SILVER DOLLAR MIXED-USE PROJECT AIR QUALITY AND GHG ASSESSMENT

Union City, California

August 29, 2018

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I&R Job No.:18-131

Introduction

This report presents the results of the construction health risk and greenhouse has (GHG) emissions analysis completed for the proposed Silver Dollar Mixed-Use project located at 31063 Watkins Street in Union City, California. The project would demolish the existing vacant building, a duplex building, and a single-family home on the approximately 0.89-acre site. The project would then construct a three-story mixed-use development consisting of 19 multi-family residential units and approximately 6,943 square feet of ground-floor retail use. The project would also construct six, three-story townhome units for a total of 25 dwelling units. The project proposes to provide a total of 54 on-site parking spaces. Air pollutant and GHG emissions associated with construction and operation of the project were modeled. This analysis addresses those issues following the guidance provided by the Bay Area Air Quality Management District (BAAQMD).

Setting

The project is located in Alameda 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 ($PM_{2.5}$).

Toxic Air Contaminants

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.

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 CEQA Air Quality Guidelines that are used in this assessment to evaluate air quality impacts of projects.[2]

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 receptor to the project site are the adjacent residents to the northern boundary. There are additional residences further out, surrounding the site. There is also an elementary school and middle school to the east of the site. The project would introduce sensitive receptors in the form of new residences.

Significance Thresholds

The Bay Area Air Quality Management District (BAAQMD) identified significance thresholds for exposure to TACs and $PM_{2.5}$ as part of its May 2011 CEQA Air Quality Guidelines. The following are the significance criteria that are used to judge this project's impacts:

Single Source Impacts

If emissions of TACs or $PM_{2.5}$ exceed any of the thresholds of significance listed below, the proposed project would result in a significant impact and mitigation would be required.

- An excess cancer risk level of more than 10.0 in 1 million, or a non-cancer (chronic or acute) hazard index greater than 1.0.
- An incremental increase of more than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$.

Cumulative Source Impacts

A project would have a cumulatively considerable impact if the aggregate total of all past, present, and foreseeable future sources within a 1,000-foot radius of the fence line of a source or from the location of a receptor, plus the contribution from the project, exceeds the following thresholds:

[1] Available online: http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm. Accessed: November 21, 2014.
[2] Bay Area Air Quality Management District. 2011. *BAAQMD CEQA Air Quality Guidelines*. May.

- An excess cancer risk levels of more than 100 in one million or a chronic non-cancer hazard index (from all local sources) greater than 10.0.
- An incremental increase of more than 0.8 $\mu g/m^3$ annual average $PM_{2.5}$.

Project Construction Activity

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known 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 $PM_{2.5}$.[3] The closest sensitive receptor to the project site are the adjacent residents to the northern boundary. There are additional residences further out, surrounding the site. There is also an elementary school and middle school to the east of the site.

Construction activity is anticipated to include demolition, grading and site preparation, trenching, building construction, and paving. Construction period emissions were modeled using the California Emissions Estimator Model, Version 2016.3.2 (CalEEMod). The anticipated construction schedule and equipment usage assumptions were provided for this modeling. The proposed project land uses were input into CalEEMod, which included 19 dwelling units and 28,179 sf entered as "Apartments Mid Rise", 6,943 sf entered as "Strip Mall", 6 dwelling units entered as "Condo/Townhouse High Rise," and 54 spaces entered as "Parking Lot" on a 0.89-acre site. In addition, 96 tons of demolition debris and 200 cubic yards (cy) of grading import and export were entered into the model. Construction period emissions were modeled using CalEEMod along with the anticipated project construction activity. The number and types of construction equipment and diesel vehicles, along with the anticipated length of their use for different phases of construction, were based on a CalEEMod default construction schedule.

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 of 0.0352 tons (70 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 1 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 0.00101 tons (2 pounds) for the overall construction period.

[3] DPM is identified by California as a toxic air contaminant due to the potential to cause cancer.

Qualitative Construction Analysis

Given the close proximity of sensitive receptors to the project site, the construction activities are considered to result in potentially significant impacts in terms of excess cancer risk to any infants present or increased annual PM2.5 concentrations caused by construction equipment and traffic exhaust and fugitive dust. There are measures available that would reduce these emissions and result in less than significant impacts.

Mitigation Measure 1: **Include basic 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. 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.

***Mitigation Measure 2*: The project shall use equipment that has low DPM or zero emissions, implementing the following measures:**

1. All mobile diesel-powered off-road equipment larger than 25 horsepower and operating on the site for more than two days shall meet, at a minimum, U.S. EPA particulate matter emissions standards for Tier 2 engines that include particulate matter emissions control equivalent to CARB Level 3 verifiable diesel emission control devices (VDECs) that altogether achieve an 85 percent reduction in particulate matter exhaust; alternatively (or in combination) use of alternatively-fueled or electric equipment (i.e., non-diesel).
2. Avoid diesel generator use by supplying line power to the construction site and limiting the use of diesel generators to no more than 50 total hours.

3. Avoid staging of construction equipment near portions of the site that are adjacent to residences.

Effectiveness of Mitigation

Implementation of Mitigation Measure 1 is considered to reduce exhaust emissions by 5 percent. Implementation of Mitigation Measure 2 would further reduce on-site diesel exhaust emissions by about 85 percent. This would reduce the cancer risk proportionally, such that the mitigated risk would be effectively controlled. After implementation of these mitigation measures, the project would have a *less-than-significant* impact with respect to community risk caused by construction activities.

Greenhouse Gas Emissions

Greenhouse gas emissions (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.

Union City Climate Action Plan

The Union City Climate Action Plan (CAP) is a strategy tool that includes goal and actions, to help reduce the city's share of GHG emissions[4]. The CAP was adopted by the City Council in

[4] City of Union City, California (2010). *Union City Climate Action Plan November 2010.* https://www.unioncity.org/DocumentCenter/View/708/Union-City-Climate-Action-Plan-PDF?bidId=

October 2010 and is aligned with the City Council's goal of reducing GHG emissions 20% below 2005 levels by the year 2020.

The operational year for this project is anticipated to begin in 2021 and projected future GHG emission levels are targeted for the BAAQMD 2030 thresholds. Therefore, the Union City CAP 2020 GHG reduction measures were not included within this GHG analysis.

Emission-Based Significance Thresholds

The BAAQMD's CEQA Air Quality Guidelines recommended a GHG threshold of 1,100 metric tons or 4.6 metric tons 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 beyond 2020, so a threshold that addresses a future target is appropriate. 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 service population metric of 2.6 is calculated for 2030 based on the 1990 inventory and the projected 2030 statewide population and employment levels.[5] The 2030 bright-line threshold is a 40 percent reduction of the 2020 1,100 MT CO_{2e}/year threshold.

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 1*.

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. The earliest the project could possibly be constructed and begin operating would be 2021. Emissions associated with build-out later than 2021 would be lower.

Trip Generation Rates

The default trip rates, trip lengths, and trip types specified by CalEEMod were used.

[5] Association of Environmental Professionals, 2016. *Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California*. April.

Energy

CalEEMod defaults for energy use were used, which include the 2016 Title 24 Building Standards. GHG emissions modeling includes those indirect emissions from electricity consumption. The electricity produced emission rate was modified in CalEEMod. CalEEMod has a default emission factor of 641.3 pounds of CO_2 per megawatt of electricity produced, which is based on PG&E's 2008 emissions rate. PG&E published 2015 emissions rates for 2009 through 2015, which showed the emission rate for delivered electricity had been reduced to 405 pounds CO_2 per megawatt of electricity delivered.[6] The projected GHG intensity factor for the year 2020 is 290 pounds of CO_2 per megawatt of electricity produced, which was input to the model.[7]

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. In the Area sources input, hearth use was changed to eliminate all wood fireplaces and stoves and the natural gas fireplaces was increased to include the number wood burning fireplaces.

Existing Uses

A CalEEMod model run was developed to computed emissions from use of the existing building as if it was operating in 2021. Inputs for this modeling scenario included 1 dwelling unit entered as "Single Family Housing", 2 dwelling units entered as "Condo/Townhouse", 1,409 sf entered as "High Turnover (Sit Down Restaurant)", and 0.30 acres entered as "Parking Lot". These inputs were applied to the modeling in the same manner described for the proposed project.

Service Population Emissions

The project service population efficiency rate is based on the number of future residents. The applicant provided the number of future residences and employees for the project site, which included 68 residences and 15 employees. The total future service population for the project site would be 83.

Construction Emissions

GHG emissions associated with construction were computed to be 84 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

[6] PG&E 2017. Climate Change. See http://www.pgecorp.com/corp_responsibility/reports/2017/en02_climate_change.html accessed March 13, 2018.
[7] PG&E. 2015. Greenhouse Gas Emission Factors: Guidance for PG&E Customers See: https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

emissions during construction where feasible and applicable. Best management practices assumed to be incorporated into construction of the proposed project include but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials.

Operational 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. The project would be operational after 2020, so the future 2030 emissions were used for this analysis. The 2020 CO_{2e} significance thresholds, though, are also shown as a comparison.

In 2030, as shown in Table 4, annual emissions resulting from operation of the proposed project are predicted to be 352 MT of CO_2e. The annual emissions from operation of the existing buildings are computed as 62 MT of CO_2e. The net emissions resulting from the project would be 290 MT of CO_2e. These emissions would not exceed the 2030 "Substantial Progress" threshold of 660 MT CO_{2e}/year.

Table 4. Annual Project GHG Emissions (CO_2e) in Metric Tons

Source Category	Existing	Proposed Project in 2021	Proposed Project in 2030
Area	< 1	1	1
Energy Consumption	25	39	38
Mobile	33	365	300
Solid Waste Generation	2	9	9
Water Usage	< 1	3	3
Total	62	417	352
Net New Emissions		355	290
BAAQMD 2020 Significance Threshold		***1,100 MT CO_2e/yr***	**-**
2030 Substantial Progress Threshold		-	***660 MT of CO_{2e}/yaer***
Service Population Emissions		5.0	3.5
Significance Threshold		***4.6 in 2020***	***2.6 in 2030***

Attachment 1: CalEEMod Modeling Outputs for Construction and GHG