Section 3.4

Human Health Risk

3.4.1 Introduction

This section analyzes the proposed project's human health risk impacts, including impacts from both construction and operational activities. As part of this analysis, the section describes the general approach and methodology, regulatory framework, environmental setting, and significance criteria used to evaluate the proposed project's effects related to human health risk. Appendix R-D provides the underlying technical substantiation for this analysis.

Construction and subsequent operation of the proposed project would result in the release of toxic air contaminants (TAC), which could result in adverse health effects for humans living and working in the vicinity of the project site. Adverse health effects associated with inhalation of increased concentrations of TAC may include increased cancer risks, increased chronic (long-term) non-cancer health hazards, and increased acute (short-term) non-cancer health hazards.

The objective of this human health risk assessment (HHRA) is to assess the nature and incremental change in probability of adverse health effects as a result of project-related exposure. This analysis discloses whether implementation of the proposed project would result in significant health risks for people living and working near the project site. The same construction schedule and operations schedule noted in Chapter 2, Project Description, and analyzed in Section 3.2, Air Quality, were analyzed for human health risks.

The assessment of possible health effects associated with TAC released during construction and operations requires consideration of TAC emissions from all mobile sources, stationary sources, and construction activities, which would be affected by the proposed project.[1] There are no established acceptable ambient air standards for local concentrations of TAC; thus, HHRA impact analyses require an approach that can examine incremental health hazard risk.

Comments received in response to the NOP addressing health risk included:

- The U.S. Environmental Protection Agency (USEPA) recommends that the Draft EIR disclose direct and indirect impacts to human health, including potential cumulative risk and health effects of criteria air pollutants and air toxics resulting from the project from all exposure routes.
- The USEPA recommends that the Draft EIR qualitatively address the potential for interactive health effects of volatile organic compounds (VOC), ozone, oxides of nitrogen, diesel particulate matter (DPM), and other pollutants.

[1] Because non-airport sources would not be directly impacted by the proposed project, no modeling of non-airport sources was conducted for purposes of the baseline or future scenarios.

- A member of the public provided an oral comment via voicemail that the Draft EIR should discuss the health effects of jet fuel and aircraft emissions.

All written and oral comments received during the NOP process are provided in Appendix R-A. Comments received specific to health risk impacts associated with the proposed project are addressed within this section of the EIR.

3.4.2 General Approach and Methodology

Calculation of cancer risk, chronic non-cancer health hazards, and acute non-cancer health hazards requires an estimate of TAC concentrations in the air. Project emissions of particulate matter with an aerodynamic diameter less than 10 micrometers (PM_{10}) and VOC[2] are modeled using dispersion modeling to determine localized concentrations of these pollutants. These localized concentrations are then broken down into their constituent compounds (speciated) to determine localized concentrations of TAC. This process is performed to calculate TAC concentrations relating to 1-hour and 8-hour averaging periods, and annual averaging periods. Annual averaging periods pertain to cancer risk and chronic non-cancer health hazards, whereas 1-hour and 8-hour averaging periods pertain to acute non-cancer health hazards.

The incremental risks and hazards were developed based on the following assumptions:

- Construction emissions of TAC represented the project's incremental contribution of TAC, since no construction would occur without the proposed project. These emissions were included in the dispersion modeling of TAC discussed in Section 3.4.2.1, below, to determine the construction TAC concentrations used in the exposure assessment.

- Future incremental TAC concentrations from operations were calculated by subtracting the existing condition operational TAC concentrations from the future with proposed project operational TAC concentrations. The resulting operational incremental TAC concentrations are attributable to the proposed project and were added to the incremental construction TAC concentrations used in the exposure assessment.

3.4.2.1 Dispersion Modeling for Local Concentrations

As discussed in Section 3.2, Air Quality, project-specific emission rates, meteorological data, and geographic data were used as inputs for the air dispersion model. The model was used to estimate localized concentrations of TAC released during each year of project construction, during the baseline year of operations (2018), and during the first year of operations at project buildout (2035).

Localized concentrations of TAC were derived from modeled concentrations of PM_{10} and VOC using California Air Resources Board (CARB) speciation profiles.[3] These profiles provide an estimate of the individual elements and compounds (species) present within PM_{10} or VOC from a given source,

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[2] As discussed in Section 3.2, Air Quality, VOCs are a precursor in the formation of ozone.

[3] California Air Resources Board. Speciation Profiles Used in ARB Modeling. Available: https://www.arb.ca.gov/ei/speciate/speciate.htm.

including estimate of TAC. The complete speciation profiles are available in Appendix R-D of this EIR.

All dispersion modeling was performed using USEPA required *AERMOD 18081* and *AEDT 2d*.[4, 5]

3.4.2.2 Exposure Locations

Localized concentrations of TAC were estimated at the same project fence-line locations and identified sensitive receptors as presented in Section 3.2, Air Quality. These modeled concentrations were used to estimate change in risk of adverse health effects. The magnitude of the change in risk determines the significance of health impacts associated with the proposed project. Because fence-line locations are used to represent residents and workers that live and work at locations that are much farther from the Airport, the risk results are extremely conservative (i.e., much higher than actual exposure risks). For long-term cancer exposure, an additional set of off-site receptors were modeled.

In February 2015, the California Environmental Protection Agency (CalEPA) Office of Environmental Health Hazard Assessment (OEHHA) released an updated version of its Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.[6] This guidance recommends the use of a software program, Hot Spots Analysis and Reporting Program Version 2 (HARP2), which is developed by CARB, for calculating and presenting Health Risk Assessment (HRA) results for the Hot Spots Program. For this analysis, equations and calculation methodology from HARP2, as well as the HARP2 Risk Assessment Standalone Tool (RAST), were utilized to quantify project impacts.

3.4.2.3 Overview of Risk Assessment

As discussed above, calculation of risk is based on estimates of modeled TAC concentrations for each year of project construction, the baseline year of operations (2018), and the first year of operations at project buildout (2035). For the purpose of calculating the change in risk, for each receptor point, the change in TAC concentration resulting from implementation of the proposed project is calculated. Baseline concentrations for construction are assumed to be zero. Baseline concentrations for operations are represented by modeling the 2018 operations, such as aircraft movements, ground support equipment (GSE) activity, road traffic, and parking, which would be changed with project implementation.

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[4] The AERMOD modeling system is a steady-state 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. Additional documentation, guidance, and model source code can be freely accessed at: https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models.

[5] Aviation Environmental Design Tool (AEDT) is a software system that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences. AEDT is a comprehensive tool that provides information to Federal Aviation Administration (FAA) stakeholders on each of these specific environmental impacts. AEDT facilitates environmental review activities required under the National Environmental Policy Act (NEPA) by consolidating the modeling of these environmental impacts in a single tool. Additional documentation and guidance can be freely accessed at: https://aedt.faa.gov/.

[6] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments. February 2015. Available: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

This analysis is consistent with state guidance for performance of HHRAs; and, it was conducted in accordance with CalEPA guidance[7,8] consisting of selection of TAC of concern, exposure assessment, toxicity assessment, and risk characterization.

3.4.2.3.1 Selection of TAC of Concern

TAC of concern are those TAC identified under Assembly Bill (AB) 2588 for which the CalEPA OEHHA has developed cancer slope factors, chronic reference exposure levels (RELs), and/or acute RELs.[9] Cancer slope factors define the relationship between inhalation of TAC and risk of developing cancer. RELs define the relationship between inhalation of TAC and subsequent non-cancer health impacts. RELs are separately identified for both long- and short-term exposure durations. The resulting list of TAC of concern evaluated in this HHRA is provided in Table 3.4-1.

Table 3.4-1: Toxic Air Contaminants (TAC) of Concern for the Proposed Project

Toxic Air Contaminant	Type	Primary Source
Acetaldehyde	VOC	Diesel Exhaust
Acrolein	VOC	Aircraft Exhaust
Benzene	VOC	Gasoline Exhaust
1,3-Butadiene	VOC	Aircraft Exhaust
Ethylbenzene	VOC	Gasoline Exhaust
Formaldehyde	VOC	Aircraft and Diesel Exhaust
n-Hexane	VOC	Diesel and Gasoline Exhaust
Methyl alcohol	VOC	Aircraft Exhaust
Methyl ethyl ketone	VOC	Diesel Exhaust
Propylene	VOC	Aircraft, Gasoline, and Diesel Exhaust
Styrene	VOC	Aircraft and Gasoline Exhaust
Toluene	VOC	Gasoline Exhaust
Xylene (total)	VOC	Gasoline Exhaust
Naphthalene	PAH	Gasoline Exhaust
Arsenic	PM-Metal	Construction Dust
Cadmium	PM-Metal	Construction Dust and Diesel Exhaust
Chromium VI	PM-Metal	Aircraft Exhaust and Brake Wear

[7] The FAA does not conduct HHRA analyses in the NEPA context.

[8] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I: The Determination of Acute Reference Exposure Levels for Airborne Toxicants. March 1999. Available: https://oehha.ca.gov/air/crnr/adoption-air-toxics-hot-spots-risk-assessment-guidelines-part-i-technical-support-document; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors. Updated May 2009. Available: https://oehha.ca.gov/air/crnr/technical-support-document-cancer-potency-factors-2009; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Air Toxics Hot Spots Program Risk Assessment Guidelines, Part III: Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels. June 2008. Available: https://oehha.ca.gov/air/crnr/air-toxics-hot-spots-program-risk-assessment-guidelines-part-iii-1999; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Air Toxic Hot Spots Program Risk Assessment Guidelines, Part IV: Technical Support Document for Exposure Assessment and Stochastic Analysis. August 2012. Available: https://oehha.ca.gov/air/crnr/notice-adoption-technical-support-document-exposure-assessment-and-stochastic-analysis-aug; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments. February 2015. Available: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

[9] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Toxicity Criteria Online Database. Available: https://oehha.ca.gov/chemicals.

Table 3.4-1: Toxic Air Contaminants (TAC) of Concern for the Proposed Project

Toxic Air Contaminant	Type	Primary Source
Copper	PM-Metal	Brake Wear
Lead	PM-Metal	Construction Dust
Manganese	PM-Metal	Aircraft Exhaust, Brake Wear, and Construction Dust
Mercury	PM-Metal	Construction Dust and Diesel Exhaust
Nickel	PM-Metal	Brake Wear and Gasoline Exhaust
Selenium	PM-Metal	Brake Wear and Tire Wear
Vanadium	PM-Metal	Brake Wear and Construction Dust
Diesel PM	Diesel Exhaust	Diesel Exhaust
Chlorine	PM-Inorganics	Gasoline Exhaust
Silicon	PM-Inorganics	Construction Dust
Sulfates	PM-Inorganics	Brake Wear and Diesel Exhaust

Source: CDM Smith, August 2019.
Abbreviations:
PAH = Polycyclic aromatic hydrocarbons
PM = Particulate matter
VOC = Volatile organic compounds

3.4.2.3.2 Exposure Assessment

The following categories of sensitive receptors were identified for quantitative evaluation: residents (third trimester after conception through adulthood), residents (adult), and adult workers. These categories cover a range of exposure scenarios and include receptors that would be subject to the highest exposures of project-related TAC emissions.

Exposure to TAC can occur in several ways, known as exposure pathways. An exposure pathway is identified as: a source of TAC; a release mechanism; a means of TAC transport from the project to a receptor; and a route of exposure. For the proposed project, the primary exposure pathway consists of fuel combustion as a source of TAC, released through engine exhaust, transported across local wind patterns, and inhalation at receptor locations. Additional exposure pathways were identified and included in the total cancer risk modeling using HARP2. These exposure pathways include soil, dermal, and mother's milk. Soil exposure accounts for multipathway pollutants that eventually settle into the ground and are later introduced to humans by incidental or intentional soil ingestion. Dermal exposure accounts for pollutants absorbed through the skin and was modeled utilizing HARP2's "warm" climate setting. Mother's milk exposure is based on a child's first year of food intake and considers transference of pollutants to infants through breastfeeding. It is a product of all exposure routes (i.e., inhalation, food ingestion, dermal absorption, etc.) to the mother. These four pathways - inhalation, dermal, soil, and mother's milk - represent the OEHHA-required exposure pathways to conduct a HRA for residents when multi-pathway pollutants are involved. The OEHHA-required pathways for risk assessment for workers includes inhalation, soil, and dermal.

3.4.2.3.3 Toxicity Assessment

Toxicity criteria, evaluated by OEHHA, include acute and chronic RELs and cancer slope factors. These criteria were used in the characterization of both construction-related and operations-related acute non-cancer health hazards, chronic non-cancer health hazards, and long-term cancer risk, respectively.[10] Tables detailing the toxicity criteria used in this analysis are provided in Appendix R-D as a Consolidated Table of OEHHA-ARB Approved Risk Assessment Health Values.

When characterizing hazards associated with short-term exposure, localized concentrations of TAC are compared against acute RELs. Short-term exposure periods vary from 1-hour to 8-hour for different TAC. OEHHA's RELs are representative of the most sensitive individuals in a population and incorporate margins of safety to account for uncertainties; thus, exceeding a REL does not automatically indicate the presence of an adverse health impact.[11] Because RELs are designed to be representative of the most sensitive individuals in a population, they are representative of both resident and worker receptors.

3.4.2.3.4 Risk Characterization

Assessment of cancer risk associated with project-related TAC accounts for exposure over a 30-year period for residents, spanning the 3rd trimester of conception through age 30; a 30-year period for adult residents, spanning ages 16 through 46; and a 25-year period for off-site workers, spanning ages 16 through 40.

Due to the nature of project-related construction, the location and magnitude of construction emissions would change throughout the 15-year construction period. Construction TAC concentrations were modeled separately for each year of construction to account for this variability. Modeled risk was calculated and summed for each receptor point across each modeled year to determine total risk at each receptor point for the construction portion of receptor exposure.

Incremental operational TAC concentrations were modeled from the beginning of the construction period through 2035, which is the proposed project's final buildout year. These operational increments were added to the construction TAC increments throughout the construction period. When calculating per receptor risk for exposure periods that extend past the construction period, annual operational risk was assumed to be equivalent to the 2035 risk for each year remaining in the exposure period. Receptors for which the total impact was calculated to be maximal formed the basis for the risk estimates herein and determination of significance.

Maximally exposed individuals (MEI) estimates were land use specific. Receptors were identified as worker or residential based on the land use near the location of the receptor and the determination of whether the location would be representative of an actual resident at a geographically farther location from the project site. The modeled receptor locations are shown on Figure 3.4-1.

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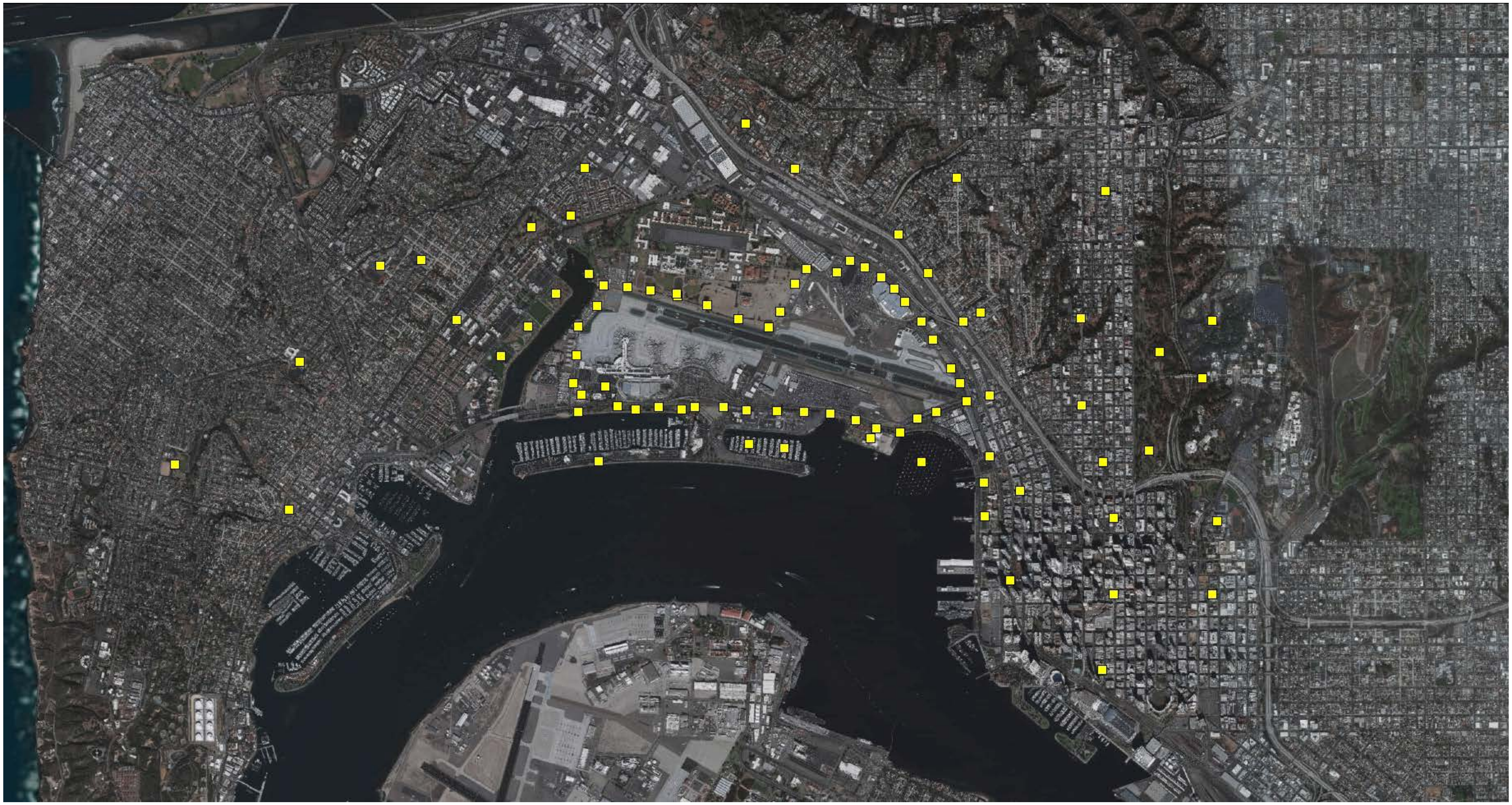
[10] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Toxicity Criteria Online Database. Available: https://oehha.ca.gov/chemicals.

[11] Margins of safety are incorporated in the development of toxicity criteria. They account for dose-response variance in individuals. For example, an equal dose of alcohol may have a greater effect on a short woman than a tall man, in part because the man in this example has a greater body mass, and in part because men and women metabolize alcohol at different rates.



Legend

Modeled Receptor Locations

Source: CDM Smith, 2019

Figure 3.4-1

MODELED RECEPTORS

Methodology for Evaluating Cancer Risks

Cancer risks were estimated by first calculating the combined construction and operational incremental annual average TAC concentrations at each modeled receptor for each year. For each receptor and each year, an approximated annual cancer potency was calculated using OEHHA propagated cancer potency values for each TAC and the corresponding TAC concentration. This step determined the relative contribution of each year's TAC emissions to individual cancer risk values. This relative contribution was, in turn, used to determine the start year of exposure such that the analysis exposure period would capture the years of maximum risk.

For 30-year residential receptors, combined construction and operation annual TAC concentrations were averaged over exposure periods corresponding to OEHHA Age Sensitivity groups:

- The first two years of the exposure period were averaged to represent annual concentrations for the 3rd trimester through two-year age group.
- The third through sixteenth years of the exposure period were averaged to represent annual concentrations for the two through sixteen years age group.
- The seventeenth through thirtieth years of the exposure period were averaged to represent annual concentrations for the 16-30 years age group.

These age group-specific TAC concentrations were used as inputs to the HARP2 RAST. Application-specific settings and sensitivity factors were utilized corresponding to the respective age group with exposure durations set corresponding to the number of years that the age group spans. The sum of the risk at each receptor across each age-group of the 30-year residential exposure duration represented the total risk. As discussed above, exposure to multi-pathway carcinogenic TAC were accounted for by utilizing RAST's soil, dermal (with warm climate setting), and mother's milk pathway options in addition to inhalation. The 95th percentile intake rate modeling method was utilized to capture risk associated with the most sensitive individuals in a population.

For receptors identified as adult residents, such as those located at nearby military installations, combined construction and operation annual TAC concentrations were averaged over the first 30-years of the maximum exposure period. These TAC concentrations were used as inputs to the HARP2 RAST. Application-specific settings and sensitivity factors were utilized corresponding to the adult resident group with exposure durations set to 30 years. Exposure to multi-pathway carcinogenic TAC were accounted for by utilizing RAST's soil and dermal (with warm climate setting) pathway options, in addition to inhalation. The 95th percentile intake rate modeling method was utilized to capture risk associated with the most sensitive individuals in a population.

For worker receptors, combined construction and operation annual TAC concentrations were averaged over the first 25-years of the maximum exposure period. These TAC concentrations were used as inputs to the HARP2 RAST. Application-specific settings and sensitivity factors were utilized corresponding to the worker group with exposure durations set to 25 years. Exposure to multi-pathway carcinogenic TAC were accounted for by utilizing RAST's soil and dermal (with warm climate setting) pathway options, in addition to inhalation. The 95th percentile intake rate modeling method was utilized to capture risk associated with the most sensitive individuals in a population.

This methodology expresses cancer risk results as the increase in an individual's risk of developing cancer. Operational cancer risk is calculated from incremental exposure, analyzing the estimated TAC concentrations at each receptor minus the corresponding operational concentrations as modeled for the existing conditions. Impacts of exposure to multiple TAC were accounted for by adding cancer risk estimates for exposure to all carcinogenic chemicals.

Methodology for Evaluating Chronic Non-Cancer Health Hazards

Chronic non-cancer health hazards were estimated by dividing TAC exposure concentrations by corresponding chronic RELs. Chronic RELs are estimates of the highest exposure level of a given TAC that would not result in adverse health effects over an annual exposure period. The ratio of a TAC's exposure concentration over its corresponding REL is the hazard quotient (HQ). A HQ greater than 1 indicates the potential for adverse health effects, whereas a HQ less than 1 indicates that adverse health effects would be unlikely. RELs are developed by OEHHA and account for the most vulnerable members of a population; thus, HQs only slightly higher than 1 are generally accepted as being associated with low risks (or even no risk) of adverse effects, and it is generally accepted that the potential for adverse effects increases as the HQ gets larger.

Exposure to multiple TAC with the potential to cause adverse chronic non-cancer health effects were accounted for by summing HQs for chemicals that would affect like target organs or tissues in the human body. This sum is the total chronic Hazard Index (HI). The chronic HI reflects the total possible chronic non-cancer health hazard increment.

Methodology for Evaluating Acute Non-Cancer Health Hazards

Acute non-cancer health hazards were estimated by dividing TAC exposure concentrations by corresponding acute RELs. Acute RELs are estimates representative of the highest exposure level of a given TAC that would not result in adverse health effects if exposure were to occur over an acute (1-hour or 8-hour) exposure period. The ratio of a TAC's exposure concentration over its corresponding REL is the HQ. A HQ greater than 1 indicates the potential for adverse health effects, whereas a HQ less than 1 indicates that adverse health effects are unlikely. RELs are developed in a conservative fashion, accounting for the most vulnerable members of a population; thus, HQs only slightly higher than 1 are generally accepted as being associated with low risks (or even no risk) of adverse effects, and it is generally accepted that the potential for adverse effects increases as the HQ gets larger.

Exposure to multiple TAC with the potential to cause adverse acute non-cancer health effects were accounted for by summing HQs for chemicals that would affect like target organs or tissues in the human body. This sum is the total acute HI. The acute HI reflects the total possible acute non-cancer health hazard increment.

Methodology for Addressing On-Site Worker Limits

California Code of Regulations Title 8, Subchapter 7, Group 16, Article 107, §5155, Airborne Contaminants, defines Cal/OSHA Permissible Exposure Limits (PELs) for multiple TAC for adult workers. These limits, detailed in Table AC-1 of that section, are established to protect on-site workers from hazardous exposure.

For each TAC of concern identified in this Recirculated Draft EIR for which Cal/OSHA PEL thresholds have been established, the maximum 8-hour modeled concentration was compared against the corresponding Cal/OSHA PEL.

Population-Based Risks

When MEI risks exceed threshold levels, CalEPA guidance indicates that population-based risks should be evaluated. A population-based assessment estimates the "cancer burden," which is equal to the sum of each individual's risk for the population in the study area. This risk sum, called cancer burden, was calculated in a manner similar to individual cancer risk, utilizing an exposure period ranging from the third trimester after conception to age 70 and corresponding age sensitivity factors and exposure parameters. The risk is calculated by utilizing census population counts for census tracts within the 1 in 1 million maximally exposed individual resident (MEIR) exposure area and multiplying the identified population counts by the average individual 70-year burden risk modeled for the tract. The sum of population-based risks in all modeled census tracts represented the total cancer burden associated with project impacts. No reductions to total burden were made to account for reduced risks in nearby census tracts.

Uncertainties

Uncertainties are unavoidable in a HHRA and include those associated with project emission estimates, dispersion modeling methodology, evaluation of receptor populations, exposure parameter assumptions, toxicity assessment, and interactions among acrolein and criteria pollutants.[12] The approach used in this HHRA uses conservative assumptions and methodologies to account for these uncertainties. This approach is appropriate for conservatively assessing the health risks associated with the proposed project.

3.4.3 Regulatory Framework

3.4.3.1 State

CARB's statewide comprehensive air toxics program was established in the early 1980s. The Toxic Air Contaminant Identification and Control Act (AB 1807) created California's program to reduce exposure to air toxics.

In September 1987, the California Legislature established the AB 2588 air toxics "Hot Spots" program. It requires facilities to report their air toxics emissions, ascertain health risks, and to notify nearby residents of significant risks. In September 1992, the "Hot Spots" Act was amended by Senate Bill 1731, which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan.

Beginning in 2000, CARB also has adopted diesel risk reduction plans and measures to reduce DPM emissions and the associated health risk. For example, CARB adopted a control measure to limit commercial heavy-duty diesel motor vehicle idling in 2004 in order to reduce public exposure to DPM and other TAC. The measure applies to diesel-fueled commercial vehicles with gross vehicle

[12] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments. February 2015. Available: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0.

weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. In general, it prohibits idling for more than 5 minutes at any location.

In addition to limiting exhaust from idling trucks, CARB promulgated emission standards for off-road diesel construction equipment such as bulldozers, loaders, backhoes, and forklifts, as well as many other self-propelled off-road diesel vehicles. Another CARB regulation that became effective in June 2008 aims to reduce emissions by installation of diesel soot filters and encouraging the replacement of older, dirtier engines with newer emission-controlled models. The regulation requires that fleets limit their unnecessary idling to 5 minutes; there are exceptions for vehicles that need to idle to perform work (such as a crane providing hydraulic power to a boom), vehicles being serviced, or in a queue waiting for work. A prohibition against acquiring certain vehicles (e.g., Tier 0 and Tier 1) began on March 1, 2009. Implementation of the fleet averaging emission standards is staggered based on fleet size, with the largest operators to begin compliance in 2014.[13]

The CalEPA provides guidance on performing a HHRA through its OEHHA publications:

- Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I: The Determination of Acute Reference Exposure Levels for Airborne Toxicants, March 1999.
- Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors, updated May 2009.
- Air Toxics Hot Spots Program Risk Assessment Guidelines, Part III: Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels, June 2008.
- Air Toxic Hot Spots Program Risk Assessment Guidelines, Part IV: Technical Support Document for Exposure Assessment and Stochastic Analysis, August 2012.
- Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, February 2015.

3.4.3.2 Regional

SDAPCD Regulation XII – Toxic Air Contaminants

The San Diego County Air Pollution Control District (SDAPCD) has jurisdiction over the air quality of the County of San Diego. Regulation XII – Toxic Air Contaminants (TAC) establishes requirements for several specific source types as well as public notification and emission reduction requirements for stationary sources that emit TAC identified under the California AB 1807 and AB 2588 statutes discussed above. Originally adopted by SDAPCD on June 12, 1996, Rule 1210 – *Toxic Air Contaminant Public Health Risks – Public Notification and Risk Reduction* established an incremental cancer risk public notification threshold of 10 in 1 million and required facility TAC emission reductions if incremental cancer risks exceeded 100 in 1 million. The rule also

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[13] California Air Resources Board. In-Use Off-Road Diesel Vehicle Regulation, Overview. Revised October 2016. Available: https://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf.

established a cancer burden risk threshold of 1.0, a total chronic non-cancer health hazard index threshold of 1.0, and a total acute non-cancer health hazard index threshold of 1.0.[14]

Supplemental Guidelines for Submissions of Air Toxics "Hot Spots" Program Health Risk Assessments

The SDAPCD has jurisdiction over the air quality of the County of San Diego. In the May 2019 *Supplemental Guidelines for Submissions of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs)*, the SDAPCD established that, if a receptor were to exceed a 10 in 1 million increase in cancer risk for an off-site MEI receptor, then a cancer burden analysis shall also be analyzed and risk isopleths (contours encircling areas of equal or greater cancer risk) shall be included in the HRA.[15]

3.4.4 Environmental Setting

3.4.4.1 Existing Health Risk in the Project Area

Adopted on October 31, 2018, the SDAPCD's *2017 Air Toxics "Hot Spots" Program Report for San Diego County*[16] uses the MEI public notification threshold for cancer risk of 10 in 1 million and public notification thresholds of 1.0 for non-cancer chronic and acute HI values. Ambient concentrations of TAC were sampled, and total ambient cancer risk was calculated at certain monitoring stations throughout the region in conjunction with the report's preparation. The monitoring station nearest to the project site is the Chula Vista air monitoring station, which shows a total ambient cancer risk of 345 in 1 million, not including DPM. While DPM cannot be measured directly, it contributes significantly to ambient cancer risk levels. Associated ambient cancer risk from DPM in California was estimated by CARB in 2012 to be approximately 520 in 1 million (down 68 percent from the 1990 risk of 1,600 in 1 million).[17]

3.4.4.1.1 Sources of Toxic Air Contaminants of Concern

Baseline sources of TAC, which would be affected by the proposed project, include both stationary and mobile sources. During operations, stationary sources consist of aircraft maintenance facilities and gates, whereas mobile sources of TAC include aircraft, GSE, and on- and off-airport vehicles. These sources generate a number of TAC of concern, including volatile organics, polycyclic aromatic hydrocarbons, metals, and other constituents. During construction, there would be no

[14] San Diego County Air Pollution Control District. Rule 1210. Toxic Air Contaminant Public Health Risks – Public Notification and Risk Reduction. As revised May 29, 2019. Available: https://www.sdapcd.org/content/dam/sdc/apcd/PDF/Rules_and_Regulations/Toxic_Air_Cotaminants/APCD_R1210.pdf.

[15] San Diego County Air Pollution Control District. Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs). May 2019. Available: https://www.sandiegocounty.gov/content/dam/sdc/apcd/PDF/Toxics_Program/APCD_Hot_Spots_Supplemental_Guidelines.pdf.

[16] San Diego County Air Pollution Control District. 2017 Air Toxics "Hot Spots" Program Report for San Diego County. October 31, 2018. Available: https://www.sandiegocounty.gov/content/dam/sdc/apcd/PDF/Toxics_Program/2017_THS_%20Report.pdf.

[17] San Diego County Air Pollution Control District. 2017 Air Toxics "Hot Spots" Program Report for San Diego County. October 31, 2018. Available: https://www.sandiegocounty.gov/content/dam/sdc/apcd/PDF/Toxics_Program/2017_THS_%20Report.pdf.

stationary sources of TAC, and mobile sources of TAC would consist of construction dust, heavy-duty construction equipment, and on- and off-airport vehicles.

3.4.4.1.2 Exposed Populations

The exposed population within the vicinity of the project site includes workers, residents, and sensitive receptors, such as schools, hospitals, and nursing facilities. The Airport is bounded to the north, east, and west by residential areas. This population includes particularly sensitive individuals such as children, the elderly, and acutely and chronically ill persons (especially those with cardio-respiratory diseases). Sensitive land uses in close proximity to the project site include the following:

- The Marine Corps Recruit Depot located approximately less than 50 feet north of the airfield.
- The United States Coast Guard Sector approximately 550 feet to the south of the airfield.
- The Sheraton Hotel & Marina located approximately 1,000 feet to the south of the airfield.
- The San Diego Harbor Police Department located approximately 325 feet to the south of the airfield.
- The Loma Portal neighborhood located approximately 3,235 feet to the northwest of the airfield.
- The Roseville – Fleetridge neighborhood located approximately 3,780 feet to the west of the airfield.
- The Bankers Hill neighborhood located approximately 1,425 feet to the east of the airfield.
- The Middletown neighborhood located approximately 1,720 feet to the northeast of the airfield.

3.4.5 Thresholds of Significance

The proposed project would result in significant impacts associated with human health risks if it would:

Impact 3.4-1 Expose receptors to significant levels of TAC.

Determinations of significance for health impacts are assessed as incremental changes in cancer risks and in non-cancer health hazards. A significant incremental impact to human health would occur if changes related to construction or operation of the proposed project would result in one or more of the following conditions:[18]

[18] The term "significant" is used as defined in CEQA and does not imply an independent judgment of the acceptability of risk or hazard.

- An increased incremental cancer risk greater than, or equal to, 10 in 1 million (10 x 10^{-6}) for potentially exposed off-site workers or residents.[19,20]
- A cancer burden greater than, or equal to 0.5 excess cancer cases in areas within the greater than 1 in 1 million zone of impact.
- An 8-hour modeled concentration of TAC, which would exceed the corresponding Cal/OSHA PEL for on-site workers.
- A total incremental chronic HI greater than, or equal to, 1 for any target organ system at any receptor location.[21]
- A total incremental acute HI greater than, or equal to, 1 for any target organ system at any receptor location.

The conditions listed above are based on SDAPCD guidance.[22] No significance threshold specific to human health risk from exposure of TAC is included in Appendix G of the State CEQA Guidelines. The significance threshold included in Section IIIc. Air Quality, of Appendix G of the State CEQA Guidelines stating "Would the project [e]xpose sensitive receptors to substantial pollutant concentrations?" is addressed in Section 3.2, Air Quality, of this EIR.

3.4.6 Project Impacts

3.4.6.1 Impact 3.4-1

Summary Conclusion for Impact 3.4-1: The proposed project would expose receptors to significant levels of toxic air contaminants. As such, and as further described below, this would be a *significant impact* for combined construction and operation.

3.4.6.1.1 Cancer Risks

The peak cancer risk associated with combined construction and operations-related TAC exposure cancer risks for MEI are presented in Table 3.4-2; supporting risk calculations are included in Appendix R-D for all receptors. As shown, combined construction and operations-related cancer risk would be significant for 30-year residents, adult residents, and off-airport adult workers.

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[19] Incremental cancer risk is defined as the difference in cancer risks between the proposed project and the baseline condition.

[20] A cancer risk threshold for CEQA has not been formally established for San Diego County. The SDCRAA has chosen to use the public notification threshold identified in SCAPCD Rule 1210 as the significant MEI incremental cancer risk threshold for this project.

[21] For purposes of this analysis, a health hazard is any non-cancer adverse impact on health. (Cancer-related risks are addressed separately in this analysis.) A chronic health hazard is a hazard caused by repeated exposure to small amounts of a TAC. An acute health hazard is a hazard caused by a single or a few exposures to relatively large amounts of a chemical. A hazard index (HI) is the sum of ratios of estimated exposures to TAC and recognized safe exposures developed by regulatory agencies.

[22] San Diego County Air Pollution Control District. Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs). May 2019. Available: https://www.sandiegocounty.gov/content/dam/sdc/apcd/PDF/Toxics_Program/APCD_Hot_Spots_Supplemental_Guidelines.pdf.

Table 3.4-2: Incremental Peak Cancer Risks for Maximally Exposed Individuals

Receptor Type	Cancer Risks[1,2,3] (per million people)	Threshold (per million people)	Exceeds Threshold?
30-Year Resident	28	10	Yes
Adult Resident, 30 years	11	10	Yes
Off Airport Adult Worker, 25 years	17	10	Yes

Source: CDM Smith, 2019.

Notes:

1. The peak cancer risk occurred for the 30-year resident MEI at the location of the nearest residential use east of the project area with an exposure period beginning in the 4th year of overlapping construction and operations (2024) and continuing through the 19th year of operations (2053).
2. The peak cancer risk occurred for the 30-year adult resident MEI at the location of the United States Coast Guard Sector south of the project area with an exposure period beginning in the 4th year of overlapping construction and operations (2024) and continuing through the 19th year of operations (2053).
3. The peak cancer risk occurred for the 25-year worker MEI at the location of commercial structures south of the project area with an exposure period beginning in the final year of overlapping construction and operations (2035) and continuing through the 25th year of operations (2059).

30-Year Resident

For the purposes of evaluating MEI cancer risk, 30-year resident risks were evaluated using representative off-site receptors. Construction of the proposed project is estimated to occur over the course of 15 years; following construction, it was assumed that residents would be exposed to operations-related TAC for the remainder of the exposure period.

Incremental MEI cancer risks are estimated to be 28 in 1 million for 30-year residents, located at a Middletown residence just east of the project area, which is above the threshold of significance of 10 in 1 million. For the MEI, DPM and Chromium VI would account for approximately 82 percent and 17 percent of the incremental cancer risk, respectively. The MEI cancer risk area for 30-year residents is shown on Figure 3.4-2.

Adult Resident

For the purposes of evaluating MEI cancer risk, adult resident risks were evaluated using representative off-site receptors. Construction of the proposed project is estimated to occur over the course of 15 years; following construction, it was assumed that residents would be exposed to operations-related TAC for the remainder of the exposure period.

Incremental MEI cancer risks are estimated to be 11 in 1 million for adult residents, located at the United States Coast Guard Sector southeast of the project area, which is above the threshold of significance of 10 in 1 million. For the MEI, DPM and Chromium VI would account for approximately 79 percent and 22 percent of the incremental cancer risk, respectively. The MEI cancer risk locations for adult residents are shown on Figure 3.4-2.

Off-Airport Adult Worker

For the purposes of evaluating MEI cancer risk, off-airport adult workers were evaluated at the fence-line and at representative off-site receptor locations. Construction of the proposed project is estimated to occur over the course of 15 years; following construction, it was assumed that off-airport adult workers would be exposed to operations-related TAC for the remainder of the exposure period.

Incremental MEI cancer risk is estimated to be 17 in 1 million for off-airport adult workers, which is above the threshold of significance of 10 in 1 million. For the MEI, DPM and Chromium VI would account for approximately 91 percent and 8 percent of the incremental cancer risk, respectively. The MEI cancer risk location for off-airport adult workers is shown on Figure 3.4-2.

3.4.6.1.2 Chronic Non-Cancer Health Hazards

Project-related chronic non-cancer hazard indices for both construction-related and operations-related TAC exposure are presented in Table 3.4-3. Incremental hazard indices are shown for the peak year of construction and the first year of operations. As shown, chronic non-cancer human health hazards would be less than significant at both resident and worker receptor locations.

Table 3.4-3: Incremental Chronic Non-Cancer Human Health Hazards for Maximally Exposed Individuals

Year	Resident HI[1]	Worker HI[1]	Significance Threshold	Exceeds Threshold?
Peak Construction Year, 2024	0.03	0.2	1	No
First Year of Buildout Operations, 2035	0.2	0.5	1	No

Source: Appendix R-D of this EIR.
Note:
1. Hazard indices are unitless.

Resident

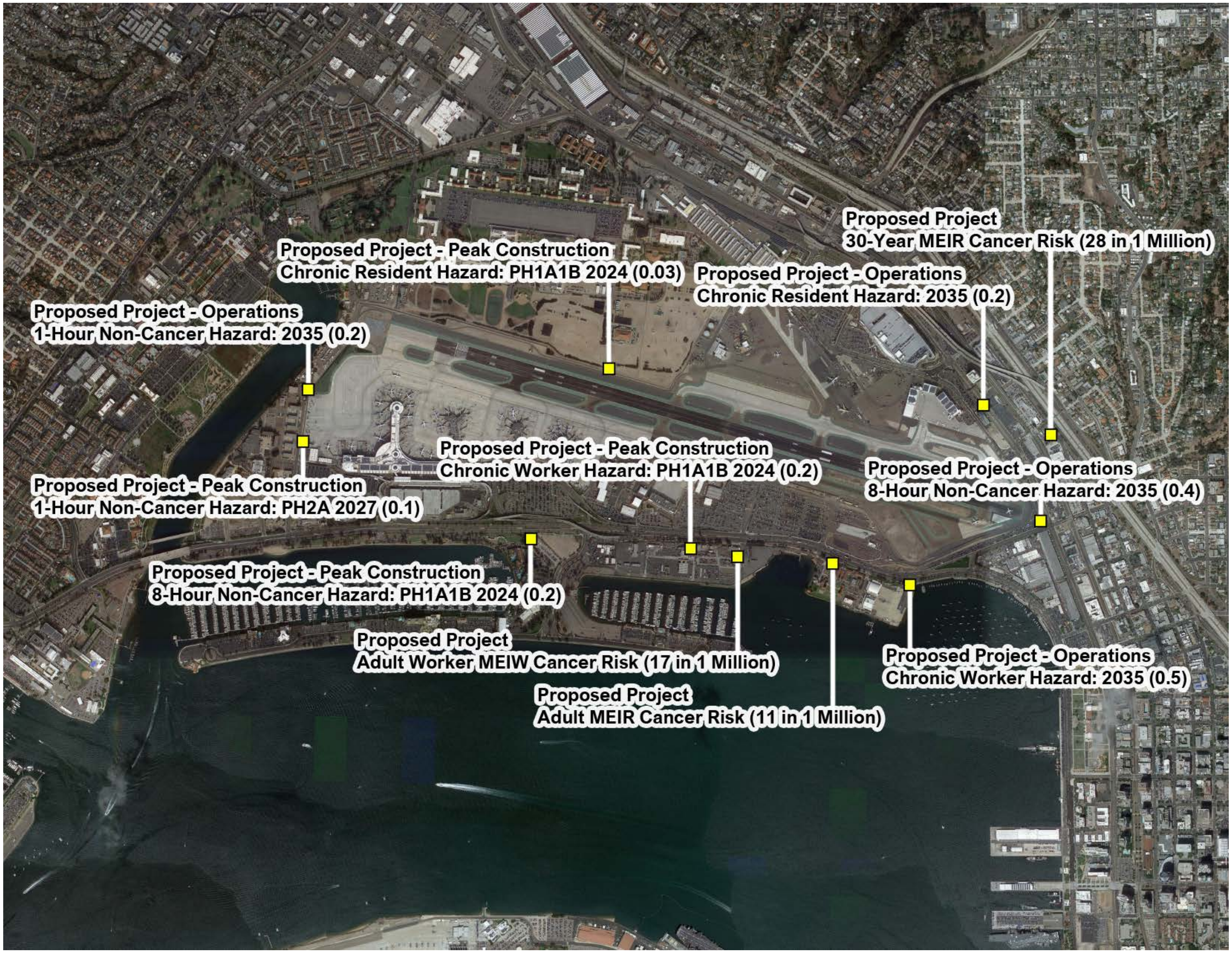
The maximum chronic non-cancer HI for a resident living at the peak hazard location across any year of construction is 0.03, projected to occur in 2024. The maximum HI for a resident living at the peak hazard location for the first year of operations is 0.2. The peak residential hazard locations for construction and for operations are shown on Figure 3.4-2. As shown in Table 3.4-3, peak incremental chronic non-cancer health hazards for 30-year residents would be below the significance threshold of 1.

Off-Airport Adult Worker

The maximum chronic non-cancer HI for an off-airport adult worker at the peak hazard location across any year of construction is 0.2, projected to occur in 2024. The maximum HI for an off-airport adult worker at the peak hazard location for the first year of operations is 0.5. The peak off-airport adult worker hazard locations for construction and for operations are shown on Figure 3.4-2. As shown in Table 3.4-3, peak incremental chronic non-cancer health hazards for off-airport adult workers would be below the significance threshold of 1.

3.4.6.1.3 Acute Non-Cancer Health Hazards

Acute non-cancer health hazards were evaluated for the modeled peak day for both construction and operations. One-hour and eight-hour exposure durations were used to represent individuals who would be exposed to project-related TAC concentrations for any period shorter than one year. All receptor locations were modeled; however, only one peak location is presented that represents both worker and resident short-term exposure.



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MEI Receptor Locations

Source: CDM Smith, 2019

Figure 3.4-2

MEI RECEPTORS

As presented in Table 3.4-4 and Table 3.4-5, the HQs for acute exposure (1-hour and 8-hour) to all TAC would be less than the threshold of 1. Each TAC affects different organs in the human body. When calculating maximum HI, a conservative screening approach is used, summing the HQ for all TAC irrespective of target organ. If the screening results are close to or exceed the HI threshold of 1, a detailed analysis is used, summing the HQs of all TAC known to affect like organ systems, and the maximum HI for any organ system is presented.

For construction-related health hazards evaluated at a 1-hour exposure period, the maximum HI was less than the threshold of 1 and no organ-system breakdown was necessary. The maximum 1-hour acute non-cancer health hazard risk is driven by benzene and formaldehyde, responsible for 18 percent and 66 percent of the maximum HI, respectively. The peak 1-hour acute non-cancer health hazard for construction is expected to occur in 2027.

For operations-related health hazards evaluated at a 1-hour exposure period, the maximum HI was less than the threshold of 1 after application of the organ-system methodology. The target organ system or tissue with the maximum HI would be the eyes. The maximum 1-hour acute non-cancer health hazard risk is driven by acrolein and formaldehyde, responsible for 75 percent and 24 percent of the maximum HI, respectively.

Table 3.4-4: Construction and Operations-Related Acute (1-Hour) Non-Cancer Health Hazards

	Acrolein HQ[1]	Arsenic HQ[1]	Nickel HQ[1]	Benzene HQ[1]	Formaldehyde HQ[1]	Total Risk HI[2]	Significance Threshold	Exceeds Threshold?
MEI (Construction)	<0.001	0.002	0.008	0.02	0.06	0.1	1	No
MEI (Operations)	0.2	<0.001	0.01	0.01	0.05	0.2[3]	1	No

Source: Appendix R-D of this EIR.

Notes:

1. Hazard indices are unitless.
2. Total risk may not add up exactly due to trace risk from unlisted pollutants.
3. Selected pollutants presented represent those with the highest individual HQs. Total Risk HI reflects the highest combined risk for pollutants which impact the same target organ systems or tissues in the human body.

For construction-related health hazards evaluated at an 8-hour exposure period, the maximum HI was less than the threshold of 1. The target organ system or tissue with the maximum HI would be the eyes. The maximum 8-hour acute non-cancer health hazard risk is driven by formaldehyde and manganese, responsible for 63 percent and 36 percent of the maximum HI, respectively. The peak 8-hour acute non-cancer health hazard for construction is expected to occur in 2024.

For operations-related health hazards evaluated at an 8-hour exposure period, the maximum HI was less than the threshold of 1. The target organ system or tissue with the maximum HI would be the eyes. The maximum 8-hour acute non-cancer health hazard risk is driven by acrolein and formaldehyde, responsible for 67 percent and 26 percent of the maximum HI, respectively.

Table 3.4-5: Construction and Operations-Related Acute (8-Hour) Non-Cancer Health Hazards

	Arsenic HQ[1]	Manganese HQ[1]	Nickel HQ[1]	Acrolein HQ[1]	Benzene HQ[1]	Formaldehyde HQ[1]	Total Risk HI[2, 3]	Significance Threshold	Exceeds Threshold?
MEI (Construction)	0.02	0.07	0.01	<0.001	0.05	0.1	0.2	1	No
MEI (Operations)	0.001	0.02	0.04	0.2	0.04	0.1	0.4	1	No

Source: Appendix R-D of this EIR.

Notes:

1. Hazard indices are unitless.
2. Total risk may not add up exactly due to trace risk from unlisted pollutants.
3. Selected Pollutants presented represent those with the highest individual HQs. Total Risk HI reflects the highest combined risk for pollutants which impact the same target organ systems or tissues in the human body.

3.4.6.1.4 Population-Based Risks

The population-based risk, when summed across all census tracts within the 1 in 1 million contour, would result in a total cancer burden of 0.6, greater than the significance threshold of 0.5.

3.4.6.1.5 On-Site Workers

On-site worker health hazards were evaluated by comparing modeled on-site concentrations for each TAC during the peak year of construction, 2024, against the corresponding Cal/OSHA PEL. As shown in Table 3.4-6, construction of the proposed project would result in on-site concentrations of TAC which would be less than the respective Cal/OSHA PEL for all TAC.

Table 3.4-6: Comparison of On-Site Worker TAC Concentrations against Cal/OSHA PEL

Toxic Air Contaminant (TAC)	Cal/OSHA PEL[1] (ug/m^3)	Maximum 8-hour On-Site TAC Concentration (ug/m^3)	Exceeds PEL?
1,3-Butadiene	2,200	0.029	No
Acetaldehyde	45,000	1.1	No
Acrolein	250	0.00000013	No
Arsenic	200	0.00061	No
Benzene	3,190	0.32	No
Cadmium	5	0.0011	No
Chlorine	1,500	0.11	No
Chromium VI	500	0.00033	No
Copper	100	0.0056	No
Formaldehyde	920	2.3	No
Lead	50	0.017	No
Manganese	200	0.029	No
Mercury	25	0.00063	No
Methyl alcohol	260,000	0.0046	No
Methyl ethyl ketone	590,000	0.23	No
Naphthalene	500	0.013	No
n-Hexane	180,000	0.024	No
Nickel	500	0.0021	No
Selenium	200	0.00012	No

Table 3.4-6: Comparison of On-Site Worker TAC Concentrations against Cal/OSHA PEL

Toxic Air Contaminant (TAC)	Cal/OSHA PEL[1] (ug/m^3)	Maximum 8-hour On-Site TAC Concentration (ug/m^3)	Exceeds PEL?
Styrene	215,000	0.0089	No
Toluene	37,000	0.23	No
Vanadium	50	0.0083	No
Xylene (total)	435,000	0.16	No

Source: Appendix R-D of this EIR.
Note:
1. Cal/OSHA PEL are permittable exposure levels for chemical contaminants for workers as detailed in the California Code of Regulations, Title 8, Section 5155, Airborne Contaminants.

3.4.6.1.6 Summary of Impacts

This analysis estimated incremental risks of adverse health effects associated with implementation of the proposed project. Cancer risk, and chronic and acute non-cancer health hazards were analyzed based on TAC dispersion modeling with results as summarized below:

- Incremental cancer risk for combined construction and operational exposure would be above the threshold of 10 in 1 million for maximally exposed 30-year residents, adult residents, and off-airport adult workers. Incremental cancer risk impacts would be ***significant***.
- Population-based cancer burden risk would result in greater than 0.5 new cases of cancer. Therefore, population-based cancer burden risk would be ***significant***.
- Incremental chronic non-cancer hazard indices for construction and operation of the proposed project would be below the threshold of 1 for maximally exposed residents and off-airport adult workers. Incremental chronic non-cancer health hazard impacts would be ***less than significant***.
- Incremental acute 1-hour non-cancer hazard indices for construction and operation of the proposed project would be below the threshold of 1 for maximally exposed residents and off-airport adult workers. Incremental acute 1-hour non-cancer health hazard impacts would be ***less than significant***.
- Incremental acute 8-hour non-cancer hazard indices for construction and operation of the proposed project would be below the threshold of 1 for maximally exposed residents and off-airport adult workers. Incremental acute 8-hour non-cancer health hazard impacts would be ***less than significant***.
- On-site concentrations of TAC during the peak year of construction would be below Cal/OSHA PEL for all TAC. Therefore, health hazards for on-site workers would be ***less than significant***.

3.4.6.1.7 Mitigation Measures

Significant impacts to cancer risk for 30-year residents, adult residents, and off-airport adult workers, and significant cancer burden impacts, would be driven by an incremental increase in DPM associated with GSE operation at the Airport. Mitigation Measure MM-AQ/GHG-1, Ground Support Equipment Conversion, would replace conventionally-fueled GSE with alternative-fueled equipment by 2024. This conversion to biodiesel, electric, renewable diesel, and natural gas would directly result in a reduction of DPM associated with GSE operation. In addition to Mitigation Measure MM-AQ/GHG-1, implementation of Mitigation Measures MM-AQ/GHG-2 through MM-AQ/GHG 10 (see Section 3.3, Greenhouse Gases and Climate Change), and MM-TDM-1 (see Section 3.14, Traffic and Circulation) would also serve to reduce TAC emissions.

3.4.6.1.8 Cancer Risk After Mitigation

The peak cancer risk associated with combined construction and operations-related TAC exposure cancer risks for MEI after mitigation are presented in Table 3.4-7; supporting risk calculations are included in Appendix R-D for all receptors. As shown, combined construction and operations-related cancer risk would be less than significant for 30-year residents, adult residents, and off-airport adult workers after mitigation.

Table 3.4-7: Incremental Peak Cancer Risks for Maximally Exposed Individuals After Mitigation

Receptor Type	Cancer Risks[1,2,3] (per million people)	Threshold (per million people)	Exceeds Threshold?
30-Year Resident	8	10	No
Adult Resident, 30 years	3	10	No
Off-Airport Adult Worker, 25 years	8	10	No

Source: CDM Smith, 2019.

Notes:

1. The peak cancer risk occurred for the 30-year resident MEI after mitigation at the location of the nearest residential use east of the project area with an exposure period beginning in the 3rd year of overlapping construction and operations (2023) and continuing through the 18th year of operations (2052).
2. The peak cancer risk occurred for the 30-year adult resident MEI after mitigation at the location of the United States Coast Guard Sector south of the project area with an exposure period beginning in the 3rd year of overlapping construction and operations (2023) and continuing through the 18th year of operations (2052).
3. The peak cancer risk occurred for the 25-year worker MEI after mitigation at the location of commercial structures south of the project area with an exposure period beginning in the 4th year of overlapping construction and operations (2024) and continuing through the 14th year of operations (2048).

30-Year Resident

For the purposes of evaluating MEI cancer risk, 30-year resident risks were evaluated using representative off-site receptors. Construction of the proposed project is estimated to occur over the course of 15 years; following construction, it was assumed that residents would be exposed to operations-related TAC for the remainder of the exposure period.

Incremental MEI cancer risks are estimated to be 8 in 1 million after mitigation for 30-year residents, located at a Middletown residence just east of the project area, which is below the threshold of significance of 10 in 1 million. For the MEI after mitigation, DPM and Chromium VI would account for approximately 45 percent and 52 percent of the incremental cancer risk, respectively. The MEI cancer risk area for 30-year residents is shown on Figure 3.4-3.

Adult Resident

For the purposes of evaluating MEI cancer risk, adult resident risks were evaluated using representative off-site receptors. Construction of the proposed project is estimated to occur over the course of 15 years; following construction, it was assumed that residents would be exposed to operations-related TAC for the remainder of the exposure period.

Incremental MEI cancer risks are estimated to be 3 in 1 million after mitigation for adult residents, located at the United States Coast Guard Sector southeast of the project area, which is below the threshold of significance of 10 in 1 million. For the MEI after mitigation, DPM, Chromium VI, and 1,3 Butadiene would account for approximately 22 percent, 60 percent, and 12 percent of the incremental cancer risk, respectively. The MEI cancer risk locations for adult residents are shown on Figure 3.4-3.

Off-Airport Adult Worker

For the purposes of evaluating MEI cancer risk, off-airport adult workers were evaluated at the fence-line and at representative off-site receptor locations. Construction of the proposed project is estimated to occur over the course of 15 years; following construction, it was assumed that off-airport adult workers would be exposed to operations-related TAC for the remainder of the exposure period.

Incremental MEI cancer risk is estimated to be 8 in 1 million after mitigation for off-airport adult workers, which is below the threshold of significance of 10 in 1 million. For the MEI after mitigation, DPM and Chromium VI would account for approximately 84 percent and 15 percent of the incremental cancer risk, respectively. The MEI cancer risk location for off-airport adult workers is shown on Figure 3.4-3.

3.4.6.1.9 Population-Based Risks After Mitigation

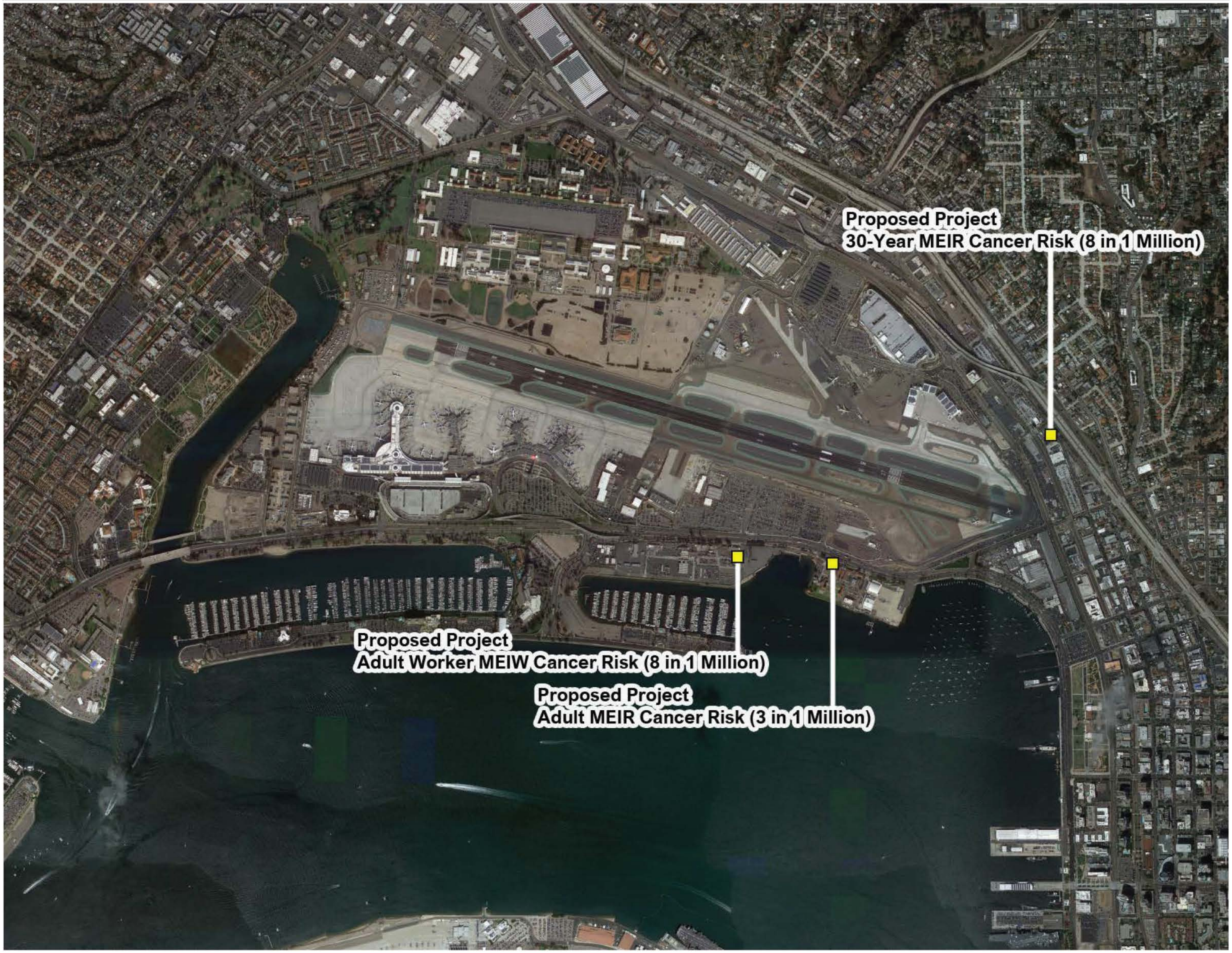
The population-based cancer burden risk, when summed across all census tracts within the 1 in 1 million contour after the application of mitigation, would result in a total cancer burden of 0.1, less than the significance threshold of 0.5.

3.4.6.1.10 Significance of Impact After Mitigation

After application of Mitigation Measure MM-AQ/GHG-1, cancer risk for 30-year residents, adult residents, and off-airport adult workers would each be reduced to levels below the significance threshold of 10 in 1 million. Additionally, the total cancer burden would be reduced to a level below the significance threshold of 0.5. Although not significant under the proposed project, 1-hour and 8-hour acute non-cancer health hazards and chronic non-cancer health hazards would be further reduced by implementation of MM-AQ/GHG-1. Therefore, implementation of the proposed project would result in a ***less than significant impact*** after mitigation relative to human health risk.

3.4.7 Summary of Impact Determinations

Table 3.4-8 summarizes the impact determinations of the proposed project related to human health risk, as described above in the detailed discussion in Section 3.4.6. Identified potential impacts are based on the significance criteria presented in Section 3.4.5, the information and data sources cited throughout Section 3.4, and the professional judgment of the report preparers, as applicable.



Legend

MEI Receptor Locations

Source: CDM Smith, 2019

Figure 3.4-3

MEI RECEPTORS AFTER MITIGATION

Table 3.4-8: Summary Matrix of Potential Impacts and Mitigation Measures Associated with the Proposed Project Related to Human Health Risk

Environmental Impacts	Impact Determination	Mitigation Measures	Impacts after Mitigation
Impact 3.4-1: The proposed project would expose receptors to significant levels of toxic air contaminants. As such, this would be a *significant impact* for combined construction and operations.	Construction: Less than Significant Operation: Significant Impact Combined Construction and Operation: Significant Impact	MM-AQ/GHG-1: Ground Support Equipment Conversion	Construction: Less than Significant Operation: Less than Significant Combined Construction and Operation: Less than Significant

3.4.7.1 Mitigation Measures

Mitigation (MM-AQ/GHG-1 in Section 3.3, Greenhouse Gases and Climate Change) is required to reduce significant human health risks associated with combined construction and operational exposure from the proposed project.

3.4.8 Significant Unavoidable Impacts

There would not be significant and unavoidable impacts to human health risk associated with construction and operation of the proposed project.