Appendix C: Air Quality and Greenhouse Gas Assessment

This page intentionally left blank.

HYATT HOTEL AIR QUALITY & GREENHOUSE GAS ASSESSMENT

Half Moon Bay, CA

July 19, 2019
Revised May 15, 2020

Prepared for:

Juliet Martin
Circlepoint
46 South First Street,
San José, CA 95113

Prepared by:

Mimi McNamara &
James A. Reyff

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality
429 East Cotati Avenue
Cotati, CA 94931
(707) 794-0400

I&R Project#: 17-129

Introduction

The purpose of this report is to address the air quality impacts and to compute the greenhouse gas (GHG) emissions associated with the Hyatt Hotel project located along Main Street in Half Moon Bay, California. The air quality impacts and GHG emissions would be associated with the construction of the new buildings and infrastructure and operation of the project. In addition, the potential construction health risk impact to nearby sensitive receptors was evaluated. This analysis addresses those issues following the guidance provided by the Bay Area Air Quality Management District (BAAQMD).

Project Description

The site is currently vacant. The project proposes to construct a 129-room hotel that would total 90,784 square feet (sf) and a 46,461-sf parking lot with 148 spaces on a 5.02 site. The project site is bordered by Main Street on the east, Highway 1 on the west, and the James Ford Automobile Dealership to the north.

Additionally, the project aims to incorporate several sustainability designs to adhere to the high-performance standards wanted by the City of Half Moon. Currently, the design strategy incorporates the prerequisites and credits required to obtain Leadership in Energy and Environmental Design (LEED) Certified Status. LEED is a third-party international green building rating system that rates the high performance of buildings and neighborhoods. LEED certification is an indicator of how sustainable a building design is. However, it should be noted that the project will not actually be seeking LEED certification due to costs. Per the design plans the project would incorporate the following measures that comply with specific parts of the LEED v4 checklist for new construction:

- Location and Transportation:
    - Develop away from the existing wetland,
    - Offer bicycle amenities,
    - Provide electric vehicle charging stations
    - Be located near a bus route.
- Sustainable Sites
    - Enhancement of the wetland area of the site,
    - Provide open space,
    - Manage surface water of the wetlands,
    - Utilize LED down lighting instead of hanging fixtures.
- Water Efficiency
    - Install low flow plumbing fixtures,
    - Use grey water for landscaping,
    - Utilize irrigation water reduction in the landscaping.
- Energy and Atmosphere
    - Install solar panel roofing,
    - Meet the Title 24 energy standards

- Materials and Resources
    - Have a construction and demolition waste management plan
    - Use products and materials where the life-cycle information is known
    - Use materials whose ingredients are inventoried using an accepted methodology and maize the generation of harmful substances
    - Use materials that have been extracted and sourced in a responsible manner.
- Indoor Environmental Quality
    - Provide desirable views,
    - Provide natural daylight,
    - Control noise,
    - Ensure comfort

Setting

The project is located in San Mateo County, which is in the San Francisco Bay Area Air Basin. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

<u>Air Pollutants of Concern</u>

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NO_X). These precursor pollutants react under certain meteorological conditions to form high ozone levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. The highest ozone levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High ozone levels aggravate respiratory and cardiovascular diseases, reduced lung function, and increase coughing and chest discomfort.

Particulate matter is another problematic air pollutant of the Bay Area. Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM_{10}) and fine particulate matter where particles have a diameter of 2.5 micrometers or less ($PM_{2.5}$). Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function growth in children.

<u>Toxic Air Contaminants</u>

Toxic air contaminants (TAC) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter [DPM] near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, State, and federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the State's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

Regulatory Agencies

CARB has adopted and implemented a number of regulations for stationary and mobile sources to reduce emissions of DPM. Several of these regulatory programs affect medium and heavy-duty diesel trucks that represent the bulk of DPM emissions from California highways. These regulations include the solid waste collection vehicle (SWCV) rule, in-use public and utility fleets, and the heavy-duty diesel truck and bus regulations. In 2008, CARB approved a new regulation to reduce emissions of DPM and nitrogen oxides from existing on-road heavy-duty diesel fueled vehicles.[1] The regulation requires affected vehicles to meet specific performance requirements between 2014 and 2023, with all affected diesel vehicles required to have 2010 model-year engines or equivalent by 2023. These requirements are phased in over the compliance period and depend on the model year of the vehicle.

The BAAQMD is the regional agency tasked with managing air quality in the region. At the State level, the CARB (a part of the California Environmental Protection Agency [EPA]) oversees regional air district activities and regulates air quality at the State level. The BAAQMD has published California Environmental Quality Act (CEQA) Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.[2] The detailed community risk modeling methodology used in this assessment is contained in *Attachment 1*.

Sensitive Receptors

There are groups of people more affected by air pollution than others. CARB has identified the following persons who are most likely to be affected by air pollution: children under 16, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, and elementary schools. The closest sensitive receptors to the project site are located at a multi-family residence east of the project site, across Main Street. There are additional residences at farther distances from the project site. The hotel would not introduce sensitive receptors to the area since the guests staying at the hotel will only be there temporarily.

[1] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: November 21, 2014.
[2] Bay Area Air Quality Management District. 2017. *BAAQMD CEQA Air Quality Guidelines*. May.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA and these significance thresholds were contained in the District's 2011 *CEQA Air Quality Guidelines*. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA. The thresholds were challenged through a series of court challenges and were mostly upheld. BAAQMD updated the *CEQA Air Quality Guidelines* in 2017 to include the latest significance thresholds that were used in this analysis are summarized in Table 1.

Table 1. Air Quality Significance Thresholds

Criteria Air Pollutant	**Construction Thresholds**	**Operational Thresholds**	
	Average Daily Emissions (lbs./day)	**Average Daily Emissions (lbs./day)**	**Annual Average Emissions (tons/year)**
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (Exhaust)	82	15
$PM_{2.5}$	54 (Exhaust)	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards	**Single Sources Within 1,000-foot Zone of Influence**	**Combined Sources (Cumulative from all sources within 1,000-foot zone of influence)**	
Excess Cancer Risk	>10.0 per one million	>100 per one million	
Hazard Index	>1.0	>10.0	
Incremental annual $PM_{2.5}$	>0.3 μg/m^3	>0.8 μg/m^3	
Greenhouse Gas Emissions			
Land Use Projects – direct and indirect emissions	Compliance with a Qualified GHG Reduction Strategy OR 1,100 metric tons annually or 4.6 metric tons per capita (for 2020) 660 metric tons annually or 2.8 metric tons per capita (for 2030)*		
Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (μm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5μm or less. GHG = greenhouse gases. *BAAQMD does not have a recommended post-2020 GHG threshold.			

Source: BAAQMD CEQA May 2017 Guidelines

Air Quality Impacts and Mitigation Measures

The Bay Area is considered a non-attainment area for ground-level ozone and $PM_{2.5}$ under both the Federal Clean Air Act and the California Clean Air Act. The area is also considered non-attainment for PM_{10} under the California Clean Air Act, but not the federal act. The area has attained both State and federal ambient air quality standards for carbon monoxide. As part of an effort to attain and maintain ambient air quality standards for ozone and PM_{10}, the BAAQMD has established thresholds of significance for these air pollutants and their precursors. These thresholds are for ozone precursor pollutants (ROG and NO_X), PM_{10}, and $PM_{2.5}$ and apply to both construction period and operational period impacts.

The California Emissions Estimator Model (CalEEMod) Version 2016.3.2 was used to estimate emissions from construction and operation of the site assuming full build-out of the project. The project land use types and size, and anticipated construction schedule were input to CalEEMod. The model output from CalEEMod is included as *Attachment 2*.

Construction Period Emissions

CalEEMod provided annual emissions for construction and estimates emissions for both on-site and off-site construction activities. On-site activities are primarily made up of construction equipment emissions, while off-site activity includes worker, hauling, and vendor traffic. The construction schedule and hauling volumes were based on information provided by the project applicant. The equipment list and usage were based on CalEEMod defaults. Additionally, the project applicant did note that the generator sets used during construction would be electrified and this change was accounted for in the CalEEMod outputs. The proposed project land uses were inputted into CalEEMod as follows: **129 rooms** and **90,784 square feet** (sf) entered as "**Hotel**", and **148 parking spaces** and **46,461-sf** entered as "**Parking Lot**". The proposed hauling volumes included 380 cubic yards of import during grading, 55 concrete round trips during building construction, and 440 cubic yards of asphalt hauled during paving. Based on the applicant construction schedule, construction was assumed to begin January 2020 and last 15 months. There were an estimated 566 construction workdays.

Summary of Computed Construction Period Emissions

Table 2 shows average daily construction emissions of ROG, NO_X, PM_{10} exhaust, and $PM_{2.5}$ exhaust during construction of the project. Average daily emissions were computed by dividing the total construction emissions by the number of construction days. The construction period emissions would not exceed the BAAQMD significance thresholds.

Table 2. Construction Period Emissions

Scenario	**ROG**	**NOx**	**PM_{10} Exhaust**	**$PM_{2.5}$ Exhaust**
Total construction emissions (tons)	0.9 tons	3.5 tons	0.17 tons	0.16 tons
Average daily emissions (pounds)[1]	3.0 lbs./day	12.2 lbs./day	0.6 lbs./day	0.6 lbs./day
BAAQMD Thresholds (pounds per day)	*54* lbs./day	*54* lbs./day	*82* lbs./day	*54* lbs./day
Exceed Threshold?	**No**	**No**	**No**	**No**
Note: [1]Assumes 566 workdays. Source: Calculations done by Illingworth & Rodkin using CalEEMod, 2019.				

However, construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less-than-significant if best management practices are implemented to reduce these emissions. *Mitigation Measure AQ-1 would implement BAAQMD-recommended best management practices*.

Mitigation Measure AQ-1: **Include measures to control dust and exhaust during construction.**

During any construction period ground disturbance, the applicant shall ensure that the project contractor implement measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less-than-significant level. Additional measures are identified to reduce construction equipment exhaust emissions. The contractor shall implement the following best management practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action

within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Effectiveness of Mitigation Measure AQ-1

The measures above are consistent with BAAQMD-recommended basic control measures for reducing fugitive particulate matter that are contained in the BAAQMD CEQA Air Quality Guidelines.

<u>Operational Period Emissions</u>

Operational air emissions from the project would be generated primarily from autos driven by future guests and employees. Evaporative emissions from architectural coatings and maintenance products (classified as consumer products) are typical emissions from these types of uses. CalEEMod was also used to estimate emissions from operation of the proposed project assuming full build-out. Note that the project site is currently vacant and there are no existing land use operational emissions.

Land Uses

The project land uses were input to CalEEMod as described above for the construction period modeling.

Model Year

Emissions associated with vehicle travel depend on the year of analysis because emission control technology requirements are phased-in over time. Therefore, the earlier the year analyzed in the model, the higher the emission rates utilized by CalEEMod. Based on construction schedule assumptions, the earliest the project could possibly be constructed and begin operating would be 2022. Emissions associated with build-out later than 2022 would be lower.

Trip Generation Rates

CalEEMod allows the user to enter specific vehicle trip generation rates, which were input to the model using the daily trip generation rate provided in the project trip generation table. The Saturday and Sunday trip rates were assumed to be the weekday rate adjusted by multiplying the ratio of the CalEEMod default rates for Saturday and Sunday trips. The project traffic analysis provided project trip generation values for the Hotel.[3] The weekday trip rate used for the hotel was 4.46 trips per room. The Saturday trip rate for the hotel changed to 4.47 trips per day and the Sunday trip rate changed to 3.25 trips per day.

EMFAC2017 Adjustment

The vehicle emission factors and fleet mix used in CalEEMod are based on EMFAC2014, which is an older CARB emission inventory for on road and off road mobile sources. Since the release

[3] Correspondence with Romi Archer, Circlepoint, May 12, 2020.

of CalEEMod Version 2016.3.2, new emission factors have been produced by CARB. EMFAC2017 became available for use in March 2018 and approved by the EPA in August 2019. It includes the latest data on California's car and truck fleets and travel activity. Additionally, CARB has recently released EMFAC off-model adjustment factors to account for the Safer Affordable Efficient (SAFE) Vehicle Rule Part one.[4] The SAFE vehicle Rule Part One revoked California's authority to set its own GHG emission standards and set zero emission vehicle mandates in California. As a result of this ruling, mobile criteria pollutant emissions would increase. Therefore, the CalEEMod vehicle emission factors and fleet mix were updated with the emission rates and fleet mix from EMFAC2017, which were adjusted with the CARB EMFAC off-model adjustment factors. On road emission rates from 2022 from San Mateo County were used (See *Attachment 3*). More details about the updates in emissions calculation methodologies and data are available in the EMFAC2017 Technical Support Document.[5]

Energy

CalEEMod defaults for energy use were used, which include the 2016 Title 24 Building Standards. Indirect emissions from electricity were computed in CalEEMod. The model has a default rate of 641.3 pounds of CO_2 per megawatt of electricity produced, which is based on PG&E's 2008 emissions rate. Peninsula Clean Energy (PCE) now provides electricity to the San Mateo County, with 50 percent renewable and 75 percent being carbon free electricity. The rate was adjusted to account for PCE's 2017 CO_2 intensity rate of 142.26 pounds of CO_2 per megawatt of electricity delivered.[6]

Emergency Generator

The project would include a 300-kilowatt emergency generator that is powered by a natural gas engine. Emissions from the testing and maintenance of the proposed generator engine were computed for a 448-horsepower natural gas engine (based on the generator engine specifications provided). The CalEEMod modeling assumed 50 hours of annual operation for testing and maintenance purposes per year.

Other Inputs

Default model assumptions for emissions associated with solid waste generation use were applied to the project. Water/wastewater use were changed to 100% aerobic conditions to represent wastewater treatment plant conditions.

---

[4] California Air Resource Board, 2019. *EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicle Rule Part One*. November. Web: https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf
[5] See CARB 2018: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-modeling-tools-emfac
[6] Correspondence with Michael Totah, Peninsula Clean Energy, April 11, 2019.

Summary of Computed Operational Period Emissions

Annual emissions were predicted using CalEEMod and daily emissions were estimating assuming 365 days of operation. As shown in Table 3, operational emissions would not exceed the BAAQMD significance thresholds. This would be considered a *less-than-significant* impact.

Table 3. Operational Emissions

Scenario	ROG	NOx	PM_{10}	$PM_{2.5}$
2021 Project Operational Emissions (*tons/year*)	0.74 tons	0.42 tons	0.40 tons	0.12 tons
BAAQMD Thresholds (tons /year)	*10 tons*	*10 tons*	*15 tons*	*10 tons*
Exceed Threshold?	No	No	No	No
2021 Project Operational Emissions (*pounds/day*)[1]	4.1 lbs.	2.3 lbs.	2.2 lbs.	0.7 lbs.
BAAQMD Thresholds (pounds/day)	*54* lbs.	*54* lbs.	*82* lbs.	*54* lbs.
Exceed Threshold?	No	No	No	No
Notes: [1] Assumes 365-day operation. Source: Calculations done by Illingworth & Rodkin using CalEEMod, 2019.				

Construction and Operational Community Health Risk Impacts

Project impacts related to increased community risk can occur either by introducing a new sensitive receptor, such as a residential use, in proximity to an existing source of TACs or by introducing a new source of TACs with the potential to adversely affect existing sensitive receptors in the project vicinity. This project would introduce a new generator to the area; however, this source would not be sources of substantial TACs or $PM_{2.5}$. In addition, temporary project construction activity would generate dust and equipment exhaust on a temporary basis that could affect nearby sensitive receptors. Community risk impacts were addressed by increased predicting lifetime cancer risk, the increase in annual $PM_{2.5}$ concentrations, and computing the Hazard Index (HI) for non-cancer health risks. The methodology for computing community risks impacts is contained in *Attachment 1*.

Project Construction Activity

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust are known as a TAC. These exhaust air pollutant emissions would not be considered to contribute substantially to existing or projected air quality violations. Construction exhaust emissions may still pose health risks for sensitive receptors such as surrounding residents. The primary community risk impact issues associated with construction emissions are cancer risk and exposure to $PM_{2.5}$. Diesel exhaust poses both a potential health and nuisance impact to nearby receptors. A health risk assessment of the project construction activities was conducted that evaluated potential health effects of sensitive receptors at these nearby residences from construction emissions of DPM and $PM_{2.5}$.[7] Dispersion modeling was conducted to predict the off-site concentrations resulting from project construction, so that lifetime cancer risks and non-cancer health effects could be evaluated.

Construction Emissions

The CalEEMod model provided total annual PM_{10} exhaust emissions (assumed to be DPM) for the off-road construction equipment and for exhaust emissions from on-road vehicles, with total emissions from all construction stages as 0.1686 tons (337 pounds). The on-road emissions are a result of haul truck travel during demolition and grading activities, worker travel, and vendor deliveries during construction. A trip length of one mile was used to represent vehicle travel while at or near the construction site. It was assumed that these emissions from on-road vehicles traveling at or near the site would occur at the construction site. Fugitive $PM_{2.5}$ dust emissions were calculated by CalEEMod as 0.0449 tons (89 pounds) for the overall construction period.

Dispersion Modeling

The U.S. EPA ISCST3 dispersion model was used to calculate concentrations of DPM and $PM_{2.5}$ at existing sensitive receptors in the vicinity of the project construction sites. The ISCST3 dispersion model is a BAAQMD-recommended model for use in modeling these types of emission activities for CEQA projects.[8] Emission sources for the construction sites were grouped

[7] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.
[8] Bay Area Air Quality Management District (BAAQMD), 2012. *Recommended Methods for Screening and Modeling Local Risks and Hazards, Version 3.0.* May.

into two categories, exhaust emissions of DPM and fugitive $PM_{2.5}$ dust emissions. For each construction area modeled at the site the dispersion modeling utilized two area sources to represent the on-site construction emissions, one for DPM exhaust emissions and the other for fugitive $PM_{2.5}$ dust emissions. For the exhaust emissions from construction equipment, an emission release height of six meters (19.7 feet) was used for the area sources. The elevated source height reflects the height of the equipment exhaust pipes plus an additional distance for the height of the exhaust plume above the exhaust pipes to account for plume rise of the exhaust gases. For modeling fugitive $PM_{2.5}$ emissions, a near-ground level release height of two meters (6.6 feet) was used for the area sources. Construction emissions were modeled as occurring daily from 7 a.m. to 4 p.m., when most of the construction activity involving equipment usage would occur.

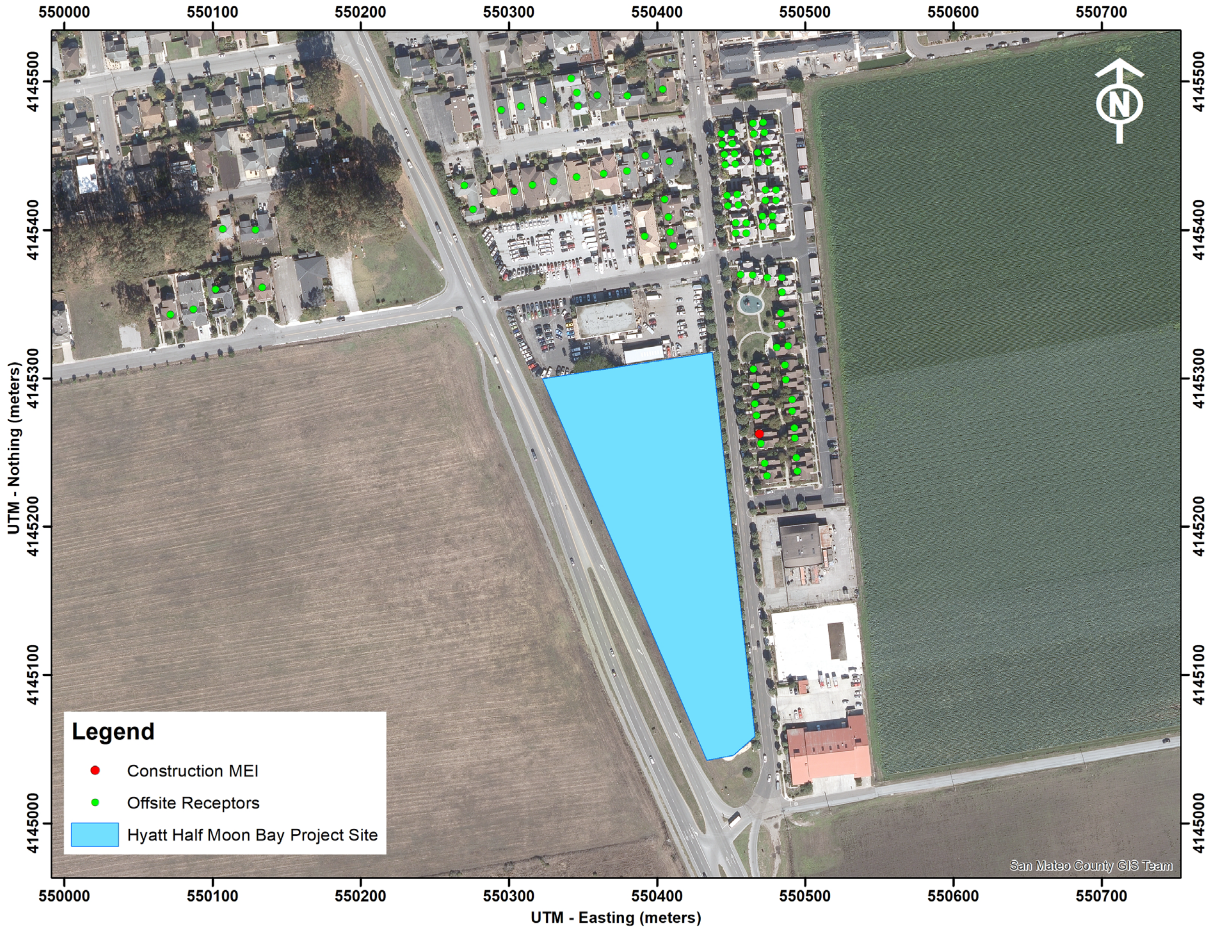
The modeling used a five-year data set (2001 - 2005) of hourly meteorological data from Fort Funston, San Francisco that was prepared by BAAQMD for use with the ISCST3 model. This is the closest meteorological monitoring station and adequately characterizes meteorological conditions for coastal areas along the San Francisco Peninsula. Annual DPM and $PM_{2.5}$ concentrations from construction activities during the construction period were calculated using the model. DPM and $PM_{2.5}$ concentrations were calculated at nearby sensitive receptors. Receptor heights of 1.5 meters (4.9 feet) were used for nearby residences.

Results of this assessment indicated that the construction maximally exposed individual (MEI) was located at a multi-family residence east from the project site across Main Street as seen in Figure 1. The maximum excess residential cancer risks at this location would be greater than the BAAQMD single-source threshold of 10 in one million Table 4 summarizes the maximum cancer risks, $PM_{2.5}$ concentrations, and health hazard indexes for project related construction activities affecting the residential MEI. *Attachment 4* to this report includes the emission calculations used for the construction area modeling and the cancer risk calculations. The cancer risk calculations are based on applying the BAAQMD recommended age sensitivity factors to the TAC concentrations. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing TACs. Third trimester, infant and adult exposures were assumed to occur at all residences through the entire construction period

Table 4. Construction Risk Impacts at the Offsite MEI

Source		**Maximum Cancer Risk (per million)**	**$PM_{2.5}$ concentration ($\mu g/m^3$)**	**Hazard Index**
Project Construction	Unmitigated	41.7 (infant)	0.17	0.03
	Mitigated	5.3 (infant)	0.03	<0.01
	BAAQMD Single-Source Threshold	***>10.0***	***>0.3***	***>1.0***
	Significant?			
	Unmitigated	***Yes***	*No*	*No*
	Mitigated	*No*	*No*	*No*
Source: Calculations done by Illingworth & Rodkin using AERMOD and health risk spreadsheets in Attachment 4, 2019.				

Figure 1. Project Construction Site and Locations of Off-Site Sensitive Receptors and TAC Impacts



<u>Project Operational Community Risk</u>

Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. When operating, the project would generate automobile traffic and infrequent truck traffic; however, these emissions are anticipated to result in low impacts in terms of TAC or $PM_{2.5}$ exposure. An emergency generator is a proposed part of the project, but it would be powered by natural gas and is assumed to have a much lesser impact compared to a diesel generator. This generator would emit TACs in low amounts that would not contribute to any health risk impacts. The hotel use would not introduce new sensitive receptors to the area since the individuals, who are temporary occupants, would not be exposed to TACs and/or $PM_{2.5}$ for extended periods that would lead to significant impacts.

Cumulative Impact on Construction MEI

Cumulative community risk impacts were addressed through an evaluation of TAC sources located within 1,000 feet of the construction MEI. These sources include freeways or highways, busy surface streets, and stationary sources identified by BAAQMD. A review of the project area indicates that Highway 1 (i.e. Cabrillo Highway) is a busy roadway that is considered sources of TACs. Other nearby streets are assumed to have less than 10,000 vehicles per day. A review of BAAQMD's stationary source Google Earth map tool identified no stationary sources within the influence area. Figure 2 shows the sources within the 1,000 feet of the proposed project. Community risk impacts from these sources upon the construction MEI are reported in Table 5. Details of the modeling and community risk calculations are included in *Attachment 5*..

Figure 2. Project Site and Nearby TAC and $PM_{2.5}$ Sources

Highway – Highway 1 (Cabrillo Highway)

BAAQMD provides a Google Earth *Highway Screening Analysis Tool* that can be used to identify screening level impacts from State highways. Highway 1 (i.e. Link 38, 6ft) risk impacts were screened using the BAAQMD *Highway Screening Analysis Tool*. The lifetime cancer risk, annual $PM_{2.5}$ exposure and non-cancer hazard index corresponding to the distance between the project and the site was used. The data were based on the project being 400-feet east of the highway. Cancer risk levels were adjusted for exposure duration, age, and new exposure guidance provided by OEHHA, as described in *Attachment 1*. Risk impacts from Highway 1 upon the MEI are listed in Table 5.

Stationary Sources

Permitted stationary sources of air pollution near the project site were identified using BAAQMD's *Stationary Source Risk & Hazard Analysis Tool*. This mapping tool uses Google Earth. No stationary sources were identified within 1,000 feet of the project using this tool.

Summary of Construction Health Risk Impacts

Table 5 reports both the project and cumulative community risk impacts. Without mitigation, the project would have a *significant* impact with respect to community risk caused by project construction activities, since the maximum cancer risk and $PM_{2.5}$ concentration exceed the single-source and the cumulative source thresholds for the maximum cancer risk and for the annual maximum $PM_{2.5}$ concentration. As shown in Table 5, these impacts would be *less-than-significant* with mitigation.

Table 5. Impacts from Combined Sources at Construction MEI

Source	Maximum Cancer Risk (per million)	$PM_{2.5}$ concentration ($\mu g/m^3$)	Hazard Index
Project Construction			
Unmitigated	41.7 (infant)	0.17	0.03
Mitigated	5.3 (infant)	0.03	<0.01
Highway 1 with project 400-ft east (BAAQMD Highway Screening Tool)	1.1	0.01	<0.01
Combined Sources			
Unmitigated	42.8 (infant)	0.18	<0.04
Mitigated	6.4(infant)	0.04	<0.02
BAAQMD Cumulative Source Threshold	***>100***	***>0.8***	***>10.0***
Significant?			
Unmitigated	*No*	*No*	*No*
Mitigated	*No*	*No*	*No*
Source: Calculations done by Illingworth & Rodkin using AERMOD, Health Risk Calculations, and BAAQMD Highway Screening tool, 2019.			

Mitigation Measure AQ-2: **Selection of equipment during construction to minimize emissions. Such equipment selection would include the following:**

The project shall develop a plan demonstrating that the off-road equipment used on-site to construct the project would achieve a fleet-wide average 80-percent reduction in DPM exhaust emissions or greater. One feasible plan to achieve this reduction would include the following:

1. All diesel-powered off-road equipment, larger than 25 horsepower, operating on the site for more than two days continuously shall, at a minimum, meet U.S. EPA particulate matter emissions standards for Tier 3 engines and this equipment shall include CARB-certified Level 3 Diesel Particulate Filters[9] or equivalent. Equipment that meets U.S. EPA Tier 4 interim standards or use of equipment that is electrically powered or uses non-diesel fuels would also meet this requirement.

2. Per the construction sheet provided by the applicant, line power shall be used to electrify generators used during construction.

Effectiveness of Mitigation AQ-2

Project construction activities were analyzed in CalEEMod with the assumption of Tier 3 equipment with level 3 diesel particulate filers per requirements of Mitigation Measure AQ-2. With mitigation included in the modeling, the computed maximum increased lifetime residential cancer risk from construction, assuming infant exposure, would be 5.3 in one million or less, the maximum annual $PM_{2.5}$ concentration would be less than 0.03 $\mu g/m^3$, and the Hazard Index would be <0.01.

[9] See http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm

Greenhouse Gases

Setting

Gases that trap heat in the atmosphere, GHGs, regulate the earth's temperature. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO_2) and water vapor but there are also several others, most importantly methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These are released into the earth's atmosphere through a variety of natural processes and human activities. Sources of GHGs are generally as follows:

- CO_2 and N_2O are byproducts of fossil fuel combustion.
- N_2O is associated with agricultural operations such as fertilization of crops.
- CH_4 is commonly created by off-gassing from agricultural practices (e.g., keeping livestock) and landfill operations.
- Chlorofluorocarbons (CFCs) were widely used as refrigerants, propellants, and cleaning solvents but their production has been stopped by international treaty.
- HFCs are now used as a substitute for CFCs in refrigeration and cooling.
- PFCs and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own potency and effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with CO_2 being assigned a value of 1 and sulfur hexafluoride being several orders of magnitude stronger. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of CO_2 equivalents (CO_2e).

An expanding body of scientific research supports the theory that global climate change is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California are adversely affected by the global warming trend. Increased precipitation and sea level rise will increase coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

Recent Regulatory Actions

Assembly Bill 32 (AB 32), California Global Warming Solutions Act (2006)

AB 32, the Global Warming Solutions Act of 2006, codified the State's GHG emissions target by directing CARB to reduce the State's global warming emissions to 1990 levels by 2020. AB 32 was signed and passed into law by Governor Schwarzenegger on September 27, 2006. Since that time, the CARB, CEC, California Public Utilities Commission (CPUC), and Building

Standards Commission have all been developing regulations that will help meet the goals of AB 32 and Executive Order S-3-05.

A Scoping Plan for AB 32 was adopted by CARB in December 2008. It contains the State's main strategies to reduce GHGs from business-as-usual emissions projected in 2020 back down to 1990 levels. Business-as-usual (BAU) is the projected emissions in 2020, including increases in emissions caused by growth, without any GHG reduction measures. The Scoping Plan has a range of GHG reduction actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system.

Senate Bill 375, California's Regional Transportation and Land Use Planning Efforts (2008)

California enacted legislation (SB 375) to expand the efforts of AB 32 by controlling indirect GHG emissions caused by urban sprawl. SB 375 provides incentives for local governments and applicants to implement new conscientiously planned growth patterns. This includes incentives for creating attractive, walkable, and sustainable communities and revitalizing existing communities. The legislation also allows applicants to bypass certain environmental reviews under CEQA if they build projects consistent with the new sustainable community strategies. Development of more alternative transportation options that would reduce vehicle trips and miles traveled, along with traffic congestion, would be encouraged. SB 375 enhances CARB's ability to reach the AB 32 goals by directing the agency in developing regional GHG emission reduction targets to be achieved from the transportation sector for 2020 and 2035. CARB works with the metropolitan planning organizations (e.g. Association of Bay Area Governments [ABAG] and Metropolitan Transportation Commission [MTC]) to align their regional transportation, housing, and land use plans to reduce vehicle miles traveled and demonstrate the region's ability to attain its GHG reduction targets. A similar process is used to reduce transportation emissions of ozone precursor pollutants in the Bay Area.

SB 350 Renewable Portfolio Standards

In September 2015, the California Legislature passed SB 350, which increases the states Renewables Portfolio Standard (RPS) for content of electrical generation from the 33 percent target for 2020 to a 50 percent renewables target by 2030.

Executive Order EO-B-30-15 (2015) and SB 32 GHG Reduction Targets

In April 2015, Governor Brown signed Executive Order which extended the goals of AB 32, setting a greenhouse gas emissions target at 40 percent of 1990 levels by 2030. On September 8, 2016, Governor Brown signed SB 32, which legislatively established the GHG reduction target of 40 percent of 1990 levels by 2030. In November 2017, CARB issued *California's 2017 Climate Change Scoping Plan*. While the State is on track to exceed the AB 32 scoping plan 2020 targets, this plan is an update to reflect the enacted SB 32 reduction target.

The new Scoping Plan establishes a strategy that will reduce GHG emissions in California to meet the 2030 target (note that the AB 32 Scoping Plan only addressed 2020 targets and a long-term goal). Key features of this plan are:

- Cap and Trade program places a firm limit on 80 percent of the State's emissions;
- Achieving a 50-percent Renewable Portfolio Standard by 2030 (currently at about 29 percent statewide);
- Increase energy efficiency in existing buildings (note that new
- Develop fuels with an 18-percent reduction in carbon intensity;
- Develop more high-density, transit-oriented housing;
- Develop walkable and bikeable communities
- Greatly increase the number of electric vehicles on the road and reduce oil demand in half;
- Increase zero-emissions transit so that 100 percent of new buses are zero emissions;
- Reduce freight-related emissions by transitioning to zero emissions where feasible and near-zero emissions with renewable fuels everywhere else; and
- Reduce "super pollutants" by reducing methane and hydrofluorocarbons or HFCs by 40 percent.

In the updated Scoping Plan, CARB recommends statewide targets of no more than 6 metric tons CO_2e per capita (statewide) by 2030 and no more than 2 metric tons CO_2e per capita by 2050. The statewide per capita targets account for all emissions sectors in the State, statewide population forecasts, and the statewide reductions necessary to achieve the 2030 statewide target under SB 32 and the longer-term State emissions reduction goal of 80 percent below 1990 levels by 2050.

Significance Thresholds

The BAAQMD's CEQA Air Quality Guidelines recommended a GHG threshold of 1,100 metric tons or 4.6 metric tons (MT) per capita. These thresholds were developed based on meeting the 2020 GHG targets set in the scoping plan that addressed AB 32. Development of the project would occur in 2020. Although BAAQMD has not published a quantified threshold for 2030 yet, this assessment uses a "Substantial Progress" efficiency metric of 2.6 MT CO_2e/year/service population and a bright-line threshold of 660 MT CO_{2e}/year based on the GHG reduction goals of EO B-30-15. The 2030 bright-line threshold is a 40 percent reduction of the 2020 1,100 MT CO_{2e}/year threshold, which reflects the goal of SB 32.

GHG emissions associated with development of the proposed project would occur over the short-term from construction activities, consisting primarily of emissions from equipment exhaust and worker and vendor trips. There would also be long-term operational emissions associated with vehicular traffic within the project vicinity, energy and water usage, and solid waste disposal. Emissions for the proposed project are discussed below and were analyzed using the methodology recommended in the BAAQMD CEQA Air Quality Guidelines.

CalEEMod Modeling

CalEEMod was used to predict GHG emissions from operation of the site assuming full build-out of the project. The project land use types and size and other project-specific information were input to the model, as described above. CalEEMod output is included in *Attachment 2*.

Sustainability Measures

Additionally, several energy and water conservation mitigation measures were applied to the model, based on the design standards provided by the applicant. As stated in the Project Description, the project plans to incorporate design strategies that comply with the LEED Project Checklist for New Construction.

The project will include glass solar panels equivalent to two LEED points and these panels would generate approximately three percent of the electricity used on-site based on LEED renewable energy production point system.[10] The project will install high-efficiency lighting throughout the site (i.e. LED lighting fixtures). A VRF heating / Air Conditioning System may also be incorporated into the project and would result in an average of 39-percent in energy savings compared to conventional HVAC systems. Additionally, the project will use grey water for outdoor landscaping, install low-flow plumbing fixtures, and use water-efficient irrigation systems. This sustainability measures were applied to the CalEEMod model and are reflected in the GHG emissions in Table 6.

Construction GHG Emissions

GHG emissions associated with construction were computed to be 493 MT of CO_2e for the total construction period. These are the emissions from on-site operation of construction equipment, vendor and hauling truck trips, and worker trips. Neither the City nor BAAQMD have an adopted threshold of significance for construction related GHG emissions, though BAAQMD recommends quantifying emissions and disclosing that GHG emissions would occur during construction. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable.

---

[10] https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-healthca-15

Operational GHG Emissions

The CalEEMod model, along with the project vehicle trip generation rates, was used to estimate daily emissions associated with operation of the fully developed site under the proposed project. To be considered an exceedance of the threshold, the project must exceed the threshold for metric tons per year in the opening and future year. Emissions from both years must be below the threshold.

As shown in Table 6, annual emissions resulting from operation of the proposed project are predicted to be 609 MT of CO_2e in the year 2022 and 548 MT of CO_{2e} in the year 2030. The project would not exceed the 660 MT CO_2e/year bright line threshold in either the opening or future years. Therefore, the project's GHG emissions would not be an exceedance. This would be considered a *less-than-significant* impact.

Table 6. Annual Project GHG Emissions (CO_2e) in Metric Tons

Source Category	Proposed Project in 2022	Proposed Project in 2030
Area	<1	<1
Energy Consumption	207	207
Mobile	363	302
Solid Waste Generation	35	35
Water Usage	3	3
Total	**609**	**548**
Significance Threshold	*660 MT CO_2e/year*	
Significant?	***No***	***No***
Source: Calculations done by Illingworth & Rodkin using CalEEMod, 2020		

Supporting Documentation

Attachment 1 is the methodology used to compute community risk impacts, including the methods to compute increased cancer risk from exposure to project emissions.

Attachment 2 includes the CalEEMod output for project construction and operation period emissions and GHG emissions. Also included are any modeling assumptions.

Attachment 3 includes the EMFAC2017 emissions modeling. The input files for these calculations are voluminous and are available upon request in digital format.

Attachment 4 is the health risk assessment. This includes the summary of the dispersion modeling and the cancer risk calculations for construction and operation. The AERMOD dispersion modeling files for this assessment, which are quite voluminous, are available upon request and would be provided in digital format.

Attachment 5 includes the screening community risk calculations from sources affecting the MEI.

Attachment 1: Health Risk Calculation Methodology

A health risk assessment (HRA) for exposure to Toxic Air Contaminates (TACs) requires the application of a risk characterization model to the results from the air dispersion model to estimate potential health risk at each sensitive receptor location. The State of California Office of Environmental Health Hazard Assessment (OEHHA) and California Air Resources Board (CARB) develop recommended methods for conducting health risk assessments. The most recent OEHHA risk assessment guidelines were published in February of 2015.[11] These guidelines incorporate substantial changes designed to provide for enhanced protection of children, as required by State law, compared to previous published risk assessment guidelines. CARB has provided additional guidance on implementing OEHHA's recommended methods.[12] This HRA used the 2015 OEHHA risk assessment guidelines and CARB guidance. The BAAQMD has adopted recommended procedures for applying the newest OEHHA guidelines as part of Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants.[13] Exposure parameters from the OEHHA guidelines and the recent BAAQMD HRA Guidelines were used in this evaluation.

Cancer Risk

Potential increased cancer risk from inhalation of TACs are calculated based on the TAC concentration over the period of exposure, inhalation dose, the TAC cancer potency factor, and an age sensitivity factor to reflect the greater sensitivity of infants and children to cancer causing TACs. The inhalation dose depends on a person's breathing rate, exposure time and frequency and duration of exposure. These parameters vary depending on the age, or age range, of the persons being exposed and whether the exposure is considered to occur at a residential location or other sensitive receptor location.

The current OEHHA guidance recommends that cancer risk be calculated by age groups to account for different breathing rates and sensitivity to TACs. Specifically, they recommend evaluating risks for the third trimester of pregnancy to age zero, ages zero to less than two (infant exposure), ages two to less than 16 (child exposure), and ages 16 to 70 (adult exposure). Age sensitivity factors (ASFs) associated with the different types of exposure are an ASF of 10 for the third trimester and infant exposures, an ASF of 3 for a child exposure, and an ASF of 1 for an adult exposure. Also associated with each exposure type are different breathing rates, expressed as liters per kilogram of body weight per day (L/kg-day). As recommended by the BAAQMD for residential exposures, 95th percentile breathing rates are used for the third trimester and infant exposures, and 80th percentile breathing rates for child and adult exposures. For children at schools and daycare facilities, BAAQMD recommends using the 95th percentile breathing rates. Additionally, CARB and the BAAQMD recommend the use of a residential exposure duration of 30 years for sources with long-term emissions (e.g., roadways). For workers, assumed to be adults, a 25-year exposure period is recommended by the BAAQMD.

---

[11] OEHHA, 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. February.
[12] CARB, 2015. *Risk Management Guidance for Stationary Sources of Air Toxics*. July 23.
[13] BAAQMD, 2016. *BAAQMD Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines*. December 2016.

Under previous OEHHA and BAAQMD HRA guidance, residential receptors are assumed to be at their home 24 hours a day, or 100 percent of the time. In the 2015 Risk Assessment Guidance, OEHHA includes adjustments to exposure duration to account for the fraction of time at home (FAH), which can be less than 100 percent of the time, based on updated population and activity statistics. The FAH factors are age-specific and are: 0.85 for third trimester of pregnancy to less than 2 years old, 0.72 for ages 2 to less than 16 years, and 0.73 for ages 16 to 70 years. Use of the FAH factors is allowed by the BAAQMD if there are no schools in the project vicinity that would have a cancer risk of one in a million or greater assuming 100 percent exposure (FAH = 1.0).

Functionally, cancer risk is calculated using the following parameters and formulas:

Cancer Risk (per million) = $CPF \times Inhalation\ Dose \times ASF \times ED/AT \times FAH \times 10^6$

Where:

CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Inhalation Dose = $C_{air} \times DBR \times A \times (EF/365) \times 10^{-6}$

Where:

C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

The health risk parameters used in this evaluation are summarized as follows:

Parameter	***Exposure Type →***	**Infant**		**Child**		**Adult**
	Age Range →	**3rd Trimester**	**0<2**	**2 < 9**	**2 < 16**	**16 - 30**
DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$		1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
Daily Breathing Rate (L/kg-day) 80th Percentile Rate		273	758	631	572	261
Daily Breathing Rate (L/kg-day) 95th Percentile Rate		361	1,090	861	745	335
Inhalation Absorption Factor		1	1	1	1	1
Averaging Time (years)		70	70	70	70	70
Exposure Duration (years)		0.25	2	14	14	14
Exposure Frequency (days/year)		350	350	350	350	350
Age Sensitivity Factor		10	10	3	3	1
Fraction of Time at Home		0.85-1.0	0.85-1.0	0.72-1.0	0.72-1.0	0.73

Non-Cancer Hazards

Potential non-cancer health hazards from TAC exposure are expressed in terms of a hazard index (HI), which is the ratio of the TAC concentration to a reference exposure level (REL). OEHHA has defined acceptable concentration levels for contaminants that pose non-cancer health hazards. TAC concentrations below the REL are not expected to cause adverse health impacts, even for sensitive individuals. The total HI is calculated as the sum of the HIs for each TAC evaluated and the total HI is compared to the BAAQMD significance thresholds to determine whether a significant non-cancer health impact from a project would occur.

Typically, for residential projects located near roadways with substantial TAC emissions, the primary TAC of concern with non-cancer health effects is diesel particulate matter (DPM). For DPM, the chronic inhalation REL is 5 micrograms per cubic meter ($\mu g/m^3$).

Annual $PM_{2.5}$ Concentrations

While not a TAC, fine particulate matter ($PM_{2.5}$) has been identified by the BAAQMD as a pollutant with potential non-cancer health effects that should be included when evaluating potential community health impacts under the California Environmental Quality Act (CEQA). The thresholds of significance for $PM_{2.5}$ (project level and cumulative) are in terms of an increase in the annual average concentration. When considering $PM_{2.5}$ impacts, the contribution from all sources of $PM_{2.5}$ emissions should be included. For projects with potential impacts from nearby local roadways, the $PM_{2.5}$ impacts should include those from vehicle exhaust emissions, $PM_{2.5}$ generated from vehicle tire and brake wear, and fugitive emissions from re-suspended dust on the roads.

Attachment 2: CalEEMod Modeling Output

Attachment 3: EMFAC2017 Inputs for Operation Mobile Emissions

Attachment 4: Construction Health Risk Calculations

Hyatt Hotel, Half Moon Bay, CA

DPM Emissions and Modeling Emission Rates - Unmitigated

Emissions Model Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2020	Construction	0.0579	DPM	115.8	0.03525	4.44E-03	20,241	**2.19E-07**
2021	Construction	0.1107	DPM	221.4	0.06740	8.49E-03	20,241	**4.20E-07**
Total		***0.1686***		***337.2***	***0.1026***	***0.0129***		

Operation Hours

hr/day = 9 (7am - 4pm)

days/yr = 365

hours/year = 3285

PM2.5 Fugitive Dust Emissions for Modeling - Unmitigated

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	PM2.5 Emissions (lb/yr)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (g/s)	Modeled Area (m^2)	PM2.5 Emission Rate $g/s/m^2$
2020	Construction	FUG	0.0425	85.0	0.02588	3.26E-03	20,241	**1.61E-07**
2021	Construction	FUG	0.0024	4.7	0.00144	1.81E-04	20,241	**8.94E-09**
Total			***0.0449***	***89.7***	***0.0273***	***0.0034***		

Operation Hours

hr/day = 9 (7am - 4pm)

days/yr = 365

hours/year = 3285

DPM Construction Emissions and Modeling Emission Rates - With Mitigation

Emissions Model Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	(lb/hr)	(g/s)	Modeled Area (m²)	DPM Emission Rate (g/s/m²)
2020	Construction	0.0064	DPM	12.7	0.00387	4.87E-04	20,241	**2.41E-08**
2021	Construction	0.0150	DPM	30.0	0.00913	1.15E-03	20,241	**5.68E-08**
Total		***0.0214***		***42.7***	***0.0130***	***0.0016***		

Operation Hours

hr/day = 9 (7am - 4pm)

days/yr = 365

hours/year = 3285

PM2.5 Fugitive Dust Construction Emissions for Modeling - With Mitigation

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	(lb/yr)	(lb/hr)	(g/s)	Modeled Area (m²)	PM2.5 Emission Rate g/s/m²
2020	Construction	FUG	0.0102	20.4	0.00621	7.82E-04	20,241	**3.87E-08**
2021	Construction	FUG	0.0024	4.7	0.00144	1.81E-04	20,241	**8.94E-09**
Total			***0.0126***	***25.1***	***0.0076***	***0.0010***		

Operation Hours

hr/day = 9 (7am - 4pm)

days/yr = 365

hours/year = 3285

Hyatt Hotel, Half Moon Bay, CA
Construction Health Impacts Summary

Maximum Impacts at Construction MEI Location - Unmitigated

Emissions Year	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM10/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2020	0.0844	0.0783	15.07	0.24	0.017	0.16
2021	0.1619	0.0044	26.60	0.46	0.032	0.17
Total	-	-	**41.7**	**0.7**	-	-
Maximum	0.1619	0.0783	**-**	**-**	**0.032**	**0.17**

Maximum Impacts at Construction MEI Location - With Mitigation

Emissions Year	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM10/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2020	0.0093	0.0188	1.66	0.03	0.002	0.03
2021	0.0219	0.0044	3.60	0.06	0.004	0.03
Total	-	-	**5.3**	**0.1**	-	-
Maximum	0.0219	0.0188	**-**	**-**	**0.004**	**0.03**

Hyatt Hotel, Half Moon Bay, CA - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Impacts at Off-Site Receptors-1.5 meter receptor height

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Frac 0

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child				Adult
Age -->	3rd Trimester	0 - 2	2 - 9	2 - 16	16 - 30
Parameter					
ASF =	10	10	3	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	631	572	261
A =	1	1	1	1	1
EF =	350	350	350	350	350
AT =	70	70	70	70	70
FAH =	1.00	1.00	1.00	1.00	0.73

* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Exposure Year	Exposure Duration (years)	Age	Infant/Child - Exposure Informatio DPM Conc (ug/m3) Year	Annual	Age Sensitivity Factor	Infant/Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Annual	Age Sensitivity Factor	Adult Cancer Risk (per million)	Hazard Index	Fugitive PM2.5	Total PM2.5
0	0.25	-0.25 - 0*	2020	0.0844	10	1.20	2020	0.0844	-	-			
1	1	0 - 1	2020	0.0844	10	13.87	2020	0.0844	1	0.24	0.017	0.0783	0.163
2	1	1 - 2	2021	0.1619	10	26.60	2021	0.1619	1	0.46	0.032	0.0044	0.166
3	1	2 - 3		0.0000	3	0.00		0.0000	1	0.00			
4	1	3 - 4		0.0000	3	0.00		0.0000	1	0.00			
5	1	4 - 5		0.0000	3	0.00		0.0000	1	0.00			
6	1	5 - 6		0.0000	3	0.00		0.0000	1	0.00			
7	1	6 - 7		0.0000	3	0.00		0.0000	1	0.00			
8	1	7 - 8		0.0000	3	0.00		0.0000	1	0.00			
9	1	8 - 9		0.0000	3	0.00		0.0000	1	0.00			
10	1	9 - 10		0.0000	3	0.00		0.0000	1	0.00			
11	1	10 - 11		0.0000	3	0.00		0.0000	1	0.00			
12	1	11 - 12		0.0000	3	0.00		0.0000	1	0.00			
13	1	12 - 13		0.0000	3	0.00		0.0000	1	0.00			
14	1	13 - 14		0.0000	3	0.00		0.0000	1	0.00			
15	1	14 - 15		0.0000	3	0.00		0.0000	1	0.00			
16	1	15 - 16		0.0000	3	0.00		0.0000	1	0.00			
17	1	16-17		0.0000	1	0.00		0.0000	1	0.00			
18	1	17-18		0.0000	1	0.00		0.0000	1	0.00			
19	1	18-19		0.0000	1	0.00		0.0000	1	0.00			
20	1	19-20		0.0000	1	0.00		0.0000	1	0.00			
21	1	20-21		0.0000	1	0.00		0.0000	1	0.00			
22	1	21-22		0.0000	1	0.00		0.0000	1	0.00			
23	1	22-23		0.0000	1	0.00		0.0000	1	0.00			
24	1	23-24		0.0000	1	0.00		0.0000	1	0.00			
25	1	24-25		0.0000	1	0.00		0.0000	1	0.00			
26	1	25-26		0.0000	1	0.00		0.0000	1	0.00			
27	1	26-27		0.0000	1	0.00		0.0000	1	0.00			
28	1	27-28		0.0000	1	0.00		0.0000	1	0.00			
29	1	28-29		0.0000	1	0.00		0.0000	1	0.00			
30	1	29-30		0.0000	1	0.00		0.0000	1	0.00			
Total Increased Cancer Risk						**41.7**				**0.71**			

* Third trimester of pregnancy

Hyatt Hotel, Half Moon Bay, CA - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Impacts at Off-Site Receptors-1.5 meter

Cancer Risk (per million) = CPF x Inhalation Dose x ASF x ED/AT x FAH x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for specified age group
ED = Exposure duration (years)
AT = Averaging time for lifetime cancer risk (years)
FAH = Frac 0

Inhalation Dose = C_{air} x DBR x A x (EF/365) x 10^{-6}

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
10^{-6} = Conversion factor

Values

	Infant/Child				Adult
Age -->	**3rd Trimester**	**0 - 2**	**2 - 9**	**2 - 16**	**16 - 30**
Parameter					
ASF =	10	10	3	3	1
CPF =	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
DBR* =	361	1090	631	572	261
A =	1	1	1	1	1
EF =	350	350	350	350	350
AT =	70	70	70	70	70
FAH =	1.00	1.00	1.00	1.00	0.73

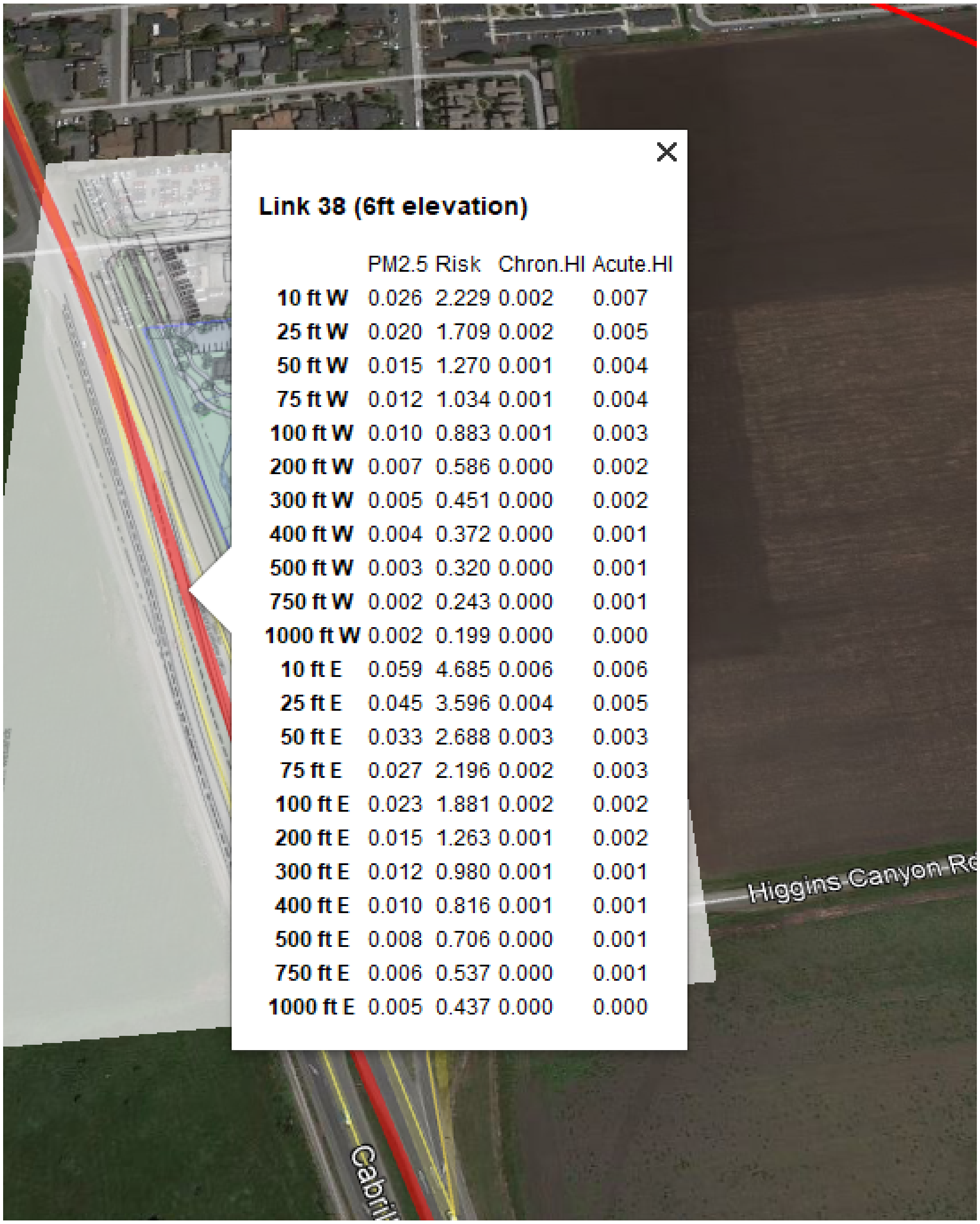
* 95th percentile breathing rates for infants and 80th percentile for children and adults

Construction Cancer Risk by Year - Maximum Impact Receptor Location

			Infant/Child - Exposure Information			Infant/Child	Adult - Exposure Information			Adult			
	Exposure				Age	Cancer	Modeled		Age	Cancer			
Exposure	Duration		DPM Conc (ug/m3)		Sensitivity	Risk	DPM Conc (ug/m3)		Sensitivity	Risk	Hazard	Fugitive	Total
Year	(years)	Age	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)	Index	PM2.5	PM2.5
0	0.25	-0.25 - 0*	2020	0.0093	10	0.13	2020	0.0093	-	-			
1	1	0 - 1	2020	0.0093	10	1.53	2020	0.0093	1	0.03	0.002	0.0188	0.028
2	1	1 - 2	2021	0.0219	10	3.60	2021	0.0219	1	0.06	0.004	0.0044	0.026
3	1	2 - 3		0.0000	3	0.00		0.0000	1	0.00			
4	1	3 - 4		0.0000	3	0.00		0.0000	1	0.00	**0.00**	**0.02**	**0.03**
5	1	4 - 5		0.0000	3	0.00		0.0000	1	0.00			
6	1	5 - 6		0.0000	3	0.00		0.0000	1	0.00			
7	1	6 - 7		0.0000	3	0.00		0.0000	1	0.00			
8	1	7 - 8		0.0000	3	0.00		0.0000	1	0.00			
9	1	8 - 9		0.0000	3	0.00		0.0000	1	0.00			
10	1	9 - 10		0.0000	3	0.00		0.0000	1	0.00			
11	1	10 - 11		0.0000	3	0.00		0.0000	1	0.00			
12	1	11 - 12		0.0000	3	0.00		0.0000	1	0.00			
13	1	12 - 13		0.0000	3	0.00		0.0000	1	0.00			
14	1	13 - 14		0.0000	3	0.00		0.0000	1	0.00			
15	1	14 - 15		0.0000	3	0.00		0.0000	1	0.00			
16	1	15 - 16		0.0000	3	0.00		0.0000	1	0.00			
17	1	16-17		0.0000	1	0.00		0.0000	1	0.00			
18	1	17-18		0.0000	1	0.00		0.0000	1	0.00			
19	1	18-19		0.0000	1	0.00		0.0000	1	0.00			
20	1	19-20		0.0000	1	0.00		0.0000	1	0.00			
21	1	20-21		0.0000	1	0.00		0.0000	1	0.00			
22	1	21-22		0.0000	1	0.00		0.0000	1	0.00			
23	1	22-23		0.0000	1	0.00		0.0000	1	0.00			
24	1	23-24		0.0000	1	0.00		0.0000	1	0.00			
25	1	24-25		0.0000	1	0.00		0.0000	1	0.00			
26	1	25-26		0.0000	1	0.00		0.0000	1	0.00			
27	1	26-27		0.0000	1	0.00		0.0000	1	0.00			
28	1	27-28		0.0000	1	0.00		0.0000	1	0.00			
29	1	28-29		0.0000	1	0.00		0.0000	1	0.00			
30	1	29-30		0.0000	1	0.00		0.0000	1	0.00			
Total Increased Cancer Risk						**5.3**				**0.09**			

* Third trimester of pregnancy

Attachment 5: Screening Community Risk Calculations



Link 38 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.026	2.229	0.002	0.007
25 ft W	0.020	1.709	0.002	0.005
50 ft W	0.015	1.270	0.001	0.004
75 ft W	0.012	1.034	0.001	0.004
100 ft W	0.010	0.883	0.001	0.003
200 ft W	0.007	0.586	0.000	0.002
300 ft W	0.005	0.451	0.000	0.002
400 ft W	0.004	0.372	0.000	0.001
500 ft W	0.003	0.320	0.000	0.001
750 ft W	0.002	0.243	0.000	0.001
1000 ft W	0.002	0.199	0.000	0.000
10 ft E	0.059	4.685	0.006	0.006
25 ft E	0.045	3.596	0.004	0.005
50 ft E	0.033	2.688	0.003	0.003
75 ft E	0.027	2.196	0.002	0.003
100 ft E	0.023	1.881	0.002	0.002
200 ft E	0.015	1.263	0.001	0.002
300 ft E	0.012	0.980	0.001	0.001
400 ft E	0.010	0.816	0.001	0.001
500 ft E	0.008	0.706	0.000	0.001
750 ft E	0.006	0.537	0.000	0.001
1000 ft E	0.005	0.437	0.000	0.000