshold of one in one million

Table 5.4-8

Maximum Impacted On-site Residential Receptor – Unmitigated [a,b]

Cancer Risk

Chemical	Cancer Risk Contribution [c] (per million)	Percent of Total
Total	**0.81**	**100%**
Diesel exhaust, particulate matter	0.62	77%
Benzene	0.10	13%
Naphthalene	0.06	8%

Chronic Risk

Chemical	Chronic Risk Contribution [c]	Percent of Total
Total	**0.01**	**100%**
Benzene	0.01	~ 100%
Chromium. Hexavalent (& compounds)	<0.01	~ 0%

Acute Risk

Chemical	Acute Risk Contribution [c]	Percent of Total
Total	**0.01**	**100%**
Benzene	0.01	96.4%
Arsenic	<0.01	3.6%
Xylenes (mixed)	<0.01	0.3%

[a] *Cancer risk values based on a 5-year exposure duration. Analysis includes inhalation, soil ingestion, and dermal for residential receptors.*

[b] *Sensitive receptors include residential uses within the site. School receptors include Wilmington Middle School southwest of the site.*

[c] *Shaded values indicate an exceedance of the significance threshold.*

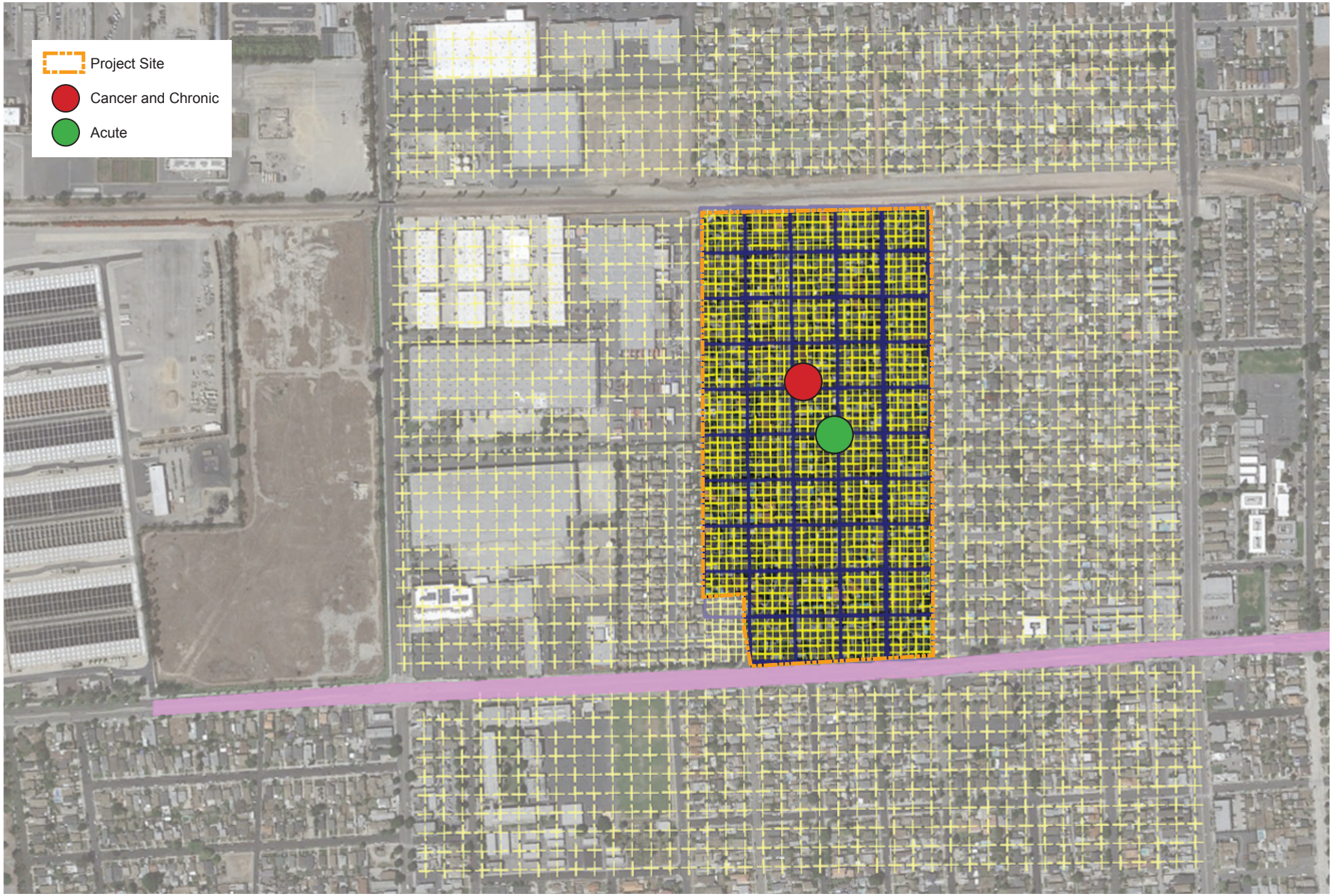
Additional details and modeling files may be found in Appendix E of this EIR.

Source: PCR Services Corporation 2014.

even with incorporation of PDFs. Chronic and acute HIs are less than 1. Therefore, implementation of the RAP would result in a less than significant impact with regard to cancer and non-cancer health risks.

Long-Term

In addition to the physical removal of COC-impacted soil and back fill with non-impacted soil, the use of SVE/bioventing would further reduce COC concentrations beneath existing paved areas, City sidewalks, and concrete foundations of the homes. SVE/bioventing system would also address impacted media that may be associated with residual concrete reservoir slabs left in place below the depth of excavation. Following excavation and backfill but prior to site restoration, SVE/bioventing wells would be installed at each property where required. Additionally, for those properties where a sub-slab mitigation system is proposed, the system would be installed concurrent with or following the excavation activities. As indicated previously, the RP would install a sub-slab mitigation system at any residence at which a homeowner requests such a system. The SVE/bioventing infrastructure would consist of a system of extraction/inlet wells, below ground conveyance piping, and an above ground treatment system. The design of the SVE



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Maximally Exposed Individual Resident (MEIR): On-Site

Former Kast Property Tank Farm Site Remediation Project
Health Risk Assessment
Source: PCR Services Corporation, 2014.

FIGURE
5.4-5

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system potentially would include use of multiple treatment technologies in a staged approach, depending on inlet concentrations. The remediation equipment would provide the flexibility to transition from thermal oxidation to catalytic oxidation followed by granular activated carbon (GAC) treatment, when the concentrations have decreased sufficiently.

Volatile COCs may migrate through the clean fill and pose an exposure concern to on-site receptors. For this reason, SSCGs, see discussion above, were developed to identify the maximum concentration of specific COCs in soil predicted to result in a risk or hazard above the design thresholds of 1 in one million (1×10^{-6}) incremental cancer or 1.0 HI, appropriate significance threshold for residents and 10 in one million (1×10^{-5}) or 1.0 HI for workers. Post-excavation confirmation samples would be collected once the initial target depth is reached and results would be compared to SSCGs to confirm that any remaining COCs do not pose an unacceptable health risk.

Conveyance piping would be installed in trenches within the City streets. Trenching would be performed for installation of SVE/bioventing piping and conveyance systems. No excavation would be performed underneath City streets. Asphalt would be replaced, so that the public would have no direct (dermal) or indirect (wind-blown inhalation) contact with contaminated materials. Any future excavation of the street, such as for utilities, would need to consider the potential hazards present before proceeding and mitigate exposure of construction workers and the public as necessary. The construction worker SSCGs were prepared with the assumption that any workers digging utility trenches in the street after completion of the project would be protected.

The long-term operation of the SVE/bioventing system is expected to result in periodic emissions from vehicles transporting visitors and maintenance activities. These trips are expected to be a source of negligible TAC emissions.

Off-Site Sensitive Receptors

With regard to off-site sensitive receptors, the installation of the SVE/bioventing system would treat emissions and limit exposure to off-site uses. The system would consist of ground conveyance piping and treatment systems which are not located near off-site receptors. Following approval of the RAP, a Site-wide Remedial Design and Implementation Plan (RDIP) will be prepared. The RDIP will provide details on the design and implementation of the RP's Proposed Remedy outlined in the RAP. The placement of the wells and treatment systems will be placed in areas to limit impacts to residential or sensitive uses. As discussed in the RAP, SVE/bioventing equipment will be constructed under a Site-specific SCAQMD Permit to Construct/Operate. The SSD system will also require SCAQMD permits. The RDIP and SCAQMD permitting requirements will limit impacts to off-site receptors. Therefore, impacts to off-site sensitive receptors would be minimal.

On-Site Sensitive Receptors

In addition to the RDIP, Property-Specific Remediation Plans (PSRPs) will be prepared for properties requiring excavation, sub-slab mitigation, and/or SVE/bioventing. The PSRP will identify venting wells and piping locations for the SVE/bioventing system. The SVE/bioventing locations would be directed away from on-site sensitive receptors to the furthest extent possible. As discussed previously, the SVE/bioventing system will be subject to SCAQMD permitting requirements. A Land Use Covenant (deed restriction) is

proposed which will require on-site properties to be recorded with the County Recorder's Office advising of potential presence of impacted soil beneath hardscaped areas. In addition, the City of Carson Municipal Code currently requires a Grading Permit to be obtained for excavations deeper than 3 feet. The RP would implement a community outreach program to inform and educate residents of the community of residual impacted soil. Therefore, impacts to on-site residential uses would be minimal.

Expedited Implementation Option

The Expedited Implementation Option would increase the number of properties actively remediated from 8 to a maximum of 16 properties at one time. The total amount of demolished materials and excavated soils would be the same as under the project. The Option would result in a greater level of activity on the site on a given day but would not change the level of activity at an individual property. Therefore, long-term impacts (cancer and chronic risk) would remain the same as the base remedy. Short-term impacts (acute risk) may be doubled in comparison to the base remedy as these impacts are evaluated on a maximum hourly throughput. However, as shown in **Table 5.4-9**, *Maximum Impacted Acute Receptor – Unmitigated* acute risk under the Expedited Implementation Option would remain below significance thresholds.

Table 5.4-9

Maximum Impacted Acute Receptor – Unmitigated

Acute Risk

Chemical	Acute Risk Contribution	Percent of Total
Total	**0.12**	**100%**
Benzene	0.12	99%
Arsenic	<0.01	1%
Toluene	<0.01	0%

Additional details and modeling files may be found in Appendix E of this EIR.

Source: PCR Services Corporation 2014.

Threshold HAZ-4: In accordance with the SSCGs, create conditions leading to, or otherwise allowing, building interiors to accumulate and or be exposed to methane concentrations exceeding 5 percent of the Lower Explosive Limit (LEL) for methane.

Impact Statement HAZ-4: *Impacts due to on-site remediation activities would result in a less than significant impact with regard to methane concentrations. The Expedited Implementation Option would also result in a less than significant impact. Therefore, mitigation measures would not be required.*

Short-Term

During remediation activities, methane would be released to the atmosphere during excavation of yards and trenching of public streets, but would not be allowed to accumulate in building interiors. Thus, this scenario does not warrant further evaluation.

Long-Term

Implementation of the RAP would result in excavation of contaminated soil and backfill with clean imported soil. The site contains small amounts of methane resulting from degradation of petroleum products, which is flammable over a narrow range of concentrations (5-15 percent) in air.[41] Sub-slab vapor mitigation systems would be installed at residences where methane levels exceed SSCGs or where a homeowner requested one. In order to keep vapors emanating from the soil below from entering a building a sub-slab depressurization (SSD) system would be used. The SSD system creates a negative pressure below the slab of the residence using a fan to remove air from below the slab and exhaust it above the building. The SSD system would include a manometer or in-line pressure gauge to provide a simple measure that the system is operating as designed. Additionally, the RP's contractors would confirm that homes with a SSD have a carbon monoxide (CO) monitor, as required in all homes by California law.

SSD design, installation, and operation would be in accordance with the DTSC Vapor Intrusion Mitigation Advisory.[42] The system would consist of creating holes in the slab or footing of the structure, removing a quantity of soil from beneath the slab to create a suction pit and installing suction pipes into the holes. The suction pipes would be directed to above the roof and a fan connected to the system to create a sub-slab vacuum. After installation of the SSD system, based on diagnostic testing to assess the vacuum distribution beneath the building foundation, any necessary adjustments to the SSD system (e.g., larger fan or additional suction pits) would be made. Because the SSD systems would be operated in an active mode using a fan to create a vacuum, the SSD systems would be permitted by the SCAQMD. Vapors vented by the system would be treated prior to discharge as required by the SCAQMD permit.

LNAPL removal would occur in localized areas through pumping at or beneath the surface of groundwater in monitoring wells. LNAPL is currently being recovered from monitoring wells MW-3 and MW-12 on a monthly basis using dedicated pneumatic total fluids pumps installed in the wells. Recovered LNAPL is placed in drums which are immediately transported off-site for proper disposal. As part of RAP implementation, LNAPL recovery would continue from wells MW-3 and MW-12 on a monthly basis, and, if LNAPL is detected in other wells, monthly LNAPL recovery would be initiated on these wells if they have an LNAPL thickness of greater than 0.5 foot. The current LNAPL recovery setup in use for MW-3 and MW-12, or equivalent, would be used for LNAPL recovery in other wells if needed. Monitoring of LNAPL and water levels, and LNAPL recovery volume monitoring would continue during LNAPL recovery events. When LNAPL recovery shows a declining trend in wells in which LNAPL occurs, recovery trends would be evaluated, a recommendation may be made to the Regional Board to reduce the frequency of LNAPL recovery, as appropriate.

The installation of the SSD system would actively reduce the amount of methane allowed to accumulate within building interiors. Recovery of LNAPL would prevent the generation of methane by removing liquid wastes. Therefore, long-term impacts of the methane generated from the Project would be less than significant.

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[41] *U.S. Environmental Protection Agency, Guidance for Evaluating Landfill Gas Emissions from Closed or Abandoned Facilities, EPA-600/R-05/123a, September 2005.*

[42] *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance). DTSC, October 2011.*

Expedited Implementation Option

The Expedited Implementation Option would increase the number of properties actively remediated at one time. The Expedited Implementation Option would install an SSD system and LNAPL recovery identical to the base remedy. Therefore, long-term impacts would remain the same as the base remedy. Short-term impacts would also be the same as the base remedy as methane would be released to the atmosphere during excavation activities. Therefore, short-term impacts would remain the same as the base remedy.

Threshold HAZ-5: Would the project create a risk of accidental release which exceeds the "acceptable with controls" category (see Table 5.4-2 of this EIR) through the routine transport, use, or disposal of hazardous materials?

Impact Statement HAZ-5: *Implementation of the RAP results in an acceptable level of risk regarding accidental release through the routine transport, use, or disposal of hazardous materials. Therefore, mitigation measures would not be required.*

Threshold HAZ-6: Would the project create a risk of accidental release which exceeds the "acceptable with controls" category (see **Table 5.4-2)** through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Impact Statement HAZ-6: ***I****mplementation of the RAP would result in an acceptable level of risk regarding reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. The Expedited Implementation Option would also result in a less than significant impact. Therefore, mitigation measures would not be required.*

Short-Term

Short-term implementation of the RAP would not involve the use or storage of acutely hazardous materials on-site, above minimal amounts such as consumer packages of solvents for cleaning and other miscellaneous materials (e.g., engine oil, and paints , etc.) needed for maintenance of equipment. Those would be stored in appropriate areas such as marked storage areas and cabinets, as required. An accidental release (spill) would be easily contained to a small area and would not be expected to reach the off-site environment. Thus, this scenario does not warrant further evaluation.

Heavy-duty equipment, such as excavators and dump trucks, do contain hazardous materials such as diesel fuel. Diesel fuel may be delivered in bulk, stored in small tanks or brought on-site by a mobile re-fueler, and dispensed as needed into individual pieces of equipment. A mobile maintenance vendor may be called on-site for routine maintenance, but equipment would be taken off-site if significant maintenance or repair were required. The drivers/operators of the bulk delivery trucks or mobile re-fuelers are trained and equipped to respond to a fuel spill, should one occur. Operators of heavy-duty equipment are trained to remain alert and nearby during fueling of equipment, and spills, should they occur, should not reach the off-site environment. Failure of the small fuel storage tanks is possible. However, with controls, such as secondary containment, even a complete de-inventory of the diesel fuel from the storage tanks is not expected to reach the receptors on-site. Any spill of diesel fuel upon the Site would be remediated and treated in accordance with applicable regulations. Therefore, an accidental release scenario involving the spill of fuel from a mobile re-fueler or from the AST does not warrant further evaluation. Although unlikely, it is possible over the life of the project

(approximately 6 years) that a device, such as a hose, valve, clamp, tank, or reservoir, on the heavy duty construction equipment could rupture or leak. However, this equipment would operate exclusively on-site, and as such, even if a leak or spill occurred, it is highly unlikely that the material would reach the off-site environment or receptors on-site. The site specific HASP would include measures to appropriately handle an on-site accidental release of fuel or other material from the equipment, and as such, this scenario does not warrant further evaluation.

With regard to the contaminated material and other material on-site, most of the COCs do not pose an immediate risk to health or safety, especially at the relatively low concentrations found in soil on-site. Some of the COCs, such as benzene and arsenic, are classified as acutely hazardous materials (AHM) by the Office of Emergency Services (OES) because they can pose an immediate threat in an upset or accidental release scenario if found in their pure form or at high concentrations. It is important to note however, that the analytical data show that these AHMs are present at the site only in low concentrations. Further, AHMs are subject to CalARP requirements, if present in volumes above thresholds quantities (TQs). CalARP requirements apply to stationary sources and not trucks; however, for the purposes of CEQA, this analysis relied on the CalARP methodology to assess impacts relative to this impact criterion. The analytical data show that any AHMs present at the site are at concentrations below TQs.

Due to the inconsistent nature of impacted materials throughout the site, not all of the approximately 188,095 CY to be transported and treated off-site is likely to contain AHMs. For the purposes of this analysis, as a conservative basis, it was assumed trucks would haul material that could contain AHMs. For haul trucks, the probability of an accident involving a collision is estimated to be 2 per 1,000,000 miles travelled.[43] However, not all collisions would result in a breach of the container and release to the environment. The probability of a release of a solid hazardous cargo is approximately 9.1 percent for solid materials.[44] The transport of 188,095 CY of material would require approximately 13,851 roundtrips. The longest on-road trip is estimated to be approximately 100 miles, which equates to approximately 130,000 total vehicle miles traveled (VMT) to transport the 188,095 CY. Based on the rate of 2 collisions per 1,000,000 miles travelled, this poses a mathematical collision chance of 0.12, where 1 means it is likely to occur once during the lifetime of the project. With a release rate of 9.1 percent of accidents, the probability of a release of AHM in transport to off-site receiver landfills is 0.01, using very conservative assumptions in that all of the 188,095 CY contains AHMs. Therefore a collision involving a truck transporting this material resulting in a release is very unlikely to occur, which is defined as a frequency category 2 on Table 5.4-2. Thus, regardless of the severity ranges if exposure were to occur (across all four categories), the risk of a spill resulting in a release of this material to the environment is so low that it falls within the "acceptable (as is)" or "acceptable (with controls)" risk ranges. Drivers of waste hauling trucks are required to be trained to respond to and contain releases, and appropriate controls are in place. Therefore, short-term impacts related to accident or upset conditions would be less than significant and no mitigation measures are required.

Using the CCPS risk assessment matrix, the hypothetical scenario of the transport of materials potentially impacted by AHM are highly unlikely that they result in risk characterization within the "Acceptable (as is)" or "Acceptable (with controls)" ranges. Appropriate controls have been identified and would be

[43] *Argonne National Laboratory, Environmental Assessment Division, Risk Assessment for the Transportation of Hazardous Waste and Hazardous Waste Components of Low-Level Mixed Waste and Transuranic Waste for the U.S. Department of Energy Waste Management Programmatic Environmental Impact Statement, December 1996.*

[44] *Ibid.*

implemented. Therefore, the risks posed by the potential hypothetical release of contaminated materials or other materials to the environment through upset conditions or accidental release during the transport of materials off-site and on-site implementation of the RAP are acceptable, and the project results in less than significant impacts.

Long-Term

The site is not expected to involve the use or storage of acutely hazardous materials on-site, above minimal amounts such as consumer packages of solvents for cleaning. Thus, this scenario does not warrant further evaluation.

Expedited Implementation Option

The Expedited Implementation Option would increase the number of properties actively remediated at one time. The total amount of soil excavation would remain the same as the base remedy. Therefore, short-term impacts would remain the same as the base remedy and result in a less than significant impact. Long-term impacts would also be the same as the base remedy as the site is not expected to use or store AHMs. Therefore, long-term impacts would remain the same as the base remedy and result in a less than significant impact.

Threshold HAZ-7: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

Impact Statement HAZ-7: *Hazardous emissions would be emitted during the implementation of the RAP, but would result in less than significant potential health risks. Long-term use of SVE would control potential emissions from impacted materials remaining on site long-term Therefore, the project would result in a less than significant impact with regard to release or handling of hazardous materials within one-quarter mile of a school. The Expedited Implementation Option would also result in a less than significant impact.*

Short-Term

Wilmington Middle School is located approximately 600 feet southwest of the site (i.e., the distance from the southwest corner of the site to the edge of the high school parking lot). Excavation and soil handling would occur throughout the entire site including portions closest to the school. Haul trucks using regional freeways regardless of their origin/destination would access local streets to and from I-110 at Sepulveda Boulevard. Incoming trucks would access the site via Sepulveda Boulevard eastbound, Wilmington Avenue southbound, Lomita Boulevard westbound, and a right turn on either Neptune or Lagoon Avenues. Trucks leaving the site would then travel westbound on Lomita, northbound on Main Street, and westbound on Sepulveda to the I-110. The haul route(s) on municipal streets would be stipulated in a Construction Traffic Management Plan reviewed and approved by the City of Carson prior to project implementation. Trucks would enter within 600 feet of the school and would exit the site travelling on Lomita Boulevard past the school. As discussed above, trucks exiting the site would be decontaminated and inspected before being allowed to leave. Implementation of the PDFs described above and the safety measures included in the RAP would ensure that impacts on school staff, attendees and visitors from emissions related to handling site materials would remain at, or be reduced to, a less than significant level and no mitigation measures are required.

As described above, the HHRA prepared for implementation of the RAP addressed impacts on off-site receptors and supports this conclusion. The HHRA estimated, based on upper confidence limit potency values, that the maximally exposed receptor at the school would experience an unmitigated cancer incidence risk of 0.29 in one million based on five year exposure duration. The estimated risk for school receptors is below the significance threshold of one in one million. The HRA shows hazard indices of 0.03 for non-cancer effects of chronic exposure and 0.12 for non-cancer effects of acute exposure at the maximally exposed school receptor. Both hazard indices are well below the significance threshold of 1.00. As shown in Table 5.4-4 above, short-term cancer risks at the school receptor would not exceed significance thresholds. In addition, the acute and chronic HI for the school receptor would remain below the significance threshold of 1.

Long-Term

Once implementation of the RAP is complete, the installation of the SVE/bioventing systems, sub-slab vapor mitigation systems, LNAPL collection, natural attenuation groundwater recovery, would serve to reduce COCs present on site and limit the release of hazardous emissions. During catalytic oxidation of the SVE/bioventing system, VOCs are thermally destroyed. Therefore, no VOC emissions would result. The design of the SVE system potentially would include use of multiple treatment technologies in a staged approach, depending on inlet concentrations. The remediation equipment would provide the flexibility to transition from thermal oxidation to catalytic oxidation followed by GAC treatment, when the concentrations have decreased sufficiently. If the treatment systems utilizes GAC, spent activated carbon would be transported off-site for treatment/regeneration or disposal. The likelihood of accidental release of spent activated carbon would be very low due to periodic maintenance trips to the site that ensure proper functioning of the treatment system. In addition, any release of spent activated carbon would not result in emissions since the VOCs would be bound to the GAC. All systems will be permitted and properly maintained and documented. Therefore, long-term operation of the project would not emit hazardous emissions within one-quarter mile of a school. No mitigation measures are required.

Expedited Implementation Option

The Expedited Implementation Option would increase the number of properties actively remediated at one time, decreasing the duration but not increasing the amount of material excavated site-wide. Therefore, lifetime cancer risks and chronic health risks from implementation of the RAP under the Expedited Implementation Option would remain the same as the base remedy and result in a less than significant impact. Acute risks would increase incrementally in comparison to the base remedy, but would not exceed threshold levels and would be less than significant. Long-term impacts would also be the same as the base remedy as the site will implement the same SVE/bioventing systems, LNAPL collection and other systems to limit the release of hazardous emissions. Therefore, long-term impacts would remain the same as the base remedy and result in a less than significant impact.

4. ALTERNATIVES ANALYSIS

Analysis of Impacts Associated with Alternative 1 (No Project Alternative)

Hazard to Public or Environment through Transport, Use or Disposal of Hazardous Materials

Under the No Project Alternative, the RAP would not be implemented. Remediation of contaminated soils, sub-soil vapor, and groundwater would not occur. The SVE/bioventing system would not be built and the

excavation of soil would not be conducted, so transport would not occur. The No Project Alternative would not create a significant hazard to the public or environment through the routine transport, use or disposal of hazardous materials, because none of that would occur. However, the site is already contaminated and the No Project Alternative would not fulfill the requirements set out by the Regional Board to remediate the site, leaving the residents subject to possible hazardous materials exposure.

Accidental Upset

Under the No Project Alternative, the RAP would not be implemented. No storage, transport or use of hazardous materials would occur. Remediation of contaminated soils, sub-soil vapor, and groundwater would not occur. The No Project Alternative would not create a significant hazard to the public or environment through reasonable foreseeable upset or accidental conditions involving a release of hazardous materials. However, the site is already contaminated and the No Project Alternative would not fulfill the requirements set out by the Regional Board to remediate the site, leaving the residents subject to possible hazardous materials exposure. The contamination on-site is not expected to be released accidentally and would not likely pose a hazard to on-site residents. Therefore, the No Project Alternative would result in a less than significant impact with regard to accidental upset.

Impacts to Nearby Schools

The No Project Alternative would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one quarter mile of an existing or proposed school. Under the No Project Alternative, the RAP would not be implemented so remediation of the site would not occur. However, the site is already contaminated and the No Project Alternative would not fulfill the requirements set out by the Regional Board to remediate the site, leaving the residents and Wilmington Middle School, as it is within the quarter-mile distance, subject to possible hazardous materials exposure. As discussed in the HHRA, health risk impacts to sensitive receptors due to existing conditions and emissions would be less than significant. Therefore, the No Project Alternative would have a less than significant impact on the School.

Analysis of Impacts Associated with Alternative 2 (Excavation Beneath Landscape and Hardscape to 10 Feet Alternative)

Alternative 2 would entail excavation of soil from landscaped areas and beneath residential hardscape to a depth of 10 feet bgs at all affected properties. Implementation of Alternative 2 would take approximately 8.4 years in order to excavate the additional materials. Daily demolition and excavation volumes, truck trips, and worker commutes are anticipated to be the same as the project. This Alternative would also implement the same project design features as described previously.

Hazard to Public or Environment through Transport, Use or Disposal of Hazardous Materials

Short-Term Impacts

Alternative 2 would result in an increase release of short-term TAC emissions compared to the project. Although daily emissions would be similar to the RP's Proposed Remedy, total emissions would be increased in comparison to the project. This Alternative would incorporate the same PDFs as the RP's Proposed Remedy, which would reduce short-term emissions from heavy equipment, trucks, fugitive dust and volatiles. However, Alternative 2 would result in an increase in exposure which would increase lifetime

cancer risks for sensitive receptors as a result of the extended duration of remediation activities. Impacts with regard to health risk would be greater under this alternative and would likely exceed cancer risk threshold of one in one million. As a result, health risk impacts due to Alternative 2 would be significant and mitigation measures would be required (see section 6.0 below).

Long-Term Impacts

Implementation of the RAP would result in restoration of affected properties and infrastructure, including yards, landscaping, and streets. Following implementation of the RAP, long-term emissions would result from the SVE/bioventing system, sub-slab vapor mitigation system, and from periodic monitoring and maintenance activities; however, these are expected to be negligible. Therefore, Alternative 2 would result in less than significant impacts with regard to hazards to the public or environment.

Accidental Upset or Release

Short-Term Impacts

Alternative 2 would not use or store acutely hazardous materials on-site. Materials needed for maintenance of equipment or vehicles might be stored on-site. However, these materials would be stored in appropriate storage areas and cabinets. Under Alternative 2, the RAP would be implemented and remediation activities would be similar to the project, but longer in duration. Thus the amount of diesel fuel handled on-site would be increased compared to the RP's Proposed Remedy.

Contaminated material on-site would not pose an immediate risk to health or safety at nearby sensitive uses. The total amount of AHMs handled under Alternative 2 would be greater than the project, which results in more total truck trips required for export. With additional truck trips, the likelihood of accidental release of contaminated soil during transport would also be increased. However, risk of accidental release during transport is minimal for the project. The increase in accidental release during transport under Alternative 2 would be increased, but would not result in a significant impact.

With regard to the CCPS risk assessment matrix, the possibility of accidental release during transport of AHMs would be greater than the project, but would not result in a significant impact. Therefore, implementation of the RAP under Alternative 2 would result in less than significant impacts.

Long-Term Impacts

Implementation of Alternative 2 would excavate contaminated soil and backfill with clean soil, similar to the project. As with the project, sub-slab vapor mitigation systems would be installed to keep methane levels from exceeding SSCGs. In addition sub-slab depressurization (SSD) systems would be used to keep soil vapors from entering buildings. Under Alternative 2, LNAPL removal and ground water monitoring would be performed similar to the project. The SVE/bioventing systems would also be installed similar to the project. Therefore, long-term impacts under Alternative 2 would be similar to the project and impacts would be less than significant.

Impacts to Nearby Schools

Short-Term Impacts

Under Alternative 2, remediation activities would be similar to the project on a daily basis. However, the total amount of soil excavated and duration would be increased in comparison to the project. As the amount of toxic emissions from remediation activities and exposure duration would be increased, health risk impacts to the Wilmington Middle School would be greater in comparison to the project. However, health risk impacts to the nearby school would remain below significance thresholds. Therefore, impacts to schools resulting from implementation of Alternative 2 would be less than significant.

Long-Term Impacts

Alternative 2 would implement the same long-term SVE/bioventing systems as the project. Once implementation of the RAP is complete, the installation of the SVE/bioventing systems, sub-slab vapor mitigation systems, LNAPL collection, natural attenuation groundwater recovery, would serve to prevent accidental release of contaminated material remaining on-site. During catalytic oxidation of the SVE/bioventing system, VOCs are thermally destroyed. As with the project, VOC emissions would be minimal and would not result in significant impacts to nearby school receptors. Therefore, long-term operation of Alternative 2 would not emit hazardous emissions within one-quarter mile of a school and impacts would be less than significant.

Analysis of Impacts Associated with Alternative 3 (No Excavation Beneath Hardscape - 5 Feet With Targeted 10 Feet Alternative)

Alternative 3 would not remove hardscape features or entail excavation of soils from beneath residential hardscape. As with the RP's Proposed Remedy, excavation would be to a depth of 5 feet with targeted 10-foot excavation. Because excavations would not occur beneath hardscape features and no hardscape features would be removed, less excavation of COC-containing soils and inert debris would occur over individual residential properties. Total remediation would occur over an approximately 4-year period compared to approximately 6 years under the RP's Proposed Remedy. Daily demolition and excavation volumes, truck trips, and worker commutes are anticipated to be the same as the project. This Alternative would also implement the same PDFs described above.

Hazard to Public or Environment through Transport, Use or Disposal of Hazardous Materials

Short-Term Impacts

Alternative 3 would result in a decrease in short-term TAC emissions compared to the project. This Alternative would incorporate the same PDFs the RP's Proposed Remedy, including PDFs HAZ-1 and AQ-1 through AQ-12 which would reduce short-term emissions from heavy equipment, trucks, fugitive dust and volatiles. The reduction in exposure duration (4-years vs. 6-years) would also reduce the lifetime increase in cancer risk. Therefore, impacts with regard to carcinogenic health risks would be less than significant under Alternative 3.

Long-Term Impacts

Implementation of the RAP would result in restoration of affected properties and infrastructure, including yards, landscaping, and streets. Following implementation of the RAP, long-term emissions would result from the SVE/bioventing system, sub-slab vapor mitigation system, and from periodic monitoring and maintenance activities. However, these emissions would be negligible, as under the RP's Proposed Remedy. Therefore, although Alternative 3 would result in less than significant impacts with regard to hazards to the public or environment.

Accidental Upset or Release

Short-Term Impacts

Implementation of Alternative 3 would excavate contaminated soil and backfill with clean soil, similar to the project, but in reduced amounts since excavation would not occur beneath hardscape. Removal of less impacted material would result in a decrease in the short-term risk of accidental release or upset involving hazardous materials. Therefore, Alternative 3 would result in less than significant impacts, with regard to accidental release or upset.

Long-Term Impacts

As with the project, the risk of upset or accidental release long-term would be less than significant.

Impacts to Nearby Schools

Short-Term Impacts

Under Alternative 3, remediation activities would be similar to the project. However, the amount of soil excavated and the duration would be reduced in comparison to the project. Heavy equipment activity and truck trips would be lower under Alternative 3. As the amount of toxic emissions from remediation activities and exposure duration would be reduced, health risk impacts to the Wilmington Middle School would be lower in comparison to the project, and impacts would be less than significant.

Long-Term Impacts

Alternative 3 would implement the same long-term SVE/bioventing systems as the project. Therefore, long-term operation of Alternative 3 would not emit hazardous emissions within one-quarter mile of a school and impacts would be less than significant.

5. CUMULATIVE IMPACTS

Short-Term Impacts

As described above, the project is located in an area with a slightly below average cancer risk due to regional airborne toxins. Ambient cancer risk due to regional airborne pollutants is approximately 1,090 in a million at the site and ranges from 1,087 to 1,434 in a million in the area surrounding the site. The incremental increase in cancer risk estimated in the health risk assessment resulting from short-term implementation of the RAP would be greater than one in a million with mitigation. Although the cancer risk would be greater than the threshold, based on a conservatively estimated incremental increase of less than one-half of 1

percent (~1/500) over the area-wide risk of average of 1,260 in a million, the cumulative impact with regard to cancer risk, the project would have a less than significant impact with regard to short-term impacts.

Accidental release incidents are typically based on individual incidents and would not be affected by cumulative conditions. The chance of accidental release due to transport of hazardous waste is based on vehicle miles travelled by the individual operator. Accidental release of on-site materials would also be dependent upon site conditions and would not be influenced by cumulative conditions. Therefore, the project would have no short-term cumulative impacts with regard to accidental release or upset conditions.

Long-Term Impacts

Health risk impacts from long-term implementation of the project would be minimal. Contaminated soil would be excavated and imported clean fill used to backfill the site. The SVE/bioventing, sub-slab vapor systems, LNAPL system, and groundwater natural attenuation system would be installed to collect and treat contaminated media. The SVE/bioventing and sub-slab vapor systems would prevent additional release of gases. Occasionally, maintenance vehicles would drive to the site for maintenance of the system and sampling activities. However, the number of trips would be minimal and would not result in vehicle emissions that exceed SCAQMD thresholds. Therefore, the project would have a less than significant impact with regard to long-term cumulative impacts. Accidental release incidents would also be based on site conditions and not cumulative conditions, as is the case with short-term impacts. Therefore, the project would have no long-term cumulative impacts with regard to accidental release or upset conditions.

6. MITIGATION MEASURES

The RP's Proposed Remedy, No Project Alternative, and Alternative 3 would have less than significant impacts. However, the project site may contain hot spots with elevated concentrations of volatile compounds. The following mitigation measures would help reduce impacts to Hazardous Materials. Mitigation Measure HAZ-1 would apply to the project and Alternative 2 and 3. Mitigation Measures HAZ-2, and HAZ-3 below are developed exclusively for Alternative 2.

MM HAZ-1 Due to the contribution of benzene to the incremental increase in cancer risks during implementation of the RAP, remedial activities conducted at properties with known substantial volatile emissions (benzene, vinyl chloride) impacts shall be undertaken with additional measures to control volatile TAC emissions implemented. Such measures include increased monitoring and watering of active excavation areas or foam application (i.e. Rusmar AC-565 or similar), in accordance with manufacturer recommended specifications, as needed. Increased monitoring will identify elevated releases of volatile emissions in a shorter time frame allowing for corrective measures to be taken.

MM HAZ-2 CARB certified Level 3 diesel particulate filter (DPF) shall be installed on construction equipment used during excavation activities. DPFs shall be required for construction equipment rated at 20 horsepower (hp) or higher and used on-site for 21-days or longer. Diesel particulate filters (DPFs) shall reduce off-road diesel particulate matter (DPM) emissions from each piece of off-road equipment by at least 85 percent. Equipment which needs servicing (breaks down) may be replaced with Tier 3 on a temporary basis if equipment with a DPF is not commercially available. If

replacement equipment is not equipped with a DPF, documentation must be provided to demonstrate that no commercially available equipment with a DPF is available.

MM HAZ-3 The applicant shall investigate the feasibility of requiring haul trucks to be model year 2010 and newer engines or trucks which have been retrofitted to meet model year 2010 emissions standards. Results of this feasibility investigation shall be documented and provided to the Regional Water Quality Control Board for approval prior to start of hauling activities.

7. LEVEL OF SIGNIFICANCE AFTER MITIGATION

Short-Term Impacts

Project-related cancer risk impacts would not exceed the one in one million cancer risk threshold at offsite and onsite sensitive receptors. Although the project would not result in significant impacts, Alternative 2 would exceed the cancer risk threshold of one in one million and mitigation measures would be required.

As discussed above, the project, Alternative 1 and Alternative 3 would result in less than significant impacts with regard to health risk. However, Alternative 2 would result in an exceedance of cancer risk thresholds and mitigation measures would be required. Mitigation Measures HAZ-2 and HAZ-3 are designed specifically for Alternative 2 to reduce impacts due to diesel particulate matter. Implementation of HAZ-2 would reduce DPM emissions by approximately 85 percent for equipment equipped with diesel particulate filters (DPFs). Mitigation Measure HAZ-3 would also reduce diesel emissions from haul trucks.

The use of diesel particulate filters on equipment reduce toxic emissions to the greatest extent feasible for Alternative 2 and meet the definition of T-BACT. As T-BACT is incorporated into the project, acceptable cancer risks of greater than 1 in one million but less than 10 in one million are applicable to the analysis. With implementation of HAZ-2 and HAZ-3, cancer risk impacts would remain below the 10 in one million threshold for Alternative 2 and would result in a less than significant impact with mitigation.

Although the RP's Proposed Remedy would result in a less than significant impact with regard to health risk, mitigation measures are proposed to reduce potential impacts from vinyl chloride emissions. As discussed previously, a vinyl chloride and benzene hotspot was detected at one residence. Excavation and remediation of this residence may result in elevated concentrations of vinyl chloride and benzene at nearby sensitive receptors. Thus, Mitigation Measure HAZ-1 has been designed to avoid potential impacts due to vinyl chloride emissions.

Mitigation Measure HAZ-1 would reduce emissions of benzene during excavation activities through the targeted use of foam or watering to control vinyl chloride or benzene emissions at those properties with known substantial concentrations of such chemicals. Although health risk impacts are below significance thresholds, implementation of the Mitigation Measure HAZ-1 would further reduce incremental cancer risk impacts.

Long-Term Impacts

Implementation of the RAP would result in long-term impacts to hazards and hazardous materials that would be less than significant. Therefore, no mitigation measures are required.